



In memoriam Nikola Tesla
(1856–1943)

teslaconference.com

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7. Joint report by NEF and The 40 Foundation

About Nikola Tesla

Nikola Tesla

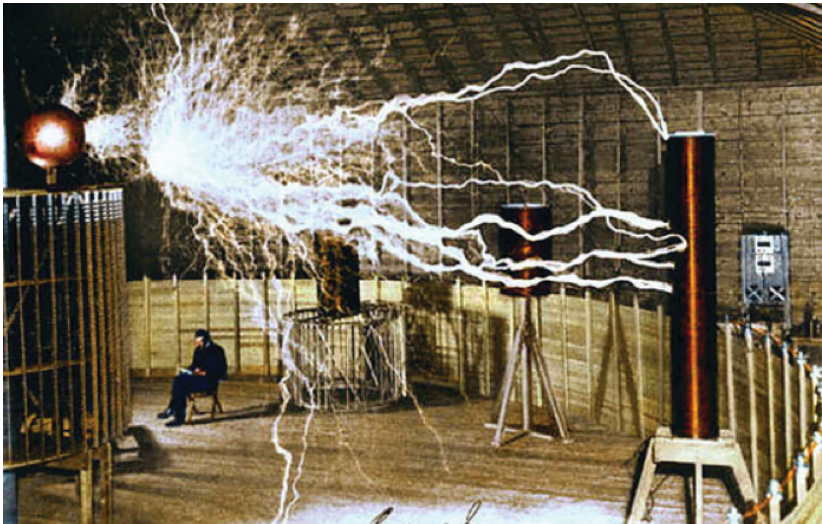
Nikola Tesla was a Serbian-American inventor, physicist, mechanical engineer, electrical engineer, and futurist. He was an important contributor to the use of commercial electricity, and is best known for developing the modern alternating current electrical supply system. His many revolutionary developments in the field of electromagnetism in the late 19th and early 20th centuries were based on the theories of electromagnetic technology discovered by Michael Faraday. Tesla's patents and theoretical work also formed the basis of wireless communication and the radio.



Born in the village of Smiljan (now part of Croatia), Tesla was a subject of the Austrian Empire by birth and later became an American citizen. Because of his 1894 demonstration of short range wireless communication through radio and his eventual victory in the "War of Currents", he was widely respected as one of the greatest electrical engineers who worked in America. He pioneered modern electrical engineering and many of his discoveries were of groundbreaking importance. In the United States during this time, Tesla's fame rivaled that of any other inventor or scientist in history or popular culture. Tesla demonstrated wireless energy transfer to power electronic devices in 1891, and aspired to intercontinental

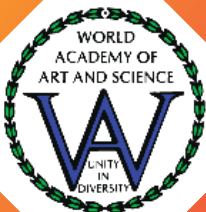
wireless transmission of industrial power in his unfinished Wardenclyffe Tower project.

Towards the end of his life in the 1930's Tesla became reclusive, living alone in New York.



Tesla's work fell into relative obscurity after his death but since the 1990s his reputation has experienced a popular culture comeback. The SI unit measuring magnetic field B, the Tesla, was named in his honor (at the CGPM, Paris, 1960).

Conference Program



human
and resources
economic
system



Tentative Program (Please mention that this program can be changed)

Tuesday, 10th of July 2012 (DAY I)

9:00

ISTC Registration opened

10:00-16:00

Poster-session

16:15-16:30

Opening: Hares Youssef (founder of The 40 Foundation), Anelka Viskovic (Deputy Major of the City of Split)

16:30-17:00

Setting the Scene

Prof. Raoul Weiler "Civilisation in Danger? In Search for a New World Vision"

17:00-17:30

Setting the Scene

Prof. Momir Djurovic "Energy vs Power" (title TBC)

17:30-18:00

Opening Keynote Speech

Prof. Ivo Slaus "Need for an alternative monetary system? - Pros. and Cons."

18:00-19:00

Drinks reception

Wednesday, 11th of July 2012 (DAY II)

9:00-10:30

Stream:

Alternative monetary systems

Stream:

Energy Currency

Bart Klein Ikink *"Natural Money"*

Jeff Beller and Susan Caumont
"Human energy renewable measure"

Prof. Jem Bendell and Matthew Slater *"Helping Sustainable Currencies to Scale: Strategic Insights from Current Practice"*

Steivan Defilla
"Metrological Aspects of an Energy-Based Currency System"

Christophe Place
"Impact Assessment of Economic and Monetary Innovations for their Financing and Improvement"

Peter Etherden and Anton Pinschof *"The Energy of Human Sovereignty"*

10:30-10:40

Break

10:40-12:15

Trond Andresen *"A recipe for a country to gradually and possibly exit from the Eurozone through a parallel emergency currency realised via the mobile phone network"*

Marusa Freire *"Smart social money for inclusive and sustainable finance"*

Prof. Margrit Kennedy *"Our Concept Of Money Used To Rule The World - With the use of new concepts we can rule money?"*

12:15-13:30

Lunch

13:30-14:30

Prof. Michael Hudson *"Money is Not Enough: It is necessary to write down debts"*

Prof. Christian Arnsperger *"Money, energy, and sustainability: Could social and sustainable banking, public money creation, and complementary currencies be combined for a better future?"*

14:30-14:40

Break

14:45-16:30

Hazel Henderson (via video link) *"Ethics of Finance"*

Ellen Brown *"Sustainable Money for a Sustainable Economy"*

Prof. Erich Hoedl *"Critical View"* (Title TBC)

16:45-18:00

Panel Discussion: *Do we need an alternative monetary system?*

questions of the Conference Declaration to be addressed:

- *Is money creation really in national hands?*
- *Which scale is optimal for currency: local, national, global or sectoral?*
- *Can modern technology enhance the efficiency of the monetary system?*

(Incl. Prof. Momir Djurovic, Dr. Joan Majo, Prof. Ivo Slaus)

Moderator Prof. Erich Hoedl

19:00

Sightseeing tour around Split

Thursday, 12th of July 2012 (DAY III)

9:00-10:15

Stream:

Alternative monetary systems

Stream:

Energy Currency

Graham Barnes

"The Lot of the Currency Designer"

John Erik Meyer

"The Perfect Currency"

Joel Thompson

"Combining Natural Savings and Parallel Planting in Kenya: a green currency to support indigenous forest stewardship"

Malcolm Greenstuart

(via video link)

"Cosmic Accounting, Monergetics, Watt-Up"

Dr. Warren Coats

"Real SDR Currency Board"

Jim Rogers

"The Power Economy"

10:15-10:30

Break

10:30-12:30

Pat Conaty *"Historical perspective"* (title TBC)

Prof. Richard Werner *"Where does money come from?"*

Dr. Shann Turnbull *"Money based on nature's laws"*

Nick Gogerty and Joseph Zitoli *"DeKo: An electricity-backed currency proposal"*

12:30-13:30

Lunch

13:30-14:15

Tony Greenham *"Revitalizing our economies through community currencies: creating a sane monetary system"*

Dr. Sgouris Sgouridis *"A Masdar City case study"* (Title TBC)

14:15-14:30

Break

14:30-16:00

Dr. Jeffrey Eisen *"Whole Systems Economics. Going Beyond Energy-backed Currency to Consciousness-backed Culture"* (via video link)

Prof. Mark T. Brown and Dr. Sergio Ulgiati *"Emergy and Economy: reflections on a resource based currency"*

Josh Ryan-Collins and Ludwig Shuster *"Energising Money"* (Joint report by NEF and The 40 Foundation)

16:00-17:00

Panel Discussion: *Energy Currency*

questions of the Conference Declaration to be addressed:

- *Do these approaches offer hope for the Euro?*
- *What are the best examples to benchmark?*
- *What steps should political decision makers take to implement the new currency model?*

(Incl. Prof. Erich Hoedl, Prof. Momir Djurovic, Prof. Raoul Weiler, Prof. Ivo Slaus) Moderator Dr. Joan Majo

17:00-17:15

Adoption of ISTC declaration

17:15-17:30

Closing

Hares Youssef (*founder of The 40 Foundation*)

Dr. Gilbert Fayl (*President of The Global Round Table*)

Keynote Speakers



Ivo Šlaus

http://en.wikipedia.org/wiki/Ivo_Šlaus

Prof. Ivo Šlaus, President of the World Academy of Art and Science and President of its South-East European Division, Member of the board of the Club of Rome and member of The Pugwash Council; European Leadership Network member; Dean of the University College for International Affairs and Diplomacy; professor of physics. Author of many publications and books, among which are "Few

body research – summary", "Building the knowledge-based society - case study South East Europe", "A Project on The Wealth of Nations Revisited", "Indicators of Economic Progress: The Power of Measurement and Human Welfare".



Richard Andreas Werner

http://en.wikipedia.org/wiki/Richard_Werner

He is noted as a monetary and development economist. He proposed the term quantitative easing, as well as the expression "QE2" referring to the need to implement true quantitative easing as an expansion in credit creation. Werner was chief economist of Jardine Fleming.

Werner is currently teaching at the University of Southampton. He is not-

ed for developing a heterodox theory of money creation called the Credit Theory of Money. He is the founding director of the university's Centre for Banking, Finance and Sustainable Development and organiser of the European Conference on Banking and the Economy (ECOBATE), first held on 29 September 2011 in Winchester Guildhall, with Lord Adair Turner, FSA Chairman, as the keynote speaker.

Since 2011, Werner has been a member of the ECB Shadow Council. Werner's book *Princes of the Yen* was a number one bestseller in Japan in 2001. The book covers the monetary policy of the Bank of Japan specifically and the central bank informal guidance of bank credit in general.



Michael Hudson

[http://en.wikipedia.org/wiki/Michael_Hudson_\(economist\)](http://en.wikipedia.org/wiki/Michael_Hudson_(economist))

Michael Hudson is a research professor of economics at University of Missouri, Kansas City, and a research associate at the Levy Economics Institute of Bard College. He is a former Wall Street analyst and consultant as well as president of the Institute for the Study of Long-term Economic Trends and a founding member of International Scholars Conference on

Ancient Near Eastern Economies (ISCANEE).

Professor Hudson received his Ph.D. in economics from New York University in 1968. He served as Chief Economic Advisor for Dennis Kucinich's 2008 presidential campaign and holds the same position in Kucinich's Congressional campaign. He has been economic advisor to the Icelandic, Chinese, Latvian, U.S., Canadian, and Mexican governments, to the United Nations Institute for Training and Research. For Scudder, Stevens & Clark in 1990, he established the world's first Third World sovereign debt fund, which became the second best performing international fund in 1991.

Hudson is the author of such books as "Super Imperialism: The Economic Strategy of American Empire", "Global Fracture: The New International Economic order", "Super Imperialism - New Edition: The Origin and Fundamentals of U.S. World Dominance".



Mark T. Brown

<http://www.ees.ufl.edu/homepp/brown/>

Mark T. Brown is Professor in Environmental Engineering Sciences and directs the programs in Systems Ecology and Ecological Engineering. From 1980 until 2006 he was a research scientist and Associate Program Director with the University of Florida's Howard T. Odum Center for Wetlands. In the spring of 2006 he was appointed Director of the Center for Environmental Policy.

His research has centered on three areas that can be broadly described as natural resource management, including systems ecology, ecological engineering, ecological economics, environmental planning, environmental policy, and wetlands ecology. He has served as consultant on environmental issues to the EPA, USAID, Governments of Mexico, Brazil, Thailand, Papua New Guinea, Venezuela, and numerous private consulting firms world-wide. For six years he was consulting ecologist to The Cousteau Society working with their research teams to develop appropriate solutions to a wide array of resource management problems that affect marine resources throughout the world.



Christian Arnsperger

http://fr.wikipedia.org/wiki/Christian_Arnsperger

Christian Arnsperger is a German economist, doctor of economic sciences at the Catholic University of Louvain and Master of Research at FNRS. The main spheres of his research are the epistemology of economics, the anthropological implications of economic growth and the

transition from capitalism to post-capitalism.

Among his main publications are "Éthique économique et sociale" (2003), "Critical political economy: Complexity, rationality, and the logic of post-orthodox pluralism" (2008), "Éthique de l'existence post-capitaliste - Pour un militantisme existentiel" (2009), "Full-spectrum economics: Toward an inclusive and emancipatory social science" (2010).



Hazel Henderson

http://en.wikipedia.org/wiki/Hazel_Henderson

Hazel Henderson is a world renowned futurist, economic iconoclast, a worldwide syndicated columnist, consultant on sustainable development, and author of The Axiom and Nautilus award-winning book Ethical Markets: Growing the Green Economy. Her other books include Building A Win-Win World, Beyond Globalization, and Planetary Citizenship.

Hazel Henderson also co-edited, with Harlan Cleveland and Inge Kaul, The United Nations: Policy and Financing Alternatives. Hazel Henderson's editorials appear in 27 languages and in 200 newspapers. Her articles have appeared in over 250 journals. Hazel Henderson's books are translated into German, Spanish, Japanese, Dutch, Swedish, Korean, Portuguese and Chinese.

She sits on several editorial boards, including Futures Research Quarterly, The State of the Future Report, and E/The Environmental Magazine (USA), Resurgence and Foresight and Futures (UK). Hazel Henderson has been concerned with finding the unexplored areas in standard economics and the "blind spots" of conventional economists. Most of Hazel Henderson's work relates to the creation of an interdisciplinary economic and political theory with a focus on environmental and social concerns.



Ellen Brown

http://en.wikipedia.org/wiki/Ellen_Brown

Ellen Brown developed her research skills as an attorney practicing civil litigation in Los Angeles. In *Web of Debt*, her latest book, she turns those skills to an analysis of the Federal Reserve and "the money trust." She shows how this private cartel has usurped the power to create money from the people themselves, and how we the people can get it back.

Ellen has written nearly 100 articles on this subject since *Web of Debt* was first published, and is the inspiration and thought leader behind the Public Banking Institute, where she serves as Chairman and President. She has degrees from UC Berkeley and UCLA School of Law. Brown developed an interest in the developing world and its problems while living abroad for eleven years in Kenya, Honduras, Guatemala and Nicaragua.

She returned to practicing law when she was asked to join the legal team of a popular Tijuana healer with an innovative cancer therapy, who was targeted by the chemotherapy industry in the 1990s. That experience produced her book *Forbidden Medicine*, which traces the suppression of natural health treatments to the same corrupting influences that have captured the money system.



Margrit Kennedy

http://en.wikipedia.org/wiki/Margrit_Kennedy

Prof. Dr. Margrit Kennedy is an architect, an ecologist, a financial expert and a critic of the prevailing economic system. As a professor she headed the department of Technological Advancement and Resource Efficient Construction at the University of Hannover's architecture school. As early as 1982 she recognized that the broader application of ecological principals was

inhibited by fundamental flaws in the monetary system, especially the consistent need for economic growth resulting from interest and compound interest. Her most famous book, *Interest and Inflation Free Money: Creating an Exchange Medium That Works for Everybody and Protects the Earth*, was originally published in 1987 and has been revised several times and translated into 22 languages.



Shann Turnbull

<http://au.linkedin.com/in/shannturnbull>

Dr Shann Turnbull is a prolific author on reforming the theories and practices of capitalism that a Google search can identify. After obtaining an MBA from Harvard he became a private equity partner re-organizing public companies and also a serial entrepreneur listing three companies on the Australian stock exchange. In 1975 he co-founded the first course in the world to provide compa-

ny directors an educational qualification and wrote *Democratising the Wealth of nations*. The novel ideas in his book led to consulting assignments for multi-national corporations, United Nations, World

Bank, and governments, including in 1991 the Peoples Republic of China and Czechoslovakia.

In the early 1980's he presented to community activists attending E.F. Schumacher Society seminars across the US his 1978 proposal for an energy currency. His presentations are published in Building Sustainable Communities: Tools and concepts for self-reliant economic change. He is now working on introducing energy money as a member of the Green Money Working Group sponsored by The 40 Foundation and Coops UK Limited.



Ludwig Schuster

http://p2pfoundation.net/Ludwig_Schuster

Ludwig Schuster is a freelance project manager and consultant for Social Entrepreneurs, with a long-term experience in the field of complementary currencies and alternative finance. He is a founding member and facilitator of the think-tank Wissenschaftliche Arbeitsgruppe Nachhaltiges Geld, and a member of the scientific committee of the German Regiogeld Association.

His research is currently focused on the monetary drivers of economic growth, as well as innovative financial instruments for a sustainable economy.

Recent Publications:

Drivers of Economic Growth in the Monetary Economy. Interim Report. Wissenschaftliche Arbeitsgruppe Nachhaltiges Geld (Co-Ed.), 2012

With a Complementary Currency, Greece Can Devalue - And Stay in the Euro Area (with Margrit Kennedy), 2011

Emission Rights as a Carbon Currency. Thoughts on the Currency Aspects of CO2-Emissions Trading (Kathy Beys Foundation), 2010



Tony Greenham

<http://neweconomics.org/about/tony-greenham>

Tony is Head of Finance and Business at nef, leading the programme of research into reforming the financial sector and aligning the interests of society and business. Since 2010 he has advised the government on regional economic regeneration as a member of the Regional Growth Fund Advisory Panel.

Tony is a regular media commentator on banking issues, contributing to various BBC programmes, including BBC Newsnight, BBC News 24, and Radio 5 Live, as well as Sky News, Channel 4 News, and AlJazeera English Newshour, and writing for the Daily Mail, the Guardian and Huffington Post.



Josh Ryan-Collins

<http://neweconomics.org/about/josh-ryan-collins>

Josh joined nef in 2006 and works in the Finance and Business team leading work on monetary reform. He is the lead author of nef's recently published guide to the UK monetary system - *Where does money come from?* - which sets out in non-technical language how commercial banks dominate the creation and allocation of credit and money. He is now working

on the implications of this model and more democratic alternatives, including strategic credit creation by governments or central banks, full reserve banking and complementary currency systems.



Pat Conaty

<http://neweranetwork.info/networkers/pat-conaty/>

Pat Conaty is a founder and former Executive Director of the UK Social Investment Forum – the national association of socially responsible investment organisations. He is also an Honorary Research Fellow at the University of Birmingham, a Research Associate at the University of Salford and since 2007 – a Fellow at New Economic Foundation.

Pat was educated at the University of California studying Political Economy. In the 90s Pat was Development Director of the Birmingham Settlement, an inner city community regeneration organisation. He led the setting up of inner city social enterprises: credit unions, Business Debtline, the Aston Reinvestment Trust, local Community Development Finance Institution – and ART Homes for home improvement finance.



Sgouris Sgouridis

<http://ae.linkedin.com/pub/sgouris-sgouridis/3/69a/3b0>

Dr. Sgouris Sgouridis is an Associate Professor at Masdar Institute. His current research interests focus on sociotechnical systems modeling including sustainable transportation systems and sustainable energy systems management including the use of energy as complementary currency. Dr. Sgouridis is Principal Investigator for projects at Masdar

Institute researching commercial aviation sustainability, EV adoption potential in UAE, renewable energy potential in UAE and as a

societal transition leverage and he co-led the development of the Sustainable Bioenergy Resource Project.

Prior to his role at Masdar Institute, Dr. Sgouridis supported governmental and private organizations including the US Department of Transportation, the Port Authority of Thessaloniki and the Hellenic Army. He holds a PhD in Engineering Systems from Massachusetts Institute of Technology (2007), an MS in Technology and Policy from Massachusetts Institute of Technology (2005), and an MS in Transportation from Massachusetts Institute of Technology (2005). Dr. Sgouridis received the Martin Fellowship for Sustainability (2004-2005) and an award for Excellence in Academic Performance from the Chambers of Engineers (1998 and 1999).

Participants

Abass Mohammad
shardfotechcomltd@yahoo.com

Abiodun Olawale James
reboottech@gmail.com

Adamson Sigalla Norman King
adamsonnorman@yahoo.com

Adeyemo Aliu Ajani
princejay145@yahoo.com

Andelka Viskovic
andjelka.viskovic@split.hr

Annet Paradi-Dolgos
dolgos.annet@ke.hu

Anton Pinschof
apinschof@fnab.org

Bart Klein Ikink
*bart@naturalmoney.org ,
bart_klein_ikink@hotmail.com*

Boris Teunga Tofeun
sokamin@safrika.com

Christian Arnspurger
christian.arnspurger~@uclouvain.be

Christophe Place
christophe.place@gmail.com

Dmytro Bechutskyi
stairway@bigmir.net

Ella Piunova, Ellen Brown
ellenhbrown@gmail.com

Erich Hoedl
office@global-roundtable.eu

**Fagbenro Jelili Abiodun,
Gilbert Fayl**
office@global-roundtable.eu

Graham Barnes
gb@hypertrails.com

Grigory Feygin
fgrig@list.ru

H A Schonbeck
hugo@ireland.com

Haim Shaposhnik
stairway@bigmir.net

Hares Youssef
haresyoussef@the40.org

Hassan Fatai Oluwagbenga
hassystemmy@yahoo.com

Hazel Henderson
hazel@hazelhenderson.com

Ibrahim Wallee
wallee@yahoo.com

Ivo Grga
ivo.grga@inet.hr

Participants

Ivo Slaus

office@global-roundtable.eu

Jane Taylor

jane@janetaylor.me

Jean Francois Moutlen Ndje

sokamin@safrica.com

Jeffrey Eisen

drjeisen@psychozoetics.com

Jem Bendell

drjbendell@gmail.com

Jim Rogers

jim@p2pelectric.com

Joel Thompson

joel@africurrency.org

John Erik Meyer

ribbons@newformresearch.com

John Theaker

johntheaker63@gmail.com

Joseph Zitoli

joseph.zitoli@baml.com

Josh Ryan-Collins

josh.ryan-collins@neweconomics.org

Jozsef Laszlo Varga

*jozsef.varga@uni-corvinus.hu ,
hunjoska@gmail.com*

Jurij Riphyak

yurij.riphyak@the40.org

Leander Bindewald

leleskywalking@yahoo.com

Lenka Kamala Šantek

LenkaSantek@gmail.com

Ludwig Shuster

schuster@livingcity.de

Maja Fredotovic

mfredot@efst.hr

Maksym Katkov

maksim.katkov@chumakway.com

Maksym Putiy

maksym.putiy@the40.org

Malcolm Greenstuart

malcolm173@ozemail.com.au

Margrit Kennedy

margritkennedy@monneta.org

Mariapaola Dosi

mpaola_dosi@libero.it

Mark T. Brown

mtb@ufl.edu

Markus Fichta

markus.fichta@chello.at

Marusa Freire

marusafreire@hotmail.com

Matthew Slater, Michael Hudson

michael.hudson@earthlink.net

Michaela Suchardová

Michaela.Suchardova@seznam.cz

Mohamed Abdi Mahamed

xaadle@hotmail.com

Momir Djurovic

office@global-roundtable.eu

Nadiia Lushchak

nadiia.lushchak@chumakway.com

Nadine Yangou Ematou

sokamin@safrica.com

Nataliia Lekhiv

natalia.lehiv@the40.org

Nazar Kulczycki

nazar@teslaconference.com

Nick Gogerty

ngogerty@thoughtfulcapital.com

Odulaja Eniola Temitope

Ogidan Ayo Tayo

Ogidan Azeezat Atoke

Pat Conaty

pat.commonfutures@phonecoop.coop

Pavel Sidelev

sidelev@gmail.com

Peter Etherden

peteretherden@yahoo.com ,

p_etherden@hotmail.com

Ram Uk

naylinaung324@gmail.com

Raphael Alain Kooh Sohna

sokamin@safrica.com

Richard Werner

R.Werner@soton.ac.uk

Rilwan o Ainimashaun

jare1981@yahoo.com

Rob Van Hilten

rob.van.hilten@qoin.org

Sergio Ulgiati

sergio.ulgiati@uniparthenope.it

Sgouris Sgouridis

ssgouridis@masdar.ac.ae

Shann Turnbull

sturnbull@mba1963.hbs.edu,

shann.turnbull@gmail.com

Steivan Defilla

steivan.defilla@encharter.org

Stephen Magara

magarastephen@yahoo.com

Stuart Beller

jeff.beller34@gmail.com

Participants

Tony Greenham

Tony.Greenham@neweconomics.org

Trond Andresen

trond.andresen@itk.ntnu.no

Veronika Alexandra Gal

gal.veronika@ke.hu

Wallas Lawrence

wallas942@aol.com,
sokamin@safrica.com

Warren Coat

WCoats@aol.com

Papers

Natural Money proposal for the Tesla Conference

Author: Bart Klein Ikink

Introduction

The choice

There is a need for an alternative to the current globalised economic system but reality does not always meet our needs. Therefore a proposal for an alternative should start with understanding the way markets behave. Most economists think that local currencies are less efficient and will remain marginal at best. Less efficient systems are destroyed by the laws of competition. Local communities are not able to compete with the global marketplace.

It does not have to be that way. One outstanding example demonstrates this. During the Great Depression the Austrian town of Wörgl introduced scrip money. The faster circulation of scrip within the local economy increased trade and created extra employment. The success was copied by neighbouring villages and a town. Soon two hundred Austrian townships were interested in adopting the idea. Then the central bank banned scrip money [1] [2].

If scrip money had not been banned at that time, the success story would have spread and everybody would use scrip money today. It only takes one community like Wörgl to make it happen now. Copying the Wörgl experiment can unleash a power that will finish off the current financial system. Less efficient systems will be destroyed by the laws of competition. The global marketplace will not be able to compete with the local communities.

In the future there will be no more economic crises. There will be sufficient employment for everyone. The economy will become sustainable. Central governments and multinational corporations



will crumble. The division of labour will be reversed. Jobs that do not contribute to the real economy will vanish. Once set in motion this development cannot be stopped. This may be just in time as the current globalised economic system is collapsing right in front of us. The interest free community economy is just around the corner, but only if we do the right thing. We have the choice: muddle through and see civilisation collapse before our eyes or make it happen and change the world.

Capitalism is suicide

Capitalism as we know it equals to collective suicide. Capitalists call our roadmap to destruction freedom of choice. Within the Capitalist economy we are free to choose which products to consume but we are not free to choose for our own survival. Those who take measures to save the Earth will be outcompeted by others who do not take these measures. Money dictates our choices and this can be called a dictatorship of money.

Mother Nature is not kind to those who destroy their own living conditions. Their demise will be caused by their own unfitness for survival. The Club of Rome already warned in 1972 with its report *The Limits to Growth* that the current economic system will end in disaster.

Money has become the most important measurement of value but money in itself is worthless. This makes everything worthless including human existence. Western culture is suicidal because it attaches too much value to money, while the value of our future existence cannot be expressed in terms of money. Currently food supplies are practically non-existent, nature is being destroyed and social structures are unravelling, while politicians and corporate interests block effective solutions [18].

All interest is usury

Interest causes wealth to concentrate as the poor pay interest to the rich. Interest disrupts the flow of money in the economy and causes economic crises. Therefore an interest based economy is inefficient.

The following example demonstrates this and also that interest on money is unsustainable in the long run:

If someone brought a 1/10 oz gold coin to the bank in the year 1 AD, and the money remained there until the year 2000 AD, collecting a yearly interest of 4%, the amount of gold in the account would have been 3.6×10^{31} kilogramme of gold weighing 6,000,000 times the complete mass of the Earth.

If interest is charged on a limited scale or over a short time-frame then those problems do not surface. Over time it is inescapable that it reduces large numbers of people to a state of servitude to the money lenders. This is a long term development that transcends the life span of a human. Interest is the main reason why a number of civilisations have failed and why Western civilisation is about to fail. Therefore all interest is usury and the current financial system is a usury financial system [10].

In order to get rid of interest on money a holding fee on money is needed otherwise there is no reward for the risk of lending out money at 0% interest. Because money with a holding fee circulates in the economy no additional debts or money printing is needed to energise the economy. The economy will do well by itself. There will be no inflation so lending out money at 0% will be attractive.

Natural Money Bomb: the way to blow up the usury financial system

Introduction

A superior power is needed to finish off the current world order based on usury banking. Natural Money is money with a holding fee (scrip money) combined with a ban on charging interest. The Natural Money Bomb employs the superior efficiency of Natural Money to wreak havoc and create chaos in the financial system. It will bring down the banks and Wall Street when it is used. The core ingredient and explosive material is Natural Money. It will end the current world order and can be the basis for the future economy based on local self sufficiency. The Natural Money Bomb will finish off the usury financial system because of Gresham's Law:

Bad [depreciating] money drives out good [stable] money. So depreciating money is a superior form of money. Most people are afraid for change and they have good reasons for that. They want a better alternative and see it work before they accept it. This

scheme has been tried before in Wörgl and Lignières-en-Berry with great success (see appendix). The Wörgl experiment became explosive because many towns and villages wanted to copy it. For this reason the central bank of Austria banned it. The Lignières-en-Berry experiment was explosive because it would have replaced regular usury money within a few years. For this reason the government of France banned it. If the experiments had not been banned then everybody would use scrip money now.

The secret formula

Currently there are thousands of similar currencies and LETS systems but they did not achieve the success of Wörgl and Lignières-en-Berry. The hidden secret of success is the power that will bring down the usury financial system. In order to turn scrip money into a killer the following conditions must be met:

- The currency must be exchangeable in regular usury money but exchanging it must be less attractive than keeping it.
- At least initially the currency has to be backed with regular usury money.
- Local businesses must accept the money.
- There must be an incentive to use the money in the form of a holding fee.
- The money must be attractive.

There are two methods to produce an explosive experiment that can spread like wildfire:

- A public currency issued by a government like in Wörgl that can be used as a payment for taxes.
- A private currency issued by a community, a group of people like in Lignières-en-Berry or a corporation.

The scheme of Lignières-en-Berry is the most easy to implement because it needs only a small amount of capital and it does not need a large organisation or support of a government.

Fatal attraction

The Wörgl currency was attractive because Schillings were hard to come by [1]. In Lignières-en-Berry a clever scheme was devised to make the money attractive [3] [4]. It was the following:

- People could buy the money at 95 cents to the Dollar/Euro.

— They could spend it as 1 Dollar/Euro because businesses accepted the money at that value.

— After four months they could exchange the money at 98 cents to the Dollar/Euro.

— They could instead buy a stamp of 1 cent to make the money valid for another month and spend it as 1 Dollar/Euro again.

The situation in Lignières-en-Berry soon became explosive because:

— People bought the money because they could spend it at a 5% profit or exchange it at a 3% profit after four months.

— Businesses accepted the money because it generated extra business and it could cost them no more than 2%, but if they did spend the money then there was no loss at all.

— The money circulated fast because spending was more attractive than keeping the money.

— Many people chose to buy the stamp even though they could get back 98 cents because by buying the stamp they could spend the currency unit as 1 Dollar/Euro.

If no currency is returned then the profit is the 1% holding fee per month excluding costs. If there are no costs and the profit is used to issue additional currency then 33% additional currency can be created each month. At the same time the money is sound because it is backed by regular usury money.

This money spreads fast and the experiment in Lignières-en-Berry became explosive. Many communities moved to copy the system. This alarmed the Bank of France so much that in July 1957 it sent a team of police specialists to investigate what it saw as a virus about to contaminate the whole country [4]. It may have taken only a few years until the money had replaced usury money in France. For this reason the government of France banned it.

Capital and profit

To set up a Lignières-en-Berry currency you do not need much capital. If you intend to issue 100,000 Dollar/Euro of currency units you only need 3,000 Dollar/Euro. People will buy the currency at 95 cents so they bring in 95,000 Dollar/Euro while you need 98,000 Dollar/Euro to pay them back.

It is possible that the operation will run at a profit because people have to pay a holding fee to keep the money valid. The profit can be used to the following ends:

- To issue additional currency. In this way the scrip money will spread fast. If the market becomes saturated more people will return the money for 98 cents so the profit will disappear and the situation will stabilise.
- For the benefit of the community, for example poverty relief.
- It can be added to the value of the currency so the value of the currency will rise. This will make the money attractive for investors to invest in, for example by loaning out money at 0% interest.
- A dividend for shareholders. Many people will not prefer this solution but in a free market this type of money can exist alongside public and community currencies.

If a consortium of local business owners issues the currency then the operation can run at a loss but still be profitable to the local business owners overall because it generates more business for them. In Lignières-en-Berry salaries were exchanged into the local currency and this generated more business locally. Even though the Lignières-en-Berry scheme did not produce a loss, it probably had been profitable for the local business owners to sustain the scheme even if there was a loss.

Extra employment

The fast circulation of the scrip money generates extra employment. It can produce even more employment if employers and employees agree on using it for salary payments. This happened in Lignières-en-Berry and this was crucial in making the currency such a success that it threatened the usury financial system [4]. Some possible schemes are the following:

- The employer pays a regular salary including taxes but the employee agrees to return a part of his or her salary to the employer in exchange for scrip money.
- The employer pays a minimum wage including taxes and an additional amount in scrip money. This scheme could cause trouble as it results in reduced tax income for the government.
- Governments may choose to accept scrip money for taxes so it will be possible to pay salaries in scrip money.

Possible adaptations in the scheme

It is possible to make some adaptations in the scheme like the following:

- The buy and sell price can be made one cent lower so it will be more attractive to buy the stamp.
- Interest rates are lower now than they were in France in 1956, so a lower return profit of 2 cents in four months (6% annually) can still be attractive.
- The money can be sold at a price of 97 cents and returned at a price of 98 cents after two months.

A successful example of a similar scheme is the Chiemgauer in Germany (see appendix) [6]. The Chiemgauer can become explosive as soon as the scheme is not used to promote charities but to make the money attractive. If businesses are able to pay salaries (partially) in Chiemgauer or when a local government accepts the money for taxes then it can turn into an unstoppable force that will replace usury money.

Issues

There are some issues that should be addressed:

- The government has a monopoly on issuing money so the currency may need to be named gift certificates or vouchers.
- The organisation behind the gift certificates must be trustworthy and transparent. This may require independent oversight and auditing.
- Before the experiment starts a significant number of businesses must be willing to accept the gift certificates.
- If too many gift certificates are issued the chance increases that gift certificates are returned, creating a loss of three cents per unit returned.
- People that sell gift certificates must not be able to buy new gift certificates at a lower price at the same time. This problem can be mitigated by limiting the issuance per person. Preventing over issuance will also help to alleviate this problem.

Setting up a local currency is a labour intensive job that will take time. People and businesses have to be contacted and persuaded to use the currency for payment [7]. It may be more practical to adapt an existing local currency and turn it into a Natural

Money Bomb. The existing network of the local currency can provide the initial clout the scheme needs.

There may come a clash between banks and governments versus money reformers. Banks and governments cannot stop the spread of knowledge and the functioning of markets so their resistance will be futile. In a democratic society people should control the government and therefore the superior efficiency of Natural Money can be a power tool to enforce democratic reforms. The most important one is a referendum law that will give citizens full control over their government. This will end the rule of the elite

Economic efficiency

Introduction

The reason why the experiments in Wörgl and Lignières-en-Berry were so successful is superior economic efficiency of Natural Money. In the Natural Economy only useful capital is built while in the usury economy useful capital is often replaced by useless capital. This is also the reason why the Natural Money Bomb will wipe out the usury financial system. The superior economic efficiency of Natural Money manifests itself in the following ways:

- A constant flow of money that makes the economy perform better from a systems perspective.
- Without the usury economic cycle the functioning of markets improves.
- Trade imbalances are resolved.
- Sustainable investments become more attractive.
- Systemic risk is eliminated from the financial system.
- More can be done with fewer resources.
- A higher economic growth rate produces higher returns on capital.

Systems perspective

Try to imagine that the economy is a system like the human body [10]. All parts of the system need each other to operate properly. Try to imagine that money flowing in the economy is like blood flowing in the body. In this case it would not make sense that a

kidney is saying to the liver: "This is my blood you may borrow it at interest." It also does not make sense for parts of the body to hoard blood because there might be no blood flowing in the future. Strangely enough economists think that this makes sense.

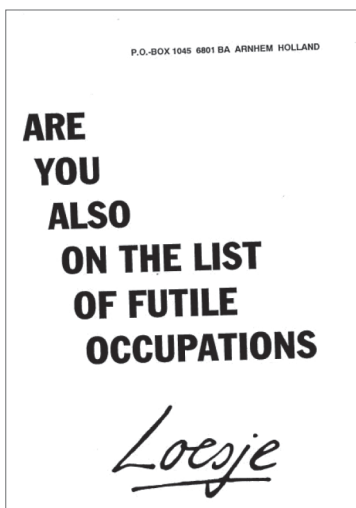
Systems theory conflicts with economics. Charging interest makes sense to economists but interest presses the weakest spots in the economy the hardest. This is because the weakest borrowers have to pay the highest interest rates and this will make the weakest borrowers even weaker. According to systems theory the economy would be far more efficient when the weakest spots are not pressed and when useful capital would not be destroyed in recessions and depressions.

All parts of the economy need money for the supply of energy like all parts of the body need blood for the same reason. If the blood circulation is hampered then the body will not perform well. Likewise if the flow of money in the economy is hampered then the economy will not perform well. A holding fee on money will improve the circulation of money and therefore the efficiency of the economic system.

The usury economic cycle

The usury economic system favours large scale operations [10]. During the usury economic cycle useful capital is replaced by use-less capital. This works as follows:

— If businesses leverage their balance sheet and make use of debt on which interest is paid, they need larger scale operations to achieve the same income level for the business owners because a part of the business income is going to the usurers. In good times businesses can borrow money to expand their operations. There is a reward for taking risk in the form of interest so



there is a tendency to over invest.

— When a recession sets in many businesses fail because demand falters and there is no credit available. If a larger scale operation fails it is often not liquidated but taken over at a lower price which makes it more cost effective for the new owners than smaller operations that are more conservatively financed.

— When the economy recovers a smaller number of larger scale businesses have survived. They start to increase their capacity again and become even larger than they were before.

This cycle is repeated again and again so with usury large scale operations have the advantage. The usury economic cycle caused the division of labour to go further than it otherwise would have done. The effect of the usury economic cycle favouring large scale operations is amplified by the free flow of capital and free trade as this created a competition of everybody against everybody on a world wide scale. As a consequence dependencies have escalated and people have become less self sufficient. In this way “the system” has been created. Before the middle of the twentieth century most people lived in villages that were largely self dependent. Henceforth more and more people live in cities and societies have become more complex than they would have been without usury.

The usury economic cycle makes the economy less efficient because the functioning of markets is perverted by cycles of leverage and liquidation. During the boom phase useless capital is created. During the bust phase useful capital is destroyed. In this way useful capital is replaced by useless capital. As less and less people can have an income from real economic output because money lenders take an ever increasing share of the profits, productive jobs have been replaced by service sector jobs that do not produce a good or service someone needs.

Balancing trade

Trade imbalances are economically inefficient and therefore Natural Money will make the economy more efficient. A holding fee on money will make international trade work based on comparative cost advantages like David Ricardo explained in his book *On the Principles of Political Economy and Taxation* [12]. A relative cost advantage between countries will result in balanced trade as the

currencies will not be hoarded because of the holding fee. A country that has a trade deficit will see its currency drop until exports match imports. Currently some countries run large current account deficits for a long period of time because of carry trades based on interest rate differentials and exporting nations hoarding currencies of importing nations.

Current account deficits destroy productive capital of importing nations. This is a process of reverse economic development resulting in a third world economy. Complete industries have been wiped out in the United States because the US Dollar was propped up by high interest rates and currency hoarding by exporting nations like China and Japan. This created useless capital in China and Japan. Those countries produce goods and services for US Dollars that will prove to be worth less in the future as the United States has too little productive capital to support the value of its currency. To balance the trade useless capital in China and Japan may need to be destroyed and replaced by useful capital in the United State.

Sustainable investment choices

When interest on money is charged, money in the future is valued less than money now. This has a major impact on investment choices. Interest promotes investments that are unsustainable and wasteful. If no interest was charged, sustainable investments would be more attractive [5]. The following example demonstrates this [3]: Suppose that a cheap house will last 33 years and that it will cost 200,000 Euro to build. The yearly cost will be 6,060 Euro (200,000 divided by 33). A more expensive house costs twice as much (400,000 Euro) but will last a hundred years. This house will cost only 4,000 Euro per year. For two thousand Euros per year less, it is possible to build a house that is not only more pleasant to live in, but will also cost less in energy use.

After going to the bank for a mortgage application the math changes, because the bank calculates interest. If the interest rate is 10% then the expensive house will not only cost 4,000 Euro per year on write-offs, but during the first year there will be an additional interest charge of 40,000.00 Euro (10% of 400,000.00 Euro).

The long lasting house now costs 44,000.00 Euro in the first year. The cheaper house now appears less expensive again. There is the yearly write off of 6,060.00 Euro but during the first year there is only 20,000.00 Euro in interest charges. Total costs for the first year are only 26,060 Euro. During the following years, lower interest charges still make the less durable house cheaper.

This example shows that without interest charges there is a tendency to select long-term solutions while with interest charges short-term solutions will be preferred. Interest charges make long-term solutions uneconomical. This is also true on a larger scale. Natural resources such as rainforests are squandered because of a short term profit. Intelligent forest management could earn a profit for centuries to come but within the present money system it can be more profitable to cut down the rainforest now and put the money in the bank to earn interest. With a tax on money, long term solutions become even more preferred. For example, the people in Wörgl started to plant trees in anticipation of future revenues.

Systemic risk

Interest is an allowance for risk and therefore interest introduces risk in the financial system [10]. This risk appears on the balance sheets of financial institutions and can become a systemic risk. People, organisations and countries that have troublesome debt levels can borrow more if they are willing to pay higher interest rates, which further erodes their capacity to repay. If there was no interest on money, debtors cannot borrow more than they are able to repay. Consequently debtors must reorganise their finances in an earlier stage. Because of the usury economic cycle, booms and busts alternate. During the boom phase, individuals and corporations take on more debt. During economic downturns the perception of risk changes and debts are liquidated, which further intensifies the economic downturn.

With Natural Money there will be less systemic risk in the financial system for the following reasons:

- A ban on charging interest will reduce the risk that lenders are willing to take.
- Debts cannot grow out of control because of interest charges.
- The balance sheets of corporations and individuals will be-

come less leveraged.

- Risky projects will be financed with equity instead of loans.
- The constant flow of money within the economy caused by the holding fee will reduce the risk of economic downturns.

Doing more with fewer resources

Currently many people are working in jobs that do not produce a good or service someone needs. Those jobs can be found in bureaucracy, management, consultancy, trade and technology [11]. For those jobs energy and natural resources are needed as roads and offices have been built, cars are driven and the office buildings are heated. Those jobs consume resources but produce nothing so they have a negative economic value. The apparent need for those jobs has arisen because of the usury economic cycle favouring large scale operations. The economy would be more efficient if those occupations were eliminated. If that happens people would have more leisure time and more labour would be available for useful ends.

In general smaller organisations are more efficient. Theoretically the optimal organisation size is one person as it minimises communication and information processing that do not contribute to economic output [11]. The main obstacles to increasing organisational effectiveness by communication reduction are complexity and change. Complexity and change require communication. If the situation was easy to understand and does not change then everybody knows what he or she must do and communication is less needed. The complexity of the environment of organisations as well as the pace of change has escalated in recent decades. Complexity is partly the consequence of the usury economic cycle favouring large scale operations while the world wide competition of everybody against everybody is a driver for constant change.

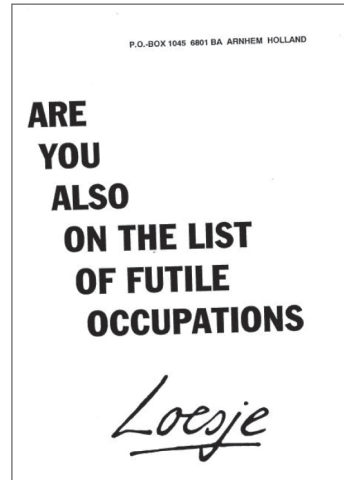
Replacing a tax on labour with a tax on fossil fuels will help to replace fossil fuel consumption with labour and renewable energy resources. The use of energy is an important cause of poverty as it causes trade balances of reverse developed nations like the United States and the United Kingdom to go negative, while it also creates the perceived need for costly resource wars to protect the exchange of natural resources and energy for currencies that would otherwise be worth less as those nations have too few exports to support the

value of their currencies. If the money spent on resource wars is spent on energy conservation and renewable energy then the trade balance of the reverse developed nations would improve and consequently the wealth of the people living in those countries would increase[18].

Superior efficiency will enforce change

The secret behind the Natural Money Bomb is the superior efficiency of Natural Money. Markets will enforce the change because there will be a capital flight from the usury economy to the Natural Economy. This can be explained as follows [17]:

1. Interest on money should be banned. Return on capital is a good thing and should not be abolished.
2. Raise a tax on holding money. This is not a tax on wealth, so shares, real estate and money lent, should not be subject to this tax.
3. Do not create more money so there will be no monetary inflation.
4. Because there is a holding fee on money people will use the money to invest, to consume or to lend without interest.
5. Because interest is an allowance for risk, and no interest may be charged, the following will happen:
 - Money will only be lent to reliable people and companies.
 - Less money will be lent and more money will be directly invested in equities and real estate.
6. There will never be an economic crisis because money is spent directly and there are practically no bad loans.
7. Because all money is directly used for investment or consumption, the economy grows steadily and there is sufficient employment.
8. As the economy grows constantly and because no more money is created, prices will fall. Loans with zero percent interest



will have a positive return that is higher than real interest rates in the usury financial system.

9. If one community, region or country applies this system, it will cause a capital flight to the interest free economy since the return on loans with zero percent interest is higher than the yield on interest products in the usury economy. This will force the rest of the world to abandon usury.

10. After that everyone can achieve economic freedom. There will always be work for employees and there will always be customers for viable businesses. Nobody is deeply in debt.

The improvement in returns may not always be higher return rates per se, but it can also consist of better risk reward ratios. To make it work no more currency should be issued after the initial phase. After the initial phase the Natural Money currencies should float against the usury currencies in a free market so they can rise in value.

Who designed the scheme?

Economic doomsday device to achieve Paradise

The Natural Economy looks like Paradise compared to the current situation. The Natural Money Bomb is an economic doomsday device that will transform the world economy in a short timeframe at a time that the usury economy is facing its end game [15]. It is remarkable that this happens just before December 21, 2012. This begs the question: Who designed Natural Money? The main ingredients of Natural Money are a holding fee on money and a ban on charging interest.

The origin of this design can be found in The Bible and The Quran:

— A holding fee on money was invented by the Egyptians after Joseph built storehouses for grain and took all the money from the Egyptians.

— Charging interest on money is condemned in both The Bible and The Quran.

— Periodic debt forgiveness as proposed in The Bible will curtail unwise lending and borrowing.

— Unleashing the Natural Money Bomb will produce a situation

similar to the story of the Tower of Babel.

Joseph in Egypt

The Bible contains a story about the Pharaoh having dreams that he could not explain. The Pharaoh dreamt about seven fat cows being eaten by seven lean cows and seven full ears of grain being devoured by seven thin and blasted ears of grain (Gen. 41:1-45). Joseph was able to explain those dreams to the Pharaoh. He told the Pharaoh that seven good years would come and after that seven bad years would follow. Joseph advised the Egyptians to store food on a large scale. They followed his advice and built storehouses for food. In this way Egypt survived the seven years of scarcity.

What is less known because it is not recorded in The Bible is that the storing of food resulted in a financial system. The historian Friedrich Preisigke discovered that the Egyptians used grain receipts for money [3] [5]. Farmers bringing in the food got receipts for grain. Bakers who wanted to make bread brought in the receipts which could be exchanged for grain. Because Joseph took all the money from the Egyptians (Gen. 47:14-15), they had to invent an alternative currency [10].

It did not take long before the grain receipts were generally accepted as money. Because of storage costs, the degradation of the grain and mice eating it, the value of the receipts was steadily decreasing. This stimulated people to spend the money fast. The grain money remained in function in Egypt until it was replaced by the Roman currency during the late Ptolemaic period. The grain receipt monetary system was stable and did not collapse. It helped Egypt to remain a viable civilisation for 1,500 years.

The actions of Joseph helped to create this system as he proposed the grain storage and took all the money from the Egyptians. A side-issue for the Natural Money case but more interesting for Biblical scholars is that this discovery is one of the few pieces of evidence supporting the Book of Genesis.

Interest in The Bible and The Quran

Exodus

22:25. If you lend money to one of my people among you who is needy, do not treat it like a business deal; charge no interest.

22:26. If you take your neighbour's cloak as a pledge, return it by sunset,
22:27. because that cloak is the only covering your neighbour has. What else can they sleep in? When they cry out to me, I will hear, for I am compassionate.

Leviticus

25:35. If any of your fellow Israelites become poor and are unable to support themselves among you, help them as you would a foreigner and stranger, so they can continue to live among you.
25:36. Do not take interest or any profit from them, but fear your God, so that they may continue to live among you.
25:37. You must not lend them money at interest or sell them food at a profit.

Deuteronomy

23:19. Do not charge a fellow Israelite interest, whether on money or food or anything else that may earn interest.
23:20. You may charge a foreigner interest, but not a fellow Israelite, so that the Lord your God may bless you in everything you put your hand to in the land you are entering to possess.

Nehemiah

5:9. So I continued, "What you are doing is not right. Shouldn't you walk in the fear of our God to avoid the reproach of our Gentile enemies?
5:10. I and my brothers and my men are also lending the people money and grain. But let us stop charging interest!
5:11. Give back to them immediately their fields, vineyards, olive groves and houses, and also the interest you are charging them—one percent of the money, grain, new wine and olive oil."

Psalms

15:1. Lord, who may dwell in your sacred tent? Who may live on your holy mountain?
15:2. The one whose walk is blameless, who does what is righteous, who speaks the truth from their heart;
15:3. whose tongue utters no slander, who does no wrong to a neighbour, and casts no slur on others;

15:4. who despises a vile person but honours those who fear the Lord; who keeps an oath even when it hurts, and does not change their mind;

15:5. who lends money to the poor without interest; who does not accept a bribe against the innocent. Whoever does these things will never be shaken.

Proverbs

28:8. Whoever increases wealth by taking interest or profit from the poor amasses it for another, who will be kind to the poor.

Ezekiel

18:7. He does not oppress anyone, but returns what he took in pledge for a loan. He does not commit robbery but gives his food to the hungry and provides clothing for the naked.

18:8. He does not lend to them at interest or take a profit from them. He withholds his hand from doing wrong and judges fairly between two parties.

18:9. He follows my decrees and faithfully keeps my laws. That man is righteous; he will surely live, declares the Sovereign Lord.

18:13. He lends at interest and takes a profit. Will such a man live? He will not! Because he has done all these detestable things, he is to be put to death; his blood will be on his own head. .

18:17. He withholds his hand from mistreating the poor and takes no interest or profit from them. He keeps my laws and follows my decrees. He will not die for his father's sin; he will surely live.

22:12. In you are people who accept bribes to shed blood; you take interest and make a profit from the poor. You extort unjust gain from your neighbours. And you have forgotten me, declares the Sovereign Lord.

The Quran

2:275. Those who charge usury are in the same position as those controlled by the devil's influence. This is because they claim that usury is the same as commerce. However, God permits commerce, and prohibits usury. Thus, whoever heeds this commandment from his Lord, and refrains from usury, he may keep his past earnings,

and his judgment rests with God. As for those who persist in usury, they incur Hell, wherein they abide forever.

2:276-280. God condemns usury, and blesses charities. God dislikes every disbeliever, guilty. O you who believe, you shall observe God and refrain from all kinds of usury, if you are believers. If you do not, then expect a war from God and His messenger. But if you repent, you may keep your capitals, without inflicting injustice, or incurring injustice. If the debtor is unable to pay, wait for a better time. If you give up the loan as a charity, it would be better for you, if you only knew.

2:282. O you who believe, when you transact a loan for any period, you shall write it down. An impartial scribe shall do the writing. No scribe shall refuse to perform this service, according to God's teachings. He shall write, while the debtor dictates the terms. He shall observe God his Lord and never cheat. If the debtor is mentally incapable, or helpless, or cannot dictate, his guardian shall dictate equitably. Two men shall serve as witnesses; if not two men, then a man and two women whose testimony is acceptable to all. Thus, if one woman becomes biased, the other will remind her. It is the obligation of the witnesses to testify when called upon to do so. Do not tire of writing the details, no matter how long, including the time of repayment. This is equitable in the sight of God, assures better witnessing, and eliminates any doubts you may have. Business transactions that you execute on the spot need not be recorded, but have them witnessed. No scribe or witness shall be harmed on account of his services. If you harm them, it would be wickedness on your part. You shall observe God, and God will teach you. God is Omniscient.

3:130. O you who believe, you shall not take usury, compounded over and over. Observe God, that you may succeed.

4:161. And for practising usury, which was forbidden, and for consuming the people's money illicitly. We have prepared for the disbelievers among them painful retribution.

7:157. "Follow the messenger, the gentile prophet (Muhammad), whom they find written in their Torah and Gospel. He exhorts them to be righteous, enjoins them from evil, allows for them all good food, and prohibits that which is bad, and unloads the burdens and the shackles imposed upon them. Those who believe in him, respect

him, support him, and follow the light that came with him are the successful ones."

30:39. The usury that is practised to increase some people's wealth, does not gain anything at God. But if you give to charity, seeking God's pleasure, these are the ones who receive their reward manifold.

Periodic debt forgiveness

In The Bible once in seven years a Sabbath Year was introduced in which debts were forgiven (Deut. 15:1-18). Once in the fifty years there was a Jubilee (Lev. 25:8-55). In the Jubilee every man could return to his possession while the land had to be redeemed. The Bible also banned charging interest. The periodic debt forgiveness in The Bible was not unique as Mesopotamian royal edicts cancelled debts, freed debt-servants and restored land to cultivators who had lost it under economic duress [13].

It is often argued that periodic debt forgiveness like a ban on interest charges will deprive people from needed credit. When there is a holding fee on money this will not happen. The absence of a risk premium in the form of interest and periodical debt forgiveness will refrain potential creditors from letting debtors go too far into debt. It is also in the interest of the borrowers not to borrow more than they are able to repay. Therefore the absence of interest and the introduction of recurrent debt forgiveness can be helpful in curtailing unwise lending.

The freedom advocated by the Covenant Code of Exodus, the septennial year of release in Deuteronomy and the Jubilee Year of Leviticus' Holiness Code were not just abstract literary ideas, but concrete legal practises freeing rural populations from debt servitude and the land from appropriation by foreclosures. It is therefore reasonable to assume that those concepts will still work well today. The creation of debt under a system of interest can be considered as fraud because new debts are needed to pay off the interest on existing debts, making debts grow exponentially. The current financial crisis can be considered as the endgame of a system of fraud by usury, so debt forgiveness is needed [14].

The Tower of Babel

Division of labour empowers humans to create great works at the risk of people becoming too specialised. People working on the same project or working in the same organisation often do not understand each other. In many cases nobody oversees the complete picture. This undermines the effectiveness of the organisation as a whole. Many organisations rely on advisors and specialists, such as lawyers, IT specialists and market analysts, while managers often do not understand the work they do and the advice they give. Humans have a limit to what they are capable of managing but common sense does not always prevail, especially when complex solutions are chosen where simple solutions suffice.

The biblical story of the Tower of Babel warns us for the division of labour gone too far. After becoming specialised, people are very dependent on each other, while they do not understand each other any more. In this way a society disintegrates and therefore the story of the Tower of Babel is reflecting the situation we live in today. After the collapse of the city civilisation people scattered over the surrounding countryside (Gen. 11:8). Some ancient city civilisations have collapsed in a similar way [16]. An important theme in The Bible is Eden versus Babylon or rural living versus city life. The story on the Tower of Babel is part of this theme.

The building of the Tower of Babel may also reflect the effect of usury and credit in the financial system. The usury economic cycle is the principle cause of the division of labour and the concentration of people in cities. Credit amplifies the booms and busts spurred by usury. Most sky scrapers have been built in the years just before financial crises. Historically, skyscraper construction has been characterised by bursts of sporadic, but intense activity that coincide with easy credit, rising land prices and excessive optimism [8].

Like the story of the Tower of Babel, the story of the Titanic is a warning against hubris. The Titanic was deemed unsinkable and the demise of the ship on its maiden voyage seems not to be a coincidence. In 1898 Morgan Robertson wrote the novel *Futility*, which described the maiden voyage of a transatlantic luxury liner named Titan. Although it was touted as being unsinkable, it struck an iceberg and sank with much loss of life [9]. The name of the novel can be seen as an indirect reference to the Tower of Babel, which was a

futile attempt of humans to become like God.

The sinking of the Titanic seems to be a prelude to the sinking of the SS Human Civilisation (SS stands for Sinking Ship) that is about to occur. Once again usury, hubris and over-reliance on technology are the principal causes for disaster. The iceberg will be exponential growth hitting the limits of the planet. On the Titanic many passengers and crew died unnecessarily because they were unprepared and panicking. A good plan for the future can prevent panic and will significantly reduce the fatality rate of SS Human Civilisation's appointment with destiny. Natural Money can enhance the development of local self sufficient communities and can greatly improve human living conditions in the centuries to come.

Appendix

Wörgl stamp scrip

In the past money systems without interest on a small scale existed in various forms and some of them were extremely successful. One of the most stunning success stories is the Wörgl currency [1]. On July 5th 1932, in the middle of the Great Depression, the Austrian town of Wörgl introduced a complementary currency. Wörgl was in trouble and was prepared to try anything. Of its population of 4,500, a total of 1,500 people were without a job and 200 families were penniless. The mayor Michael Unterguggenberger had a long list of projects he wanted to accomplish, but there was hardly any money with which to carry them out. These projects included paving roads, streetlights, extending water distribution across the whole town, and planting trees along the streets.

Rather than spending the 40,000 Austrian schillings in the town's coffers to start these projects off, he deposited them in a local savings bank as a guarantee to back the issue of a type of complementary currency known as stamp scrip. The Wörgl currency required a monthly stamp to be stuck on all the circulating notes for them to remain valid, amounting 1% of the each note's value. The money raised was used to run a soup kitchen that fed 220 families. Because nobody wanted to pay the holding fee, everyone receiving the notes would spend them as fast as possible. The 40,000 schilling deposit allowed anyone to exchange scrip for 98 per cent of its

value in schillings but this offer was rarely taken up. Of all the business in town, only the railway station and the post office refused to accept the local money. Over the 13-month period the project ran, the council not only carried out all the intended works projects, but also built new houses, a reservoir, a ski jump and a bridge. The people also used scrip to replant forests, in anticipation of the future cash flow they would receive from the trees.

The key to its success was the fast circulation of scrip within the local economy, 14 times higher than the Schilling. This in turn increased trade, creating extra employment. At the time of the project, unemployment in Wörgl dropped while it rose in the rest of Austria. Six neighbouring villages copied the system successfully. The French Prime Minister, Eduoard Dalladier, made a special visit to see the 'miracle of Wörgl'. In January 1933, the project was replicated in the neighbouring city of Kirchbuhl, and in June 1933, Unterguggenburger addressed a meeting with representatives from 170 different towns and villages. Two hundred Austrian townships were interested in adopting the idea. At this point the central bank panicked and decided to assert its monopoly rights by banning complementary currencies.

Lignières-en-Berry

In 1956 a few people in Lignières-en-Berry started a revolutionary experiment. They issued vouchers of 100 French francs for 95 French francs [3] [4]. After four months the vouchers could be returned for 98 French francs. A notary saw to it that for each voucher 98 French francs were deposited into a bank account. If the vouchers were not returned, a stamp of 1 franc had to be bought to keep the voucher valid.

Many people took the money because there was three francs of profit to be made by buying vouchers for 95 French francs and returning them for 98 French francs four months later. By spending the vouchers for 100 Francs it was even possible to make a profit of five francs. People tried to spend the vouchers in the shops and the shopkeepers liked the currency because it brought them many additional customers, while it never did cost them more than 2% because the vouchers could be returned for 98 French francs. The shopkeepers also preferred to use the vouchers for payment.

Many people did not return the vouchers but bought the stamps to keep them valid. From the income of the stamps the cost of buying returned vouchers for 98 French francs could be covered. It did not take long before the currency of Lignières-en-Berry had replaced the French francs. The vouchers spread quickly and the French authorities became alarmed. The vouchers became prohibited.

Chiemgauer

Chiemgauer is the name of a regional local currency started in 2003 in Prien am Chiemsee, Bavaria, Germany [6]. The Chiemgauer program is intended to promote local commerce. The Chiemgauer operates with a fixed exchange rate: 1 Chiemgauer = €1. Bills of 1, 2, 5, 10, 20, and 50 Chiemgauer are issued. To maintain an individual bill's validity a scrip corresponding to 2% of the banknote value must be paid every three months.

The Chiemgauer is intended to:

1. Employment creation: students, unemployed and volunteers are hired to work, earning some allowances.
2. Promotion of cultural, educational and environmental activities: the Chiemgauer system supports non-profits who work for such purposes.
3. Promotion of sustainability: organic food and renewable energy among others.
4. Strengthening the solidarity: enhancing the human relationship between local shoppers and businesses.
5. Stimulation of local economy: Chiemgauer retains purchasing power within the region better than the euro and favors local small businesses, stimulating transactions by the demurrage.

Chiemgauer, considered to be equivalent to the euro, circulates as follows within Prien and neighbouring towns:

- Non-profits: entitled to purchase 100 Chiemgauer at €97 and resell them at €100, thereby earning €3 to be spent for their own activities.
- Shoppers: exchange €100 for 100 Chiemgauer at a non-profit they support, allowing the non-profit to benefit from the preferential purchase price. Also, spend Chiemgauer at local businesses at face value, thereby helping both local non-profits and businesses

without any further cost.

— Businesses: accept 100 Chiemgauer at face value and spend them for their own purchases or exchange 100 Chiemgauer into €95, losing 5% for commission but earning more by attracting Chiemgauer members to their products and/or services. Of this, €2 is devoted to administrative costs, and €3 replaces the original discount to the non-profit.

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Helping Sustainable Currencies to Scale: Strategic Insights from Current Practice

Author: Jem Bendell PhD and Matthew Slater

Matthew Slater is a monetary activist and software engineer. He serves on the board of Community Forge, and edits Community Currency magazine. Dr Jem Bendell is an Adjunct Professor of Sustainability with Griffith Business School, Founder of Lifeworth Consulting, Young Global Leader of the World Economic Forum, and a board member of Community Forge. To comment on this draft, visit www.p2pfoundation.net

Introduction

The volunteers at Community Forge work with local community groups to increase their efficiency and coherence, helping them to value, give and exchange with, each other. We provide advice, open-source software, training and web hosting to community currency groups with the aim of building community, fostering economic resilience and prototyping local money systems. Our open source software is used by hundreds of currencies worldwide, including Timebanks USA and The Hub. We combine community building with monetary reform because we want to see a fair and sustainable economy emerging, based on human values and more localised production, trade and exchange of essential goods. We seek to connect communities to their own abundance, through providing them with mechanisms of exchange that they themselves can own and control. Our approach has not involved lobbying governments or persuading donors, but to volunteer our time to community initiatives that already exist and help them to scale. We participate in broader discussions on monetary reform and currency innovations, but do so with a scepticism about their usefulness, given a current lack of evidence that such discussions have led to tangible action, rather than generic claims to “learning” and “network building”. We have a clear theory and approach to change, which we will describe in this paper. We encourage any initiatives or donors in the field of “sustainable currency” to be clear about their theory of change and not allow considerations of institutional or personal self-interest to frame one’s interventions. That is because an initiative may

not only contribute to a field of work, but can also be a cost to the participants in that field, in terms of time and attention. Therefore in the paper we set out some questions we encourage any initiative or potential donor to consider, as well providing our own hopes, limitations and needs at this time, as practitioners who are already helping extant sustainable currencies to scale.

The Awakening

There is clearly a lack of understanding about the origins of our mainstream currencies, both amongst the general public, within politics, and the economics profession. However, since the first bank bailouts we have observed a growing popular awareness about the problems with the money system itself. Internationally, independent internet movies such as Money as Debt (I, II and III), The Money Fix, The Money Masters, Zeitgeist, and 97% Owned, have encouraged discussion. In the UK, awareness raising by the Positive Money campaign has helped.

Although awareness of the problems associated with the for-profit creation of money as debt at interest has grown, understanding of the solutions is still weak. Despite an understanding of the problem as just described, many currency innovators have chosen currency designs which initially ally themselves with the existing monetary system, such as the 'Transition Pound' initiatives in the UK. This could be because they are designed with an interest in how to market an idea to people who would choose to engage in the currency for reasons other than necessity. Although a similar model in Germany, called Chiemgauer, has had some success, it has been going a long time and its growth is slow, with everybody who maintains it being unpaid.

Those countries that suffer a larger contraction in money supply are not interested in or able to use systems that require bank-debt to buy local currencies that in turn require charitable funding and entail additional transaction costs. For example, a few months ago, an alternative currency was introduced in the Greek port city of Volos. Their central market does not require Euros. From jewellery to food, electrical parts to clothes, everything is on sale through a local alternative currency called TEM. If you have goods or services to offer, you gain credit, with one Euro notionally equivalent to one

TEM. You can then use your TEM earnings to buy whatever else is being offered through the network. The whole system is organised online, with members holding TEM accounts. It is a form of mutual credit, where everyone can issue or earn credit, without the need for a loan from a bank. Everyone can exchange as much as they wish, without it being restricted by availability of Euros, and everyone ends up returning to zero, so no one makes money out of issuing the currency or charging interest. The mayor of Volos supports the project and thinks it can co-exist with the Euro.

Difficult immediate circumstances reduces the need for or ability to participate in lengthy discussions ("processes") or proportionally large investments in marketing ("outreach") compared to implementation activity. People innovating in such circumstances need active support not spectators, by those interested in the broader field of monetary reform and innovation or local sustainable development. The awakening of non-governmental organisations, donors, and entrepreneurs to the problems of our money system will be a mixed blessing for real transformation. The history of social movements, as well as our experience, suggests that support and funds will likely flow to initiatives that resonate with the interests, assumptions, and identities of those with the funds and time to influence the field of monetary activism and alternatives. Hopefully some institutions will support well-designed initiatives that address the causes of our current economic, social and environmental malaise, and which respond in solidarity with those who are already acting out of necessity, rather than theories or personal tastes. It is in this hope that we write this paper, and share these ideas at various events in the developing field of monetary reform and monetary alternatives.

The Disruptive Opportunity

Every technological innovation, from writing, to metal work, to printing, to electronic communications, has enabled new technologies of money. A 'technology of money' is not merely the material form it takes, but also the societal assumptions, beliefs, norms and regulations that shape it i.e. money is an agreement about valuation and how to exchange value. The internet, software and telecommunications, not only enable existing currencies to go digital,

as has been the case for many years, but also for new agreements on forms of “money” to become possible at scale. For any innovative currency to begin to provide a largescale alternative to legal tender, it must have a pervasive payment infrastructure: which is now becoming possible. The internet is leading to the creation of new digital currencies. For instance, Bitcoin is a cryptographic system in which ‘work’ is needed to create coins, and a network of mostly anonymous wallets ‘agrees’ where the coins are. It shot to fame when media reported in 2011 that it was being used for drugs, and since then technology enthusiasts have been growing its whole payments infrastructure. In early 2011 there was a single wallet application and several online marketplaces for Bitcoin to be bought and sold. Now there is Bitcoin cash, smartphone apps, gambling sites, its own magazine and even a consulting firm in London. In addition, new payment technologies are beginning to emerge, which although presently used for bank-money, will provide approaches and methods that could be deployed for other currencies. Banks are investing millions in new payment technologies to make payments easier, more traceable, cheaper to handle, and preferential to cash. New payment innovations are myriad, contactless payment systems, micro-payments, for contributing to bloggers and musicians, Canadian Mint’s ‘MintChip’ system, M-wallets, e-Gold, i-Money, and so on. In addition there are payment technologies barely explored in the west such as SMS or the Mobile phone currency in Kenya, the M-Pesa.

Given these developments, major internet companies have looked at the potential for issuing their own currencies. Google has considered developing “Google Bucks” but say they dropped the idea due various legal issues. Facebook has developed a currency for online products, such as games hosted on its environment. The Chinese social network QQ has developed a currency that began to be used for non virtual goods and services, until the Chinese government outlawed the use of new virtual currencies for non virtual goods and services.

These developments highlight that we are at a time of disruptive innovation in currency. Some of these innovations will help to address the problems arising from the current bank-money system, while some will not. It is important, therefore, to be clear on the spe-

cific problems any currency system seeks to address, and how.

The Problems We Seek to Solve

Our understanding is that the current mainstream monetary systems are unstable, unfair and unsustainable. Unstable, because the system of money issuance as debt with interest leads to speculation and business cycles. Unfair, because some private institutions are given the right to create money for everyone else and charge them interest on it, therefore deciding what is funded, and generating increasing inequality. Unsustainable, because it drives not only permanent economic growth, but exponential growth, which means commoditising ever more human life and the natural world, whether or not a particular society and their government wish to do so. From many years of research on sustainable development, environmental economics, political economy, and more recently monetary theory and monetary history, we have come to an understanding that we need what we now call “sustainable currency.” A sustainable currency is an agreement about value that is used to denote value, exchange value, and/or store value, which is sufficiently credible, stable and available to enable these functions, while not necessitating, through its production or use, damage to ecosystems or wealth extraction from its user communities.

At Community Forge we seek to solve the dual problem that I) there are not enough sustainable currencies widely available for daily exchange, and that II) there has been minimal support from institutionalised powers in government, business or civil society, for creating sustainable currency systems.

We are deploying mutual credit systems because they do not require support in order to begin (problem II) and they have a number of advantages as a sustainable currency (problem I), including the way they address the following related needs:

- they help match underused assets with unmet needs, to the degree that people want, not to the degree that there is money around to complete a transaction. This helps to address the problem where people stand idle, as unemployed, and assets stand idle, while needs exist or grow within society.

- they involve all credits and debits ultimately cancelling each other out, you don’t find increasing amounts of money chasing the

same amount of stuff or services, so the currency doesn't inflate. This helps to address the problem where currency loses its value and thus makes the elderly on low incomes more vulnerable.

- there is no interest charged upon the issuing of credit, so wealth isn't extracted from those with lower incomes. This helps address the problem of growing economic inequality and reduced social mobility.

- they are often locally-focused, they encourage us to trade locally, so reducing our carbon footprint and build economic resilience

- they do not require backing, beyond the soft infrastructures to produce credibility, so there is no need for start-up capital, and thus no extraction of wealth by lenders or investors. In addition, as an accounting currency, there is also nothing to steal.

In these ways, mutual credit systems can meet our definition of a sustainable currency, with current weaknesses in its ability to store value or to transact over large distances or in larger communities with limited trust or mechanisms for sanction. However, examples of mutual credit in business barter networks, such as the WIR in Switzerland, which has around 70,000 business participants, and turns over an equivalent of 2 billion Swiss francs a year, show that much greater scale could be reached with appropriate support.

How We Seek to Solve Them

Our work is a work in social change. This means we need an understanding of our approach to social change. That requires clarity on I) the problem, II) the method we employ to address it, III) how this method compares to other potential methods, IV) and what empirical evidence and learning process to evaluate our problem definition and methods. In some circles on organisational change and social change these are components of any initiatives' "theory of change." There are various ways to arrive at a theory of change, and sometimes these are mere stories added to explain existing decisions based on organisational or personal self-interest. In our case, the deployment of mutual credit is the combination of a hacker approach that involves prototyping and user feed back, and what could be called sustainable currency design principles, which arise from our analysis of what is most needed for future scale of current sustainable currency innovations.

The vast majority of our users are not very interested in monetary theory or political campaigning. The mutual credit approach is one which most people, without any professional interest, can grasp immediately. In contrast to commercial fiat money and its obfuscating clouds of dubious theory, mutual credit can be grasped by a child. Mutual credit is ideal for close knit communities with inter-dependent livelihoods. Community Forge's approach is to provide solutions to the needs of such communities. The specific software upgrades we issue or training we provide is a direct response to day-to-day user consultation, not conceptual discussion.

Therefore the method of change that we employ has been:

1. Identify solutions according to sustainable currency principles and look for communities with potential to benefit from using such solutions
2. Develop the open source software tools
3. Offer assistance to key groups and groups that approach us about those tools
4. Provide network infrastructure for these groups to implement the tools at minimal or no cost
5. Learn from these groups of users to further develop our services
6. Communicate our approach through various specialist networks to encourage new user communities and greater support

After a few years of operation CommunityForge now hosts 130, largely Francophone, local exchange systems, with many more using our tools and hosting their systems themselves. The volume of trade of three exchanges around Geneva is greater (at minimum wage) than the renowned Berkshares, which reports USD\$22K circulation per year (see Box 1). We are directly supporting around 7000 users and indirectly, more than twice that. Numerous independent initiatives are now using our software for their own independent exchange and currency projects.

*Box 2: Benefits to Geneva Community Exchange System
(SEL du Lac)*

The number of members has more than doubled since the website was launched.

The per member management overhead has gone down from almost five hours (of which one hour was conflict resolution) to one hour per year.

That hour is disbursed to a broad collegial group which discusses and implements opportunities for interaction between members.

The website has lowered the monetary cost of running the scheme, allowing the purchase of Common Goods (approx. €1000 per year) that are shared and managed by all. The next Common Good purchase will most likely be a walk-in cooler/freezer that will enable a contractual agreement with local producers for perishable local produce: a move towards food sovereignty and stimulating the local economy.

Some of our activities and collaborations are described in Box 2. We emphasise the importance of volunteering and are wary how the logic of money, even donated money, can skew an organisation's original intentions. Therefore, is it important to focus on our intended beneficiaries, who are the users of our software, and relate their needs to an understanding of sustainable currency design, and insights from the history of social movements, as we seek to enable our beneficiaries to participate in a broader societal change.

Research has found four key factors behind movement creation. First, is the extent to which common interests exist amongst movement participants. Second is the degree of common identity and social ties linking the individuals or organizations that affect a movement's ability to act on its interests. Third is the process by which a movement accesses the resources needed for its activities. This includes resources for movement professionals, who work full time on movement-related issues, but also for broader movement

supporters. The fourth factor in movement generation is the political space and opportunity for activism in a particular society. This includes the protections of civil rights, the existence of an independent media, and an open political system.

Our work in mutual credit and community support, is based on the clarifying and enabling of common interest between community members. In addition, it helps to create the deep ties between people that come from very social forms of co-production and trade, rather than merely online interaction, or irregular displays of disaffection through protest action, petition signing and the like. In addition, we aim to create autonomous forms of resourcing for movement participants, so that they can rely less exclusively on the forms of fiat currency that are not currently meeting all their needs and interests. These relate to the first three drivers of social movements. We are not well versed in the fourth area, although we recognise a political backlash against mainstream monetary systems may create more interest in alternative solutions, such as community currencies. However, there is the possibility for the freedoms for innovation and advance in this field to be curtailed with draconian policies resulting from ignorance or lobbying pressure from incumbent institutions.

Box 2: Community Forge Partnerships

Many Local Exchange Trading (LETS) groups in France and Switzerland use our software and services. A cluster of LETS in Belgium has committed to our software for three years now, they are expert users and can run it largely without us now. We are networking their mutual credit circles together so they can trade between circles. <http://www.community-forge.net>

We are working with the Common Good Bank in the USA to make an SMS interface for our software. <http://common-goodbank.com/>

We are working with the Hub network to develop a combined mutual credit / reputation system to encourage freelancers to collaborate better together. <http://www.the-hub.net/>

With a sustainable energy project in Wales.

When Transition towns produce a community site for each town, we shall offer an optional marketplace component, working with communitytools.info

We are engaged with Timebanks in UK and Turkey as they experiment with ways to become more sustainable through business [participation. zumbara.com](http://participation.zumbara.com)

We are striving to provide an affordable rebuild for Community Exchange Systems (CES) whose software is ageing. www.ces.org.za

Through participation in initiatives like The Finance Innovation Lab, The Rebuild 21 Conference, TEDx Transmedia, Future Perfect, European Academy of Business and Society, Global Ethics Forum and World Economic Forum, we articulate our analysis and work to wider audiences.

As Editors of the Community Currency Magazine we have reached out to hundreds of activists and [enthusiasts. cc-mag.net](http://enthusiasts.cc-mag.net)

Our Hopes, Limitations and Needs

There is a general lack of coverage of monetary reform and currency alternatives in mainstream media, and relative lack of engagement with the issues in civil society. Two subjects equally contentious to vested powers, are land reform and monetary reform. On google "land reform" generates 9 million pages, while "monetary reform" OR "money reform" generates 0.9 million pages. Less than 1% of pages that mention the financial crisis also mention "monetary reform" OR "money reform." Within the field of monetary reform, the vast majority of attention is given to those advocating greater use of, or backing by, precious metals. Not only Republican politician Ron Paul and RT talk show host Max Keiser, but a host of investment companies specialising in metals are calling for a 'return' to metal standards; they do not show how this would improve the situation of the common man, but usually stress the benefits to the wealthy. The latest example of how this is becoming acceptable discourse is the 2012 Economist published book on the role of gold as money.

Currently, we contest that work on community currencies is underfunded. Perhaps this is due to our lack of skill and networks in the field of fundraising. However, we have found that few people, and fewer people with money, are emotionally open to the subject matter of community currency development. Monetary reform is a somewhat respectable subject, but implementing currencies attracts almost no institutional money. Notable exceptions include STRO, which has survived over the years with Dutch government support and is increasingly seeking corporate funding, and NEF, which has managed to raise significant funds for their transition money projects.

Most of the pioneering community currency organisations — Regiogeld, CES, and Community Forge — source next to nothing in institutional funding, and the numerous local community initiatives nothing at all. Timebanks receive government support but they have to be very careful not to treat hours as money. It is very difficult to work in such a diverse and under-resourced field. However we are finding that coherence can be offered in the form of free open-source software. So our initial offering is just that — free software for community accounting. We are actively

seeking to work with Transition Towns who have an impressive global network of relocalisation activists who are open to change; we have links with National timebanking organisations who receive government money for community building; we also assist communities who have already made the leap into monetary activism, to increase their chances of impact. We are not dogmatic about currency design, but we have some experience at the same time, and we are happy to witness a wide diversity of approaches. So we are one step removed from the coal face where transactions actually happen, and our impact is felt across a large proto-network. We are networking all the community exchanges we host, because our users absolutely need the benefits described by Metcalfe's law, which states that networks become exponentially more useful as they grow. The Community Currency Magazine, which we edit and publish, is part of that network building. We are now actively seeking opportunities to apply the same open-source free software methodology in the commercial business barter space because LETS activity has a negligible economic impact. We believe that a new culture of sustainable businesses is emerging and that we can help them to flourish by providing non-money accounting systems.

For those interested in providing tangible support, and therefore learning by doing, there is much to be done. Our users want better payment technologies, more useful web sites, trust metrics, training, and support to help them grow their membership. Therefore, currently we don't need more theory, we don't want to lobby, we don't need more multi-stakeholder conversations and conferences. Instead, we need skilled volunteers, sources of non-tied non-branded donations of resources, either in-kind or, sometimes, in fiat currency.

Possible Lessons for Other Sustainable Currency Initiatives

We recommend that anyone starting a new initiative, or deciding what to support, needs to reflect first on their theory of change, in particular:

- I) what is the 'problem set' that your proposals are solving,
- II) what are the grounds for the method you propose to employ to address it
- III) how does this method compare to other potential methods, and

IV) what empirical evidence and what learning process is there to evaluate your problem definition and methods.

In addition, we encourage enthusiasts for monetary reform and currency innovation to draw insight from social movements theories to see how your work could contribute to a movement of change. These processes of strategic reflection need to be done with as an exploration, rather than an attempt to create a better narrative for what you already want to do.

To those reformers who think that money is a matter of State, and that it must be changed by affecting policy, law and government, then we think the following questions need to be asked before putting all your efforts in that basket: i) when was the last time that monetary policy was affected by popular feeling, ii) are the banks & central banks more or less powerful than then, and iii) what is different now that will make advocacy and lobbying more effective?

We ask these questions because we see that while the highly educated discuss ideas for top-down reform, grass roots approaches with volunteers are already making headway with almost zero investment. These grassroots approaches are not trying to change the old system, but building a new system. Yet as they progress they will need political support, to defend progress from reactionaries.

To those who want to engage in new currency innovations, then not only do we encourage clarity on the specific problems your currency proposals are trying to solve, but also why working on such proposals is more important than engaging with those who are already implementing sustainable currency systems. For those who prefer to work in solidarity with a social movement for sustainable currency, then here are some insights we have on needed areas of action:

1) Education and Public Relations. Education efforts are needed for the “multipliers,” who include educators at schools and universities, and business and finance journalists (in print and TV). In addition, additional educational efforts directed at enabling specialists working on aspects of sustainable development to begin new programmes of work, would be helpful. That includes NGOs, churches, charitable foundations and networks of activists, CSR managers and social entrepreneurs, and international development agencies

and intergovernmental organisations. Ideally, more education of general publics, via a mainstream feature length documentary, of a standard that could be nominated for international awards, could be catalytic. We are very pleased to see Positive Money vigorously touring the UK educating people about money, and think that they could usefully expand their message about potential solutions and ways to engage, and also be replicated by similar campaigns worldwide.

2) Encourage Local Variety and Decentralisation of Authority.

Many experiments need to be undertaken and much needs to be learned. If we act too much together, then a single law, or software virus, or a bad PR event could be catastrophic. Given this need for experimentation and diversity, we should question if an initiative deploys the same 'proxy pound' model on numerous occasions, despite minimal usage and the only evidence of impact in public relations, not in the economy.

3) Coordination and Professional Development.

Currently, resources are few, and we should share all we can, and to do that, we have to know what each other is doing. The reason for the Community Currency magazine is to encourage the myriad new projects starting up to be relevant and informed about what else is going on. We have found that often the most energetic local activists are the least informed about other localities. This situation points to the need for mutual learning. In time, the lesson learning could lead to a body of knowledge on what constitutes good sustainable currency design, implementation and governance. Standard trainings could be developed, while enabling a variety of models to be tried.

4) Engagement With Mainstream.

As mentioned above, the economic impact of LETS is minimal. There is a need and opportunity to scale these, to make mutual credit systems ubiquitous. There are two main ways we see to mainstream. First, local, state and regional governments could ally with or create mutual credit systems and back them through accepting taxes in such currencies. This would also provide such local

authorities with new means of hiring local labour for public aims. Second, a free open-source software solution to business bartering and associated APIs for existing platforms to connect, would help to this to scale. Then such systems could even be connected to person-to-person mutual credit systems, and thus take community currencies to greater scale.

Box 3: Thoughts on Energy-Backed Currency Propositions

Using energy futures as money is an interesting idea proposed by the organisers of the conference at which we present this paper. To benefit wider society rather than only its developers or adopters, it is important that such a currency would be sustainable, meaning it would be sufficiently credible, stable and available to enable the functions of a currency, while not itself damaging ecosystems or extracting resources from its user communities. It is also important that any initiatives to develop such currencies are clear on their methods of change and why such an initiative is more worthy of support and time than other sustainable currency initiatives which are already extant and in need of support.

On the question of sustainable energy generation, the key challenge is investment capital for local renewable energy generation. The providers of such capital only have a secondary interest in how the energy is sold, as their first interest is to get their money back, with an agreed return. With this in mind, the more practical way to begin an energy currency will be to help the green power companies to sell transferable energy future certificates, or even just to accept Kilowatt cards <http://www.kilowattcards.com>. Then an effort to encourage people to install local renewable power generation, and keep the monetary agenda for later.

If the proposal is to use energy as a medium of exchange, then we should be asking about the payment infrastructure.

Presently there is one global payment infrastructure which is owned by the banks, and which may not be open to an energy currency, or may be available at an undesirable price. Payment technology is a vibrant field, both for legal tender and novel currencies. It could be a while before a suitable technology emerges, and even then, it cannot achieve ubiquity without either massive popular uptake, such as we have seen with bitcoin, or massive investment. For this reason, and because the value of energy is likely to increase over time, we would currently favour the use of energy promises as a store of value.

It is our understanding, especially having read "The Lost Science of Money", that money does not need to be backed; it is a false analysis of the financial crisis to argue that a backed currency would prevent the economic, social and environmental problems arising from our monetary system. From our perspective as grass-roots implementers, backed currencies are much more difficult to bootstrap, and much more constrained by law. First of all, you need to acquire a suitable commodity in sufficient quantity. Then you need to store it with some trusted party, and finally you need extra security because commodity money is more steal-able and has intrinsic value outside the community. Therefore, often the better kind of backing is the backing of agreement and commitment from a community of users. Aristotle observed that nominal money should be used locally, while commodity money (gold) was more suited to trade abroad. We need to solve both problems, but until there are serious resources available, nominal money solutions can be implemented more readily.

Conclusion

In Community Forge we are adamant that people deserve money that they can control. Communities deserve currencies with a better kind of backing: their own skills and trust in each other. The current dominant for-profit monopoly is unacceptable. Money is critical public infrastructure and either it should be open to competition, or it should be strictly run not for profit. We practice what we preach, giving everything for free and our users respond by freely donating. As community currency practitioners, we notice resources and attention going in impractical directions: think tanks, conferences, dialogues, outreach, and academic studies; which appear to have no bearing on the matters that are being addressed by those implemented solutions with no resources right now. Therefore we hope to see more clarity about what problems people seek to solve with their currency efforts, combined with support for the communities who most need it and are most ready to implement solutions.

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Will be provided in a final version, after the conference.

Coming Natural Saving And parallel planting in Kenya: a greency to support indigenous forest stewardship

Autor: Joel Thompson

Abstract

The work of African Forest Ltd. in pioneering Parallel Planting in Kenya's Rift Valley province has opened the door to enhancing sustainable indigenous forest stewardship using microsavings and complementary currency instruments based on Hudon and Lietaer's Natural Savings model (2006). The paper proposes uniting the conceptual nature of Lietaer and Hudon's Natural Savings model with the practical success of parallel planting to form a combined micro-savings and green currency instrument for farmers and small communities living near protected forest areas. The instrument would utilise cooperative and complementary functions alongside national money, backed by the non-timber products of standing indigenous trees grown by farmers participating in parallel planting projects in Kenya. Indicators of success would be rooted in objectives which seek to a) advance indigenous forest cover and stewardship, b) provide profitable returns from sustainable forest management, and c) improve economic security for communities dependent on Kenya's forests for their livelihoods.

1. Introduction

The forests of Kenya nurture a bounty of endemic biodiversity (Peltorinne 2004) and gift crucial climatic and watershed services to the Kenyan population (Wass 1995, pp.35-40). Some 70-80% of Kenyans depend upon wood sources for domestic energy (Ludeki et al. 2006, p.18; UNDP and GEF 2007, p.7) and many indirectly depend upon the forests to provide water of ample quantity and quality to produce hydropower, which accounts for nearly 60% of national grid energy (UNEP 2009, p.4).

Despite great human dependence on the environmental services they provide, Kenyan forests have suffered from aggressive deforestation for decades. Indigenous closed canopy forests declined by 8% from 1990 to 2010, sinking Kenya's indigenous forest cover to 1.96% of total land area (FAO 2010, p.8) – far short of the interna-

tional recommendation of 10% (Ludeki et al. 2006, p.1).

The cumulative decimation of Kenya's forests has an adverse impact on environmental sustainability, human welfare and political stability. The following examples touch on these considerations:

1.1. Environmental Sustainability: the 'edge effect'

Firstly, even if deforestation were to halt completely, the highly fragmented nature of Kenya's forests has already upset their trophic balance and biodiversity (Peltorinne 2004, p.1; Wass 1995, pp.20, 30). The so-called 'edge effect' caused by forest fragmentation increases exposure of the interior to the forest edge. This affects the balance of species' populations, and has been thoroughly corroborated by studies of American forests (e.g., Robinson et al. 1995) and some studies on Kenyan forests (e.g., Maina and Jackson 2003, Spanhove et al. 2009). In protected areas, such as Nakuru National Park, fragmentation is clearly visible from satellite imagery:



Figure 1: View of Nakuru National Park

Source: Google Earth 2012

What is not clearly visible is the environmental impact of fragmentation and the edge effect. These impacts include (i) the 'extinction vortex', a type of genetic drift whereby 'small populations can fall into a vortex of positive feedback loops leading to smaller and smaller population size' (Campbell and Reece 2008, p. 98), (ii) acceleration of land and watershed degradation (UNEP 2009, p.34) and (iii) interference with population dynamics through the curtailment of species' natural territorial and migratory behaviours (Gichohi et al 1996, p. 296).

It is clear from the above that environmental sustainability requires more than outlawing logging and the application of law enforcement to that end. Forest fragmentation and the edge effect

should be a key consideration in the design of a currency instrument to advance indigenous forest cover and stewardship.

1.2. Human Welfare: climate change

The Government of Kenya has dedicated significant political capital to understanding the impacts of climate change upon the country (Kameri-Mbote and Odote 2012, pp. 297-8). The 2010 release of the government's National Climate Change Response Strategy (NCCRS) acknowledges climate change in Kenya as 'unmistakeable and intensifying at an alarming rate', evidenced by the droughts of 1999/2000 when around 4.7 million people faced starvation (GoK 2010, p.5). Since 2000, the increasing climatic extremities have all but ended traditional weather patterns upon which millions have relied upon for centuries to make a living in arid and semi-arid areas, which define the majority of Kenya's territory (CSTI and MSDNKAL 2009, p.3). Most recently, in 2011, the consecutive failure of annual rains in the horn of Africa lead to what the UN described as the 'worst drought that East Africa has seen in 60 years' (AMREF n.d.). Millions of Kenyans faced starvation.

Advancing indigenous forest cover and stewardship has a significant contribution to make towards community resilience initiatives seeking to protect the most vulnerable from natural disasters caused by climate change. The Government of Kenya's NCCRS recognises forests as the 'ultimate climate regulators' (GoK 2010, p.30) and the work of Wangari Maathai in establishing the Green Belt Movement has spread recognition nationwide of the importance of tree planting in combating desertification (Wilson and Juntti 2005, p.217).

Climate change is a global phenomenon and only so much can be achieved by even the richest countries of the world working with the most dedicated public, private and third sector institutions. Nevertheless, Kenyan forests play a crucial role in national climate regulation and a currency instrument designed to advance indigenous forest cover should also consider supporting climate change resilience through sustainable forest management (SFM).

1.3. Political Instability: 2008 election violence

Kenya is ranked as one of the most politically unstable countries in

the world, although its situation has improved somewhat in recent years (Foreign Policy FSI n.d.). Environmental degradation and the ensuing fight for diminishing resources strongly contributed to the 2008 post-election violence (UN FT 2010, p.16) and Médard describes issues of resource poverty and landlessness in Kenya as 'inherently political' (2010, p.19). Indeed, it has been argued that the title deed itself is 'unnatural'; that an institutional exaction of traditional community ownership is the root cause of the 2008 election violence (Borruso 2005, pp. 5-8; Borruso 2008, p.1).

Whatever the argument as to the precise cause, it is clear from cases such as the 2008 post-election violence that there is a positive relationship between environmental degradation and political instability. Building a complementary currency instrument to advance indigenous forest cover must also look to these concerns not just hopefully, but strategically, through the lens of economic and environmental security.

2. Government Policy and International Conventions

Given the concerns hitherto outlined, a short exposé on government policy is in order, the substance from which one might determine the political appetite for the intervention proposed in this paper. The Forests Act of 2005 makes clear the Government of Kenya's commitment to protecting the country's forests. In specific regard to indigenous forests, the policy promotes Participatory Forest Management (PFM) and the 'user pays principle' to encourage those who derive direct benefits from the forest to 'contribute to their conservation and management' (Ludeki et al. 2006, p.15). To this end, forest community residents have been encouraged to organise themselves by registering with the government as Community Forest Associations (CFA) (Ibid., p. 66).

The decentralised and participatory approach set out in the Forests Act is also favoured by UN bodies (UN FT 2010, p.35); there remains, however, considerable discord between the noble intentions of the Government's Forest Policy (GoK 2007) and the level of interest from forest community residents in implementing PFM. This may be related to the level of economic security in the community, given that the benefits of PFM accrue over many years, whereas poverty impresses immediate needs upon forest commu-

nity residents (Koech et al. 2009, pp.6-7).

Increasing forest cover features in 'Kenya Vision 2030', the government's development blueprint for the country (UNEP 2009, p.1). 'Rehabilitation and Protection of Indigenous Forests in Five Water Towers' is one of Vision 2030's 'flagship projects' (GoK 2012). Whether the government's environmental aspirations can be reconciled with the pursuit of 10% annual GDP growth – a central pillar of Vision 2030 – is a relevant question, and will be touched upon in Section 3.

Rehabilitation of indigenous forests is also recognised in several international conventions to which Kenya is a party. These include the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Convention to Combat Desertification (UNCCD) (Ndiritu 2009, pp.7-8). Monitoring carbon stocks in forests to establish baselines for carbon offsetting and cap-and-trade schemes has also benefited from international leverage since the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD) began in 2008; the Kenya Forest Service has demonstrated a desire to develop a national strategy to this end (KFS 2010).

The prospect of REDD/carbon credits in Kenya might find viability for indigenous forests by leveraging market mechanisms within the present monetary-economic paradigm. But it raises questions over how best to adequately value and protect ecosystem services from within a paradigm which environmental economist E.F. Schumacher termed as the 'idolatry of economism' (1999, p.91). With this in mind, the next section will broadly consider (i) obstacles to incorporating sustainable indigenous forest management within the dominant monetary-economic paradigm and (ii) opportunities in 'green' complementary currency interventions to overcome these obstacles.

3. 'Green' Complementary Currencies

3.1. National Money and Economic Growth

Vision 2030's development agenda rests on three pillars, one of which is 'to maintain a sustained economic growth of 10% p.a. over the next 25 years' (UNEP 2009, p.1). The position taken by the

Government of Kenya is that economic growth will bring prosperity for all as well as the protection of indigenous forests. However, the argument that economic growth always produces marginal benefits not only does a disservice to the true meaning of 'economic' (Daly 2011), but is slowly being vanquished from 21st century economic development theory, which recognises that the economy does not grow into a void, but is instead limited by the fragility and biocapacity of the planet (e.g., Daly 2005, Gilding 2011, Jackson 2009, Martenson 2011, Rubin 2012, Zencey 2012).

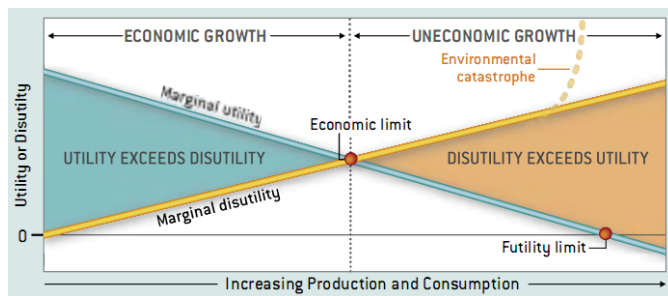


Figure 2: 'When growth is bad' (Daly 2005, p.103)

Given the numerous environmental calamities befalling Kenya (some mentioned in Section 1), the target growth rate of Vision 2030 augurs a path of uneconomic growth which will do more harm than good to human wellbeing and environmental conservation. It may well be, however, that the growth will never be realised, but falter under immediately pressing natural limitations to growth (Rubin 2012).

Orthodox economic mantra may confide that 'all growth is good growth', but GDP growth is more a systemic imperative than a policy option. The decoupling of the money supply from the limits of the planet means that money can grow indefinitely regardless of the ability of the biosphere to replenish its stocks (Turnbull 2012). Further, it must grow indefinitely to pay off compounding interest on the money supply which originates from interest-bearing debt. This phenomenon has been described by monetary theorist Greco as the 'debt imperative and the growth imperative that derives from it' because an exponential expansion in the economy is re-

quired to service the debt-based money supply (Greco 2009, p.54, Martenson 2011).

Measuring the existing value of ecosystem services is fraught with difficulties (Chee 2004, p.17). Without an adequate valuation of the foundational services indigenous forests provide to the economy, the dominant economic growth narrative may remain unchallenged at a political level. In any case, any such challenge would be limited, as GDP growth will only count marginal monetary benefits of the forests and not the existing value of standing trees in the form of ecological goods and services (Zencey 2011). A one-dimensional valuation might be realised through Kenya's Forest Service monitoring carbon stocks with a view to potentially trading carbon credits (see Ndiritu 2009, p.3, for a tentative valuation). Eco-tourism may also make a 'clean' contribution to achieving Vision 2030's target but is limited by finite marginal economic gains to be made from the sector.

The challenge for today remains the unsustainable utilisation of Kenya's indigenous forests, which generate significant monetary and non-monetary gains for state and non-state actors (Ndiritu 2009, pp.2-3). These gains may buttress Vision 2030's growth target in the short term, but as long as the growth remains truly and grossly uneconomic, the costs borne to the environment and the economy as a whole will become ever more catastrophic.

3.2. Green CCs (Green Complementary Currencies)

For human activity to draw sustainably from the Earth's ecosystems it must do so at a level commensurate to the sun's energy or, more precisely, the low entropy input of the sun (Jones 2012). To align the expansion and contraction of the money supply to these levels would produce a radical economic paradigm shift. It would shackle growth of the money supply to the ecological economic limits of the planet, thereby disabling the wanton growth imperative of the current monetary-economic system. The result would be a human economy that need not grow indefinitely, and need not want to grow indefinitely.

Complementary currencies (CCs) are grassroots media of exchange that could bypass this system to find a solution for protecting Kenya's indigenous forests. Designed with various sustainability

agendas and community regeneration objectives in mind, some CCs have a specifically green agenda (Seyfang and Longhurst 2012, pp.8-9). A 'green' CC might, for example, use renewable energy as a unit of value, limited by the low-entropy of current sunlight but maximised by human ingenuity. Rather than tapping 'ancient sunlight' (Hartmann 2004) the currency might begin as renewable energy bonds but ultimately become a self-sustaining local community currency, anchoring monetary and economic expansion to 'real world limits' (Turnbull 2012).

Furthermore, the design of a green CC can and perhaps should consider anthropology and eco-mimicry. For example, lessons can be learned from how ecosystems balance diversity and efficiency for the optimal function of their 'economy' (Lietaer et al 2010). Complementary currencies can add to financial stability by breaking the monoculture of national debt money (Ibid.)

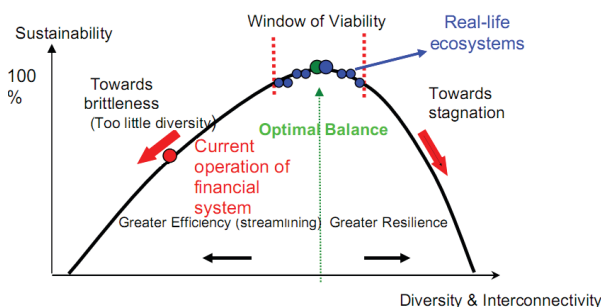


Figure 3: 'Sustainability curve mapped between the two polarities of efficiency and resilience' (Adapted from Lietaer et al 2010, pp.8,11)

In a similar vein, Brakken et al make the case for 'trophic currencies': a diversity of CCs to build a pyramid of wealth from the bottom (individuals, communities) to the top (national, supranational) in a manner akin to energy flows within food chains (2011, p.3). Anthropologically, CCs modelled on traditional or indigenous concepts of value, wealth and economics in Africa have also been proposed (Thompson 2011).

Green-tinged currencies are increasingly at the fore of CC innovation. Some come in the form of loyalty cards, such as the NU

card in the Netherlands and the SOL card in France; both incentivise environmental awareness through 'sustainable consumption' (Blanc 2011, p.8). Others have come in the form of a physical medium to encourage young people to clean up the environment, such as in Kenya and Latin America (Ruddick 2011, Brenes 2011). Latin America, in particular, has become a hive of activity for innovative fourth generation CCs many of which have strong green credentials (Blanc 2011, Brenes 2011).

CCs which use renewable energy or an organic growth process as a unit of account remain elusive. However, Japan has pioneered a variety of such systems, including the WAT currency (backed by renewable energy generated by citizens' cooperatives) and the 'leaf currency' backed by crops (Lietaer 2004, p.13). The conference proceedings of the 2012 First International Social Transformation Conference, which has a theme of 'energy currency', also promises insights into the ongoing development of energy-backed currencies.

3.3. Natural Savings

Natural savings is a green CC concept designed by Lietaer and Hudon (2005). It is a microsavings tool and medium of exchange for marginalised communities in inflationary and environmentally degraded environments. It is backed by the organic growth processes of natural resources. If, for example, the natural resource is forests, communities develop forest plantations on privately owned or community owned or leased land. In return for their labour on the plantation, labourers earn 'tree shares', which grow in value over time as the trees mature and come closer to the time of harvesting for timber. Once harvested, the shares return a monetary profit. The shares may also act as a medium of exchange among community members and, hence, as a complementary currency. The natural savings model seeks to diminish the net present value of deforestation in inflationary environments in favour of long-term sustainability goals for local communities and the environment.

Natural savings could be suitable for deployment in Kenya. However, to suit the goals of indigenous forest stewardship and advancement outlined in this paper, it would benefit from integration into existing successful forest conservation projects in Kenya.

'Parallel planting' is one such project, belonging to African Forest Ltd..

4. Parallel Planting

African Forest's parallel planting project is being implemented near Nakuru National Park in Kenya's Rift Valley Province. The project creates incentives for local farmers to plant indigenous tree varieties alongside fast-growing exotic varieties presently grown for firewood and charcoal manufacture. The indigenous trees mature into standing trees harvested for non-timber forest products, such as medicinal compounds and essences. Parallel planting provides other non-monetary benefits by preserving the biodiversity of Kenya's forests, increasing rainfall, creating natural springs, decreasing soil erosion and preserving Kenya's ecological heritage (African Forest 2008, AJE 2012).

The process and outcome of parallel planting is as follows:

1. Protected indigenous trees are located and used as seed sources for African Forest's nurseries.
2. Land owners mix slow growing native trees (e.g. the East African Olive and Uganda Greenheart) with fast growing exotics (e.g. Eucalyptus trees).
3. Fast growing exotics are harvested for fuel and timber while the slow growing natives are left to mature.
4. Standing indigenous trees generate revenue and produce long term investment instruments from non-timber products; such as sustainable charcoal, medicines and honey.
5. Farmers, land owners and local communities profit from the non-timber products of indigenous trees. (Ibid.)

African Forest's parallel planting project is a unique approach to indigenous forest stewardship in Kenya because it brings attention to the profitability in sustainable forest management. The profit-making status of the company is an advantage because the project does not depend upon the fleeting and unreliable donor funding typical of traditional non-profit planting projects in Kenya, such as those implemented by the Green Belt Movement (see, for example, UNDP 2007). Instead, African Forest garners funding through a variety of revenue streams which 'tap the wealth available in agro-forestry in an innovative and sustainable way' (African Forest 2008, p.2).

Another advantage of parallel planting is that African Forest utilises CFAs and the PFM approach with a promise of both short and long term monetary and non-monetary benefits to forest community residents, thereby supporting the government's Forest Policy and feeding back vital information on best practices (Live Africa Live n.d.). At present, and as described in Section 1, the lack of immediate financial incentives for forest community residents to take ownership of indigenous forest stewardship through CFAs is a 'major source of concern' for the successful realisation of the government's Forest Act of 2005 (Koech et al 2009, pp.6-7).

5. Combining Natural Savings and Parallel Planting

Parallel planting complements the Government of Kenya's policy objectives, whereas natural savings offers a green CC framework to create monetary/financial incentives for the conservation of indigenous forests. Combined, the two could operationalise a formidable tool to realise the following objectives:

- a) Advancement of indigenous forest cover and stewardship.
- b) Provision of profitable returns from sustainable forest management.
- c) Improved economic security for communities dependent on Kenya's forests for their livelihoods.

For the rest of this section, the proposed currency instrument will be referred to as the Parallel Planting Complementary Currency (PP-CC)

5.1. PP-CC Issuance

In return for contributing to indigenous re-forestation and forgoing lost earnings derived from deforestation or planting exclusively exotic tree plantations, commitment to parallel planting projects would provide a variety of favourable returns for forest community residents and farmers:

- a) Short term: issuance of PP-CC in return for growing indigenous trees and protecting extant indigenous trees.
- b) Medium term: planting, growing and felling of fast-growing exotic tree varieties selectively planted in parallel with indigenous varieties.

c) Long term: issuance of PP-CC in return for the sowing, cultivation and conservation of indigenous trees harvested for non-timber products.

In the case of (a), above, the amount of PP-CC earned is commensurate with the amount of time put into protecting local indigenous trees. The greater the duration of time a tree or an area of trees is taken care of the greater the number of PP-CC could be issued. For example, 1 PP-CC could be issued annually per tree which is protected and not felled by forest community residents. The intended incentive is to switch current practices of deforestation to stewardship.

In the case of (c), above, the value of PP-CC earned increases with the growth of trees from saplings to mature standing trees. This is because the first harvest of non-timber forest products comes ever closer. From the first harvest onwards, yields may fluctuate with the seasons but they will be maximised with the careful stewardship of the owner looking after the health of the tree(s). If the tree is healthy, it will continue to generate a long term revenue stream for the owner with minimal input once the tree is matured and established. Regardless of how the economic climate impacts the desirability of harvesting the forest products, an incentive remains in place to protect indigenous trees that are not being harvested (see (a) above). Such an incentive is important in times of economic volatility when shrinking profit margins might increase the temptation to fell indigenous trees for timber.

Finally, in the case of (b), above, farmers are free to continue the current practice of harvesting exotic tree varieties for subsistence uses of timber or sale. Such tree planting would, however, take place in parallel with indigenous tree varieties in accordance with parallel planting methodology employed by the project implementer.

5.2. PP-CC Functions

PP-CC could be:

- I) Spent on products harvested by other farmers or forest community residents.
- II) Used as a form of microsavings, since the value of PP-CC

would naturally increase over time.

III) A medium of exchange to pay for other, non-forest products from local businesses.

IV) Exchanged for national money by the implementer once the trees' goods are harvested and sold.

In instances of exclusive stewardship of extant trees, PP-CC could be spent in ways (I), (II) and (III), but could not be exchanged for national money. This is because standing trees left untouched do not create a revenue stream within parallel planting practice. It is conceivable, however, that a carbon credit scheme could be incorporated into parallel planting. Under such circumstances, it could be permissible for PP-CC originally issued for the sole stewardship of standing trees to be exchangeable into carbon credits, which could then be traded or sold for national money.

5.3. PP-CC Benefits: environmental and climatic

As mentioned in sub-section 1.1., forest fragmentation and the edge effect should be a key consideration in the design of a currency instrument to advance indigenous forest cover and stewardship. Strategically implemented parallel planting projects could reduce the edge effect and thereby recover biodiversity and the balance of species' populations. Furthermore, parallel planting makes a contribution to a plethora of ecological services; including climate regulation and watershed management. The crucial importance of these for human welfare has been pointed out in sub-section 1.2. PP-CC creates an incentive for local labourers, farmers and residents to make coordinated efforts to support sustainable forest management and reduce fragmentation.

5.4. PP-CC Benefits: socioeconomic

PP-CC works as both a green CC and a microsavings instrument to inject additional liquidity into local economies among forest communities. It monetises indigenous forest stewardship accounted for in the form of PP-CC issuance, which is fully backed by the organic growth and energy of indigenous trees. PP-CC has validity and circulation within a select circle of businesses and individuals, and furthermore has fungible properties which make it highly liquid for exchange

into national money and locally produced goods and services.

PP-CC also introduces a relatively stable and predictable local currency to function alongside the Kenyan Shilling. For instance, it encourages holding savings in a country with high currency and price inflation (Cf. KBNS 2012). This is made possible by the value PP-CC accumulates over time, whereas the purchasing power of national money, the Kenyan Shilling, depreciates, sometimes dramatically, over time. PP-CC is, however, a complement to national money and does not impinge upon the ability of forest community residents to continue earning Kenyan Shillings from growing and felling fast-growing exotic trees for timber.

5.5. PP-CC Benefits: political stability and government policy

The major obstacle to the formation of CFAs to protect indigenous forests has been identified as a lack of financial incentives for forest community residents (Koech et al 2009, pp.6-7). PP-CC creates an economic incentive for the formation of CFAs earnest in their dedication to indigenous forest stewardship. PP-CC further supports the Government of Kenya's Forest Policy and makes a direct contribution to the government's National Climate Change Response Strategy.

A positive relationship has also been previously identified between environmental degradation and political instability. This gives reason to believe PP-CC projects could buttress political stability by, for example, reducing the number of environmental refugees created by climate change and desertification in Kenya.

5.6. PP-CC as a Green CC

The green nature of PP-CC plays a pivotal role in the combining of natural savings and parallel planting. Natural savings tethers the issuance of the natural savings instrument to the limits of some organic growth process, like indigenous forest rehabilitation. It therefore models an energy-backed financial instrument. The advantage and perhaps necessity for the coupling of money to the ecological regenerative capacity of the biosphere has been previously discussed.

Parallel planting's success rests on generating adequate revenue from its profit-making conservation methods. The methodology it uses to attract investment in its agro-forestry products requires

sustained growth in product value over time and growing consumer markets to satisfy the compound return on investment. A stable macroeconomic milieu is, however, out of reach because of economic instability provoked by the global monoculture of debt-based money. The long term success and contribution of parallel planting therefore begins with an appreciation of how the monetary-economic paradigm further drives socioeconomic and environmental instability. It then becomes relevant to incorporate the natural savings framework into parallel planting because natural savings brings a micro monetary-economic paradigm shift to parallel planting through the introduction of a green CC. This allows PP-CC to be designed with ideals pertinent to sustainable forest management while simultaneously making the project more financially resilient and sustainable. By comparison, eco-tourism, for example, aims to advance sustainable forest management from within the present monetary-economic paradigm. As a consequence, since the money supply must grow exponentially, marginal growth in production is necessary in eco-friendly industries, such as eco-tourism or carbon cap and trade schemes. In reality, of course, eco-tourism could not grow exponentially even it were desirable. Growth in the supply of PP-CC does not need to be exponential because issuance is commensurate with the growth and stabilisation of Kenya's indigenous forests.

6. Conclusion

Combining natural savings with parallel planting equals a green savings, investment and currency instrument adequately issued and circulated among forest community residents to advance indigenous forest cover and stewardship in Kenya. PP-CC could provide profitable returns from indigenous forest stewardship and improve economic security for communities dependent on Kenya's forests for their livelihoods.

The successful realisation of PP-CC would create competing and differing methodologies for its deployment by project implementers; this paper has only sought to outline PP-CC as a concept and not delve into unique project planning and implementation enquiries. Furthermore, there are many other considerations to be made regarding the harvesting, marketing and selling of forest products. PP-CC would be but one component in a parallel planting project, no more than an instrument intended to engender structural economic incentives that work for Kenya's indigenous forests rather than against them.

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Human energy renewable measure

Autor: Jeff Beller and Susan Caumont

Abstract

The energy for human thought and human efforts derives directly from renewable solar energy. Just as energy units can be standardized, human energy can be standardized and used as a renewable energy basis for considering values in a human economy. The Human Energy Renewable Measure, the H.E.R.M., is a starting point for measuring the fairness of human economy/currency systems.

How do we know what is fair without a measurement? How does a person know value with out a standard?

Creating an equitable economic system for human energy(physical and intellectual) requires a base equation for the value of human energy input. A base value can be standardized with a chosen measure/equation that expresses human physical and intellectual effort. This standard valuation would then be based on real economic worth and can be used as a peg for the currency of any country.

The H.E.R.M. can be augmented by special abilities and higher education but the base Human Energy Renewable Measure always guarantees four rights to each person, education, healthcare, food and shelter, which would be part of the Gross Domestic Product.

Introduction

Throughout history there has never been a base measurement for human renewable energy (thought and physical effort). Our economic system functions on subjective valuations of human accomplishment (wages) and a belief system in the form of currency, that is based on nothing.

A system of human energy (physical and intellectual) valuation needs to be created, because human effort is what runs economies and is its source of value; there for should be the peg for its currency. The H.E.R.M., Human Energy Renewable Measure, is a way of thinking about creating a base equation for such an economic system.

How do we know what is fair, without a measurement? How

does a person know where he is if he has no map, no measure for distance, no compass or other locating devise? There is a joke about this. A man had to bail out of his plane and landed in a field. A hiker appeared nearby so the man asked him where he was. The hiker said, "you are in a wheat field." The man said, "you must be an economist." The hiker said, "yes, but how did you know?" The man replied, " you just gave me perfectly accurate information and told me nothing."

There is a need for a measure/axiom for human renewable energy. This measurement is needed so people every where can have a base number on which to calculate their own value, assess the fairness of their economic systems and on which to base the value of their currency. Then real adjustments will become clear as to how the wealth and resources of each nation can be distributed to benefit the majority of human population. An economic system that has currency pegged to the value of human renewable energy empowers all human intelligence to design the best economic solutions and will become organically self adjusting toward the benefit of everyone.

If we are going to create a type of currency that would stabilize value and present less opportunity for inflation, deflation and manipulation, we need a decentralized resource everyone can produce and has real free market potential, for currency to be based on. Presently, the value of our dollar, and by extension the value of currency throughout the world, because the dollar is the "preferred currency", is linked to fossil energy prices. Fossil energy is the amplifier for human energy that has made possible the forms of human civilization we know today. Without it we would still be doing everything 'by hand'. But these fossil resources and prices are controlled by a small group of people in a subjective manner. Fairness will start to evolve as we create more renewable sources for energy, gradually replacing fossil fuel, and peg currency to the most basic renewable energy, human renewable energy, physical and intellectual.

Pre-industrial economies

For almost all of human existence on earth societies have been powered only by humans themselves. They and we derive all of our

energy for thoughts and actions from the energy that comes to us via the sun. Our air, water, and food are all provided by sunshine on plants and sunshine distilling fresh water into the atmosphere for our rain, rivers, and lakes. This renewable energy supply is roughly 4 giga-joules for every adult human existing now and whoever existed over the millions of years of beings we'd call human.

The solar energy input powered our food gathering, our reproduction, our social interactions and our society including the arts and our wars and is still growing our population numbers. It was enough energy for a long enough time to allow the evolution of communication, verbal and written, the storage and transfer of information and the development of science and technology allowing industrialization and the use of fossil fuel energy resources.

Energy from economic man

In 1957, Rear Admiral Hyman G. Rickover, USN, estimated that, "Man's muscle power is rated at 35 watts continuously, or one-twentieth horse power." (he was thinking of the typical army enlisted man) Ref 1

This statement both quantifies an energy basis for humans and also makes comparison with another quantified standard for energy measurement, the horse power. Certainly people as well as horses come in different physical capabilities. However, for the basis of civil commerce the power can be standardized, 35 watts for people, 550 foot-pounds per second for horses.

A reasonable estimate for human renewable energy can be expressed in terms of human peddled bicycle-like devices generating electricity for a specified amount of time, similar to the way horse power was standardized. The standard is somewhat arbitrarily set as 20 human energy hours = 7.2 mega Joules, (Dr. David Borton, RPI).Ref 2 The 20 hours represents a desired length of a basic work week and the energy represents hard physical effort for that time interval by someone in good physical condition. We can break that down as an individuals one hour of energy is standardized to 360,000 Joules = 360 kJ. With the Human Energy Renewable Measure standardized to equal to 20 human energy hours (or 7200kJ) It becomes a useful unit that expresses human energy similar to other numbers we attach significance to like, inches in a

foot, degrees of temperature, ounces in a pound, horse power or any other valuable measurements/equations we use so that there is a starting point agreed upon for transactions, experimentation, travel, time etc.

Human existence economy defined as GDP

Presently, our GDP concerns itself with the human energy that is paid with wages. These wages can become more fair when pegged to a base equation for human intellectual and physical labor (the H.E.R.M.) Wage enhancements based on agreed upon subjective multipliers (higher education, pleasant personality, creativity, etc.) can be applied but a limit must be set in the form of a pay ceiling, so no one makes more than maybe, 50 times the base income. This is a nod to 'inherited knowledge' which makes possible all that humans collectively know. 'No man is an island' the saying goes, and no one can become wealthy without the human community in which they live. No one is discouraged from working as much or hard as they want but a 'ceiling' is necessary to discourage labor/money hoarding.

There is another very important aspect of human energy that is not calculated in the GDP, but without which the GDP cannot exist. This is what we have defined as the 'human existence economy'. It is noted that human existence hours per person per year equal 8,760 hours. Of these hours a 20 hour human work week would be equal to say 2,000 hours per year. The rest of these hours that are not used for sleep are human energy used to create a support structure for the 'work hours'. The 'human existence economy' provides essential support in the form of child care, elder care, volunteer work of all kinds, maintenance of the home, preparation of meals, psychological council, creative activities (writing, music, painting), innovative thinking, etc. In a H.E.R.M. economic system the 'human existence economy' must be included in the GDP and supported by a base wage that guarantees every person no matter what age or ability, education, healthcare, food and shelter. This equals freedom. The success of nations that develop H.E.R.M. economies is rated by how well it takes care of its population.

Energy for currency basis

But how can we value the unique abilities and differences among

individual humans in the HERM system of measurement? We can trade with the HERM value if we put a decimal value on it of 100 of whatever currency used. This kind of currency would be a no interest currency. From this base point of valuation amplifiers for the value of each persons hours of work can be applied. The REGO (Renewable Energy Generation Output, (concept by John Finnerty.) shows the quality of individual human effort helping the free market work. (For instance each year of education beyond a certain point would be equal to some agreed upon amount, years of work experience in a specialized field, unique abilities for writing or the arts and sciences, all these things can make the hour wage higher, but not extraordinarily higher. There needs to be a ceiling as well as a base (as discussed previously). Individuals who use more resources/wealth should pay more back into the economy (taxes, etc.) to sustain the economic system they benefit from. The debt an individual owes to the collective human intelligence (based on thousands of years of human development and inherited knowledge, which is the true debt!) must be taken into account, because we all sink or swim together now that most of us have chosen to live cooperatively in cities, states and countries.

We go back to the HERM to see where balance is, by holding to a base measure for human renewable energy. No one can be denied this base value, whether they can work or not, for they are all still consumers and this creates economic stimulus as well. The HERM is a guarantee of education, healthcare, food and shelter to each individual from birth.

The promise of the HERM can only be reality if human population world-wide is in balance with the sustainable and renewable use of the natural resources on earth. This is a very important aspect that must be addressed scientifically and peacefully. Computers can be used to study the essential systems, human and natural, determine their needs and calculate workable balances. We already have the tools available to determine the best practices on earth.

Conclusions

The value of human thought and effort can be based upon a standardized measure of human physical work. The standard can be multiplied by physical and intellectual values that add to the agreed upon base wage but cannot exceed an agreed upon 'ceiling'. Human individuality and quality of effort are recognized and rewarded then focused to the benefit of everyone.

The HERM principals need to be further clarified so they can begin to influence the formation of an efficient, sustainable and equitable economic system. We welcome input on these ideas.

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Metrological Aspects of an Energy-Based Currency System

Autor: Steivan Defilla¹

Abstract

An energy-based currency or currency system is the only one to implement clearly defined metrological principles as they apply in physical sciences. In metrological terms, money is needed as measurement instrument for economic activity, which is a complex supply and demand driven “income game”. A measurement instrument is however distinct from the measurement unit upon which it is calibrated or standardized and which may designate basic quantities measured in economics such as wealth and value. Energy is the basis for defining a measurement unit for these quantities. This author has proposed an energy-based definition for value called walras in 2007. This definition is materially compatible with the System of International units (SI) administered by the Bureau International des Poids et Mesures in Paris. The exchange rate between the walras and any currency can be called energetic or physiological purchasing power (PhPP) of the currency. Its inverse is the hedonic energy price (HEP) or hedonic walras price (HWP). Both, PhPP and HWP are estimated by hedonic statistical methods. This author has estimated the PhPP and HWP of the Swiss franc in 2003 and plans in his current research to estimate the PhPP and HWP of some further currencies and years. The paper shows that even with an energy-based definition of a wealth or value unit, wealth and value remain clearly distinct from energy.

JEL classification codes: A12, B13, C13, C43, E42, E5, Q4

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1. Introduction

The measurement paradigm of economics and the theory of value is the Achilles heel of modern economics and econometrics. The problem stems from a missing part in the theory of value. This article aims at showing how the link between energy and money can bridge this gap and at the same time contribute to introducing the idea of an energy based currency into economic thought. It starts with describing the challenge of measurement of the "income game", then introduces basic metrological principles that can be applied to economics, further presents the definition of the walras as the value or wealth unit based upon energy and finally discusses several options of introducing energy standards in practice.

2. Challenge of measurement in economics and finance

Economics is usually considered as a quantitative social science studying production, distribution and consumption. The term "econometrics" literally designates measurement of economic activity. Economic activity can be compared to a competitive game whereby agents strive for income². It may be convenient to call this process an "income game".³

The term "measurement", applied to economics, can mean either measuring an accounting aggregate, such as income, or setting a price. Note that in spite of prices being attributes of products (i.e. goods or services), they are in reality not properties of goods or services. Rather, prices, multiplied by the quantities of goods or services sold by an agent, can be seen as marginal or incremental contributions to this agent's income. In this sense, income is a more fundamental concept than price. Scientifically interesting economic observations are also the price-based transactions ("quantities") of products.

If economic activity can be called a kind of a competitive "income game", it can be compared to a competitive sports game in which winning consists in running over a certain distance in the shortest possible time. Examples are a popular marathon, a cycling,

² In non-cooperative games, the equilibrium is called Nash equilibrium, cf. J. Nash, (1951), "Non-Cooperative Games" *The Annals of Mathematics* 54(2):286-295. The prisoner's dilemma is an example of a non-cooperative game, see for instance http://en.wikipedia.org/wiki/Prisoner%27s_dilemma, retrieved June 2012

³ „Game“ is understood here in a broader sense than in game theory. Wittgenstein showed that there is no exact definition of the word „game“ and that it does not need any definition because it is understood anyway, Wittgenstein, Ludwig (1953/2001). *Philosophical Investigations*. Blackwell Publishing, §3.

a skiing, yachting or a motor racing competition. The competitors of the “income game” are the producers and sellers of goods and services. Whereas cyclists or yacht race participants have to run over a given distance in the shortest possible time, market agents have to produce goods and services at least cost. In sports and in the “income game”, playing may be more essential than winning. Competition need not necessarily take place only between individuals. Just as in a sports game like yachting, where competition takes place between teams within which individual athletes do not compete, economic competition may take place between enterprises within which individuals cooperate.

All games have in common to need rules. It is a breach of rules to run a cycling race on a motorbike, just as it is inadmissible to employ unpaid child or slave labour for producing or selling commercial goods or services. Note that these rules, also called framework conditions, are entirely man-made. It is therefore not true that economics is a purely descriptive science. Just as any sports competition has its rule-setting component, the “income game” has a normative, prescriptive component, namely how to design optimal man-made rules or framework conditions. Note that one set of rules may “work better” than another one, whereby “work better” means either that it produces an overall better performance of athletes when all other things are being kept unchanged (“*ceteris paribus*”), or that other specific social objectives are better attained. Fundamental framework conditions of the “income game” can be divided into two categories:

- the generic rules of the game such as property rules and the exchange principle, without which the game would not take place because it would be easier for agents to grab and steal, i.e. to play another game;
- the accompanying rules such as labour or environmental conditions, without which slaves or unpaid children could be employed or the natural environment could be depleted for free, i.e. the game would take place, but allow for more or less severe cheating.

Cheating occurs when agents pursue their own goals. In economic theory, pursuit of one’s own goals will lead to a social or

Pareto optimum except in cases of market failure. Economic theory distinguishes between more or less three types of market failures which have to be corrected by state intervention:

— If an agent is so dominant on a market that he might set a price independently from any other agent, he has a dominant position. This market will fail, i.e. lead to cheating, unless controlled by special legislation⁴. In the ideal case, markets work under conditions of perfect competition, meaning that no seller or producer has an influence on price.

— If a producer causes negative effects on others for which he does not pay, this is called external effect, or externality. The biggest ever market failure of this type is climate change⁵, which is caused by incomplete internalisation of external costs due to green house gases such as CO₂. External effects should be corrected by taxes or by any other appropriate instrument. Climate policy also shows the political and economic limits of science: if a decision maker is paid for not knowing climate change, scientific evidence will not be in a position to change this situation⁶. A special kind of a positive externality is the public good⁷ or public service, where the state that produces it can not exclude any consumer from using it (no rivalry of consumption). Public goods have to be financed by taxes.

— A third type of market failure is caused by asymmetry of information, where a producer or seller has much more information⁸ about a product than a buyer. A special kind of information asymmetry is in the principal-agent problem⁹, when an agent may not want to share all information with his commanding authority or person, creating an information asymmetry on the labour or agency

⁴ Competition or antitrust legislation, e.g. in the US: Sherman Act, 1890, whose section 2 prohibits monopolies, (Public Law 94-435, Title 3, Sec. 305(a), 90 Stat. 1383 at p. 1397)

⁵ Stern, N. (2006). "Stern Review on The Economics of Climate Change (pre-publication edition). Executive Summary". HM Treasury, London., <http://www.webcitation.org/5nCeYJr>, retrieved June 2012

⁶ Al Gore, in Davis Guggenheim's documentary film "An inconvenient truth", 2006

⁷ Cf. Paul A. Samuelson, (1954). "The Pure Theory of Public Expenditure". *Review of Economics and Statistics* (The MIT Press) 36 (4): 387–389. DOI:10.2307/1925895. JSTOR 1925895. Also knowledge is an example of a global public good, cf. Joseph E. Stiglitz, *Knowledge as a Global Public Good in Global Public Goods*, ISBN 9780195130522

⁸ Akerlof, George A. (1970). "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism". *Quarterly Journal of Economics* (The MIT Press) 84 (3): 488–500; and: Spence, Michael (1973). "Job Market Signaling". *Quarterly Journal of Economics* (The MIT Press) 87 (3): 355–374; and also: Stiglitz, Joseph E. "The Theory of Screening, Education and the Distribution of Income." *American Economic Review*, June 1975, 65(3), pp. 283–300

⁹ Stiglitz, Joseph E. (1987). "Principal and agent, *The New Palgrave: A Dictionary of Economics*, v. 3, pp. 966–71

market. Information asymmetry and principal-agent problems play a certain role in the failure of systemically-important banks. As it is difficult to force all agents to cooperate and to fully share all information at all times, this market failure also needs to be addressed by ethical standards of culture.

A particularity of the “income game” is that it has no beginning, no end, and no geographic limitation and that it is to a certain extent compulsory in that it is hardly possible in civilization to survive without playing this game.

All the framework rules mentioned above are seller or producer oriented and condition the “income game” itself and the results obtained by players. The market failures describe three different ways of breaking the rules, i.e. of cheating. In metrological terms, cheating will lead to false measurement of performance, particularly of those who cheat, only marginally of all the others. This is different in the rules that will be explained hereafter, which are buyer or consumer oriented and are genuinely of metrological relevance. The absence of clear metrological rules in the economic game is not a market failure in the above sense, but rather more a failure of economic theory entailing a systemic failure, meaning that all measurement results are false. The metrologically relevant rules are buyer or consumer oriented and will be explained hereafter.

Of metrological relevance is the fact that in sports competitions like cycling or skiing, the performance of athletes is measured by a clock, i.e. a precisely indicating measurement instrument. In the “income game”, the performance of a seller is measured in terms of a currency of the buyer. More precisely, money in this context means buyers’ purchasing power. Purchasing power of the buyer sets the scale for the income of the seller. Without purchasing power, there is no “income game”. If e.g. purchasing power of all buyers is numerically divided by a factor 1000 due to a money reform consisting in taking off three zeros from all bank notes, the corresponding seller income will divide by the same numerical factor.

In this situation economic theory states that it is not nominal or current, but real or constant prices that matter. The former is transformed into the latter by taking account of inflation or, more generally, the change of purchasing power of the currency, which is calculated on the basis of the underlying consumer basket. In this

context it should be mentioned that there are in principle two types of currencies: a commodity currency linked to a commodity having intrinsic value, and a fiat currency (or pure legal tender¹⁰) not directly linked to any commodity. Today all main currencies are fiat currencies. Inflation indices establish a link between fiat currencies and consumer baskets.

A clock and a fiat currency have both in common to be measurement instruments. The question is what differentiates them from each other.¹¹ The answer is that the clock is calibrated for a conventionally standardised measurement unit for time, namely the second, whereas a fiat currency is not calibrated. A fiat currency unit is merely a unit of a scoring system (also called numeraire) rewarding producers or sellers of goods and services. The metrological difference with respect to a measurement unit is that the latter is fix, whereas the unit of the economic scoring system is variable. As a matter of fact, there are many fiat currencies in the world, and many of them have flexible exchange rates against each other, and all of them experience either some form of inflation or, at certain times, deflation.

3. Basic metrological principles

The science of measurement and its application is called metrology. The internationally standardized definitions of basic and general metrological concepts and principles can be found in the International vocabulary of metrology, 3rd Edition (VIM3), available on the website of the Bureau international des poids et mesures BIPM¹². The metrological definitions used in this article are taken from the VIM3.

A quantity is a property of a phenomenon, body, or substance, where the property has a magnitude that can be expressed as a number and a reference (1.1.)¹³.

¹⁰ A pure legal tender is means of payment that has no other function except for settling debts; cf. "Legal Tender Guidelines", British Royal Mint. http://www.royalmint.com/Corporate/policies/legal_tender_guidelines.aspx. Retrieved June 2012

¹¹ 68 of 188 countries classified by IMF have chosen to let their currencies float, cf. Uri Dadush/Vera Eidelmann (Ed.): Currency wars, Carnegie Endowment for International Peace, Washington, 2011

¹² International vocabulary of metrology, 3rd edition, 2008 version with minor corrections, Joint Committee for Guides in Metrology JCGM, 2012, available for free on the BIPM website, <http://www.bipm.org/en/publications/guides/vim.html>, retrieved June 2012

¹³ Numbers in brackets refer to numbers of the respective definition in the (VIM3), <http://www.bipm.org/en/publications/guides/vim.html>, retrieved June 2012.

If economic activity may be characterized as “income game”, its fundamental quantity is income. Income mostly applies to physical persons or households. For enterprises, it is often called gross revenue or turnover, and for non-profit organizations it is called gross receipts. In finance, too, income is the main aim, whereas wealth is an important means to achieve it. Wealth is the stock, whose corresponding gross flow is income. In order to better understand the income flow, it is necessary to look at its stock equivalent, namely wealth. A succinct description of the quantity “social wealth” has been given by Léon Walras in the following terms:

“By social wealth I mean all things, material or immaterial ... that are scarce, that is to say on the one hand useful to us and, on the other hand, only available in a limited quantity”¹⁴ .

Note that useful¹⁵ alone does not mean wealth. The oxygen in the air is certainly very useful, but it becomes wealth only if its availability is sufficiently limited so that it gets a price. The same can be said for limited availability. A dangerous virus may not be available in large quantity, but it is not wealth as long as it is not useful. Utility of any product may be extremely variable and its sign (positive or negative) may depend on the kind of interaction of the economic agent with a product. Utility of a gun is different (has opposite sign) for the owner than what it is for the victim.

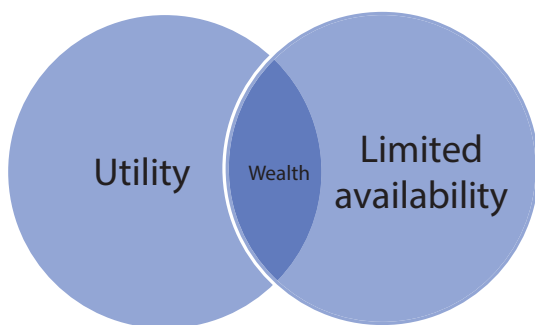


Fig. 1, Walrasian definition of wealth

¹⁴ L. Walras, Elements of Pure Economics or the Theory of Social Wealth, translated by William Jaffé, Orion Editions, Philadelphia, PA, 1984, p. 65

¹⁵ Synonymous for: having utility

Income in general, or gross receipts, is not to be confused with profit or net receipts, the net income flow after deduction of cost, i.e. losses. Price has been described above as incremental income of a seller having sold a good or service. The fundamental quantities of interest of economics and finance are therefore: income (flow), wealth (stock), profit (net), cost (losses), and price (value). Note that income, wealth and profit refer to entities (e.g. "the income of Mr. Smith", "the profit of the ABC Corporation" or "the wealth of nations"). Entities in this sense are individuals, households, firms, governments or nations. Cost, price and value refer to products (e.g. "the price of bread", "the cost of a house" or "the value of an hour of my labour"). Products are goods or services. For a list of products see e.g. the Central Product Classification¹⁶. All these quantities are expressed in terms of money and therefore satisfy the basic requirement, stated in VIM3, that they may be expressed as a number.

The above definition from VIM3 (1.1), however, also requires the existence of a reference:

A reference can be a measurement unit, a measurement procedure, a reference material, or a combination of such (1.1., note 2).

It is worth to look at these terms in more detail:

A measurement unit is a real scalar quantity defined and adopted by convention, with which any other quantity of the same kind can be compared to express the ratio of the two quantities as a number (1.9.).

The biggest deficit of economics is that there is no conventionally agreed measurement unit for expressing the fundamental quantities of income, wealth, profit, cost and price. This is not totally surprising, as economic theory is not unequivocally clear whether the basic quantities of economic science are cardinal or ordinal quantities. Utility is the most commonly used ordinal quantity of economic science¹⁷.

An ordinal quantity is a quantity, defined by a conventional measurement procedure, for which a total ordering relation can be established, according to magnitude, with other quantities of the same kind, but for which no algebraic operations among those

¹⁶ <http://unstats.un.org/unsd/cr/registry/cpc-2.asp>, retrieved June 2012

¹⁷ Utility is synonymous with want, desire, cf. Alfred Marshall. 1920. Principles of Economics. An introductory Volume. 8th edition. London: Macmillan.

quantities exist (1.26). Ordinal quantities can enter into empirical relations only and have neither measurement units nor quantity dimensions. Differences and ratios of ordinal quantities have no physical meaning (1.26, note 1)

Most contemporary authors refuse the concept of cardinal utility and argue that utility is only ordinal. Indeed, Debreu has proved that order or preference relations of economic agents suffice to create general equilibrium¹⁸. Figure 1 shows that wealth is at the intersection between utility and limited availability. This means that if utility was always ordinal, wealth would necessarily be ordinal, too, as it would inherit this property from utility. Wealth, which is not necessarily produced but can exist in form of natural capital¹⁹, is however usually seen as cardinal. If utility is ordinal, wealth necessarily inherits cardinality from limited availability, its other conceptual component. In other words, utility is ordinal except where it is wealth, i.e. where it has also limited availability and is therefore cardinal. Note that in economic theory, it is common to differentiate utility for getting marginal utility, and to take utility ratios. These operations implicitly suppose that utility is a cardinal quantity, i.e. wealth. For ordinal quantities not having any measurement unit, the reference – according to the above definition of the reference (1.1. note 2) – may be a measurement procedure or a reference material, or a combination of such. It is now worth looking at the definition of measurement procedure:

A measurement procedure (2.6.) is a detailed description of a measurement according to one or more measurement principles and to a given measurement method, based on a measurement model and including any calculation to obtain a measurement result.

This requires explanation of the terms used in this definition:

— A measurement principle (2.4.) is a phenomenon serving as a basis of a measurement.

In a market economy, the main phenomenon serving as a basis for measuring prices is the market, i.e. the set of all exchange

¹⁷ Utility is synonymous with want, desire, cf. Alfred Marshall. 1920. Principles of Economics. An introductory Volume. 8th edition. London: Macmillan.

¹⁸ G. Debreu, Theory of Value, an Axiomatic Analysis of Economic Equilibrium, Cowles Foundation Monograph 17, Yale University Press, 1959.

¹⁹ Cf. Capital approach to sustainable development, OECD (2005) glossary of statistical terms, <http://stats.oecd.org/glossary/detail.asp?ID=6360>, retrieved June 2012

possibilities of a good or service of a given agent at a given place and moment in time. Not all markets are equal; some allow quite fair competition, while others are seller-dominated (oligopolies)²⁰ and again others are buyer-dominated (oligopsonies)²¹. The type of market may influence the price level of goods and services traded on that market.

The measurement method (2.5.) is a generic description of a logical organization of operations used in a measurement.

In economic activity, the predominant measurement or the price formation method is price taking – used for most consumer goods – whereby the consumer takes or leaves a good or service that is proposed at a given price. Besides that, other price formation methods are auctions that are used on specific markets, and price negotiations that are common for investments or large equipment contracts. Most consumer surveys use prices stemming from the price taking method.

A measurement model (2.48) is a mathematical relation among all quantities known to be involved in a measurement.

Simple examples of measurement models used in economics are utility maximization under budget constraint²², or cost minimization under production constraint²³.

To sum this up, the measurement procedure in economics consists of a detailed description of price formation on one or more kinds of market (e.g. competitive or oligopolistic) where agents use a given price formation mechanism such as price taking, based upon a model such as utility maximization under budget constraint, including calculations to obtain a price.

²⁰ Oligopolies even exist in areas where the entry barrier into the market is not an issue, such as for auditing, where four big companies dominate the global market, http://en.wikipedia.org/wiki/Big_Four_auditors, retrieved June 2012, or for credit rating agencies, dominated by three big US companies, [http://en.wikipedia.org/wiki/Big_Three_\(credit_rating_agencies\)](http://en.wikipedia.org/wiki/Big_Three_(credit_rating_agencies)), retrieved June 2012

²¹ Examples of oligopsonies can be found in international trade of agricultural commodities such as bananas or cocoa where a small number of buyers meet a large number of producers. This situation was at the heart of fair trade initiatives. These are now grouped in the World Fair Trade Organization WFTO, a worldwide NGO whose global office is in the Netherlands, <http://www.wfto.com/>, retrieved June 2012

²² E.g. in Alpha C. Chiang, *Fundamental Methods of Mathematical Economics*, Third Edition, Mc Graw Hill, 1984, pp. 400 ss

²³ See Alpha C. Chiang, *Fundamental Methods of Mathematical Economics*, Third Edition, Mc Graw Hill, 1984, p. 418 ss

Definition (1.1. note 2) also mentions reference material:

A reference material (5.13) is material, sufficiently homogeneous and stable with reference to specified properties, which has been established to be fit for its intended use in measurement or in examination of nominal properties.

In this definition the following two terms occur:

A measurement (2.1.) is the process of empirically obtaining one or more quantity values that can reasonably be attributed to a quantity.

A nominal property (1.30) is a property of a phenomenon, body or substance, where the property has no magnitude (e.g. sex of a human being, colour of a paint sample, ISO two-letter country code).

In economic activity and economic science an example of a reference material is any commodity having intrinsic value so that it can be used as a basis for a commodity currency.

Any numeraire, no matter whether it exists in form of a commodity currency or whether it exists as fiat currency, is a measuring instrument, defined as follows:

A measuring instrument (3.1.) is a device used for making measurements, alone or in conjunction with one or more supplementary devices.

In the Walrasian general equilibrium approach, there is exactly one (scalar) numeraire, which in theory may be freely built upon any product. This numeraire is the scoring unit of the “income game” as well as the accounting unit of the system. In contemporary reality, the choice of the numeraire is mostly a fiat currency. The monetary system therefore describes nominal wealth; all the other theoretical choices of numeraire describe some form of real wealth. If all relative prices were always the same, the economy would be in perpetual equilibrium, in which case the choice of the numeraire would not matter. In reality, relative prices vary however as a function of relative scarcity and relative utility of their underlying products, therefore the choice of the numeraire matters.

An indication (4.1.) is a quantity value provided by a measuring instrument or a measuring system.

In economics, nominal (or current) prices are indications provided by a fiat currency. It should be stressed again that the numeraire of a fiat currency is a measuring instrument, not a measurement unit because the value, or more precisely the purchasing power of one currency unit, e.g. one USD, depends on basic

economic phenomena such as the equilibrium between total supply of goods and services and total money supply, contrary to, e.g. the mass of a kilogram that is fix. Measuring instruments must be calibrated.

Calibration (2.39) is an operation that ... uses ... information to establish a relation for obtaining a measurement result from an indication.

In economics, calibration is attempted when transforming nominal (or current) prices into real (or constant) prices. Calibration is the operation that eliminates money illusion²⁴. In economics, calibration is made by dividing the nominal prices by the price of the numeraire whose commodity or commodities are chosen as numeraire. In the special case of neoclassical economic theory, the price of the numeraire (in terms of the numeraire) is set equal to 1 by definition.

The more general case with inflation²⁵ may be illustrated in the following example. Let the nominal (or current) wealth of Mr. Smith be equal to 400 USD. This is the non-calibrated indication of the measurement instrument, in this case the USD. Calibration in the mainstream sense means calculating the real (or constant) price by eliminating inflation. For this, one chooses a base year (e.g. 2000), determines the current inflation index (2012) on basis 2000 (i.e. 1.33)²⁶ and divides the nominal price by the inflation index, giving 400 USD/1.33 = 300 USD. This is a short form for:

$$\frac{400USD_{2012}}{1.33USD_{2012}/USD_{2000}} = 300USD_{2000}$$

(Eq. 1)

This more elaborate form states that a wealth of 400 USD of the year 2012 translates to 300 USD of the year 2000 by dividing by the ratio of the USD of the year 2012 and the USD of the

²⁴ Fisher, Irving (1928), *The Money Illusion*, New York: Adelphi Company

²⁵ Note that inflation is not simply an increase in the price level, as there are many other factors of price level increases than inflation, which is a loss in money's purchasing power (as a result of which, the price level increases). See Sergio Rossi (2001), *Money and inflation, a new macroeconomic analysis*, Edward Elgar.

²⁶ US consumer price index 2012 basis 2000, IMF World Economic Outlook data base, retrieved June 2012.

year 2000 (i.e. 1.33 USD of 2012 correspond to 1 USD of 2000). This shows that calibration must account for the specific circumstances in which a measurement is made (e.g. translate the 2012 context into the 2000 context). This also exists in physical sciences. Take e.g. a balance, i.e. a measuring instrument for mass. Due to a change in gravity, a balance on the moon gives a different indication for the same mass than a balance on the earth. This “balance illusion” originates from the fact that a balance usually measures weight and not mass, and that mass and weight are only identical under normalized terrestrial gravity conditions. Appropriate calibration may eliminate the “balance illusion”.

A similar method is used to determine the purchasing power parity (PPP) of currencies. The state of the art of calculation is the International Comparison Program ICP²⁸. It is an index-based method expressing the purchasing power parity PPP of any local currency unit (LCU) per international dollar in a reference year (e.g. 2005). The international dollar is a US dollar that takes account of the price level difference between a country and the base country chosen to be the US. In the US the international dollar is identical to the national dollar. There is an analogy between PPP and inflation measurement: in both, the numeraire is a consumer basket. A consumer price index CPI expresses the current purchasing power of a currency in terms of the purchasing power of that currency unit in a chosen base year (e.g. 2000). The first to propose an index was the German economist Etienne Laspeyres (1871)²⁹. His index is notorious for overestimating inflation. The index developed by the German economist Hermann Paasche in 1875³⁰ systematically underestimates inflation. Irving Fisher combined the two to what became known as Fisher ideal index³¹. Comparisons made by using his index are however not transitive.

²⁷ PPP was first proposed by the Swedish economist Gustav Cassel in 1920, Memorandum on the World's Monetary Problems, published by the League of Nations, Geneva. The idea was also supported by J.-M. Keynes, 1923, Tract on Monetary Reform, London: Macmillan

²⁸ http://siteresources.worldbank.org/ICPEXT/Resources/ICP_2011.html retrieved June 2012. Due to the involvement of all major countries and extensive price information of their consumer baskets, the ICP is probably the largest statistical program of the world.

²⁹ Etienne Laspeyres: Die Berechnung einer mittleren Warenpreissteigerung” in Jahrbücher für Nationalökonomie und Statistik.

³⁰ Hermann Paasche in Die Geldentwertung zu Halle a. S. in den letzten Decennien dieses Jahrhunderts. Plötz, Halle a.S. 1875

³¹ Irving Fisher (1921): The Best Form of Index Number, American Statistical Association Quarterly. 17(133), p. 533 - 537

Transitivity means that a comparison between A and B and one between B and C allows also inferring a comparison between A and C. For multilateral comparisons (involving more than two measures), transitivity is an obvious, but not the only requirement. Diewert has shown³² that none of ten classes of multilateral index methods satisfies all twelve desired criteria. It is impossible to achieve numerical consistency between cross-cutting international PPP comparisons (usually based upon a star index around a base country) and intertemporal inflation (usually computed as chain index linking each year only to its neighbour, i.e. with variable base year). In that case numerical consistency only exists for the base country, i.e. the USA. All these problems originate from the variability of consumer baskets

Consumer basket variability occurs in at least three different ways: in size (number of items), in quantity (of each item) and in quality (of each item). Variation as a result of different consumer tastes, as described in consumer theory, is but a part of overall variability. Variability is a result of the economic process and of development in general. Hundred years ago, consumers had less choice than today, and similarly, baskets of developing countries are today still smaller than those of developed countries. Variation of consumer baskets between communities often results in adaptation of the community to specific conditions. A fridge does not have the same importance for an Eskimo as it has for a Kuwaiti, and umbrellas are more needed in Thailand than in the Sahara. Hence there are considerable differences in methodology between CPI calculations of different countries³³. Harmonization is greater within the EU, where the relative development levels of member countries is similar so that a Harmonized Index of Consumer Prices HICP³⁴ has been elaborated. Note that even harmonized consumer baskets are vectors whose variable coefficients (weights) do not satisfy the metrological property of scalar measurement units.

In metrological terms, PPP merely converts indications from one non-calibrated measurement instrument into theoretical in-

³² Diewert, National Bureau of Economic Research, Working Paper Nb. 5559, 1996

³³ For current practices, see http://en.wikipedia.org/wiki/Consumer_price_index_by_country, retrieved June 2012

³⁴ Erwin Diewert (2002): Harmonized Indexes of Consumer Prices – Their conceptual foundation. Working Paper 130, European Central Bank Working Paper series

dications of another such instrument. The conclusion to be drawn from this is that the PPP method gives rise to a circular definition of wealth or value, whereby each agent takes the implicit definition of the value scale from his client, as in the tale of the cheated cheater:

A baker once went to the judge to complain that the farmer's chunks of butter were smaller and smaller every year, which according to him meant that the farmer was cheating and should be fined. Questioned by the judge, the farmer replied that he has not noticed any change and that he was obliged to use the bakers bread loafs as counterweights for setting the weight of his chunks of butter as he had no other counterweights, and that if anyone was cheating, it was the baker.

This measurement paradigm is not a sufficient replacement for a measurement unit. The "income game" cannot be played in fairness if the measurement system only produces indications of non-calibrated measurement instruments. It needs measurement results that are comparable among each other.

4. Definition of the walras as measurement unit for real wealth or real value

Wealth and value are today largely understood as anthropogenic phenomena based upon utility of a consumer basket. In this respect the history of discovery of the phenomenon "value" can be compared with the history of discovery of the phenomenon "light", which in ancient times was also understood as anthropogenic phenomenon. For Socrates and Plato, light consisted of rays having their origin in the eye and being projected onto objects. Today, light is understood as a physical phenomenon emitted by a non-human source, reflected by visible objects and absorbed by the human eye, where it transforms to sight. A similar paradigmatic change needs to take place for correctly understanding wealth and value. Wealth and value originate both in the physical world and are being reflected in man-made products and may then be affected to economic agents and entities. Looking at the walrasian definition of wealth, this means simultaneously taking utility and limited availability in the definition of wealth. This is crucial for an appropriate choice of the numeraire phenomenon, body, or substance which can be used as a basis for defining a measurement unit.

Inferring from the fact that several currencies were and still are named after some kind of weight unit³⁵, it seems that value was defined as intrinsic to weight of rare metals used to make coins. Only a minority of agents use rare metals as inputs in production processes, hence this definition has an elitist connotation. The early writers of the 19th century, especially Ricardo and Marx, wanted to have some more common ground for defining value³⁶ and therefore thought of it in terms of labour value. For them, value was intrinsic in a labour hour. This idea continues to live on in time banking³⁷ used in local service barter systems and in the popular saying "time is money". This approach neglects the fact that labour hours are extremely unequal in quality and hence should not have the same value. This author has proposed in 2007³⁸ to define a real value or wealth unit on the basis of energy, more precisely available energy of the highest quality³⁹. The choice of energy has two motivations:

Firstly, energy is the measurement scale of physiological metabolism of living organisms including human beings. This emphasizes the role of the individual in the economic process. Physiology is the specialization of biology analyzing functions of living systems. Life of human beings is defined here in its biological or more precisely, physiological sense, by asking the question: what is the difference between a living and a dead human body? The living human body has a so-called metabolic⁴⁰ activity which the dead body does not have and which is usually expressed in terms of joules per second (= Watt) or kilocalories (kcal) per day or megajoules (MJ) per year. This gives rise to the physiological purchasing power PhPP of a currency, which is its theoretically estimated exchange rate, at a given moment in time and at a given place, with respect to a certain quantity of human physiological life.

³⁵ Pound, peso, lira, mark, rouble

³⁶ David Ricardo (1823), *Absolute Value and Exchange Value*, in "The Works and Correspondence of David Ricardo", Volume 4, Cambridge University Press, 1951; Karl Marx, *Value, Price and Profit* (1865) and: *Das Kapital – Kritik der politischen Ökonomie*, 1867, Otto Meissner, Hamburg

³⁷ Seyfang, Gill. "Time banks: rewarding community self-help in the inner city?" *Community Development Journal* 39.1 (January 2004): 63

³⁸ S. Defilla, *A Natural Value Unit – Econophysics as Arbiter between Economics and Finance*, *Physica A* 382 (2007) 42-51; 5th International Conference on Applications of Physics in Financial Analysis, online: <http://aree-web.polito.it/eventi/apfa5/Proceedings/Physica%20A%20382%202007/Defilla.pdf>, retrieved June 2012

³⁹ High quality energy is sometimes also called exergy. For a comprehensive bibliography on exergy, see also: <http://exergy.se/>, retrieved June 2012

⁴⁰ Metabolism is the set of chemical reactions that happen in the cells of living organisms to sustain life

PhPP answers the question: “What quantity of human physiological life does one unit of a given currency (e.g. USD) buy in average at a given moment in time (e.g. in January 2010) and at a given place (e.g. Denver, Colorado)?”

A “unit human physiological life” can then be defined by taking the basal metabolic rate (BMR)⁴¹ or resting energy expenditure (REE) of a reference person with a reference activity, gender, age, weight and height, during a given period of time in a neutrally temperate environment. For reasons that are explained further down, the “unit human physiological life” is chosen to correspond to the basal metabolism of a sleeping person of female gender, aged 20 years, weighing 53 kg, of height 162 cm, during one year. For that reference person and her reference activity, which could be more familiarly called “sleeping beauty”, the resting energy expenditure calculated with the Mifflin equation⁴² (1990) often used in calorie calculators⁴³ lies between 60 and 65 joules per seconds (= 60 to 65 W) or between 1250 and 1300 kcal a day or between 1900 and 2000 MJ a year. The Mifflin equation has been estimated for males and females separately and has the following formulae:

$$\text{REE (kcal/day, males)} = 10 \times \text{weight (kg)} + 6.25 \times \text{height (cm)} - 5 \times \text{age (y)} + 5 \quad (\text{Eq. 2})$$

$$\text{REE (kcal/day, females)} = 10 \times \text{weight (kg)} + 6.25 \times \text{height (cm)} - 5 \times \text{age (y)} - 161 \quad (\text{Eq. 3})$$

With non-metric units (pounds, feet, inches) the coefficients have to be adjusted accordingly. These equations can be simplified to a single equation by adding a discrete variable “gender”.

For persons not at sleep the effective caloric daily need depends on effective activity. REE has to be multiplied by a factor ranging from 1.2 for sedentary activity to 1.9 for extra high activity. As the year is the predominant time period used in accounting, it is

⁴¹ Basal Metabolic Rate (BMR), and the closely related resting metabolic rate (RMR), or Resting Energy Expenditure, is the amount of daily energy expended by humans and other animals at rest.

⁴² M D Mifflin, S T St Jeor, L A Hill, B J Scott, S A Daugherty, and Y O Koh: A new predictive equation for resting energy expenditure in healthy individuals, The American Journal of Clinical Nutrition, vol. 51 no. 2 241-247, February 1990

⁴³ E.g. <http://www.scientificpsychic.com/health/cron2.html>, retrieved June 2012

convenient to define also annual REE, meaning that the daily REE shown above has to be adjusted accordingly.

Whereas the PPP approach is relative to cost of living, the PhPP approach is relative to cost of life: PhPP considers that income should be measured in terms of cost of units of human physiological life.

Secondly, energy, more particularly solar energy in form of extraterrestrial radiation, is the only commonly used resource which is of extraterrestrial origin. This motivation emphasizes the role of the global system in the economic process. The intensity of solar radiation is a particularly good indicator for global limited availability in the long term. Theoretically it is the only factor that could determine a maximum achievable real annual income per person.

The intensity of solar energy is determined by the so-called solar constant⁴⁴. At the distance of the earth from the sun, this amounts to 174 PW (Petawatt or 10¹⁵ W) equalling 1367 W per square meter cross section. Given that the surface of any sphere is exactly four times its maximal cross section and hence the surface of the earth is four times its cross section, the solar constant amounts to 342 W of solar energy per square meter of earth surface, averaged over day and night, all seasons and all locations. These values apply at the outer atmosphere. At the earth surface, there remains about 122 PW or 239 W per square meters at sunny conditions and 89 PW or 175 W per square meter at average weather conditions. The resulting solar energy flow per square meter is of the same order of magnitude as the REE of our reference person, which is 62 W.

The solar constant is a much more fundamental limit than the limits of the four types of capital that are described in the capital approach to sustainability⁴⁵. This approach states that overall capital should not be destroyed in the long term. Overall capital is defined as the sum of four types of capital:

- Financial capital (bank deposits, bonds, equity stocks and their financial derivatives),

⁴⁴ http://en.wikipedia.org/wiki/Solar_constant, retrieved June 2012

⁴⁵ Pearce, D.W., Barbier, E.B. & Markandya, A. (1990): Sustainable development: economics and environment in the third world. Hants: Edward Elgar, as well as: Stern, D.I. (1997). "The capital theory approach to sustainability: a critical appraisal". *Journal of economic issues* 31 (1): 145–73

- Produced capital (fixed capital such as infrastructure, buildings, machinery, livestock, and variable capital such as manufactured durable and consumable goods),
- Human capital (demography, its skills and knowledge as well as those forms of human health that can be capitalized),
- Natural capital (covering the four spheres: biosphere including plants, animals and their biodiversity, atmosphere including atmospheric oxygen and atmospheric pollution, hydrosphere including sweet water and its quality, and the lithosphere including land, stones and minerals).

Derived quality	Name	Symbol	Expressed in terms of other SI units	Expressed in terms of other SI base units
piane angle	radian ^(b)	rad	l ^(b)	m/m
solid angle	steradian ^(b)	sr ^(e)	l ^(b)	m ² /m ²
frequency	hertz ^(d)	Hz		s ⁻¹
foree	newton	N		m kg s ⁻²
pressure, strees	paseal	Pa	N/m ²	m ⁻¹ kg s ⁻²
energy, work, amount of heat	joule	J	N m	m ² kg s ⁻²
power, radiant flux	watt	W	J/s	m ² kg s ⁻²
electric charge, amount of electricity	coulomb	C		s A
electric potential difference, electomotive foree	volt	V	W/A	m ² kg s ⁻³ A ⁻¹
capacitance	farad	F	C/V	m ⁻² kg ⁻¹ s ⁴ A ²
electric resitance	ohm	Ω	V/A	m ² kg ⁻¹ s ⁴ A ²
electric conductance	siemens	S	A/V	m ² kg s ⁻³ A ⁻²
magnetic flux	weber	Wb	V s	m ² kg s ⁻² A ⁻¹
magnetic flux density	tesla	T	Wb/m ²	kg s ⁻² A ⁻¹
inductance	henry	H	Wb/A	m ² kg s ⁻² A ⁻²
Celsius temperature	degree Celsius ^(e)	^o C		K
luminous flux	lumen	lm	ed sr ^(e)	cd
illuminance	lux	lx	lm/m ²	m ⁻² cd
activity referred to a radionuclide ^(f)	beequerel ^(d)	Bq		s ⁻¹
absorbed dose, specific energy (imparted),kerma	gray	Gy	J/kg	m ² s ⁻²
dose equivalent, ambient dose equivalent, directional dose equivalent personal dose equivalent	sievert	Sv	J/kg	m ² s ⁻²
catalytic activity	katal	kat		s ⁻¹ mol

Fig. 2, Examples of some SI units bearing names of eminent scholars⁴⁶

⁴⁶ Source: http://www.bipm.org/utls/common/pdf/si_brochure_8_en.pdf

In the format of the international system of units, units are sometimes named after eminent scholars having favoured scientific progress of their discipline. To distinguish units from the respective scholar, units are written in lower case letters.

In honour of Léon Walras, whose definition of wealth is of striking simplicity yet clearly superior to the one given by Adam Smith⁴⁷, it is proposed to name the measurement unit for real wealth walras and describe it in familiar language as follows:

In terms of wealth, one walras may be interpreted as the theoretical minimum quantity of real wealth consumed in one year by the metabolism of the sleeping beauty⁴⁸.

Note that in order to eliminate money illusion the definition explicitly refers to real wealth, not to wealth, as "wealth" is more often understood as "nominal" rather than "real" wealth. It is possible to give alternative equivalent familiar language descriptions of the walras as unit of real income, real cost and real value respectively:

In terms of income, the walras may be interpreted as the theoretical minimum real annual income necessary to cover the metabolic energy use of the sleeping beauty during one year.

In terms of cost, the walras may be interpreted the theoretical minimum real cost of conserving the physiological human life of the sleeping beauty during one year.

In terms of value, the walras be interpreted as the theoretical minimum real value of the energetic characteristic consumed by the sleeping beauty in goods or services during one year.

None of these interpretations in familiar language is exact. Before arriving at the exact definition of the walras, some further clarifications have to be given. In metrological terms, metabolic activity is a quantity of the same kind as energy use. The international metrology vocabulary (VIM3) gives the following definition for kind of quantity:

The kind of quantity is the aspect common to mutually comparable quantities (1.2).

⁴⁷ Adam Smith (1776), *An Inquiry into the Nature and Causes of the Wealth of Nations*, W. Strahan and T. Cadell, London, described wealth as "the annual produce of the land and labour of the society"

⁴⁸ See also: S. Defilla, *Physica A* (2007), 42 - 51, online: <http://areeweb.polito.it/eventi/apfa5/Proceedings/Physica%20A%20382%202007/Defilla.pdf>, retrieved June 2012

Only quantities of the same kind can be added to each other. The earlier mentioned interval of 1900 to 2000 MJ per year for the resting annual energy expenditure (REE) is too large for a precise definition of a measurement unit. Precision of the measurement unit determines precision of the measurement results. Within the mentioned interval there is a quantity of 1956.1 MJ also known as Planck mass energy equivalent, i.e. the energy equivalent of Planck mass or, in short, Planck unit for energy (PUE)⁴⁹. Planck units are the so-called natural units of the Universe that are based upon fundamental physical constants. As Planck, who discovered them in 1899, wrote, they are “constant for all times and all civilizations, even for non-human ones”⁵⁰. Since then their quantitative determination has greatly improved. Planck units simplify theoretical physics and sometimes designate extremes such as the smallest or the biggest quantity of their kind to be found in the Universe⁵¹.

The Planck unit for energy is an exception as it is of human scale: Besides being within the interval of the annual resting energy expenditure, 1956.1 MJ corresponds also approximately to a 60 W lamp burning during one year (more exactly it equals 61.99 Wyears) or to a car tank filling of 52 litres diesel oil, i.e. to quantities used in everyday transactions. From its magnitude, the Planck unit for energy is ideally suited to be taken to define a measurement unit for wealth. The energy quantity referenced in the definition of the walras is therefore made to coincide with the Planck unit for energy.

A wealth measurement unit defined according to the conventions of the SI system can only be defined in language form, not as a mathematical formula. This is so because wealth is a base quantity, just as luminous intensity and the other base quantities of the SI system. Base quantities shown in Figure 3 are not reducible to any other quantity found elsewhere.

In other words, wealth is a quantity *sui generis* that cannot be defined by a definite mathematical formula as a function of any other physical quantity, including energy.

⁴⁹ <http://physics.nist.gov/cgi-bin/cuu/Value?plkmc2gev>search_for=universal_in, retrieved June 2012; Planck mass energy equivalent is defined in terms of three fundamental physical constants: c (speed of light in vacuum), \hbar (Planck constant over 2π) and G (Newtonian constant of gravitation)

⁵⁰ M. Planck, *Sitzungsberichte der Preussischen Akademie der Wissenschaften* 5, 479 (1899).

⁵¹ See the Annex the formulae of the Planck units

Base quantity Grandeur de base	Base quantity Grandeur de base
length longueur	L
mass masse	M
time temps	T
electric current courant électrique	I
thermodynamic temperature temperature thermodynamique	Θ
amount of substance quantite de matiere	N
luminous intensity intesite lumineuse	J

Fig. 3: Base quantities of the SI system⁵²

In the SI system, all base units are defined in language form, e.g. the kilogram, defined as the “mass of the international prototype of the kilogram”. The derived units are expressed as mathematical formulae using base units, e.g. the energy unit joule ($J = \text{kg m}^2 \text{s}^{-2}$). In SI terminology, the walras would have the following exact definition:

*1 walras (Wal) is the real wealth in, or the real value of, 1956.1 MJ of the energy characteristic available in an environment at physical and chemical equilibrium.*⁵³

The proposed abbreviation for the walras is Wal. It has already been mentioned earlier that energy is not a single good, but a characteristic found in many goods. The addition "in an environment at physical and chemical equilibrium" is necessary for the precise definition of the available energy which is only defined with respect to an environment in equilibrium⁵⁴. For the specialist, there is in fact

⁵² VIM3, <http://www.bipm.org/en/publications/guides/vim.html>, retrieved June 2012

⁵³ See also: S. Defilla, *Physica A* (2007), 42 - 51

⁵⁴ See Diederichsen Ch.: Referenzumgebungen zur Berechnung der chemischen Exergie. Fortschritt-Ber. VDI-Reihe 19, Nb. 50. Düsseldorf, VDI, 1991

a small difference between “energy” and “available energy”. Energy is a quantity that can enter or leave a system, but that remains constant in time at the level of the Universe, whereas available or Gibbs free energy, more recently called exergy, can enter or leave a system just like energy, but that can only decrease in time at the level of the Universe. Available energy takes account of the thermodynamic quality of energy and is closely related to negentropy, a quantity that can only decrease in time at the level of the Universe. Available energy corresponds more or less to the popular understanding of “energy”, with some minor differences, mainly concerning the thermodynamic quality of heat.

At this stage, two propositions merit demonstration. First, the definition of a base unit such as a wealth or value unit is a necessity without which no meaningful economic science can exist. Imagine for instance choosing the Big Mac wealth unit⁵⁵. The total wealth of, say, Mr. Smith would then amount to 400 Big Macs. Yet he does not necessarily consume or possess one single Big Mac, but merely the equivalent of 400 Big Macs, i.e. an amount of wealth that could be exchanged for 400 Big Macs. This shows that a wealth unit cannot be identical to its underlying commodity. In this example the wealth unit should be called Big Mac Unit (BMU), so that the wealth of Mr. Smith is 400 BMU. This fact is independent from the choice of the underlying commodity. If the choice of the underlying commodity is energy, the error is particularly serious, as can be shown in the following. Admit that the wealth of Mr. Smith is 400 current USD and that this non-calibrated indication should be calibrated by using an energy price which we admit as being, say, 10 current USD/MJ. We then get a wealth of 40 MJ, as the USD cross away. That would mean that the creation of wealth would violate the energy conservation principle in that it increases total energy of the Universe, which is pure nonsense. The correct way is to give

$$\frac{400USD_{2012}}{10USD_{2012}/MJ} = 40MJ \quad (\text{Eq. 4})$$

⁵⁵ http://www.economist.com/search/apachesolr_search/big%20mac%20index, retrieved June 2012

to Cesar what belongs to Cesar (i.e. the walras) and to God what belongs to God (i.e. energy). The above example, if correctly stated, will attempt to calibrate wealth using a walras price of, say, 100 USD per walras:

$$\frac{400USD_{2012}}{100USD_{2012}/Wal} = 4Wal \quad (\text{Eq. 5})$$

The second proposition of interest states that a wealth or value unit cannot be defined in terms of a mathematical formula. Take the formula: 1 kilojoule = 1 Eco Unit⁵⁶. Equality is a very strong relation as it means that also the dimension and unit are equal on both sides. If the wealth of Mr. Smith is 400 Eco Units, it is also equal to 400 kJ. This again means that the creation of wealth would violate the energy conservation principle.

One can conclude this section by stating that the necessary precondition for an energy based currency is that a unit for real wealth or real value is defined in language form, thereby making clear that real wealth and real value are distinct from energy.

The study of the interaction between economics and physics is also the subject matter of econophysics and thermoeconomics.

5. Pilot estimation of PhPP

An energy based currency may be useful for metrological purposes. Energy is however not a commodity, but a characteristic⁵⁷ that can be found in many commodities, namely in (final) energy products, in human food products as well as in animal feed bought on markets. Estimation of the ratio between currency and walras, i.e. the walras price and its inverse, PhPP, remains a challenge.

⁵⁶ <http://ecounit.org/system/money/> , retrieved June 2012

⁵⁷ Lancaster Kelvin J.: A new approach to consumer theory, *Journal of Political Economy*, 74, pp. 132 – 157, 1966

These can both be estimated by so-called multiple hedonic regression⁵⁸ involving the energetic characteristic alongside with other characteristics and with price. As the estimation is hedonic, the resulting walras price should be called hedonic walras price (HWP). It is a conditional mean price. Price data are taken from individual energy prices from price surveys of consumer price indices (CPI) and producer price indices (PPI).

On the basis of over 24'000 individual 2003 CPI and PPI energy price data for Switzerland and the corresponding meta data received from the Swiss Federal Office of Statistics, an identical number of transactions has been reconstructed, each involving several physical characteristics as well as money paid in exchange. The pilot estimation did not include food prices. Several hundreds of different regression specifications have been tested. The best one was found to be a log-log specification involving besides the energy characteristic (or numeraire N) and price P also the characteristic of physical mass M and one dummy variable D for each physically identical good:

$$\ln N = \gamma_0 + \gamma_P \ln P + \gamma_M \ln M + \gamma_1 D_1 + \dots + \gamma_6 D_6 + \eta$$

After estimation it has been found that physically similar goods can easily be grouped in coarser categories without loss of estimation efficiency. Best estimates give adjusted R squared of 99.5% and very significant t-ratios for all coefficients (see results in the annex).

On the basis of the best equation retained, PhPP has been calculated as first order partial derivative of N with respect to P at given other covariates. The natural choice of the standard values of the other covariates is the one corresponding to the energy of high-

⁵⁸ The term "hedonic" has first appeared in Court, Andrew T: Hedonic Price Indexes with Automotive Examples, in The Dynamics of Automobile Demand, pp. 99-117, New York: General Motors Corporation, 1939. The hedonic or, using a less value-loaded word, characteristics approach to the construction of price indexes is based on the empirical hypothesis which asserts that the multitude of models and varieties of a particular commodity can be comprehended in terms of a much smaller number of characteristics, cf. Zvi Griliches, Hedonic Price Indexes Revisited, in: Price indexes and quality change, Studies in new methods of measurement, Ed. By Zvi Griliches, Harvard University Press, Cambridge, Massachusetts, 1971. Yet, the number of characteristics does by no means always have to be less than the number of goods, cf. Kelvin J. Lancaster, A new approach to consumer theory, Journal of Political Economy, 74, pp. 132 – 157, 1966. For a complete description of the Lancaster approach, cf. K. Lancaster, Consumer Demand: A New Approach, New York, Columbia University Press, 1971

est thermodynamic quality that can be shown to be electricity. The PhPP was found to be 0.010 Wal / CHF. HWP was calculated as inverse of PhPP ($1/\text{PhPP}$) and found to be 102.36 CHF / Wal, indicating the theoretical minimal cost of "pure sleeping" during one year. Conversion of the Swiss per capita GDP of 2003 to Wal gives 577 Wal per person per year, meaning that the total per capita output of Switzerland in 2003 is 577 times the minimum biological cost of physiological life.

The log-log specification allows in principle to detect non-linearity of money in wealth. The pilot study has shown that non-linearity is not statistically significant, as the respective coefficient is not significantly different from 1. Still, the mentioned 102.36 CHF / Wal are only exact for a real transaction size of 1 Wal. For smaller and larger transactions the HWP is slightly different. This shows that the choice of the wealth unit especially matters in a context of non-linearity.

From the point of view of data necessary to estimate PhPP, they stem from price surveys of non-core inflation items. Non-core inflation is defined as inflation without energy and food items. This shows that PhPP requires much less data than conventional PPP and is also more efficient than PPP from the metrological point of view. The fact that PhPP estimation requires regression methods is not an extraordinary one. Bear in mind that most contemporary PPP index formulae are based upon the EKS method originally based upon an idea by Gini (1924)⁵⁹, developed by Eltető / Köves (1964)⁶⁰ and Szulc (1964)⁶¹. Gini has expressed the EKS in a least squares estimate which Aten and Heston in a draft paper (2009)⁶² describe as GEKS.

6. Implementing Options of an Energy Standard

The interesting question following up on the definition of a real wealth or real value unit is what are the possibilities and limits of

⁵⁹ Gini, Corrado (1924), "Quelques considerations au sujet de la construction des nombres indices des prix et des questions analogues," *Metron*, 4, 3–16

⁶⁰ Eltető, O., and P. Köves, 1964, "On a problem of index number computation relating to international comparison," *Statistikai Szemle* 42, 507–18

⁶¹ Szulc, B., 1964, "Indices for multiregional comparisons," *Przegląd Statystyczny*, 3, 239–54

⁶² B. Aten, A. Heston (2009): Are all Fishers equal? Penn World Tables research papers, online http://pwt.econ.upenn.edu/papers/AH_BA_april30.pdf, retrieved June 2012

implementing an energy standard in practice. More specifically, this includes, as first question, what are the means of estimating and spreading information about hedonic walras prices (HWP) and PhPP of currencies, and, as second question, what would be adequate monetary systems and monetary policies for implementing an energy standard.

Answering the first question implies that hedonic estimation of HWP and PhPP should be done for each currency on at least an annual basis. It would be possible to do it more frequently, e.g. on monthly basis, with the same methodology relying upon official CPI and PPI data. Also, in the case of large currency areas such as the USD or the euro that are legal tenders in many countries, it would be possible to do country by country estimations.

As for the second question, it is more fundamental in nature. It concerns the concrete nature of the merit system of the “income game”, in which metrology is but a part. In metrology, a measurement standard is defined as follows:

A measurement standard is the realization of the definition of a given quantity, with stated quantity value and associated measurement uncertainty, used as a reference (5.1).

The idea of a measurement standard is to guarantee that measurement uncertainty does not exceed a certain level. As an example, the uncertainty for the kilogram mass measurement standard is 3 micrograms (VIM3, example to 5.1), corresponding to 3 billionth of the measured mass. In economics, this degree of precision is almost unthinkable. Still, the relevant questions in this regard are how to favour the systematic diminution of measurement uncertainty of currencies, and whether and how currencies can and should be eliminated if they exceed a threshold of measurement uncertainty.

In order to answer these questions, it is necessary to look more in detail at the different functions of money and look which of them the walras could fulfil. Some authors attribute the following four functions to money⁶³ ; however, the fourth function is sometimes subsumed in the other three functions⁶⁴ :

⁶³ T.H. Greco. Money: Understanding and Creating Alternatives to Legal Tender, White River Junction, Vt: Chelsea Green Publishing (2001). ISBN 1-890132-37-3

⁶⁴ Mankiw, N. Gregory (2007), “2”. Macroeconomics (6th ed.). New York: Worth Publishers. pp. 22–32

a) Money is a medium of exchange of (nominal) wealth. The walras cannot perform the role of unit for a medium of exchange, as it is only a measurement unit, but not a currency or measurement instrument. One could of course create a special currency called walras (or possibly with a different name so as to distinguish it from the measurement unit). Such new currency would be a better measurement instrument than usual currencies (i.e. show less measurement uncertainty) if it guarantees constant PhPP. In order to guarantee constant PhPP, the currency should be supplied strictly as a function of final energy demand and should be redeemed in a finite period. That currency would be similar to the ergo proposed by Sgouridis / Kennedy (2010)⁶⁵ on a model of a redeemable currency ("free currency") originally proposed by Gesell (1916)⁶⁶. It could be a local parallel currency.

b) Money is the unit of account for (nominal) wealth. The walras could certainly become a unit of account for real wealth; this would be its primary function. The International Financial Reporting Standards (IFRS) offer as an option the accounting model called Financial Capital Maintenance in Units of Constant Purchasing Power (i.e. Constant Item Purchasing Power Accounting CIPPA), which is compulsory during hyperinflation (i.e. >25% inflation during three consecutive years)⁶⁷. The walras would eliminate the measurement and reporting uncertainty of currency accounting in non-hyperinflationary cases when historical cost accounting (HCA) is used. The walras is a better unit for storing economic and financial information than a currency unit. Ideally it would replace currency accounting, also in the public sector. That would mean that all transactions would be treated from the accounting point of view as if they were transactions in foreign currency and converted to Wal before being written into the agent's proper accounts (i.e. totally disjoining accounting from currency).

c) Money is a store of (nominal) wealth. The walras could only become a unit of real wealth storage to the extent that the underlying

⁶⁵ Sgouridis & Kennedy, *Tangible and fungible energy: Hybrid energy market and currency system for total energy management. A Masdar City case study*. *Energy Policy* 38(2010)1749 - 1758

⁶⁶ Silvio Gesell: *Die natürliche Wirtschaftsordnung durch Freiland und Freigeld*. Selbstverlag, Les Hauts Geneveys 1916, online http://www.florian-seiffert.de/doc/my_nwo.pdf, retrieved June 2012

⁶⁷ IFRS Conceptual Framework (2010), Par 4.59 (a) states: "Financial capital maintenance can be measured in either nominal monetary units or units of constant purchasing power"

ing energetic goods can be stored. Energy is best stored in form of energy itself. The idea of the walras being a store of real wealth is relevant if stored energy can itself be a medium for clearing debts (i.e. if debts can be repaid by delivering energy). This way of clearing debts has storage and transaction costs which can be assimilated to metrological uncertainties that are higher than the ones of a currency. A priori this debt clearing method will be used only in case debt clearing by means of currency is not available (e.g. in emergencies). The International Energy Agency IEA has introduced stockholding obligations for its member states in 1974. This would broaden the oil asset to other energy and food products and allow the use of stocks for clearing monetary or macroeconomic imbalances and debts. The use of such energetic reserves for clearing debts in emergency times could be broadened to allow any public or private agent to participate.

d) Money is a standard for denominating deferred (nominal) debts. The walras could become a unit for denominating deferred real debts. In comparison with currency denominated debts, walras denominated debt bonds would eliminate the measurement uncertainty caused by variations of PhPP and of exchange rates. The walras is a better time storage of debts than a currency. The advantage of such real debt bonds lies in the fact that they are neutral with respect to currency risk and inflation for both, the lender and the borrower. Energy loans or debt bonds would replace and extend the SDR. For this reason, the IMF would be the predestined issuing body. There is no reason, however, to provide exclusivity of this role to any organization. In principle any debtor, public or private, can

be allowed to issue walras denominated bonds, and any creditor allowed to accept them.

These four potential functions of the walras can of course be combined.

7. Conclusions

This article understands itself as a further development of the metric aspects of economics with the aim to introduce the idea of an energy-based currency into general economic theory. The absence of a measurement unit for wealth and value has been shown to be a failure of economic theory that has much more dramatic consequences than the three usual kinds of market failures. Using metrological concepts that are generally valid in quantitative sciences, it has been shown that energy is a natural choice of a numeraire phenomenon. It allows for a paradigmatic change in understanding what real wealth and value are. Based upon an earlier publication of this author it has been proven that an energy-based measurement unit for wealth and value is a necessity in order to avoid nonsense

interpretations of real wealth. Wealth and value are base concepts that cannot be reduced to any other concepts. The practical implementation of energy-based currency or accounting systems is an avenue for future research.

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Annexes

1. Fundamental Planck units

Constant (Symbol)	Measured value (Codata, Nist)	In SI units	Interpretation
G	6.6742E-11	$\frac{m^3}{kg \cdot s^2}$	Newtonian gravitation
c	299'792'458	$\frac{m}{s}$	Speed of light
\hbar	1.05457168E-34	$J \cdot s$	Dirac cst. = $\hbar / 2\pi$
k	1.3806505E-23	$\frac{J}{K}$	Boltzmann entropy cst.
κ_c	8987551788	$\frac{m}{F} = \frac{kg \cdot m^3}{C^2 \cdot s^2}$	Coulomb force constant

Source: Codata <http://physics.nist.gov/cuu/index.html>, retrieved June 2012

If these units are set to 1, they simplify theoretical physics

2. Derived Planck units

Planck time	$\sqrt{G\hbar/c^5}$	5.39121E-44	s
Planck length	$\sqrt{G\hbar/c^3}$	1.61624E-35	m
Planck mass	$\sqrt{\hbar c/G}$	0.0217645 (= 23.9E+21m _e)	mg
Planck energy	$\sqrt{\hbar c^5/G}$	1'956.1	MJ
Planck temperature	$\sqrt{\hbar c^5/Gk}^2$	1.41679E+32	K
Planck angular frequency	$\sqrt{c^5/G\hbar}$	1.85487E+43	Hz
Planck charge	$\sqrt{\hbar c/\kappa_c}$	1.87554E-18 (= 11.7q _e)	C

Source: Codata, <http://physics.nist.gov/cuu/Constants/index.html>, retrieved June 2012

Planck Unit of Energy is the only Planck derived unit of anthropogenic scale

3. Statistical results of the PhPP pilot study Computed with Data Desk 6.1

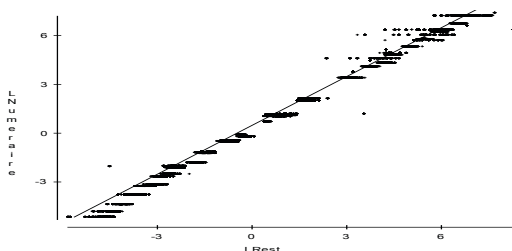
Dependent variable is: **L.Numeraire**
No Selector

R squared=99.5% R_squared (adjusted)=99.5%
s = 0.2607 with 24249 - 9 = 24240 degrees of freedom

Source	Sum of Squares	df	Mean Square	F-ratio
Regression	321798	8	40224.8	591878
Residual	1647.38	24240	0.067961	

Variable	Coefficient	s.e. of Coeff	t-ratio	prob
Constant	2.76023	0.0993	27.8	≤ 0.0001
Lprice	0.997242	0.0016	636	≤ 0.0001
Lmass	0.143091	0.0019	76.5	≤ 0.0001
DistrHeating	-12.2567	0.1447	-84.7	≤ 0.0001
CarFuel	-10.1382	0.1345	-75.4	≤ 0.0001
ELHOil	-9.62431	0.1395	-69.0	≤ 0.0001
RawWood	-9.52903	0.1430	-66.6	≤ 0.0001
Gas	-9.25687	0.1348	-68.7	≤ 0.0001
DryWood	-8.38461	0.1435	-58.4	≤ 0.0001
Electricity	0	0	.	.

4. Graphical fit of the regression



5. Conversion table of energy units; examples: one Planck Unit of Energy (PUE) = 1956.1 MJ; one Watyear (Wyear) = 0.000754 tons oil equivalent (TOE)

kcal	kcal	MJ	kWh	Wyear	PUE	TOE
MJ	1	0.0041876	0.001163317	0.000132708	2.14079E-06	1E-07
kWh	239	1	0.2778	0.031690623	0.000511221	2.39E-05
Wyear	860	3.6	1	0.114077116	0.001840249	8.6E-05
PUE	7535	31.6	8.766	1	0.016131627	0.000754
TOE	467117	1956.1	543.4	61.99	1	0.046712
	10000000	41876	11633	1327	21.4	1

The Energy of Human Sovereignty

Author: Peter Etherden

Peter Etherden is an independent scholar and investigative historian who received his formal education at Cambridge University, Stockholm University and the MIT Sloan School in USA. He has taught at the University of East Africa in Nairobi and at Wheelock College in Boston, USA. From 1986 to 2006 he was a regular contributor to the political journal Fourth World Review. He publishes online at cesc.net/passagen/.

Anton Pinschof is a smallholder in Brittany and the co-founder in 1993 with Peter Etherden of the Cliff's Edge Signalling Company, an independent policy and strategy development forum which publishes the writings of discerning radicals at cesc.net; and he is the secretary of the Intercontinental Network of Organic Farmers Organisations. He is fluent in English, French & German.

Conference Questions

1. Why do we need an alternative monetary system?
2. Should the money be nationalized or privatized?
3. Which scale is optimal for currency: local, national, global or sectoral?
4. Is commodity backing necessary for money?
5. Is an energy unit better for economic accounting than monetary unit?
6. Global energy-backed supplementary currency: pros and contras
7. How can modern technologies enhance the efficiency of money?
8. How will the economy react to the alternative currency?
9. What are the best examples to benchmark?
10. What steps are political authorities required to take to implement the new currency model?

Abstract

The present monetary system is not fit for humanity's purpose and will destroy the world if it is not replaced. An alternative system is needed because the present system abusively accumulates mo-

nopoly capital, transmutes it overnight into monopoly of political power, and manufactures wars whenever this is profitable or beneficial to the system's cynical controllers or to their discreet beneficiaries. All wars, not least the post-Yugoslav wars, destroy societies, cities & memories, mosques, synagogues & churches, and their net effect has left us today worshipping in supermarkets.

The present privatized monetary system is very efficient at extracting profit for the benefit of a few to whose purposes we gave no consent. The needs of ordinary people and stable communities for their own mints and coinage, to create and cancel money; and exchanges to swap credit contracts, has never been properly examined. The consent of ordinary people for the present monetary system has neither been sought nor given. It evolved to serve principally the private interests of international financiers who have exploited the collapse of the doctrines of usury...which over many centuries held in check the abuse of money by giving neither moral nor legal sanction to the making of money out of money.

This paper is a sequel to one written by the same authors in November 2010 for a conference at the University of Lyons, discussing infrastructure renewal in the energy and currency sectors and concluding that neither tasks should be entrusted to the private sector. The principal concern of this present paper is the purpose and the moral basis of the sane, humane and ecological monetary systems that will evolve to replace the present hyper-expansionist monetary systems with an honest currency regime based on sound issue rather than on speculative debt creation.

This paper does not discuss directly the technical question of whether an energy unit is better for economic accounting than a monetary unit; nor does it discuss the pros and cons of a global energy-backed supplementary currency, but instead concludes that the evolution of a sane alternative to the present competitive, war-mongering energy and credit regimes will share a number of similar features and could usefully take place in parallel.

Such questions as the optimal scale or the optimal basing for a currency depend on what we want the currency to do; on whose economy the currency is designed to serve; and on who counts in the decision-making. Similar questions need to be asked about our energy infrastructure, wherein human energy must not be forgotten.

The task of creating new energy and currency worlds is too important to be left to technocrats. Decisions must instead emanate from the moral sovereignty of the people. Who is the issuer of a currency (the community & nation or the private monopoly)? What is the basis of issue (terrestrial reality or speculative fantasy)? Who is the agent of issue (the commonwealth or private protection racket)? Where is the source of power in the pyramid (topside or downside)? Who owns the world (peoples or gangsters)?

These questions could have constitutional implications. As new currency and energy regimes emerge in the 21st century, the principal task for parliaments will be to prevent the controllers of the old debt machinery from maintaining their privileges and deploying the present monopoly power to subvert or arrest the democratic process by means of quasi-legal or illegal military and police measures. In many cases parliaments will require national political superstructures to step aside and cede the decision making to the most subsidiary administrative infrastructures of the nations from the earliest stage of the debate.

This paper proposes a Principle of Sovereign Localitude as the basis for achieving several ends: (a) restoring moral sovereignty to constituent communities within society; (b) introducing democracy into the management of the means of exchange; and (c) allowing for the redistribution of the energy created safely 93 million miles away by our sun's internal nuclear processes.

The Energy of Human Sovereignty by Peter Etherden & Anton Pinschhof

Introduction

The present monetary system is not fit for humanity's purpose and will destroy the world if not replaced. An alternative system is needed because the present system abusively accumulates monopoly capital, transmutes it overnight into monopoly of political power, and manufactures wars whenever this is profitable or beneficial to the system's cynical controllers or their discreet beneficiaries. Wars, like the post-Yugoslav wars, destroy societies, cities, memories, mosques, synagogues & churches. The net effect is to leave us worshipping in supermarkets.

The capital growth system is very efficient at extracting profit for the benefit of a few to whose purposes we gave no consent. The needs of ordinary people and stable communities for their own mints and coinage, to create and cancel money; and exchanges to swap credit contracts, has never been properly examined. The consent of ordinary people for the present monetary system has neither been sought nor given. It evolved to serve the private interests of international financiers who have exploited the collapse of the doctrines of usury...which over many centuries held in check the abuse of money by giving neither moral nor legal sanction to the making of money out of money.

Infrastructure renewal is not a makeover or an improvement to something that exists. It is something quite different. It is a qualitative change in the manner in which some function is performed or some purpose is met. It is a once or twice a century operation, not something to be done every few months.

The Monetary Idea

Money can be useful but neither money nor its sidekick, credit, is essential for the good life. This is available free at the point of use from Earth and 'universe'...only people and time are needed to 'work' the fruits of our creation.

Money is given function. It can facilitate consuming and investing. Abused, it can support speculation. It can help keep score, provide a store of value, and when rightly set in society in general or in community in particular it can assist the creation and maintenance of social justice.

Money and credit are created by man...coins are minted, credit is created out of nothing by the stroke of a pen, not as a common good but as personal (or private) accessories. Neither money nor credit is God-given. The design and architecture of monetary systems is not in the lap of the gods. Continuous creation of money and credit cannot take place without continuous cancellation of money and credit...they are two sides of the same coin. And money and credit can be either spent freely or sold into circulation.. (in this latter case, the interest is the price).

Exchanges grow up around any monetary system to swap credit or their paper and digital representation. They come in

two basic flavours. Commodity exchanges originally designed for the swapping of apples and pears to clear surpluses and eliminate shortages; and time exchanges where one pound per year is swapped for twenty pounds today. Most of everything else associated with a money system, such as banks, are man-made creations designed, at worst, to expropriate resources and privileges from the commons for private or personal use, now or in the future; and at best to bring benefit to all the people all the time. Money can be used for good or for ill. Money with strings attached can enslave. Money without strings attached can liberate.

The Energy Currency Idea

There are three principal sources for the energy currency idea. The first is Buckminster Fuller who saw it as the inevitable side effect of constructing a Global Electricity Grid. It is now engineeringly demonstrable that there is no known way to deliver energy safely from one part of the world to another in larger quantities and in swifter manner than by high-voltage-conducted electricity. For the first half of the twentieth century the limit-distance of technically practical delivery of electricity was 350 miles. But as a consequence of the post-World War II space program's employment and advancement of the invisible metallurgical, chemical and electronics more-with-lessing technology, sixty years ago it became technically feasible and expedient ¹ to employ ultra-high-voltage and superconductivity which can deliver electrical energy within a radius of 1500 miles from the system's dynamo generators.

Buckminster Fuller presented his integrated, world-around, high-voltage electrical energy network concept to the World Game Seminar of 1969. Employing the new 1500-mile transmission reach, this network made it technically feasible to span the Bering Straits to integrate the Alaskan USA and Canadian networks with Russia's grid, which had recently been extended eastward into northern Siberia and Kamchatka to harness with hydroelectric dams the several powerful northwardly flowing rivers of north-easternmost USSR. This proposed network would interlink the daytime half of the world with the night time half.

¹ In a private conversation in January 2011, a Cambridge University economics professor remarked that transmission losses have now been reduced to below three percent.

Fuller argued that electrical energy integration of the night and day regions of the Earth would bring capacity into use at all times, thus overnight doubling the generating capacity of humanity because it would integrate all the most extreme night and day peaks and valleys.

The second source of the energy currency idea came with the publication of *The Ecology of Money* by Richard Douthwaite. He argued that 'an international currency should be based on the global resource whose use it is highly desirable to minimize'. Douthwaite then picks up the old Limits to Growth argument from thirty years ago. Economic growth needs piped energy; piped energy and economic growth produce pollution and pollution brings economic growth to a shuddering halt. The structure of Jay Forrester's System Dynamics model for his World Dynamics modelling ensured that collapses were suitably dramatic...good visual effects.

This is where Global Warming enters the argument. Enter the Global Commons Institute and their Contraction & Convergence agenda. We the World can stop Global Warming dead in its tracks, they claim, by reducing global carbon dioxide emissions. Think ration books in the Hitler-Churchill War and coupons for Carbon Dioxide Emissions. Hey presto! You've got yourself a scarce resource. And a scarce resource is just what is needed allegedly for an international currency. Hold on to your hats. We are nearing the currency link.

In New York seven years ago a book was published entitled *Kingpins of Carbon: How Fossil Fuel Producers Contribute to Global Warming*. It included the interesting fact that 80% of the fossil carbon that ends up as man-made carbon dioxide in the earth's atmosphere comes from only 122 producers of carbon-based fuels. So the idea is that someone somewhere guesstimates how much Carbon Dioxide we can permit to be emptied into the atmosphere each year and expresses these annual emissions as Ration Book Coupons.

What then happens to these coupons? The Competent Receivers of these Carbon Emission Coupons sell them to the Gang of 122 who receive them in addition to cash from big users such as the electricity companies and the oil and coal merchants. This forces the wicked polluters to pay an arm and a leg for all the foul fumes they spew out into the atmosphere. This leads to shareholder prof-

its plummeting and so they pull their money out and invest in profitable new carbon-free technologies like the 600-year old Windmill Business and the 60-year old Nuclear Fission Steam Kettle Industry.

So far so good. Who does what to whom? Who hands out these coupons to whom? The current ideas doing the rounds talk about half of them going to ordinary people as Domestic Tradable Quotas (DTQs) so we can pay our energy bills with them instead of paying in cash. Someone has already designed the credit cards. The other half get auctioned off like the 3G licenses for mobile phone companies. Economists from the University of Chicago have proved that auctions are an efficient way to allocate scarce resources. So that's all right then.

You were there before me again. Who decides? And what happens to the money? The Global Commons Institute has worked out how to put the International Monetary Fund in charge. The IMF would assign Special Emission Rights (SERs) to national governments every month, issue the energy backed currency units (ebcus) and fix their value relative to the SERs. Then The Great and The Good would spend the money on noble causes like renewable energy development and energy conservation.

By now you may be feeling a little sceptical about the whole scheme. But now is the time to start getting really nervous. There is a third game afoot with three prongs to its trident. On both The Left and The Right the gloves are off and the new Great Game is on, to replace our world of nation-states running on a mix of Common Law and Roman Law with a one-world state running on international law.

The Left have given the UN environmental agencies an aggressive...though scientifically flawed... climate change agenda for the job.² The Right...with a motley crew of libertarians and 'genocidists'... have outsourced the job to NATO and corporate private contractors.³ Climate Exchanges are the mechanism of choice for The Left. Debt swapping and rationing is the preferred method of The Right...who have now learnt to deploy their plans through the 'useful idiots' on the left.

In cahoots with both sets of players will be the vested inter-

² See *The Strange Life of Maurice Strong* by William Shepherd.

³ See *Lugano Report* by Susan George and *Shock Doctrine* by Naomi Klein.

ests of the component makers and energy suppliers growing fat on the declining supply and rising prices of the old dying fossil energy infrastructure and the large-scale pipe and cable structure of last century's electricity infrastructure.

Future Social Mix

Globalization has transformed society leaving few corners of the planet untouched. But the Earth is the limit. Globalization can reach no further. From here on we must restructure where we have come within the constraints of our global reach on the one hand and of the human reach on the other hand. For the next great leap in the adventure of civilization, the free choice of right scale for purpose and function will be crucial.

Reconciliation between the human scale and the planetary scale will be the new challenge. From here on, structure will determine behaviour; and our structures will need to be different: networks & nodes, nested systems, 'large and small' not 'large or small', pilot plants and theories of scale (to permit the correct scaling up and scaling down). Neither the Little Individual nor Planet Earth should continue to be used as a guinea pig for the latest fashionable idea emanating from Chicago or London.

Peter Drucker was one of the first social scientists to discriminate between the hand worker and the mind worker. Governments everywhere stress the importance of education in delivering mind workers to meet the needs of the global economy. Governments have also embraced, often unwittingly, Buckminster Fuller's idea of energy slaves. This is the notion that every industrial worker in the modern world can call on some hundred and fifty energy slaves to do his or her bidding. With better use of energy it will be possible to reduce this to perhaps fifty or less, but returning to shovels and pedal power is not a route many of us wish to go down.

But the brute force of regiments of energy slaves is not the way to go either. Ivan Illich was one of the first to recognise the need for intelligent tools. To harness energy to meet real human needs, our tools have to be smart. We do not just need transmission grids for our electrical power, we need them to be smart grids. Illich takes this one stage further by suggesting that intelligent tools are not enough. Society also needs Convivial Tools.

Future Energy Mix

We need energy for three things: heating space, running gadgets, and rushing ourselves and our stuff about. Space seldom needs to be warmer than twenty five degrees Celsius...so a supercharged kettle that heats water to four times this...and then throws three quarters of the heat into the surrounding ocean...makes very little engineering sense.

Besides, electricity demands will be coming down over the next few decades as the world gets smarter at doing more with less. Nicholas Negroponte's \$100 wind-up lap-top computer may or may not have been sabotaged by Intel but, it is a sign of what is possible.

There are dire warnings about the planet running out of fossil fuels. A while ago the British coal miners were assuring us that there were hundreds of years of coal. Since then untold billions of cubic feet of shale gas have been found. Warnings of scarcities do wonders for oil prices so a little scepticism is in order regarding peak oil and dwindling fuel supplies.

Ten years ago Jeremy Rifkin wrote a book entitled *The Hydrogen Economy*. It sank without trace but ten years on it seems fitting to revive it. Most of Rifkin's book is about the end of the fossil-fuel era and the certainty that 'business as usual' would not take the energy sector much further than the middle of the present century. In the middle of the book there is an interesting essay entitled *The Dawn of the Hydrogen Age*. Rifkin's message is 'accelerate the shift from carbon to hydrogen...and do it now'. However, Rifkin, like the peak oil doomsayers, overstates his case...and his survey of the scene is inadequate.

The truth is that Planet Earth has been blessed with an abundance of energy. We have only ourselves to blame if we can't get the right amount to the right place at the right time and make sure it goes to the right people. Energy, like air and water is a 'commons' so why have we allowed it to become enclosed? The right to a warm room of your own in winter should be a basic human right. Fuel poverty, like debtors prisons, should be a thing of the past.

Over the past hundred years several of the world's most illustrious inventor-scientists have become intrigued by the idea of free

energy ⁴ and the internet is awash with thousands of free energy designs. One particularly enterprising researcher has devoted a lifetime to gathering them all together and making the details freely available. Should we give credence to their claims?

Earlier on in the century, before gasoline and electricity established their present hegemony in the face of competition from the supposedly too-cheap-to-meter nuclear power, ordinary people were aware of the alternatives on a day to day basis.

But as the fossil-fuel option has become a global monopoly, with distribution of fossil-fuel electricity coming under the control of undemocratic centralizing corporations operating within a 'radical monopoly' ⁵ so the research and development of environmentally- and people-friendly energy options all but dried up...until the elites who were running most of the industrialized countries of the world noticed that energy had developed a geopolitical component...and one not at all to their liking. OPEC was a wake-up call. But their response was predictably inept.

Caught with all their cables and pipelines lacing our One-World Island and their tanker fleets prowling the seven oceans, they panicked...several times...starting wars with each other, then with creeds and races they failed to understand, and finally with their own children. We live in the aftermath of a century of panicky over-reaction. Unfortunately the Left-Wing response has been every bit as inept. Instead of checking their premises, they bought into The Right's energy paradigms.

A century ago, Halford Mackinder remarked that politics really came down to the struggle between locality and interests...which, in our age of compressed time and extended distance, means outside interests. As far as energy is concerned, the gods have placed it very firmly on the side of locality. Energy is everywhere. The sun does not discriminate...except by degree.

The sun shines all over the planet and will continue to do so for millions of years. It probably takes the sun no more than forty-five minutes to furnish us with enough energy to keep ten billion of us going for a year. Sensible harvesting and husbanding of this abundance would cut this down to ten minutes. Forty years ago in

⁴ Nikola Tesla, Wilhelm Reich and Viktor Schauberger, for example.

⁵ Radical Monopoly is a term coined by Ivan Illich in his long essay on the Disabling Professions.

Soft Energy Paths, Amory Lovins explained how to go about it. Very little has changed...except that the need to reframe 'the energy problem' has become even more urgent. In his championing of the cause of hydrogen, Rifkin unwittingly sketches out one of several 'free energy' options from which The Left can choose.

Talk of left and right has rather gone out of fashion. Thomas Jefferson believed that there will always be two political factions: one that believes in decentralizing power...to the point of dissolving it completely to limit the damage caused by its accumulation...through We The People governing ourselves (the 99%); and the other faction, which pays lip service to the same ideals but believes in monopolizing power to the benefit of a privileged elite (the 1%). Bombing Serbia, Afghanistan and the Middle East into the stone age from forty thousand feet in the name of Democracy gives you the scope and flavour of the deceit.

Jefferson did not delude himself that 'the common people' were competent to run a country. But he was quite clear that the remedy was not to outsource the job to the mis-educated...ignorant of their own ignorance...but to educate the 99% who were uneducated...or a sufficient number of them...to ensure they could have a decent shot at running the show on behalf of all the people most of the time rather than for a very few of the people all of the time.

The fuel to drive our intelligent tools and power our energy slaves comes in three categories: sun fuel, earth fuel and free fuel. Earth Fuel includes the carbon-based coal and oil and natural and shale gas, and the non-carbon fuels such as hydro- and geothermal-harnessed earth energies; Sun Fuel includes the fuel-stuff derived from the complex array of the sun's emissions. These include the harnessing of primary derivatives by solar-voltaic cells; of secondary derivatives such as wind, wave and tide; and of tertiary derivatives by biofuel plantations. Free Fuel is perhaps the most interesting of all.

Free Fuel comes in a number of strange flavours but may also exist as 'known' and 'unknown unknowns'. At the leading edge of theoretical physics there is much consternation at present because nothing adds up. The cosmic arithmetic is off by factors of ten or hundreds...perhaps more. Very little of the energy in the universe is properly accounted for. We live in exciting times. But ever since

Albert Einstein's discovery of the $E=mc^2$ equation it has become apparent that sticking with the 'knowns' is a fool's game: there is free fuel in abundance locked up in atomic forces...and dissident scientists like Tesla and Reich were convinced that this represented just the tip of the iceberg.

Future Electricity Mix

Much has been written about the War of the Currents (AC vs DC) at the turn of the 19th and 20th centuries. But any realistic survey of that era reveals that the conflict was a public relations dispute between competing systems and had little impact on engineering decisions, which were based allegedly on practicality and economics.

In New York major advances were made by a little-known electric utility, the United Electric Power and Light Company (United), a former Westinghouse holding. George Westinghouse purchased United, a company that resulted from the reorganization of several arc light companies to obtain a foothold in the New York City electricity market.

United's initial 1889 installation of alternating current in lower Manhattan was less than a success as transformer losses were high. Technology advanced substantially during the following seven years. Westinghouse had purchased the polyphase system patents of Nikola Tesla, which he then used to develop the comprehensive power system that was installed at Niagara Falls.

One factor that was not taken into consideration at the time was health. The electricity ring mains on alternating current could turn out to be, for us, what lead water-supply piping was to the Romans. A Special Issue of Marilyn Ferguson's Brain-Mind Bulletin in 1981 on bioelectricity included some worrying research by Robert Becker on the high sensitivity of human cells to the 60 Hz frequency adopted for domestic electricity 'on economic grounds'.

Conjectural history has long been a favourite literary sport. To quote Walter Bagehot in Lombard Street: "Upon grounds of probability a fictitious sketch is made of the possible origin of things existing. But such history is rarely of any value. The basis of it is false. It assumes that what works most easily when established is that which it would be the most easy to establish, and that what seems simplest when familiar would be most easily appreciated by

the mind though unfamiliar. But exactly the contrary is true."

The truth is that the existing electricity infrastructure has grown like topsy, driven by private greed and financial engineering rather than by electrical engineering and the consent of the user. Electricity, like the deposit banking Bagehot was describing, seems simple and appears to work well when firmly established, but would be well nigh impossible to establish among new people, and not very easy to explain to them. Vested interests not intelligent design is the hallmark of the electricity business. It makes little sense to hook a new currency to this old architecture.

Purpose of Currency

The purpose and the moral basis of the monetary systems that will evolve to replace the hyper-expansionist monetary systems of the past four centuries will be an honest currency regime based on sound public issue rather than on speculative debt creation. The evolution of a sane alternative to the present competitive, war-mongering energy and credit regimes will share a number of similar features and could usefully take place in parallel.⁶

Today the issuance of money and credit has become the private right of vampire speculators, who are using it to squeeze the lifeblood out of local, regional and national economies. This right of issue needs to be reclaimed by sovereign governments. Credit should be a public utility, dispensed, and managed for the benefit of the people.

The optimal scale or the optimal backing for a currency depend on what we want the currency to do, on whose economy the currency is designed to serve, and on who counts in the decision-making. Similar questions need to be asked about our energy infrastructures. Who is the issuer of money (the community and nation or the private monopoly)? What is the basis of issue (terrestrial reality or speculative fantasy)? Who is the agent of issue (the commonwealth or private protection racket)? Where is the source of power in the pyramid (topside or downside)? Who owns the world (peoples or gangsters)? These questions have constitutional implications.

As new currency and energy regimes emerge, the principal task

⁶ See *The Sane Alternative* by James Robertson for a fuller discussion of the HE and SHE alternatives.

for parliaments will be to prevent the controllers of the old debt machinery maintaining their privileges by deploying the present monopoly power to subvert or arrest the democratic process by means of quasi-legal or illegal military and police measures. In many cases parliaments will require national political authorities to step aside and cede the decision making to the most subsidiary administrative infrastructure of the nations from the earliest stage of the debate.

Sovereign Localitude

We propose a Principle of Sovereign Localitude (or self-determination), which has the potential to underpin, constitutionally, the means for achieving several ends: (a) restoring moral sovereignty to constituent communities, wherein diverse peoples cohabiting common territory seek consensus on questions of policy, administration and technology; (b) introducing democracy into the management of the means of exchange; (c) allowing for the distribution of the energy created safely 93 million miles away by our sun's internal nuclear processes.

What does this mean? Instead of the Principle of Interests, the heretical religion of money-theism which puts Kapital in command of the human spirit, we prefer to establish a Principle of Localitude,⁷ implying that technological choices be made by the people, not by their lords and masters. The political model for this could be the Swiss confederation arising from the original revolt of 1291 against the German Empire, or the constitutions proposed by the Peasants Revolts all over Europe in the 16th Century⁸ or the Yugoslav constitution of 1974. The emerging Icelandic constitution would also seem promising.

In the context of energy systems Sovereign Localitude means that transmission grids will be just one of an array of options. When the self-determination of the regions and micro-nations is paramount, this will allow for the subsidiary administrative territories to come to their own appreciation of resources and policy. The Subsidiarity Principle, as formulated originally by Pope Leo XIII

⁷ See *Democratic Ideals and Reality* by Halford Mackinder, (1919).

⁸ The constitutional writings of Michael Gaismair (1490-1532) became the manifesto for the Austrian Peasants & Workers Revolt (1525-1532) which only died out with the killing of their major Swiss supporter, Ulrich Zwingli, in 1531.

in Encyclical *Rerum Novarum* in 1891 did not make it clear who decided what was feasible at what level of administration...a matter that the Founding Fathers of the United States of America made much clearer. This priority can now be established, severely limiting the topside decisions of technocrats while empowering the people to remember that they embody the sovereignty of the human spirit and can decide within each territorial assembly what they can and cannot do.

The nations that started negotiating the Peace of Westphalia in 1644 (concluding in 1648) established peaceful co-existence rather than competition as a governing principle for nation states. But, since the Bretton Woods Conference ⁹ of 1944, these nation states as redefined 300 years before have lost their economic sovereignty and unbridled competition has gone on a final rampage.

Summary & Conclusions

Energy is deeply political and 'solutions to the energy problem' run along party lines. Decentralized energy, like silver coins, is the property of The Left (the 99%). Centralized energy, like the gold standard, central banks, debt and scarcity are the weapons of The Right (the 1%). Energy Wars are part of the Class War rightly identified by Karl Marx as the driving force of history. The result, however, is not inevitably pre-determined.

Infrastructure renewal should not be entrusted to the private sector. Public and private sectors represent a false dichotomy. Good constitutions should ensure that the custodians of the common wealth of a village, county or nation have the right to command personal and private sectors to take on the task of infrastructure renewal...and specify the terms and conditions of the process. Stringent rules against sabotage of the public purpose are needed. The original US legislation against insider trading and the anti-competitive behaviour of trusts are sound models.

Europeans, as Ellen Brown has suggested, would be better advised to "reverse article 123 of the Lisbon treaty", as any sovereign state is entitled to do. She goes on to propose that the European Central

⁹ The Keynes Proposal was defeated and the proposition from Dexter White, the leader of the US delegation, adopted instead.

Bank issue credit directly to its member governments,¹⁰ or, as an alternative, Eurozone governments re-establish their economic sovereignty by reviving their publicly owned central banks and using them to issue the credit of the nation for the benefit of the nation, effectively interest-free.¹¹

This is not a new idea, it has been used historically to good effect, e.g. in Australia through the Commonwealth Bank of Australia and in Canada through the Bank of Canada. The Deutsche Bundesbank...a confederation of Länder Banks...also operates along similar lines, as does the Bank of North Dakota...a good working model for US public state banks operating at the State rather than the Federal level. The US Federal Reserve...a central bank for the USA...is quite different, prompting Ellen Brown to refer to it as "a monstrous deception". In like manner, the Bank of England was designed to deceive.¹² These two should also be reconstituted along Australian and Canadian lines.

Our conviction is that Free Land & Free Money are the sine qua non for the good life. The Principle of Localitude, working in harness with the Doctrine of Usury,¹³ can ensure the right of everyone to pursue happiness in their own way without restraint from illegitimate outside interests or powers that are ultra vires to Common Law and do not themselves respect the slightest obligation to society. The means cannot be separated from the ends.¹⁴ Money with strings attached enslaves. Money without strings liberates.

¹⁰ The authors would draw attention to the coordinated campaign, currently gathering momentum in many countries, demanding and indeed doing Audits of Public Debt, distinguishing legitimate from illegitimate debt. Such auditing has to precede any repudiation of bondage to private monopoly capital such as that which Article 123 of the Lisbon Treaty pretends to legitimate. See recent meeting of citizens of 12 countries: <http://www.cadtm.org/Des-efforts-coordonnes-en-Europe>.

¹¹ In a private email dated 11th December 2008, one of the principal founders of the New Economics Foundation, James Robertson, made the following comments relating to Article 123: "My assumption has always been that the Bank of England should decide how much new money to create to be put into circulation by the government to satisfy monetary needs. The Bank should then give it to the government to use, along with all the other public revenue, as decided by the normal democratic parliamentary budgetary procedures for controlling public spending."

¹² See The 1690s Bank Wars by William Franklin which includes the accounts by Thomas Macaulay and Walter Bagehot.

¹³ On Societal Inversion see Letter from Oberndorf and on the Doctrine of Usury see Sing-a-Song-of-Sixpence, both by William Shepherd and available online. For a discussion of constitutional issues see England's Constitution History by William Hall.

¹⁴ See Ends & Means by Aldous Huxley commissioned by the Peace Pledge Union in 1934.

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Sustainable Money for a Sustainable Economy

Autor: Ellen Brown, J.D.

The reason our financial system has routinely gotten into trouble, with periodic waves of depression like the one we're battling now, may be due to a flawed perception not just of the roles of banking and credit but of the nature of money itself. In our economic adolescence, we have regarded money as a "thing"—something independent of the relationship it facilitates. But today there is no gold or silver backing our money. Instead, nearly all money is created by banks when they make loans. Money originates simply as credit or debt, a legal agreement to pay in the future.

Money as Relationship

In an illuminating dissertation called "Toward a General Theory of Credit and Money" in *The Review of Austrian Economics* (vol. 14:4, pages 267-317, 2001), Mostafa Moini, Professor of Economics at Oklahoma City University, argues that money has never actually been a "commodity" or "thing." It has always been merely a "relation," a legal agreement, a credit/debit arrangement, an acknowledgment of a debt owed and a promise to repay.

Contrary to popular belief, money did not begin with gold coins and evolve into a sophisticated accounting system. It began as an accounting system and evolved into the use of precious metal coins. Money as a "unit of account" (a tally of sums paid and owed) predated money as a "store of value" (a "commodity" or "thing") by two millennia. The Sumerian and Egyptian civilizations using these accounting-entry payment systems lasted not just hundreds of years (as with some civilizations using gold) but thousands of years. Their bank-like ancient payment systems were public systems — operated by the government the way that courts, libraries and post offices are operated as public services today.

In the payment system of ancient Sumeria, goods were given a value in terms of weight and were measured in these units against each other. The unit of weight was the "shekel," something that was not originally a coin but was a standardized measure. She was the word for barley, suggesting the original unit of measure

was a weight of grain. This was valued against other commodities by weight: So many shekels of wheat equaled so many cows equaled so many shekels of silver, etc. Prices of major commodities were fixed by the government. Hammurabi, Babylonian king and lawmaker, has detailed tables of them. Interest was also fixed and invariable, making economic life predictable.

Grain was stored in granaries, which served as a form of "bank." But grain was perishable, so silver eventually became the standard tally representing sums owed. A farmer could go to market and exchange his perishable goods for a weight of silver, and come back at his leisure to redeem this market credit in other goods as needed. But it was still simply a tally of a debt owed, and a right to make good on it later. Later there were wooden tallies, then paper tallies, then electronic tallies.

The Credit Revolution

The problem with gold coins was that they could not expand to meet the needs of trade. The revolutionary advance of medieval bankers was that they succeeded in creating a flexible money supply, one that could keep pace with a vigorously expanding mercantile trade. They did this through the use of credit, something they created by allowing overdrafts in the accounts of their depositors. Under what came to be called "fractional reserve" banking, the bankers would issue paper receipts called banknotes for more gold than they actually had. Their shipping clients would sail away with their wares and return with silver or gold, settling accounts and allowing the bankers' books to balance.

The credit thus created was in high demand in the rapidly expanding economy; but because it was based on the presumption that money was a "thing" (gold), the bankers had to engage in a shell game that periodically got them into trouble. They were gambling that their customers would not all come for their gold at the same time; but when they miscalculated, or when people got suspicious for some reason, there would be a run on the banks, the financial system would collapse, and the economy would sink into depression.

Paper money is no longer redeemable in gold; but money is still perceived to be a "thing," something that has to "be there" before credit can be advanced. Banks engage in money creation by

advancing bank credit, which becomes a deposit in the borrower's account, which becomes checkbook money. But in order for their outgoing checks to clear, the banks have to borrow from a pool of money deposited by their customers; and if they don't have enough deposits, they have to borrow from the money market or other banks.

Today, they can get this money very cheaply. U.S. banks can borrow from each other at the Fed Funds rate of 0.25%, and European banks can borrow from the European Central Bank at 1%. Meanwhile, Euroland governments have been forced to borrow on the open market at exorbitant rates (for Greece it was over 30% last March), an unsustainable situation.

British author Ann Pettifor, fellow of the New Economics Foundation in London, writes:

[T]he banking system . . . has failed in its primary purpose: to act as a machine for lending into the real economy. Instead the banking system has been turned on its head, and become a borrowing machine.

The banks suck up cheap money and return it as more expensive money, if they return it at all. The banks control the money spigots and can deny credit to small players, who wind up defaulting on their loans, allowing the big players with access to cheap credit to buy up the underlying assets very cheaply.

That's one systemic flaw in the current scheme. Another is that the borrowed money backing the banks' loans usually comes from shorter-term loans. Like Jimmy Stewart's beleaguered savings and loan in the popular movie *It's a Wonderful Life*, the banks are "borrowing short to lend long," and if the money market suddenly dries up, the banks will be in trouble. That is what happened in September 2008: According to Rep. Paul Kanjorski, speaking on C-Span in February 2009, there was a \$550 billion run on the money markets.

Securitization: "Monetizing" Loans Not with Gold But with Homes

The money markets are part of the "shadow banking system" where large institutional investors park their funds. The shadow banking system allows banks to get around the capital and reserve requirements now imposed on depository institutions, by moving loans off their books. Large institutional investors use the shadow bank-

ing system because the conventional banking system guarantees deposits only up to \$250,000, and large institutional investors have much more than that to move around on a daily basis.

The money market is very liquid, and what protects it in place of FDIC insurance is that it is “securitized,” or backed by securities of some sort. Often, the collateral consists of mortgage-backed securities (MBS), the securitized units into which American real estate has been sliced and packaged, sausage-fashion.

As with the gold that was lent many times over in the 17th century, the same home may be pledged as “security” for several different investor groups at the same time. In the U.S., this is all done behind an electronic curtain called MERS (an acronym for Mortgage Electronic Registration Systems, Inc.), which has allowed houses to be shuffled around among multiple, rapidly changing owners while circumventing local recording laws.

As in the 17th century, however, the scheme has run into trouble when more than one investor group has tried to foreclose at the same time. And the securitization model has now crashed against the hard rock of hundreds of years of state real estate law, which has certain requirements that the banks have not met—and cannot meet, if they are to comply with the tax laws for mortgage-backed securities. (For more on this, see here.)

The bankers have engaged in what amounts to a massive fraud, not necessarily because they started out with criminal intent (although that cannot be ruled out), but because they have been required to in order to come up with the commodities (in this case real estate) to back their loans. It is the way our system is set up: The banks are not really creating credit and advancing it to us, counting on our future productivity to pay it off, the way they once did under the deceptive but functional façade of fractional reserve lending. Instead, they are vacuuming up our money and lending it back to us at higher rates. In the shadow banking system, they are sucking up our real estate and using it as the “pawns” in the pawnshop of the shadow banking system. The result is a mathematically impossible pyramid scheme, which is inherently prone to systemic failure.

The Public Credit Solution

The flaws in the current scheme are now being exposed in the major media, and it may well be coming down. The question then is what to replace it with. What is the next logical phase in our economic evolution?

We need to acknowledge that “money” is merely “credit”—and that we as a community can create our own credit, without having to engage in the sort of impossible pyramid scheme in which we’re always borrowing from Peter to pay Paul at compound interest. We can avoid the pitfalls of privately-issued credit with a public credit system, a system banking on the future productivity of its members, guaranteed not by “things” (gold, oil, houses) that are shuffled around furtively in a shell game vulnerable to exposure, but by the community itself.

The simplest public credit model is the electronic community currency system. The participating Internet community does not have to begin with a fund of capital or reserves, as is now required of private banking institutions; nor do members need to borrow from a pool of pre-existing money on which they pay interest to the pool’s owners. They create their own credit, simply by debiting their own accounts and crediting someone else’s. If Jane bakes cookies for Sue, Sue credits Jane’s account with 5 community currency units and debits her own by 5. They have “created” money in the same way that banks do, but the result is not inflationary. Jane’s plus-5 is balanced against Sue’s minus-5, and when Sue pays her debt by doing something for someone else, it all nets out. It is a zero-sum game.

Community currency systems can be very functional on a small scale, but because they do not trade in the national currency, they tend to be too limited for large-scale businesses and projects. If they were to grow substantially larger, however, they could run up against the sort of exchange rate problems afflicting small countries.

There is a way, however, that the functional equivalent of this community system can be achieved using the national currency. That is by forming a network of publicly owned banks. By turning banking into a public utility operated for the benefit of the community, the virtues of the expandable credit system of the medieval bankers can be retained, while avoiding the parasitic exploitation to

which private banking schemes are prone. Profits generated by the community can be returned to the community. Rather than feeding off the economy, the bank feeds the economy, recycling local credit back into the local community.

A public bank that generates credit in the national currency could be established by a community or group of any size. But as long as we have capital and reserve requirements and other stringent banking laws, states, counties and cities are the most feasible option, since they can most easily meet those requirements without jeopardizing the solvency of their collective owners.

For precedent, the U.S. has the Bank of North Dakota, the country's only state-owned depository bank. Its performance has been stellar, and North Dakota is the only state to have escaped the recent credit crisis.

Internationally, there is also substantial precedent. Forty percent of banks globally are publicly-owned. These are largely in the BRIC countries—Brazil, Russia, India, and China—which contain nearly 40% of the global population. Like North Dakota, they have generally escaped the global credit crisis and have been the main locus of world economic growth in the last decade.

The Global Clearing House: Back to Keynes?

If trade can be conducted at the local and national levels simply with credits and debits, then why not at the international level? Today the dominant global reserve currency is the U.S. dollar, essentially backed by guns and oil; but even the world's strongest military is having trouble maintaining the scheme.

Before 1971, international trade balances were cleared interchangeably with U.S. dollars and gold. The dollars were considered "as good as gold" because the U.S. had agreed to redeem them for gold on demand. But the Vietnam War drove the country heavily into debt, and French President Charles DeGaulle, seeing that the United States was spending far more than it had in gold reserves, cashed in 300 million of France's U.S. dollars for gold, seriously depleting U.S. gold reserves. In 1969, the IMF attempted to supplement this shortage by creating "Special Drawing Rights," which were credits drawn on the IMF; but in 1971, the British followed the French and tried to cash in their gold-backed U.S. dollars for gold.

The sum was fully one-third the gold reserves of the United States, forcing President Nixon to renege on the gold deal and close the “gold window” permanently.

As a result, the dollar dropped precipitously in international markets. According to William Engdahl in his 2009 book *The Gods of Money* (pages 265-273), a group of powerful financiers and politicians then met secretly in Sweden in 1973 and discussed an arrangement that would effectively “back” the dollar with oil. In 1974, the price of oil quadrupled, following an oil embargo along with a clandestine agreement between Henry Kissinger and the Shah of Iran. In 1975, an arrangement was finalized in which, in return for military protection and an engineered boost in oil prices, the oil-producing countries of OPEC would sell their oil only in U.S. dollars. The dollars would wind up in Wall Street and London banks and would fund the burgeoning U.S. debt. The upshot was that countries without sufficient dollar reserves had to borrow from Wall Street and London banks to buy the oil they needed.

Despite massive military backing, however, this arrangement is now collapsing; and it has been disastrous for the U.S. trade balance. As John Maynard Keynes warned in 1944, any country undertaking to provide the reserve currency for the world would wind up with unsustainable trade imbalances (a problem later called “Triffin’s dilemma”).

A number of authorities have proposed returning to the Keynesian solution or some variant of it, including Joseph Stiglitz, George Soros, and the Chinese—who now seem to have enough leverage to get their way. At Bretton Woods in 1944, Keynes proposed that rather than clearing trade balances with gold or a particular national currency, they should be run through a global bank. He called it the International Clearing Union. The bank would issue its own unit of account, called the “bancor.” It would not be a commercial currency but would just be a reference unit for keeping track of debits and credits between nations, a yardstick for measuring a country’s trade deficit or surplus.

The bancor was not a “one world currency” threatening the financial sovereignty of nations. It differed from the SDR, the U.S. dollar, the Euro and gold, in that it was not a store of value and was not a medium of exchange. It was merely a unit of account, a refer-

ence unit like inches or pounds for comparing the value of different currencies.

In the plan proposed by Keynes, every country would have an overdraft facility in its bancor account at the International Clearing Union, equivalent to half the average value of its trade over a five-year period. To keep countries from abusing this facility, any country racking up a large trade deficit (equal to more than half of its bancor overdraft allowance) would be charged interest and other penalties; and so would any country with a bancor credit balance that was more than half the size of its overdraft facility. If its credit balance exceeded the total value of its permitted overdraft by the end of the year, the surplus would be confiscated. The nations with a surplus would thus have a powerful incentive to get rid of it, and in the process would automatically clear other nations' deficits.

For valuing the currency reference unit, various alternatives have been proposed. Keynes' idea was that the bancor would be calculated as the value of a basket of 30 commodities. But in *Occupy Wall Street: A Global Roadmap for Radical Economic and Political Reform* (2012), Ross Jackson suggests that a basket of 25 major currencies would be more stable. Commodity prices can and often do all move in the same direction. Currencies, on the other hand, cannot all fall at the same time.

In Jackson's proposal, interest would be charged on debit balances, but no interest would be paid on credit balances. Penalties would also be charged for exceeding certain trade parameters in either direction. Funds from the interest and penalties would create an income stream to finance climate mitigation, ecosystem restoration, and so on.

There are a number of other interesting proposals for valuing a currency unit, including the consumer price index and the use of energy as the fundamental measure of price, cost and value (the proposal featured in this conference).

Money as Credit

Whatever the unit chosen, the point stressed here is that money today is not a commodity but a relationship, a series of legal agreements that are secured by no more and no less than the full faith and credit of the people and their governments. Money is simply

credit, a monetization of the borrower's promise to repay. When the lender is a bank, when the bank is owned by the community, and when the profits return to the community, the extension of credit need not be backed by commodities or capital or loans of other people's money. The borrower, not the lender, backs the loan, either with collateral or with future income or with projected productivity.

Credit is the bloodstream of the economy, carrying nutrients to the organs and cells. Like highways, water and electricity, it needs to flow freely for the economy to work efficiently. When banking is made a public utility, the result can be a functional, efficient, and sustainable system of finance.

Ellen Brown is an attorney and president of the Public Banking Institute, <http://PublicBankingInstitute.org>. In *Web of Debt*, her latest of eleven books, she shows how a private cartel has usurped the power to create money from the people themselves, and how we the people can get it back. Her websites are <http://WebofDebt.com> and <http://EllenBrown.com>.

*Money, energy, and sustainability:
Could social and sustainable banking, public money creation,
and complementary currencies be combined for a better future?*

Autor: Christian Arnsperger

I am very grateful to the 40 Foundation, and in particular to Yuriy Riphayak, for the invitation to participate in this prestigious workshop in such a gorgeous place, and to give this keynote address. It's an honor to be here for these three days, in the company of so many highly regarded practitioners and thinkers in the area of currency reform — an area which I, like most if not all of you here, regard as the most crucial and strategic field of economic thinking and practice today. I have come to this insight thanks to the influence of Bernard Lietaer, who could not be with us here for this meeting but whose impact on our shared field of research I would like to acknowledge gratefully.

Bernard and I have, quite recently, co-authored and published — with Sally Goerner and Stefan Brunnhuber — a report of the Club of Rome's European chapter, which was delivered to the NGO Finance Watch based in the European Parliament. The title of the report is Money and Sustainability: The Missing Link ¹. Implicit in this title is an idea we surely all share here — that we can't understand the way out of our multi-pronged predicament of unsustainability if we don't question very deeply the way our economies produce, circulate, and destroy money. 'Money' is not a specific object such as gold, paper, or plastic; 'money' is a principle of social regulation and, therefore, a convention: It gathers under its name all the currencies — that is, the means of payment — which are accepted by all members of a community as tools to effect economic transactions.

The topic of our gathering here in Split is commodity money and energy currencies. It is an extremely timely topic, of course, simply because in one way or another all our economies are going to have to deal — in fact, already have to be dealing — with the challenges of climate change and the peaking of non-renewable fossil reserves. How can new forms of financing and of money creation help us better stand up to those challenges? In the short time I have available, I will certainly not be able to offer an exhaustive overview. Nor would I be competent to do so. As an economist interested in ecological and monetary issues, I don't pretend to replace the long-time experts gathered here, but I would like to provide a

general outline, a 'big picture' if you will, of some of the new mechanisms that could and should be created.

Frontline 'energy peak' experts like Richard Heinberg have finally begun to recognize what money reform thinkers and activists such as Shann Turnbull or Margrit Kennedy, among many others, have been telling us for a very long time — namely, that a built-in flaw in our money system is creating constant systemic pressures towards energy overconsumption². That built-in flaw is the interest-based circulation of bank-debt money — that is, of 50 to 90% of the money in circulation in our daily lives³. Because everyone needs to repay the yearly interest on their loans, and because due to the fact that private banks are highly competitive, for-profit firms, new loans are always being reissued as long as confidence is high, there is a general scramble for currency. Since everyone tries to extract a corresponding surplus from their transactions, and since many fail to do so and need to go deeper into debt in order to keep ahead of their interest payments, the whole economy is geared systemically (and not just incidentally) towards exponential growth⁴. This has little, if anything, to do with people's greed or with alleged human nature — it has to do with a choice of institutional design in which the production of the public good represented by the availability of 'payment power' in the economy has been entrusted to profit-seeking private agents. At the microeconomic level, this problem isn't so visible and interest seems legitimate and justified; however, at the macroeconomic level, using debt-money as the main mechanism for the issuance of currency turns out to be highly problematic.

In essence, the problem of unsustainability stems from the existence of wrong incentives within the existing money system. Bank-debt money circulation implies, in the words of ecological economist Herman Daly, a process of increasingly 'un-economic growth'.⁵ Energy efficiency is certainly desirable along a transition path towards, but the main issue is how we are going to finance the corresponding investments and — even more importantly — whether the way we finance them is going to stand in our way once we need to move beyond energy efficiency towards the

² Richard Heinberg, *The End of Growth* (Gabriola Island: New Society, 2011).

³ See Margrit Kennedy, *Geld ohne Zins und Inflation: Ein Tauschmittel, das allen dient*, new revised edition (Munich: Goldmann, 2004).

⁴ For a skillful and conceptually deep economic analysis of this 'growth spiral' mechanism, see Hans Christoph Binswanger, *Die Wachstumsspirale: Geld, Energie und Imagination in der Dynamik des Marktprozesses* (Marburg: Metropolis, 2006).

⁵ See, for instance, Herman Daly, *Beyond Growth: The Economics of Sustainable Development* (Boston: Beacon Press, 1996).

re-localization of economic activities and the generalized reduction in material throughput and output — that is, once we need to move ‘from quantitative growth to qualitative development’, to borrow another of Daly’s apt expressions. What sorts of currencies do we need in our wealthy ‘developed’ economies so that we can finance and maintain a stationary economic system?

Our businesses want to grow because they want to be able to pay out dividends to their shareholders so that they can in the future obtain fresh capital by issuing new shares, and because they want to be able to pay back principal plus interest to their bank so that they can in the future obtain new loans. Why might they constantly need fresh capital and new loans? Because, first, they need to compete with each other for market shares and this forces them to invest constantly so that they can generate the needed labor productivity hikes; and because, second, they have to face ever increasing energy costs, which endangers their cash flows and forces them to invest constantly so they can generate the needed energy efficiency hikes. The resulting macroeconomic growth imperative of course means that (since mere nominal growth through inflation is self-defeating) material output needs to increase even when per-unit throughput falls — and this leads to the well-known ‘rebound effect’ in which energy consumption continues to increase despite substantial efficiency gains.

We thus seem to be locked into a systemic logic whereby the generalized need to get one’s hands on a currency made scarce by for-profit bank credit generates a constant race for more — making the dream of absolute energy-production decoupling a mere fantasy. We don’t just need to consume less energy per unit produced, we need to produce fewer units. You may ask: Fewer units of what? The answer is: Fewer units of the abstract general ‘commodity’ that gets produced every year in our economies, and whose quantity we never observe first-hand; we deduce it by deflating the total value-added in the economy (the nominal GDP) by the consumer price index and obtain the real GDP — a mere statistical construction representing an abstract general commodity. In fact, money GDP is nothing more than an accounting magnitude that measures how many velocity-adjusted currency units (written ‘ $M \cdot v$ ’ in technical economic language) were used to effect all the monetary transactions (written ‘ $P \cdot Q$ ’) which economic agents — consumers, businesses, and government — deemed necessary or desirable that year. Real GDP is therefore

nothing more than an artificially constructed aggregate measure of all the units of goods and services which were purchased by the money that was in circulation, at the given general price level. This is simply written as $Q \equiv v \cdot M/P$. If we call E the amount of energy consumed and e the energy efficiency of the economy, we get simply $E = Q/e \equiv v \cdot M/e \cdot P$. Energy consumption can be reduced through higher efficiency (lower per-unit throughput through higher e) or lower output. If there is inflation and no additional money — which could be the case if energy prices soar — energy consumption will drop, because real output necessarily decreases unless people use each existing monetary unit more often (that is, unless v increases).

This simple equation allows us to visualize what the monetary reform proposal of 'plain money' — in German, *Vollgeld* — could induce in combination with the generalization of sustainability-oriented ethical banking.^{6,7} Suppose that (a) a publicly-minded central bank or 'currency board' becomes the sole issuer of the national currency, so that banks become 'money brokers' who can no longer create new sight deposits through credit; (b) banks can only lend money that they have first borrowed off the sight deposits of their clients and channeled into savings deposits; and (c) clients who put their money into savings accounts want that money (which they effectively hand over to their bank for lending purposes) to be invested in energy efficiency projects. Then we could easily imagine that there is no public creation of additional money and that M grows only by a quantity ΔM corresponding to sustainability-oriented credit creation by banks and that, as a result, e increases by an amount Δe corresponding to the energy efficiency gains induced by those new investments. If the growth rate of e is much larger than the growth rate of M , meaning that the sustainability-oriented banks have done a good job in selecting 'good' projects,⁸ and if v is constant while P increases due to higher oil and gas prices, we might perfectly well get a negative growth rate for E .⁹ In other words, credit creation for sustainability purposes can lead not just to

⁶ For the 'plain money' proposal, see James Robertson and Joseph Huber, *Creating New Money* (London: New Economics Foundation, 2001) and Joseph Huber, *Monetäre Modernisierung: Zur Zukunft der Geldordnung* (Marburg: Metropolis, 2011).

⁷ For a detailed presentation of social and sustainable banking, see Olaf Weber and Sven Remer (eds), *Social Banks and the Future of Sustainable Finance* (London: Routledge, 2011).

⁸ We might view the ratio of the growth rate of energy efficiency over the growth rate of sustainability-oriented credit as a measure of the project selection skills of banks.

⁹ Quite simply, $\Delta E/E = \Delta v/v + \Delta M/M - \Delta e/e - \Delta P/P < 0$ if $\Delta e/e > \Delta M/M > 0$, $\Delta P/P > 0$, and $\Delta v/v = 0$.

higher energy efficiency, but to a net decrease in total energy consumption in the economy under the assumption that money creation does not feed additional consumption spending — which is the case in our example here where money creation is public, but would be much less likely if money were still issued through credit transformed into sight deposits.

Would the distribution of sustainability-oriented credit be carried out by social and sustainable banks or by mainstream banks? I think this model can provide good arguments in favor of the former. We might view the ratio of the growth rate of energy efficiency over the growth rate of sustainability-oriented credit, or $\pi \equiv (\Delta e/e)/(\Delta M/M)$, as a measure of the project selection skills of banks. Arguably, social and sustainable banks (such as Banca Etica, GLS Bank, Alternative Bank Switzerland, La Nef, and others) that devote their entire activity to sustainability-oriented financing, have knowledge and experience which would make their π -ratio significantly higher than that of classical mainstream banks that do 'green' banking only as a side activity.¹⁰

Therefore, the combination of public money creation — which allows to rein in the circulation of money for standard productivist and consumerist, as well as speculative, spending by households and businesses¹¹ — and social and sustainable banking — which allows to focus private money creation through bank credit on sustainability-enhancing investments — can significantly help in reducing macroeconomic energy consumption.

Now please note an important point: I have not assumed that households and businesses devote no spending at all to non-sustainability-oriented activities in consumption or production. After all, under the 'plain money' model there is a publicly created money stock M^* available in the economy in the form of cash and checking accounts, and how people use that money can't be prescribed; they might buy cheap Chinese plastic toys and organize wasteful and polluting business trips. This

¹⁰ Arguments in this direction (although not using the notion of a π -ratio) can be found in Sven Remer, 'Social banking at the crossroads', in Olaf Weber and Sven Remer, *Social Banks and the Future of Sustainable Finance*, op. cit., pp. 136-211.

¹¹ Of course, an additional benefit of the 'plain money' idea is that it would largely eliminate the boom-and-bust roller coaster of the traditional money system (which offers a historical succession of banking, currency, and public finance crises). This would certainly also, by itself, contribute to sustainability because booms can generate huge overexploitation of resources while busts, while reducing resource pressures in the short run, create an atmosphere of economic and social depression that is not conducive to long-lasting reductions in energy consumption: As soon as a bust is overcome, mentalities are in place to start the trend towards overconsumption again. Thus, a more structurally stable banking system would be conducive to more environmental sustainability.

might mean a high level of energy consumption E , and decreasing this all other things being equal implies taking measures of a cultural and fiscal nature.¹² However, other things are not equal here and we are talking about variations in M starting from a given level M^* . My point has been to explain how energy consumption might be reduced through different banking practices and money creation procedures — I have not claimed that these practices and procedures can solve all or even most issues linked to energy consumption.

In fact, the problems linked to how households and businesses spend the existing money stock are quite substantial. After all, even if we have a wise social and sustainable banking sector that does its very best to finance energy-efficiency-oriented investments, and even if we have made money creation public so that the amount of national currency in circulation can be controlled collectively rather than being left to private banks, we still have the question of how people spend that national currency. How can we be sure they won't spend it in ways that hugely increase total energy consumption? The answer is, we can't. Especially in a globalized economy where goods can be imported, we need additional monetary incentives — incentives of a different kind from the existing ones built into either bank-debt money or 'plain money' — if we want to avoid that the efforts of social and sustainable banks be counterbalanced and rendered ineffective by ecologically reckless consumers and businesses. This is where complementary currencies, the third component announced in my title, come in.

A popular idea nowadays, which has been around for quite a while, is to put into circulation permits to emit greenhouse gases and to allow these permits to be traded on 'carbon markets'.¹³ The idea is that by making CO₂ emissions gradually more expensive per unit produced, we will impel the whole economy to seek out ways of producing in a more energy-efficient manner. In fact, it is precisely this constraint that would strengthen the 'demand' side of the sustainability-oriented credit market and would channel more and more businesses towards ethical and sustainable banks.

Of course, we should calculate emissions correctly. This means

¹² Such as those discussed by Tim Jackson, *Prosperity Without Growth: Economics for a Finite Planet* (London: Earthscan, 2009).

¹³ For a detailed discussion of this carbon trading idea, see Peter Newell and Matthew Paterson, *Climate Capitalism: Global Warming and the Transformation of the Global economy* (Cambridge: Cambridge University Press, 2010).

adopting a 'cradle-to-cradle' view where we look at a business's whole manufacturing chain from the use of raw materials upstream to the actual production processes and all the way downstream to how wastes are disposed of. Also, the total volume of permits has to evolve according to a 'contract and converge' logic whereby global emissions are gradually reduced (i.e., there are fewer additional tons of CO₂ spewed into the atmosphere each year) and emission rights are gradually realigned across nations so as to ensure equal opportunity for development (i.e., the North emits less and less CO₂ as the South emits more and more, within the contracting global emissions budget).

Next to these emissions permits, an international agency would issue¹⁴ a fixed stock of an ad hoc currency called energy-backed currency unit or 'ebcu'.¹⁵ This currency would be the only one that could legally be used to purchase additional permits and would have to be acquired by states and businesses that wanted to emit more than their initial national quota. Since the stock of ebcus would be fixed once and for all, we would de facto find ourselves with a 'commodity money' anchoring similar to the gold standard, except that here it would be a 'nonrenewable-energy standard'—that is, a currency backed by a stock of goods (energy goods, and in particular fossil fuels) whose available quantity would inexorably decrease over time. If each citizen received an identical quota of permits, he or she could cash them in at his or her bank against standard currency — but at an exchange rate that would be determined by the exchange rate between permits and ebcus, hence between ebcus and standard currency. As to the bank, it would subsequently (for a fee) re-sell the collected permits against standard currency to states or businesses that need them — up to the point where above-quota permits need to be purchased by these states or businesses no longer in standard currency, but in ebcus at the going exchange rate. This would then lead to a cancellation of the corresponding number of ebcus, which not be replaced — contrary to what is usually the case with bank-debt money, which is most often replaced as soon as outstanding loans are paid back in order to maintain the profitability of the banks that issue this money. Therefore, each nation's quota decreases and the purchasing price of

¹⁴ This would be done in order to avoid that some countries, among which the United States, which have an international reserve currency as their national monetary unit, could purchase additional permits by practically printing money at zero cost.

¹⁵ In this paragraph I am following closely the ideas put forward by Richard Douthwaite, *The Ecology of Money* (Totnes: Green Books, 1999).

supernumerary permits gradually becomes prohibitive because there are almost no ebcs left in circulation. As a result, businesses have to adapt to drastically reduced emissions norms: Either they doggedly pursue the continued strategy of increasing energy efficiency through more and more expensive R&D (and they go to our social and sustainable banks for specific credits), or they finally end up not only consuming less energy per unit produced, but producing fewer units (which is likely given the inherent limits to energy decoupling). Such a 'post-growth' economy will only be socially viable if it offers work to all citizens, i.e., if we abandon the perpetual quest for increasing and even accelerating labor productivity¹⁶ — which implies a wholesale return to so-called 'eco-technic' technologies,¹⁷ which are more labor-intensive and more technically unsophisticated, hence less 'heteronomous'.¹⁸

As I said at the beginning, this is hardly the place to set out an exhaustive, or even reasonably detailed, monetary and financial architecture for a sustainable economy. In *Money and Sustainability*, Lietaer, Goerner, Brunnhuber and myself describe a number of other complementary-currency mechanisms that could, and sometimes already do, contribute to overall sustainability. The main message of my address is simply this: Political decision makers, as well as economists and managers, especially in the financial and banking sectors, can no longer afford to treat sustainable banking, public money creation, and complementary currencies — in particular, energy currencies — as marginal phenomena. Unless we skillfully combine these elements, we will have to continue to rely exclusively on a structurally flawed money system and we will fail in building a more sustainable future.

¹⁶ As forcefully suggested by Tim Jackson, *Prosperity Without Growth*, op. cit.

¹⁷ As characterized by John Michael Greer, *The Ecotechnic Future* (Gabriola Island : New Society, 2009).

¹⁸ In the sense of Ivan Illich—see the last part of Christian Arnsperger, *L'homme économique et le sens de la vie: Petit traité d'alter-économie* (Paris : Textuel, 2011).

*Our Concept Of Money Used To Rule The World -
USING NEW CONCEPTS CAN WE RULE MONEY?*

Autor: Prof. Dr. Margrit Kennedy

Executive Summary:

This paper will deal with a fundamental problem concerning one of the most ingenious inventions of mankind - money. The central question it attempts to answer is: How can we create money systems which will serve people – instead of people serving money?

While the real economy enables people to secure their material needs, the financial sector mainly exists to make money from money itself. Money earns interest and the interest earns interest again. Thus, monetary wealth grows exponentially, losing its relationship to the real economy. Since in the long term exponential growth is not possible, our monetary system produces crises at regular intervals, pulling the real economy into the abyss. At the national level, we have seen this repeatedly. With globalization, we now face the risk of global collapse.

The second fundamental dilemma we are facing in the present money system is that only 10% of the population earns more interest than they pay, when we include the interest –hidden in the prices of all they purchase, as well as in taxes. Meanwhile 90% pay on average twice as much interest as they receive. This causes a massive redistribution of wealth. In Germany, this redistribution from the large majority to a small minority amounts to approximately € 600,000,000 per day. Bankers and economists see no alternative to this system and postulate “Let your money work for you.” Yet, money never works. Only humans or machines are productive.

However, there are various ways out of this dilemma: new types of banks and new types of money avoid interest and inject diversity into the monetary system. They include: cooperative member banks like the Swedish JAK system; time banks for the exchange of hours of work; regional currencies promoting regional economic activity; and complementary currencies serving primarily social, cultural, economic or environmental purposes. This new money does not compete with the Euro, but complements, stabilizes and enriches the existing monetary system.

Many of these models levy a small fee (also called “demurrage” or “circulation incentive”) on money not spent or invested, as an inducement to pass money on to those who need it – thus establishing a system free of the coercion of exponential growth and redistribution of money. If this would be introduced on a wider scale - i.e. in our national and international monetary systems - long-term environmental projects would finally prove to be “economical”, a “basic income for everyone” would become possible, the redistribution of wealth for the benefit of a small minority would cease and the real economy would be freed from the captivity of the financial industry. Rather than money ruling the world, it would serve the majority of people.

PART 1

Lifting the veil over a hidden problem:

The compounding of interest

In the late seventies, environmentalists – among which I count myself - were among the first to question why economic reasoning demanded growth returns that the planet could never sustain. We discovered that there was a severe lack of understanding of the most basic facts about money amongst laymen as well as professional economists. Remarkably little research by economists had been devoted to the questions of money creation and functioning. But only since 2008 and the first global financial crisis, which started with the collapse of Lehman Brothers, has the taboo on discussing money gradually been lifted. Up to then both economists and governments had taken the global monetary system as a fundamental, inescapable given. However, nothing could be further from the truth.

In this first part of the lecture, we need to confront the problems created by an almost ignored aspect of the present system, which is one of the root causes for its impetus on exponential growth: the compounding of interest. Compound interest leads to the assumption that money must and can keep growing or accumulating forever. The present worldwide financial and economic crisis, inflation, monetary speculation and an uneven growth of various economic indicators - like monetary assets, GNP and the net income

in real wages and salaries - are just some of the problems associated with this development.

Money - as one of the most ingenious inventions of human-kind - facilitates the exchange of goods and services and, thereby, overcomes the limitations of barter, and creates the possibility of specialization as the basis of civilization. However, the availability of money - based on the payment of interest - has two sides. The known side is that interest - as the price for money - functions as an indicator for the scarcity of money in our economies and seems difficult to replace. The problematic side, which is rarely discussed, is that interest also creates an impetus for exponential growth. What we call 'Interest' not only contains the cost of the work of the bank, a risk premium and an inflationary adjustment, i.e. costs which cannot be eliminated, but also contains the so-called 'liquidity premium'. This is the reward for the lender who lends his money to others. And the money owners' ability to hold money back until the 'price is right' (as it produces almost no storage costs, unlike all other goods) forces other participants in the market to pay more than their fair share for obtaining the necessary means of exchange. Money - in its present form - therefore not only provides a key but also a lock to the market. This possibility for the retention of money tends to distort all market mechanisms and, therefore, should be eliminated. Otherwise, money (and not the provision of goods and services) becomes the prime focus of all economic activities. It inevitably leads - over time - to excesses of monetary speculation. At present, for the first time in human history, these excesses confront us on a global scale.

Over the last decades - in which all barriers to the mobility of financial transactions have been removed - this flaw in the monetary system has led to a global financial system in which speculation is more powerful than trade, has more financial clout, and depends on individuals running the system who have more to gain from instability than from stability.

In 1936, Keynes wrote: "Speculators may do no harm as bubbles on a steady stream of enterprise. But the position is serious when enterprise becomes the bubble on a whirlpool of speculation. When the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done."

Since this statement was made, productive enterprises have indeed become a by-product of the activities of a casino - i.e. the world of financial markets.

Therefore, the question arises: How can we create a money system which avoids the instability of the present system, based on the compounding of interest and all its associated problems like increasing speculation and financial bubbles bursting from Asia to Europe. For this it is useful to understand three out of at least thirty misconceptions about money which almost everybody holds. I will call them:

1. the 'Growth Misconception'
2. the 'Transparency Misconception' and
3. the 'Fairness Misconception'.

Three Misconceptions

1. The 'Growth Misconception' is based on the belief that money based on interest can grow forever. This in turn is based on people not understanding two generically different types of growth:

a. The normal physical growth pattern in nature in which everything stops growing at an optimal size, like animals, plants, or our bodies with all their subsystems. This is the only sustainable growth pattern that exists.

b. Exponential growth is quite different. It doubles its units at regular intervals. It proceeds slowly in the beginning, then accelerates continually faster and, finally, grows in an almost vertical fashion. Unless it stops naturally, it leads to sickness or even death. Since our money system is completely artificial, the self-regulating mechanism, which stops growth in a healthy natural organism does not apply here. And based on interest and compound interest, our money follows an exponential growth pattern until it either breaks down partially or collapses totally. At 3% compound interest it doubles in about 24 years; at 6% it takes about 12 and at 12% about 6 years.

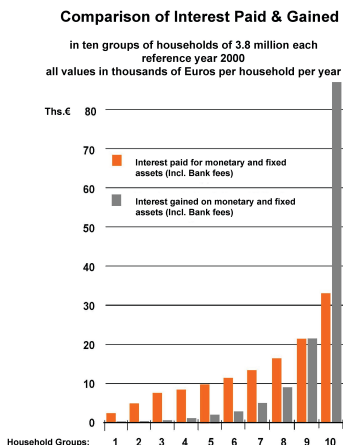
Hardly anyone is able to grasp intuitively this drastic characteristic of exponential growth and the dangers it entails. Its consequences simply outstrip our powers of imagination. This can be illustrated by a simple example. If you had to choose spontaneously between two pay raises, which would you pick: \$10,000 per

week for an entire year, i.e. 52 weeks, or one cent in the first week, double that (\$.02, \$.04, \$.08 etc.) in every subsequent week of the year? Most people pick the first option, because they can calculate very quickly that it adds up to \$520.000. And if they suspect (or even know for sure) at this point that the second option is more lucrative, they still do not know - neither intuitively nor rationally - exactly how much money they would have at the end of the year. It amounts to a total of more than \$45,000,000,000,000.00 – that's 45 trillion dollars, or about two-thirds of the world's gross domestic product (GDP). That would mean on average about \$800 million a week – an enormous gain vis-à-vis the \$10,000 that the first option would net. The reason the difference is so enormous can be found in the exponential nature of compound interest (interest on interest). If we had added only one cent per week to the original penny we would only have 52 cents at the end of the year.

Since our monetary system is based on the exponential growth of compound interest, and interest determines what is considered "economical", our economy is constantly driven to grow exponentially.

2. The 'Transparency Misconception' provides the second major difficulty in fully understanding the impact of the interest mechanism on our economic system. Most people think that they pay interest only if they borrow money. They do not understand the fact that every price contains a certain amount of interest, depending on the share of capital deployed per unit of output. This relationship – together with the rate of interest – determines the interest component in prices. Taking three examples from Germany: interest ranges from 12 % of the price for garbage collection (because here the share of capital costs is relatively low and the share of physical labor particularly high) to 38% for drinking water - and up to 77% of the rent for public housing (when calculated over 100 years, which is the estimated life span of German houses). On average, people in Germany pay about 40% interest in the prices of goods and services they need for their life. (Creutz, 2010, pp. 122 - 139).

3. And thirdly, the 'Fairness Misconception' is based on the notion that everyone is treated equally in our monetary system. We all have to pay interest when borrowing money, and we receive interest for savings. However, when we take a closer look, there are



indeed huge differences as to who profits and who pays in this system. Comparing the average interest payments and income from interest in ten equal groups of 2.5 million households in Germany, we can show that 80% of the population pay almost twice as much as they receive, 10% receive about as much as they pay, and the remaining 10% receive more than twice as much interest as they pay. This last amount is the share that the first 80% loses (Fig.2).

This illustrates one of the least understood reasons why the rich get richer and the poor get poorer - and that the economists' notion that money is just a neutral veil over the economy is incorrect. In Germany, in the year 2010, about 600.000.000 Euros were transferred every day from those who work for their money to those who can make their 'money work for them' (Creutz, 2005). But money never 'works'. Only people and machines produce real value. Money can only be re-distributed from those who create that value to those who own money. In other words, we allow the operation of a hidden redistribution mechanism in our monetary system, which continually transfers money from the large majority to a small minority, creating a social polarization that undermines any democracy over time. An Argentinian banker, who had worked in the National Central Bank for 37 years, once remarked – in regard to this figure: "...and what use is equality before the law for us, without equality before the money?"

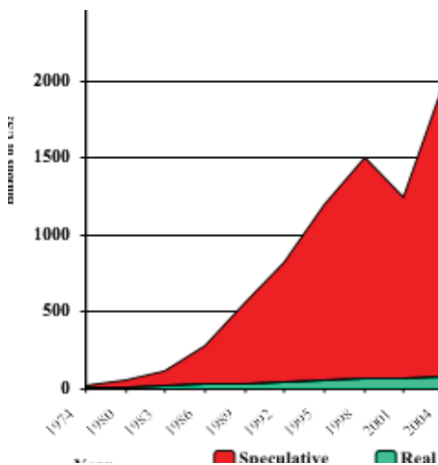
Even more to the point, President Obasanjo of Nigeria stated after the G8 summit in Okinawa in 2000: "All that we borrowed up to 1985 or 1986 was about \$5 billion. So far we have paid back about \$16 billion. Yet we're being told that we still owe about \$28 billion ... because of foreign creditors' interest rates. If you ask me what is the worst thing in the world, I will say it is compound interest." At that time, the developing world was spending thirteen dollars on debt repayment for every one dollar it received in foreign

aid and grants (Lietaer, 2007).

Three Results

1. Inflation: As one result of this defect in our monetary system, every Deutsche Mark lost 80% of its value between 1950 and 2001 - and this was the most stable currency in the world. For most people, inflation seems like an integral part of any money system - almost 'natural' - since there is no country in the world without inflation. Because inflation is perceived as a given, economists and most people believe interest is needed to counteract inflation, while in fact interest is one of the major causes of inflation. True, the short-term relationship between the rate of interest and the rate of inflation corresponds to conventional wisdom: A reduction of interest rates makes credit easier and encourages capital and consumer spending. The result is an expansion of the money supply and - in most cases - eventually a rise of the rate of inflation. Conversely, an increase of interest rates slows down the economy, reduces the money supply and counters inflation. Empirical evidence substantiates this. But what happens in the long run? What is the relationship between interest rates and inflation over a period of, say, 50 to 100 years?

Empirical research doesn't give us much of a clue as it is very difficult, if not impossible, to empirically identify clear causes and effects and exclude the impact of other factors over such a long time span. Still, what we do know is this: The creation of money is carried out via bank loans. Whoever receives these loans has to repay them with interest and compound interest. If we consider the world economy, it follows that the amount of money in circulation is systematically insufficient to repay all debt, regardless of whether interest rates are set high or low. Leaving aside temporary contractions, it is only by a continuous expansion of the money supply that economic actors as a whole can sustain their ability to pay. Moreover, in order to meet the accumulating liabilities resulting from compound interest, the expansion of the money supply itself has to be exponential. Common sense tells us - and empirical data confirm - that exponential expansion of the productive economy is impossible over the long run. Hence, an exponential increase of M1 - that aggregate of money that is available for payments - will necessarily lead to inflation.



Interest rate fluctuations will affect the speed at which the inflation proceeds, but can never prevent it entirely. So where is exponential growth actually taking place? In the asset markets. The number of assets and their assessed values are growing exponentially. This has been especially noticeable in the securities market over the past decades. However, since this rise does not and cannot – correspond

to a comparable rise in the productive economy, their surge is excessive. Meanwhile, these overvalued assets serve as backing for ever more new loans. But if the backing is getting weaker, how is the money supposed to remain solid, and how are prices not to inflate?

Thus in a monetary system built around compound interest, inflation cannot be prevented. At best, it can be kept at low levels for a number of decades. Ultimately, a correction – and that means a massive and painful adjustment – is inevitable. We are in the middle of just such a process right now.

2. Monetary instability: A second result of the exponential growth pattern in our money system is that in contrast to measures like the meter or the kilogram, we are used to the exchange rate of our currencies varying almost daily. Cashing in on this variability, the global volume of speculative foreign currency transactions between 1974 and 2007 increased to 98%, with a mere 2% of all transactions serving the exchange of goods and services, including tourism. Whereas the daily volume of trading in the 1970s amounted to just \$20-30 billion, figures from 2007 show that it already exceeds \$3,200 billion. What makes the situation so dangerous is that it creates economic instability on a global scale. In the early 1990s, for instance, speculative money flowed massively into Thailand, Malaysia and Korea, only to be withdrawn a few weeks later. Where these speculators withdrew, they left devastating effects on the culture, ecology and society.

3. An uneven growth of different sectors of the economy: One further result is the ever-wider drifting apart of the most important economic indicators of net growth. Comparing three of them between 1950 and 1995 in Germany, we find that monetary assets - backed by an equivalent amount of debt - increased 461 times; the Gross National Product increased 141 times; and net income in real wages and salaries (after tax) rose only 18 times. (It actually declined after 1980 to the level of the 1970s.) Few people understand that these figures indicate a severe sickness of our economic system and a growing polarization of our societies. Many believe that those 10% who profit from the system are the culprits who will not allow any change. However, even the rich are just as helpless to change it as the poor who pay more than their fair share. The late billionaire Sir James Goldsmith once said: "What use is more money to me when I will be surrounded by more and more poor and suffering people who hate me? I feel as if I have won a game of poker on the Titanic!"

A study of the Club of Rome proves that money is anything but neutral (Brunnhuber, Klimenta, 2003). It changes the kind of trades being performed as well as the relationships among the people using it. What we need today is another perspective on money, in order finally to be able to use to its full potential one of the most ingenious inventions of mankind, and to provide everyone on this earth with the basic necessities of life.

Three Historical Solutions

The religious leaders of Judaism, Islam and Christianity understood the problems of compounding interest and left us solutions for how to deal with it:

— In Islam people who follow the Sharia observe a complex set of rules to prevent interest from compounding. It forbids not only investments in morally or socially prohibited activities but also speculation and excessive costs of loans and, consequently, makes the moneylenders - whether private or professional - a part of the project they are financing. Therefore, monetary gains are normally matched by gains in the sphere of production, and moneylenders have a strong sense of responsibility for the success of the project they invest in.

— Judaism used to resolve the problem of compounding interest by waiving all debt regularly every seven years in the so-called “jubilee year”. After 7×7 or 49 years, not only were debts ‘for-given’ and debt-slaves freed, but also private land was given back to the community.

— The Christian churches in Europe, mainly during the Middle Ages between 900 and 1400 a.D., imposed strict interest prohibition laws. They punished those who levied interest on loans, severely excluding them from the Christian community and Christian funerals. Money was kept in circulation by regularly re-calling and re-minting the thin metal coins - in some areas called Brakteaten - every 3 to 4 years and by levying a fee of 30 – 40 % in the renewal process. This was simultaneously a way of collecting taxes. The use of the old coins was forbidden by law and sanctioned by prison sentences. This time-related charge on money – called ‘demurrage’ – acted as a ‘circulation incentive’ and meant that nobody was able to hoard money without risking a loss. Instead of charging interest, people usually accepted loan agreements that guaranteed repayment of equivalent value after some months or years - thus eliminating the ‘liquidity premium’ or reward for the lender, which causes the compounding of interest. In terms of modern banking practices, leaving out this share of the cost of interest would halve the costs for loans and subsequently – over time - the 40% share of interest concealed in all prices.

All three historic solutions have remained alive up to this day: The Islamic model is finding more and more acceptance among the Muslim population in view of the failure of the capitalist money system to provide for systemic stability and fairness. The Jewish model of waiving the debts has been advocated to counteract the capitalist money systems’ inability to deal with social justice - in the form of waiving the outstanding loans of the least developed countries. And many of the complementary currencies that have been introduced in Germany and elsewhere since 2003 are using demurrage as a circulation incentive.

Where these solutions have not been applied, three historic consequences have arisen: hyperinflation (or crash), social revolution, and war. However, neither the 87 monetary crashes over the last 25 years (Lietaer 2007), nor two world wars, nor social revolu-

tions like the French, Russian or Chinese, have changed anything fundamental about the money system.

Various complementary currency models that addressed the problem of compound interest through a time-related fee that kept money circulating proved their potential to create employment and solve social problems in the 1930s in Austria and Germany - just before Hitler came to power. However, they were discontinued on 'legal' grounds - as they threatened the monopoly of central banks. It is, therefore, of paramount importance to start communicating to central banks and politicians, now, that they need to create a sustainable legal framework for complementary currency systems on a scale that counts. Otherwise, we are heading for the abyss yet again. And this time again the options seem to be social revolution, crash, or war. All three are already in the making.

One additional approach for 'taming' the economy comes from a Buddhist perspective. In contrast to Adam Smith's "invisible hand" and the liberal and neo-liberal acceptance of the profit motive in all individuals, Brodbeck (2007) points out that the starting point of a Buddhist economy is every individual's freedom to recognize what is needed for enhancing life and to change one's behavior accordingly. Thus we can overcome the three 'poisons' that are part of the accepted theoretical and practical basis of the global market economy: ignorance, greed and aggression.

PART 2.

New models for banking and monetary designs

In the second part of this lecture, historic evidence as well as new examples for monetary designs will show how these problems can be avoided and how some of the most pressing problems of social, financial, and ecological instability can be resolved at one fell swoop. It suggests that "Complementary Currencies" (CCs) - defined as means of payment with a built-in target - offer qualitatively different solutions from those which can be achieved via the conventional money system. CCs do not intend to replace the existing national or international currencies but to complement them. In many instances, they already have proven their potential to support and strengthen economies over several decades; their principles can be

applied to economic activities from the local to a worldwide scale.

Rather than accepting monopolies for national money as an unquestionable given, it seems useful to enhance monetary stability by a diversity of currency systems, so that multiple and more diverse channels of monetary links and exchanges can emerge. In a time that calls for new solutions to the pressing problems we are facing globally, the unusual move toward giving up powerful central monopolies in favour of a cooperation with smaller partners in order to create democratically controlled, life enhancing monetary systems – a paradigm shift for economists and bankers – may well have a chance for the first time in recent history.

Complementary Currencies and the Use of Demurrage

As indicated above, a Complementary Currency (CC) may be defined as a means of payment with a built-in target. Mainly in social, cultural and ecological areas in which the present system does not work very well, new liquidity can be created without burdening the taxpayer or governments with additional costs. Models which have existed for decades show that CCs can be a powerful tool for strengthening the economic viability of a specific social sector or geographically limited region (defined here as an area between the local and the national) - especially in economically difficult periods. The Fureai Kippu Care Ticket in Japan, for instance, helps to provide care for millions of elderly people, based on hours of service. The WIR Wirtschaftsring in Switzerland, a parallel currency to the Swiss Franc, strengthens the economic viability of 20% of the small and medium business sector, which in turn creates over 80% of all jobs. And the Saber - a proposed educational voucher system for Brazil, is designed to strengthen the country's educational system. The latter demonstrates clearly the different design features available to complementary currencies in comparison to conventional currencies. So I'll focus on it here in more detail.

The Saber model

In 2004 Brazil was facing a crisis. More than 40% of the populace was under age 15, presenting the nation's schools and universities with a great problem. Taking advantage of the privatization of the mobile telecommunications industry, the government introduced

a 1% charge on all phone bills to provide the funds for expanding the education system. By mid-2004 the Education Ministry had amassed 1 billion phone-fee dollars (= 3 billion Reais, Brazil's national currency) for this task.

But how best to distribute these substantial funds? Lively debate ensued among the decision-makers. Bernard Lietaer and his colleague Gilson Schwartz proposed adding to the national currency a complementary one called Saber (pronounced: sa-BEHR -- Spanish/Portuguese for "knowledge"), and denominated at par and issued as non-counterfeitable credit notes. The model would work as follows.

The Education Ministry was to control the issuance of the credit notes. It would distribute them to schools in economically weaker regions where higher education was usually unaffordable, though plenty of young people were qualified for it. The schools would give the credit notes to the youngest pupils. The teachers would work out with the children where their strengths and weaknesses lay, and which of the weaknesses could be addressed by tutoring. The students were to get the coaching they needed from mostly older fellow students, and pay their tutors in Sabers. This process was to continue until the Sabers reached those students ready to leave school, who could then use them to pay the first year's tuition at one of the participating universities. These universities, and no one else, could then exchange the Sabers back into Reais at the Education Ministry at a rate of 2:1 (two Sabers for one Real). As vacant student slots cost the universities about 10% of what filled slots cost, this project would bring them approximately 40% more income, while the state saves half of the costs per slot – a profitable situation for both, but even more so for the young people whose educational horizons would be dramatically enhanced.

Furthermore, the Saber was designed to lose 20% of its value after one school year plus 4 months. In this period, Lietaer and Schwartz estimated that a Saber would change hands an average of five times. Together with the 50% savings on student seats at the partner universities, this results in a ten-fold (!) increase in education benefits: Two times for the university discount of Sabers, and five times for the circulation of Sabers in the mentoring process. The one billion dollars in the Education Ministry fund thus would

create a benefit for education worth at least 10 billion dollars (= 30 billion Reais).

The whole country would profit from the introduction of an educational currency like this. More young people would earn the necessary qualifications to enter the university, and then could also afford to pay for their studies. The economy, politics, and culture of the country would gain many more educated citizens. More tutoring and new courses of study would become available at no extra cost. In addition, most people retain their own knowledge of a particular subject much better when they teach it to others. While teaching, 90% of the relevant information content is assimilated, whereas only 10% is assimilated while reading and a mere 5% when listening to another person's lecture. So in theory at least, the Saber program would be educationally far more effective than the current system.

Differences between complementary and traditional currencies-

This example shows the main differences between complementary and traditional currencies. They are marked indeed:

- Instead of being profit-oriented they are use-oriented - their primary goal is to connect underutilized resources with unmet demands.
- They are clearly marked as not being legal tender - thus their acceptance is entirely voluntary.
- Their limited - instead of general - acceptance provides a "semi-permeable membrane" around the function (or the region) for which they are designed; they cannot be used to buy products from abroad or to speculate on the international financial markets.
- Most of the complementary currencies do not charge interest but use a circulation incentive or a demurrage mechanism to keep the currency "on the move"; thus they avoid all the dire consequences associated with interest.
- They can be established through a transparent process and therefore can be democratically controlled by the users.
- As they are always 100% backed by services or products, they do not cause inflation.
- They are a proven means to counteract economic boom and bust cycles in contrast to conventional currencies, and thus support the policies of central banks and governments (Stodder, 1998)

— They can stop the drain of financial resources to low-wage countries, thereby halting the resulting loss of wealth and job opportunities, and promoting community instead of destroying it.

— They create a win-win situation for everybody: from an expansion of educational benefits to solving the problems of the increasing numbers of elderly, from the protection of cultural identity to marketing regionally grown foods, from an ecologically sensible use of the shortest transportation routes to exercising ethical concerns when utilizing non-renewable resources, providing closer links between consumers and producers, and helping to re-animate local and regional identity and diversity.

One additional difference and reason for the introduction of complementary currencies on a large scale would be the massive recovery of tax revenue that is, at present, lost due to multinational companies playing national tax authorities off against each other in such a way that many of them pay very little or no tax in their home economies. Somewhere between a sixth and a third of all the money in the world is now lodged offshore, and though it re-enters the economy, it does so mostly in the form of short-term speculation in the growth centres of the world.

Regional Complementary Currencies

In addition to the above list of advantages, regional currencies offer a feasible way to counteract the negative consequences of financial globalization. They allow a partial decoupling from the global financial system, and thus may become an effective life raft in the case of a global financial meltdown. Everyone who accepts "Regios" - as they are often called - will pass them on to another person who shops with them in the region.

Of the 22 practical examples of regional currencies that are presently up and running in Germany, one of the first is the Chiemgauer, circulating in the region around Lake Chiem, Bavaria. Initiated in January 2003, it uses a voucher model. A bonus of 3% is given to 200 selected regional non-profit associations for purchasing Chiemgauer vouchers. The associations in turn sell 1 Chiemgauer for 1 Euro to their members, who profit by supporting their association without paying for it. The members can spend the Chiemgauer in over 600 participating shops. About 2400 participants accept

an annual fee of 8% to guarantee circulation. Four times a year, a stamp (worth 2% of the value of the voucher) has to be attached to Chiemgauer notes in order for them to retain their nominal value. The businesses that accept the vouchers can either exchange them for Euros at a five percent fee or can use them for paying other businesses. If they pass the vouchers on, they do not have to pay the fee. Both the exchange fee and the circulation incentive are tax deductible, because they are seen as customer loyalty schemes. Since August 2006, electronic versions of the Chiemgauer have been used, which makes it easier to deduct the time-related fee or circulation incentive. On average the Chiemgauer currency circulates about 3 - 4 times as fast as the Euro, i.e. it changes hands over 20 times, while the Euro changes hands on average 7 times per year. Thus it creates and keeps the added value in the region (www.Chiemgauer.Info).

Two of the initiators of the Chiemgauer - Christian Gelleri and Thomas Mayer - have used the almost ten years of experience with the regional currency to develop a model for overcoming the euro crisis. Their solution is called "Express Money" (EM). Using EMs the euro crisis countries can speed up monetary circulation in their economies, thereby optimizing their liquidity, promoting economic growth, creating new jobs, enhancing tax revenues, and reducing their dependence on foreign countries.

If the parliaments and governments of Greece, Portugal, and/or Ireland for instance move autonomously to adopt a government-issued regional currency, they can help their countries in two ways:

1. Via demurrage (for instance 8% per year as in the Chiemgauer model) the circulation of money is accelerated, thereby stimulating the economy. (Doubling monetary velocity doubles GNP!)
2. Via a leakage inhibitor (an exchange fee - for instance of 10% - for conversion into euros) results in more money staying in the home country, strengthening the regional economy and reducing trade deficits.

By issuing EMs, the government immediately gains a 10% increase in available liquidity (as 100 Euros will be changed to 110 EMs), and the spending incentive and leakage inhibitor provide it with further billions of euros. Low-income people bear practically no increased burden. EM credits carry a lower interest rate than euro credits, thus facilitating economic investment. The EM would quickly

become the vehicle for a large percentage of domestic payment transactions. It would circulate only in the real goods- and-services economy, since it would not be suitable for speculative financial products. Countries would gain the benefits of a regional currency while not being forced out of the euro - an outcome far preferable to a catastrophic euro abandonment. Express Money will only come about, however, once the idea finds its way to responsible parties in politics, economics, the media, and non-profit organizations, and is subjected to broad public discussion. (www.eurorettung.org.)

Conclusions

While complementary sectoral and regional currencies can show how applying relatively small amounts of energy and resources at the right time and place can produce maximum advantageous change, it should be made clear that their basic tenets can also be applied on a larger scale. At least two solutions for complementary currencies that are meant to operate on a worldwide scale should be mentioned: the emissions-backed currency unit called "EBCU" (Douthwaite, 1998); and the "Terra", a global Trade Reference Currency (Lietaer, 2007). Both aim at adding more fairness, sustainability and stability to our international monetary systems.

The solutions for monetary sustainability and financial stability presented here will be a surprise for conventional economic thinking, which invariably assumes monopolies on national currencies as an unquestionable given. What the above examples are trying to show is that monetary sustainability will be enhanced by a diversity of currency systems that allows multiple, more varied channels of monetary links and exchanges to emerge. We have all the technologies we need to make the use of multiple currencies feasible. However, complementary currencies operate as yet at the margins of the official system. While they are proving their capacity to play a stabilizing role on a small scale, it is urgent to recognize that they can contribute to sustaining the global economic system tomorrow, if they are allowed to grow to the requisite scale. For this to happen, cooperation between governments, central banks and federations of complementary currency associations - which formulate quality criteria and regulate their implementation - is an essential pre-condition.

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Websites:

www.margritkennedy.de

www.monneta.org

E-mail contact: margritkennedy@monneta.org

The Lot of the Currency Designer

Autor: Graham Barnes

Once we realise that currency-nay, money in general-can be designed to fulfill or support specific objectives, it sets us free. Free from the constraints of the broken pseudo-science that is mainstream economics; free to recognise that not all transactions are of equal importance; and potentially free to redesign ourselves away from our existing pervasive elite monetary hegemony and reclaim the monetary commons.

This paper describes a number of legitimate objectives for a currency, getting liftoff and some selected design parameters. It then gives some views on cross-connecting currencies and concludes with a brief comparison with the 1930s: lots of creativity was shown then but most of it was subsequently buried - what is different this time?

The presentation aims to encourage the currency advocate and to emphasise that monetary economics is too important to be left to the economists.

Graham Barnes is a Currency Designer. He is an Executive Member of Feasta - the Foundation for the Economics of Sustainability (<http://www.feasta.org>) and co-leader of the Feasta Currency Group[1]. He holds a PhD in Computer Science and worked at a senior level in IT and online marketing in a previous life. His current projects include the detailed design and delivery of currencies to be sponsored by a local authority; by a social entrepreneur to complement and enhance a well established sustainability methodology; and by a restaurant chain.

Acknowledgement: to Richard Douthwaite, much missed visionary, freethinker and friend.

Currency can be designed

We don't take money for granted - unless perhaps we are one of the 1% and have tired of the acquisitive accumulation game — because there's seldom enough of it to feed our peer-pressured, advertising-driven needs. But we rarely give the idea of money much thought or consider if money could work differently.

This paper is mainly about exchange currency — a sort of money that exists to facilitate the exchange of goods and services in a multi-player economy. Fiat currency (euros, dollars etc) performs this function but

it also aims to be a secure store of value. As has been described elsewhere, these two functions sometimes act against each other. In this paper a functional means of exchange takes precedence.

The central theme of the paper is that currency can be designed to promote or support specific values, behaviours or outcomes. A mainstream economist might suggest that this was not appropriate - that currency should be neutral. It should facilitate any sort of exchange, and incorporate no inbuilt value-associations.

Unfortunately even fiat money fails this test, because it is created by being lent into circulation - created out of thin air as debt. The borrower backs himself to create value faster than the debt grows via compounded interest. The currency is provided by those who have more than they need (or have been given the right to mint digital money) to those who need more than they have. And the wealth thus created is a capital rent, bestowed on the lender solely by virtue of the fact that he already has the money (or the issuance rights), not because he is clever or industrious.

It requires growth to repay the debt+interest. In theory the extent of the growth implied is moderated by a level of debt default. The interest rate is theoretically an indicator of risk - the higher the risk the more interest is payable. But more and more, as in the current crisis, debtors are not allowed to default — their debt is 'socialised' — that is picked up by non-participants in the loan, typically the taxpayer. The lender's position is held paramount.

There are a number of unfortunate aspects of this means of money-creation — its role in increasing inequality; its failure to stop the financialised-economy tail wagging the real-economy dog; its need for infinite growth on a planet with finite resources. But while we may be generally sympathetic to these arguments, and they certainly motivate the search for alternatives, they are not the subject of this paper.

This paper is about currency design as a legitimate profession. It anticipates and welcomes the emergence of multiple 'Designer Currencies'.

Design Objective №1 : increased liquidity

If we accept that currencies can be designed, one objective that comes to mind immediately is the need to increase liquidity. The current 'credit crunch' is largely caused by lenders' concerns that the preferential position accorded to them by politicians may not survive multiple banking crises and the progressive transfer of debt to citizens and its societal

aftermath. Putting money under a Swiss or German government mattress (figuratively speaking) is perhaps the best way to store value until the crisis clears. Euros are scarce and getting scarcer by the day.

One school of thought here focuses on 'self-issued credit', where the currency is essentially created by each player issuing their own IOUs backed by a promise of future delivery of goods or services. This creates additional liquidity today, because these IOUs can be traded without the need for fiat currency.

Feasta's approach — the Liquidity Network (LQN) — is rooted in the work of the late Richard Douthwaite, a visionary and freethinking radical economist and author of the seminal 'The Ecology of Money'[2] (where a full but concise analysis of the functions of money can be found). Additional liquidity is created by the currency sponsor(s) spending or granting/ giving the currency into circulation.

This begs the question as to what, if anything 'backs' the currency. Store of value currencies clearly need some form of backing — that is they need to be exchangeable on demand into something of undeniable worth or they can make no claim to store value.

Douthwaite's view was that exchange currencies, once established, need no backing. They have value by virtue of the confidence that they are widely accepted within the community of use.[3] Indeed, the ability to 'cash in' the currency — exchange it for the backing commodity — removes it from circulation and decreases the very liquidity which we want to create. Thus in an established exchange currency there need to be 'leakage inhibitors' — mechanisms to stop, control or mitigate the loss of circulating currency.

In a pure Liquidity Network this leakage inhibitor is 100% — no formal exchange into another currency is allowed. In contrast, in a typical 'proxy pound' currency (like the Brixton, Lewes and Totnes Pounds) the inhibitor is 5% - proxy pounds can be changed back into sterling at 95% of face value. Critics therefore claim that no additional liquidity is created. This may be a somewhat unfair criticism because liquidity can be measured as a combination of currency in circulation and velocity of exchange, and there are some claims that the latter may be increased.

The design of leakage inhibitors is a key tool in the currency designer's kitbag. It may be achieved via an exchange rate; or it may be achieved via a set of control conditions qualifying which units may be exchanged and when.

This area of action research and analysis is central to the development of the LQN conceptual model, because a 'companion currency' (or currencies) is needed to achieve the legitimate store of value function which falls outside LQN's design. Feasta's provisional thinking here is that such a companion currency might be based on energy bonds.

Douthwaite's view was that backing, for an exchange currency, is like the trainer wheels on a child's bicycle.[4] It is needed to get the currency rolling but can be discarded once momentum is established. The initial source of such backing for LQN was envisaged to be local authority sponsorship and acceptance of the currency in payment of rates and charges. Other models - including commercially sponsored currencies - are being explored.

Design Objective Nº2: relocation

Much of the creative thinking about Designer Currencies is set against an agenda of rebuilding local economies. This line of action is engendered by local experiences of centralised supply chains and the perceived leeching of local wealth into the centre, combined with the search for an elusive 'local distinctiveness'[5].

Certainly, the publication of local directories (often online) can alert users to the existence of local supply of which they were unaware, and this can trigger a certain amount of substitution of supply. But the core problem here is that as local economies have been progressively undermined over many years, alternative local supply may simply not exist.

In this context therefore, the Feasta Currency Group believe that the documentation of local economic circuits, (via data visualisation and other techniques) is an important by product of local currency projects, providing collateral for meaningful local economic development initiatives.

Design Objective Nº3: behaviour change

Relocalisation is a special example of what may be termed a 'behaviour change' objective. The sought behaviours may be 'pro-currency' (actions likely to accelerate the usage or acceptability of the currency); 'pro-local' or 'pro-value' (supporting a defined value set). Mechanisms comprise rewards/ incentives and penalties.

The design of rewards offers an opportunity for embodying the values driving the currency. Rewards can be given in the form of additional

currency subject to inflation-management. Penalties, for an exchange currency, can legitimately include demurrage (that is a form of negative interest to discourage hoarding), though implementing this feature in an immature currency may be problematic, and doing so retrospectively in an established currency will imply a change of terms and need careful introduction.

This set of objectives offers an exciting opportunity for building communities with shared values through the means of exchange. A key challenge here is in the definition and subsequent validation of sought outcomes, which in turn implies a governance responsibility and a proper trust in the management and ongoing design of the currency.

It also permits the currency designer to define some transactions as more valuable than others. For example the transactions of the financialised economy may be considered inferior to those of the real economy; and within the real economy 'stuff of life' transactions (food, shelter, energy) may be preferred via incentives.

Connecting currencies

Just as Black Velvet is a good way of ruining Guinness and champagne by combining them, so the connection of currencies should be approached carefully, and with due consideration of the rationale. Work on currency exchanges has tended to focus on the technical operation of the exchange, whereas the key issues are around the compatibility of value-sets. Often analysing this compatibility is not straightforward because value sets may be implicit rather than explicitly stated and therefore require extraction and discussion.

The Feasta team encountered an enlightening example of this in 2010 when we were engaged to look at the potential for green loyalty and timebanking in South Dublin. The loyalty element, grounded in a commercial loyalty framework generated pure financial value, but this value, when introduced via exchange to a timebanking operation, potentially crowded out the timebanking value set. The danger was that timebank participants who had previously been content to exchange hours began to put a cash value on their 'time-in' with a real threat to the solidarity of the timebank operation.

In general, currencies should not be connected just because they can be. The rationale is likely to be either to increase the scale of operation or to provide a diversified function. The former is often tempting as

an apparent way to reel in a wider range of goods or service providers, or in search of economies of scale. It carries a risk of loss of identity and may fail to meet expectations. The latter may, as we have seen, compromise the currencies' respective core values.

Scalability and international monetary reform

The potential for scaling-up designed currencies to a national or international level of operation is likely to be as much about realpolitik as fit-for-purpose design. Influencing policy makers can be a frustrating, time consuming and thankless business, and tends to appeal to rather different animals than currency activism.

However, understanding money systems and the need for monetary reform is getting much more air-time than previously, and discussion is beginning to escape the 'funny money' pigeonhole. Initiatives such as Positive Money[6] and Sensible Money[7] are gaining advocates.

The big question seems to be - 'why do governments continue to subcontract the issuance of money to self-interested and socially amoral banks?'

The answer seems to be a combination of government mistrust with a rose-tinted view of the efficacy of uninterfered-with markets. If that is the case, maybe, after we point out gently (as Stiglitz and others are doing) that perfect markets don't exist outside of computer models, we should be exploring the nature of a government/ banking partnership that is genuinely sustainable. By redrawing the roles and responsibilities, the checks and balances, we may achieve monetary reform.

The activist view though is that change will come from the ground upwards, not from Bilderberg downwards.

Its deja vu all over again

Just as in the 1930s there are large numbers of clever and committed people working on currency alternatives and monetary reform. Many of the tools of the currency designer were 'invented' in the 19th century. We have been here before. So how come we still have dysfunctional systems? And are we doomed to repeat history, reverting to 'business-as-usual' after a period of zombie flatlining?

Nobody knows the answer to that, but there are two major differences between the situation in the 1930s and now that may give us a perverse hope. One is the wide availability of the Internet; the other is the

clear and present danger of imminent converging environmental crises.

The Internet enables ideas to be spread quickly, interest groups to be formed quickly, co-operative work to be undertaken by dispersed individuals, currency operations to be run in the cloud at low cost. Peer to peer working can avoid the inbuilt design of a central weak point. If establishment attempts to bring this anarchic and uncontrollable activity to heel can be resisted, successful currency initiatives will be much harder to suppress than in the 1930s.

At the same time, the converging crises of peak oil and energy descent, climate change, population and environmental degradation are becoming more apparent in our everyday lives. Systems have to be reinvented anyway. And each reinvention will carry with it opportunities for currency redesign.

We must hope, and intend, that these factors are sufficient to disrupt any intransigent vested interests and facilitate the redesign of current dysfunctional and over-complex systems. If not, our children may be disappointed in us.

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Impact Assessment of Economic and Monetary Innovations for their Financing and Improvement

Author: Christophe Place ¹

SUMMARY

After a deep literature review of 151 sources on impact assessment in the sector of development projects, sustainable finance and monetary innovation, only 31%, 17% and 14% were respectively reference materials of this research topic. The two first sectors are advanced on this topic and already have some principles, standards and guidelines for impact assessment methodology and even handbooks. Furthermore, in the impact finance sector, 24% of a database of 169 sources or 54% of a research of 35 other resources is dealing with assessment tools and indicators. However in the complementary currency sector, only 18% of a database of 1251 sources or 6% of the 406 English sources of this same database integrates a project qualitative or quantitative monitoring and evaluation. Nevertheless, we know that 74% of complementary currency projects depend on conventional money financing. Creating a holistic methodology for impact assessment of economic and monetary innovation projects is essential to conceive the appropriate impact report necessary to reach: external financing analysis and support; internal project management and leadership improvement; global legitimacy as impact development tool. Not only measurement and performance indicators, but also planning, monitoring and evaluation of socio-environmental transformation project seem to be important. That's why we propose a concept of scorecard including 4 dimensions, 20 topics, 55 objectives, 62 indicators and assessment tools. This approach may appear too quantitative and rational and not enough intuitive and qualitative, but a good equilibrium of hard skills and soft skills will help us to attract the indispensable energy,

¹ After five years of operational experience with integrated sustainability management systems in different organizations, sometimes in their strategic executive committees, I worked for a sustainable finance fund and learned more about impact assessment. Then, thanks to my dissertation on economic and monetary innovation and three years of studies and research, I coordinated some local development projects by integrating those tools and analysing their high impact potential. Furthermore, as a sustain-entrepreneur in impact philanthropy, I am currently developing a venture philanthropy seed fund structure and platform to support innovative development projects through expertise on valuation and impact devices. As a political and environmental economics assistant, I focus on both qualitative and quantitative analysis in the governance, economics, environmental and social domains.

time and competencies of our conventional economy in order to reach a social transformation.

INTRODUCTION

Energy-backed, time-backed, surface-backed or other kinds of innovative value-based monetary systems should be implemented in order to reach a more viable and enhanced purpose than the traditional monetary system. Their function should improve the qualitative and quantitative impact in terms of political, economic, environmental, social and anthropological aspects within a territory, a community, and a development project. Furthermore, as creative monetary system implementation needs conventional money financing, impact metrics, measurement and assessment become necessary to create a deep relationship between the dynamics of financial sector money and the energy of currency flows.

Thus, we need to discuss and then adopt a multidisciplinary approach to the impact assessment of those sustainable money systems in order to have a strong relation with and support from ethical finance for a sustainable economy. Indeed, both impact finance and venture philanthropy are currently focus on impact assessment to validate the legitimacy of their financing. They are moreover appropriate ethical devices to stimulate and sustain the deployment and progress of monetary innovations. Consequently, whether for an external financing purpose or an internal evaluation process, impact assessment is necessary for reaching a common goal of Human and Planet well-being.

After a literature review on impact reporting indicators and monitoring systems, I will analyse which holistic progress indicators processes are the most pertinent for monetary innovation, and finally propose a balanced scorecard for a quantitative and qualitative approach.

1. LITERATURE REVIEW: REPORTING INDICATORS AND MONITORING SYSTEMS

According to the European Commission, impact assessment is a policy study and analysis, using participatory impact pathways analysis or econometrics:

"Impact assessment is a set of logical steps to help you prepare policy

proposals. It is a process that prepares evidence for political decision-makers on the advantages and disadvantages of possible policy options by assessing their potential impacts.” (EC, 2008)

According to the International Association for Impact Assessment, impact assessment is a quantitative and qualitative evaluation process:

“Impact assessment, simply defined, is the process of identifying the future consequences of a current or proposed action. The impact is the difference between what would happen with the action and what would happen without it.[...]The process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made”². (IAIA, 2012)

On the contrary of Environmental and Social Life Cycle Assessment of Products (UNEP/SETAC, 2011) and unlike Sustainability Societal Responsibility of Organizations (ISO, 2010) which both have their international standard providing guidance, Environmental and Social Impact Assessment don't have yet a worldwide methodology, guideline and principle reference alike Economic Wealth Progress Indicators or Extra-Financial Analysis and Reporting (LOUETTE, 2009) (ORSE, 2007) (EUROSIF, 2010).

1.1. Impact assessment general definition

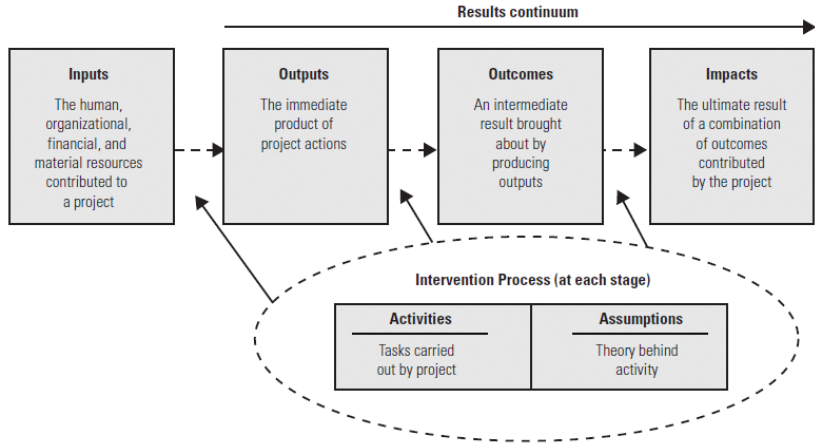
Impact assessment deals with both program evaluation to measure the quantitative output of an activity and impact evaluation to verify the qualitative outcome of a mission (UPEACE, 2011). Those reporting indicators and monitoring systems, based on scorecard and dashboard, are a systematic method for collecting, analyzing, and using information to answer questions about projects, policies and programs, particularly about their effectiveness and efficiency. They assess the changes that can be attributed to a particular intervention, both the intended ones, as well as ideally the unintended ones. They can involve both quantitative and qualitative methods of environmental and social research with different background such as economics, politics, cultural, sociology, anthropology, philosophy and psychology domains.

According to the Theory of Change approach, an impact strat-

² The concept of environment in impact assessment evolved from an initial focus on the biophysical components to a wider definition, including the physical-chemical, biological, visual, cultural and socio-economic components of the total environment

egy uses some means, activities and outputs, to reach some ends, outcomes and impacts (CCBA, 2011). Furthermore, a logic model framework, or logframe, compiles objectively verifiable indicators, means of verification and important assumptions for each project structure: project goals, purpose or outcome, outputs and activities (UNICEF, 2012). To better understand this, here are some explanations:

Figure 1: generic representation of a project's theory of change



Source: THE WORLD BANK – NETWORK OF NETWORKS FOR IMPACT EVALUATION.
Impact Evaluations and Development: NONIE Guidance
on Impact Evaluation, 2009.

Board 1: Theory of Change approach explanation

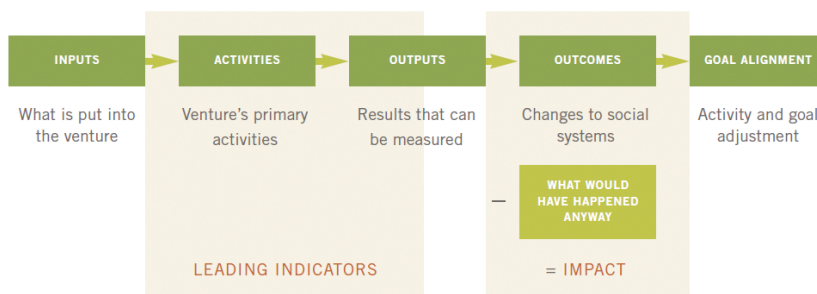
Activity	Output	Outcome	Impact
Man throws stone in pond	Splash when stone hits water	Ripple or wave is formed	Wave hits bank
Keeping hens/hen sitting on eggs	Eggs	Chicks reach eating size	Family protein level increased
Training of local people as park guards	Local people trained and working as park guards	Reduction in illegal hunting	Recovery of biodiversity; but possible negative impact on family nutrition/cost of food

Source: CCBA (The Climate, Community & Biodiversity Alliance). SBIA Social and Biodiversity Impact Assessment manual. The Climate, Community & Biodiversity Alliance (CCBA), September 2011.

This Impact Value Chain, or Performance Pathway, is thus a measure of change where inputs and activities are planned work, and where outputs, outcomes and impact are intended results (THE ROCKEFELLER FOUNDATION, 2003):

- Inputs: what you put in, resources invested in your activity, certain resources are needed to operate your program.
- Activities: what you do, if you have access to resources, then you can use them to accomplish your planned activities.
- Outputs: results that are measured, direct and tangible products from the activity, if you accomplish your planned activities, then you might deliver the amount of product and/or service that you intended.
- Outcomes: collection of all results, changes to people resulting from the activity, if you accomplish your planned activities to the extent your intended, then your participants will benefits in certain ways.
- Impacts: outcomes less an estimate of what would have happened anyway, if these benefits to participants are achieved, then certain changes in organizations, communities, or systems might be expected to occur.
- Goal alignment: how well outcomes align with intended goals (SROI PRIMER, 2004) (LIM, 2010).

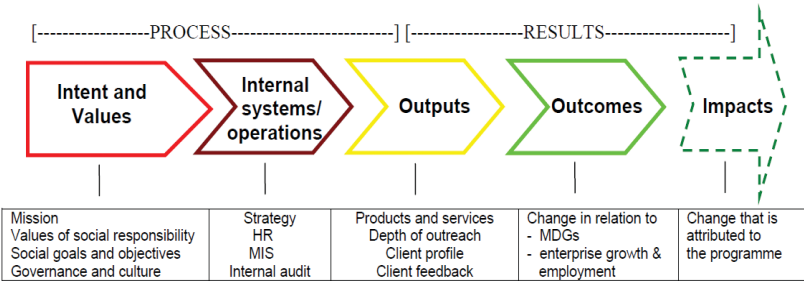
Figure 2: Impact Value Chain



Source: SVTG (Social Venture Technology Group). Catalog of approaches to impact measurement. Social Venture Technology Group (SVTG), March 2008.

The process is made of mission and systems alignment, social responsibility to clients, and finally staff, community and environment responsibility. Outputs results are made of outreach and services (portfolio analysis), profile of new clients (client data) and appropriate services (client feedback). Outcomes results are made of change (MICRO-CREDIT RATINGS INTERNATIONAL LIMITED, 2008).

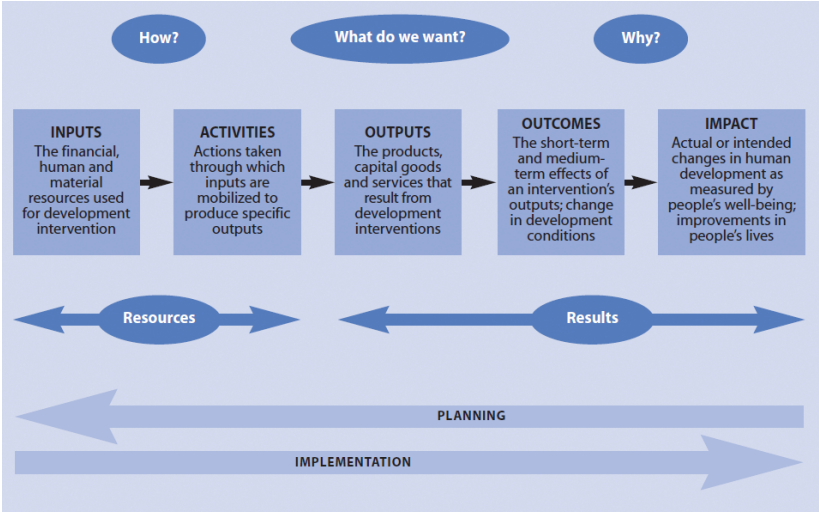
Figure 3: Performance Pathway



Source: MICRO-CREDIT RATINGS INTERNATIONAL LIMITED. Social Rating, 2008.

This Theory of Change guide us for creating a Result-Based Management results chain and framework which integrate impact (vision, goal, objective, longer term outcome, long-term results), outcome (first, positive result or immediate result, prerequisites, short-term and medium-term results), outputs (interventions, programmes), activities (actions), indicators (measure, performance, measurement, performance standard), mean of verification (data source, evidence) (UNDP, 2009).

Figure 4: Result-Based Management results chain & result framework



Results	Indicators	Baseline	Target	Means of Verification	Risks & Assumptions
Impact statement (Ultimate benefits for target population)	Measure of progress against impact				Assumptions made from outcome to impact. Risks that impact will not be achieved.
Outcome statement (Short- to medium-term change in development situation)	Measure of progress against outcome				Assumptions made from outputs to outcome. Risks that outcome will not be achieved.
Outputs (Products and services—tangible and intangible—delivered or provided)	Measure of progress against output				Assumptions made from activities to outputs. Risks that outputs may not be produced.
Activities (Tasks undertaken in order to produce research outputs)	Milestones or key targets for production of outputs				Preconditions for implementation of activities.

Source: UNDP (United Nations Development Programme). Handbook on Planning, Monitoring and Evaluating for Development Results. United Nations Development Programme (UNDP), 2009.

Thus, a Performance Management System will use leading measurement indicators to improve environmental and social impact assessment thanks to different data collection processes.

Board 2: categories of measurement indicators

Organizational Health Indicators	Program Performance Indicators	Social and Economic Impact Indicators
Financial Sustainability Team Capacity Implementation Effectiveness	Activities Outputs Quality Program Costs	Outcomes Outcomes Costs Systemic Impact Generated

Source: ROOT CAUSE. Building a Performance Measurement System: Using Data to Accelerate Social Impact, 2009.

Board 3: data and performance indicators

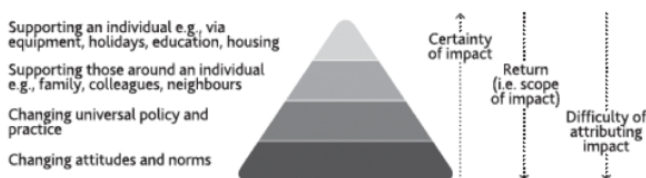
DATA	
ITEM	MEASURE
Total Inputs	Total cost (funds applied to the program)
Output	No of cases managed
Outcome	No of successfully managed clients
PERFORMANCE INDICATORS	
CATEGORY	MEASURE
Cost efficiency	Cost per case managed
Cost effectiveness	Cost per successfully managed client

Source: WESTERN AUSTRALIA. Developing Performance Indicators.

Impact Assessment remains a difficult approach depending on the focus, scope and purpose of each project. Consequently, for a specific recognized situation, the degree of agreement between stakeholder and the degree of certainty about what to do may vary from simple to complicated and then complex (UNICEF, 2012). For

example, relevant criteria for selecting significant impacts may include: probability of the event occurring, number of people including indigenous populations that will be affected, duration of impacts (long-term versus short-term), value of benefits and costs to impacted groups (intensity of impacts), extent to which the impact is reversible or can be mitigated, likelihood of causing subsequent impacts, relevance to present and future policy decision, uncertainty over possible effects, presence or absence of controversy over the issue (CENTRE FOR GOOD GOVERNANCE, 2005).

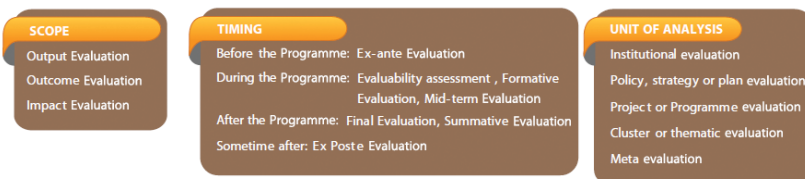
Figure 5: Impact assessment certainty degree



Source: FIENNES Caroline. It ain't what you give, it's the way that you give it.
London: Giving Evidence, 21st of February 2012.

Consequently, in order to build a reliable, legitimate and credible evaluation process, we should have different timing, scope, stage and modalities criteria depending on qualitative or quantitative information, on data or experimental analysis, on internal or external evaluation, on self or peer evaluation, and on individual or joint evaluation. Furthermore, for each stage, different type of projects involves different impact assessment variables.

Board 4: evaluation type



Source: UN WOMEN. Guide to Gender Equality & Human Rights Responsive Evaluation, 2010.

Board 5: stage of impact assessment

STAGE	"Implied Impact"	"Proven Impact"	"Optimized Impact"
DEFINITION	STORYTELLING + INTERNAL DATA ANALYSIS	EXTERNAL DATA ANALYSIS + EXPERIMENTAL ANALYSIS	PROVEN IMPACT + INTERRELATIONSHIP WITH FINANCIAL PERFORMANCE
	Through the comparison of our activities and outputs to internal performance targets supplemented by staff and/or customer anecdotes, we believe it works.	We compare our data to existing comparables and experimental or statistical data, and can predict our impacts using these proxies. We also do primary research or partner with third party experts to conduct experiments on a subset of our work to demonstrate our actual impact.	We assess our proven impact relative to the investment required, and systematically measure the ways our impact affects our financial performance and vice versa.

Source: SVTG (Social Venture Technology Group). Catalog of approaches to impact measurement. Social Venture Technology Group (SVTG), March 2008.

Board 6: management and conduct evaluation modalities



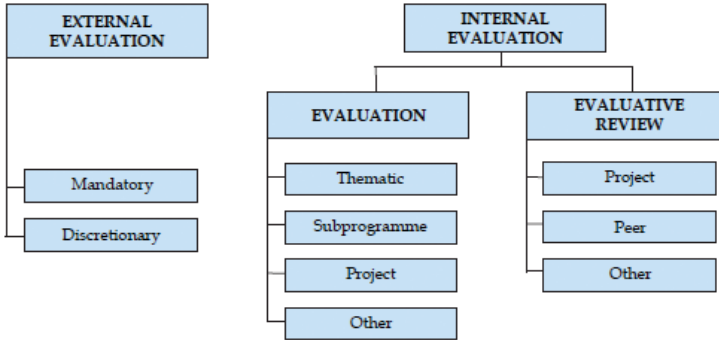
Source: UN WOMEN. Guide to Gender Equality & Human Rights Responsive Evaluation, 2010.

Board 7: impact assessment variables per project type and stage

Project/Policy Stage				
Project/Policy Settings (type)	Planning/Policy Development	Construction/ Implementation	Operation/ Maintenance	Decommission/ Abandonment
Hazardous Waste Site	Perceptions of risk, health and safety	Influx of temporary workers	Trust in political and social institutions	Alteration in size of local government
Industrial Plant	Formation of attitudes towards the project	Change in community infrastructure	Change in employment/ income characteristics	Change in employment equity of minority groups
Forest Service to Park Service Management	Interested and affected publics	Trust in political and social institutions	Influx of recreation users	Distribution of power/authority

Source: INTERORGANIZATIONAL COMMITTEE ON GUIDELINES AND PRINCIPLES FOR SOCIAL IMPACT ASSESSMENT. Guidelines and Principles for Social Impact Assessment, May 1994.

Figure 6: type of evaluative process



Source: ESCAP (Economic and Social Commission for Asia and the Pacific).
Monitoring & Evaluation System Overview and Evaluation Guidelines.

As Impact Assessment is an imprecise science for every Sustainable Impact and Triple Bottom Line organisation, we should develop case studies and be clear about ownership of data and results. We should also support data interpretation with dialogue, and use information simple, easy to communicate and useful for the organisation, because measure is marketable (UPEACE, 2011).

Consequently, we should always try to focus on SMARTER information evaluation which means specific, measurable, attainable, relevant, timely, evaluate, reevaluate, but also significant, stretching, simple, meaningful, motivational, manageable, appropriate, achievable, agreed, assignable, ambitious, aligned, aspirational, acceptable, action-focused, results-oriented, realistic, resourced, resonant, time-oriented, timed, time-based, timeboxed, time-bound, time-specific, timetabled, time limited, trackable, tangible, ethical, excitable, enjoyable, engaging, ecological, rewarded, reassess, revisit, recordable, rewarding, reaching.

Figure 7: SMART indicators, outcomes and impacts

Specific: Is the indicator specific enough to measure progress towards the results?	
Measurable: Is the indicator a reliable and clear measure of results?	
Attainable: Are the results in which the indicator seeks to chart progress realistic?	
Relevant: Is the indicator relevant to the intended outputs and outcomes?	
Time-bound: Are data available at reasonable cost and effort?	
S	Specific: Impacts and outcomes and outputs must use change language—they must describe a specific future condition
M	Measurable: Results, whether quantitative or qualitative, must have measurable indicators, making it possible to assess whether they were achieved or not
A	Achievable: Results must be within the capacity of the partners to achieve
R	Relevant: Results must make a contribution to selected priorities of the national development framework
T	Time-bound: Results are never open-ended—there is an expected date of accomplishment

Source: UNDP (United Nations Development Programme). Handbook on Planning, Monitoring and Evaluating for Development Results. United Nations Development Programme (UNDP), 2009.

Even if there are no any international standards, guidelines and principles concerning Environmental and Social Impact Assessment, we should respect some of the existing ones. Impact evaluation should follow those lessons: institutional readiness (understand key stakeholders, adapt the investives, invest in capacities and skills), implementation (define impact in relation to the specific context, develop the right blend of methodologies, involve those who matter in the decisions that matter), communication and engagement (communicate effectively, be persistent and flexible). Furthermore, to gain in credibility and efficiency, Impact Assessment may overpass those challenges: identify and strengthen processes to ensure that evidence is used in policy, institutionalise impact evaluation, improve evaluation designs to answer policy-relevant questions, make progress with small impact evaluations, and expand knowledge and use of systematic reviews (ODI, 2011).

Board 8: principles for impact assessment

* Involve the diverse public
<i>Identify and involve all potentially affected groups and individuals</i>
* Analyze impact equity
<i>Clearly identify who will win and who will lose and emphasize vulnerability of under-represented groups</i>
* Focus the assessment
<i>Deal with issues and public concerns that really count, not those that are just easy to count</i>
* Identify methods and assumptions and define significance
<i>Describe how the SLA is conducted, what assumptions are used and how significance is determined.</i>
* Provide feedback on social impacts to project planners
<i>Identify problems that could be solved with changes to the proposed action or alternatives.</i>
* Use SIA practitioners
<i>Trained social scientist employing social science methods will provide the best results.</i>
* Establish monitoring and mitigation programs
<i>Manage uncertainty by monitoring and mitigating adverse impacts.</i>
* Identify data sources
<i>Use published scientific literature, secondary data and primary data from the affected area.</i>
* Plan for gaps in data
<i>Evaluate the missing information, and develop a strategy for proceeding.</i>

Source: INTERORGANIZATIONAL COMMITTEE ON GUIDELINES AND PRINCIPLES FOR SOCIAL IMPACT ASSESSMENT. Guidelines and Principles for Social Impact Assessment, May 1994

The literature on environmental impact assessment, social impact assessment, capital benefits, program evaluation, impact evaluation, monitoring and evaluation, impact indicator, and impact measurement is important. Those tools of sustainability management are currently used for Corporate Social Responsibility through Triple Bottom Line: People Planet Profit, for Social Responsible Investment or Social Impact Investment through Environmental Social and Governance extra financial rating criteria, and also for Charity, Philanthropy, Fundraising such as High Impact Philanthropy, Corporate Social Investment, Charity Business, and Venture Philanthropy.

Figure 8: norms for evaluation

- **Independent**—Management must not impose restrictions on the scope, content, comments and recommendations of evaluation reports. Evaluators must be free of conflict of interest (see Box 34, page 155).
- **Intentional**—The rationale for an evaluation and the decisions to be based on it should be clear from the outset.
- **Transparent**—Meaningful consultation with stakeholders is essential for the credibility and utility of the evaluation.
- **Ethical**—Evaluation should not reflect personal or sectoral interests. Evaluators must have professional integrity, respect the rights of institutions and individuals to provide information in confidence, and be sensitive to the beliefs and customs of local social and cultural environments.
- **Impartial**—Removing bias and maximizing objectivity are critical for the credibility of the evaluation and its contribution to knowledge.
- **Of high quality**—All evaluations should meet minimum quality standards defined by the Evaluation Office (see Annex 3).
- **Timely**—Evaluations must be designed and completed in a timely fashion so as to ensure the usefulness of the findings and recommendations
- **Used**—Evaluation is a management discipline that seeks to provide information to be used for evidence-based decision making. To enhance the usefulness of the findings and recommendations, key stakeholders should be engaged in various ways in the conduct of the evaluation.

Source: UNDP (United Nations Development Programme). Handbook on Planning, Monitoring and Evaluating for Development Results. United Nations Development Programme (UNDP), 2009.

Nevertheless, those tools are mostly used in Sustainable Development and Impact Finance area, with sometimes some terminology differences³. Consequently, to review international initiatives of environmental and social impact assessment methodology, guidelines and principles, we will first look at the development sector, then review some specialized process from the impact finance area, to finally focus on monetary innovation research.

1.2. Development project impact assessment

As we saw in the Theory of Change, the purpose of a logic framework, of Impact Assessment is to reach a vision, a goal (objective, longer term outcome, long-term results). In the sector of

³ In term of definition, in the corporate and finance sector, we have a qualitative evaluation of the global project, or mission, impact, or outcome which results from a quantitative assessment of the specific program, or activity, output. On the contrary, in the development domain, we have a qualitative evaluation of the global program with its impact, or outcome, which results from the specific project, or activity, output. Thus, project and program terms may vary from a global to a specific level from the Sustainable Development domain to the Impact Finance area. Nevertheless, in order to avoid confusion, we mostly speak about activity instead of project or program to measure quantitative output, and speak about program in the development domain and about project in the finance area when we speak about the qualitative impact evaluation. Nevertheless, even if we should speak about development programs, we commonly speak about development projects.

sustainable development, most of the world states agreed on a sharing vision and goal through United Nations principles, charter, blueprint, declaration. Here are the 5 main ones.

Board 9: brief description of sustainable vision, goals, objectives

Year	Organisation	Title	Description
1993	UNCED United Nations Conference on Environment and Development Rio Earth Summit 1992	Agenda 21	Comprehensive blueprint of action plan to be taken globally, nationally, and locally
2000	United Nations Global Compact	The Ten Principles	The Universal Declaration of Human Rights The International Labour Organization's Declaration on Fundamental Principles and Rights at Work The Rio Declaration on Environment and Development The United Nations Convention Against Corruption
2000	The Earth Charter Initiative United Nations WCED World Commission on Environment and Development Brundtland Commission	The Earth Charter	Ethical vision proposes that environmental protection, human rights, equitable human development, and peace are interdependent and indivisible
2000	United Nations Millennium Declaration	Millennium Development Goals	Objectives and Goals by 2015 Millennium Development Goals: Eradicate extreme poverty and hunger. Achieve universal primary education. Promote gender and empower women. Reduce child mortality. Improve maternal health. Combat HIV/AIDS, malaria and other diseases. Ensure environmental sustainability. Develop a global partnership for development.
2002	WSSD World Summit on Sustainable Development Johannesburg Earth Summit 2002	Johannesburg Declaration on Sustainable Development	Declaration

Source: LOUETTE Anne. Sustainability compendium: social and environmental responsibility management tools.
São Paulo: Antakarana Cultura Arte Ciência/Willis Harman House, 2008.

Board 10: reference material and organisation for development monitoring and evaluation

Level	Type	Organisation	Title	Description
Global	Handbook	UNDP United Nations Development Programme	Handbook on Planning, Monitoring and Evaluating for Development Results	Synthesis of Development Evaluation
Global	Principles	International Association for Impact Assessment	Social Impact Assessment International Principles	Process for International Principles of Impact Assessment
Global	Applied Mathematics Methodology	The World Bank Network of Networks for Impact Evaluation	Impact Evaluations and Development: NONIE Guidance on Impact Evaluation	Methods and applied mathematics for impact evaluation
Global	Principles	IE4D Impact Evaluation for Development Group	Principles for Action	Rethinking, reshaping, reforming impact evaluation
Global	Efficiency Assessment	BMZ Federal Ministry for Economic Cooperation and Development	Tools and Methods for Evaluating the Efficiency of Development Interventions	Efficiency Evaluation Methodology Social Welfare and Aid efficiency assessment
Global	Monitoring and Evaluation Compendium	My M&E	Recommended toolkit	List of Monitoring & Evaluation Tools

Level	Type	Organisation	Title	Description
Global	Monitoring and Evaluation Compendium	International Development Evaluation Association	Monitoring and Evaluation Tools	List of Monitoring & Evaluation Tools
Global	Impact Effect Compendium	IOCE International Organisation for Cooperation in Evaluation	Resources on Impact and Effects	A list of relevant references and resource on Evaluating program impacts and effects
National	Standards Compendium	European Evaluation Society	Evaluation Standards	List of Evaluation Standards of National and Regional Evaluation on Societies & of International and Supranational Organisations
National	Wealth Indicators Compendium	LOUETTE Anne	Sustainability Indicators of nations: a contribution to dialogue	Economic Wealth Progress Indicators of Nations Indicators and Index of Nations Sustainability
National	Assessment Tool Evaluation State of the art	Institute for Environmental Studies	Sustainability A-Test	Review and Evaluation of 40 assessment tools: Assessment frameworks, Participatory tools, Scenario analysis, Multi-criteria analysis, Cost benefit analysis, Cost-effectiveness analysis, Modelling tools, Accounting tools, Physical analysis tools, Indicator sets
National	Interlinkage Evaluation Indicators	INDI-LINK	Indicator-based evaluation of interlinkages between different sustainable development objectives	State of the art. Evaluation of interlinkage. Elaboration of policy making.

Social, Community	Guidelines & Principles	Interorganizational Committee on Guidelines and Principles for Social Impact Assessment	Guidelines and Principles for Social Impact Assessment	Legal mandates. Administrative procedure. Basic model. Step process.
Social	Research Methodology	Delbert Charles MILLER, Neil J. SALKIND	Handbook of Research Design and Social Measurement	Handbook of methodology, research technique. Epistemology, research design and statistics. Theoretical and practical knowledge (scales, indices, applications)
Equity, Poverty, Inequality	Assessment Methodology	UNICEF United Nations Children's Fund	Evaluation for equitable development results	Concept, design, implementation, evaluation focus on human rights and equity. Strategic evaluation.
Food Security	Assessment Methodology	FAO Food and Agriculture Organization	Overview of methods for baseline assessments	Overview of development assessment methodology. Baseline assessment in food security situation
Climate, Community, Biodiversity	Assessment Methodology	CCBA The Climate, Community & Biodiversity Alliance	SBIA Social and Biodiversity Impact Assessment manual	Participatory approach that integrates project design and impact assessment through the development of a project theory of change. REDD: Reducing Emissions from Deforestation and Forest Degradation. SES: Social & Environmental Standards

1.3. Sustainable finance impact assessment

Sustainable and Ethical finance include Ethical and Alternative Banking, Socially Responsible Investment, Microfinance, Social Investment, Solidarity Finance, Impact Investment and Venture Philanthropy (FEBEA, 2009) (GABV, 2011) (EUROSIF, 2010) (FRBSF, 2008) (FINANSOL, 2010) (MIX, 2009) (TIDES, 2011). Within the sustainable finance sector, some principles, standards, commitment and frameworks have been agreed by

most of worldwide institutions. Some of them deal with financial investment and credit commitment or principles and other with performance standard, indicator framework or taxonomy standard for the impact report. Here are the 6 main ones.

Board 11: brief description of sustainable finance principles, standards, commitment, framework

Year	Organisation	Title	Description
1997	GRI Global Reporting Initiative	Sustainability Reporting Framework	Content (materiality, stakeholder inclusiveness, sustainability context and completeness) & Quality (balance, comparability, accuracy, timeliness, clarity and reliability).
1997	UNEP FI United Nations Environment Program Finance Initiative	UNEP Statement of Commitment by Financial Institutions (FI) on Sustainable Development	Financial Services Sector recognize that economic development needs to be compatible with human welfare and a healthy environment
1998	IFC International Finance Corporation	Performance Standards on Environmental and Social Sustainability	8 performance standard with details: Assessment and Management of Environmental and Social Risks and Impacts Labor and Working Conditions Resource Efficiency and Pollution Prevention Community Health, Safety, and Security Land Acquisition and Involuntary Resettlement Biodiversity Conservation and Sustainable Management of Living Natural Resources Indigenous Peoples Cultural Heritage

2002	IFC International Finance Corporation	Equator Principles	<p>Minimum screening criteria for project financing in order to ensure that the projects financed are developed in a manner that is socially responsible and reflect sound environmental management practices.</p> <p>EPFI Equator Principles Financial Institutions will only provide loans to projects that conform to principles:</p> <p>Review and Categorisation Social and Environmental Assessment Applicable Social and Environmental Standards Action Plan and Management System Consultation and Disclosure Grievance Mechanism Independent Review Covenants Independent Monitoring and Reporting EPFI Reporting</p>
2006	UNEP FI United Nations Environment Program Finance Initiative United Nations Global Compact	PRI Principles for Responsible Investment Initiative	<p>Network of international investors. Environmental, social and corporate governance (ESG) issues can affect the performance of investment portfolios</p>

Year	Organisation	Title	Description
2008	GIIN Global Impact Investing Network	IRIS Impact Reporting & Investment Standards	<p>Taxonomy - library of commonly reported impact-term</p> <p>Framework Structure of Metrics</p> <p>Organization description (mission, operational model and location): metrics that focus on the organization's mission, operational model, and location (Report Information, Organizational Information, Impact Objectives)</p> <p>Product Description (products and services and target markets): metrics that describe the organization's products and services and target markets (Product/Service Information, Target Beneficiaries)</p> <p>Financial Performance: metrics that are consistent with both the Generally Accepted Accounting Principles (GAAP) and the International Financial Reporting Standards (IFRS) (Income Statement, Balance Sheet, Cash Flow, Ratios, Concepts, and Calculations).</p> <p>Operational Impact (policies, employees and environmental performance): metrics that describe the organization's policies, employees, and environmental performance (Governance & Ownership, Social Policies, Environmental Policies, Environmental Performance, Employees, Wages, Training & Assessment)</p> <p>Product Impact (performance and reach): including descriptions and measures of the benefits of an organizations' products and services (Quality & Reach, Quality & Performance, Client Information, Supplier Information, Distributor Information).</p>

Board 12: reference material and organisation for impact finance, investment and philanthropy

Level	Type	Organisation	Title	Description
Global	Handbook	Investing for Good	The Good Analyst	Methodology for Impact Analysis and Assessment. Mission Fulfilment. Beneficiary Perspective. Wider Impact.
Global	Monitoring and Evaluation Compendium	Tides	Assessing Social Impacts of Investments	Synthesis of Impact Finance Assessment
Global	Monitoring and Evaluation Compendium	Foundation Center	TRASl – Tools and Resources for Assessing Social Impact	Compendium of 150 Tools, Methods, Best Practices. Assessment, Management, Certification. Outputs. Outcomes, impacts.
Global	Monitoring and Evaluation Compendium	Social Venture Technology Group	Catalog of approaches to impact measurement	Catalog of 25 approaches. 21 assessment systems.
Global	Assessment Methodology	McKinsey&Company	Learning for Social Impact - 3 steps to designing a Learning Driven Assessment	Clarify initiative objectives. Select specific indicators. Consider priorities to select design options. indicators for each initiative objectives.
Global	Assessment Methodology	The Rockefeller Foundation	Social Impact Assessment	Overview of Social Impact Assessment methodology
Global	Assessment Methodology	Root Cause	Building a Performance Measurement System: Using Data to Accelerate Social Impact	Sample Management Dashboard. Organizational Health Indicators. Program Performance Indicators. Social and Economic Impact Indicators.

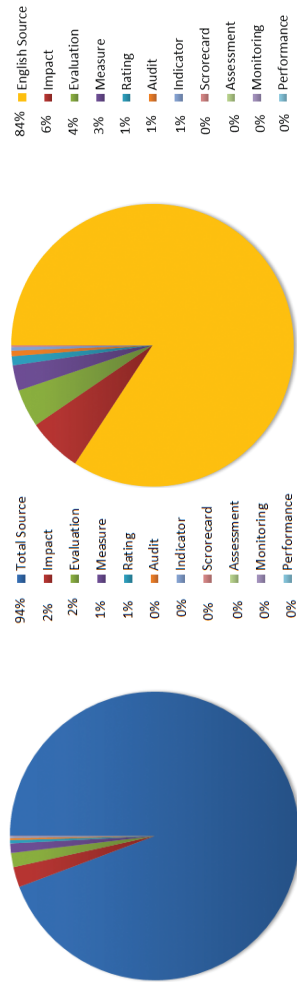
Level	Type	Organisation	Title	Description
Philanthropy	Assessment Methodology	Terence LIM Committee Encouraging Corporate Philanthropy	Measuring the Value of Corporate Philanthropy	Focus on effectiveness, strategy, measurement and metrics. Reference tool in Venture Philanthropy. Formal impact evaluation. Outcomes measurement. Impact achievement-potential assessment
Corporate	Monitoring and Evaluation Compendium	LOUETTE Anne	Sustainability compendium: social and environmental responsibility management tools	Compendium of International, Corporate Governance and Sectorial Principles and Guidelines. Compendium of Management Tools, Standards and Certification
Social Return on Investment	Monitoring and Evaluation Compendium	SROI London	SROI Primer	Compendium on Social Return on Investment: Organisations & Networks, Measurement Tools, Publications, Social Accounting and Audit. SROI Calculation process.

1.4. Monetary innovation impact assessment

According to the Bibliography of Community Currency Research, called CC-Literature, 37% of the 1251 sources of the database are in English, which means 406 sources (SCHROEDER, 2011 (2)). By researching the source linked with the key words: impact, evaluation, measure, rating, audit, indicator, scorecard, assessment, monitoring, performance we can respectively extract 30, 21, 14, 5, 3, 1, 0, 0 sources, which means a total of 76 sources. It means that only 18.7% of English sources and 6.1% of total sources deal with impact assessment in the monetary innovation bibliography.

"The database identifies 201 contributions with information about specific exchange systems or groups of systems – these are systematic empirical studies, sometimes country surveys of certain types of systems, and sometimes reports from activists." (SCHROEDER, 2011 (2)).

Graphic 1: percentage of impact assessment research in monetary innovation bibliography (Total & English source)



Source: SCHROEDER Rolf F.H., MIYAZAKI Yoshihisa, FARE Marie. Community currency research: an analysis of the literature. International Journal of Community Currency Research 15, 2011 (2).

In the Economic and Monetary Innovation sector, there are no principles, standards, or guidelines intentionally known or agreed by most of worldwide institutions of this sector. Nevertheless, after the International Conference on Community and Complementary Currencies which took place in Lyon the 16th and 17th of February 2011, a Complementary Currency Standards Guidance initiative emerged under the impulsion of William O. RUDDICK.

Board 13: complementary currency standards guidance initiative

System	Author	Organisation	Title	Description
Complementary Community Local Currency	RUDDICK William O.	Complementary Currency Alliance (CCA)	Concept Paper – Draft v2	<p>The CC-Standards are important for all phases of project planning and management, from design (rules and guidance to encourage effective and integrated project design, consulted and applied during design phase, preliminary stage, for validation) through implementation and monitoring (evaluate the social, poverty reduction, environment and economic impacts of a CC project). Regardless of geographical location, start date, or size; digital or physical forms and either in commodity or social service markets. Need program accounting certificates: full cost accounting standard certificate such as ISO 26000 on Corporate Social Responsibility in combination with CC-Standards.</p> <p>CC-Standards & Model Specific Guidance (Concept + Indicators): Legal Framework (Taxation, Country specific laws), Risk Management (Disaster mitigation, Transactional and Information Security). Community (Involvement, Implementation, Diversity, Co-creation and cooperation, Net Positive Community Impacts) Governance (Administration, Collaborative decision making). Sustainability (Locally Appropriate Solutions, Flexibility, Adaptability, Practicality, Innovation). Economic Viability (Independence, Market Diversity, Resilience, Cost Recovery, Net Positive Economic Impacts, Marketing). Professionalism (Accounting and Financial standards, Transparency / Information sharing, Effectiveness, Efficiency, Exchangeability, External auditing, Training, Baseline projections, Values and Goals, Management Capacity). Technology and Monitoring (Software, mobile phone systems, Record keeping and statistics, Impact assessments). Model Specific Guidance (will also cover topic such as: Interoperability between systems, Maximum or minimum - Debt levels, Backed by national currency or resources, Exchange Rates, Fungibility)</p>

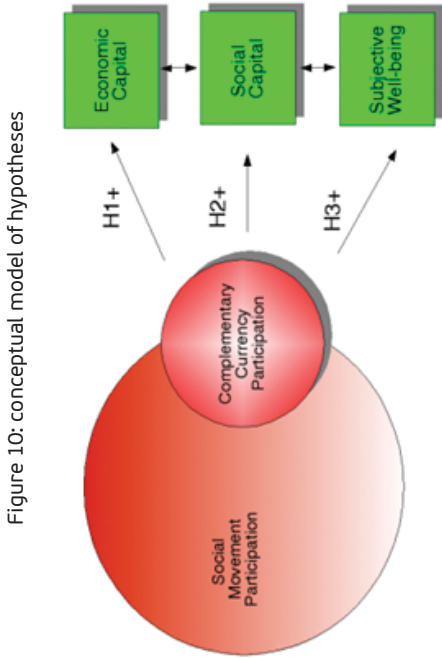
Source: RUDDICK William O., Concept paper draft version 2. Mombasa: Complementary Currency Alliance, 7th of March 2012.

Figure 9: complementary currency standards guidance initiative brief

Legal Framework Taxation Country specific laws	Market Diversity Resilience Cost Recovery Net Positive Economic Impacts Marketing
Risk Management Disaster mitigation Currency Security Features Transactional and Information Security	Professionalism Accounting and Financial standards Transparency / Information sharing Effectiveness Efficiency Exchangability External auditing Training Baseline projections Values and Goals Management Capacity
Community Involvement Implementation Diversity Co-creation and cooperation Net Positive Community Impacts	Technology and Monitoring Software, mobile phone systems Record keeping and statistics Impact assessments
Governance Administration Collaborative decision making	Model Specific Guidance will also cover topic such as: Interoperability between systems Maximum or minimum - Debt levels Backed by national currency or resources Exchange Rates Fungibility
Sustainability Locally Appropriate Solutions Flexibility Adaptability Practicality Innovation	
Economic Viability Independence	

Source : RUDDICK William O., Concept paper draft version 2. Mombasa: Complementary Currency Alliance, 7th of March 2012.

After a literature review of 36 of the 76 documents linked with impact assessment in the sector of complementary, look at annexe 5 page 48, local and community currency sector, here are the 12 main reference research papers and authors about indicator, evaluation, impact and social or environmental capital benefits (process and results). Actually, most of the monetary innovation evaluation process and results are based on a conceptual model dealing with economic, social and well-being issues through either a qualitative or quantitative approach:



Source: WHEATLEY Gerald. Complementary currency and quality of life: social and economic capital effects on subjective well-being. Calgary: The University of Calgary, 3rd of April 2006

Board 14: monetary innovation impact assessment process (social capital benefits)

System	Author	Editor	Title	Result
Local currency systems	SEYFANG Gill	International Journal of Community Currency Research	Examining local currency systems: a social audit approach	Social audit is a process of defining, observing and reporting measures of an organisation's ethical behaviour and social impact against its objectives. Social policy is then evaluated according to its impact on these needs, rather than by applying efficiency criteria. Macro/micro social indicator' method which measures an organisation's (micro) performance in areas of (macro) social indicators (quality of life of members and the community); 'constituency group attitudes' audit, which uses both factual and subjective information to evaluate the impacts of a pluralistic organisation on its stakeholders
Community currency systems	WALKER David	International Journal of Community Currency Research	The impact of community currency systems on gender relations in rural northeast Thailand	A hybrid social audit – gender analysis approach Social Audit Approach - Gender analysis frameworks Community currency systems strengthening of women's social capital Community currency systems can positively influence gender relations The transformative impact on gender relations is seen to be limited to the arena of collective action or Social Capital.
Local money Transition town	GRAUGAARD Jeppe Dyrendom	Local Environment: The International Journal of Justice and Sustainability	A tool for building community resilience? A case study of the Lewes Pound	There have been no empirical studies to date assessing the socio-economic impacts of this model. Novel framework for estimating economic, social, and environmental outcomes, which uses a mixed-methods approach Findings suggest that complementary currencies can enhance social-ecological resilience through awareness-raising and changes in consumption. Although economic localisation – a key indicator – is lacking, there is evidence that the Lewes Pound has developed social interactions and changed consumption patterns of its users.

System	Author	Editor	Title	Result
Time Banking	OZANNE Lucie K.	International Journal of Community Currency Research	Learning to exchange time: benefits and obstacles to time banking	Using focus groups, this study identifies benefits of Time Banking in terms of physical, human, social, and cultural capital Physical: an affirming institution which enables participants to recognise their skills and capabilities and gain new skills. Social capital: Time Banking serves to build connections and increase trust among members, their social capital, and reinforce weak ties in the community
Time bank	COLLOM Ed	International Journal of Community Currency Research	Key indicators of time bank participation: using transaction data for evaluation	Time Bank Participation Indicators: System: Number of active members per quarter. Quarter of first transaction. Total number of hours per quarter. Services categories (Arts and crafts production. Beauty and spa. Cleaning, lights tasks and errands. Computers and technology. Construction, installation, maintenance and repair. Entertainment and social contact. Events and program support. Food preparation and service. Health and wellness. Office and administrative support. Sales and rentals of items. Transportation and moving. Tutoring, consultation and personal services.) Individual: Total hours of participation. Average hours per quarter. Account balance. Number of trading partners. Number of reciprocated contacts. Ego-network density. Number of services exchanged.
Community currency	KOKABU Masayuki. KATAI Osamu. SHIOSE Takayuki. KAWAKAMI Hiroshi.	Kyoto University	Design concept of community currency based on fuzzy network analysis	In this paper, we have introduced community currency for constructing lively communities and taken account of the reciprocity that can be expected by the use of community currencies. The reciprocity contributes to emerge and accumulate social capital.

Complementary currencies	BRENES Erik	International Journal of Community Currency Research	Complementary currencies for sustainable local economies in Central America	Strong solution that can empowers communities and/or local organizations to address local problems and needs with local resources. Improve local economy as well as energetic independence due to the integration all three dimensions of the Agenda 21 Global policy Strong planning tool for middle and long term sustainable development Maximize local usage of resources making it sometimes an affordable solution for local economic development Local economy becomes more resilience and adaptable to national or global economy crisis.
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Board 15: monetary innovation impact assessment results (social capital benefits)

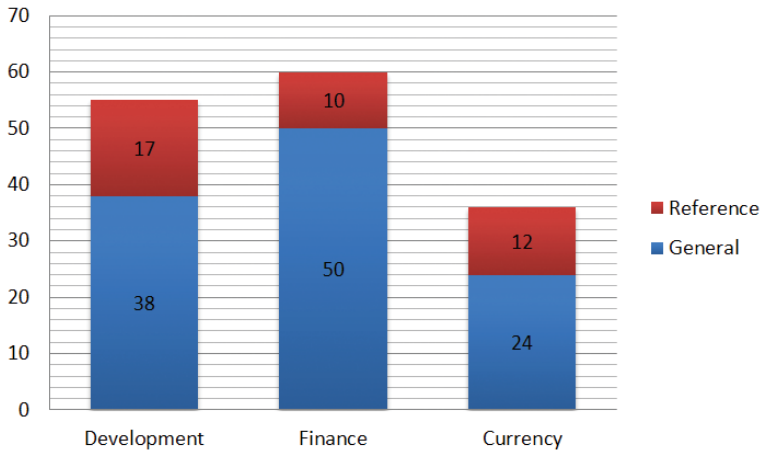
System	Author	Editor	Title	Result
Time Banks	SEYFANG Gill	Voluntary Action	Spending time, building communities: evaluating time banks and mutual volunteering as a tool for tackling social exclusion	Building social capital: 91% Participants in their time bank were building friendships and trust, and the same proportion agreed that members were expanding their social networks as a result of their time exchanges. Encouraging community involvement : 91% time bank co-ordinators who responded agreed that their projects encouraged community involvement Engaging socially excluded Groups: 73% of the co-ordinators responding to the survey agreed that their time banks were benefiting the socially excluded
Social money	SILVA JUNIOR Jeová Torres	Universidade Federal do Ceará Laboratório Interdisciplinar de Estudos em Gestão Social	Avaliação de impactos e de imagem : banco palmas – 10 anos	Why do you use Palmas currency (Principal reason) ? 43% Help local business. 22% for the purchase discount. 18% to receive a part of the salary in Palmas currency. 10% to receive loans in Palmas currency. 7% other. How Palmas currency helped you? 22% increase its income. 20% find a job. 23% meet other people. 12% find other projects. 11% become best-known. 05% increase its study interest. 01% help local growth.

System	Author	Editor	Title	Result
Complementary currency	WHEATLEY Gerald	The University of Calgary	Complementary currency and quality of life: social and economic capital effects on subjective well- being	<p>Currency improves subjective well-being: 27% strongly agree. 51% agree. 13% disagree. 7% strongly disagree Improved social capital indicators from currency involvement: 75% more friends. 87% support others. 81% more relationships. 41% more self-confidence. 82% help others. Improved economic capital indicators: 59% more access. 80% more customers. 28% more disposal. 41% use skills Complementary currency spent and earned: <\$100: 42% spent / 43% earned. \$100 – 500\$: 41% spent / 17% earned. \$500 – \$2000: 13% spent / 15% earned. >\$2000: 3% spent / 5% earned Importance of mindfulness and spirituality: Mindfulness: 3% very little, 10% somewhat. 16% quite. 68% very. Spirituality: 6% very little. 21% somewhat. 31% quite. 41% very. Education levels 3% Some high school. 8% High school. 8% High school + training. 22% Some university-college. 44% university-college. 3% Some graduate school. 13% Graduate degree. Evaluation instrumental dimensions: 89% support hour merchants. 36% develop self-confidence. 43% develop new skills. 33% use skills. 72% new customers. 40% access to goods/ services. Relationship evaluations: 84% improve quality of life. 87% help people. 55% deeper friendships. 80% deeper friendships. 80% establish trust. 67% relationships outside circle of friends. 67% increase circle of friends</p>
Complementary currency	WHEATLEY Gerald. YOUNIE Corrine. ALAJLAN Hind. McFARLANE Erin.	International Journal of Community Currency Research	Calgary dollars: economic and social capital benefits	<p>48% decrease in accessing crises services thanks to timely access to goods, services, support and referrals aid in crisis prevention 45% of respondents (stated that they agreed or strongly agreed with the statement "I) have established relationships of trust with people in the community 50% agreed or strongly agreed to be more active in community issues and initiatives.</p>

Complementary currency	RUDDICK William O.	International Journal of Community Currency Research	Eco-Pesa: an evaluation of a complementary currency programme in Kenya's informal settlements	<p>This increase in local trade resulted in a 22% average increase in net monthly incomes of participating businesses</p> <p>Monthly income in Shillings and Eco-Pesa of registered businesses type (Health clinic, General shop, Water, Business Groups, Cooked food, Vegetables, Salon, Charcoal, Drinks, Education, Meat & Poultry, Waste removal, Fish, Housewares, Transportation, Vegetables & Fruit, Hawkers, Dairy, Poultry)</p> <p>Eco-Pesa issued, exchanged and circulated: Issued (registration, sales, events + youth service), Exchange/In Circulation (current circulation, exchanged for Shillings)</p> <p>Goods and services trade with Eco-Pesa (local vs non-local): Charcoal, Flour, Water, Soap, Fire Wood, Sugar, Green Vegetable, Cooked Food, Detergent, Fish, Milk, Meat, Soda, Waste removal, Beans, Photography, Utensils, Salt, Rice, Cigarettes, Cooking oil, Green grams, Tomatoes, Ground nuts, Potatoes, Seedlings, Spices, Airtime, Biscuits, Books, Bread, Cakes, Eggs, Handkerchief, Matches, Pesticides, Popcorn, Sweets, Tea.</p>
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After a literature review of 36 of the 76 documents linked with impact assessment in the sector of complementary, look at annexe 5 page 48, local and community currency sector, here are the 12 main reference research papers and authors about indicator, evaluation, impact and social or environmental capital benefits (process and results). Actually, most of the monetary innovation evaluation process and results are based on a conceptual model dealing with economic, social and well-being issues through either a qualitative or quantitative approach:

Graphic 2: number of impact assessment reference and general materials in development, finance and currency sector



As shown in the graphic, there are relatively more reference materials in the development project sector (31%) than in the sustainable finance sector (17%). Concerning the monetary innovation sector, even if there is a relative important reference material (33%), it is important to notice that only 5 of the 12 materials present quantitative measurement indicators which may reduce the relative amount of reference material (14%).

2. ANALYSIS: HOLISTIC PROGRESS INDICATORS PROCESS

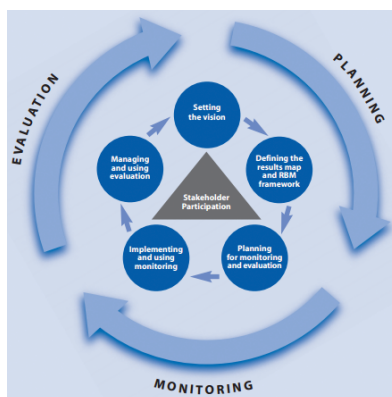
After a deeper analysis of the literature review, instead of thinking an impact assessment approach for monetary innovation outside the box from a blank slate approach of our mind where everybody envision success differently, we should take inspiration from the existing concepts and models. Be like them but better. Indeed, a well-constructed box help people generate innovative ideas, improve on something instead of nothing.

Structure doesn't hamper creative, it enables it. It's a constraint that liberates. To conceive the appropriate crystal-clear box for economic and monetary innovation, we will analyse the different steps or phase and different approach, process, procedure, meth-

odology, methods and tools from both ⁴ development ⁵ and finance ⁶ sectors. Consequently, to create holistic progress indicators for the impact assessment of economic and monetary innovation, we will first analyse the impact assessment methodology by presenting some cycle and then some tool used in the process. Afterwards, we will explore some performance indicators for progress objectives. Finally we will study the holistic approach to integrate in the impact assessment indicator.

2.1. Impact assessment phases and steps cycle
Concerning the phase and steps of the impact assessment planning, evaluation and monitoring, here are 4 main approaches of the cycle.

Figure 11: result-based management life-cycle approach



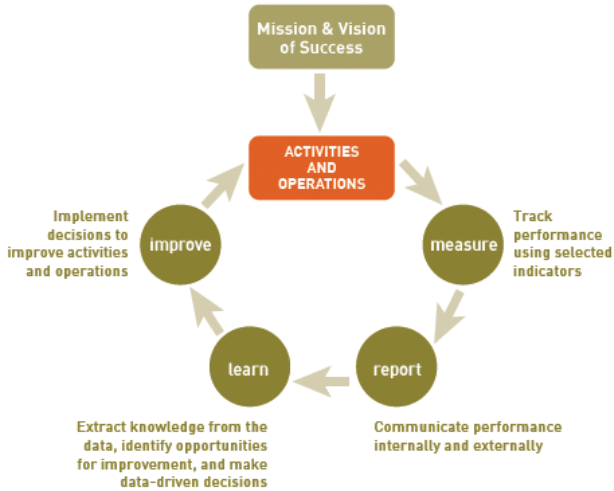
Source: UNDP (United Nations Development Programme). Handbook on Planning, Monitoring and Evaluating for Development Results. United Nations Development Programme (UNDP), 2009.

⁴ sustainability reporting, sustainability assessment tools, environmental, social and governance matrix, environmental and socio-economic impact assessment, social and environmental impact assessment, social and biodiversity impact assessment, strategic environment and social assessment, social ratings, social impact measurement, social return indicators, social returns measurement, social measurement, social return on investment, economic impact indicator, impact evaluation, impact measurement, impact reporting, impact measurement and analysis, performance indicators, performance measurement system, performance analysis, effective evaluation systems, result-based management system, integrated management system, planning, monitoring and evaluating, monitoring and evaluation system, learning driven assessment, balanced scorecard, responsive evaluation, log-frame evaluation, real-time evaluation, charity analysis methodology,...

⁵ environmental and social sustainability, international development, development program, development results, economic cooperation and development intervention, economic and social program, public sector operations, equitable development results, climate, community and biodiversity program, environmental studies, food and agriculture program, gender equality program, human rights program, peace-building programs, equity-focused intervention, humanitarian action,...

⁶ corporate philanthropy, high impact philanthropy, social venture, social investment, impact investment industry,...

Figure 12: performance measurement cycle



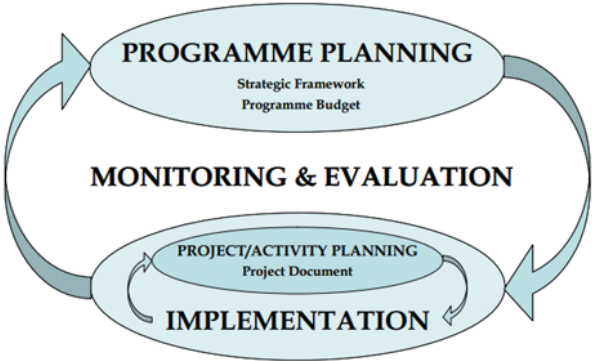
Source: ROOT CAUSE. Building a Performance Measurement System: Using Data to Accelerate Social Impact, 2009.

Figure 13: project management cycle



Source: CCBA (The Climate, Community & Biodiversity Alliance). SBIA Social and Biodiversity Impact Assessment manual. The Climate, Community & Biodiversity Alliance (CCBA), September 2011.

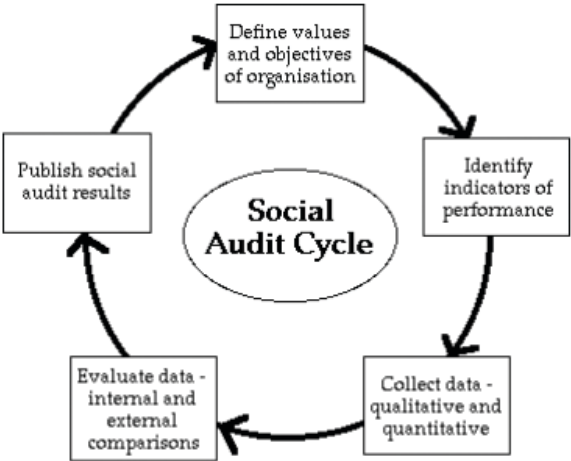
Figure 14: program cycle



Source: ESCAP (Economic and Social Commission for Asia and the Pacific). Monitoring & Evaluation System Overview and Evaluation Guidelines.

Concerning the community, local and complementary currency sector, a very similar cycle has been proposed, named social audit cycle:

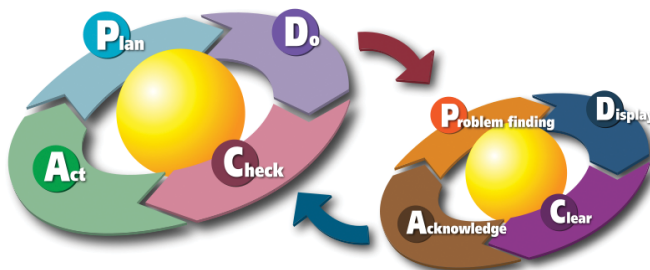
Figure 15: social audit cycle for community, local and complementary currency systems



Source: SEYFANG Gill. Examining local currency systems: a social audit approach. International Journal of Community Currency Research 1, 1997.

Most of those cycles are based on three scientific phase: hypothesis, experiment and evaluation. Thus, we define, measure, analyze, improve and then control the collected information. It is very similar to the Dr W. Edwards Deming cycle for the control and continuous improvement of processes.

Figure 16: plan do check adjust cycle



After defining the cycle, phase and steps, of the impact assessment methodology, it is important to determine which techniques, procedures, mechanisms and tools are the most appropriate for economic and monetary innovation impact monitoring and evaluation process.

2.2. Impact assessment process, tools and mechanisms

An assessment plan starts with an overall design, and includes specific choices about how to collect and interpret data. The full range of assessment option is fairly extensive (McKINSEY&COMPANY, 2010). Concerning the different process, tools, mechanisms and technique of qualitative and quantitative assessments, here are the main ones, even if you may sometimes find different approaches.

Board 16: comparison of data characteristics in technocratic and participatory approaches in impact assessment

Data Characteristics	Technocratic	Participatory
Nature	Value-free (objective)	Value-laden (subjective)
Source	Expert	Community
Type	Quantitative	Qualitative
Scope	Nomothetic (trends in variables based on patterns assumed to stay constant)	Idiographic (consideration given to specific political and cultural setting)
Secondary data source	Previous surveys Census data Official statistics Monitoring studies Maps	Local histories / accounts Previous studies / Social Impact Assessments Other literature Newspapers. Photos, video, film. Maps
Primary data source	Sample surveys Observations	Interviews. Discussion / focus group Workshops Participant observation Photos, video, film

Source: KENT Michelle. Development of a Social Impact Assessment methodology and its application to waste for life in Buenos Aires. Crawley: The University of Western Australia.

Board 17: selecting the right mix of monitoring mechanism

Purpose		
Data and Analysis	Validation	Participation
<ul style="list-style-type: none"> ■ M&E framework ■ AWP ■ Progress and quarterly reports on achievement of outputs ■ Annual Project Report ■ Project delivery reports and combined delivery reports ■ Substantive or technical documents: MDG Reports, National Human Development Reports, Human Development Reports ■ Progress towards achieving outcomes and Standard Progress Reports on outcomes 	<ul style="list-style-type: none"> ■ Field visits ■ Spot-checks ■ Reviews and assessments by other partners ■ Client surveys ■ Evaluations ■ Reviews and studies 	<ul style="list-style-type: none"> ■ Sectoral and outcome groups and mechanisms ■ Steering committees and mechanisms ■ Stakeholder meetings ■ Focus group meetings ■ Annual review
← Learning takes place through all monitoring tools and mechanisms →		

Source: UNDP (United Nations Development Programme). Handbook on Planning, Monitoring and Evaluating for Development Results. United Nations Development Programme (UNDP), 2009.

Board 18: methods selection

Selection of Methods

- Choose appropriate and relevant methods
- Choose methods that are participatory
- Ensure collection of disaggregated data
- Understand the constraints and challenges of informants
- Interrogate gender roles
- Be context and culturally sensitive
- Emphasize mixed methods

Source: UN WOMEN. Guide to Gender Equality & Human Rights Responsive Evaluation, 2010.

Board 19: the full range of assessment options

Assessment design Framework that shapes data collection and analysis, and what types of conclusions can be drawn	Data collection methods Mechanisms to collect data from a variety of sources	Data collection methods Mechanisms to collect data from a variety of sources
Experimental design <ul style="list-style-type: none">▪ Randomized, controlled trials Quasi-experimental design <ul style="list-style-type: none">▪ Non-randomized comparison trials<ul style="list-style-type: none">— Regression-discontinuity trial— Pre-post trials with separate comparison group— Pre-post trials within one group Observational design <ul style="list-style-type: none">▪ Purposive randomized or controlled studies<ul style="list-style-type: none">— Cohort studies (e.g., prospective, retrospective, cross-sectional)— Case-based (e.g., control comparisons, case studies) Simulations <ul style="list-style-type: none">▪ Modeling of phenomena and testing of potential outcomes in a virtual environment	Primary data collection <ul style="list-style-type: none">▪ Interactive methods<ul style="list-style-type: none">— Interviews— Focus groups▪ One-way methods<ul style="list-style-type: none">— Participant surveys— Direct observations (e.g., site visits, photographic records)— Implementation data collection (e.g., operational metrics, interim outcome tests, time logs) Secondary data collection <ul style="list-style-type: none">▪ Administrative data (e.g., records gathered by institutions involved in program)▪ External data (e.g., reports generated outside of the program)	Quantitative methods <ul style="list-style-type: none">▪ Descriptive statistics▪ Regression analysis▪ Cost analysis (e.g., cost-benefit, cost-effectiveness)▪ Multidimensional indices (e.g., OPHI poverty indices)▪ Benchmarking▪ Mapping methods (e.g., network mapping, geo-demographic mapping) Qualitative methods <ul style="list-style-type: none">▪ Expert review (e.g., Delphi survey, "wise person" panel)▪ Strategic assessment (e.g., logical analysis, decision-making frameworks)

Source: MCKINSEY&COMPANY. Learning for Social Impact - 3 steps to designing a Learning Driven Assessment overview, March 2010.

Board 20: tools and techniques for qualitative impact assessments

VISUAL TECHNIQUES

Diagrams

Flow/causal Diagrams	Venn Diagrams	Systems Diagrams	Pie charts	Histograms
They are the graphical result of a causal mapping exercise. The purpose of the exercise is to create a diagram that can be discussed and shared with others showing the perceptions and beliefs of an individual or a group about the causes and consequences of a given situation. E.g. problem trees used in programme design show how one problem leads to another. Objective trees show how a set of means lead to a given end.	Used to illustrate the extent to which individuals, organisations, projects or services interact with each other or overlap. The diagram will also show the links between different types of groups in a clear, graphic format. Can also be used to summarize the roles that different groups play and how their importance varies.	Visual tools that help create understanding about how complex systems work. Systems diagrams are similar to causal diagrams but are more complex. They show how a change in one factor has an impact elsewhere and may eventually feed back to affect itself. E.g. a systems diagram may show how childhood malnutrition leads to poor cognitive development, which in later life will affect the person's ability to make a living and thus possibly will feed back into malnutrition among the next generation.	Charts in the shape of a pie, which are split into segments that show the relative contributions of different shares of a whole (e.g. the proportion of female headed and male headed households in a community). It gives an immediate visual idea of the relative size of each share.	Representations of a frequency distribution by means of rectangles whose widths represent class intervals and whose areas are proportional to the corresponding frequencies.

Ranking

Preference Ranking	Pair Wise Ranking	Direct Matrix Ranking	Ranking by Voting	Wealth Ranking
Technique to make an individual's or group's underlying preferences visible through drawing items and ranking them in accordance to their importance as perceived by the individual or group. The discussion that takes place about why a given item (e.g. the kind of assistance to be provided by a programme) is given a specific ranking reveals the underlying criteria for the priority setting of different groups (e.g. different priorities among men and women).	Structured method for ranking a small list of items in priority order. It can help to determine the main preferences, priorities, needs, constraints or problems of a person or a group on a certain subject and to make consensus decisions.	A form of preference ranking but whereby an item is scored for more than one preference criteria at the same time. The sums of different scores for each item are then compared and form the basis for the final ranking of the item in question.	An exercise that facilitates priority setting and decision making among larger groups of people, e.g. to make a decision about which community project(s) will be implemented first.	Tool that helps to investigate perceptions of wealth differences and inequalities in a community and to identify and understand local indicators and criteria of wealth and well-being.

Timelines	Historical and Future mapping	Time Trends chart	Oral Histories
	For understanding the history of a community, historical timelines can be developed as a visual tool for discussion of the past and a means of identifying and discussing key events that shaped the present. A similar exercise can be carried out to envision a desired or expected future and outline the paths that may lead to this future.	Visual tool to show local perspectives about changes in for example natural resources, ecology, etc. over time.	Collections of stories told by a member of the community and used to collect information which is not documented in formal records.
Mapping	Mobility Mapping	Social Mapping	Transect Walks
	This technique creates a visual representation of people's movements within and outside their community. Through a discussion, issues and problems are identified related to socially differentiated mobility and access to resources such as capital, land, water, health services, education services, information, etc. Development of calendars is a participatory technique used to explore changes and events throughout a year, e.g. seasonal calendars related to workload, diseases, rainfall, farming, festivities throughout the year.	A map drawn by the residents that shows the social structures and institutions found in an area. It helps to learn about social and economic differences between the households.	Activity that involves walking in a community along a predetermined path, taking notes and asking questions as one goes.
Calendars			
Ethno-Classification	Proverbs	Stories	
	Used to attribute qualities or reveal perceptions, e.g. about men, women, youth, etc. as a means of analyzing the messages they convey in terms of the identities of these groups in the community.	Dialogue technique that uses stories to draw out important themes and issues for a community, moving from personalised experience to generalised knowledge.	

GROUP AND TEAM DYNAMICS TECHNIQUES

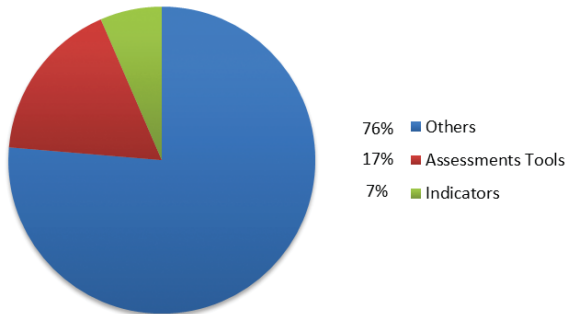
Focus group discussions	Role play	Community workshop
Group of interacting individuals having some common interest or characteristics, brought together by a moderator who uses the group and its interaction as a way to gain information about a specific issue. In a focus group discussion, people, in general from similar backgrounds or experiences (e.g., mothers, young married men, birth attendants/mid-wives, etc.), are brought together to discuss a specific topic of interest to the investigator. Homogeneous samples are preferred because mixing age and gender groups may inhibit some people, e.g. women and youth, from expressing their views.	A dramatization technique to help people to open their minds and to stimulate discussion about the situation and choices that other people might face.	Used to present the main findings and conclusions of an assessment to the community at large and to provide an opportunity for discussion of the main findings of the appraisal.

COMPLEMENTARY TECHNIQUES			
Secondary data review	Semi structured interview with key informants	Case studies	Participant observation
This involves review of information that was collected in the course of another study or as part of a publicly available set of data. It may be in the form of official statistics or other informal sources that have not been generated by the researcher.	Guided conversations with key informants where broad questions are asked which do not constrain the conversation, and in which new questions are allowed to arise as a result of the discussion. This type of information gathering is different from questionnaires and surveys which use very structured questions that are not deviated from. A semi-structured interview is therefore a relatively informal, relaxed	A technique to illustrate and delve deeper into the findings of a survey using concrete cases. They are a useful way of listening to the poorest and most marginalized in the community who are sometimes excluded from community meetings. It is also an excellent opportunity for observing the surroundings and the way the interviewed people live.	A technique whereby a researcher participates in the daily life of those he or she is observing, often over a longer period of time, with the purpose of collecting data on the subject that he or she is studying in a more profound way than could be achieved with, for example, a questionnaire. These are techniques whereby a researcher observes a given study group as they go about their normal activities and takes notes on what takes place. The observation is direct when the researcher is present or indirect when other means of observing are used like for example a video camera. The researcher should always be aware that people may act differently when they know that they are being observed.

Source: FAO (Food and Agriculture Organization). Overview of methods for baseline assessments, 2010.


In the Impact Finance sector, there is a compilation of 169 resources for impact assessment which can be differentiated among their type or approach (tools, methods, best practices) and their purpose (assessment, management, certification). From these 169 resources, 29 are assessments tools and 11 indicators, as we can see below:

Graphic 3: repartition of assessment tools and indicators among impact assessment resources



Source: FOUNDATION CENTER. TRASl – Tools and Resources for Assessing Social Impact, 2012.

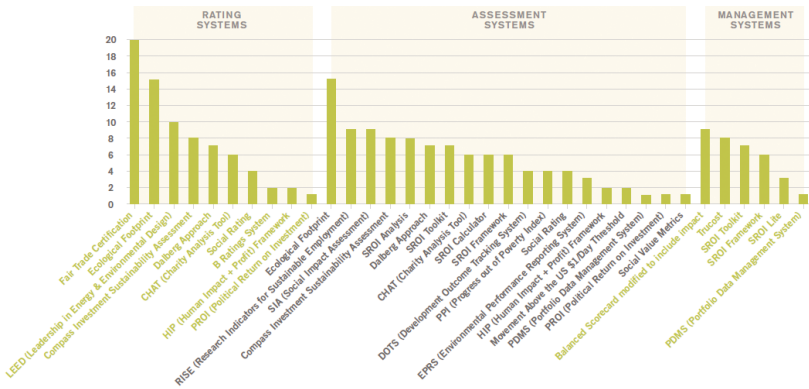
Figure 17: impact assessment tools and methods differentiation in impact finance

Approach		
What type of assessment are you looking for?		
<input type="checkbox"/> Tools	<input type="checkbox"/> Methods	<input type="checkbox"/> Best Practices
Purpose		
What is your end-goal?		
<input type="checkbox"/> Assessment	<input type="checkbox"/> Management	<input type="checkbox"/> Certification 
Organization		
What type of organization would you like to assess?		
<input type="checkbox"/> NGO/nonprofit	<input type="checkbox"/> Program Cluster	<input type="checkbox"/> Social Enterprise
<input type="checkbox"/> Government	<input type="checkbox"/> Foundation	<input type="checkbox"/> Social Investor
Sector		
What sector would you like to assess?		
(For more results, select General sector applicability alongside any specific sectors you would like to see.)		
<input type="checkbox"/> General sector applicability		
<input type="checkbox"/> Civil Rights, Social Action, Advocacy	<input type="checkbox"/> Community Involvement/ Capacity Building	<input type="checkbox"/> Education
<input type="checkbox"/> Employment	<input type="checkbox"/> Environment	<input type="checkbox"/> Food, Nutrition, Agriculture
<input type="checkbox"/> Health General and Rehabilitative	<input type="checkbox"/> Housing/Shelter	<input type="checkbox"/> Human Services
<input type="checkbox"/> Microfinance	<input type="checkbox"/> Philanthropy, Grantmaking Foundations	<input type="checkbox"/> Other
Focus		
What are you measuring?		
<input type="checkbox"/> Organizational Effectiveness	<input type="checkbox"/> Social Impact	
	<input type="checkbox"/> Cultural	
	<input type="checkbox"/> Economic	
	<input type="checkbox"/> Environmental	
	<input type="checkbox"/> Political	
	<input type="checkbox"/> Social	
At what stage of the impact value chain?		
<input type="checkbox"/> Outputs	<input type="checkbox"/> Outcomes	<input type="checkbox"/> Impact

Source: FOUNDATION CENTER. TRASl – Tools and Resources for Assessing Social Impact, 2012.

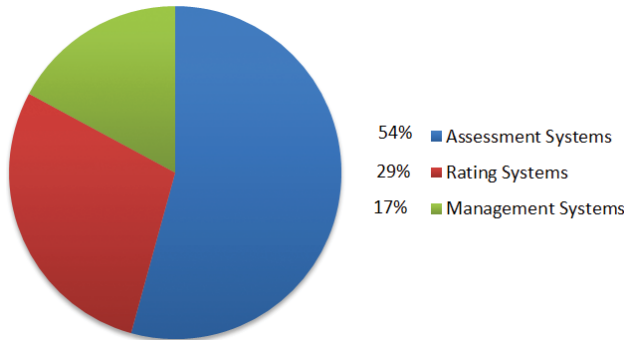
Among the different impact assessment tools, methods and purpose of the Impact Finance sector, we can extract 35 different impact measurement approaches divided in: 10 rating systems have a screening function, 19 assessment systems summarize results, and 6 management systems have a function of ongoing tracking (SVTG, 2008).

Figure 18: impact measurement approach in impact finance



Source: SVTG (Social Venture Technology Group). Catalog of approaches to impact measurement. Social Venture Technology Group (SVTG), March 2008.

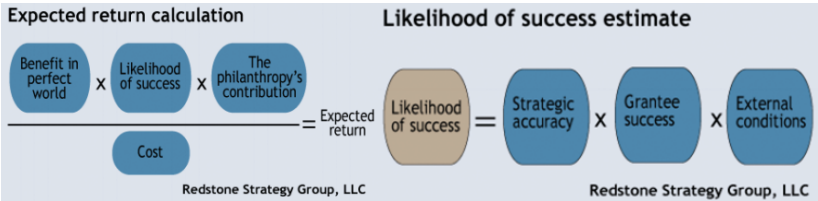
Graphic 4: repartition of assessment, rating and management systems among impact measurement approaches



Source: SVTG (Social Venture Technology Group). Catalog of approaches to impact measurement. Social Venture Technology Group (SVTG), March 2008.

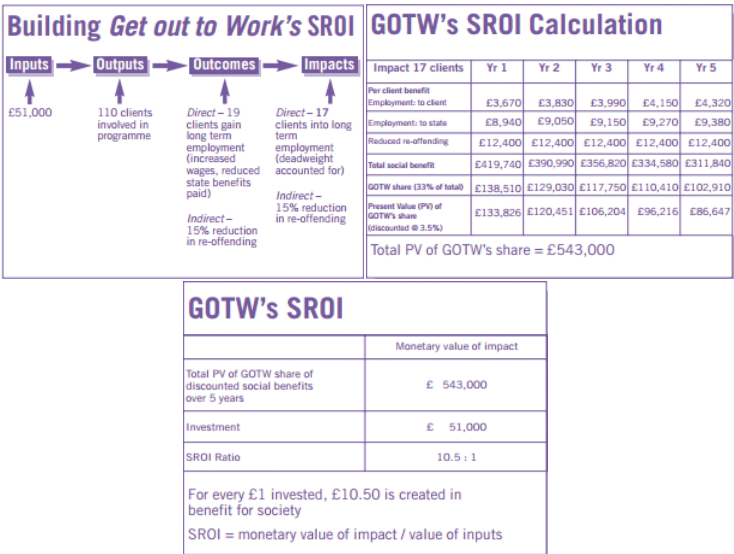
Globally, there are more assessment systems than indicators in the impact assessment resources of impact finance sector: 17% of impact assessment resources and 54% of impact measurement approaches. Nevertheless, from all these different resources and approaches, here are some examples of concrete formulas to calculate some indicators:

Figure 19: expected return & likelihood of success estimate calculation formula



Source: WILLIAM AND FLORA HEWLETT FOUNDATION. Making every dollar count: how expected return can transform philanthropy, 10th of April 2008.

Figure 20: social return on investment calculation process



Source: SROI PRIMER. Measuring social impact: the foundation of social return on investment (SROI), 2004.

Social Return on Investment ratio is the total monetary value of impact, divided by the investment which helps to tell a story, not the whole story. It is important to set objectives and identify output indicators, to think through outcomes, to decide which can be measured and monetised, to find data, to calculate outcome with subtract deadweight to illustrate impact, to check assumptions. Social Return on Investment brings objective, quantitative metric, forces to focus, enables comparison of programs, and fosters investment mentality. Nevertheless, it has an allure of false precision, resource intensive and do not fully capture the complexities on the ground because not all benefits or costs are easily monetized and counted.

As we noticed, there is a plenty of different techniques, procedures, mechanisms and tools for the determination and calculation of the impact and in order to estimate the most appropriate ones, we can use some criteria. Indeed, impact assessment criteria for either program level evaluation, real-time evaluation, or integrated management initiatives evaluation contain: timeliness, interactivity, perspective, efficiency, influence, vulnerability, order, type, probability, significance, extent, duration, consequence, potential for mitigation, effectiveness, impact, impact of contribution, relevance, sustainability, salience, credibility, legitimacy, knowledge management, social dynamics, confidence, return, feasibility (ALNAP, 2009) (KENT) (INDI-LINK, 2009) (FASID, 2005) (IISD, 2011) (INVESTING FOR GOOD, 2012) (McKINSEY&COMPANY, 2010). Once again, the various and numerous criteria give a complex decision-making process to determine the appropriate assessment tool, indicator calculation and data collection process. Nevertheless, we can notice two very interesting initiatives concerning the impact assessment variable or methods choice:

- INDI-LINK which evaluate each indicators of sustainable topic through three criteria grades: salience, credibility and technical cons.
- Sustainability A-Test: which evaluate each assessment tools used in development projects

Board 21: overview of assessment procedure and tools use

Assessment procedure		Tools	
Transition Management	Stakeholder identification	Institutional analysis, Internet search, in-depth interviews	
	Scenario building	Visioning, Scenario analysis, Focus groups	
	SD Impacts	Climate Change	EW-MFA + Modelling
		Land use	GLUA + Land use change model
		Water quantity and quality	Physical Assessment + Modelling
		Biodiversity	Land use change model
		Air quality	EW-MFA + Modelling
		Poverty and social exclusion	Literature review
		Indicators Tuning	Repertory Grid Methodology
	CBA	Market methods, equilibrium models, input-output models, non-market valuation methods	
	MCA	NAIADE, TIDDD	
	Extending the audience	TIDDD, Internet survey	

Source: Institute for Environmental Studies. Sustainability A-Test: Advanced Techniques for Evaluation of Sustainability Assessment Tools. Final case study report, 10th of July 2006

As there is a plenty of assessment tool, indicator calculation and data collection process, we can choose some of them under relevant criteria or conceive appropriate ones from a compilation different existing process. But each indicator must be linked to a specific objective, because the only purpose of measuring an impact is to reach a specific goal.

2.3. Impact assessment objectives and indicators

From this whole literature review, we extracted some examples of economic, social and environmental dimension, topics, and priorities, linked with the sustainable development vision, goals and objectives we analysed before, which could lead us to impact indicators, assessment, and evaluation tools as you can see in annexe 8 page 59. Here are some examples of objectives and indicators from Sustainable Development domain, Impact Finance sector and Monetary Innovation area.

Board 21: overview of assessment procedure and tools use

Focal Issue	Objectives	Indicators
Strengthened Governance	By January 2012, the Coordinating Committee of the Maya Biosphere Reserve has the mechanisms to implement the environmental security strategy in at least 70% of the area	- Mechanisms approved
	By March 2012, an effective program of community leadership is being developed in 10 concessions	- Community leadership program designed and implemented - Number of people trained
	By June 2014, at least 50% of judiciary operators in the Petén are applying their specialized understanding of environmental legislation	- Number of judiciary operators trained
	By December 2014, at least 80% of environmental actions result in criminal sentences	- Number of criminal sentences
Gender-Social Equity	By the end of 2011, [number] of project area communities and families are receiving training to strengthen shared family responsibilities	- Number of trainings received - Number of communities trained - Number of women, youth, and others trained
	By the end of 2013, [number] of women have finished primary education in the project area	- Number of women who completed 6 th grade - Number of women reincorporated into primary education
	By the end of 2013, at least three production projects are implemented by youth and women in the project area	- Number of projects being implemented - Number of new initiatives - Number of women/youth implementing projects
	By the end of 2013, multiple ethnic youth and women are involved in community organizations and training courses in the project area	- Number of women and youth participating in community organization activities - Percentage of annual increase in youth and women participants
	By the end of 2013, the management boards and community committees are composed of 25-30% women and children participating in decision-making	- Number of women and youth on community committees
Indicator Types	Possible Examples	
Output	- numbers of jobs created	
Indicators	- number of people trained - number of trees planted - number of participants in environmental education workshops	
Outcome	- number of households adopting a new livelihood activity	
Indicators	- percentage or absolute increase in household income from carbon payments - reduction in hours spent by women collecting firewood or water - percentage of carbon beneficiaries agreeing that they get a fair payment (this implies a viable project and an effective benefit-sharing system) - percentage of women on the project stakeholder committee - number of village management committees functioning effectively - ecological and economic zoning completed - establishment of improved monitoring systems for protected areas	

Indicator Types	Possible Examples
Impact Indicators	<ul style="list-style-type: none"> - percentage of reduction in infant mortality - percentage of reduction of households living on < \$2 per day - percentage of local population changing from a negative to a positive attitude to forest conservation measures - significant increase in female participation in decision-making - reduction in domestic violence - percentage of increase in the population of an endangered species - number of hectares of a rare ecosystem preserved

Source: CCBA (The Climate, Community & Biodiversity Alliance). SBIA Social and Biodiversity Impact Assessment manual. The Climate, Community & Biodiversity Alliance (CCBA), September 2011.

Board 23: common organizational health, program performance, social and economic impact indicators

Financial Sustainability	<ul style="list-style-type: none"> • \$ amount of revenue, expenses, net surplus (loss) • % annual expense budget covered by currently committed funding • % variation between budgeted and actual revenue and expenses • # months of cash available at current spending rate • % revenue mix (individuals, foundations, government, earned income, etc.) • # funders at various funding levels, \$ amount, and % of revenue contributed 			
Team Capacity	<ul style="list-style-type: none"> • # full-time and part-time staff • # board members • # volunteers • # staff hours devoted to each program • ratings of staff and volunteer satisfaction 			
Implementation Effectiveness	<ul style="list-style-type: none"> • % milestones met • % goals achieved 			
	Direct Service	Advocacy/Policy	Association/Network	Capacity Building
Activities	<ul style="list-style-type: none"> • # inquiries or applicants • # classes or sessions • average length of service 	<ul style="list-style-type: none"> • # petitions launched • # supporters recruited 	<ul style="list-style-type: none"> • # members • # events • # member communications 	<ul style="list-style-type: none"> • # workshops • # articles disseminated • # coaching hours
Outputs	<ul style="list-style-type: none"> • # beneficiaries served • % participants who complete program 	<ul style="list-style-type: none"> • # petition signatures submitted • # emails, letters, or calls to legislators • # policy proposals developed 	<ul style="list-style-type: none"> • # members engaged through program activity • % members using services 	<ul style="list-style-type: none"> • # clients served • # clients engaging in programming

	Direct Service	Advocacy/Policy	Association/ Network	Capacity Building
Quality	<ul style="list-style-type: none"> • % beneficiary satisfaction • % beneficiaries recommending your organization to their peers • qualitative interview data 	<ul style="list-style-type: none"> • % petition drives meeting signature target • % supporter satisfaction • qualitative interview data 	<ul style="list-style-type: none"> • % member satisfaction • % members recommending your organization to their peers • qualitative interview data 	<ul style="list-style-type: none"> • % client satisfaction • % clients recommending your organization to their peers • qualitative interview data
Program Costs	<ul style="list-style-type: none"> • \$ amount for individual program areas • \$ amount per beneficiary served 	<ul style="list-style-type: none"> • \$ amount for individual program areas • \$ amount per campaign, petition, or policy recommendation 	<ul style="list-style-type: none"> • \$ amount for individual program areas • \$ amount per member 	<ul style="list-style-type: none"> • \$ amount for individual program areas • \$ amount per client
	Direct Service	Advocacy/Policy	Association/ Network	Capacity Building
Outcomes	<ul style="list-style-type: none"> • # beneficiaries experiencing targeted outcomes • % success rate 	<ul style="list-style-type: none"> • # policy changes implemented • # new coalitions created 	<ul style="list-style-type: none"> • # members indicating that they experience targeted outcomes • % success rate 	<ul style="list-style-type: none"> • # clients demonstrating improvement in key capacity areas • % success rate
Outcomes Costs	• \$ cost per successful outcome			
Impact Generated	<ul style="list-style-type: none"> • \$ amount saved in social service costs • \$ amount in new economic activity generated • Quantitative and qualitative data addressing higher-level systemic outcomes, such as new practices that your organization brought to its field or new stakeholders engaged in addressing the target social issue 			

Source : ROOT CAUSE. Building a Performance Measurement System: Using Data to Accelerate Social Impact, 2009.

Board 24: key and advanced indicators for Time Bank participation

LEVEL	NAME	DESCRIPTION
System	Number of active members per quarter	The number of members who are providing and/or receiving services within each quarter
System	Quarter of first transaction	The number of new members per quarter
System	Total number of hours per quarter	Turnover (number of time dollars or hours earned) per quarter
System	Service categories	Thirteen broad categories to classify services
Individual	Total hours of participation	Sum of the total number of hours providing and receiving services
Individual	Average hours per quarter	Total hours divided by quarters participated
Individual	Account balance	Difference between hours earned and spent

LEVEL	NAME	DESCRIPTION
Individual	Number of trading partners	The size of a member's exchange network
Individual	Number of reciprocated contacts	The number of two-way exchange partners
Individual	Ego-network density	The percentage of transaction ties among one's trading partners that exist
Individual	Number of services exchanged	The number of different service categories that one has exchanged within

Source: COLLOM Ed. Key indicators of time bank participation: using transaction data for evaluation. International Journal of Community Currency Research 16, 2012.

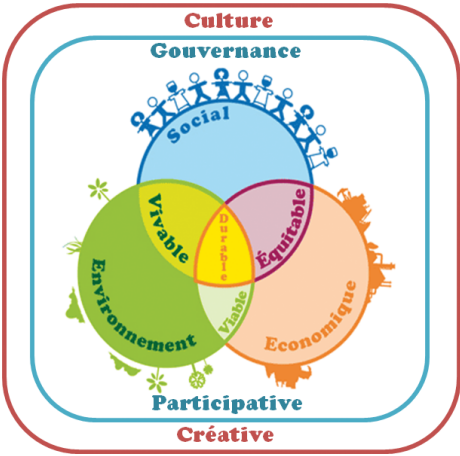
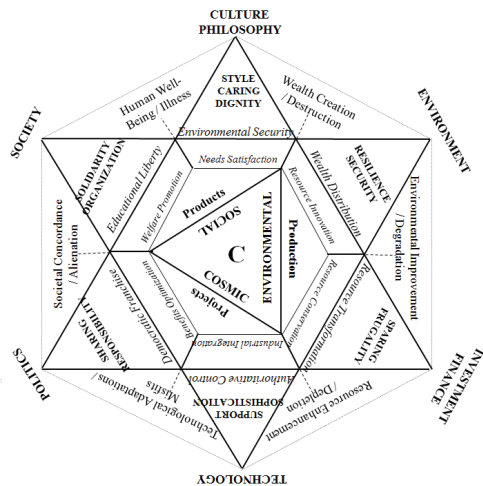
Setting up objectives and creating measurement indicators for economic and monetary innovation is a current challenge. And we can take our inspiration from the well-structured work made in the Sustainable Development domain, Impact Finance sector. Nevertheless, economic and monetary innovation should overpass them by designing a holistic global approach which takes into account more than strictly rational data collection and assessment.

2.4. Holistic global approach

Indeed, to reach sustainable development, green economy or prosperity without growth, economic and monetary innovation should integrate a diversity of transdisciplinary domains in its impact assessment approach to remain efficient with resiliency.

Figure 21: holistic global approach





Source: FURTADO Jose Ireneu dos Remedios. Multiple approaches towards sustainable development. Los Banos: IRRI, 2005.

Source: DEHEINZELIN Lala. Novos bancos e moedas. In: SEMINÁRIO CRIE FUTUROS IBERO AMÉRICA- NOVOS BANCOS E MOEDAS, 1., 13th and 14th of October 2009, São Paulo. Presentation. São Paulo: CRIE FUTUROS, 2009.

Source: UNEP (United Nations Environment Program). Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication. United Nations Environment Program (UNEP), 2011.

Consequently, to conceive a progress indicator which deals with a holistic and synergy approach to reach an intrinsic metamorphose of the paradigm, we need to integrate knowledge, hard skills and soft skills:

- Knowledge to create a collective and individual vision based on hope and ethic thanks to global collective intelligence methods and ethical leadership and governance models.

- Soft skills to become personally synchronized as a being of wisdom thanks to congruence between intention and fulfillment and integral practice.

- Hard skills to build wealth valuation tools, piloting models thanks to progress indicators, motivation systems and collaborative tools.

We need to deal with those dimensions together to reach a global transformation.

Thanks to this impact assessment methodology analysis which brings us to a better understanding of its cycle, its tools and its indicators, we can now try to build a scorecard for economic and monetary innovation.

3. RESULTS: BALANCED SCORECARD FOR QUANTITATIVE AND QUALITATIVE APPROACH

Why should we create all of this impact assessment cycle, tools and indicators for economic and monetary innovation sector? Here are 3 most important reasons:

- Global legitimacy for development projects by proving its impact efficiency: to demonstrate that monetary innovation is necessary in our current economy because it improves the social and environmental transformation impact of development projects.

- External visibility for impact finance by attracting funders and supporters: to bring credibility and legitimacy to financing institutions by analysing their impact efficiency thanks to impact reporting dealing with monitoring and evaluation systems and performance indicators.

- Internal viability for monetary innovation by improving the currency design implementation: to incentive confidence and adherence among the project management team and leader about the appropriate implementation and design of the monetary innovation

tool for impact insurance.

That's why we should enhance monetary innovation projects analysis, monitoring and evaluation methods by improving assessment tools, measurement indicators and data collection systems. The majority of the scientific community of monetary innovation agree on this.

Board 25: address complementary currency movement weakness
and built its strength

Improving our data collection system to enable better academic analysis of the impact and viability of complementary currency projects
Drawing upon our diversity of initiatives and perspectives to support bigger picture thinking and develop larger-scale solutions
Gathering the movement's intelligence about leverage point projects and opportunities, and making them more visible to potential funders and supporters

Source: LIETAER Bernard. Building strength: a big picture look at challenges and opportunities in the complementary currency movement, 30th of January 2011.

Indeed, in the complementary, local and community currency sector, there is a lack of studies and researches about economic, social and environmental impact or capital.

“There have been no empirical studies to date assessing the socio-economic impacts of this model. [...] Novel framework for estimating economic, social, and environmental outcomes, which uses a mixed-methods approach.” (GRAUGAARD, 2012)

“Scholars are encouraged to construct these key indicators for comparative purposes. While individual case studies are most common, comparisons of multiple systems over time will enable us to learn more about the dynamics of time banking and its potential to empower the economically marginalized and build social capital.” (COLLOM, 2012)

“The body of literature on CCs needs to be expanded to include a more in-depth investigation into the use of CCs as a tool which can address global development issues like human poverty and environmental degradation.” (JELEN, 2008)

“Despite their existence around the globe and the wealth of

anecdotal evidence of their benefits, the measurable successes of individual complementary currency systems have been largely undocumented." (WHEATLEY, 2011)

"Number of "local money" initiatives up and running; however, with no positive impact to be documented." (HELMECZI, 2011)

"An efficient selection of local partners, a comprehensive logical framework and strong mechanisms for monitoring and evaluation are much needed to ensure that the intervention is well implemented and able to redress any problems that may arise during the project." (CARNEIRO DA SILVA, 2005)

"I strongly suggest improving the project's monitoring and evaluation process being an essential tool to objectively redress strategies and actions when issues arise. The creation of specific indicators to measure the economic gain of members, their satisfaction within the project and the member's rotation or participation level are necessary indicators. Other indicators would concern the community empowerment and social interactions and would also be strongly recommended to measure human capital increase." (CARNEIRO DA SILVA, 2005)

"The themes of the plenary sessions attempted to be a bridge between the past and future: by discussing the development of an infrastructure for scientific research on complementary currencies and the opportunities and risks of a political assessment of these social innovations." (SCHROEDER, 2011 (1))

And a lack of public or private institution and financing support because of legitimacy and efficacy issues:

"Lack of institutional support to projects involving complementary currencies. [...] Most result in the short run are qualitative rather than quantitative, when not properly explained or understood, this may discourage local people and/or funding organizations." (BRENES, 2011)

"More research is needed into the effectiveness of different kinds of co-production projects – but, crucially, this must be reflected in the way public bodies are audited, so that investment in time banks can be clearly set against the resulting savings in public money." (NEW ECONOMICS FOUNDATION, 2003)

"Ongoing research seeks to contribute to the existing complementary currency body of knowledge and thereby support a

broader understanding of their legitimacy and efficacy." (WHEATLEY, 2011)

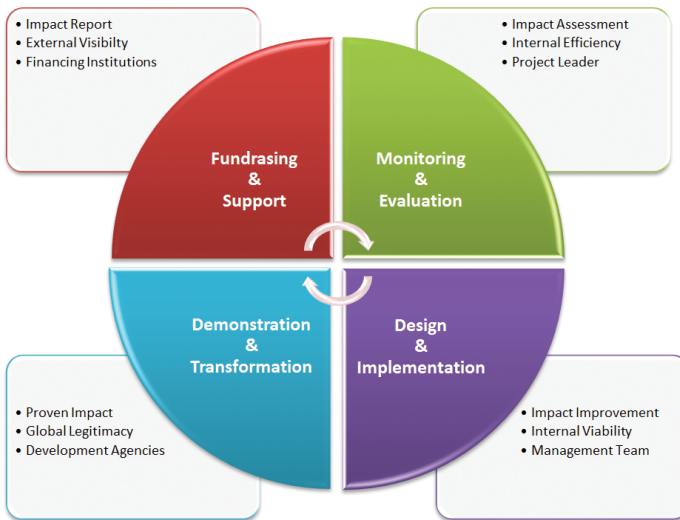
Nevertheless, scientists are working on this to prove that monetary innovation is a mass-constructive weapon for development projects:

"The question of economic sustainability of complementary currencies, their socio-cultural and political environment, show that scientists not only interpret the movement's development but are capable of giving it a major impetus." (SCHROEDER, 2011 (1))

"Achieving their objectives of community-building, creating more localised economies and helping the unemployed to participate in productive activity, the finding is that local currency systems represent a potentially powerful new weapon in the armoury of community development agencies." (WILLIAMS, 1996 (1))

Moreover, in a period of crisis, we need, more than never, efficient complementary currencies to bring resiliency to the economic systems, and thus impact assessment become essential to evaluate this performance. To conceive those indispensable currencies and to evaluate their impact, financing is important. A good impact analysis is essential for financing institution to prove the impact return on financing. However, in period a period of crisis, fundraising is complex, because money is rare and hard to rise. That's why creating an impact report is necessary before a crisis period in order to raise more easily money during the crisis period.

Figure 22: interdependence between financing, impact assessment and development project



3.1. Impact reporting to motivate financing

Indeed, during initial phase or management phase of an economic and monetary innovation project based on voluntary, not paid, or employed, paid, project management work, a conventional money budget is necessary to finance some internal or external resources to reach the tipping point of the network scale where complementary currency can totally or partially finance those resources ⁷. Moreover, during crisis period, where complementary currency is most needed, volunteer and money become rare, and the process to attract them is more complex. All the more so this conventional money mostly comes from donation and often implies a counter-donation of qualitative and quantitative information of project impact assessment.

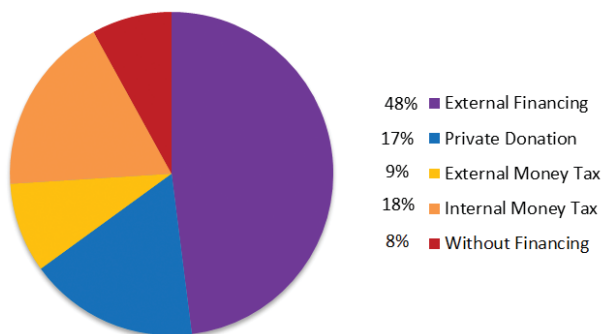
Indeed, based on a study of 165 systems around 28 countries, here is the information linked with their financing source of complementary currency projects (DEMEULENAERE, 2008):

⁷ That's why complementary currency projects sometimes start from 100 users and 20 businesses at the initial phase in order to reach the management phase of 500 users and 100 businesses. Some other complementary currency projects directly start at 500 users and 100 businesses to avoid the risk of collapse by not reaching this amount during the initial phase.

- 8% exist without financing thanks to voluntary work.
- 27% exist with internal financing called recovery or income generating mechanism: 18% thanks to service tax paid in complementary currency and 9% thanks to service tax paid in conventional money.
- 65% exist with external financing: 48% thanks to institutional support (public, private, association) and 17% thanks to individual donations.

Thus, 74% depend on conventional money financing: 9% thanks to internal service tax and 65% thanks to external institutional or individual financing.

Graphic 5: financing source of complementary currency projects



Source: DEMEULENAERE Stephen. 2007 yearly report of the worldwide database of complementary currency systems. *International Journal of Community Currency Research*, 12:2-19, 2008.

Scientific community agreed on the necessary financing concern in conventional money in complementary currency projects:

“It would also be really worthwhile for our movement to have a web platform where we could propose and comment on our suggested ‘acupuncture points worth funding. This would be a very helpful resource for funders who are interested in supporting this movement. With the advent of crowd sourcing solutions, some of the most affordable projects could perhaps even be funded by grassroots philanthropists rather than larger ones” (LIETAER, 2011)

“In order to be sustainable, community currencies need to

have a well anchored governance structure. This implies that the long term financial basis of community currencies has to be taken into consideration." (SCHROEDER, 2011 (2))

A social-purpose organisation, holding for example a complementary currency project, is operating within a specific field and pursuing its own unique mission. Thanks to a process of impact measurement, it produces an impact report, using standard model, which exhibit systemic problems and individual generation and composite discontinuity. That's why impact analyst and assessment structures operate across the social sector to extract from this impact report an impact analysis report which exist on a consistent plane and help financing institutions to allocate their funds in order to match their mission with the field social-purpose organisation one (INVESTING FOR GOOD, 2012). That's why we need much more applied economic, social and environmental research scientist in the community, local and complementary currency sector such as policy analyst, social and environmental monitor, evaluation researcher and data analyst.

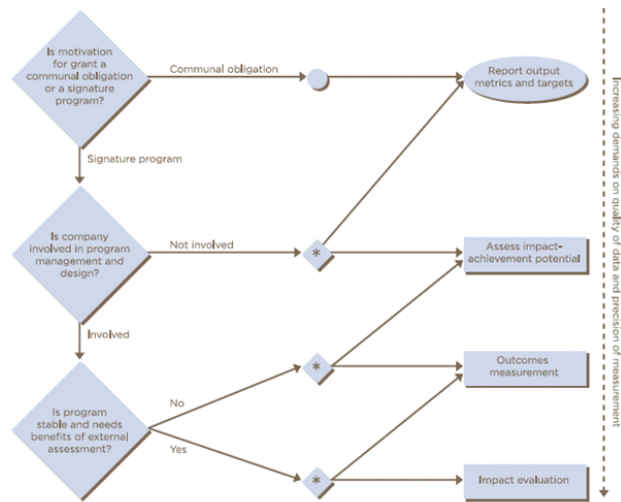
Figure 23: typology of applied research

	<i>Focus Upon Policy Implications</i>	<i>Focus Upon Data Gathering and Data Interpretation</i>
<i>Concern With Social Processes</i>	Policy Analyst	Evaluation Researcher
<i>Concern With Social Outcomes</i>	Social Monitor	Data Analyst

- A *policy analyst* studies social processes and describes what policy alternatives exist to solve an existing problem
- An *evaluation researcher* studies social processes to determine if a program or project is accomplishing what it is intended to accomplish
- A *social monitor* examines outcomes data to discover patterns that require some organizational or government action
- A *data analyst* uses and refines methodological tools to interpret outcome data, often using advanced statistical procedures

Source: MILLER Delbert Charles, SALKIND Neil J.. Handbook of research design and social measurement. London: Sages Publications, 2002

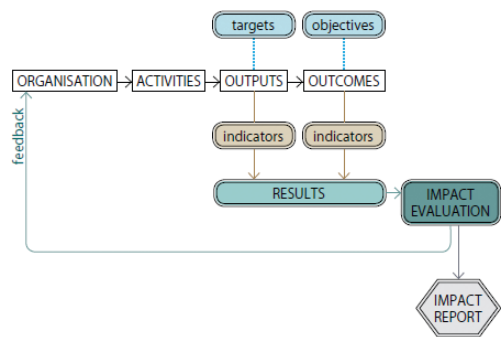
Figure 24: measurement approaches and motivation for grant



Source: LIM Terence. Measuring the Value of Corporate Philanthropy. New York: Committee Encouraging Corporate Philanthropy, 2010.

As we explained before, Impact Assessment and thus Impact Report is necessary to receive financing, especially impact philanthropy through donation fundraising.

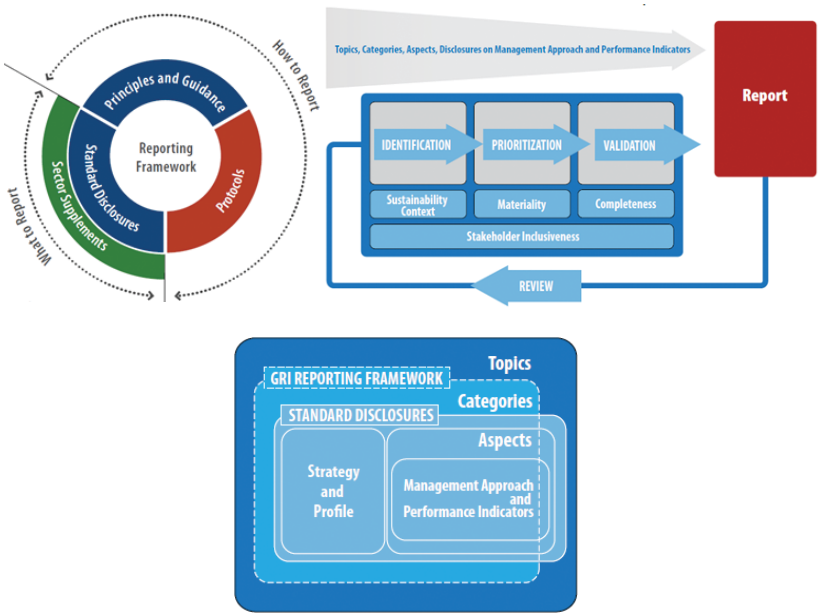
Figure 25: impact report from impact evaluation process



Source: INVESTING FOR GOOD. The Good Analyst - Impact Measurement & Analysis in the Social-Purpose Universe, 2012.

This sustainability report may follow some specific input guidance and principles for defining the content (materiality, stakeholder inclusiveness, sustainability context, completeness), ensuring its quality (balance, clarity, accuracy, timeliness, comparability, reliability) and set its boundary. Moreover, this sustainability report may also follow some output standard disclosures for the profile the management approach and the performance indicators through context (strategy and analysis, report parameters, governance commitments and engagement, management approach) and results (economic, environmental, labor practices and decent work, human rights, society, product responsibility) (GRI, 2011).

Figure 26: reporting framework terminology and content definition process



Source: GRI (Global Reporting Initiative). Sustainability Reporting Guidelines, 2011.

Figure 27: evaluation report and terms of reference content



Source: UN WOMEN. Guide to Gender Equality & Human Rights Responsive Evaluation, 2010.

Figure 28: report element

REPORT ELEMENT
Summary
date of report and period covered
overview of report
Mission
What is your mission?
How do you understand the problem you are seeking to address?
What is your response in terms of your key aims, approach, and the basic direction of your work?
How are you responding to your beneficiaries?
Activities and Results
What were your activities over the reporting period?
• can you map your activities?
How does these translate into your impact?
• can you outline your impact chain?
What were your results for the reporting period?
• what indicators did you use?
• what values were recorded (outputs, outcomes)?
• what inputs were used (costs, resources)?
What were your wider impacts?
Were there any unintended or negative outcomes?
How do you address the question of additionality?
Reviewing and Responding
How do your results compare with your targets and objectives for the period? What were the key factors?
What are the lessons learned, and what changes are you going to make as a result?
How do you see the external situation developing (opportunities, risks)?
What is your plan for next year?
How do you intend to measure its success (targets, objectives)?
What is your longer term strategy for the future?

Source: INVESTING FOR GOOD. The Good Analyst - Impact Measurement & Analysis in the Social-Purpose Universe, 2012.

To receive the necessary financing of complementary currency projects, impact assessment is necessary in order to create an impact report. This impact report should follow a specific content framework to reach a consistent structure for the impact evaluation analyst. Thanks to this analysis, financing will be allocated or not to the project. Impact assessment and impact reporting are indispensable to raise money among impact finance institution. This is the duty of the analyst to validate or not the impact assessment methodology

and measurement indicators process. Now we know why and how to create an impact assessment and an impact report, we can start to conceive a scoreboard for monetary innovation. However monetary innovation objectives actually depend on its typology and category. We need to define these objectives for each type of complementary currency.

3.2. Monetary innovation typology and category

A lot of specific types of community currencies appear in some database: Banche del Tempo, Banco Palmas, Bancos del Tiempo, Barter Systems, Bia Kud Chum, Constant, Double Triangle Scheme, Earth Day Money, Eco-Money, Free Money, Friendly Favors, Fureai Kippu, Green Dollars, Hansatsu, Hours, Jardin d'Échange Universel, Labour Note, Local Exchange Trading Scheme, Q-project, Regiogelder, Scrip Currncey, Système d'Échange Local, Seniorengenossenschaften, Talentum, Tauschringe, Tauschzentralen, Tianguis Tlaloc, Time Bank, Trueque, Wära, WAT, WIR (SHROEDER, 2011). Nevertheless, to categorize and classify those tools, some typology exists.

Board 26: classification of complementary types according to Siglinde Bode (2004)

CC-Type	Relationship	Payment system	Backing
Local Exchange Trading Scheme	Mainly C2C	Closed	Service-backed
Barter Club	Mainly B2B	Closed	Service-backed
Voucher System	Mainly B2C (also B2B)	Open	Currency-backed

Source: MARTIGNONI Jens. A new approach to a typology of complementary currencies. *International Journal of Community Currency Research* 16, 2012.

Board 27: typology of currencies after Kennedy /Lietaer (2008)

Main Classification	Purpose		Medium	Function		Money creation process	Cost recovery
Specification	Legal tender		Commodity money. Coins, Paper. Electronic money. Hybrid forms	Means of Payment	Medium of Exchange	Real backing. Secured loans. Unsecured loans. Redeemable vouchers. Corporate vouchers. Customer loyalty currency. Mutual Credit. Central issuance (flat). Hybrid forms.	No additional cost recovery. Fixed fees. Transaction fees. Interest charges, demurrage and other. Time-dependent charges. Hybrid forms
		Commercial		Measure of Value	Store of Value		
Finer Gradations	B2B. B2C. C2C. C2B			Payment in conventional currency. Payment in units of time. Payment with concrete objects.	Interest-bearing currencies. Interest-free currencies. Currencies with user fee. Currencies with a specific value in units of time. Currencies with expiry date. hybrids	-	-

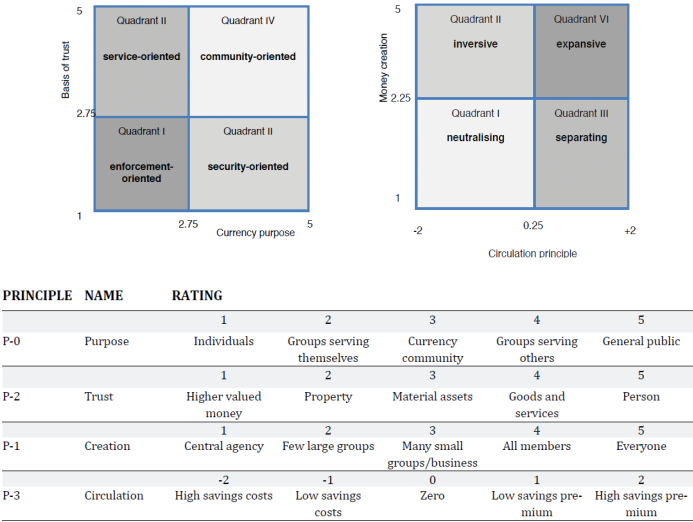
Source: MARTIGNONI _Jens. A new approach to a typology of complementary currencies. International Journal of Community Currency Research 16, 2012.

Board 28: ideal-types of currency schemes & community currency generation

Denomination & Currency scheme type	Nature of projects & Space considered	Purpose & Guiding principle	Generation & Significant Case	Content overview
Community currency	Community & Social space (pre-existing or ad hoc community)	Defining, protecting and strengthening a community & Reciprocity first, various distance to market	G1 & LETS, Trueque, CES.	Inconvertible schemes; quite small openness to external economic activities
		Defining, protecting and strengthening a community & Reciprocity first, various distance to local governments	G2 & Time Banks, Accorderie.	Inconvertible schemes with time currencies; frequent partnerships, especially with local governments
Local currency	Territorial & Geopolitical space (territory politically defined)	Defining, protecting and strengthening a territory & Redistribution or political control, Market first; generally distant from local governments	G3 & Ithaca Hours, Regio, Palmas, BerkShares.	Convertible schemes; local businesses are included; interest of partnerships with local governments
Complementary currency	Economic & Economic space (production and exchange)	Protecting, stimulating or orientating the economy & Market first, with links to governments and reciprocity	G4 & NU, SOL.	Complex schemes oriented toward consumer responsibility or/and economic activities re-orientation and other purposes; partnerships are necessary
National currency	Territorial & Sovereign space	Sovereignty & Redistribution or political control	-	-
For-profit currency	Economic & Clients of a for-profit organization	Profit & Purchasing power capture	-	-

Source: BLANC Jérôme. Classifying "CCs"; Community, complementary and local currencies' types and generations. In: INTERNATIONAL CONFERENCE ON COMMUNITY AND COMPLEMENTARY CURRENCIES, 1., 16th and 17th of February 2011. Lyon. Article. Lyon: CC-CONF, 2011.

Figure 29: basic currency concepts, evaluation grid, currency technical design



Source: MARTIGNONI Jens. A new approach to a typology of complementary currencies. International Journal of Community Currency Research 16, 2012.

Board 29: overview of completed typing

CURRENCY	BASIC CONCEPT	TECHNICAL DESIGN
Bancor	security-oriented	neutralizing
Chiemgauer	security-oriented	neutralizing
Coin	community-oriented	inversive
Fleci	service-oriented	neutralizing
Fluss-hours	service-oriented	inversive
Lunch-Franc	enforcement-oriented	separating
Minuto	service-oriented	inversive
Reka-Franc	security-oriented	separating
Talent	community-oriented	inversive
WIR-Franc	service-oriented	inversive
Swiss-Franc	enforcement-oriented	expansive

Source: MARTIGNONI Jens. A new approach to a typology of complementary currencies. International Journal of Community Currency Research 16, 2012.

Board 30: service category proposition for Time Bank

SERVICE CATEGORY	EXAMPLES
Arts and Crafts Production	Arts and crafts, artwork
Beauty and Spa	Haircut, massage, facial
Cleaning, Light Tasks and Errands	Cleaning, mending and alterations, errands
Computers and Technology	Computer repair, website design, audio/video production
Construction, Installation, Maintenance and Repair	Carpentry, painting, yard/garden maintenance
Entertainment and Social Contact	Companionship, performances, telephone assurance
Events and Program Support	Assistance with project/event, committee meetings
Food Preparation and Service	Cooking, catering
Health and Wellness	Yoga, acupuncture, meditation
Office and Administrative Support	Clerical help, bulk mailing
Sales and Rentals of Items	Purchase of used goods, space rental
Transportation and Moving	Transportation, moving assistance, hauling
Tutoring, Consultation and Personal Services	Lessons, tutoring, basic computer assistance, childcare

Source: COLLOM Ed. Key indicators of time bank participation: using transaction data for evaluation. International Journal of Community Currency Research 16, 2012.

Furthermore, during the International Conference on Community and Complementary Currencies which took place in Lyon the 16th and 17th of February 2011, objectives of those initiatives emerged such as: exchange differently with sense, think money differently, tool employed for a project. Indeed, what exchange do we want to promote? Between who? For what? How? What exchange community and complementary currency should develop as a vocation?

Dimension Goal Vision	Topic Priority Issue	Objectives	Currency Typology Category	Type Level Results	Progress Indicators Qualitative Review Quantitative Measurement	Tools Assessment. Data Collection Monitoring & Evaluation
Economic	Currency standards	Demurrage / Interest	C L S	Outcome	%rate	Best practice
		Debt levels	C L S	Outcome	Minimum and maximum	Best practice
		Discount rate	C L S	Output	%discount	Best practice
		Salary bonus	C L	Output	%bonus	Best practice
		Exchange rates	C L S	Activity	%rate	Best practice
		Backed system	C L S	Activity	%backing	Best practice
	Transparency	Open source system	C L S	Impact	Certification	External auditing
Social	Cooperation	Open banking	C L S	Impact	Certification	External auditing
		Exchangeability	C L S	Outcome	N° compensation systems	System database
		Co-creation	C L S	Output	N° involved in design	Management database
	Engagement	New skills	C L S	Activity	% agree & strongly agree	Interview
		Involvement	C L S	Impact	% agree & strongly agree	Interview
		Inclusion	L S	Impact	N° solidarity inclusion	Management database
		Social service dependence	L S	Outcome	N° social service dependant	Management database
	Well-being	Cohesion	L S	Outcome	N° new relationship	Interview
		Increase self- confidence	L S	Outcome	% agree & strongly agree	Interview
		Friendship and Trust	L S	Outcome	% agree & strongly agree	Interview
		Improve quality of life	L S	Outcome	% agree & strongly agree	Interview
		Mindfulness and Spirituality	C L S	Output	% agree & strongly agree	Interview
	Diversity	Education level repartition	C L S	Activity	%High & Graduate school	Interview

Dimension Goal Vision	Topic Priority Issue	Objectives	Currency Typology Category	Type Level Results	Progress Indicators Qualitative Review Quantitative Measurement	Tools Assessment, Data Collection Monitoring & Evaluation
Social	Mission	Ethic Charter	C L S	Activity	Yes / No	Best practice
	Education	Conducts Code	C L S	Activity	Yes / No	Best practice
		Enrolment	C L S	Impact	N° children enrolled in school	Interview
	Poverty	Income increase	L S	Impact	%income increase	Interview
			C L S	Impact	N° risen out of acute poverty	Interview
Employment		L S	Impact	%employment increase	Interview	
Environment	Relocation	Local growth	C L S	Impact	N° new job created	Interview
			L	Impact	%GDP local increase per year	Regional database
		C L	Impact	N° profitable enterprise support	Interview	
		C L	Impact	N° new profit & wage generated	Interview	
		GHG emission	C	Impact	%CO2 & CH4 decrease	Regional database
	Eco-Friendly	Local consumption	L	Impact	%products locally produced	System database
			Currency exchange	C L S	Output	%salary exchanged in CC
		Behaviour change	C L S	Output	N° of CC spent & earned	System database
		Waste management	C	Impact	% agree & strongly agree	Interview
		Water management	C	Impact	%recycling increase	Regional database
Politics	Biodiversity	Green economy	C	Impact	%water consumption decrease	Regional database
		Reforestation	C	Impact	%organic & fair product increase	Regional database
		Collaborative decision making	C	Impact	N° tree plantation	Regional database
	Governance	Administrative structure	C L S	Output	N° stakeholder involved	Interview
		National Legislation	C L S	Activity	N° administrative person	Management database
	Legal	Taxation	C L S	Output	N° legal text	Research
			C L S	Output	%rate (fixed & variable)	System database

Board 31: objectives of community and complementary currencies initiatives

Initiative	Objective
Services Exchange & Mutual Aid (Système d'Échange Local. Time Bank. Accorderie. Community Exchange System. SOL Temps)	Encourage time and knowledge exchange
	Strengthen solidarity and sharing
Economic Development (C3 Circuito Crédito Comercial. WIR. SUCRE. RES)	Catalyst to economic exchange development
	Business to Business economic exchange development
	Exchange relocation
	Economic development resilience through relocation. Employment and solidarity economy development. Energize citizen life. Reduce ecological footprint.
Local Economy (Transition Town. Abeille. Bon Netz Bon. Monnaie Complémentaire Locale. Regiogeld. SOL-Eco)	Support of income and employment generating activities
	Dynamize economy and territory solidarity
	Make exchange possible
Social Economy (Banco Plamas. Community Bank Network)	Population needs satisfaction. Responsible consumption. Planet & Human respect.
Solidarity Economy (Trueke. Clubes de Trueques)	Positive valuation of citizen and ecological conscience, practise, gesture, behaviour (carpool, energy saving, waste recycling)
	Collective visibility and society recognition
	Reintegration of larger exchange circuit
	Local economic exchange
Eco-Friendly Behaviour Development	Mutual aid, service and time exchange between people
	Affected public politic. Eco-citizen behaviour.
Hybrid forms	

Source: MONNAIE EN DÉBAT. Synthesis of the international day. In: MAKE MOTION – COMMUNITY AND COMPLEMENTARY CURRENCIES ACTORS, 1., 18th of February 2011. Lyon. Synthesis. Lyon: MONNAIE EN DÉBAT, 2011.

Source : CAHIER D'ESPÉRANCE RICHESSES ET MONNAIES. Cahier d'espérance pour un autre regard sur la richesse et la monnaie. In: ÉTATS GÉNÉRAUX DE L'ÉCONOMIE SOCIALE ET SOLIDAIRE, 1., 17th, 18th and 19th of June 2011. Paris. Synthesis. Paris: PALAIS BRONGNIART, 2011.

Board 32: objectives & scale change of community and complementary currencies initiatives

Actors	Economic	Social	Environment
Producer Provider	Turnover/Sales Client Loyalty Value-Added	Encourage Local Exchange Give Sense to Activity Keep Wealth Circulation Locally	Label Network Integration Relocation Network Activation
Consumer User	Value & Wealth Recognition Ethical Use of Money Sustainable Purchasing Power	Re-appropriation & Co-creation of Money Use Confidence. Openness. Sharing. Rethink. Neighbourhood.	Connect Autonomous Transition Initiative Become Consum'Actor
Stakeholder Institutions	Crisis Resiliency Orientation & Promotion of Local & Sustainable Development Viability & Perennial	Territorial Services – Unsatisfied Needs meet Unused Resources Social Services – Financial Inclusion	Socio-Environmental Profit Behaviour Change Incentive Eco-Citizen Happy Sobriety
Objective	Description		
Collaborative & Cooperative Vector	Alliance logic and strategy within solidarity and social economy and with sustainable development actors		
Sustainable Local Development	Stakeholders integration and recognition in a common development project		
Innovative Wealth Valuation	Partnership co-creation between companies, associations, citizens and local authority		
Social Protection Systems Preservation	Acceptance and organization of the connection between profit and non-profit wealth such as voluntary work		
Ethic Currency Constellation	Support, impulse, reinforce, participation to local, knowledge and local exchange systems		
Monetary Creation Power to Public Actors	Conceive innovative accountancy scheme and account unit		
	Sustainable and non-speculative worldwide complementary currency		
	Common but non-unique European currency		
	Territorial community currency (national, regional or local)		

Source: MONNAIE EN DÉBAT. Synthesis of the international day. In: MAKE MOTION – COMMUNITY AND COMPLEMENTARY CURRENCIES ACTORS, 1., 18th of February 2011. Lyon. Synthesis. Lyon: MONNAIE EN DÉBAT, 2011.

Source : CAHIER D'ESPÉRANCE RICHESSES ET MONNAIES. Cahier d'espérance pour un autre regard sur la richesse et la monnaie.
In: ÉTATS GÉNÉRAUX DE L'ÉCONOMIE SOCIALE ET SOLIDAIRE, 1., 17th, 18th and 19th of June 2011. Paris. Synthesis. Paris: PALAIS BRONGNIART, 2011.
Source: DERUDDER Philippe. LE PESANT Michel. Monnaie locale complémentaire éditorial, 2011.

Finally, utility, interest, engagement and motivation for complementary and community currencies depends on each actor perception and on each sustainable dimension involvement. As we defined the types and thus the objectives of the complementary, local, community currencies, we can now propose a scoreboard for economic and monetary innovation, based on the information we collected through the literature review and thanks to the analysis we made about impact assessment methodology, measurement indicators process and impact reporting framework

3.3. Monetary innovation impact assessment scorecard and dashboard

This monitoring and evaluation methodology of impact assessment, reporting, analysis may not appear enough original and out-of-the-box thinking. We know that in our current society, as we repress the archetype value of creativity, it became hyper-rational. However, by not being sufficiently rational, the shade emerging value of inconstant may appear too. Why should we use a Yang concept based on Hard skills in order to create a Yin concept based on Soft skills? Here are the main reasons:

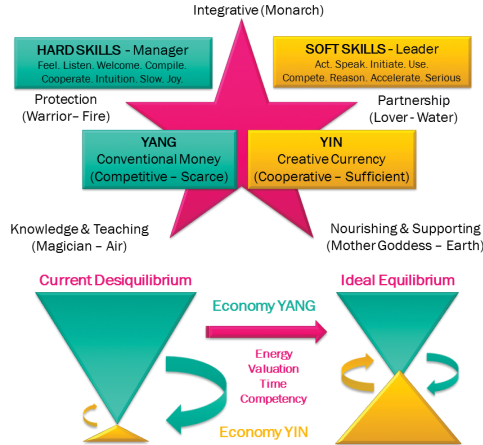
- As we need energy, information, time and competency to create a Yin economy, we may find it where it is nowadays: in the Yang Economy. To attract it, we need to use Yang concept based on hard skills.

- Using hard skills with temperance and equilibrated with soft skills is necessary to build a Yin and Yang economy equilibrium.

- We can also integrate some Ying concept and soft skills in the methodology to evaluate the Yin economy.

Thus, we should create a Yang and Yin evaluation concept, based respectively on Hard and Soft skills, to transform some of the Yang economy energy, mostly rational and quantitative, in Yin economy energy, mostly intuitive and qualitative in order to reach an ideal equilibrium.

Figure 31: collective unconscious and archetypal & equilibrium of Yang and Yin economy



Source: LIETAER Bernard, Au cœur de la monnaie – systèmes monétaires, inconscient collectif, archétypes et tabous. Gap : Yves Michel, September 2011

Board 33: emergent and repressed values

Repressed values (archetype)	Emerging values (two shades)	
Lucidity, wisdom, justice (sovereign)	Fear (tyrant)	Dishonour (coward)
Abundance, fertility, equilibrium dynamic of flow (mother Earth)	Big and quick (voracity)	Accumulation (scarcity)
Supernatural forces and energy connection, creativity (magus)	Hyperrational (apollonian)	Inconstant (dionysian)
(Warrior)	Sadist	Masochist
(Lover)	Dependant	Impotent

Source: RAVEN Hans George. Carl Gustav JUNG (1875 – 1961): um dos mais famosos psicoanalistas do século XX. In FINANÇAS SOLIDÁRIAS E REDES DE TROCA: EXPLORANDO IDÉIAS; PROJETOS E OPORTUNIDADES, 28th of November 2009, São Paulo. Presentation. São Paulo, 2009a.

We are now conceiving a genuine and necessary scorecard, which can be used as a dashboard, for the Environmental and Socio-Economic Impact Assessment of an economic and monetary innovation project planning, implementation, monitoring and evaluation, reporting and financing. The methodology will be based on qualitative and quantitative information, on data and experimental analysis, on

internal and external evaluation, on self and peer evaluation, and on individual and joint evaluation.

Figure 30: scorecard between the strategic roadmap and performance measurement of a project



Here is an explanation of the following scorecard:

- Dimension, goal, vision: linked with scientific research domains in different background such as environment, sociology, economics, politics, cultural, anthropology, philosophy and psychology.
- Topic, priority, issue: main subjects which deals with the dimension.
- Objectives: it can be an impact, outcome, output or activity objective
- Currency typology and category: to simplify we will use the following: C for complementary currency, L for local currency, S for social or community currency.
- Indicators: can be qualitative or quantitative performance, organisational or social and environmental indicators.
- Tools: it contain monitoring and evaluation, data collection, assessment systems

Nevertheless, the following scorecard is just an example, a proposition. That's why it is not complete.

Table 1: proposition of a sustainable management strategy scoreboard of monetary innovation

Dimension Goal Vision	Topic Priority Issue	Objectives	Currency Typology Category	Type Level Results	Progress Indicators Qualitative Review Quantitative Measurement	Tools Assessment. Data Collection Monitoring & Evaluation
Economic	Resilience	Market diversity	C L	Impact	N° goods & services category	Classification standards
		Tipping Point Network Scale	C L S	Output	N° & % users & producers	System database
		Training	C L	Outcome	N° users & N° business	Best practices: 500 & 100
		Interoperability	C L S	Output	% trained	Interview
	Viability	Participation	C L S	Output	N° training hours per year	Management database
		Friendly user	C	Activity	N° systems users	System database
		Intelligibility	C L S	Impact	N° active members per year	Management database
		Team Capacity	C L	Outcome	% agree & strongly agree	Interview
	Risk	Disaster mitigation	C L S	Output	% agree & strongly agree	Interview
		Currency Security features	C L S	Activity	N° management team	Management database
		Transaction and Data Safety	C L	Output	Backup system Frequency	System database
		Record keeping and statistics	C L S	Output	N° security features	Best practices: 3
	Finance Standards	Investment standards	C L S	Activity	N° failure accident	System database
		Loan Standards	C L S	Activity	Backup system Frequency	System database
	Accountancy Standards	Accountancy standards	C L	Output	Certification	External auditing
		Startancy standards	C L	Output	Certification	External auditing
	Management standards	Monitoring and Evaluation	C L	Output	Certification	External auditing
			C L S	Output	N° standards & tools used	Best practice

CONCLUSION

Sustainable economy, sustainable money and ethics of financial relations are the main topic addressed in our current society. What are the appropriate tools to be created to reach a sustainable future? And more specifically why do we need an alternative monetary system? How will the economy react to the alternative currency? To answer those questions, we must understand that economic and monetary innovations improve the social transformation impact of development project, proving it through impact assessment is necessary for both external and internal issues: external legitimacy and financing ; internal engagement and management.

Indeed, development project stakeholders need a genuine demonstration of impact improvement to create adherence, confidence and legitimacy. Ethic, sustainable and impact finance, moreover venture philanthropy, are looking for reporting indicators and monitoring systems to demonstrate the efficiency of their financing. Social transformation projects participant need impact insurance concerning the tool implementation. Development project leader want an evaluation process at program level to measure their output and at mission levels to verify their outcome.

Consequently we proposed a scorecard of dimension, objective, indicator and assessment tools in order to better plan, implement, monitor, evaluate, report and thus finance impact development projects which integrate economic and monetary innovation. Scientific research in this domain is necessary to reach the structuration level of impact finance and sustainable development sectors.

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Annexe 1: sustainable vision, goals, objectives

Board 34: sustainable vision, goals, objectives

Year	Organisation	Title	Description & Content
1993	UNCED United Nations Conference on Environment and Development Rio Earth Summit 1992	Agenda 21 ¹	<p>Comprehensive blueprint of action plan to be taken globally, nationally, and locally</p> <p>Section I. Social and Economic Dimensions</p> <p>International cooperation to accelerate sustainable development in developing countries and related domestic policies. Combating poverty. Changing consumption patterns. Demographic dynamics and sustainability. Protecting and promoting human health conditions. Promoting sustainable human settlement development. Integrating environment and development in decision-making.</p> <p>Section II. Conservation and Management of Resources for Development</p> <p>Protection of the atmosphere. Integrated approach to the planning and management of land resources. Combating deforestation. Managing fragile ecosystems: combating desertification and drought. Managing fragile ecosystems: sustainable mountain development. Promoting sustainable agriculture and rural development. Conservation of biological diversity. Environmentally sound management of biotechnology. Protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas, and coastal areas and the protection, rational use and development of their living resources. Protection of the quality and supply of freshwater resources: application of integrated approaches to the development, management and use of water resources. Environmentally sound management of toxic chemicals, including prevention of illegal international traffic in toxic and dangerous products. Environmentally sound management of hazardous wastes, including prevention of illegal international traffic in hazardous wastes. Environmentally sound management of solid wastes and sewage-related issues. Safe and environmentally sound management of radioactive wastes.</p> <p>Section III. Strengthening the role of major groups.</p> <p>Global action for women towards sustainable and equitable development. Children and youth in sustainable development. Recognizing and strengthening the role of indigenous people and their communities. Strengthening the role of non-governmental organizations: partners for sustainable development. Local authorities' initiatives in support of Agenda 21. Strengthening the role of workers and their trade unions. Strengthening the role of business and industry. Scientific and technological community. Strengthening the role of farmers.</p> <p>Section IV. Means of implementation</p> <p>Financial resources and mechanisms. Transfer of environmentally sound technology, cooperation and capacity-building. Science for sustainable development. Promoting education, public awareness and training. National mechanisms and international cooperation for capacity-building in developing countries. International institutional arrangements. International legal instruments and mechanisms. Information for decision-making.</p>

2000	United Nations Global Compact	The Ten Principles	<p>The Universal Declaration of Human Rights</p> <p>The International Labour Organization's Declaration on Fundamental Principles and Rights at Work</p> <p>The Rio Declaration on Environment and Development</p> <p>The United Nations Convention Against Corruption</p> <p>Human Rights</p> <p>Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights; and</p> <p>Principle 2: make sure that they are not complicit in human rights abuses.</p> <p>Labour</p> <p>Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;</p> <p>Principle 4: the elimination of all forms of forced and compulsory labour;</p> <p>Principle 5: the effective abolition of child labour; and</p> <p>Principle 6: the elimination of discrimination in respect of employment and occupation.</p> <p>Environment</p> <p>Principle 7: Businesses should support a precautionary approach to environmental challenges;</p> <p>Principle 8: undertake initiatives to promote greater environmental responsibility; and</p> <p>Principle 9: encourage the development and diffusion of environmentally friendly technologies.</p> <p>Anti-Corruption</p> <p>Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery.</p>
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2000	The Earth Charter Initiative United Nations WCED World Commission on Environment and Development Brundtland Commission	The Earth Charter	<p>Ethical vision proposes that environmental protection, human rights, equitable human development, and peace are interdependent and indivisible</p> <p>I. Respect and care for the community of life: Respect Earth and life in all its diversity. Care for the community of life with understanding, compassion, and love. Build democratic societies that are just, participatory, sustainable, and peaceful. Secure Earth's bounty and beauty for present and future generations.</p> <p>II. Ecological integrity: Protect and restore the integrity of Earth's ecological systems, with special concern for biological diversity and the natural processes that sustain life. Prevent harm as the best method of environmental protection and, when knowledge is limited, apply a precautionary approach. Adopt patterns of production, consumption, and reproduction that safeguard Earth's regenerative capacities, human rights, and community well-being. Advance the study of ecological sustainability and promote the open exchange and wide application of the knowledge acquired.</p> <p>III. Social and economic justice: Eradicate poverty as an ethical, social, and environmental imperative. Ensure that economic activities and institutions at all levels promote human development in an equitable and sustainable manner. Affirm gender equality and equity as prerequisites to sustainable development and ensure universal access to education, health care, and economic opportunity. Uphold the right of all, without discrimination, to a natural and social environment supportive of human dignity, bodily health, and spiritual well-being, with special attention to the rights of indigenous peoples and minorities.</p> <p>IV. Democracy, nonviolence, and peace: Strengthen democratic institutions at all levels, and provide transparency and accountability in governance, inclusive participation in decision making, and access to justice. Integrate into formal education and life-long learning the knowledge, values, and skills needed for a sustainable way of life. Treat all living beings with respect and consideration. Promote a culture of tolerance, nonviolence, and peace.</p>
2000	United Nations Millennium Declaration	Millennium Development Goals	<p>Objectives and Goals by 2015</p> <p>United Nations Millennium Declaration</p> <p>Values and principles: Freedom. Equality. Solidarity. Tolerance. Respect for nature. Shared responsibility. II. Peace, security and disarmament. III. Development and poverty eradication. IV. Protecting our common environment. V. Human rights, democracy and good governance. VI. Protecting the vulnerable. VII. Meeting the special needs of Africa. VIII. Strengthening the United Nations Millennium Development Goals:</p> <p>Eradicate extreme poverty and hunger. Achieve universal primary education. Promote gender and empower women. Reduce child mortality. Improve maternal health. Combat HIV/AIDS, malaria and other diseases. Ensure environmental sustainability. Develop a global partnership for development.</p>

2002	WSSD World Summit on Sustainable Development Johannesburg Earth Summit 2002	Johannesburg Declaration on Sustainable Development	<p>Poverty eradication : social inequality, social link, employment, education for all, gender equality, housing, cultural diversity</p> <p>Changing unsustainable patterns of consumption/production: overconsumption, freight transport, waste, pollution, global warming, agriculture, eco-efficiency.</p> <p>Resource protection: water, air, biodiversity, forests, mobility, commodities, energy</p> <p>Globalization: governance, international trade, new technologies, tourism</p> <p>Health: risk prevention, disease prevention, food, sport, mobility</p>
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Source: LOUETTE Anne. *Sustainability compendium: social and environmental responsibility management tools*. São Paulo : Antakarana Cultura Arte Ciência/Willis Harman House, 2008.

Annexe 2: development project impact assessment compendium
Board 35: development project impact assessment compendium

Level	Type	Organisation	Title	Description
National	Assessment Tool Evaluation State of the art	Institute for Environmental Studies	Sustainability A-Test	State of the art 40 tools reviewed Evaluation of assessment tools
National	Interlinkage Evaluation Indicators	INDI-LINK	Indicator-based evaluation of interlinkages between different sustainable development objectives	State of the art Evaluation of interlinkage Elaboration of policy making
National	Legal Directives	European Commission	Environmental Impact Assessment	Legal power directives
Social	Research Methodology	Delbert Charles MILLER, Neil J. SALKIND	Handbook of Research Design and Social Measurement	Handbook of methodology. Research technique only Epistemology, research design and statistics Theoretical and practical knowledge (scales, indices, applications)

Global	Monitoring and Evaluation Compendium	Evaluation Resource Institute	Evaluation Wiki	Compendium of information and resources - Science and practice Evaluation knowledge only
Global	Monitoring and Evaluation Compendium	Evaluation Portal – Link Collection	Evaluation Approaches – Impact Evaluation	Collection of resources
Global	Monitoring and Evaluation Compendium	Innovation Network	Point K Learning Center	Tools and resources to plan and evaluate their own programs. Logic model. Evaluation plan. Organizational assessment Workbooks, tipsheets, reports
Global	Monitoring and Evaluation Compendium	The Global Social Change Research Project	Free resources for Program Evaluation and Social Research Methods	Program evaluation and Social research methods: Surveys, focus groups, sampling, interviews
Global	Monitoring and Evaluation Compendium	Purdue University College of Education Assessment Council	Links to Assessment and Evaluation Resources	Collection of resources
Social, Community	Guidelines & Principles	Interorganizational Committee on Guidelines and Principles for Social Impact Assessment	Guidelines and Principles for Social Impact Assessment	Legal mandates. Administrative procedure. Basic model. Step process.

Level	Type	Organisation	Title	Description
Waste recycling	Assessment Methodology	Michelle KENT	Development of a Social Impact Assessment methodology and its application to waste for life in Buenos Aires	Synthesis of Social Impact Assessment Methodology
Community	Assessment Methodology	Comité Sectoriel de Main-d'Oeuvre Economie Social Action Communautaire	Indicateurs de rentabilité sociale ou indicateurs d'impact économique ?	How to define, build indicators to measure social and economic impact of social economics and community action
Petroleum	Assessment Methodology	British Petroleum	Environmental and Socio-economic Impact Assessment Methodology	Synthesis of Environmental and Socio-economic Impact identification, mitigation, monitoring and management
Global	Assessment Methodology	United Nations Environment Program	Environmental Impact Assessment Training Resource Manual, Second Edition	Synthesis of Environmental, Social and Strategic Impact Assessment Methodology
Social	Assessment Methodology	Massachusetts Institute of Technology Abdul Latif Jameel Poverty Action Lab	Evaluating Social Program	Methodology overview of Randomized Evaluation. Building capacity. Informing policy.

Mining	Assessment Methodology	Golder Associates – Tenke Fungurume Mining	Environmental and Social Impact Assessment for Tenke Fungurume	Impact analysis methodology Potential Sustainability Actions to Protect and Enhance Positive Effects
Global	Assessment Methodology	Centre for Good Governance	Social Impact Assessment Methodology	Methodology: baseline conditions, public involvement, project description & identification of alternatives, screening, scoping, predicting responses to impacts, management and monitoring
Global	Principles	IE4D Impact Evaluation for Development Group	Principles for Action	Rethinking, reshaping, reforming impact evaluation
Global	Monitoring and Evaluation Compendium	Social Impact Assessment Hub	Resources Guides and Tools	Good practice guidance for case study
Global	Principles	International Association for Impact Assessment	Social Impact Assessment International Principles	Process for International Principles of Impact Assessment
Health	Guidelines & Best Practices	Health Impact Project	Guidance & Best Practices for Stakeholder Participation in Health Impact Assessments	Methodology for Health Impact Assessment
Equality	Assessment Methodology	Local Government Improvement and Development	Equality Impact Assessments - EqIA	Methodology for Equality Impact Assessment

Level	Type	Organisation	Title	Description
Global	Assessment Methodology	African Development Bank	Environmental & Social Assessment Procedures Basics	Strategic Environmental and Social Assessment Procedures: Project identification, Project preparation, Project appraisal, Loan negotiation, Project implementation and supervision, Project completion
National	Standards Compendium	European Evaluation Society	Evaluation Standards	List of Evaluation Standards of National and Regional Evaluation on Societies & of International and Supranational Organisations
Global	Handbook	United Nations Development Programme	Handbook on Planning, Monitoring and Evaluating for Development Results	Synthesis of Development Evaluation
Global	Standards & Norms	United Nations Evaluation Group	Standards & Norms for Evaluation in the UN System	Standards and Norms
Gender	Assessment Methodology	UN Women	Guide to Gender Equality & Human Rights Responsive Evaluation, 2010.	Synthesis of Development Evaluation Tools and Methodology

Global	Principles	OECD Development Assistance Committee	Principles for Evaluation of Development Assistance.	Principles of Development Evaluation
Global	Standards & Norms	OECD Development Assistance Committee	Evaluating Development Co-operation: summary of Key Norms and Standards.	Norms and Standards
Global	Equity, Poverty, Inequality	Assessment Methodology	Evaluation for equitable development results	Concept, design, implementation, evaluation focus on human rights and equity.
Global	Assessment Methodology	ESCAP Economic and Social Commission for Asia and the Pacific	Monitoring & Evaluation System Overview and Evaluation Guidelines	Synthesis of Monitoring & Evaluation Methodology
Global	Monitoring and Evaluation Compendium	My M&E	Recommended toolkit	List of Monitoring & Evaluation Tools
Humanitarian Aid	Real-Time Evaluation	ALNAP Active Learning Network for Accountability and Performance in Humanitarian Action	Real-time evaluations of humanitarian action	Synthesis of Real-Time Evaluation Methodology

Level	Type	Organisation	Title	Description
Global	Monitoring and Evaluation Compendium	International Development Evaluation Association	Monitoring and Evaluation Tools	List of Monitoring & Evaluation Tools
Global	Impact Effect Compendium	IOCE International Organisation for Cooperation in Evaluation	Resources on Impact and Effects	A list of relevant references and resource on Evaluating program impacts and effects
National	Assessment Methodology	MCC Millennium Challenge Corporation	Impact Evaluation	Overview of National Development Evaluation Methodology
Food Security	Assessment Methodology	FAO Food and Agriculture Organization	Overview of methods for baseline assessments	Overview of development assessment methodology
Global	Assessment Methodology	FASID Foundation for Advanced Studies on International Development.	L-E-A-D Log-frame Evaluation Application Design	New approach for Policy and Program Evaluation

Global	Efficiency Assessment	BMZ Federal Ministry for Economic Cooperation and Development	Tools and Methods for Evaluating the Efficiency of Development Interventions	Efficiency Evaluation Methodology
Global	Impact Effect Compendium	Center for Effective Global Action	Research & Impact	Many research projects
Poverty	Applied Mathematics Methodology	The World Bank Poverty reduction and Equity	Handbook on Impact Evaluation: Quantitative Methods and Practices	Applied mathematics for quantitative impact assessment
Global	Monitoring and Evaluation Compendium	The World Bank Development Impact Evaluation Initiative	Data Catalogue	List of Methodology
Global	Assessment Methodology	The World Bank Africa Impact Evaluation Initiative	Impact Evaluation Method	Randomization, instrumental variables, regression discontinuity design, difference-in-difference, propensity score matching, pipeline comparison
Global	Applied Mathematics Methodology	The World Bank Network of Networks for Impact Evaluation	Impact Evaluations and Development: NONIE Guidance on Impact Evaluation	Methods and applied mathematics for impact evaluation
Global	Monitoring and Evaluation Compendium	International Initiative for Impact Evaluation	Impact Evaluation Resources	Database & Resource of Impact Evaluations

Level	Type	Organisation	Title	Description
Global	Monitoring and Evaluation Compendium	Wageningen UR Center for Development Innovation	Participatory Planning Monitoring & Evaluation	Theories, backgrounds, methodologies, approaches, tools, methods resources
Commodity	Assessment Methodology	Sustainable Commodity Initiative	Committee on Sustainability Assessment	Diagnostic, didactic, business decision-making, monitoring and evaluation tool
Global	Assessment Tool Evaluation	IISD International Institute for Sustainable Development	Evaluation of Integrated Management Initiatives	Integrated Place-based Management Evaluation approaches and frameworks
Global	Assessment Methodology	MDCR Manpower Demonstration Research Corporation	Research Methodology	Impact, implementation, integration
Global	Network	MONITORING AND EVALUATION NEWS	A list of M&E email lists	List of Email list linked with Monitoring and Evaluation
Regional & District	Assessment Methodology	CONFEDERATION SUISSE	Cercle Indicateurs - Canton et Ville	35 indicators

National	Assessment Methodology	CONFEDERATION SUISSE	MONET Selected Monitoring Sustainable Development	75 indicators
Climate, Community, Biodiversity	Standards	CCBA The Climate, Community & Biodiversity Alliance	CCB Standards - Climate, Community and Biodiversity Project Design Standards	Standards to promote the development of forest protection, restoration and agroforestry
Climate, Community, Biodiversity	Assessment Methodology	CCBA The Climate, Community & Biodiversity Alliance	SBIA Social and Biodiversity Impact Assessment manual	Participatory approach that integrates project design and impact assessment through the development of a project theory of change REDD Reducing Emissions from Deforestation and Forest Degradation SES Social & Environmental Standards

Annexe 3: sustainable finance principles, standards, commitment, framework

Board 36: sustainable finance principles, standards, commitment, framework

Year	Organisation	Title	Description & Content
1997	GRI Global Reporting Initiative	Sustainability Reporting Framework	<p>Content (materiality, stakeholder inclusiveness, sustainability context and completeness) & Quality (balance, comparability, accuracy, timeliness, clarity and reliability).</p> <p>ECONOMIC</p> <p>Economic Performance : Direct economic value generated and distributed, including revenues, operating costs, employee compensation, donations and other community investments, retained earnings, and payments to capital providers and governments. Financial implications and other risks and opportunities for the organization's activities due to climate change. Coverage of the organization's defined benefit plan obligations. Significant financial assistance received from government.</p> <p>Market Presence : Range of ratios of standard entry level wage by gender compared to local minimum wage at significant locations of operation. Policy, practices, and proportion of spending on locally-based suppliers at significant locations of operation. Procedures for local hiring and proportion of senior management hired from the local community at locations of significant operation.</p> <p>Indirect Economic Impacts : Development and impact of infrastructure investments and services provided primarily for public benefit through commercial, in-kind, or pro bono engagement. Understanding and describing significant indirect economic impacts, including the extent of impacts.</p> <p>ENVIRONMENT</p> <p>Materials : Materials used by weight or volume. Percentage of materials used that are recycled input materials.</p> <p>Energy : Direct energy consumption by primary energy source. Indirect energy consumption by primary source. Energy saved due to conservation and efficiency improvements. Initiatives to provide energy-efficient or renewable energy based products and services, and reductions in energy requirements as a result of these initiatives. Initiatives to reduce indirect energy consumption and reductions achieved.</p> <p>Water : Total water withdrawal by source. Water sources significantly affected by withdrawal of water. Percentage and total volume of water recycled and reused.</p> <p>Biodiversity : Location and size of land owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas. Description of significant impacts of activities, products, and services on biodiversity in protected areas and areas of high biodiversity value outside protected areas. Habitats protected or restored. Strategies, current actions, and future plans for managing impacts on biodiversity. Number of IUCN Red List species and national conservation list species with habitats in areas affected by operations, by level of extinction risk.</p> <p>Emissions, Effluents, and Waste : Total direct and indirect greenhouse gas emissions by weight. Other relevant indirect greenhouse gas emissions by weight. Initiatives to reduce greenhouse gas emissions and reductions achieved. Emissions of ozone-depleting substances by weight. NO_x, SO_x and other significant air emissions by type and weight. Total water discharge by quality and destination. Total weight of waste by type and disposal method. Total number and volume of significant spills. Weight of transported, imported, exported, or treated waste deemed hazardous under the terms of the Basel Convention</p>

		<p>Strategies, current actions, and future plans for managing impacts on biodiversity. Number of IUCN Red List species and national conservation list species with habitats in areas affected by operations, by level of extinction risk.</p> <p>Emissions, Effluents, and Waste : Total direct and indirect greenhouse gas emissions by weight. Other relevant indirect greenhouse gas emissions by weight. Initiatives to reduce greenhouse gas emissions and reductions achieved. Emissions of ozone-depleting substances by weight. NO_x, SO_x and other significant air emissions by type and weight. Total water discharge by quality and destination. Total weight of waste by type and disposal method. Total number and volume of significant spills. Weight of transported, imported, exported, or treated waste deemed hazardous under the terms of the Basel Convention Annex I, II, III, and VIII, and percentage of transported waste shipped internationally. Identity, size, protected status, and biodiversity value of water bodies and related habitats significantly affected by the reporting organization's discharges of water and runoff.</p> <p>Products and Services : Initiatives to mitigate environmental impacts of products and services, and extent of impact mitigation. Percentage of products sold and their packaging materials that are reclaimed by category.</p> <p>Compliance : Monetary value of significant fines and total number of non-monetary sanctions for noncompliance with environmental laws and regulations.</p> <p>Transport : Significant environmental impacts of transporting products and other goods and materials used for the organization's operations, and transporting members of the workforce. workforce.</p> <p>Overall : Total environmental protection expenditures and investments by type.</p> <p>SOCIAL – LABOR PRACTICES AND DECENT WORK</p> <p>Employment : Total workforce by employment type, employment contract, and region, broken down by gender. Total number and rate of new employee hires and employee turnover by age group, gender, and region. Benefits provided to full-time employees that are not provided to temporary or parttime employees, by significant locations of operation. Return to work and retention rates after parental leave, by gender.</p> <p>Labor/Management Relations : Percentage of employees covered by collective bargaining agreements. Minimum notice period(s) regarding operational changes, including whether it is specified in collective agreements.</p> <p>Occupational Health and Safety : Percentage of total workforce represented in formal joint management-worker health and safety committees that help monitor and advise on occupational health and safety programs. Rates of injury, occupational diseases, lost days, and absenteeism, and total number of work-related fatalities, by region and by gender. Education, training, counseling, prevention, and risk-control programs in place to assist workforce members, their families, or community members regarding serious diseases. Health and safety topics covered in formal agreements with trade unions.</p> <p>Training and Education : Average hours of training per year per employee by gender, and by employee category. Programs for skills management and lifelong learning that support the continued employability of employees and assist them in managing career endings.</p>

Year	Organisation	Title	Description & Content
			<p>Percentage of employees receiving regular performance and career development reviews, by gender. Diversity and Equal Opportunity : Composition of governance bodies and breakdown of employees per employee category according to gender, age group, minority group membership, and other indicators of diversity. Equal remuneration for women and men : Ratio of basic salary and remuneration of women to men by employee category, by significant locations of operation.</p> <p>SOCIAL – HUMAN RIGHTS</p> <p>Investment and Procurement Practices : Percentage and total number of significant investment agreements and contracts that include clauses incorporating human rights concerns, or that have undergone human rights screening. Percentage of significant suppliers, contractors, and other business partners that have undergone human rights screening, and actions taken. Total hours of employee training on policies and procedures concerning aspects of human rights that are relevant to operations, including the percentage of employees trained. Non-discrimination : Total number of incidents of discrimination and corrective actions taken. Freedom of Association and Collective Bargaining : Operations and significant suppliers identified in which the right to exercise freedom of association and collective bargaining may be violated or at significant risk, and actions taken to support these rights.</p> <p>Child Labor : Operations and significant suppliers identified as having significant risk for incidents of child labor, and measures taken to contribute to the effective abolition of child labor.</p> <p>Forced and Compulsory Labor : Operations and significant suppliers identified as having significant risk for incidents of forced or compulsory labor, and measures to contribute to the elimination of all forms of forced or compulsory labor. Security Practices : Percentage of security personnel trained in the organization's policies or procedures concerning aspects of human rights that are relevant to operations. Indigenous Rights : Total number of incidents of violations involving rights of indigenous people and actions taken. Assessment : Percentage and total number of operations that have been subject to human rights reviews and/or impact assessments.</p> <p>Remediation : Number of grievances related to human rights filed, addressed and resolved through formal grievance mechanisms.</p> <p>SOCIAL – SOCIETY</p> <p>Local Communities : Percentage of operations with implemented local community engagement, impact assessments, and development programs. Operations with significant potential or actual negative impacts on local communities. Prevention and mitigation measures implemented in operations with significant potential or actual negative impacts on local communities. Corruption : Percentage and total number of business units analyzed for risks related to corruption. Percentage of employees trained in organization's anti-corruption policies and procedures. Actions taken in response to incidents of corruption.</p>

		<p>Public Policy : Public policy positions and participation in public policy development and lobbying, Total value of financial and in-kind contributions to political parties, politicians, and related institutions by country.</p> <p>Anti-Competitive Behavior : Total number of legal actions for anticompetitive behavior, anti-trust, and monopoly practices and their outcomes.</p> <p>Compliance : Monetary value of significant fines and total number of non-monetary sanctions for noncompliance with laws and regulations.</p> <p>SOCIAL - PRODUCT RESPONSIBILITY</p> <p>Customer Health and Safety : Life cycle stages in which health and safety impacts of products and services are assessed for improvement, and percentage of significant products and services categories subject to such procedures. Total number of incidents of non-compliance with regulations and voluntary codes concerning health and safety impacts of products and services during their life cycle, by type of outcomes.</p> <p>Product and Service Labeling : Type of product and service information required by procedures, and percentage of significant products and services subject to such information requirements. Total number of incidents of non-compliance with regulations and voluntary codes concerning product and service information and labeling, by type of outcomes. Practices related to customer satisfaction, including results of surveys measuring customer satisfaction.</p> <p>Marketing Communications : Programs for adherence to laws, standards, and voluntary codes related to marketing communications, including advertising, promotion, and sponsorship. Total number of incidents of non-compliance with regulations and voluntary codes concerning marketing communications, including advertising, promotion, and sponsorship by type of outcomes.</p> <p>Customer Privacy : Total number of substantiated complaints regarding breaches of customer privacy and losses of customer data.</p> <p>Compliance : Monetary value of significant fines for noncompliance with laws and regulations concerning the provision and use of products and services.</p>

Year	Organisation	Title	Description & Content
1997	UNEP FI United Nations Environment Program Finance Initiative	UNEP Statement of Commitment by Financial Institutions (FI) on Sustainable Development	<p>Financial Services Sector recognize that economic development needs to be compatible with human welfare and a healthy environment</p> <p>1. Commitment to Sustainable Development</p> <p>1.1 We regard sustainable development - defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs - as a fundamental aspect of sound business management.</p> <p>1.2 We believe that sustainable development is best achieved by allowing markets to work within an appropriate framework of cost efficient regulations and economic instruments. Governments have a leadership role in establishing and enforcing long-term priorities and values.</p> <p>1.3 We regard financial institutions to be important contributors to sustainable development, through their interaction with other economic sectors and consumers and through their own financing, investment and trading activities.</p> <p>1.4 We recognize that sustainable development is an institutional commitment and an integral part of our pursuit of both good corporate citizenship and the fundamentals of sound business practices.</p> <p>1.5 We recognize that the sustainable development agenda is becoming increasingly inter-linked with humanitarian and social issues as the global environment agenda broadens and as climate change brings greater developmental and security challenges.</p> <p>2. Sustainability Management</p> <p>2.1 We support a precautionary approach to environmental and social issues, which strives to anticipate and prevent potential negative impacts on the environment and society.</p> <p>2.2 We will comply with all applicable local, national and international regulations on environmental and social issues. Beyond compliance, we will work towards integrating environmental and social considerations into our operations and business decisions in all markets.</p> <p>2.3 We recognize that identifying and quantifying environmental and social risks should be part of the normal process of risk assessment and management, both in domestic and international operations.</p> <p>2.4 We will endeavor to pursue the best practice in environmental management, including energy and water efficiency, recycling and waste reduction. We will seek to form business relations with customers, partners, suppliers and subcontractors who follow similarly high environmental standards.</p> <p>2.5 We intend to update our practices periodically to incorporate relevant developments in sustainability management. We encourage the industry to undertake research accordingly.</p> <p>2.6 We recognize the need to conduct regular internal reviews and to measure our progress against our sustainability goals.</p> <p>2.7 We recognize the need for the financial services sector to adapt and develop products and services which will promote the principles of sustainable development.</p> <p>3. Public Awareness and Communication</p> <p>3.1 We recommend that financial institutions develop and publish a statement of their sustainability policy and periodically report on the steps they have taken to promote the integration of environmental and social considerations into their operations.</p>

			<p>integration of environmental and social considerations into their operations.</p> <p>3.2 We are committed to share relevant information with customers, as appropriate, so that they may strengthen their own capacity to reduce environmental and social risk and promote sustainable development.</p> <p>3.3 We will foster openness and dialogue relating to sustainability matters with relevant stakeholders, including shareholders, employees, customers, regulators, policy-makers and the public.</p> <p>3.4 We will work with the United Nations Environment Programme (UNEP) to further the principles and goals of this Statement, and seek UNEP's active support in providing relevant information relating to sustainable development.</p> <p>3.5 We will encourage other financial institutions to support this Statement. We are committed to share with them our experiences and knowledge in order to extend best practices.</p> <p>3.6 We recognize the importance of other initiatives by the financial services sector in forwarding the aims and objectives of sustainable finance and will seek to assist such initiatives in an appropriate manner.</p> <p>3.7 We will work with UNEP periodically to review the success in implementing this Statement and expect all Signatories to make real progress</p>
1998	IFC International Finance Corporation	Performance Standards on Environmental and Social Sustainability	<p>8 performance standard with details</p> <p>Assessment and Management of Environmental</p>
2002	IFC International Finance Corporation	Equator Principles	<p>Minimum screening criteria for project financing in order to ensure that the projects financed are developed in a manner that is socially responsible and reflect sound environmental management practices.</p> <p>EPFI Equator Principles Financial Institutions will only provide loans to projects that conform to principles:</p> <p>Review and Categorisation</p> <p>Social and Environmental Assessment</p> <p>Applicable Social and Environmental Standards</p> <p>Action Plan and Management System</p> <p>Consultation and Disclosure</p> <p>Grievance Mechanism</p> <p>Independent Review</p> <p>Covenants</p> <p>Independent Monitoring and Reporting</p> <p>EPFI Reporting</p>

Year	Organisation	Title	Description & Content
2006	UNEP FI United Nations Environment Program Finance Initiative United Nations Global Compact	PRI Principles for Responsible Investment Initiative	<p>Network of international investors. Environmental, social and corporate governance (ESG) issues can affect the performance of investment portfolios</p> <p>1 We will incorporate ESG issues into investment analysis and decision-making processes.</p> <p>Possible actions: Address ESG issues in investment policy statements</p> <p>Support development of ESG-related tools, metrics, and analyses</p> <p>Assess the capabilities of internal investment managers to incorporate ESG issues</p> <p>Assess the capabilities of external investment managers to incorporate ESG issues</p> <p>Ask investment service providers (such as financial analysts, consultants, brokers, research firms, or rating companies) to integrate ESG factors into evolving research and analysis</p> <p>Encourage academic and other research on this theme</p> <p>Advocate ESG training for investment professionals</p> <p>2 We will be active owners and incorporate ESG issues into our ownership policies and practices.</p> <p>Possible actions: Develop and disclose an active ownership policy (if outsourced)</p> <p>Exercise voting rights or monitor compliance with voting policy (if outsourced)</p> <p>Develop an engagement capability (either directly or through outsourcing)</p> <p>Participate in the development of policy, regulation, and standard setting (such as promoting and protecting shareholder rights)</p> <p>File shareholder resolutions consistent with long-term ESG considerations</p> <p>Engage with companies on ESG issues</p> <p>Participate in collaborative engagement initiatives</p> <p>Ask investment managers to undertake and report on ESG-related engagement</p> <p>3 We will seek appropriate disclosure on ESG issues by the entities in which we invest.</p> <p>Possible actions: Ask for standardised reporting on ESG issues (using tools such as the Global Reporting Initiative) Ask for ESG issues to be integrated within annual financial reports</p> <p>Ask for information from companies regarding adoption of/adherence to relevant norms, standards, codes of conduct or international initiatives (such as the UN Global Compact)</p> <p>Support shareholder initiatives and resolutions promoting ESG disclosure</p> <p>4 We will promote acceptance and implementation of the Principles within the investment industry.</p> <p>Possible actions: Include Principles-related requirements in requests for proposals (RFPs)</p> <p>Align investment mandates, monitoring procedures, performance indicators and incentive structures accordingly (for example, ensure investment management processes reflect long-term time horizons when appropriate). Communicate ESG expectations to investment service providers</p> <p>Revisit relationships with service providers that fail to meet ESG expectations</p> <p>Support the development of tools for benchmarking ESG integration</p> <p>Support regulatory or policy developments that enable implementation of the Principles Possible actions: Support/participate in networks and information platforms to share tools, pool resources, and make use of investor reporting as a source of learning. Collectively address relevant emerging issues</p> <p>Develop or support appropriate collaborative initiatives</p>

2008	GIIN Global Impact Investing Network	IRIS Impact Reporting & Investment Standards	<p>6 We will each report on our activities and progress towards implementing the Principles. Possible actions: Disclose how ESG issues are integrated within investment practices. Disclose active ownership activities (voting, engagement, and/or policy dialogue). Disclose what is required from service providers in relation to the Principles. Communicate with beneficiaries about ESG issues and the Principles Report on progress and/or achievements relating to the Principles using a 'Comply or Explain' approach. Seek to determine the impact of the Principles. Make use of reporting to raise awareness among a broader group of stakeholders</p> <p>Taxonomy - library of commonly reported impact-term Framework. Structure of Metrics. Organization description (mission, operational model and location): metrics that focus on the organization's mission, operational model, and location (Report Information, Organizational Information, Impact Objectives). Product Description (products and services and target markets): metrics that describe the organization's products and services and target markets (Product/Service Information, Target Beneficiaries). Financial Performance: metrics that are consistent with both the Generally Accepted Accounting Principles (GAAP) and the International Financial Reporting Standards (IFRS) (Income Statement, Balance Sheet, Cash Flow, Ratios, Concepts, and Calculations). Operational Impact (policies, employees and environmental performance): metrics that describe the organization's policies, employees, and environmental performance (Governance & Ownership, Social Policies, Environmental Policies, Environmental Performance, Employees, Wages, Training & Assessment). Product Impact (performance and reach): including descriptions and measures of the benefits of an organizations' products and services (Quality & Reach, Quality & Performance, Client Information, Supplier Information, Distributor Information). Social Impact Objectives Access to Financial Services: Clients. Non performing loans (portfolio at risk). Social responsibility to microfinance clients Agricultural productivity: Cultivated land area. Supplier individuals: smallholder. Purchase from supplier individuals: smallholder. Capacity building: Education services. Technical assistance. Enterprise/business development training. Food security: Crop type. Supplier individuals; smallholder. Clients: smallholder. Health improvement: Procedures/Surgeries. Medicinal/Drug Provisions. Immunizations. Employment generation: Permanent employees. Employees residing in low-income areas. Employment benefits.Environmental Impact Objectives Energy & Fuel Efficiency: Energy conservation. Energy purchased renewable. Energy used by product replaced. Natural resources conservation: Water conservation. Sustainable cultivated land area. Biodiversity assessment Pollution prevention & waste management: Waste produced. Waste disposed. Waste reductions. Sustainable energy: energy capacity. Energy produced. Greenhouse gas emissions.</p>
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Board 39: sustainable finance impact assessment compendium

Level	Type	Organisation	Title	Description
Corporate	Monitoring and Evaluation Compendium	LOUETTE Anne	Sustainability compendium: social and environmental responsibility management tools	Compendium of International, Corporate Governance and Sectorial Principles and Guidelines. Compendium of Management Tools, Standards and Certification
Social Return on Investment	Monitoring and Evaluation Compendium	University of Pennsylvania – School of Social Policy and Practice – The Center for High Impact Philanthropy	Measuring what matters: Social Return on Investment	Overview of SROI methodology
Global	Monitoring and Evaluation Compendium	Social Venture Technology Group	Catalog of approaches to impact measurement	Catalog of 25 approaches. 21 assessment systems.
Global	Monitoring and Evaluation Compendium	Foundation Center	TRASI – Tools and Resources for Assessing Social Impact	Compendium of 150 Tools, Methods, Best Practices. Assessment, Management, Certification. Outputs. Outcomes, impacts

Global	Assessment Methodology	Impact Finance	Khamax – Impact Monitoring System	Impact tracking solution. Aggregated portfolio scorecard
Philanthropy	Assessment Methodology	Terence LIM Committee Encouraging Corporate Philanthropy	Measuring the Value of Corporate Philanthropy	Focus on effectiveness, strategy, measurement and metrics Reference tool in Venture Philanthropy Formal impact evaluation. Outcomes measurement. Impact achievement-potential assessment
Global	Assessment Methodology	McKinsey&Company	Learning for Social Impact - 3 steps to designing a Learning Driven Assessment	Clarify initiative objectives. Select specific indicators. Consider priorities to select design options
Strategy	Assessment Methodology	The Boston Consulting Group	Social Impact	Impact Stories: Starting position. Value Levers. Insights & Advice. Impact
Strategy	Assessment Methodology	Bain&Company	Social Impact	Issue, community, sector, leader, firm, organization change
Strategy	Assessment Methodology	The Bridgespan Group	Building capacity to measure and manage performance	Performance management and measurement methodology
Global	Assessment Methodology	The Rockefeller Foundation	Social Impact Assessment	Overview of Social Impact Assessment methodology

Level	Type	Organisation	Title	Description
Investment	Assessment Methodology	New Profit Inc.	Balanced Scorecard	Operational performance measurement: financial, customer, business process and learning-and-growth
Global	Assessment Methodology	NPC New Philanthropy Capital	CHAT Charity Analysis Tool	Research-driven approach.
Investment	Assessment Methodology	AtKisson Inc.	Compass Investment Sustainability Assessment	Early-stage company design Nature, economy, society, well-being, synergy
Investment	Assessment Methodology	Dalberg Global Development Advisors	Dalberg Approach	Double bottom line goal progress: social and financial. Strategy and operations.
Global	Assessment Methodology	IFC International Finance Corporation	DOTS Development Outcome Tracking System	Project outset and implementation tracking
Global	Assessment Methodology	Global Footprint Network	Ecological Footprint	Resource accounting tool: biological capacity offer by human activity and population demand

Investment	Assessment Methodology	Environmental Capital Group	EPRS Environmental Performance Reporting System	Aggregate summary of actual net environmental benefits
Products	Certification	Fair Trade USA	Fair Trade Certification	Product production with environmental impact, working conditions, democratic and transparent governance standards
Investment	Assessment Methodology	HIP Investor Inc.	HIP Scorecard and Framework	Human, social an environmental impact drive financial results. Management systems for organization sustainability
Building	Certification	US Green Building Council	LEED Leadership in Energy and Environmental Design Certification	Benchmark for design, construction and operation of green building measurable impact performance
Poverty	Assessment Methodology	Microcredit Summit Campaign	Movement Above the US \$1 A Day Threshold	Poverty scorecard
Poverty	Assessment Methodology	Grameen Foundation	PPI Progress Out of Poverty Index	Credit risk, poverty likelihood scorecard
Investment	Assessment Methodology	New Progressive Coalition LLC	PROI Political Return on Investment	Quantitative and Qualitative output: Advocacy, electoral, idea generation, infrastructure, Leadership and media.

Level	Type	Organisation	Title	Description
Global	Assessment Methodology	REDF	RISE Real Indicators of Success in Employment OASIS Ongoing Assessment of Social Impacts	Social impact of non-profit enterprise
Investment	Assessment Methodology	Global Social Venture Competition	SIA Social Impact Assessment	Impact assessment projection analysis of 3 top priority outcomes
Global	Assessment Methodology	M-CRIL Micro-Credit Ratings International Limited	Social Rating	Social, ethical and financial goal. System assessment, market research.
Global	Assessment Methodology	Imp-Act Consortium	Social Performance Management	Achieve social mission. Managing social performance
Global	Assessment Methodology	Root Capital	Social Value Metrics	Performance monitoring system: Environmental, Social and Economic Progress Indicators

Investment	Assessment Methodology	Calvert Social Investment Foundation	SROI Calculator	Social output supplement to Financial and management due diligence reports
Investment	Assessment Methodology	Pacific Community Ventures	SROI Analysis	Employment and job quality aggregated annual executive summary
Global	Standards & Principles	AccountAbility	AA1000 AccountAbility Principles Standard	Framework for an organisation to identify, prioritise and respond to its sustainability challenges.
Social Return on Investment	Assessment Methodology	Global Social Benefit Incubator	SROI Lite	Management dashboard: financial, organizational and process metrics.
Social Return on Investment	Assessment Methodology	Social Venture Technology Group (SVT)	SROI Toolkit	Impact assessment and management system
Investment	Assessment Methodology	Trucost PLC	Trucost	Manage and improve environmental risk. Environmental impact performance improvement
Social Return on Investment	Assessment Methodology	The SROI Network	A guide to Social Return on Investment	Methodology for measuring and managing return on the social impact of an investment. Guidelines for measurement of non-financial impact
Social Return on Investment	Assessment Methodology	Social Evaluator	A guide to Social Return on Investment	Methodology for measuring and managing return on the social impact of an investment

Level	Type	Organisation	Title	Description
Social Return on Investment	Assessment Methodology	NEF	SROI Social Return on Investment	Analytic tool for measuring and accounting social, environmental and economic costs and benefits into decision making
Social Return on Investment	Monitoring and Evaluation Compendium	SROI London	SROI Primer	Compendium on Social Return on Investment: Organisations & Networks, Measurement Tools, Publications, Social Accounting and Audit SROI Calculation process. Conventional monetary valuation
Social Return on Investment	Monitoring and Evaluation Compendium	REDF	Social Return on Investment (SROI) Collection	Collection of SROI research, methodology and case study
Philanthropy	Assessment Methodology	Center for High Impact Philanthropy	Cost per Impact	Methodology of social impact measurement Concept paper.
Philanthropy	Assessment Methodology	Robin Hood	Benefit-Cost Ratio	Methodology of social impact measurement
Philanthropy	Assessment Methodology	The William and Flora Hewlett Foundation	Expected Return	Methodology of social impact measurement
Philanthropy	Assessment Methodology	The Edna Clark Mc Connell Foundation	Results Portfolio Assessments	Grantee Performance and Projections Measuring Grantee Performance Evaluating Grantee Impact Evaluation Advisory Committee Evidence based policy

Global	Network	Social Impact Analysts Association	Mentoring scheme	international professional body that supports and connects all those involved in social impact analysis
Clothes	Certification	Fair Wear Foundation	International verification initiative	Policy & Labour standards: payment of a living wage, freedom of association, reasonable hours of work, no discrimination in employment, safe and healthy working conditions, employment is freely chosen Supply chain responsibility, labour standards, multi-stakeholder verification, process-approach to implementation, involvement of stakeholders in production countries
Information & Communications Technology	Assessment Methodology	GeSI Global E-Sustainability Initiative	E-TASC Electronics - Tool for Accountable Supply Chains	web based system for Information and Communications Technology (ICT) corporate responsibility management throughout efficient supply chains
Products	Certification	Ethical Trading Initiative	ETI Base code	Ground-breaking alliance of organisations. Improve the working lives of poor and vulnerable people

Level	Type	Organisation	Title	Description
Global	Assessment Methodology	Root Cause	Building a Performance Measurement System: Using Data to Accelerate Social Impact	Sample Management Dashboard Organizational Health Indicators Program Performance Indicators Social and Economic Impact Indicators
Philanthropy	Assessment Methodology	NPC New Philanthropy Capital	Charity analysis methodology	Charity analysis framework Grading Grid Activities, results, leadership, people and resources, finances, and ambition
Global	Monitoring and Evaluation Compendium	Tides	Assessing Social Impacts of Investments	Synthesis of Impact Finance Assessment
	Guidelines	ESG Managers Portfolio	ESG Matrix	Guiding principles
Global	Assessment Methodology	GIIRS Global Impact Investing Rating System	Impact rating	Using B Impact Ratings System and IRIS taxonomy
Global	Assessment Methodology	Independent Sector	Charting Impact	Aim, strategy, capabilities, progress, accomplishment

Global	Assessment Methodology	The Mulago Foundation	Focused milestones	Impact Assessment Design Model : impact determination and cost-effectiveness calculation Program/product delivery, building the organization, and impact
Global	Handbook	Investing for Good	The Good Analyst	Methodology for Impact Analysis and Assessment. Mission Fulfilment. Beneficiary Perspective. Wider Impact.
Global	Assessment Methodology	Acumen Fund	Pulse - PDMS -Portfolio Data Management System	Quantitative financial, operational and social Metrics. Qualitative Capabilities Assessment score. Summary descriptive context notes. For investors only
Global	Assessment Methodology	Acumen Fund	BACO – Best Available Charitable Option	Social Return Measurement Methodology Calculation of a specific ratio
Corporate	Assessment Methodology	B Corporation	B Impact Assessment	Tools, best practices and survey for Social and Environmental performance improvement
Global	Assessment Methodology	B Lab	B Rating System	Online survey, database and report

Annexe 5: monetary innovation impact research compendium

Board 40: monetary innovation impact assessment (social capital benefits)

System	Author	Editor	Title	Result
Local Exchange Trading Systems	John PEARCE. Chris WADHAMS	Joseph Rowntree Foundation	Local initiatives in property repair and maintenance	0.012% of DoltYourself investment in LETS activity 10% of LETS trades in property repair and maintenance are adequatly covered by accident insurance Repair and maintenance demand exceed offer Small preventative maintenance items are more economic through LETS
Time Banking	KNAPP Martin. BAUER Annette. PERKINS Margaret. SNELL Tom.	Think local act personal	Building community capacity: making an economic case	Annual household income was below £ 10,000 a year for 58% of time bank participants, compared to only 16% for traditional volunteers Cost per time bank member per year = \$ 450. Cost savings and economic benefits per time bank member per year = more than £ 1'300 (conservative estimate) Social venture ventures have potential to improve quality of life for individuals and communities, but, in the absence of economic scrutiny, they run the risk of being a feel good story of no wider significance. Time bank is an novel and effective community development project approach to the prevention and meeting of needs, but we need to demonstrate that they are affordable.

Local money Trade voucher	HELMECZI István Nándor. KÓCZÁN Gergely	MNB Magyar Nemzeti Bank	On trade vouchers called "local money"	<p>Potential impact of "local monies" intended to promote consumption: Monthly reduction in value when taken out of circulation, thereby motivating their holder to use them for purchases. Promote the short-term growth of the local economy. Render accumulation of capital impossible.</p> <p>Number of "local money" initiatives up and running; however, with no positive impact to be documented.</p>
Local money Transition town	GRAUGAARD Jeppe Dyrendom	Local Environment: The International Journal of Justice and Sustainability	A tool for building community resilience? A case study of the Lewes Pound	<p>There have been no empirical studies to date assessing the socio-economic impacts of this model.</p> <p>Novel framework for estimating economic, social, and environmental outcomes, which uses a mixed-methods approach</p> <p>Findings suggest that complementary currencies can enhance social-ecological resilience through awareness-raising and changes in consumption.</p> <p>Although economic localisation – a key indicator – is lacking, there is evidence that the Lewes Pound has developed social interactions and changed consumption patterns of its users.</p>
Complementary currency	SEYFANG Gill	International Journal of Community Currency Research	The new economics of sustainable consumption – seeds of change	<p>Conceptual framework to examine the social, environmental and economic impacts of consumption.</p> <p>Insight into what a New Economics of sustainable consumption might look like in practice</p>

System	Author	Editor	Title	Result
Community currency systems	WALKER David	International Journal of Community Currency Research	The impact of community currency systems on gender relations in rural northeast Thailand: a hybrid social audit – gender analysis approach	<p>Social Audit Approach</p> <p>Gender analysis frameworks</p> <p>Community currency systems strengthening of women's social capital</p> <p>Community currency systems can positively influence gender relations</p> <p>The transformative impact on gender relations is seen to be limited to the arena of collective action or Social Capital.</p>
Local currency systems	SEYFANG Gill	International Journal of Community Currency Research	Examining local currency systems: a social audit approach	<p>Social audit is a process of defining, observing and reporting measures of an organisation's ethical behaviour and social impact against its objectives.</p> <p>Social policy is then evaluated according to its impact on these needs, rather than by applying efficiency criteria.</p> <p>Macro/micro social indicator' method which measures an organisation's (micro) performance in areas of (macro) social indicators (quality of life of members and the community);</p> <p>'constituency group attitudes' audit, which uses both factual and subjective information to evaluate the impacts of a pluralistic organisation on its stakeholders</p> <p>The potential for benefits to the wider locality were seen as primarily related to the establishment of non-profit making community services or small businesses with insufficient cash income.</p> <p>The impacts of LETS need to be better investigated to assess its potential - in practice, not merely in principle - to facilitate a more sustainable local economic development</p>

Time banks	MILLER Elizabeth Jill	Australian National University	Both borrowers and lenders: time banks and the aged in Japan	<p>Four pillars, visions, objectives of NALC: worthy life, self-help, mutual help, voluntariness</p> <p>Theoretical framework examines whether the social exchange that these groups nurture can enhance the social capital of their communities, creating a positive image for ageing</p> <p>The benefits that older time bank members derive include formation of new friendship networks to replace those lost by retirement and the chance to use old skills and learn new ones</p> <p>Time banks can generate a new form of social capital that fosters traditional Japanese reciprocity and has 'ikigai' or 'sense of meaning in life' as one of its main pillars</p>
Social money	SILVA JUNIOR Jeová Torres	Universidade Federal do Ceará Laboratório Interdisciplinar de Estudos em Gestão Social	Avaliação de impactos e de imagem : banco palmas – 10 anos	<p>Why do you use Palmas currency (Principal reason) ?</p> <p>43% Help local business. 22% for the purchase discount. 18% to receive a part of the salary in Palmas currency. 10% to receive loans in Palmas currency. 7% other.</p> <p>How Palmas currency helped you?</p> <p>22,25% increase its income. 20,20% find a job. 23,23% meet other people. 12,12% find other projects. 11,11% become best-known. 05,05% increase its study interest. 01,01% help local growth.</p>

System	Author	Editor	Title	Result
Complementary currency	WHEATLEY Gerald	The University of Calgary	Complementary currency and quality of life: social and economic capital effects on subjective well-being	<p>Voluntary simplicity suggests that if we know ourselves and look more deeply for pleasure we can become happier, reduce our environmental impact, and create a more just society</p> <p>Although the overall level of trade may be small, for the individuals involved, the impacts on their quality of life can be major: This suggests that the overall economic impact of complementary currency systems is small and that there are likely a large number of participants who are not very active, at least as measured by the amount of complementary currency earned. This comparison would suggest that the entire economic impact of all three complementary currency systems is less than the annual retail expenditure of a hundred individuals in Ithaca. Their economic impact relies on public promotion and participants' abilities to establish offers and buyers, and they require that participants are able to overcome inconveniences as compared to the mainstream economy. The social impact of these currencies relies on special event organizing, communications and promotions and one of the systems in this study has sufficient resources to adequately develop its potential. Despite these limitations, this research supports the conclusion that complementary currency systems are capable of providing material and social benefits to participants while simultaneously supporting social and environmental lifestyles. Currency improves subjective well-being: 27% strongly agree. 51% agree. 13% disagree. 7% strongly disagree Improved social capital indicators from currency involvement: 75% more friends. 87% support others. 81% more relationships. 41% more self-confidence. 82% help others. Improved economic capital indicators:</p> <p>59% more access. 80% more customers. 28% more disposal. 41% use skills Complementary currency spent and earned: <\$100: 42% spent / 43% earned. \$100 – 500\$: 41% spent / 17% earned. \$500 – \$2000: 13% spent / 15% earned. >\$2000: 3% spent / 5% earned Importance of mindfulness and spirituality: Mindfulness: 3% very little. 10% somewhat. 16% quite. 68% very. Spirituality: 6% very little. 21% somewhat. 31% quite. 41% very. Education levels 3% Some high school. 8% High school. 8% High school + training. 22% Some university-college. 44% university-college. 3% Some graduate school. 1.3% Graduate degree.</p> <p>Evaluation instrumental dimensions: 89% support hour merchants. 36% develop self-confidence. 43% develop new skills. 33% use skills. 72% new customers. 40% access to goods/services.</p> <p>Relationship evaluations: 84% improve quality of life. 87% help people. 55% deeper friendships. 80% deeper friendships. 80% establish trust. 67% relationships outside circle of friends. 67% increase circle of friends</p>

Complementary currency systems	ZAGATA Lukás	Czech University of Agriculture	Complementary currency systems as a source of endogenous development of localities	Establishing a currency on the local level, which would circulate as a complement of the national currency, brings certain social benefits to local society
Time banking	SEYFANG GILL SMITH K	New Economics Foundation	The Time of Our Lives: using time banking for neighbourhood renewal and community capacity building	Impacts so far reflect the early stage of development of time banks, it points to the major potential contributions that such currencies might make in the realm of active citizenship

System	Author	Editor	Title	Result
Time bank	COLLOM Ed	International Journal of Community Currency Research	Key indicators of time bank participation: using transaction data for evaluation	<p>Scholars are encouraged to construct these key indicators for comparative purposes. While individual case studies are most common, comparisons of multiple systems over time will enable us to learn more about the dynamics of time banking and its potential to empower the economically marginalized and build social capital</p> <p>There is very little published research on participation in time banks or LETS (Local Exchange and Trading Systems) that analyzes official recorded transaction data. Most studies in this area involve membership or coordinator surveys in which the frequency and form of participation is estimated by respondents.</p> <p>Time Bank Participation Indicators: System: Number of active members per quarter. Quarter of first transaction. Total number of hours per quarter. Services categories (Arts and crafts production, Beauty and spa, Cleaning, lights tasks and errands, Computers and technology, Construction, installation, maintenance and repair, Entertainment and social contact, Events and program support, Food preparation and service, Health and wellness, Office and administrative support, Sales and rentals of items, Transportation and moving, Tutoring, consultation and personal services.) Individual: Total hours of participation. Average hours per quarter. Account balance. Number of trading partners. Number of reciprocated contacts. Ego-network density. Number of services exchanged.</p>

Community Currency	JELLEN Matthew	Humboldt State University	Evaluating the viability of community currency as a tool for sustainable development: a case study of the Humboldt Exchange Community Currency Project	<p>It is our assessment that there are a number of other community structures that have and will likely continue to have a far more substantial impact of the promotion and development of a sustainable bioregional development strategy. The body of literature on CCs needs to be expanded to include a more in-depth investigation into the use of CCs as a tool which can address global development issues like human poverty and environmental degradation. In this way the system would encourage the development of new small businesses and at the same time ensure that a significant percentage of accumulated wealth would stay only in the local area, which would help to develop a sustainable local economy.</p>
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System	Author	Editor	Title	Result
Time Banking	MOLNAR Stefan	International Journal of Community Currency Research	Time is of the essence: the challenges and achievements of a Swedish Time Banking Initiative	<p>Social capital consists of norms of reciprocity, trust, and social networks and enables cooperation among individuals</p> <p>Social capital is a prerequisite for positive attributes such as health and happiness, economic growth, low crime and corruption, effective schools and communities, and other social needs</p> <p>But what exactly is empowerment? The term is most often used to describe concepts such as "power," "feelings of strength," "autonomy," "self control," "confidence" and "self worth"</p> <p>The degree of empowerment of an individual or group, therefore, is dependent on the availability of assets and on the existence of a social structure allowing the fulfillment of desired actions and outcomes.</p> <p>The positive correlations between empowerment and economic growth and between empowerment and efficient governmental, commercial and civil/societal organizations.</p> <p>TNB has empowered its participants and has fostered an increase in social capital</p> <p>As a result of their engagement with the organization, participants have gained new resources, are considered as assets by the organization, and have, at least in some cases, shaped the activities of TNB</p> <p>This social capital is mostly based on weak ties, whereas strong ties seem to be less common. Both bridging and bonding social capital exist within TNB, but the latter is more prevalent. TNB is permeated by norms of reciprocity and trust</p> <p>The mutual giving and receiving that characterize time banking initiatives allow the participants to learn new skills, which increases their self-confidence and leads to the formation of new social networks, often between people of different backgrounds.</p>

Complementary currency	WHEATLEY Gerald. YOUNIE Corrine. ALAJLAN Hind. Mc FARLANE Erin.	International Journal of Community Currency Research	Calgary dollars: economic and social capital benefits	<p>Despite their existence around the globe and the wealth of anecdotal evidence of their benefits, the measurable successes of individual complementary currency systems have been largely undocumented.</p> <p>Ongoing research seeks to contribute to the existing complementary currency body of knowledge and thereby support a broader understanding of their legitimacy and efficacy.</p> <p>They achieve greater economic stability by earning complementary currency, federal currency, and from barter transactions, all the while developing valuable professional and business networks. Participants also build durable social relationships and broaden their community participation.</p> <p>These findings encourage the creation and growth of complementary currencies in solidarity with the global demand for a resilient monetary system that supports sustainable, complete communities.</p> <p>48% decrease in accessing crises services thanks to timely access to goods, services, support and referrals aid in crisis prevention</p> <p>45% of respondents (stated that they agreed or strongly agreed with the statement "I) have established relationships of trust with people in the community</p> <p>50% agreed or strongly agreed to be more active in community issues and initiatives.</p>
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System	Author	Editor	Title	Result
Community currency	SCHROEDER Rolf F.H.. MIYAZAKI Yoshihisa. FARE Marie.	International Journal of Community Currency Research	Community currency research: an analysis of the literature	<p>In order to be sustainable, community currencies need to have a well anchored governance structure. This implies that the long term financial basis of community currencies has to be taken into consideration.</p> <p>It can however be observed that community currencies have not so far been developed in academic laboratories, but by individuals focusing on their practical aspects; systems which later mushroomed into grassroots initiatives.</p> <p>It is more difficult to appraise the impact of research carried out into existing systems. Feasibility studies have definitely been essential for community currencies whose organisation has depended on professional work rendered by paid administrators</p> <p>The various empirical studies which proved the social benefits of small systems such as LETS, Tauschringe, SEL etc. and their minor economic significance, may have been of some relevance for fiscal and other authorities in at least tolerating them—however, there is no clear evidence to prove this supposition.</p> <p>The database identifies 201 contributions with information about specific exchange systems or groups of systems – these are systematic empirical studies, sometimes country surveys of certain types of systems, and sometimes reports from activists</p> <p>The quantity and the quality of work necessary to organise even a small community currency has not been portrayed in a systematic and detailed manner.</p> <p>It is possible that a large number of the empirical investigations carried out to date have been based on an implicit understanding of community currencies as self-regulatory bodies, and has therefore failed to comprehend important aspects of explaining the limited scope of these systems.</p>

Voluntary contribution game	CARPENTER Jeffrey P., DANIERE Amrita G., TAKAHASHI Lois M.,	Journal of Economic Behavior and Organization	Cooperation, trust and social capital in Southeast Asian urban slums	-
Inclusive network	ANNEN Kurt	Standford University University of Fribourg	Social capital, inclusive networks and economic performance	Self-enforcement of cooperation within a network is influenced by its inclusiveness, its communication capacity, and the complexity of the exchange setting The paper shows that inclusive social capital can combine both low enforcement costs and high gains from trade even in a complex exchange setting
Local Exchange Trading Scheme	SEYFANG Gill	University of East Anglia	Working for the Fenland Dollar: an evaluation of Local Exchange Trading Schemes as an Informal Employment Strategy to tackle social exclusion	Local Exchange Trading Scheme (LETS) local grassroots community currency which operates as a cashless trading network for members. LETS was found to be successful at delivering new informal employment opportunities to socially excluded groups, boosting their income, and providing a forum for social interaction and community-building.
Local Exchange Trading Scheme	WILLIAMS Colin C., ALDRIDGE Theresa. LEE Roger. LEYSHON Andrew. THRIFT Nigel. TOOKE Jane.	Policy studies	Bridges into work? An evaluation of Local Exchange and Trading Schemes (LETS)	LETS are moderately successful at maintaining and improving employability, they are most effective at providing a seedbed for self-employed business ventures and at providing reciprocal exchange networks so that people can engage in community self help

System	Author	Editor	Title	Result
Service credit banking program	Program Results Report	Robert Wood Johnson Foundation	Service credit banking in managed care	<p>Service credit banking programs seek to help elderly people remain healthy, independent, and in their homes by enlisting volunteer caregivers to provide supportive services, such as transportation, medication monitoring, shopping and light housekeeping. As an incentive, each caregiver receives credits that can be redeemed for similar volunteer services</p> <p>The program did not determine whether earning service credits is a meaningful incentive for volunteers or whether service credit banking programs can produce savings that offset their administrative costs</p>
Service credit banking program	FEDER Judith. HOWARD Julia. SCANLON William.	Journal of aging and social policy	Helping oneself by helping others: evaluation of a service credit banking demonstration	<p>Evidence on the significance of the "credit" in attracting volunteers was mixed, but the programs have attracted new volunteers, and have not substituted for other volunteer activities. Program development has entailed considerable staff investment in volunteer support; programs are better understood as community membership organizations than as mechanical exchanges.</p>
Community currency systems	NAKAZATO Hiromi. HIRAMATO Takeshi	Studies in Regional Science	A comparative study of Swedish and Japanese Community Currency Systems : consideration of the design of community currency systems based on an evaluation of social effects	<p>Based on a comparative analysis, we conclude that (a) community currency transactions are not conducted in the theoretically assumed manner; and (b) each region has its unique social and environmental context, so the manner in which transactions are conducted and social effects provided vary among regions, indicating that (c) community currency transactional schemes should be modified according to the uniqueness of a region.</p>

Community currency	KOKABU Masayuki. KATAI Osamu. SHIOSE Takayuki. KAWAKAMI Hiroshi.	Kyoto University	Design concept of community currency based on fuzzy network analysis	In this paper, we have introduced community currency for constructing lively communities and taken account of the reciprocity that can be expected by the use of community currencies. The reciprocity contributes to emerge and accumulate social capital.
Time Bank	New Economics Foundation	New Economics Foundation	Evaluation report: London Time Bank: building London's social capital	More research is needed into the effectiveness of different kinds of co-production projects – but, crucially, this must be reflected in the way public bodies are audited, so that investment in time banks can be clearly set against the resulting savings in public money. The insight of time banks and co-production is that bringing these two different sides of the equation together can provide a way that public services can find more resources, make a sustainable impact on crime, education and health – and on a range of other apparently intractable issues. In short, time banks use co-production techniques that go a long way beyond simple participation, and which can be used to make public services more effective. This is a new kind of mutualism, and one that has a tangible meaning in people's lives – they own their local services because of the roles they play in them.
Local Currencies	WILLIAMS Colin C.	Community Development Journal	Local Currencies and Community Development: an evaluation of Green Dollar Exchanges in New Zealand	Achieving their objectives of community-building, creating more localised economies and helping the unemployed to participate in productive activity, the finding is that local currency systems represent a potentially powerful new weapon in the armoury of community development agencies.

System	Author	Editor	Title	Result
Local Exchange Trading Systems	WILLIAMS Colin C.	Work, Employment & Society	Informal sector responses to unemployment: an evaluation of the potential of Local Exchange Trading Systems (LETS)	LETS might well provide a valuable alternative means by which the unemployed can overcome their problems of social exclusion, poverty and the inability to work as well as a way of getting work done which they would be unable to otherwise afford. It has been proposed that attempts are made to increase their size so as to make a wider range of goods and services available, to focus their development on more deprived localities, to introduce skills acquisition on a wider scale within LETS and to encourage the unemployed to join and actively participate. It is only by looking forward to how we want work and welfare structure in the next century rather than back to the way in which employment was organised in the middle of this century, that new forms of coping mechanism for the increasing numbers of people who find themselves without employment can be designed and implemented.
Time Banks	SEYFANG Gill	Voluntary Action	Spending time, building communities: evaluating time banks and mutual volunteering as a tool for tackling social exclusion	Building social capital: 91% Participants in their time bank were building friendships and trust, and the same proportion agreed that members were expanding their social networks as a result of their time exchanges. Encouraging community involvement : 91% time bank co-ordinators who responded agreed that their projects encouraged community involvement Engaging socially excluded Groups: 73 per cent of the co-ordinators responding to the survey agreed that their time banks were benefiting the socially excluded The findings of the first national survey of time banks in the UK are presented. A time bank is a community currency that aims to build social capital and promote community self-help through mutual volunteering (both giving and receiving help in exchange for time credits), targeting socially excluded groups.

Time Banking	OZANNE Lucie K.	International Journal of Community Currency Research	<p>Learning to exchange time: benefits and obstacles to time banking</p>	<p>Using focus groups, this study identifies benefits of Time Banking in terms of physical, human, social, and cultural capital</p> <p>Physical: an affirming institution which enables participants to recognise their skills and capabilities and gain new skills.</p> <p>Social capital: Time Banking serves to build connections and increase trust among members, their social capital, and reinforce weak ties in the community</p>
Complementary currencies	BRENES Erik	International Journal of Community Currency Research	<p>Complementary currencies for sustainable local economies in Central America</p>	<p>Strong solution that can empowers communities and/or local organizations to address local problems and needs with local resources.</p> <p>Improve local economy as well as energetic independence due to the integration all three dimensions of the Agenda 21 Global policy</p> <p>Strong planning tool for middle and long term sustainable development</p> <p>Maximize local usage of resources making it sometimes an affordable solution for local economic development</p> <p>Local economy become more resilience and adaptable to national or global economy crisis.</p> <p>Most result in the short run are qualitative rather than quantitative, when not properly explained or understood, this may discourage local people and/or funding organizations</p> <p>Lack of institutional support to projects involving complementary currencies</p> <p>Approach not suitable to pure import-export economies with little economic diversifications</p> <p>Good level financial/economic literacy form the interlocutor</p> <p>discourage to read long and technical documents.</p>

System	Author	Editor	Title	Result
Complementary currency	CARNEIRO DA SILVA Janaína	University of Westminster	Rubem Berta's complementary currency: An evaluation of the initial stage of the experience of a Southern Brazilian local community on implementing its own complementary currency	Complementary currencies can be a valuable tool to promote development in poor communities An efficient selection of local partners, a comprehensive logical framework and strong mechanisms for monitoring and evaluation are much needed to ensure that the intervention is well implemented and able to address any problems that may arise during the project. I strongly suggest improving the project's monitoring and evaluation process being an essential tool to objectively redress strategies and actions when issues arise. The creation of specific indicators to measure the economic gain of members, their satisfaction within the project and the member's rotation or participation level are necessary indicators. Other indicators would concern the community empowerment and social interactions and would also be strongly recommended to measure human capital increase.
Complementary Currencies, Exchange Systems, Social Money	SCHROEDER Rolf F.H.	ICC International Conference on Community and Complementary Currencies	Conference report - Complementary Currencies, Exchange Systems, Social Money	The themes of the plenary sessions attempted to be a bridge between the past and future: by discussing the development of an infrastructure for scientific research on complementary currencies and the opportunities and risks of a political assessment of these social innovations. the question of economic sustainability of complementary currencies, their socio-cultural and political environment, show that scientists not only interpret the movement's development but are capable of giving it a major impetus.

Complementary currencies. Local currencies	BLANC Jérôme	ICCC International Conference on Community and Complementary Currencies	Classifying "CCs": Community, complementary and local currencies' types and generations	<p>Ideal-types of currency schemes: Complementary Currency: Territorial - geopolitical space – protecting a territory – local currency Community - social space – strengthening a community –community currency Economic – economic space – orientating the economy – complementary currency Conventional money: Territorial – sovereign space – sovereignty – national money Economic – clients of for profit organization – profit – for-profit money</p>
Complementary currencies	MARTIGNONI Jens	International Journal of Community Currency Research	A new approach to a typology of complementary currencies	<p>Evaluation grid: Purpose: individuals, groups serving themselves, currency community, groups serving others, general public Trust: higher valued money, property, material assets, goods and services, person Creation: central agency, few large groups, many small groups/ business, all members, everyone Circulation: high savings costs, low savings costs, zero, low savings premium, high savings premium</p>

Complementary currency	RUDDICK William O.	International Journal of Community Currency Research	Eco-Pesa: an evaluation of a complementary currency programme in Kenya's informal settlements	<p>This increase in local trade resulted in a 22% average increase in net monthly incomes of participating businesses</p> <p>By creating a complementary currency as a voucher for the national currency, funds targeted at local development could be encouraged to remain in circulation within the community</p> <p>Cost effective means of mobilizing community efforts for waste collection and tree-planting operations. Collection of 20 tonnes of waste, and the creation of three youth-led community tree nurseries</p> <p>Programme showed clear signs of increasing small business incomes and provided increased employment for local youth</p> <p>Eco-Pesa created direct incentives for residents to take an active role in conserving and improving their surroundings and boosted the local economy in a cost effective and scalable manner</p> <p>The programme was cost effective (only \$4,698 USD was spent over seven months), and provided an improved mechanism for tracking development funding and increasing overall accountability</p> <p>Monthly income in Shillings and Eco-Pesa of registered businesses type (Health clinic, General shop, Water, Business Groups, Cooked food, Vegetables, Salon, Charcoal, Drinks, Education, Meat & Poultry, Waste removal, Fish, Housewares, Transportation, Vegetables & Fruit, Hawkers, Dairy, Poultry)</p> <p>Eco-Pesa issued, exchanged and circulated: Issued (registration, sales, events + youth service), Exchange/In Circulation (current circulation, exchanged for Shillings)</p> <p>Goods and services trade with Eco-Pesa (local vs non-local): Charcoal, Flour, Water, Soap, Fire Wood, Sugar, Green Vegetable, Cooked Food, Detergent, Fish, Milk, Meat, Soda, Waste removal, Beans, Photography, Utensils, Salt, Rice, Cigarettes, Cooking oil, Green grams, Tomatoes, Ground nuts, Potatoes, Seedlings, Spices, Airtime, Biscuits, Books, Bread, Cakes, Eggs, Handkerchief, Matches, Pesticides, Popcorn, Sweets, Tea.</p>
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Annexe 6: different phase, steps, cycle approach compendium

Board 41: different phase, steps, cycle approach

Level	Type	Organisation	Title	Description
Waste recycling	Assessment Methodology	Michelle KENT	Development of a Social Impact Assessment methodology and its application to waste for life in Buenos Aires	Summary of steps in social impact assessment methodology: Scoping, Problem identification. Establish policy objectives. Public involvement plan. Profiling. Understand transmission channels. Assess institutions. Identification of alternatives. Projection of estimated impacts. Estimate indirect and cumulative impacts. Changes to alternatives. Impact assessment. Contemplate enhancement and compensation. Assess risks. Evaluation. Mitigation. Implementation of project. Monitoring. Ex-post audit. Report findings. Management.

Level	Type	Organisation	Title	Description
Climate, Community, Biodiversity	Assessment Methodology	CCBA The Climate, Community & Biodiversity Alliance	SBIA Social and Biodiversity Impact Assessment manual	<p>Social and biodiversity impact assessment stages and open standards approach:</p> <ol style="list-style-type: none"> 1. Conceptualize: situation analysis, conceptual model (original conditions study and stakeholder identification, without-project social and biodiversity projections) 2. Plan actions & monitoring: develop strategies (result chains, project design and theory of change), result chain review modification (negative impact, risks and mitigation measures), develop objectives and monitoring plan (identification of indicators, developing the monitoring plan) 3. Implement actions & monitoring: data collection 4. Analyse, use & adapt: analysis 5. Capture & share learning: reporting <p>Biodiversity-related requirements:</p> <ol style="list-style-type: none"> 1. General description. 2. Baseline projections. 3. Project design and goals. 4. Management capacity and best practices. 5. Net positive biodiversity impacts. 6. Offsite biodiversity impacts. 7. Biodiversity impact monitoring. 8. Exceptional biodiversity benefits. 9. Develop monitoring plan and carry out monitoring. Analyze monitoring program data an compare to original starting data.
Global	Assessment Methodology	FASID Foundation for Advanced Studies on International Development.	L-E-A-D Log-frame Evaluation Application Design	<p>Steps of LEAD:</p> <ol style="list-style-type: none"> 1. Initiation phase: evaluation scope planning 2. Preparation phase: hierarchy tree development, logic tree development, projects mapping, log-frame formulation 3. Evaluation phase: evaluation study design, evaluation study implementation, conclusions recommendations and lessons learned 4. Improvement phase: feedback, improvement planning, improvement implementation

Global	Assessment Methodology	ESCAP Economic and Social Commission for Asia and the Pacific	Monitoring & Evaluation System Overview and Evaluation Guidelines	<p>Stages in the evaluation and review process:</p> <ol style="list-style-type: none"> 1. Planning: prepare evaluation plan and budget, prepare terms of reference, establish evaluation team, schedule and organize evaluation. 2. Implementing: conduct evaluation, prepare draft report, review draft report. 3. Using evaluation finding: prepare management response and actions, share evaluation findings, follow up and promote learning situation.
Global	Assessment Methodology	African Development Bank	Environmental & Social Assessment Procedures Basics	<p>How to carry out a Strategic Environmental and Social Assessment:</p> <ol style="list-style-type: none"> 1. Determine the approach and baseline information requirements 2. Identify alternatives 3. Undertake an impact assessment 4. Analyze the alternatives 5. Elaborate a mitigation plan or enhancement measures 6. Identify environmental and social effects that might remain after mitigation 7. Develop an institutional strengthening plan to improve environmental and social management 8. Document the results of the analysis 9. Monitor results

Level	Type	Organisation	Title	Description
Gender	Assessment Methodology	UN Women	Guide to Gender Equality & Human Rights Responsive Evaluation, 2010.	<p>Results Based Management:</p> <ol style="list-style-type: none"> 1. Context situation analysis 2. Developing expected results: the results chain 3. Developing rights-based indicators 4. Planning for monitoring and evaluation 5. Reporting on results <p>Evaluation planning:</p> <ol style="list-style-type: none"> 1. Preparation: check evaluability, management structures and roles, stakeholder analysis and reference group, terms of reference, select evaluation 2. Conduct: inception report, collect and analyze data, final reporting 3. Utilization and follow up: dissemination, using results, management response
Global	Handbook	UNDP United Nations Development Programme	Handbook on Planning, Monitoring and Evaluating for Development Results	<p>Organization of the chapter:</p> <ol style="list-style-type: none"> 1. Getting started: Initiating the planning process 2. Stakeholder engagement: stakeholder analysis, orientation and training 3. The planning exercise: problem analysis, creating the draft results map 4. Finalizing the results framework: finalizing the results table 5. Preparing to operationalize: communicating and reinforcing the plan
Global	Assessment Methodology	Root Cause	Building a Performance Measurement System: Using Data to Accelerate Social Impact	<p>Five-step process to build a performance measurement system:</p> <ol style="list-style-type: none"> 1. Planning to measure 2. Choosing what to measure 3. Determining how to measure 4. Preparing to use your data 5. Putting your performance measurement system into action

Philanthropy	Assessment Methodology	Terence LIM Committee Encouraging Corporate Philanthropy	Measuring the Value of Corporate Philanthropy	<p>Methodology for Social Value Assessment Tool:</p> <ol style="list-style-type: none"> 1. Diligence in collecting data. 2. Possession of a clear set of outcomes and a logic model that together describe how the organization intends to achieve the desired outcomes. 3. Relation of efforts (outputs) to outcomes, to determine whether the organization's intervention is indeed producing the observed outcomes. 4. Flexibility in adjusting the service approach given the latest data and changing circumstances. 5. Substantiation of the value of the program through data collection and analysis. 6. Capacity to deliver program services as they were designed.
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Annexe 7: different process, tools and technique approach compendium

Table 2: Tool groups and their roles in the different phases of an integrated assessment for sustainable development

	Phase 1 Problem analysis	Phase 2 Finding solutions	Phase 3 Analysis	Phase 4 Follow-up
Participatory tools	Problem framing	Support scenario building	Providing the context for and improve robustness of MCA, CBA and CEA	Quality assurance
Scenario tools	Providing the future perspectives to problem framing	Visioning (including uncertainty analysis)	Reference for the application of the other tools	-
Multi-criteria analysis tools (MCA)	-	Definition of criteria	Compare different alternatives	-
Cost-benefit analysis (CBA) and cost effectiveness analysis (CEA) tools	-	Definition of criteria	Compare different alternative	-
Model tools & Indicator tools	Supporting problem framing	Supporting scenario construction	Full characterization of scenarios to enable comparison	Ex-post assessment

Source: Institute for Environmental Studies. Sustainability A-Test: Advanced Techniques for Evaluation of Sustainability Assessment Tools, Final case study report, 10th of July 2006

Board 42: different process, tools and technique approach

Level	Type	Organisation	Title	Description
Global	Efficiency Assessment	BMZ Federal Ministry for Economic Cooperation and Development	Tools and Methods for Evaluating the Efficiency of Development Interventions	Cost-Benefit Analysis (CBA) Cost-Effectiveness Analysis (CEA) Cost-Utility Analysis (CUA) Multi-Attribute Decision-Making (MADM): intuitive scoring models Multi-Attribute Decision-Making (MADM): scientific decision analysis Effects Method
Global	Handbook	United Nations Development Programme	Handbook on Planning, Monitoring and Evaluating for Development Results	Summary of common data collection methods used in UNDP evaluations Monitoring and Evaluation systems Extant reports and documents Questionnaires Interviews On-site observation Group interviews Key informants Expert panels Case studies
Global	Applied Mathematics Methodology	The World Bank Network of Networks for Impact Evaluation	Impact Evaluations and Development: NONIE Guidance on Impact Evaluation	Brief illustration of the logic of comparative advantages: Randomized experiment Survey data and case studies Semi structured interviews and focus group conversations

Level	Type	Organisation	Title	Description
Global	Assessment Methodology	FASID Foundation for Advanced Studies on International Development.	L-E-A-D Log-frame Evaluation Application Design	Literature survey Direct measurement Sample survey Case studies Observation Key informant interviews Group interviews
Global	Assessment Tool Evaluation	International Institute for Sustainable Development	Evaluation of Integrated Management Initiatives	Examples of definitions of the key approaches within the integrated assessment: Integrated watershed management (IWM) Integrated resource management (IRM) Ecosystem-based management (EBM) Integrated landscape management (ILM)
Social	Research Methodology	Delbert Charles MILLER, Neil J. SALKIND	Handbook of Research Design and Social Measurement	Evaluation forms: orientation, typical issues and key approaches: Proactive evaluation (synthesis) Clarificative evaluation (clarification) Interactive evaluation (improvement) Monitoring evaluation (Justification fine tuning) Impact evaluation (justification accountability)
Waste recycling	Assessment Methodology	Michelle KENT	Development of a Social Impact Assessment methodology and its application to waste for life in Buenos Aires	Comparison of data characteristics in technocratic and participatory approaches:

	<p>National</p>	<p>Assessment Tool Evaluation State of the art</p>	<p>Institute for Environmental Studies</p>	<p>Sustainability A-Test</p> <p>Assessed tools:</p> <p>1. Assessment frameworks: EU Impact Assessment system, Environmental impact assessment, Strategic environmental assessment, Integrated Sustainability Assessment / Transition Management 2. Participatory tools :Electronic focus groups. Tools to inform debates, dialogues & deliberations, Consensus conference, Repertory grid technique, Interactive backcasting, Focus group, Delphi Survey, In-depth interviews, Citizen's Jury</p> <p>3. Scenario analysis: Trends, Cross Impact, Relevance trees and morphologic analysis, Modeling, simulating, training, Interactive brainstorming, Scenario workshops, Integrated foresight management model, Ranking method. 4. Multi-criteria analysis : Multi-attribute value theory, Weighted Summation, Analytic hierarchy process, Preference ranking organisation method for enrichment evaluations, Novel approach to imprecise assessment and decision environments, REGIME, Dominance method, Software for MCA.</p> <p>5. Cost benefit analysis and cost-effectiveness analysis: Cost-benefit analysis, Travel costs, Hedonic pricing, Cost of illness, Contingent valuation, Averting expenditures, Contingent behavior, Market methods, Conjoint choice questions, Cost-effectiveness analysis</p> <p>6. Modelling Tools: Family of socio-economic models, General economy models, Demographic models, Public health models, Partial economic models, Family of bio-physical models, Climate models, Biogeochemistry models, Hydrology models, Family of integrated models, Land use models, Integrated assessment models, Qualitative system analysis models, Scenario building and planning tools. 7. Accounting tools, physical analysis tools and indicator sets: Measure of economic welfare, Sustainable national income, Genuine savings, National accounting matrix including environmental accounts, Index of sustainable economic welfare, Ecological footprint, Global land use accounting, Economy-wide MFA, Lifecycle assessment, Indicator sets for assessments, Vulnerability Assessment: Livelihood sensitivity approach.</p>
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Level	Type	Organisation	Title	Description
National	InterLinkage Evaluation Indicators	INDI-LINK	Indicator-based evaluation of interlinkages between different sustainable development objectives	Multi Criteria Analysis (MCA) Global Vector-Auto Regression model (GVAR) Global InterIndustry Forecasting System (GINFORS) Dynamic applied general Equilibrium model with pollution and Abatement forth the Netherlands (DEAN) Advanced Sustainability Analysis (ASA)
Global	Assessment Methodology	The Rockefeller Foundation	Social Impact Assessment	Social Responsibility: SVN Best Practices. UN Global Compact. CERES Principles. Process Methods: New Profit Balanced Scorecard. REDF OASIS. Acumen Scorecard. AtKisson Model. AA 1000. GRI. Balanced Scorecard. ISO 14001. Impact Methods : Benefit Cost Analysis. Theory of Change. REDF SROI. NSVC SROI. World Bank Poverty and Social Impact Analysis
Global	Assessment Methodology	NPC New Philanthropy Capital	CHAT Charity Analysis Tool	Charity analysis framework: Activities: Focus on the greatest needs, Match to the charity's goals, Ability to adapt and innovate, Potential to grow or replicate, Potential synergies. Results: Results-driven culture, Evidence of positive results, Quality of results evidence Sector impact: Theory of change, Contribution to sector knowledge, Impact on services across the sector. Leadership: Governance, Management team, Vision and strategy, Staff. Use of resources Finances: Financial security, Unit costs, Opportunities for donors

Annexe 8: sustainable development dimension, topic priorities and strategic indicators compendium

Board 43: sustainable development dimension, topic priorities and strategic indicators

Level	Organisation	Title	Dimensions & Topic Priorities & Strategic Indicators Description
National	Institute for Environmental Studies	Sustainability A-Test	<p>State of the art. 40 tools reviewed. Evaluation of assessment tools.</p> <p>Economic: Economic Growth. Effects on public authority budgets. Human capital formation and employment. Economic cohesion. Innovation. International performance. Market structure. Microeconomic effects on enterprises, non-profit organisations. Effects on households. Global partnership.</p> <p>Environmental: Air, water, soil or climate. Renewable of non-renewable resources. Biodiversity, flora, fauna. Land use. Natural and cultural heritage. Waste production/generation or recycling. Human safety or health. The likelihood or scale of environmental risks. Mobility (transport modes), or the use of energy.</p> <p>Social/Societal: Social cohesion. Employment quality. Public health. Health systems and security. Social protection and social services. Consumer interest. Education. Social capital. Liveable communities. Equality of opportunity and entitlement. Culture. International co-operation. Governance and participation. Fundamental human rights. Security, crime or terrorism. Ageing of society and pensions.</p> <p>Cross-cutting aspects: Inter-generational effects. (De-)coupling. Adaptability. (Ir-)reversibility. Distributional effects. Global dimension. Spatial scale.</p> <p>Strategic sustainable development priority and indicator: Limit climate change and increase the use of clean energy (CO₂ emissions). Address threats to public health (NO_x emissions). Manage natural resources more responsibly (Energy and resource productivity). Improve the transport system and land-use management (rate of the area used for transport from total area, transport system freight and peons, rate of ecological agriculture). Combating poverty and social exclusion (restructuring of rural landscape). Dealing with the economic and social implications of ageing society. Harnessing globalisation trade for sustainable development (share of biofuel imports from developing countries, increase of economic and energy decentralisation). Fighting poverty and promoting social development. Sustainable management of natural and environmental resources (primary energy consumption, rate of natural protected areas). Improving the coherence of EU policies (effectiveness of energy crop premium). Better governance at all levels. Financing sustainable development (private and public investments for research and development, tax revenues expenditures)</p>

Level	Organisation	Title	Dimensions & Topic Priorities & Strategic Indicators Description
National	INDI-LINK	Indicator-based evaluation of interlinkages between different sustainable development objectives	<p>State of the art. Evaluation of interlinkage. Elaboration of policy making.</p> <p>Climate change and clean energy. Sustainable transport. Sustainable consumption & production. Conservation and management of natural resources. Public health. Social inclusion, demographic change and migration. Global poverty and sustainable development challenges/socio-economic development. Global partnership. Good governance.</p> <p>Theme and indicators:</p> <p>Transport growth (vehicle-km and GDP at constant price). Determinants of health (population exposure to air pollution by particulate matter, index of apparent consumption of chemicals by toxicity class, deaths due to infectious food-borne diseases). Biodiversity (sufficiency of member states' proposals for protected sites under the habitats directive, biodiversity index). Land use (land-use change by category, exceeding critical loads of acidifying substances and nitrogen in sensitive natural areas). Eco-efficiency (generation of waste by all economic activities and by households, environmentally weighted indicator of material consumption, total material consumption and growth domestic product at constant prices, eco-innovations). Resource management (contribution of the clean development mechanism to greenhouse gas emission reductions in developing countries). Transport prices (external costs of transport activities). Marine ecosystems (trends of spawning biomass of selected fish stocks). Openness and participation (number of EC internet public consultations). State of health (life years lost through premature death). Financing and economic instruments (proportion of environmentally harmful subsidies). Health inequalities (socioeconomic disparities in health, unmet needs for healthcare by cause). Consumption patterns (green public procurement). Policy coherence and effectiveness (administrative cost imposed by legislation). Monetary poverty and living conditions (child wellbeing)</p>

<p>Social, Community</p>	<p>Interorganizational Committee on Guidelines and Principles for Social Impact Assessment</p>	<p>Guidelines and Principles for Social Impact Assessment</p>	<p>Legal mandates. Administrative procedure. Basic model. Step process.</p> <p>Population Characteristics : Population change. Ethnic and racial distribution. Relocated populations. Influx or outflows of temporary workers. Seasonal residents.</p> <p>Community and institutional structures : Voluntary associations. Interest group activity. Size and structure of local government. Historical experience with change. Employment/income characteristics. Employment equity of minority groups. Local/regional/national linkages. Industrial/commercial diversity. Presence of planning and zoning activity.</p> <p>Political and Social Resources : Distribution of power and authority. Identifications of stakeholders. Interested and affected publics. Leadership capability and characteristics. Conflict newcomers & old-timers. Interorganizational cooperation.</p> <p>Individual and family changes : Perceptions of risk, health, and safety. Displacement/relocation concerns. Trust in political and social institutions. Residential stability. Density of acquaintanceship. Attitudes toward policy/project. Family and friendship networks. Concerns about social well-being.</p> <p>Community Resources : Change in community infrastructure. Native American tribes. Land use patterns. Effects on cultural, historical, and archaeological resources.</p>
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Level	Organisation	Title	Dimensions & Topic Priorities & Strategic Indicators Description
Mining	Golder Associates – Tenke Fungurume Mining	Environmental and Social Impact Assessment for Tenke Fungurume	<p>Impact analysis methodology. Potential Sustainability Actions to Protect and Enhance Positive Effects.</p> <p>Physical Resources: Topography and Geomorphology, Geochemistry, Soils, Visual Aesthetics, Major Hazards, Air Quality, Noise and Vibration, Groundwater, Surface Water Flow, Water Quality, Traffic, Waste Management.</p> <p>Biological Resources: Flora, Fauna, Fish and Aquatic Habitat, Natural Habitats and Biodiversity, Protected Areas.</p> <p>Social and Cultural Resources: Socio-economics, Land Use, Workforce and Population Change, Training, Employment and Labor, Economic Impacts/Income Effects, Community Safety, Public Health and Well-Being, Livelihoods, Cultural and Social Change, Cultural Resources, Community Infrastructure.</p>
Global	Centre for Good Governance	Social Impact Assessment Methodology	<p>Methodology: baseline conditions, public involvement, project description & identification of alternatives, screening, scoping, predicting responses to impacts, management and monitoring</p> <p>Land. Structures. Livelihood. Crop. Tree. Community infrastructure. Public utility lines.</p>
Global	United Nations Development Programme	Handbook on Planning, Monitoring and Evaluating for Development Results	<p>Impact indicators:</p> <p>Increased public participation in national and local elections, particularly by women, indigenous populations and other traditionally marginalized groups: overall proportion of eligible voters who vote in the national (or local) elections, percentage of eligible women who vote in the elections, percentage of eligible indigenous people who vote in elections.</p> <p>Improved educational performance of students in region of the country: percentage of students completing primary schooling, pass rates in standardized student tests.</p> <p>Reduction in poverty and hunger: poverty rate, gini coefficient, percentage of population living in extreme poverty, level of infant malnutrition.</p> <p>People are healthier and live longer: longevity, infant mortality, HIV/AIDS prevalence rate.</p>

Global	International Institute for Sustainable Development	Evaluation of Integrated Management Initiatives	<p>Integrated Place-Based Management evaluation</p> <p>Qualitative regular monitoring (every 2-5 years):</p> <ol style="list-style-type: none"> 1. Stakeholders (customer involvement, customer feedback, environmental audits, basin livelihoods). 2. Learning and growth (human resource development, technical development). 3. Internal management objectives (planning maturity, resource allocation, data sharing) <p>Quantitative indicators (multiple times per year-yearly):</p> <ol style="list-style-type: none"> 4. Environmental status with focus on water (recreational water quality, raw water supply, flood vulnerability, chemical spills, environmental water quality, biodiversity index or indicator species occurrence) <p>Community partnerships: regional democracy and direction, relationships with other, community actions and initiatives, natural heritage program</p> <p>Environmental management: community health, resource management, environmental information, ecosystem health.</p> <p>Regional development: integrated management, connected communities, sustainable industries.</p> <p>Safe and resilient communities: community safety, resilient development, catchment management.</p>
Global	African Development Bank	Environmental & Social Assessment Procedures Basics	<p>Strategic Environmental and Social Assessment Procedures: Project identification, Project preparation, Project appraisal, Loan negotiation, Project implementation and supervision, Project completion</p> <p>Poverty. Environment. Population. Health. Gender. Participation.</p>

Level	Organisation	Title	Dimensions & Topic Priorities & Strategic Indicators Description
Commodity	Sustainable Commodity Initiative	Committee on Sustainability Assessment	<p>Diagnostic, didactic, business decision-making, monitoring and evaluation tool</p> <p>Economic: Farmer livelihood (Net Income), Risk & Resilience (Production and Labor Efficiencies), Competitiveness (Proportion revenue in different crops), Management (Credit source and availability), Organizational (Access to market info).</p> <p>Social: Health & Safety (Access to medical care), Working conditions (Safe water), Education & Training (Types of training and investment), Basic Rights & Equity (Children's schooling levels), Inclusive Value Chains (Women in elected positions).</p> <p>Environmental: Resource Use (Use of fertilizers, biocides, energy), Waste (Contamination & recycling), Soil Conservation (Soil conservation practices), Biodiversity (Tree diversity and quantity), Climate Change (Carbon sequestered).</p>

<p>Regional & District</p>	<p>CONFEDERATION SUISSE</p>	<p>Cercle Indicateurs - Canton et Ville</p>	<p>35 indicators for Regional and District Scope</p> <p>Environmental dimension: Biodiversity (Breeding bird index). Nature and landscape (Area of valuable natural space). Energy quality (Renewable energy including recovered heat). Energy consumption (Total energy consumption) Climate (CO2 emissions). Consumption of materials (Waste separate collection rate). Water scheme (Water flow through the Station pumping energy transfer). Water quality (Content of nitrates in groundwater). Land use (Building area). Soil quality (Soil pollution by heavy metals). Air quality (Index Pollution Long-term)</p> <p>Economy dimension: Income (District revenue). Cost of living (Level of rents). Labour (Market Unemployment Rate) Investment (Expansion, processing and maintenance works). Truth Cost (No indicator). Efficient use of resources (No indicator). Innovations (Jobs in innovative industries). Economic structure (Jobs in industries with high labor productivity). Hard-skill (qualifications level). Public Finance (Health of district finance). Tax (Index of fiscal potential exploitation). Production (No indicator)</p> <p>Society dimension: Noise / habitat quality (Noise from traffic). Mobility (Access to public transport system). Health (Years of potential life lost). Safety (Road traffic accidents with victims). Safety (Offences involving serious violence). Distribution of income and wealth (Low-income taxpayers). Participation (Rate of participation in elections and referenda. Culture and recreation (Expenditures for culture and recreation). Training (Youth in training). Welfare (Recipients of social assistance). Integration (Naturalization of foreigners). Opportunity equity (Women in executive positions). Interregional solidarity (Assistance actions)</p>
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Level	Organisation	Title	Dimensions & Topic Priorities & Strategic Indicators Description
National	CONFEDERATION SUISSE	MONET Selected Monitoring Sustainable Development	<p>16 key indicators to measure progress:</p> <p>Meeting needs: Health, Income, Physical safety, Unemployment.</p> <p>Fairness: Official Development Assistance, Equality.</p> <p>Preservation of resources: Teenage reading skills, Public debt, Investment, Innovation and technology, Biodiversity, Built-up areas.</p> <p>Decoupling: Freight transport, Passenger transport, Energy consumption, Consumption of raw materials. Global dimension of sustainable development (75 indicators)</p> <p>Impact of resource flows and financial flows: Material requirement abroad for imports, Greenhouse gas emissions, Energy dependency, Remittances by migrants, Direct investments in developing countries, Ecological footprint.</p> <p>Living up to its responsibility: Official Development Assistance, ODA to the least developed countries, Attitude towards development assistance, Multilateral treaties, Duty-free imports from developing countries, Fair trade, Pocket Statistics</p> <p>Living conditions : Household income, Population living below poverty line, Life satisfaction, Violent crime, Remittances by migrants, Housing costs, Suicide rate.</p> <p>Health : Life expectancy in good health, Health-relevant behaviour: physical exercise, Overweight, Mental wellbeing, Health expenditure. Social cohesion : Inequality of income distribution, Voluntary work, Women in the National Council, Reading skills of 15-year-olds by socio-economic background, Early school leavers by citizenship.</p> <p>International cooperation : Official development assistance, Official development assistance to poor countries, Multilateral treaties, Duty-free imports from developing countries, Attitude towards development assistance, Direct investments in developing countries.</p> <p>Education and culture : Reading skills of 15-year-olds, Early school leavers, Participation in further education, Internet use by income group, Regular use of a second national language, Participation in cultural activities, Own cultural activities.</p> <p>Research and technology : Patent applications, Human resources in science and technology, Expenditure on research and development.</p> <p>Work : Unemployment rate, Youth unemployment, Working Poor, Wage gap between men and women, Professional position by gender.</p> <p>Economic system : Investment to GDP ratio, Labour productivity, Level of public debt, Fiscal revenue rate, Environment-related taxes.</p> <p>Production and consumption : Material intensity, Material requirement abroad for imports, Fair trade, Municipal waste, Total material requirement, Consumption of organic products, Waste recycling.</p> <p>Mobility and transport : Final energy consumption of transport, Modal split in passenger transport, Intensity of freight transport, Take-offs and landings, CO2 intensity of individual motorised transport, Modal split in freight transport, Persons affected by noise.</p> <p>Energy and climate : Final energy consumption, Renewable energies, Greenhouse gas emissions, CO2 intensity, Energy intensity, Energy dependency, CO2 emissions.</p> <p>Natural resources : Per-capita settlement area, Natural resources, Landscape fragmentation, Particulate matter concentration, Phosphorus content in lakes, Breeding bird populations, Ecological quality of forests, Ecological footprint, Settlement area, Arable land, Nitrate content in groundwater, Ozone concentration</p>

<p>Climate, Community, Biodiversity</p> <p>CCBA</p> <p>The Climate, Community & Biodiversity Alliance</p>	<p>CCB Standards</p> <ul style="list-style-type: none"> - Climate, Community and Biodiversity Project Design Standards 	<p>Standards to promote the development of forest protection, restoration and agroforestry</p> <p>General section</p> <p>Original conditions in the project area. Baseline projections. Project design and goals. Management capacity and best practices. Legal status and property rights.</p> <p>Climate section</p> <p>Net positive climate impacts. Offsite climate impacts (leakage). Climate impact monitoring.</p> <p>Community section</p> <p>Net positive community impacts. Offsite stakeholder impacts. Community impact monitoring.</p> <p>Biodiversity section.</p> <p>Net positive biodiversity impacts. Offsite biodiversity impacts. Biodiversity impact monitoring</p> <p>Gold level section</p> <p>Climate change adaptation benefits. Exceptional community benefits. Exceptional biodiversity benefits. CARE household livelihood security indicators: Nutrition (nutritional status). Food (access to food). Income (financial status). Education (access to education). Health (access to health, sanitation, water, disease levels). Habitat (housing materials, access to water). Social network (social network participation). Personal safety (Physical safety). Environment (environmental protection). Life skills (life skill capacities status)</p> <p>Millennium Ecosystem Assessment components and indicators of human well-being: Security (a safe environment; resilience to ecological shocks or stresses such as droughts, floods, and pests, secure rights and access to ecosystem services). Basic materials for a good life (access to resources for a viable livelihood (including food and building materials) or the income to purchase them). Health (adequate food and nutrition, avoidance of disease, clean and safe drinking water, clean air, energy for comfortable temperature control). Good social relations (realization of aesthetic and recreational values, ability to express cultural and spiritual values, opportunity to observe and learn from nature, development of social capital, avoidance of tension and conflict over a declining resource base). Freedom and choice (the ability to influence decisions regarding ecosystem services and well-being)</p> <p>Landscape Outcomes Assessment Methodology livelihood indicators and scoring approach:</p> <p>Natural capital (village forest reserves, riparian strips protected, presence of trees in gaps corridors, native species planted in corridors, enhancing encouraging natural regeneration in corridors). Social capital (village NR committees, village participation in landscape level, joint forest management, awareness of zones boundaries, management of village finances). Human capital (education primary school distance, health e.g. no. clinics, skill levels and opportunities, health status of village, involved in innovative projects)</p> <p>Potential and environmental impact areas:</p> <p>Social development (labor rights, gender equity, access to education, access to health and sanitation, cultural identity). Environmental integrity (water, integrity for biodiversity, soil fertility, climate change, natural resource management). Economic resilience (secure livelihoods, social capital, resilience to economic risk, inclusive value chains)</p>
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Level	Organisation	Title	Dimensions & Topic Priorities & Strategic Indicators Description
Social Return on Investment	The SROI Network	A guide to Social Return on Investment	<p>Stakeholder – outcome (indicator and data collection):</p> <p>Unemployed person - gains and maintains employment (whether in work after 12 months)</p> <p>Participant with physical disability – reduced social isolation (frequency of social contact with friends)</p> <p>Young person – improved behaviour (number and type of school exclusions)</p> <p>Local government – increase in recycling (amount of waste going to landfill)</p> <p>Local community – reduced fear of crime (number of local people who report feeling safer)</p> <p>Person with mental health problem – improvement in mental health (amount of time spent socialising, extent to which participants engage in new activities, level of use of mental health services)</p> <p>Local community – improved access to local services (take-up of those services, and by whom)</p> <p>Person with physical health problem – improved physical health (number of visits to doctor, extent of improvements in health self-reported, how often the exercise)</p> <p>The environment – less waste (amount of waste going to landfill, level of carbon emissions)</p> <p>Offenders – reduced reoffending (frequency of offences for which participant is charged, nature of offence)</p> <p>Care leaver – reduced homelessness (access housing upon leaving care, satisfaction with appropriateness of housing)</p> <p>Women offenders – improved family relationship (child continues living in the family home)</p> <p>Local community – improved perception of the local area (residents report improvements in local area)</p>
Strategy	The Boston Consulting Group	Social Impact	<p>Impact Stories: Starting position. Value Levers. Insights & Advice. Impact</p> <p>Poverty & Hunger. Global Health. Education. Community & Economic Development. Arts & Culture. Philanthropy. Corporate Social Responsibility</p>
Strategy	Bain & Company	Social Impact	<p>Issue, community, sector, leader, firm, organization change</p> <p>Education. International and economic development. Community development. Environment.</p>

Investment	ESG Managers Portfolios	Environmental, social and governance matrix	<p>Environment: Resource management and pollution prevention, reduced emissions and climate impact, environmental reporting disclosure</p> <p>Social: Workplace (diversity, health and safety, labor-management relations, human rights), product integrity (safety, product quality, emerging technology issues), community impact (community relations, responsible lending, corporate philanthropy)</p> <p>Corporate governance: Executive compensation, board accountability, shareholder rights, reporting and disclosure</p>
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*A Global Currency for a Global Economy:
A Real SDR Currency Board*

Author: Warren Coats¹

Introduction

Since the collapse of the gold standard and the Bretton Woods system in the early 1970s, the resulting international monetary system (IMS) has supported a dramatic growth in world trade and finance remarkably well. Yet the system of market determined or managed exchange rates, which suited well a world of limited international monetary cooperation, and the dominance of the U.S. dollar in international reserves and for international transactions has well known shortcoming and vulnerabilities that have revived the search for a better one.²

The weaknesses of the existing system include the asymmetry between the market pressure for deficit countries (other than reserve currency countries) to adjust and the lack of such pressure for surplus countries, and the Triffin dilemma like risk of foreign exchange reserve growth producing an increasingly large foreign holding of reserve currency countries' debt relative to the size of their economies. Less often discussed is the fundamental impediment to the free flow of goods and capital globally on the basis of national currencies, whose exchange rates vary dramatically. Moreover, the primary supplier of international reserves, the United States, has historically given little attention to the international value of its currency when formulating its monetary and fiscal policies.

In this paper I argue that a radically reformed system can be achieved by building on the existing foundation for the alternative reserve asset to the U.S. dollar created by the IMF in 1969. The Second Amendment to its Articles of Agreement obligated Fund members to make the Special Drawing Right (SDR) "the principal reserve asset in the international monetary system" (IMF Article XXII). The United States and many other industrial

¹ Warren Coats retired from the International Monetary Fund in 2003, where he was chief of the Operations Division for SDRs, in the Finance Department from 1982 - 88. While the ideas presented in this note have benefited from discussions with many people over the years, especially Leland Yeager, he is particularly grateful for the recent comments by Robert Pringle, Chairman of Central Banking Publications, and Leanne Ussher, Queens College, City University of New York. Earlier versions of this paper were presented in Paris on December 11, 2010; Nanjing, March 31, 2011; Astana, May 4, 2011; Buenos Aires, July 1, 2011; and Siena, July 10, 2011. His most recent book, "One Currency for Bosnia: Creating the Central Bank of Bosnia and Herzegovina," was published in November 2007. He has a Ph.D. in economics from the University of Chicago and lives in Bethesda, Md.

² International Monetary Fund, 2010, "Reserve Accumulation and International Monetary Stability", April 13.

country members quickly lost interest in the SDR until a large allocation was approved in response to the financial crisis of 2008.

While many simple and practical steps can and should be taken to promote the use of the existing SDR, I argue that interest in the SDR could be transformed by replacing its valuation basket of currencies with a basket of goods and replacing the allocation of SDRs with issuing them under currency board rules. Rather than buying and selling SDRs for the items in its valuation basket (ala the gold or other traditional commodity standards), the IMF would sell and redeem these “real SDR” for the basket indirectly (against government or other AAA financial assets of equivalent value). Such an SDR, with a relatively constant real value, is likely to be adopted as the anchor currency for fixing the exchange rates of many if not most national currencies and to augment or replace the U.S dollar and Euro in countries’ foreign exchange reserves.

The Existing System and Options

According to the IMF: “Sustained government deficits may eventually bring public debt sustainability into question, undermining the store of value characteristic of reserve assets (by which is meant a stable value of a representative international basket of goods and services).”³ However, “More diversified reserve holdings would require the availability of other asset classes that reproduce the desirable characteristics of the dollar in terms of liquidity, safety and yield.”⁴

In an exploratory paper on a possible expanded role for the IMF’s Special Drawing Rights (SDR), the IMF stated that: “Clearly, problems in the international monetary system (IMS) — persistent global imbalances, large and volatile capital flows, exchange rate gyrations disconnected from fundamentals, insufficient supply of safe global assets — are complex and call for an array of remedies — global policy collaboration and stronger surveillance, enhanced systemic financial safety net, financial deepening in emerging markets and more generally development of new reserve assets. The issue is whether there is a helpful role to play for the SDR amid these solutions.”⁵

³ Ibid. Page 10

⁴ Ibid. Page 8

⁵ International Monetary Fund, 2011, “Enhancing International Monetary Stability--Is there a Role for the SDR?”, January 7.

The IMF⁶ and others have explored measures that could reduce the demand for international reserves while increasing a more diversified supply. These deserve serious consideration. However, it is also clear that some surplus countries continue to accumulate reserves as a byproduct of a policy of export promotion rather than to satisfy their demand for reserves. Thus more effective surveillance may also be needed. On the supply side, the most promising approach to moderating the demand for and growth of U.S. dollar reserves is to greatly increase the role and use of SDRs, the IMF's international reserve asset.

The attractiveness and importance of the existing SDR can be greatly enhanced without changes in the Fund's Articles of Agreement by continuing the relatively large allocations started (and also seem to have stopped) in 2009, encouraging the adoption of the SDR unit for pricing and invoicing and by the development and use of SDR denominated financial instruments ("private SDRs"). Clearing and settlement facilities for such SDR instruments and for the SDR currency counterpart would also provide a major boost to the expanded use of SDRs as an international reserve asset in all respects.

Revival of the old substitution account idea lacks "only" political will and would allow large-scale substitution of U.S. dollar reserves with SDRs without exerting exchange rate pressure on the dollar. A Substitution Account would introduce an exchange rate risk between its SDR liabilities and its USD assets. "The proposal foundered, however, when the United States refused to take sole responsibility for maintaining the dollar value of the SDR-denominated claims on the proposed account. No other arrangement was acceptable to the other governments involved in the negotiations."⁷ In a recent study, Peter Kenen finds that had it been adopted, the Account would not have resulted in any maintenance of value cost to the U.S.⁸ The IMF and the United States would be wise to have a Substitution Account ready in the wings in case there is a sudden drop in the demand for dollars in reserve holdings.

A more significant reform would allow international commercial banks to hold official SDRs (i.e. open accounts in the SDR Department) thus allowing foreign exchange market intervention in SDRs directly. The ability to settle market transactions with "SDRs" directly without first

⁶ Ibid.

⁷ Kenen, 2010.

⁸ Ibid.

exchanging them for USD or EURO would further enhance the attractiveness of official (allocated) SDRs as reserve assets. Such an SDR would take the form of current account balances with the issuer (the IMF or a third party clearing bank such as the BIS). Account holders might be limited to IMF members as now or could be opened to all international banks. A two or three-tiered structure could be used to tie all banks into the system for the clearing and settlement of SDR payments.⁹

An all SDR IMF as advocated by J. J. Polak would further expand the use of SDRs.¹⁰ Pegging domestic currencies to the SDR rather than the dollar or euro would often provide increased real effective exchange rate stability and would further increase the demand for and use of SDRs of all types (official and private). Over time regular allocations, supported by expanded uses of the SDR unit and of private SDRs of all types, could supplement or replace the USD and EURO in the expansion of reserve assets that are expected in coming years. Sufficiently broad acceptance could even reduce the absolute amounts of USD and EURO in reserve holdings thus substituting claims on the IMF's entire membership for claims on the U.S. or the E.U. Wide spread pegging of national currencies to the SDR would promote global trade by removing exchange rate uncertainty thus emulating the openness of the gold standard era.

None of these ideas is new but they have received little traction in the past three decades for lack of political will on the part of the major players. Times and circumstances are different today and perhaps the missing political will can be found.

Two further enhancements could significantly improve the SDR's attractiveness and potentially precipitate a virtuous cycle of its wider adoption as an exchange rate peg, invoicing unit, means of payment, and reserve asset to such an extent that dollar holdings in reserves might actually fall. First, the SDR's valuation basket, though marginally attractive relative to the behavior of a single currency, could be significantly improved giving it a constant real value (to be defined below). Second, allocations could be augmented or replaced by issuing (rather than allocating) SDRs with open market sales (and repurchases) of SDRs. Both would require amendments to the IMF's Articles of Agreement.

The recent IMF papers on the SDR have raised the more radical pos-

⁹ Op cit, IMF, 2010.

¹⁰ Polak, Jacques J. 1979

sibility of issuing an international currency unlinked to the SDR basket—"bancor." Its value would be determined by its supply and demand, possibly supported by some official uses (as is the demand for existing SDRs). An international central bank issuing a fiat currency would enjoy the political protection of needing the agreement of a majority of its international members to expand its supply, but is still very unlikely to enjoy the broad support necessary for its adoption. However, the value of such an SDR/bancor could be linked to that of the Real SDR valuation basket. An international "currency board," in which the IMF (or a new International Central Bank) would passively buy or sell SDRs (ala the classical gold standard) at the value of a real SDR valuation basket, would raise far fewer risks and potentially attract more political support. The rest of this paper explores the features of such a currency.

The Real SDR Unit of Account

The existing SDR unit of account has the current market value of the fixed quantities of the four currencies (USD, EURO, Pound Sterling, and Yen) in its valuation basket. The valuation basket (the amounts and choices of currencies included) has been adjusted every five years in a well tested process that preserves its continuity of value.

While pricing in or pegging an exchange rate to SDRs or holding assets denominated in SDRs provide the stabilizing advantages of a portfolio of major currencies and the transactional efficiencies of a universally fixed and recognized portfolio, these advantages are modest relative to dealing in any one of the four basket currencies. If the SDR's value were determined by a basket of goods and commodities, it would more closely achieve the goal of being a unit with constant real value. Its value would be anchored to the real economy. This would set it apart from any existing currency and could attract considerable interest for invoicing and denominating assets, and as a currency peg.

The gold standard was an example of such a system. One gold dollar was a dollar exchangeable for the fixed amount of gold and thus had a value equal to the market price for that amount of gold. But being anchored to only one commodity, whose relative price varied, the real value of currencies fixed to gold was far from constant.

In the 1970s and 80s a handful of countries and international organizations fixed their exchange rates to the SDR or adopted it as their unit of account. It finessed the dilemma posed by fixed exchange rate

regimes that traded with both the dollar and the Euro blocks, for example, when those exchange rates moved significantly against each other. Over the past ten years, for example, the USD/EURO rate has varied from 0.86 to 1.57, almost 100%, which departed widely from fundamentals and poses serious challenges for international trade. Pegging exchange rates to a Real SDR would stabilize terms of trade more than pegging to the current SDR and thus is likely to be attractive to a larger number of countries. Should a large number of countries peg to the Real SDR, something like the global trading system enjoyed under the classical gold standard could be restored.

The manner in which the current SDR is valued facilitates understanding how the SDR could be given a fixed real value. The SDR/USD rate is set every day on the basis of the market value of the amounts of the four currencies in its valuation basket. Holders of SDRs transact at that rate when a rate is needed. When SDR amounts are being settled with SDRs, exchange rates are not needed. But if SDRs or SDR amounts need to be converted into their USD equivalent or the equivalent in any other currency for which there is a market value in terms of USD, its value is given as explained above. The IMF publishes these rates every day. The value of one SDR is defined by the contents of the valuation basket, which is fixed, but the market value of the basket in terms of dollars or other currencies can vary.

The value of a Real SDR would be determined in the same way except that the valuation basket would consist of a globally representative basket of goods. If one SDR's value is defined as the market value of one tenth ounce of gold (of a specific fineness), one ounce of butter, an one tenth bail of cotton (of a specific type and quality), the representative market prices of each of these goods would be applied to the indicated amounts and added up to establish that day's value of an SDR. If the market prices of these goods were stated in USD, the result would be the USD value of one SDR (from which its value in terms of any other currency traded in currency markets could be established). In an all SDR world, the market prices of these goods would be in SDRs. If the SDR value of the basket were something more or less than one, there would be an arbitrage incentive to adjust the market supply of SDRs, which is discussed below. An SDR's value would thus be constant in terms of the goods in the basket.

There is a long history of proposals for commodity baskets or tabular standards, which is well summarized by Richard Copper.¹¹ Benjamin Graham¹² proposes a basket of 23 commodities, while Keynes¹³ proposed 62 internationally traded commodities, which were reduced to 31 by Hart, Kaldor, and Tinbergen.¹⁴ Irving Fischer¹⁵ and later Robert Hall¹⁶ proposed indexing the valuation basket to a consumer price index. Each proposed different schemes for using their valuation baskets in order to anchor the value of money to the real economy.

Identifying the goods whose collective market value should be constant in SDR terms, i.e. establishing the Real SDR valuation basket, would be a challenging but manageable task. The items in the basket should have well defined market values, be widely and preferably globally traded, and relatively representative of a “typical” family’s expenditures.

A Real SDR Allocated by the IMF

A key point about the existing SDR’s valuation basket and the Real SDR valuation basket proposed here is that the IMF does not hold, and it is not necessary to hold, actual quantities of the items in the basket. If the valuation basket defines contract and accounting values, it is sufficient that the value of an SDR can be express in US dollars or any other currency at relevant times. Administratively defining the value of a Real SDR unit of account in this way does not insure, however, that SDR assets issued by the IMF or privately carry the same value in the market. That requires additional mechanisms.

The “official” SDRs allocated by the IMF (the asset, not the unit of account) are unusual assets in several respects. They have an indefinite and potentially infinite maturity, but can be used on demand, pay the equivalent of a three-month interest rate, and can only be held by central banks (with a few exceptions). The IMF relies on rules and compulsory requirements to keep the value of these SDRs fixed to that of their valuation basket. The official SDR may only be used at its official value. The “designation mechanism”, which obligates IMF members with strong balance of payments to accept SDRs at its official value in exchange for currency,

¹¹ Cooper, 1988.

¹² Graham, 1937.

¹³ Keynes, 1930.

¹⁴ Hart, Kaldor, and Tinbergen, 1964.

¹⁵ Fischer, 1920.

¹⁶ Hall, 1982.

insures that it is always possible for a holder of official SDRs to exchange them for a freely usable currency at the official SDR exchange rate.

Given that the SDR is valued daily in foreign exchange markets, its official value is rarely if ever far from the collective values of the currencies in its valuation basket for which it can always be exchanged. It is also important to note that SDR allocations have always been far below the growth in the demand for international reserve assets. As a result the compulsory designation mechanism has never been stressed by over use and in fact has not been invoked for over a quarter of a century.¹⁷

While the monetary liabilities of central banks (currency and current account balances of commercial banks) do not pay interest, term deposits with central banks do. In addition, the Federal Reserve in the U.S. now pays interest on bank balances in their current accounts with Federal Reserve Banks in excess of required levels as an instrument of monetary policy. The IMF's official SDR pays interest at the weighted average of three-month government debt with the same weights as the currencies in its valuation basket. Thus the yield on SDRs is attractive relative to other reserve assets that may be used on demand as can the SDR but unattractive relative to assets of longer maturities than three months when the expected holding period is longer. The interest rate on Real SDRs allocated by the IMF could not be set in this way, which raises the important questions of how its rate would be set and how its interest payments would be financed. A basket of inflation adjusted government securities, such as TIPS in the U.S., from the countries whose currencies are currently in the SDR valuation basket (or a broader collection of countries) might be considered.

The official "allocated" SDR is self-financing. Holdings of SDRs (Real or otherwise) earn interest at the official SDR interest rate. Holdings of SDRs are exactly matched globally by cumulative allocations, which carry a charge at the same rate payable by those to whom they were allocated. Those who hold SDRs equal to what they were allocated earn interest at the same rate and in the same amount as they pay charges on their allocations. Net use (holdings below allocations) or net acquisitions incur net charges or earn net interest respectively. If Real SDRs are allocated in the same way, whatever interest rate is given to them could be self-financed in

¹⁷ While Chief of the Operations Division for SDR's in the Finance Department of the IMF in the mid 1980s I introduced the market making arrangements for voluntary purchases and sales of SDRs (so called Transactions by Agreement) that have made Designated Transactions unnecessary ever since.

the same way. Privately issued Real SDRs would pay interest determined in the same way as for other debt instruments in the market.

SDRs allocated by the IMF are fundamentally different than, say, SDR bonds issued by the United States or any other country or company. The IMF's SDRs augment the supply of international reserves with a claim on the IMF (on its entire membership) while those that might be issued by the U.S. would add to the considerable claims on the U.S. government already held abroad. While development and wide spread use of private SDRs would facilitate the use of and thus the demand for SDRs issued by the IMF as part of international reserve asset holdings, only IMF (or internationally) issued SDRs would substitute for claims on countries or their firms or real estate in the reserve assets of central banks.

Bancor – An SDR Currency

If the IMF (or some other international body) were to issue rather than allocate Real SDRs, they could be used freely like the monetary liability of any "other" central bank. The rules required to ensure the usability of allocated SDRs would not be needed.

Earlier proposals for issuing a currency whose value was fixed to a commodity basket (whether just gold, or a broader collection of commodities) required that they be sold (and redeemable) for the items in their valuation basket. This has obvious costs of physically transporting and storing (warehousing) the commodities in the basket that earlier schemes attempted to deal with. The larger and thus more representative the basket, the larger the challenges.

Greenfield and Yeager explained why transactions in and storage of the items in the valuation basket are not necessary to tie the market value of a currency to that of its valuation basket.¹⁸ If a currency is indirectly redeemable for its valuation basket, it will be redeemed for something of comparable market value to the basket rather than for all of the items in the basket. Any discrepancy between the market value of the currency and its value defined by its valuation basket would create an arbitrage incentive to either buy or redeem the currency at the basket price paying or receiving the equivalent value of the designated redemption asset (rather than everything in the basket). This market mechanism for keeping the quantity of currency equal to the market's demand for it at its official

¹⁸ Greenfield and Yeager, 1983 and those cited there.

value is well known and has functioned well with currency boards.

Some central banks, known loosely as “currency boards,” now operate under rules that guarantee that the market value of the currency they create and issue is equal to its fixed posted value (an exchange rate for some other currency — usually the USD or the EURO). The required supply of such currencies is regulated by the market via the central bank’s commitment to buy and sell its currency for the foreign anchor currency at the fixed posted price. The SDR currency’s market value could be kept equal to the value of its valuation basket in the same way. The IMF would stand ready to passively buy or sell its SDR currency (balances in member central banks’ SDR currency accounts with the IMF) for a select list of eligible assets (e.g., U.S. Japanese, UK and EU government debt securities) at the market value of one real SDR.¹⁹ Like the reserve or base money issued by central banks, SDR currency would not pay interest.

Real SDR currency issued by the IMF according to currency board rules would thus have the same value as the Real SDR valuation basket within a very small margin. Whenever the SDR market prices of the goods in the basket resulted in a market value of the basket below one SDR, it would be profitable for banks to arbitrage the difference by selling an eligible asset to the IMF for SDRs at the official price and buying it back in the market at the cheaper market price. The supply of SDRs (and market prices) would increase. If the market value of the basket rose above one SDR banks would do the reverse, thus reducing the supply of SDRs.²⁰

The assets held by the IMF against the SDR currency it has issued would be the eligible government debt it had purchased when selling its SDRs. These assets would earn interest from which the IMF’s operations could be financed and any valuation gains or losses relative to the valuation basket defined value of its SDR liabilities could be covered. In an all SDR world, one in which all countries have pegged their currencies to the SDR or used it directly, the only valuation risks to the eligible SDR denominated debt held by the IMF would arise from changes in interest rates (and default).

¹⁹ To illustrate with the simplified case of a basket consisting of one ounce of gold defining one SDR and the market price of one t-bill initially equal to one SDR: if all market prices double so that one ounce of gold and one t-bill cost 2 SDRs in the market, it will be profitable to redeem SDRs for the one ounce of gold equivalent in t-bills per SDR. The one ounce of gold value of an SDR when redeemed will buy one t-bill in the market, thus one SDR may be redeemed for one t-bill, but that t-bill will buy 2 SDRs in the market giving rise to arbitrage profits from redemptions. The resulting contraction of the market supply of SDRs will reduce market prices in SDRs

²⁰ Coats, 1994.

Thus the IMF's holdings of such debt should have short maturities.²¹

The possibility of net gains or losses on the assets held by the IMF against its Real SDR liabilities relative to the value of those liabilities raises the same issue faced by any central bank and that was discussed in relation to earlier proposals for an SDR Substitution Account. Who would cover any losses should they arise? In the case of the Substitution Account, many IMF members argued that the U.S. should cover any losses because the Account directly benefited the U.S. Whatever the merits of that argument, it is clear that the IMF's collective membership (in proportion to its quotas) should stand behind the integrity of its Real SDR liabilities issued under this proposal. To the extent that the issuers of eligible debt denominated them in SDRs, there were be no exchange rate risk.

It is useful to compare the international Real SDR currency board with a classical gold standard. In its hypothetical purest form, currency was issued in exchange for gold at a fixed price with the obligation to redeem it on demand for gold at the same price (with a modest bid ask spread). The currency issuer had to maintain an inventory of gold equal in value to its currency liabilities. Currency was supplied in response to market demand, but its value varied with changes in the relative price of gold. The supply of Real SDR currency would also be determined by market demand, but the issuer would hold and deal in eligible government debt against its SDR currency liabilities rather than the items in the valuation basket (i.e. rather than gold). The redemption obligation and arbitrage would keep the market value of Real SDRs equal to the market value of its valuation basket. Relative price changes of items in the valuation basket would not affect the market value of the SDR, which would be fixed to the value of the entire basket.

²¹ A change in world demand for Real SDR's would produce redemptions (for a fall in demand) or additional purchases of SDR currency. These would reduce or increase the amount of SDRs outstanding (and hence the size of the IMF's balance sheet), but would not (if these operations were timely) significantly change the market value of SDR currency nor of the IMF's assets (abstracting from the IMF's other financial activities).

Conclusion

The classical gold standard was good for long run monetary stability and trade. The disciplining effect of national money redeemable for gold at a fixed price and a world money (i.e., fixed exchange rates between national currencies) in which to price and settle external trade contributed to trade's rapid growth in the late 19th century. "What made the upward leap in international trade, the creation of an integrated world economy--a world economy where for the first time trade was not confined to luxuries and intoxicants but extended to staples and necessities--possible in the years before World War I? Falling costs of ocean transportation was one major factor. The development and extension of the international political and economic order called the gold standard was another."²²

While the year-to-year value of money varied considerably under the gold standard in the United States, its value was essentially the same at the beginning of World War II as it had been at the beginning of the Civil War or the beginning of the Union, a two-hundred-year period. Since the beginning of World War II, however, the value of the U.S. dollar has fallen to about 12 percent of its previous value (that is, prices have risen by a factor of more than 8). However, because of the variability of gold supplies and thus its price, both prices and real output were more variable in the short term during the gold standard years than after.²³

These shortcomings of the gold standard and the high resource cost of storing gold, would be overcome by an international currency issued and redeemed for eligible government debt at the market value of a large basket of internationally traded goods (a Real SDR currency board). Such an international currency would have a number of important benefits.

a) It would relieve the pressure on the United States to supply dollar assets to satisfy the demands by other countries for international reserves. In the extreme and over time it could replace the U.S. dollar as the unit of account, means of payment and store of value (reserve asset) for international transactions.

b) For countries pegging their own currencies to the Real SDR or using it directly, domestic prices would become more predictable both in the short and long term, thus promoting investment and growth.

²² DeLong, 1997.

²³ Bordo, "For the United States between 1879 and 1913, the coefficient was 17.0, which is quite high. Between 1946 and 1990 it was only 0.8.... The coefficient of variation for real output was 3.5 between 1879 and 1913, and only 1.5 between 1946 and 1990." See also Cooper.

c) Moreover, international prices would become much more predictable, facilitating the further extension of the gains from trade. A Real SDR could attract a large number of countries to peg the exchange rates of their currencies to the Real SDR, thus reestablishing a truly global currency for global trade.

d) Global liquidity would automatically become countercyclical and thus stabilizing. "This idea [of a commodity standard], which goes back to Keynes' *Treatise on Money*, had interesting countercyclical features: world liquidity would automatically increase during global business downswings, which tended to depress commodity prices, and automatically decreased during business upswings, when commodity prices boomed."

A number of technical issues would need to be addressed, none of which are insurmountable:

- Which goods should be put in the valuation basket and in what amounts?
- How should their market prices be determined and how frequently?
- How frequently should the items in the basket and their weights be adjusted?
- Should Real SDRs be issued actively or only passively?

Most of the measures proposed above to enhance the usefulness of the existing SDR would apply to the Real SDR as well.

Real SDRs issued under these rules would have enormous advantages and minimal risks. It would build upon an already established international asset with a well-established valuation methodology. It would introduce an improvement in the system of such significant benefit, that it could well overcome the propensity to hold on to the status quo except in time of crisis. This should make it possible to establish sufficient political support to amend the IMF's articles to approve such a system. While the United States and the European Union would lose some of the privileges they now enjoy as a result of being able to borrow and transact internationally in their own currencies, they would also be relieved of the growing concern over the sustainability of their growing debt burdens as suppliers of international reserves.

²⁴ Ocampo, page 5. The countercyclical behavior of liquidity referred to here differs from the stabilizing effect on commodity prices of a traditional commodity standard, which resulted from supplying and absorbing the actual commodities in response to fluctuations in their prices.

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Split Article – Energy Currency

Autor: John Erik Meyer

As we survey our economic and social landscape in this first part of the 21st century, we see a great deal of imbalance, confusion and lost opportunity. Fiat currencies and the financial and banking systems built on them are responsible for a good deal of these large and visible problems. Furthermore, fiat currencies are responsible for obscuring the much larger problems with which we should be dealing.

Climate change, debt, resource depletion and scarcity, inequality and fiscal and trade imbalance are all critical problems which our fiat currency based financial systems both mask and exacerbate. Dealing with them should be our true priority but instead we find ourselves stuck in the mud and fog of finance.

Human society needs tools which illuminate our circumstances and options. A fiat currency based financial systems produces illusion, not illumination. Money now dominates our financial and social worlds but in a healthy economic and social system, currency would function as a tool and not a master.

What we measure determines what our targets are. If we want to do more than maximize consumption and strive for growth-forever, we need to identify new goals and create measurement systems which will allow us to reach them.

Fiat currencies are a Gordian knot. A back to basics approach asks which currency systems have worked in the past and what will work in the future.

Historically, most forms of currency have had high intrinsic value - cattle, grain, metal, arrow heads, iron coins etc. Effectively, they were a barter system - real goods on both sides of the transaction with no hidden or lingering after effects.

For a commodity to serve as the basis of currency, it must have two principle characteristics.

1. It must have widely appreciated value in its market region.
2. It must be available on a reliable basis. Reliability is what made the Egyptian wheat currency function so well over 1500 years. The Nile almost always replenished the Egyptian soil in its

annual floods allowing the Egyptian wheat crop to become the most dependable food source in human history. The society endured and so did it's currency base and banking system.

Humans have always used the most readily transportable, highest value commodity as a basis for exchange. The effectiveness of a currency is its ability to fulfill the needs of the society which is using it.

Here is a table of commodities which have been used as currency and many have worked well. Their strengths and weaknesses vary considerably.

Historical Currency Viability Table

Units	Intrinsic Value	Scientifically Definable	Portable	Scalable	Widely Valued	Defined Redemption	Long Term Stability	Score
Knife Blades Arrow Heads	high 8	high 8	good 7	fair 4	yes 8	yes 10	yes 10	55
Cowrie Shells	low 2	low 4	high 8	high 8	yes 8	no 2	medium 7	39
Gold	low 4	high 9	high 10	high 10	yes 9	no 2	medium 8	52
Seal Oil	high 10	high 9	high 9	high 9	yes 10	yes 10	yes 10	66
Wheat	high 10	high 9	medium 8	high 9	yes 10	yes 10	yes 10	66
Cattle	high 10	medium 7	fair 5	poor 3	yes 8	yes 10	yes 10	53
Tobacco	medium 4	medium 7	yes 7	yes 8	medium 6	yes 8	yes 8	48
Printed Money	none 0	no 0	yes 10	yes 10	medium 8	no 0	poor 4	32
Commodity Certificates	high 10	high 9	high 10	poor 4	yes 9	yes 10	yes 8	60

The best forms of currency have been the ones which have had high intrinsic value. Humans moved away from functional value to broadly perceived value with the move to cowrie shells and precious metals. This was required because commodity based currencies of the day had neither the scale, portability nor liquidity to support the potential of rapidly expanding trade and the increasing complexity of goods production. Gold, which has very little intrinsic value, is essentially a global fiat currency and so ubiquitous it was the closest thing to an intrinsic value commodity available. To this day most people think gold in itself is actually worth something.

Which currency looks to have been the most successful? The historical record says wheat currency because it lasted for a very long time and a very sophisticated and stable banking system was built around it.

But nothing beats the Swiss-army-knife-practicality of seal oil. Not only was it an excellent medium of exchange but it provided heat, light and was edible. It could also be used to waterproof a kayak! However the Eskimo or Inuit culture was not a dominant, complex culture with a banking system as was that of the Egyptians so wheat currency has to stand as the reference.

Commodity certificates exchanged between merchants also worked extremely well. Defined goods exchanged between experts with a specific redemption time - hard to beat. In 18th century Europe these commodity certificates were written on paper while they were inscribed on clay tablets in ancient Egypt and Assyria.

After a run of several thousand years, gold was replaced by printed fiat currencies when even precious metals failed to be able to keep up with the scale and complexity of a burgeoning commercial economy. Also, let's be honest, the printing press opened up the opportunity for commercial and government fraud on a never-before-dreamed-of scale. The time of the commodity based currency appeared to be over.

Despite its current dominance of world finance though, printed fiat currency ie baseless currency is coming under a very critical light. And none too soon.

Fortunately, a suitable replacement is available. The uber commodity, the one upon which all other commodities, our economies and our societies are now based, is available. Over the past century, it has stepped beyond its embodied forms into pure stocks and flows which can be applied for any purpose. It has the scale and the liquidity to meet all of the demands, both present and future, of an advanced currency.

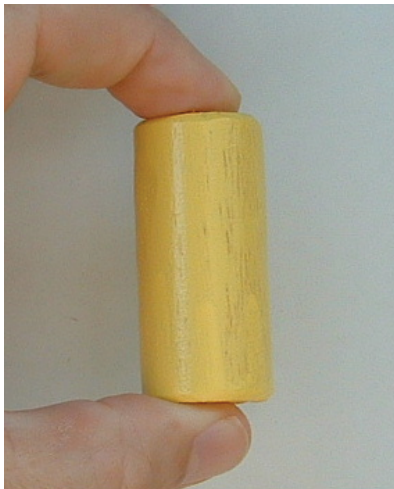
Energy is ready to be established as the monetary representation of the real wealth creation process which it now empowers. Energy is the physical basis for our economies and societies and it is past time to measure our progress in the commodity which is directly responsible for it. Every bit as much as seal oil for the Eskimos and wheat for the Egyptians, energy sustains the modern

human condition.

Imagine a truly advanced society in which environmental assets and human development were valued instead of cash flow and consumption. Imagine a system of exchange based on energy. The word "money" would not exist.

Picture the perfect currency. A stable, vital commodity with very high intrinsic value which could be easily carried around or transferred over an omni-present network.

And here (cylinder) is what it might look like. This storage system as envisioned would hold say 100kWhrs - the energy equivalent of 10 litres of gas - the conversion between gasoline and



kiloWatt hours is amazingly convenient! It could download into a device the size of a cell phone and you could tell how much energy was in it by placing it into said device. The transfer devices are ubiquitous in public, private buildings, vehicles and anywhere where humans need or generate energy. Just like our current electrical and fossil fuel systems. Effectively, every wall plug is an energy banking machine. This would be your new wallet.

If this technology actually existed, monetary problems would not be at the forefront of public discussion nor would we be experiencing as many of the social and economic issues we are today.

To put this into perspective, just about everything has been used as currency. Many commodities have worked pretty well for many centuries. It is impossible to believe if energy had been available as a storable, transportable commodity 2000 years ago that it would not have been adopted as the only currency then and remain so today. What could replace it, time? Time is the only other commodity as vital as energy.

In the history of human exchange, unless it was direct barter, the means of exchange has always been the most commonly avail-

able, most scalable, most widely valued commodity. This perfectly defines energy in the 21st century.

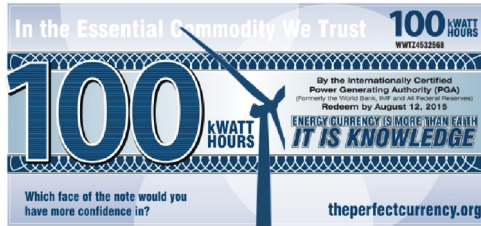
Future Currency Viability Ranking Table

Units	Intrinsic Value	Scientifically Definable	Portable	Scalable	Widely Valued	Defined Redemption	Long Term Stability	Score
Energy in 2012	high 10	high 10	high 11	high 10	yes 10	yes 10	yes 10	71
Seal Oil	high 10	high 9	highly 9	highly 9	yes 9	yes 10	yes 10	66
Wheat	high 10	high 9	medium 8	highly 9	yes 10	yes 10	yes 10	66
Commodity Certificates	high 10	high 9	high 10	poor 4	yes 9	yes 10	yes 8	60
Knife Blades Arrow Heads	high 8	high 8	fairly 7	poor 3	yes 8	yes 10	yes 10	54
Gold	low 4	high 9	highly 10	high 10	yes 9	no 2	medium 8	52
Cattle	high 10	medium 7	fairly 5	poor 3	yes 8	yes 10	yes 10	53
Tobacco	medium 4	medium 7	yes 7	yes 8	medium 6	yes 8	yes 8	48
Cowrie Shells	low 2	low 4	highly 8	high 8	yes 8	no 2	medium 7	39
Printed Money	none 0	no 0	yes 12	yes 10	medium 8	no 0	poor 4	34

Contrast this to the Zimbabwe Hundred Billion \$ bill. Zimbabwe on one side, energy currency on the other. If there was really an energy backed currency, which side would have the most credibility?.

The Chinese were the first to develop the printing press and





apply it to money around 1000AD and therefore were the first to experience hyper-inflation. Records are scant but we can be fairly sure some Chinese government officials and merchants got rich while a great many peasants starved in this process.

This 100 kWatt hour cylinder precisely represents the work that can be done and the work that has been done. It is directly related to the real wealth creation process.

The Zimbabwe \$100 Billion bill lost its connection with the real wealth creation process the moment it was released. It represents a claim on real wealth, not a guarantee of past or future real wealth creation. What it represents now and what it represents in the future can be very different.

When will a fiat currency note be redeemed and how many of its sibling claims are in circulation relative to how much real wealth are questions which absolutely no one can answer. The last person to try to redeem the printed promise will likely be disappointed. It is unlikely that the promises printed exactly matched the goods available and even less likely that the goods available exceeded the amount of the promises printed. In the final stages of the cycle when the mismatch between expectation and reality becomes all too apparent, we refer to it as a monetary crisis. But it was a crisis from the beginning, we just didn't realize it at the time.

Societies and economic systems have been plagued by monetary problems since money was invented. To be sure there have been major disruptions of the economic system by real world disasters but these are much more rare.

Our current economic woes are driven by monetary distortions primarily and these mask the real world challenges that must be met.

Like climate change, everyone these days is talking about

money but no one seems to do anything about it. Money should not be a topic for discussion, it should just be toiling away quietly in its small corner, while human societies address their major issues.

Another trap of monetization is that it obscures the workings and structure of the economy. Money priests have aggregated measurement of the real wealth creation system beyond any recognition of its actual function. Economic levers no longer deal with the structure of the real economy, they deal with flows of money. Fiat currency systems have gone completely missing on representing and predicting fundamental physical trends. This makes understanding and addressing real world issues impossible. Adoption of energy currency will not cure this problem completely but it will strip away several layers of illusion between policy makers and the economic mechanism for which they are responsible.

We need to move to a system where money is real, scientifically definable and used in a way which can be fully monitored and fully understood. If there anyone on this planet who understands the current monetary system, they have yet to step forward and explain it. It is impossible to fix or fine tune that which you do not understand.

An energy based currency system will be less complex, less prone to corruption and more manageable. Therefore it will be more stable allowing the rest of the productive economy to attain its potential without the destructive cycles inherent in a fiat currency system. Energy currency in this (cylinder) form is monetary system perfection because it is real, scientifically verifiable and timeless.

But let's take a step back from an idealized solution which does not yet exist to what we can do today. How can we take a step towards perfection or more realistically, into more shallow mud?

The Way Forward

Energy currency or more exactly, energy certificates should be used as the reserve currency for international exchange. So in effect, nations will be exchanging stocks of energy rather than pallets of fiat currency or flurries of keystrokes to balance their trade accounts.

An energy certificate would define an amount of energy equalized to kilo Watt hours in a specific form (oil, gas, electricity etc) deliverable at a specific point and at a specific time (no more than 3 years out). There would be no stale or worthless paper in this system, just specific claims on a clearly identifiable quantity of a scientifically defined commodity in a set time period. Defined goods, clear redemption time, rapid turnover means no accumulation of undefined claims.

If the international currency reserve system were based on energy certificates, it would have the following impacts:

- eliminate competitive devaluation of currencies
- eliminate Dutch disease wherein one strong sector of a nation's economy damages other sectors by inflating the value of its currency
- eliminate the disconnect between the consumption and real goods production level of nations fostered by fiat currency valuation illusions.
- eliminate the problem of distorted exchange rates causing a competitive mismatch ie a producer with high material inputs and lower labour efficiency underselling another producer in another country because of exchange rate anomalies.
- National currencies would not cross borders nor would any bond or certificate based on them.
- speculation would disappear from international finance.

The basis for this effort isn't simply to establish a technically superior lubricant of commerce but to re-attach the financial sector to both society and the means of real wealth creation. Energy currency will do more even than establishing clarity and cohesion in a fractured, murky and indecipherable economic system, it will give us real links to the natural environment as well as a more realistic view of the future. Energy has become our present and energy is definitely our future.

Right now, world finance dominates world politics and economics. Adopting energy currency will make the monetary system a reliable tool rather than a deranged master allowing us to better prepare for the coming decades of radical environmental, resource and social change. It will simply do its job, not take over the entire enterprise.

Energy based reserve currency will be a vital tool and its adoption is a glittering opportunity for human society wrapped in the pressing necessity for immediate and effective action. Money based on real commodities has never crashed. It's time to make money real again.

Autor: Malcolm Greenstuart

This paper introduces an energy currency system utilising electricity, a system that could work across nations, continents or the entire world, replacing the existing monetary system. It reveals the structure of the system including how it would operate. It examines some philosophical aspects of the nature of structure — co-operation in dynamic balance with competition, is mirrored with tension versus compression, in a new structural arrangement (tensegrity), and shows how this new system embodies these balanced forces resulting in dynamic integrity. It shows how using energy-as-currency makes available new ways of 'making money' that could result in everyone achieving significant passive income. It shows ways of distributing energy wealth across society that will greatly help to achieve relative equity without attracting popular right-wing resistance.

The paper explores technical aspects necessary for the new systems implementation highlighting that the potential for introduction of the system is growing. The paper looks at the future of work and income security and how this new system could impact upon this in a positive manner. It shows how the new system is relevant and appropriate for the future.

Preamble

There are many ideas of how to make the World a better place in the future. Many of these ideas are similar to returning to the past, the wisdom of the ancients, where apparently we will all have to 'cut back' a great deal. Other than that it is business as usual and more of the same, only bigger, when we can all plainly see that that is not really working for everyone and the planet's environment.

One fundamental issue that is not addressed in utopian rosy futures is 'how is everyone going to obtain an income?' Having an income, fundamental to living a life, is something that is missing for a great deal of the World's population.

Forget 'Make Poverty History' – poverty is a symptom, let's make 'not-having-an-income' history.

People worry about the greed of others and the wastefulness of others, however if we extinguish consumerism and greed, if we were highly efficient and did 'more with less', then the manufacturing sector would shrink dramatically, and the resources and transport sectors would contract along with it, many people would lose their jobs – what then for them? No income for many people does not equal a great future for the world.

However we do want to tackle the forces of greed, wastefulness and inefficiency.

It is a fact that many people really do have sensible worthwhile jobs/work at present, even these however are insecure. Topsy-turvy is surely the future of the World as great changes are forced upon us and the economy due to changes in technology, climate or 'regime change'. We live in a local or global system that can, in unexpected ways, suddenly affect (derail) us all, what about income security then?

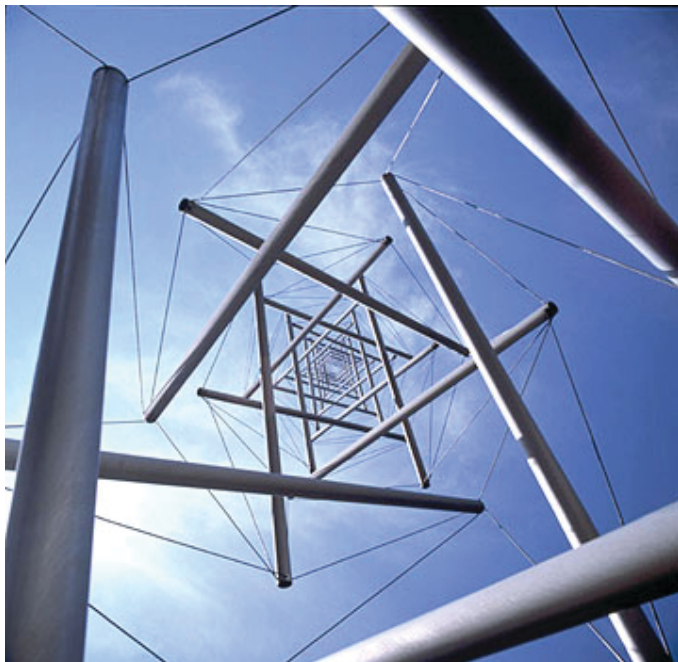
Most of us don't live in a forest, or have many acres available to us for farming – most of us can't 'live off the land' like we use to be able to do. Nor do many of us have sufficient shares in Blue Chip companies that we can rely upon for an automatic and secure income.

Also Social Security as presently practised often leads to people exploiting welfare, it leads to an 'us and them' attitude, and there is always the problem of how to find the extra tax dollars to support it (plus right-wing agitation against it). Similarly with regards to employment in the government sector.

If there is going to be any continuity of harmony and security in societies of the future, then security of income is going to have to be designed into the system. Illustrating this is a wholly new idea presented in the following.

Part 1.

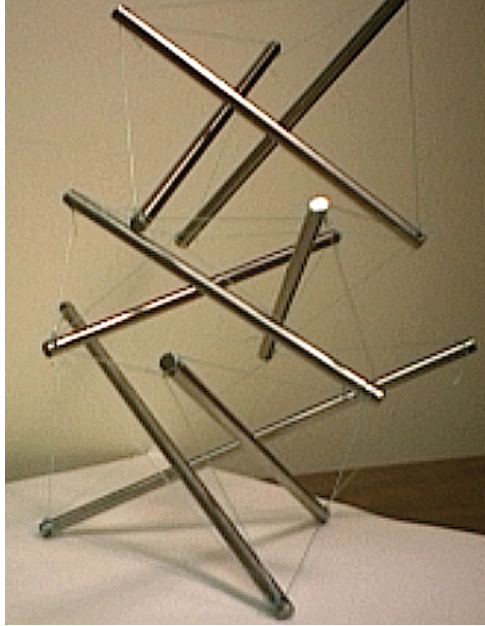
The picture shows a specialised structure known as Tensegrity



Needle Tower outside of the Hirshorn Museum, Washington DC, Kenneth Snelson

Tensegrity structures are a dynamic balance of the forces of tension and compression, the compression members do not touch each other, they are held together in a web of tension. As a structure they are strong, semi-rigid, light-weight, while at the same time maintaining flex.

These structures could be considered representative of the new economic paradigm. That they exist and 'hold up' indicates that they are an allowable system in Universe – they have true structural integrity. Along these lines a new economic system can be built – it follows that this new economic system could also be strong, self-sustaining while still flexible.



In these structures tension is primary as it is all embracing, while compression, as a force, is secondary as it is islanded (each compression member is an island).

Here is an example from living nature –



This picture at least shows an amazing web of structural tension members within the tree

Tension and compression in the physical domain can be seen to be analogous, in the social domain, to co-operation and competition. When we co-operate - we pull together. When we compete for something we push each other out of the way.

At the moment we live in a world and an economic system that is principally competitive and only secondarily co-operative.

Tension is like integration and compression is akin to dis-integration. That a successful interplay of the integrative and dis-integrative forces of nature can exist in pure principle is illustrated by tensegrity structures, suggesting that a fully integrative interplay of co-operation and competition could also work. We are left wondering 'could a new human currency system facilitate and help generate an economic system of this model'?

What it is

Cosmic Accounting(3 elements)

1. We make electricity (kiloWatt-hours) the currency of our society. This energy-money would be the medium-of-exchange that we use to pay for the goods and services of life, for daily living, and the whole of the economy. This is not a barter system. Electricity will act as the 'middleman' or the 'intermediate carrier of value' to facilitate the economic exchanges of different types of products and services in our society. That this new money can also be used to power electric loads in our factories, at home, and electric vehicles is a bonus and a true benefit. A unique feature of this form of currency is that it flows into the Earthian system from outside the system, from the cosmos, in the form of solar/renewable energy.

2. Instead of money banks, where people store their money, there would be battery banks where people store their energy. These battery banks would be connected to the electricity grid so that the energy-money (electricity) could be uploaded and downloaded to and from the power grid, any time and at any location, just like uploading and downloading information on the WWW. This will enable using electricity as the medium of exchange in a normal way with high speed transmission of value over the network.

3. Cosmic Accounting proposes a social system where 'the community' builds and owns solar farms and collects vast quantities of cosmic/solar energy. This would be the primary input of liquidity into the economy. Renewable electricity that is generated in this way on a daily basis would be distributed freely and equitably to everyone. This is the feature of the new system that demonstrates all-embracing integrative co-operative (tension). Everyone will receive a free income of energy (kiloWatt-hours) everyday! This means that everyone will have money (energy-money) to go out shopping with, to buy food and furniture, as well as using this energy to power home appliances, transport, etcetera.

Now since the people, the public, paid for the renewable technology...

Income goes to everyone, rich and poor. This will not be means tested.

Free market competitive enterprise, the same as today, still applies for anyone/everyone. It would be still worthwhile to go out and compete with others to sell goods and services for an enhanced income. Individuals or businesses would give up some of their energy-money in exchange for the provision of the goods and services they want to buy, the point here is that the socialised method of free-money-electricity income, as described above, is complemented by normal competitive market activity (including working a job and being paid – the pay would be kiloWatt-hours too). Business would boom because everyone would have plenty of energy-money with which they could buy, however, unlike artificial dollars that devalue if there are too many printed, energy-money kiloWatt-hours are inherently valuable, plus they disappear as they are 'burned up' in factory motors or domestic appliances, so it will not lead to inflation.

When we purchase items at the shops the price of each item would be presented in terms of kWhs, where the price would reflect or encompass the amount of energy embodied in each item, plus probably some profit. For the service industries there may be very little embodied energy in their 'product'. People could still charge whatever they like, it would be a free agreement between the buyer and the seller that determines the amount of energy exchanged for the product or service.

We would swipe our cosmic energy debit card, then the system's computerised electrical accounting software would make

sure that the right quantity of energy be extracted from our energy bank account and sent to the shop's energy bank account. Similarly for eBay purchases, energy would be uploaded onto the power-lines and sent across the grid to be downloaded to the seller.



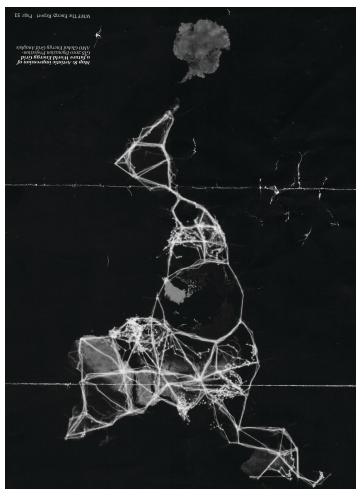
Cosmic Card courtesy Pangea Productions

Solar Power

Cosmic Accounting obviously relies upon great sources of solar power. After much reading, direct measurement, analysis and calculation, the author is satisfied that the solar resources of planet Earth are far more than sufficient to supply mass quantities of energy into a sustaining global human society. For example the author has calculated that just one percent of the land area of one state of Australia (the state of Western Australia) if dedicated to highly-efficient solar-thermal technology, solar parabolic dishes, as developed by Professor Stephen Kaneff formerly of the Australian National University, is sufficient to power China's entire current demand for electricity. Furthermore many people are becoming aware of the great energy contribution coming from domestic rooftop solar panel installations – a free income on an individual or household scale.

The Global System — Super-conductor grid and high speed internet

Below shows a map of the world illustrating a globally interconnected electricity grid in potential. Australia and New Zealand lie in the bottom right hand corner of the map, with South America at the top.



Courtesy of GENI Global Energy Network Institute

Many people seem to think that the transmission grid absorbs a great deal of energy, however this is only true if it is poorly engineered. High voltage AC and DC links might lose only a few percent of the energy they carry over thousands of kilometres. Furthermore the future holds the potential for superconductors. The first super conductor cable, about a mile long, was installed in the Long Island New York electricity grid in 2008.

It is true that the currency system of energy accounting would put a strain on existing electricity transmission infrastructure. This infrastructure will need to be reinforced. Germany has just announced that it will spend 30billion Euro on their transmission system so that it can harness more wind and solar energy.

In an energy currency system there could be balance of trade energy accounting where electricity going in one direction in pay-

ment could be cancelled out by energy going in the opposite direction in payment, this will greatly save the total amount of energy that needs to be conducted across the grid.

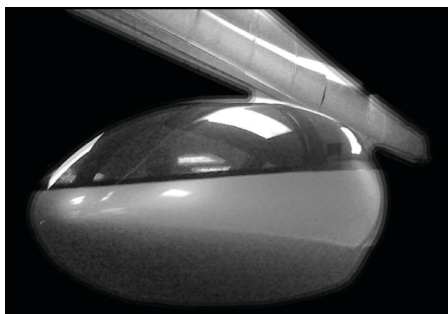
Very high speed data transmission rates will also be required to transmit all the information of all the commerce happening everywhere. These high speeds are becoming more common (google Mark Keel Chattanooga).

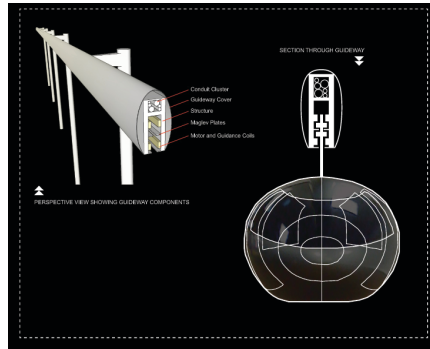
Doing more with less, this is critical

Cosmic Accounting is a good economic framework for the future.

With the current economic system the future is a real problem, as the future calls for much greater efficiency, and thanks to super-high technology 'Man' is able to deliver this much greater efficiency. However if society (and its machines and robots and electronics and automation and mass-manufacture) is going to be so very efficient it looks as though it will be very difficult to give everyone a formal job paid for from dollar income generated from the competitive cut and thrust of business activity. Even a job paid for from delivering a public service could be under threat.

Existing in the world today is a proposal for a new form of transport. It is suspended individual monorail pods running under magnetic-levitation light-weight track. This form of transport could make a vast impact on city travel, making commuting tremendously efficient, far more efficient (and cleaner) than gasoline guzzling internal-combustion automobile cars. To propel these suspended monorail pods (each standard pod could carry two people) requires the energy equivalent of just two hair-dryers (!) and has virtually no moving parts.





SkyTran

This new technology coming in to society, a technology that makes sense and would be so good in so many ways, would be a great threat to many existing businesses and many people's jobs. It could be that introducing this technology would initially meet with dis-interest (from government officials) and then encounter great resistance as businesses under threat (fear of losing their white-collar jobs) whip-up unions for popular resistance to something that would make their work redundant and strip them of income. This is a very real barrier to introducing efficiency into our society. There would be myriads of examples that could be referenced to demonstrate this situation.

In a Cosmic Accounting future, however, where everyone (including white collar workers) have a free and automatic income of truly valuable kWhr energy-dollars, threat of the dis-appearance of current employment (and the income that comes with it) is not so critically disabling or troubling.

Cosmic Accounting is not threatened by unemployed or idle people – particularly when people do have 'money' (their automatic and substantial energy income) with which they could go traveling, or start an enterprise of their own, or afford to purchase time at gyms or intellectual training facilities. With Cosmic Accounting, because of an automatic income, a great deal of superfluous work, work that people were doing only, not that they wanted to – only doing because it paid an income – a great deal of that sort of work probably would be given up. Vast layers of societal inefficiency or superfluosness might just slough off.

Cosmic Accounting mimics how Universe accounts – in terms of energy consider this paraphrase from Buckminster Fuller

...we must accomplish conversion of our present-day only-on-Earth wealth accounting system and synchronise our planetary economic affairs with the time-energy behaviour laws demonstrated by astrophysics to be in economic governance throughout the entire cosmos. Little planet Earth, of our small star the Sun, is not exempt from the laws that the rest of the universe is following.

Critical Path, 1981, p199

The future of energy storage is sure to be important. Battery technology is developing rapidly at the moment, especially with the development of 'ultra-capacitors' married to very good batteries (lithium-ion) to make 'ultra-batteries'. Other methods such as 'pumped-hydro' and reverse thermal ammonia reactions also have a big future for mass energy storage.

In the Cosmic Accounting system everyone would have their own personal battery energy storage system connected to the electricity grid. People would be able to send electrical energy (kilowatt-hours) into the grid, and receive kWh from the grid, similar to how we today use our computers, uploading and downloading information across the internet, to and from our hard-drives.

To store our personal energy-money more efficiently, there could be large communal battery banks, and these would operate like big banks at present, where customers make deposits and withdrawals over the internet, only people would be depositing and withdrawing electrical energy.

The Power Economy

Autor: James Rogers

"The privilege of creating and issuing money is not only the supreme prerogative of government, but it is the government's greatest creative opportunity."
Abraham Lincoln

We are seeing stress within the nations and states - selling assets, loss of jobs, cuts in services, destruction of pensions, and misery. Most States have budget deficits, and are compelled to sell real land and assets to pay off debt, which was created out of thin air. Austerity, cuts, threats, credit ratings, every day the media trumpets the distress.

The problem is with Collectivists and their usury financial system. This sinister system allows a small group of people to create money from nothing, then charge interest on it, and compel governments to collect taxes to pay off interest on this debt. We are at the point where the system is exposed. It is at this point in time, in the summer of 2012, that we can decide to burn this cancer, and create a new system.

We need money, which is tied to production. Gold and silver are history – we need something for the 21st Century. We need an energy-backed money that reflect the 21st Century economy. With this kind of money, we can build a Power Economy. A Power Economy will be ten times bigger than now, supports society instead of draining society. To make this happen, we need Power Currency, the money for the 21st Century.

The place to do this is Greece, the foundation of Western Civilization.

When we consider money, we need to see if it meets three criteria:

- Medium of exchange – society accepts it
- Unit of account – a standard unit recognized by everyone
- Store of Value – does not degrade over time (the prime reason against electricity)

Power Currency as a Medium of Exchange

Through the 19th Century, and before this fiat money system, gold and silver were widely accepted as a wonderful medium of exchange. Many esteemed economists call for going back to the gold standard and certainly a gold standard has many advantages over the current system. Why not go back to the gold standard? There are two key reasons.

1. Gold and silver reflected the economy of the time, where most production originated with minerals mined from the earth. Today's economy is far more complex, with far more intellectual property, and information technology. There is not enough gold and silver to handle today's economy, and we would have to resort to debt money. The USA has 8,192 tons of gold stored in vaults at Fort Knox, West Point, and the Federal Reserve Bank of New York. This averages out to about one ounce per person and if all melted into a cube, it all can fit into a 900 square foot apartment with a ten foot ceiling. For silver, multiply these amounts by twenty.

2. Gold especially is very easy to hoard. It will be too easy to manipulate and control by a small group of people. In the age before the steamship and rail, gold was not so easy to hoard. A gold standard would be a good mechanism to force people to spend their gold into the economy, where it would eventually end up in banks, which could be compelled to send to a central vault. Then with no gold circulating but compelling to use gold for debts would create a terrible financial tyranny.

Another example is useful, as many doom-and-gloomers tout gold and silver for protection in times of chaos. Imagine a time in the future if the money collapses, or there is a disaster. What will be more useful for you – (a) gold coins and jewelry or (b) a generator, fuel and sustainable system that will give you power. If the situation is dire, how far will that gold help you. Savvy negotiators will do very well, but most people will spend the metals away, to be hoarded by a few astute groups. On the other hand, a generator, and fuel can run water filters, a greenhouse in cold climates, provide heat and light. You can also barter this energy as we will discuss below.

As a medium of exchange, energy is far more useful. There are many forms of energy – oil, coal, wood, electricity, etc.. Electricity, measured in kilowatt-hours, is used by nearly 100% of society.

Everyone needs electricity. Electricity amounts represented as an energy-backed money will be spent among the general population. People will spend these energy credits everyday and it is difficult to hoard. Our current technology allows us to use smart card and information technology to track all the energy.

POWER CURRENCY AS AN UNIT OF ACCOUNT.

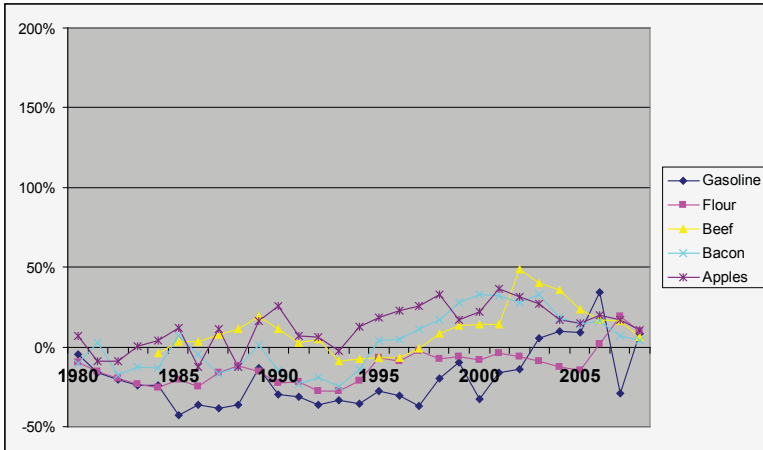
This is the key strength of Power Currency. It has a specific measure recognized by all parties. The unit is a kilowatt-hour and it can easily be measured in relation to fuel.

A 100 kilowatt-hour coin could buy almost three gallons of gasoline,

Diesel gallon	41.420 KWH
Gasoline gallon	36.718 KWH
LNG gallon	27.316 KWH
Propane gallon	26.687+/-1.703 KWH
Ethanol gallon	23.091 KWH
Methanol gallon	17.413 KWH

or over four gallons of ethanol. We can show the same effect with basic food items. Basic food such as flour, beef, bacon and apples hold their value fairly steady over time with kilowatt-hours.

The price fluctuation over a period of thirty years is quite stable, so

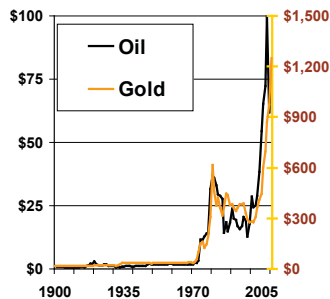


7.4 Electricity vs. food and energy items

a currency backed by electricity will be non-inflationary, which leads into our next criteria.

Power Currency as a Standard of Value

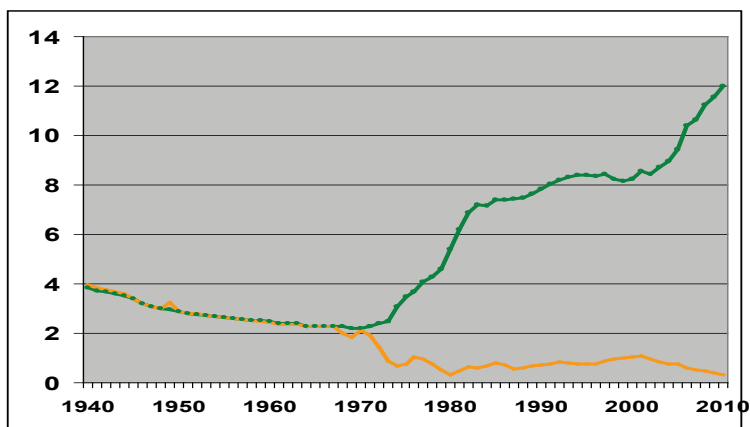
Gold is the ultimate store of value. It holds its value over hundreds of years. It is interesting to see how energy and gold tend to track each other over time. Over the past century, oil and gold (and as measured by dollars) has been keeping a steady value against each other. The price of electricity in terms of dollars and gold shows a similar relationship. Electricity drops in price against the dollar and gold



3.7 Oil and Gold Source for data: US Geological Survey, Energy Information Administration

until 1971. Price in terms of dollars moves up steadily since 1971 due to inflation of debt based money, and continues to stay steady, though dropping a bit, against gold until the present day. Electricity in terms of gold or silver gets a little bit cheaper each year, reflecting technology, similar to other technology in our lives – phone, computers, etc...

Critics will always say, 'but you can't store electricity'. That is true



7.2 Electricity vs. dollars and gold

and this is the main drawback to energy-backed money – until now. In 2000, we could not do this, but now in 2012, we are ready. Smart cards, virtual money, massive multiplayer games, and such technology make it easy to manage Power Currency. To solve this weakness in standard of value, we break down the power currency into three components – machines, fuel and electricity.

- Machines – steam turbines, PV cells, wind turbines, generators, car engines, ship engines, farm machines, etc.

- Fuels – oil, coal, biomass, sunlight, bio-diesel, ethanol, gas, waste, etc.

- Electricity – the making and using of electricity.

So let's compare the types of money.

Machines

Accounting Concept	Federal Reserve Notes	Gold and Silver	Power Currency
Assets, Balance Sheet	Stocks, Bonds, Loans M1, M2, M3	Gold and Silver stored in the Vault	Machines that can make the power
Cash Flow, Income Statement	Checking account, cash on hand.	Gold and Silver in the pocket	Fuels in the tank ready to be used
Transactions	Cash changing hands	Gold and Silver being spent	Electricity made, and used

Power Currency vs Metals and Federal Reserve Notes

There is 1,100 Gigawatt Capacity in the USA electric power system. Here is a breakdown by type for the whole national grid in MWH capacity and horsepower.

Type	MWH	Horsepower
Steam Turbines	580,420	778,342,550
Gas Turbines	388,609	521,124,669
Hydro	77,910	104,477,176
Wind	34,683	46,510,171
Pumped Storage	20,538	27,541,860
Other Turbines	18,578	24,913,634
Other Renewable	948	1,270,598
Total	1,121,686	1,504,180,658

The Steam turbines are the elephant. They run all the nuclear and coal power plants, and can also run oil, gas, and biomass. But this whole electric grid is centrally controlled by a small oligarchy. We need to expand participation, and to do this, we simply need to convert the automobile and truck into dual function transportation

and power plant. This technology is proven by the military, and once done, the power grid would be far more distributed. This would be similar to the shift from mainframe computers in the 70s to PC's and smart phones today. Cars as power plants could make every car owner a producer, and disperse the power from a few to many.

Doing a quick survey, we find that most cars are somewhere between 150 and 300 horsepower and heavy duty trucks over 400 HP. For our purposes, we take 200 horsepower as the number. There are about 250 million cars and trucks in the USA. Many of these are abandoned, but they are still capable of being refurbished. Taking recent numbers about power plants and cars on the road and putting an average 200 horsepower per car, we are able to compare the entire electricity industry including all nuke, coal, gas, wind, etc. and compare this to all the cars.

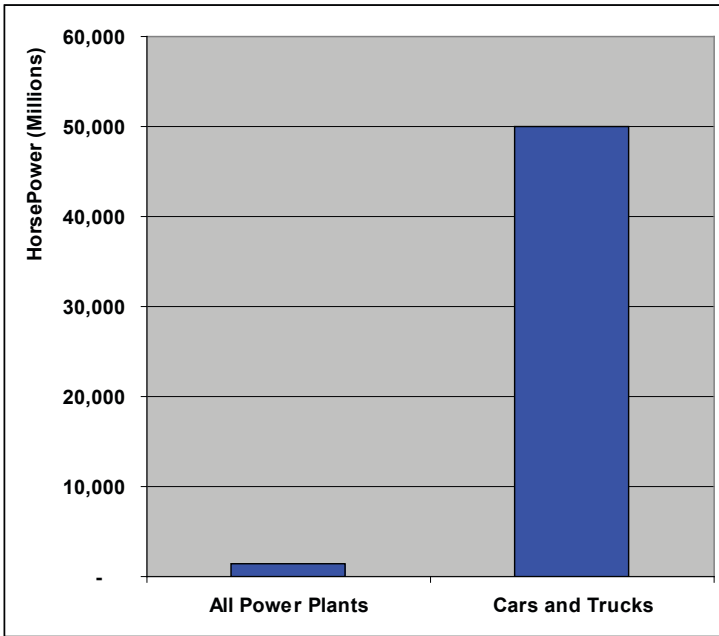
	All Power Plants in USA	All Cars and Trucks in USA
	17,000	250,000,000
Horsepower	1,504,180,658	50,000,000,000
MWH	1,121,686	37,500,000

One KWH = 1.341 Horsepower

One Horsepower = 0.75 KWH

Horsepower

Here is the total horsepower of the Auto vs. power plants in 2010. This graph is a little exaggerated as not all the horsepower can be



converted, but it shows the potential.

Horsepower

In terms of horsepower, large car companies are the largest power plant producers in the planet. The trick is to tie all these together. If we can tap into this resource, we could increase our energy capacity ten fold in one year.

How many cars are retired for reasons besides a broken engine. Instead of destroying these engines, we network them into a system, run as needed, capture pollution, and feed the energy into the grid.

- Encase a used car engine. Exhaust is captured into a filter so there is no noise and air pollution.

- Get 1000 old car engines and put them in an array. They turn on and off as needed to power the grid during peak periods, black-outs, etc...

- Refit cars with new smaller engines and batteries. The old engines are pulled out and out to use with other power plants.

This scenario shows an untapped resource that we can use now.

In between cars and large power plants is another class of power generation. Distributed energy resources like generators, and small wind fill an important gap. Companies like Caterpillar are very big in this area, and make mobile generators that can put out up to 16

Technology	Size KWH	Installed Cost(\$/KW)
Diesel Engine	1-10,000	350-800
Natural Gas Engine	1-5,000	450-1,100
Micro turbine	15-60	950-1,700
Combustion Turbine	300-10,000	550-1,700
Fuel Cell	100-250	5,500+
Photovoltaics	0.01-8	8,000-13,000
Wind Turbine	0.2-5,000	1,000-3,000

MWH of capacity. These plants can be developed and put into large buildings, factories, parks, stadiums, etc... Smaller ones are good for homes and stores.

A small percentage of people in any neighborhood are all that is needed to cover emergencies. In times of huge storms, most people can hook up as needed, and as fuel allows. It is merely a software issue to assign a unique identifier to each battery, power generator, and other assets so that load balancing can take place. This will lead to local distribution systems that will manage the back and forth of energy transfers with the homeowners getting a net credit or debit based on how much power they use or sell.

Fuel

Transportation uses two-thirds of all the oil used. Most fuel comes from oil, gas, and coal, which is controlled by a few governments and corporations. A solution in this area would stimulate the local economies, cut pollution and satisfy those people who believe in global warming. Over 100 years ago, in 1906, farmers worked to cash in on the huge market for fuel by making denatured alcohol for automobile fuel. By using farm wastes they saved money on disposal and had a new cash crop. They formed cooperatives for this purpose with the goal to have community distilleries.

Bio-fuels are ideal as fuels to support Power Currency. They come from the energy of the sun, so they renew year round. Biofuels give better engine performance and less pollution. Oil and coal have sulfur, while biofuels have none. They have less CO2 emissions which should appeal to a lot of people. Some biofuels are made from garbage, sewage, and other wastes, which can help communities save money dealing with waste. Biofuel plants can be small in size so that farms, towns and cities can set up their own production. This would disperse the power away from the few and bring that power into society.

Biofuels and home energy systems can create a great shift in the power structure. In this scenario, autocrats are the top ten banks,

	Electricity	Fuels	Engines
Autocrats	99%	95%	10%
Population	1%	5%	90%

big oil, central banks, corrupt politicians, hedge funds, and such.

CURRENT SICK ECONOMY

— Electricity is dominated by large centralized power plants that deliver electricity through old equipment.

— Fuels are primarily oil, coal and gas and is controlled by a small group.

— Engines are cars, trucks, trains, ships, wind turbines and power plants for energy.

FUTURE POWER ECONOMY

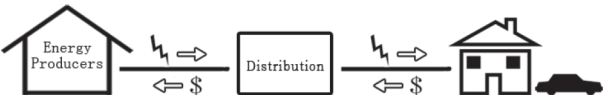
	Electricity	Fuels	Engines
Autocrats	20%	30%	10%
Population	80%	70%	90%

- Electricity now is produced by anyone, and distributed locally.
- Fuels are produced in country and there is a big shift to bio-fuels and renewable systems.
- Engines stay the same.

Implementation

Power Currency is designed to work within the existing financial and energy systems starting now. There are unlimited revenue and pricing models. A wide range of service providers participate and can get rich. Service providers will be a very important part of the growth of this process. They open many new business models, push viral marketing and push exponential growth. In addition to the financial aspects, there are all kinds of data applications here. These are tied in with marketing, vehicle use, media, telecom, and endless other applications. Marketing related information tied to demographic, income, and other factors are used. These can add new levels of opportunities for incentives, and discounts. These also bring about schemes for bundling. For example, an air conditioner is sold with a set amount of kilowatts that are financed. Groups of individuals can come together in a peer to peer method to form a buying group.

BASIC LEVEL



The first scenario is a simple one – a direct transaction where a customer has a direct link to the source of energy. They will use a clearinghouse to manage the transaction. The clearinghouse is tied in with the utility. This simple model shows electricity and money each going in one direction. Here the energy producer gets 77 percent of the revenue, and the various other participants get 23 percent.

Energy Producer	77%
Utility	10%
3 rd Party	5%
Info Tech Provider	5%
Local Tax	2%
Tax	1%

These splits are arbitrary and changed however the parties wish. Then in terms of raw KWH numbers we split things out below using 50 KWH.

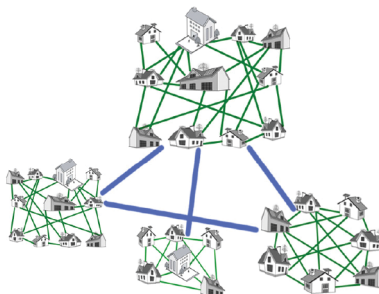
	50 KWH		Tax
Participants		Service Providers	
Energy Producer	38.5	2.5	1
Utility	5		
3 rd Part	2.5		0.5
Total	46	2.5	1.5 50

The various business rules added (e.g. pricing, time, importance criteria, min/max, and limits) by the energy supplier, energy management system and the users will let all parties to optimize and negotiate benefits to both sides.

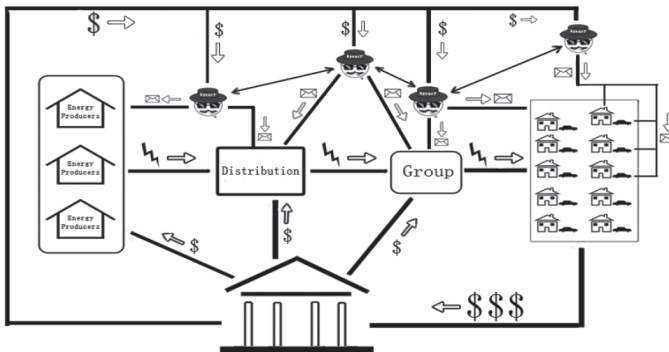
In a group of homes on a street, or small neighborhood, the participants will buy and sell from each other. When there is a shortage, some local resources can kick in, such as a car or generator. The transactions stay local.

A whole range of agents (appliance manufacturers, stores, coffee shops, car dealers and other limitless possibilities). Maybe they subscribe to an organization such as a credit card company, or non-profit organization. The agent will claim a portion as markup. We start with a similar share as before, but there are more parties to take taxes or fees for services. All the communications and programming are set up by computer companies, utilities and others. A financial clearinghouse comes in to make sure that all participants are compensated.

At the county or state level, we see larger networks and Virtual Power Plants. Whole robust communities will evolve. Each location can have a number of power generating devices, and each of those have a unique identification. For example, a small business has a solar array, wind turbine, battery packs and some vehicles with batteries. There can also be many nodes in remote areas such as a wind farm or solar concentrator. Then as two or more join they can have one time or long term relationships and transactions. Once the other sources are identified then the users swap or transact energy. Applications are endless.



Numerous agents may be included in a transaction. The payment is split among an energy producer, utility, agent, 4th parties and multiple sources at some of these levels.



The various business rules added (e.g. pricing, time, importance criteria, min/max, and limits) by the energy supplier, energy management system and the users will let all parties optimize and negotiate benefits to both sides.

Energy Producer	77%
Utility	10%
3rd Party	5%
Info Tech Provider	1%
Agent	0.5%
Financial company	1%
Data Company	1%
Member/Clubs	1%
Services Companies	0.5%
Local Tax	2%
National Tax	1%

This will lead to great incentives for energy production, and promotion among users. There are two main processes here (1) the information sharing and negotiation and (2) the financial transaction. This level can hand off the data and transaction to a third party that provides clearing services for the transaction. This third party can be the utility or a software company, and show some basic accounting here.

The various business rules added (e.g. pricing, time, importance cri-

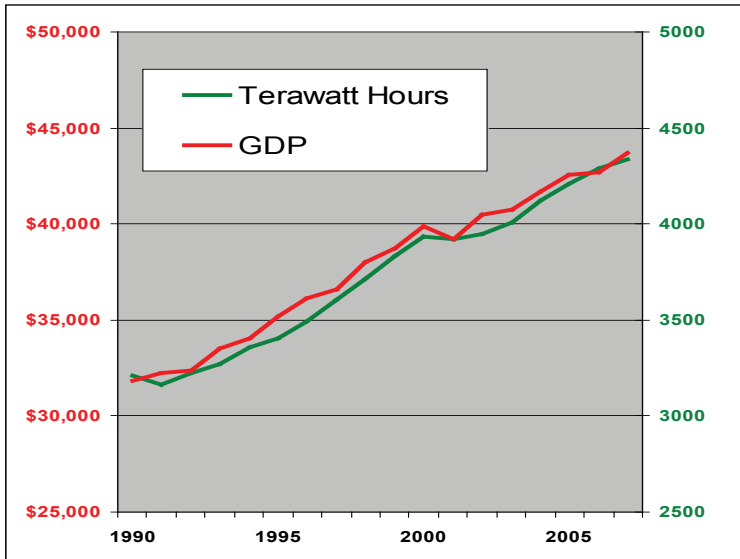
200 KWH		Service Providers		Tax	
Energy Producer	154	Info Tech	2	4	
Utility	20	Agent	1		
3rd Party	10	Financial company	2	2	
		Data Company	2		
		Member/Clubs	2		
		Services Co.	1		
Total KWH	184		10	6	200

teria, min/max, and limits) by the energy supplier, energy management system and the users will let all parties optimize and negotiate benefits to both sides. This provides new areas of optimization at the user level, group level or across the entire grid. This allows mass personalization of decisions and also at the higher level for inventory of energy to be gathered and optimized across a wide area. That's how it can work at the street level. Lets look to see how to deploy this to make Greece the Power Economy in 2013!

THE POWER ECONOMY

Electricity reaches into nearly every home and business in the country. We see a strong relationship between growth in GDP and supply of electricity.

We can start to engage society into Power Currency and the



Energy and GDP

Power Economy.

- Individuals can invest. They put in 1 to a 10,000 dollars in Central Bank Notes and receive a certain amount of KWH back each month. This can be financed and offer a positive cash flow.

- Taxes. Pension contributions and taxes are put toward such largest projects. Pension recipients receive a mix of paper money and kilowatt hours each month as their pension

- National credit. Issue money tax free through 50 year bonds and pay it off through electricity credits as they are spent

POWER CURRENCY FINANCING

The people through their representatives have the power to reclaim their ability to issue credit and to use this for the benefit of society. You can issue currency against the infrastructure project without using interest bearing bonds. From now on, for such projects you never need to go back to borrowing. A country, the society, can build national wealth without adding to the national debt. Here is a comparison of the system now, and how it can be.

CURRENT USURY SYSTEM	NEW SYSTEM
Debt through a Central Bank	National Credit issued by the State Treasury
Government needs 30 million dollars	Government needs 30 million dollars
Goes to the Central Bank and asks for the money	The Government issues the money
Then the Bank asks the treasury to print the money	Government backs money production from the project
Bank pays 10,000 dollars for the printing of the bonds	Keeps money in circulation
Then the Treasury prints the money and gives to the Bank	
Then the bank will lend back to the Government at 4 % interest over 30 years	
Then the Government pays 30 million principal and 36 million interest for 30 years until it is paid off.	
Project completed	Project completed
Debt is 36 million	Debt is ZERO

Let's build out our Power Economy with some examples, of which there are many.

Energy homesteadse

In 1862 the United States set up a homestead system where any citizen could claim land in certain areas, and if they could improve the land, keep it. This worked wonders and is an extremely strong example of public and private partnership. We can take this same concept and use it in any country. The country takes some public lands that are suitable for building energy producing assets such as solar thermal plants or windfarms, then open this up to the public as a new investment option. For example, the United States has enormous solar energy potential in the Southwest. According to the National Renewable Energy Laboratory, a 100 mile by 100 mile plot of land in the Southwest USA, fitted with solar energy systems, could provide enough electricity for the entire United States. Greece has similar resources in its own public lands.

Let's use a solar project as a benchmark. In 2006, Acciona Energy built a Concentrated Solar thermal project in the Nevada desert 40 miles from Las Vegas. This uses parabolic troughs and started operation in 2007.

Size: 64 MW

Land area: 400 acres

Cost: 266 million dollars

Electricity Generation: 134,000 MWH/yr

Construction Job Years 350

Annual Operation and Maintenance Jobs: 30

So based on this, we generate the following numbers

4,156 dollars per KWH cap cost

2,093 KWH per year per KWH installed capacity

23.9 percent utilization.

We allow for storage, roads, transmission and other land. Let's say that one square mile, or 640 acres, for a 64 MWH plant. 400 acres are for the power, and 240 for access roads, storage and extra support. We can project that the unit cost will drop with mass production. After 50 plants are built, we can get the cost down to 2000 dollars per MWH, and after 250 plants we can get the cost down to 1000 dollars per MWH. We allocate 10 percent of the

energy output to pay for ongoing operations and dividends for the investors.

The output of the energy will be returned to the ‘homesteader’ who can use those credits against his electric bills, and spend the rest into the economy. Those credits will flow through the economy until someone decides to apply the credit against their electric bill.

Offshore Wind Energy Homesteads

Offshore wind is a proven technology in Europe. Already five countries have built more than 100 MWH or offshore wind capacity

Build 1000 MWH capacity of wind farms. Each MWH will average out to 5 million euros, so the project costs 5 billion euros. Over the construction time period, the government issues five billion in debt free money. They charge one percent interest on this money. The interest is like a tax, paid to the Treasury to cover other expenses, like healthcare for the contractors, admin, insider dealings and so forth. Let’s look at it here comparing State backed non-debt money to Central Bank debt money.

	Central Bank Notes	State Treasury money
Capital cost/MWH	4.6 million	4.6 million
Ongoing costs/MWH	0.4 million	0.4 million
MWH	1,000	1,000
Capital cost total	5 billion	5 billion
loan	5 billion	5 billion

Interest Rate	5%	1%
Monthly payment - 20 Year Loan	32,997,787	22,994,715
Total Payments	7,919,468,871	5,518,731,683
Interest	2,919,468,871	518,731,683
Where the interest goes:	All to the banks lending the State its own credit	Back to the State treasury

In terms of kilowatt hour output we have the same amount of output but compare to the monthly expense shown above.

per month KWH ¹	246,575,342.47	246,575,342.47
Monthly payment(from above)	32,997,787	22,994,715
Cost per KWH/monthly payment	0.13	0.09
Difference		0.04

This added interest cost adds four cents to every kilowatt hour that is produced - forever. This is four cents purely from paying interest to the bankers at five percent as opposed to paying one percent interest for government backed notes. Remember, this money is made from thin air. This four cents extra on each KWH would extract money from the economy and add to inflation. The baker, retailer, and producer all need to pass on this extra four cents (or about 30 percent) onto the next person for the next twenty years.

Now, if you have a choice, what would you choose?

The financing for this can be open to society. As people buy new electric or hybrid electric cars, they have the option to buy a slice of production of the project. For example:

New car owners - 200 thousand owners finance 2 billion

Car conversions - 50 thousand finance 500 million

New homes - 100 thousand finance 600 million
Distressed homes - 100 thousand finance 600 million
Government, Investors, Other finance 1.3 billion.
Total is 5 billion.

Let's take that first line and make a breakdown for a new car sale. Someone buys a new electric or hybrid car. That car needs 400 watts per mile. They buy a package that gives them 15000 miles over the next forty years, which is the expected life of the wind turbine. This is financed for the first twenty years and the second twenty years is all theirs to keep.

15000 miles X 400 watts per mile is 6000 KWH need each year, or 500 each month.

6000 KWH needs 2 KWH capacity

Each KWH of capacity costs 5000 dollars, so they will need a loan for 10,000 dollars.

Using a 20 year loan at one percent interest, we get monthly payments of 46 dollars.

500 KWH each month costing 12 cents is worth 60 dollars so they have a nice 14 dollar benefit there. As electricity prices go up in the future, this benefit increases.

So in this deal, the new car owner would have a monthly payment of 46 dollars over the next twenty years, as opposed to 60 dollars. Any KWH the car owner does not use is used as money in the form of Power Currency. Any time the owner is short of KWH in any month, he can buy from the electric grid. This is a better system than taxation.

PENSIONS

We all know that the pensions are under stress. People are demonizing Greek retirees, and saying they need 'austerity' programs. Some even go so far to suggest less healthcare, implying shorter lifespans (early deaths). Maybe the problem is not that people are retiring too early, perhaps we can create so much wealth that people can retire in their thirties. Let us remember that the pension payments represent man-hours of labor, and is designed to

help people in their old age. Anyone that contributes to a pension program either privately or compelled through taxes, has a right to get a return on that investment.

Energy backed Power Currency is a good solution for retirees. Energy costs a good proportion of income for retirees, unemployed, single mothers, etc... People below 20,000 dollars income pay ten percent of their income to cover energy, while those above 100,000 income pay one or two percent on energy. You can take this on a national level, and pensions are a very good way to introduce energy credits into the money supply. Many retirees will have more than enough and will start to pay with these at grocery stores, transportation, etc... As energy costs go up in terms of dollars, retirees will stay get energy credits that are interest free.

The way it works now is:

1. Contributions come from people from their wages and income (normally from labor)
2. The money goes into some account
3. The pensions are paid back from this account in the same medium of exchange.

The problem is with the medium of exchange. If the Government or company has a shortfall, then they look to pensions to balance the accounts.

The Collectivists and Bureaucrats say we only have two options to fix this – tax more or reduce benefits. What if we decide that we are going to find a way to let people live as long as they want, don't encourage an early death, live in abundance, and cover our social security obligations?

Here is how we can do this.

1. Contributions come from people from their wages and income (normally from labor)
2. The money goes into building energy and transportation infrastructure.
3. The pensions are paid back in energy credits from those projects.

Other scenarios like this can be used with state pension plans. The pension fund allows workers to invest in renewable energy and receive their pension payment part in USD and part in KWH. People invest between one percent and 25 percent of their pension money

into this plan as the money is allowed to grow over time by the time they hit retirements they are looking at more than enough energy for their own needs. They sell off excess to their neighbors or allow it to accrue in their account. They can buy coffee, food, clothes and whatever they want with the extra energy backed money. State pension funds can match contributions from the loan interest we mentioned above.

Put the pension taxes into large projects and issue interest free notes, for these projects. These notes can be tied to the kilowatt hours, or can be government interest free notes. The government can also make the notes with interest but the interest gets paid back into the treasury displacing income taxes.

This will keep inflation low. Power Currency is issued and used equal to the electricity output. The infrastructure adds to the national wealth and will provide its own return on investment. There is no new debt from this and the dividends fund Social Security.

To illustrate, for an average Social Security monthly benefit:

Old way:

1000 Federal Reserve debt based dollars per month

New way:

Part in paper money (United States money or Federal Reserve money) and part in Power Currency.

For example, 80 - 90 percent in dollars and 10 - 20 percent in Power Currency.

Let's look at this proposal using the United States situation. The 2010 and 2030 population projections in the USA by age groups.

Year	0-14	15-64	65+	Total
2010	62380610	207623541	40228712	310232863
2030	72959056	228452703	72091915	373503674

So take the 2030 figures which are about when our bureaucrats predict the system will die.

Let's take ten percent of that

Monthly benefit	\$1,200
Paper Money	\$1,000
Power Currency	\$200
price per KWH	\$0.20
KWH/month	1,000
Capacity needed per day	
Recipients	60,000,000
KWH/year/person	12,000
KWH per year	720,000,000,000
KWH Capacity needed	164,000,000

This new capacity needed is equal to about fifteen percent of what the United States has now

Given time, say 20 years, the amount of infrastructure will make a dramatic impact to people's lives and make a huge break away from debt based money.

Power Currency is the money for the 21st Century. It uses the same economic system set up by our founding fathers

POWER CURRENCY WITHIN A MULTI-CURRENCY SYSTEM

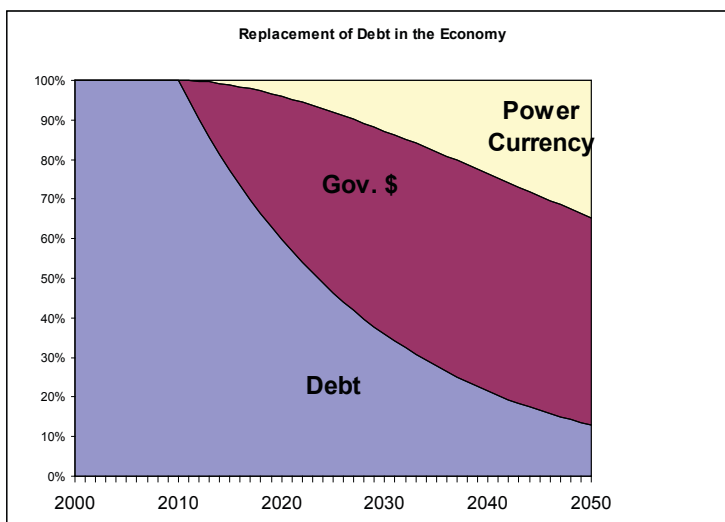
It is advantageous to phase this in over time. You can shift your tax system to flush out the old usury system and favor a new Power Economy. Here are some scenarios under a multicurrency system.

1. Debt based currency. Central Bank Notes remain in place and are used to pay off the national debt (no repayment of debt comes from government issued or power currency). Any payments for interest on the debt come directly from issuing more Central Bank Notes. Taxes can come from derivatives, interest payment and such. There is no requirement that any labor, land, homes or assets ever be forfeited to Central Bankers.

2. Government issued money. This is for infrastructure projects primarily. All pension taxes go to debt free systems to build infrastructure. This money can be backed by Power Currency, land or anything else.

3. Power Currency. Energy backed currency produced within society.

Here is how the Power Currency can develop.



Future money out to 2050

Taxes:

National Debt paid with other debt

Infrastructure projects paid with debt free money

Power currency related needs paid with power currency.

Power Currency is energy-backed money that reflects the 21st Century economy. With this kind of money, Greece and other sovereign nations can build a Power Economy. A Power Economy will be far bigger and stronger than now. It will be able to handle many of societies needs and will not transfer wealth to a small group of plutocrats. Power Currency supports society instead of draining society.

Power Currency, the money for the 21st Century.

Whole Systems Economics Going Beyond Energy-backed Currency to Consciousness-backed Culture¹

Autor: Jeff Eisen

Abstract

Those of us who wish to make changes to our world are well aware of the intransigence of an interconnected world, where everything affects everything. The task at hand is to find those aspects of the whole system that will have ripple effects throughout. Economics is that portal, and of course, the most entrenched aspect of the system, built upon the consciousness of scarcity emerging from the competition of the evolutionary process itself. Yet, taking a whole-system perspective, this paper identifies several possible (albeit contentious) strategies that would turn human motivation and behavior toward a consideration of the whole system. These include: moving toward an energy-backed currency and value-based economy, redefining profit through four column bookkeeping that includes impacts on the earth as a whole, taxation that takes whole-system impacts into account, and redefining competition toward the greatest good. Of course, implementing new economic strategies will always face the problem of the scarcity consciousness upon which old strategies have arisen, but steps such as these can build a new global, abundance consciousness, and lead us toward sustainable change.

Whole systems economics

I offer the following insights not as an economist, but as a psychologist, a psychologist that has spent over 20 years contemplating the roles that social and economic systems play in forming the consciousness of the individual, and of the roles that individual consciousness plays in forming the social and economic systems around it. These two forces work together to create a feedback loop, one which created the world that we live in today. It is imperative that we redirect this evolutionary feedback loop, in order to the change the world that we are to live in tomorrow.

¹ Taken from and expanding previous essays by Eisen, J.S. (2011a, b).

This feedback loop is part of a whole systems economics². Whole systems economics is just what it says it is... looking at the economic system as an aspect of a larger whole, as an arbiter of individual and cultural consciousness and vice versa. Of course, there are many portals through which we may grasp the entirety of the whole system, and thus change it, but for now I choose economics. In doing so, I realize that we cannot fix currency issues without fixing the economic system, and we cannot fix the economic system without fixing the culture and the individuals that make it up. This is axiomatic.

The following bullet points outline the discussion that follows and the feedback loops that might follow from an energy backed currency combined with a redefinition of profit. I consider here:

- Moving from a fiat currency to an energy backed currency; energy like consciousness itself is infinite and cannot be created or destroyed.
- Thereby moving towards a positive, abundance and value based economy; energy has value and is a unit of abundance.
- Thereby shifting human consciousness away from scarcity and survival consciousness.
- Viewing the corporation as a living system; but noticing that while all life is ecologically positive, capitalism and industrialism are ecologically negative.
- Redefining profit from consumption to whole-system contribution, reducing corporate irresponsibility and the degradation of the environment, using quadruple entry bookkeeping.
- Thereby rewarding whole-system contributions, and taxing corporations for the real costs of cleaning up the environment and reversing human suffering.
- Thereby redirecting not only corporate consciousness, but also human nature from limited self-interest to whole system appreciation.
- Making a case for a limited global regulation; global problems need global solutions.

² See also Eisen, J.S. (2012) The discussion of holosentience is relevant here. I posit that there is a capacity being awakened in human beings, a potential to perceive in the round, holistically, and to consider the reality of systems within systems within systems for effective decision-making. The considerations of this paper stem from a holosentient perspective.

— Moving from a fiat culture to a whole system enlightened self-interest.

The Evolutionary Advantages of an Energy-Backed Currency

The problem with fiat currency

Traditionally, money has either had intrinsic value in itself, like gold, or it has been backed by or exchangeable for something that has intrinsic value. The abandonment of this principle, and the world-wide move to fiat currency, money freely printed and backed only by the soundness of the country that issued it, has brought many of the world's economies to the verge of collapse.

Fiat currency, because it is backed and only backed by the credit of the issuing country, has both advantages and disadvantages. Basically, however, both can be reduced to the ability of national banks to print as much currency as they feel the need to and then make up a fitting rationale for doing so. The problem with doing so arrives when the net production of the country (GNP) in question has no relationship to its currency, or worse yet, has an inverse relationship. In these cases, as more and more currency is printed, its value is increasingly diluted and its buying power goes down. This, in turn, by and large raises interest rates, decreases the value of savings and pension plans, penalizes those living on fixed incomes, impoverishes the many and concentrates wealth into the hands of the few. Clearly, this system is not sustainable.

The world needs to return to sound money, currencies that either have intrinsic value in themselves or are readily exchangeable for something that has intrinsic value. In addition, this move has to be worldwide. In other words, whatever the currency is, whether it is dollars, euros or pounds, for maximum exchangeability, it has to be backed by the same commodity or basket of commodities (failing this, the world will have to find a universal basis for comparison, whether it is the dollar, gold, or the price of a Big Mac).

We need to go back to backed money, but what to back it with?

Some people think that getting rid of money altogether is the solution. But this is a "throwing out the baby with the bathwater" solution that will not really solve anything. Instead, it will leave us without a universal medium of exchange and set us back to a very primitive, barter economy. Sort of like going back to the horse and

buggy because the internal combustion engine creates air pollution, instead of going forward to non-polluting sources of energy. Getting rid of money is the last thing we want to do. Instead, we need to return to a backed currency, and a universally backed one at that, but the problem is what to back it with.

We could return to the gold standard, a solution that has many adherents, but also many drawbacks. One of these drawbacks is that gold, aside from its scarcity, has not much intrinsic value in itself. There is not a lot you can do with it except admire it, hoard it, and make jewelry from it. But the biggest of these drawbacks is its scarcity itself. It means that we have not only a scarcity-backed currency, but also a scarcity based economy – the disastrous situation that has been dominating human affairs since the dawn of civilization. Both support the survival consciousness³ that created the system in the first place.

Don't get me wrong, this is not a condemnation of competition, for it is survival competition that has been the primary engine of evolution, not only human evolution, but the evolution of all life⁴. It is as simple as this... forms of life that do not strive to compete, do not survive. It is not only the survival of the fittest that counts; it is the survival of the most competitive.

Although as the engine of evolution, scarcity-based survival consciousness is eminently necessary, in humans competition breeds separation, conflict, greed, envy, and all of the other inter-related ills of modern society. Integrated into an economic system it has brought most nations to the brink of collapse. Of course, it is still needed and always will be, but it is necessary to balance it with something more positive, something that promotes harmony and cooperation, something that doesn't demotivate individuals to compete, create and innovate, but rather redirects evolutionary flow to more constructive goals that take the whole system into account.

As human ingenuity and technology create more and more abundance, we need to take advantage of that, rather than manipulating it to perpetrate value through scarcity. We need to gradually

³ Survival consciousness comes from the belief that there are not sufficient resources to support everyone; therefore one has to strive and compete, both individually and as a group, in order to be sure of getting more than their share.

⁴ See Bloom, H. (1995).

get away from the competition of scarcity-based survival consciousness and move to a consciousness that is abundance based; let us call it abundance consciousness.

There are currently many proposals on the table for this shift, most of them well-meaning and many of them exemplary, but they all share one problem. They butt heads with the old system that, more out of collective habit than any other factor, dominates human consciousness (at least in the developed world). That is the economic system that really governs us, and that I call Econocracy. Every economic proposal, innovation and initiative for reform is ultimately weakened if not totally defeated on the economic level. This is nowhere more true than in the proposals to make business and corporations more conscious, for conscious businesses, (i.e., those incorporating humanistic principles) despite some exceptions, incur restraints and expenses which make them less competitive and therefore less likely to survive⁵.

The only way to get out of this bind is to move from a scarcity-based economy to an abundance based economy. But how are we to do that? The first step is for the world to abandon fiat currency. However, this does not necessarily mean returning to the gold standard, which would be returning to a scarcity backed currency. In order to advance to an abundance based economy, we have first to base our currency on a unit of abundance.

The first step could be abandoning fiat currency, not by going back to the gold standard, but by backing our currency with energy, which could be measured by the calorie, or by the standard measurement of work called the erg⁶.

What makes the calorie or erg a unit of abundance?

Energy, like consciousness itself, is infinite. It cannot be created or destroyed, only transformed or transferred. On a practical level a calorie or erg-based currency would move human consciousness towards abundance consciousness. As advances in technology con-

⁵ As Einstein's famous quote points out, you cannot solve a problem in the same consciousness that created it.

⁶ An erg is the unit of energy and mechanical work in the centimetre-gram-second (CGS) system of units, symbol "erg". Its name is derived from the Greek *ergon*, meaning "work". An erg is the amount of work done by a force of one dyne exerted for a distance of one centimeter. In the CGS base units, it is equal to one gram centimeter-squared per second-squared ($\text{g}\cdot\text{cm}^2/\text{s}^2$). It is thus equal to 10⁻⁷ joules or 100 nanojoules (nJ) in SI units. See also, Rae, P. (n.d.).

tinuously create alternative sources of energy that are more abundant, as well as less polluting, energy becomes less expensive, which means that humanity becomes richer in it, and therefore richer in general. One practical consequence of this advance is that as energy becomes more abundant, countries can print more money - without diluting its value. (The present reliance on fossil fuels is almost completely a result of manipulation by energy and mining companies to keep the economy in a scarcity mode.) Abundant and inexpensive energy is not only a primary component of prosperity itself, but it also frees humanity to move from scarcity-survival consciousness to abundance consciousness, which in turn throws open the doors to connection, collectivity, love and unity.

Energy backed currency is just a start. In a positive, abundance and human value based economy, various things could back the currency. In time we could back the currency with a basket of commodities which are positive indices of applied energy like clean water, abundant food, and essential services like universal education and medical care. Of course, that is a distant goal, but it could and should start with a move to an energy backed currency, especially if the energy that is backing the currency is not limited to fossil fuels.

However, in order for this to happen, it is not enough to back our currencies with energy. We have to radically change our entire economic system. In fact, we have to redefine the idea of 'profit' itself. Let us examine how our corporations define profit through a little invention called double entry bookkeeping, how double entry bookkeeping inevitably depletes both human and environmental resources, and how this deplorable situation could be easily reversed - how? - by making it more profitable to contribute to humanity and the earth, than it is to consume and pillage them.

Redefining Profit: a proposed solution to corporate irresponsibility and the degradation of the human environment

The corporation as a living system

Capitalism and the corporate culture, despite spinning off a virtual cornucopia of benefits for humanity as a side effect of its obsessive

drive for profit, has become more and more destructive to both the quality of human consciousness and the quality of the ecosystem. Capitalism is about making a profit and the corporations which populate capitalism are profit generating organisms. In this, they're not very different from biological organisms. All living systems have to operate at a profit, that is, increase their energy and substance, as well as propagate, in order to survive.

There is another similarity between corporations and living systems. All living systems survive, increase and propagate by consuming the resources of their environment and successfully competing with other living systems for the same resources. And finally, like corporations, all living systems not only consume resources, but also transform them, thus adding value.

However, all living systems, (with the exception of those created by industrial man) from bacteria to rain forests, whatever their rate and mode of consumption, ultimately create and put back more resources than they consume, with the ultimate return being the decomposition of their own bodies after death. For the most part, all organisms are not only ecologically neutral (contributing as much as they consume), but also ecologically positive (contributing more than they consume). One shining example of this principle is bacteria, which break down all sorts of matter, both organic and inorganic, into nutrients that not only can they use, but also directly or indirectly can be used by all life.

Recently, however, industrial man has reversed this process, consuming far more than he contributes, creating mountains, rivers and clouds of unusable and toxic waste, and threatening the very ecosystem that supports him, so much so that in less than a century, a mere instant in the lifespan of the planet, the natural balance has begun to be destabilized, and we are teetering on the brink of unprecedented scarcity in such basics as uncontaminated water and food, fossil fuels and clean air.

All life is ecologically positive, but capitalism and industrialism are ecologically negative.

There are many proposals on how to fix capitalism and the corporate system, but most are looking to either elevate the consciousness of management (with the idea that an increase there would trickle down the ladder of corporate practices), or elevate

the consciousness of consumers (with the idea that informed buying would influence corporate practices from the bottom up). Despite the considerable merits of these initiatives, I fear they are doomed to only a moderate success, so long as the way that corporations profit does not reflect their consumption of resources, both natural and human.

Redefining profitability: from self interest to enlightened self interest

The way in which corporations now figure the ratio of profit to loss is basically double entry bookkeeping. One column is for outflow, the cumulative cost of doing business; the other is for inflow, the income derived from selling goods, services and the like. If the sum of column two exceeds the sum of column one, the corporation is profitable and viable; if not, it eventually goes bankrupt. No other considerations whatsoever really count. If the bottom line is negative, the corporation is not profitable. End of story. Every other consideration, consumption, pollution, fairness, social consequence, aesthetics, ecological devastation, etc., is reduced to profit or loss. This means that in the final analysis, every consideration has to favorably influence the bottom line.

This, as far as it goes, is the way it has to be – even the way it should be. Corporations are subject to approximately the same energy economics as living systems. They have to make a profit, or at least not operate at a loss, in order to survive. (In addition, no one would either operate or invest in a corporation that consistently operated at a loss.)

The problem, though, is not that corporations operate for a profit; it is that the present economic system, not reality, defines this profit. Another way of saying this is that only the corporation makes the profit, not humanity and the global ecology (i.e., the humansphere⁷). As a matter of fact, corporations regularly profit at the expense of the humansphere, consuming and/or destroying a large part of the global system in order to eke out a relatively minor profit for themselves.

⁷ Humansphere: all of the levels of the system, both human and ecological, that support and nurture human life and well-being

At this time in history, a corporation can destroy an ecosystem, pollute a river and impoverish an indigenous culture, but if it makes a monetary profit, if it costs less to destroy part of the world than the earnings such destruction engenders, the corporation is deemed profitable — and the investors realize a comfortable return on their investments. That is not a real profit! That is not a profitable corporation, but a subsidized one that operates at a substantial loss. By who is it subsidized? By the countries that house it, by the ecosystem of the globe, by you and I, and by every person that walks or will walk the earth.

It is clear that we have to build accountability and responsibility into corporate consciousness; but the question is how to do this? I believe the most realistic answer starts with redefining profitability itself, in other words making it profitable for the corporation to contribute to the humansphere and unprofitable for it to consume without at least recycling and restoring.

The only way to do this is to make corporations accountable for the real costs of their doing business, to make them fully responsible for the consumption and the destruction they cause, and to make them pay for the real costs of correcting it. In this context a profitable bottom line would still be a surplus of income over expenditure, but the expenditure would include a monetization of the consumption and/or destruction of human and natural resources, and the income would be balanced by the need to pay compensation for the restoration of the human and natural resource pool. (Corporations and governments working together could accomplish this by monetizing or otherwise calibrating social and ecological consumption and balancing it out with contributions to the whole system, which could be either remedial or financial).

Quadruple entry bookkeeping

Of course, this will be a difficult task to accomplish, but it can be facilitated by interfacing it with the corporation's normal, accounting practices. What I would propose would be changing from double entry to quadruple entry bookkeeping, adding a column on one side for system consumption or depletion and a column on the other side for system contribution. In that way one could keep track of whether the corporation, viewed as a part of the total system of hu-

manity and the earth which supports it, i.e., the humansphere, was really operating at a profit or a loss. And if not, calculate to what extent the corporation is withdrawing from the common property of all the sentient beings on earth.

Reverse taxation

Corporations, then, would be taxed for the real costs of cleaning up the environment, replenishing resources and (as if this is possible) reversing human suffering and the degradation of everyday life. Overseeing this process would be a quasi-governmental function (on a global level). I can imagine a sort of global IRS, or ERS (External Revenue Service) which would further tax corporations which are system negative, reduce taxation and/or credit and reward corporations which are system positive, and neither tax nor reward corporations which are system neutral.

Within this framework of two-way taxation, corporations would not be taxed solely on the basis of traditional profitability, but also on net loss or gain to the social and ecological system. Profitability, then, would be redefined from a net monetary gain without regard to the whole system – to a net monetary gain balanced by its impact on the system. A system positive corporation would be proportionally rewarded, and a system negative corporation would be heavily and proportionally taxed. With this arrangement it would even be possible for a corporation to turn a profit when it was running at a monetary loss, or conversely, for a corporation to operate at a net loss, even though profitable in monetary terms. This alone, without necessitating any other changes whatsoever, would lead corporate energies in new and positive directions.

Redirecting human nature

Marxism failed by not taking into account two aspects of human nature, individual self-interest and the survival drive. Margaret Thatcher was of the opinion that due to the same considerations of human nature, there were no viable alternatives to capitalism. However, by redefining profitability, you neither have to change human nature nor abandon capitalism! Profitability can be redefined by extending its beneficiaries from the individual or corporate selves (as well as other collective but separate selves like family, religion, and

nation) to the whole humansphere. This redefinition takes advantage of human nature and redirects it to benefit the world rather than plundering it. This is the concept of enlightened self-interest⁸ expressed on the corporate level.

If we redefined what it is to be profitable, neither self-interest, the survival drive, nor the drive to corporate profitability would have to be changed.

Potential economic and social outcomes

It's possible that redefining profitability this way could lead to a reduction in government revenue from corporate taxation. However, this would be more than compensated for by a drastic reduction in expenditures for government services, subsidies, regulatory services, and the size of the social safety net. Many, if not all, of these governmental functions are now necessitated by corporate irresponsibility, but in the new order, where corporations are either taxed or rewarded for the way they impact social and environmental systems, the need for many of these government services would be dramatically reduced, and still others would be assumed by the corporations themselves. In addition, the consumption and destruction of our planet would be gradually reversed as corporations find it more profitable to conserve and restore, rather than to consume and destroy.

The ways in which corporations and the technology they develop and exploit can contribute are many. The surface is not even scratched. Once corporations grasp the principle that minimizing consumption and destruction and maximizing contribution and restoration can positively impact their profitability, with the savings potentially exceeding the costs, the immense ingenuity of entrepreneurial capitalism will be turned to conservationist, ecological, social and humanitarian concerns, and the degradation to both the natural environment and human consciousness will be quickly and profitably reversed. And all of this can happen without the need for further regulation, corporate altruism or even individual enlightenment.

⁸ Enlightened self-interest is the realization that ultimately one's individual self-interest is dependent on the survival and stability of the All, the furthest extension of the system that holds both humanity and the individual, and which both are dependent on.

Realistically we can expect an increase in corporate altruism and both ecological and humanitarian awareness when and only when these qualities become economically advantageous. Once this happens, corporations will value these traits in their policies as well as employees, and the propaganda/education machine of our society will begin to promote them in earnest.

Of course, the monetization and/or calibration of negative and positive, societal and ecological impacts is going to be a difficult, contentious and time-consuming process, but it is doable. Not only that, it will quickly spawn new technologies, new industries, new professions and above all – a new consciousness.

It will also be expensive, but only by the old standards of double entry bookkeeping and consumption profit. By the new, quadruple entry standards of contribution profit, where contribution is balanced against consumption, it will be immensely profitable — not only in dollar terms but even more, in environmental and human terms.

In addition, making corporations accountable for the damage they do will immensely diminish the cost of governing and running a country, from sustaining its infrastructure to providing human services, and will consequently decrease the necessary tax burden on the populace. To develop one example: cleaning up the environment, phasing out unhealthy and adulterated foods, purifying the water supply and improving working conditions will immensely decrease the need for healthcare and thus the costs. However, these and other benefits will only accrue if our corporations are made strictly accountable and billable for the way they consume our world.

In this every corporation would be treated identically. Every corporation that could demonstrate that it put back more than it took, would be treated as a nonprofit, or better yet, subject to a reverse taxation income flow. Conversely, any corporation that operated at a deficit to the social or physical environment, whether it was for profit or nonprofit, would be taxed accordingly. This would mean that some corporations whose profitability is marginal and whose environmental cost is substantial would be taxed out of viability. Others who operated without profit or even at a loss, but were system positive, would be compensated into viability. 'Non-

profit' would become an irrelevant distinction. (Furthermore, I deem it axiomatic, that any corporation which is significantly system negative should be so severely taxed that it would be impossible for them to show a profit and remain economically viable, no matter how great their unbalanced, consumption-derived income is.)

Impacts on Human Consciousness

Perhaps most importantly, redefining profitability will elevate human consciousness itself. Writer and Holocaust survivor Eli Weisel said of the Nazis "they killed the God in themselves". To a lesser extent, but just as surely, corporations under their present charter tend to kill the God in all of us. They kill the God in their employees, they kill the God in the corporate officers, and they kill the God in the consumer, or at least try to. Why, because no matter how well-intentioned they are, profit and nothing but profit is the bottom line. It has to be. Of course, they will give lip service to all sorts of high ideals like integrity, green business practices and service to mankind, and sometimes even accomplish a modicum of that, but when profitability threatens viability, crueler – I mean cooler heads emerge, ideals are sacrificed, and survival at any cost quickly becomes the name of the game.

This is not evil. To quote The Godfather, it is simply "business." Business in the present economic structure, with the present definition of profitability, is like that. No one is to blame, and everyone is to blame. It is the system, and the system kills the God in everyone that the system touches.

We can try to change human nature, but the truth is we are not going to succeed very well. In fact, for the most part, the very people who are trying to change it, are faced with the choice of either bucking the system and being made powerless by it, or joining the system and being corrupted by. The only hope is to change the system itself. But since the Communist Manifesto, there has not been a really complete and compelling vision of a new, economic order. Communism failed, not because its ideals were evil, but because it ignored the 'evil' aspects of human nature. Learning from that mistake, we propose to harness and redirect the forces of individual self-interest and survival consciousness rather than denying them.

Paradoxically, however, if anything can change human nature, it is harnessing and redirecting these very forces of selfishness and survival consciousness. It's not that we're going to change human nature, because human nature is what it is. But human nature is two sided. Just as we can alienate or kill the God in us, we can also bring it out. And for the most part being expected, nay required to be positive and loving, to do good deeds, to contribute to society, and to be part of a social order which encourages and rewards that, not only makes people happy, it brings out their Godness.

Wars, violence, criminal behavior, social unrest, marital discord, teenage ennui, litigiousness, etc. all are symptoms, symptoms of a defective system, a system born of the illusion of separation, of competitive individualism. The present economic system, where the only mandate for corporations is to make profit for their stockholders, was conceived from that consciousness. However, the son has become the father and now corporate consciousness is eroding even the competitive individualism that spawned it. It is making almost everyone into corporate zombies, mindless of the devastation they wreak and ravenous for any vestige of living flesh not yet consumed.

The case for global regulation

Of course, none of this can happen without a global regulating agency, one that has the power of taxation and rewarding. No one is more aware than I am of the countless difficulties and disadvantages associated with this. However, we have to all face the fact that we are one species sharing one planet. What one country does to its population, or takes out of the Earth, or adds to the water or the sky affects all of us. On the face of it, any proposal that rests on global regulation would seem to be unrealistic in the extreme. However, given the fact that the problems we are facing are global in scope, what is really unrealistic is anything short of a global solution – and any global solution presupposes some level of global regulation, which unfortunately suggests a global governing body. The solution I would propose is a multilevel governmental scheme or global federation, where global issues and only global issues are the jurisdiction of the global government, national affairs and only national affairs are the jurisdiction of national governments and

local affairs and only local affairs of the jurisdiction of local governments. Sort of like federal, state and city governments in the United States. Global government does not necessitate the giving up of national and local autonomy, but where basic human and ecological issues are concerned, we are one species sharing one Earth and no one nation, state, city, corporation or individual has the right to consume or destroy any aspect of that.

That said, there are three primary dangers of globalism that we have to look at, central planning, demotivation and over-regulation.

From central planning to distributed feedback

The problem with central planning is the feedback loop. With past experiments in central planning, the only feedback loop is between the company or corporation as a whole, and the planning and/or regulating agencies, and that is such an extended feedback loop that effective regulation is next to impossible. Furthermore, inter-company feedback is minimalized. What I would propose is the opposite, a complete ban on meddling on the part of the planning and regulating agencies, and the addition of a number of internal feedback loops, between management and workers, from foreman to workers, and from worker to worker. This way the work in question, whatever it is, would be done with maximum efficiency. This matrix of feedback loops is not only a proposal for effective central planning, is a primary facet of evolution, whether on the species, group or individual scale, or for that matter on the evolution of all life itself.

There is another problem as well with central planning, and that is that the planning agency only proposes goals, goals that may or may not be realistic. Sometimes they are too easy to accomplish, but most often, they are way too ambitious. In the first case success is too easy; in the second case failure is almost ensured. Which brings us to the third problem with central planning; it tends to create a situation where the blame for failure greatly outstrips the reward for success. This, in turn, creates a fear and 'pass the buck' mentality where the axe falls on the persons least powerful and least to blame.

In a global government situation, central planning must be kept to a minimum, not allowed to set unrealistic goals or interfere

with the autonomous running of companies. Above all, it must not become punitive or scapegoat companies for failing to meet unrealistic goals, but instead become reward and success oriented.

From over-regulation to trusting the system

Over-regulation is another danger of global government and central planning. However, this can be avoided if government trusts in the new system. If it really turns out that companies and corporations will be more profitable by contributing than by consuming, this will be a powerful incentive to self-regulate, and almost the only role that government would have to take would be that of enforcing accurate bookkeeping.

From demotivation to redefining competition

In whole systems economics, individuals and corporations would largely give up the expectation of realizing huge profits from their endeavors. One could argue then, and with some justification, that this would demotivate people to the extent that many of the industries whose fruits we now enjoy, would either not have come into being in the first place, or, would be a shadow of their present self. That is, without the incentives and pressures of the free marketplace, we would experience a 'Russian' economy where the shelves are bare of choices, and the quality of what is produced is often shoddy.

However, redefining profit from consumption to contribution does not mean doing away with competition. There are various ways of retaining and even enhancing competition without either the conventional profit motives or the expectation of huge profits. One way is an incentive structure, where individuals, companies and corporations receive rewards for excellence, contribution, controlling costs and timely completion, but nothing but minimal compensation for mediocrity and/or failure. Again, the only thing that has to be guarded against in this regard is a punitive structure. If people can earn rewards, but not be punished or penalized if they don't come up to snuff, the result will be a fluorescence of eagerness and creativity.

Another way to ensure excellence and creativity is through outright competition. If two or more individuals, companies or cor-

porations are set to accomplish the same task, then they will strive and strive hard. However, again there must be some protection against loss. Organizations and their employees need to be adequately compensated for their expenditures and their labor, even if they don't win the day. But this compensation should be kept to a minimum, and if possible agreed upon in advance

However, the paradigm shift of contribution outweighing consumption might still blunt the cutting edge of some forms of creativity. The truth is that we might not have as many smart phones, computer tablets, fashion choices, models of automobiles and other slick consumer goods. But do we need them? My thought is that we are going to channel the creative minds into creating things of real value: producing organic food through permaculture, making advances in understanding disease and encouraging wellness, universal housing, real education, creating new strategies of governance, etc. Without the specter of scarcity and the survival consciousness it spawns, there will arise a new idealism, not the unrealistic, wish fulfillment idealism of today, but an idealism that is practical, doable and analytic - considering whole systems, foreseeing problems and aiming for real results, while at the same time being competitive.

Global heroes

There is another way of rewarding people for excellence, and that is the creation of category of Global Heroes. In the West we have the Nobel Prize. In Japan they have a category of national heroes. It is only a small jump to create a category of Global Heroes, people who are singled out for outstanding contributions to humanity and to the world - then rewarded with that reward that towers above all others -prestige.

From a fiat culture to enlightened self-interest

And that brings us to the task of cultivating a culture that is evolving toward these goals...

At the present we don't only have a fiat currency, we have a fiat culture. Both our currencies and our culture are backed by illusory values; not only that, but the illusory values of our currency and our culture are closely connected. Our currency is backed, not

by what it can be redeemed for, but by what it can buy, and when what it can buy diminishes, its value diminishes. When our currencies, be they dollars, euros or anything else, can no longer buy anything, they will cease to have any value. Currently, what money can buy is almost totally determined by the expectation that the countries that issue the currency, will, if push comes to shove, stand behind it. But the truth is that none of them are backed by anything of real value, they are all fiat currencies backed by fiat cultures. Consequently, it is impossible for the issuing countries to stand behind them.

The same principle, although to a lesser extent, stands behind our cultural values. Of course, good, nutritious food, clean water, adequate housing and even transportation and communications are of indisputable value, but those things constitute a small percentage of what the westernized world values and consumes. The "things" that signify success, prosperity, luxury, prestige, superiority, style, choice and so on make up the lion's share of what we consume and value. Community, creativity, peace, security, leisure, freedom from want, health and real medical care, and real education, what has been termed the gift economy, and generally living in a field of caring and love, these constitute real values. To a great extent they are generated by the community, and they are potentially affordable to everyone. What is needed is an economic system that encourages these real values, rather than marketing false values and thus sustaining scarcity.

On the other hand, we as the individuals that make up humanity are part of the same system that oppresses and exploits us - as much a part of it as the corporations, their officers, and even their employees. We are all to blame, and yet there is no blame. Most of us are part of one, extensive system, supporting one another, equally culpable, equally ignorant, and equally guilty of ignoring what is really valuable. To hold that we are going to fix the currency without fixing the system, to hold that we are going to fix the system without fixing the culture, and to hold that we are going to fix the culture without fixing the consciousness of the individual - and vice versa- is the height of naïveté.

Enlightened self-interest

Enlightened self-interest is the realization that ultimately one's individual self-interest is dependent on the survival and stability of the All, the furthest extension of the system that holds both humanity and the individual, and which both are dependent on. People of little or no imagination and/or education have trouble imagining that they are dependent on any system that goes beyond their individual efforts. At best they understand that their survival is dependent on the survival of an economic unit like their family, their religion, their country or their corporation. At this moment in time however, people are becoming aware that both their survival as individuals and species is dependent upon the survival of the present ecological balance of the Earth. This is the minimum consciousness that qualifies as enlightened self-interest. Actually, our survival is directly dependent on the survival of the present ecological balance of the whole cosmic system that encompasses us. Not necessarily the survival of any one element, be it a species or a star, but the survival of the cosmic metabolism, the cosmic ecology, the cosmic Tao.

Fortunately, at present the powers of humankind to nurture or consume and destroy, are still concentrated mainly on Earth, with extremely limited forays into the space of our solar system. But that is enough! We can destroy our planetary home, or we can wake up in time and garden it. It is at once an opportunity, a training and a test. We can seize the opportunity, master the training and pass the test, or we can fail and destroy ourselves. This opportunity is being presented to us on every imaginable level from individual to social to ecological. The economic level is not an inconsiderable part of this emerging, multidimensional consciousness. Whole system economics, as a fractal of enlightened self-interest, is an essential step that needs to be taken without delay.

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Biography

Dr. Jeff Eisen, Ph.D., is an enlightenment therapist, teacher, and author. Trained as a psychotherapist, he has gone far beyond that to create PsychoNoetics, a system of holosentient thinking, intentional clearing and evolution. In his books and in dozens of online essays, he has explored nonduality, the nature of illusory reality, and recently, the socioeconomic forces that condition our consciousness. Dr. Eisen practices and teaches PsychoNoetics locally in his South Florida office, and globally through the Internet. Email address: drjeisen@psychonoetics.com. Website: <http://drjeffeisen.com>.

Autor: Nick Gogerty and Jozeph Zitoli

Currency Definition

The goal of a currency system should be economic stability and growth as a means of improving citizens' lives. A currency acting as a stable store of value contributes to economic stability.

Premise/promise

All currencies are belief systems. The inherent belief for users of a currency is that the currency issuer does not over-issue or debase the currency relative to the asset portfolio held against the currency by the issuer. The first and primary role of a currency for users is as a store of value. After that role is established, a currencies economic utility function is as a means of exchange. Historically, currencies have been government debt or commodity backed.

The DeKothesis is that energy, more properly electrical work in the unit form of delivered kilowatt hours (a DeKo), may be a more stable asset form for backing a currency. A DeKo backed currency may offer the advantages of stable value and economic utility over time that neither debt nor gold backed currencies offer alone.

The utilitarian value of a currency as a unit of exchange is driven by people's faith in the currency as a representation of value. Currency faith is driven by faith in the issuer and the perceived value of the issuer's underlying asset portfolio. If the assets in the currency issuer's portfolio are perceived weak or not present, the currency may become volatile, potentially contributing to economic contractions.

Most currencies represent claims on portfolios of government debt and other perceived low risk securities.

Debt backed currencies often hold assets denominated in the currency itself. This leads to a complex reflexive relationship between assets held and the metric used to determine their future value. Often the bulk of these debt assets are domestic government debt, meaning that a government's fiscal policy (taxation and spending) and monetary policy (currency issuance and inflation targeting) management attempts become tightly interrelated.

Hard vs. Soft Currency

Currencies require perceived value stability in order to perform their primary economic role acting as stores of value to facilitate trade and their secondary role as a unit of account. Historically, currencies represented claims on physical assets such as gold or other hard assets such as grain. These commodity backed currencies were mostly separate from government political fiscal policy. Many early civilizations were defined by their economic activities and their currencies strength reflected these activities output such as agriculture or trade.

Consumer

Consumers as holders of a currency bear the ultimate risk of a currency in exchange for its usefulness as a store of value and unit of exchange. The more stable the currency, the longer the period consumers may hold or “bear” the currency using it for trade or as a store of value. This faith in a currencies purchasing power and unit of account allows for longer term planning and investment.

Monetary policy

Shutting the devaluation escape hatch for Good or Bad?

Many countries consider currency devaluation as a last ditch escape mechanism for economic relief during a fiscal budget or debt crises that places the ability for a government to service its debt at risk. It remains to be seen if the approach of periodic currency devaluation as a government crisis response aids long-term growth. One could argue that the economic pain of devaluation (inflation spikes) acting as penalty for savers coupled with lingering currency uncertainty hinders the private sector capital appetite for longer term and larger capital planning and investment. This investment appetite decline may reduce a country’s longer term potential rate of growth.

The complex reflexive relationship in government debt based currency systems poses analytical and political challenges. A fixed commodity standard based deliverable currency provides a measured understanding of the economic value of the callable currency issuance going forward. This measure of future utility as a metric

may provide earlier and clearer price signals for economic and political actors in government debt market pricing and demand.

An economic risk is that the market represented by the asset backing a currency may become economically distorted by the currency issuer's purchases. Gold, Debt or Electricity all become sensitive to the shifts in demand caused by large currency issuers such as central banks.

The current published asset base of the US Central Bank known as the Federal Reserve is shown below for illustrative purposes.

Consolidated Federal Reserve Securities Held outright

All amounts in millions of USD

As of 1/5/2011

Bills	\$18,423
Notes and bonds, nominal	\$956,554
Notes and bonds, inflation-indexed	\$49,743
Inflation compensation	\$6,265
Total US Treasury	\$1,030,985
Federal agency debt securities	\$147,460
Mortgage-backed securities	\$992,141
Mortgage and related debts	\$1,139,601
Total securities held outright	\$2,170,586

Source: Federal Reserve
<http://www.federalreserve.gov/>
 Table1

A Government and its Central Bank relationship

Governments and Central Banks are two separate entities. Depending on the country, the central bank has varying degrees of freedom with respect to the assets it may purchase and how it manages its monetary policy. The relationship between a country's government and central bank runs a continuum from total central bank political

independence to a fully captive and controlled central bank.

When a central bank or currency issuer is in a fully captive role, the currency issuer typically becomes the major consumer of domestic government debt. This leads to a distorted market for government debt. A politicized central bank effectively treats currency holders as captive consumers of government debt. One risk of any central bank is that it may overpay for assets or sell them too cheaply. Many have argued the forced consumption of government debt by currency holders is a form silent tax. This can occur whether those assets are gold, debt or some other form or representation of an asset.

Useful price signals for government debt markets may be hidden due to the currency holders' role as captive debt consumers. A variant of this has occurred in Japan as its large postal savings bank became a quasi captive consumer of government debt, effectively using domestic savers in the postal banking system as captive government debt consumers, allowing the government of Japan to have a 200% debt to GDP ratio with minimal interest rates. This indirect tax on currency holders and savers may hinder or mask fiscal policy reform needs.

Governments manage fiscal policy in terms of taxation (income), government debt issuance and spending. Many central banks are not technically required to purchase their domestic government debt to back their currency.

Centralized Issuance

A country's central bank is often a quasi-captive consumer of the government's national debt issuance. This circular mechanism of having a currency denominated in the national debt has for decades, in various countries, acted as a national fiscal get out of jail free card via the route of government spending funded by central bank purchases potentially at the expense of currency holders.

Gold Based Currency

Gold backed currencies rely on the assumption that the gold is available relative to the redemption demand for the currency. At various times, banks issuing gold backed certificates and notes have been found to not have enough metal on hand due to over

issuance and a crisis in confidence. This type of issuer liquidity and or solvency risk is inherent in any currency where the issuer isn't fully transparent in regards to the nature and availability (term structure) of their asset holdings and the asset base is too leveraged relative to issuance. The DeKo alone will not resolve the over issuance risk of a reserve based currency, but it is intended that the increased transparency and the known future utility value of the assets induces issuers to retain adequate reserve ratios.

Gold challenges

Hard currencies backed by gold or commodities have their own challenges relative to risk, storage, pricing variance, reserve ratios and market distortions. Since 1972 and free floating gold, the average annual range of price fluctuation in dollars for the price of gold has been 37%.¹ One can argue whether this fluctuation reflects mostly perceived variance in the demand for currency or gold. Regardless, such variance poses challenges to the "stable" unit of value argument for gold. What many pro gold currency backers actually seek without articulating it properly is a transparent issuing entity with policy stability and full transparency. These are sought as mechanisms for increased value stability in the underlying assets.

It can be argued that increasing gold production due to central bank demand provides less social utility and developmental progress than increasing demand in electrical production. Gold has limited utilitarian uses relative to the amounts produced. Gold has an estimated 11% of annual production used by industry². One might say that gold is dug out of dangerous holes in poor countries to be re-buried in safe holes in rich countries. Gold's primary value is in the belief that others value it. Gold is a socially constructed store of wealth, subject to the fears and beliefs of others, but not their actions or material needs.

Debt Based Currency

Domestic Government and private sector debt in the form of notes and bonds are claims on future cash flows mostly priced in the domestic currency itself. If the currency or economy weakens, the value of those claims may also weaken at the same time. One may consider the currencies underlying debt assets as more uncertain

in future value due to the reflexive relationship of an asset being valued and priced in terms of its future self.

Governments seeking ways out of fiscal or economic crisis may direct a captive central bank to create currency via purchases of government debt, mortgage backed securities or other securities. These central bank purchase activities increase the narrow money supply and may induce significant inflationary scenarios. In captive central bank currency environments, currency issuance, economic growth, fiscal policy and political motivations are complexly and reflexively interrelated which may lead to extreme feedback loops and convex currency value outcomes. This combining of central bank monetary and government fiscal policy may introduce significant uncertainty into the currency valuation equation. Significant value uncertainty is associated with assets priced at risk discounts and on a large scale may impact economic growth and citizen well being.

Domestic debt ring of uncertainty

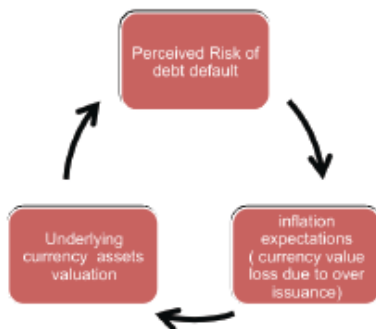


Chart 1

These feedback loops (Chart 1) may lead to convexity (exponential) changes in price (current purchasing power) or yield (expected value going forward). Like many convex relationships, the drivers are often misunderstood or misidentified until it is too late. Going from a 20-50% debt to GDP ratio is not equivalent to going from 70%-100% debt to GDP ratio. At a certain point of interest payments outstanding relative to GDP,

the payments become so large that they dominate budgets with governments effectively entering a debt spiral.

Failed faith in debt backed currency systems

Most people calling for alternatives to debt-backed currencies discuss gold backed currencies. Gold is easily managed, measured and has historically been perceived as valuable. Although limited in utilitarian value, the historical logic that gold has value across cultures has made it a store of value, a circular form of belief and associated behaviors. Due to a limited utility, gold's value is a function of demand and belief. This has lead to wide swings in price having little to do with utilitarian value.

The DeKo backed currency solution

A DeKo represents kilowatt hours delivered, a unit of work (energy consumed over time). The terms and nature of delivery are standardized and the assets held by the issuer represent the ability and expectation to deliver DeKos as contractually backed. DeKo based assets are worth a premium or discount relative to the standard delivery attributes including physical point, rate and time of electrical delivery. The DeKo based currency issuer holds a portfolio of electricity delivering assets.

Coal, oil, natural gas, hydro, geothermal, solar, wind, etc. are not DeKo deliverables. Electrical output measured in kilowatt hours (kW·hs) (work unit) made available on the grid or to an agreed off taking party is the DeKo based asset deliverable. The DeKo represents a promise of the standardized delivery of work (electrical energy over time), not any particular fuel. Fuel is potential energy. The cheapest to deliver electricity based on fuel or generating type facility may be chosen by the deliverer and the cost of shipping electricity transmission are adjusted based on agreed rates and specifications of cost/loss to meet the contractual delivery requirements.

An economic promise for energy delivered using DeKos as the underlying asset provides a standard future reference for the deliverable asset baskets functional value in Power Purchasing Parity (PPP) represented by a currency. This standardized reference serves to anchor one side of the value equation versus the abstract and reflexive nature of domestic debt value. The reflexive debt problem is

especially pronounced in central banks holding significant portions of domestic government debt as assets.

Each issued DeKo represents a portion of the portfolio of energy assets approximating the delivery of 10 kW·hs. It is important to make the distinction that each DeKo only approximates 10 kW·hs as future delivery contracts are adjusted relative to delivery risk factors. The central bank's mandate is to maintain a portfolio equivalence ratio of 10 kW·hs delivered with minimal failure to deliver risk relative to each DeKo backed note or coin issued. The central bank is likely to purchase excess forward delivery contracts relative to outstanding issuance to reflect portfolio default (failure to deliver) risk.

Social Utility Theory DeKos better than gold?

The DeKo doesn't solve the risk of over issuance or fraudulent asset backing associated with a currency issuer in a fractional reserve structure. The DeKo provides a more stable unit of value over time with greater socioeconomic benefit. Many desiring gold backed currencies are merely articulating a desire for a stable independent central bank issued currency with a fixed reserve ratio. In this guise, gold is the fiscal and physical expression of a rational economic desire for price and monetary stability.

The desire for fixed value currency runs counter to some macroeconomic theory that advocates a 1-2% stable annualized inflation target rate as optimal for optimizing longterm economic growth. This 1-2% inflation rate is effectively a wealth tax on currency holders but not necessarily asset holders.

The value of the deliverable assets representing DeKos may be more concrete than politically sensitive domestic debt assets, which may default or be devalued due to inflation (over issuance) or reckless government fiscal policy. The DeKo issuer could maintain callable assets to meet the capacity for delivery of outstanding DeKos. DeKo asset risk is based on energy delivery and less on political fiscal responsibility. The DeKo issuer is assumed to be an independent central bank.

DeKos offer more utilitarian advantages as they are less subject to

political spending whims. A kilowatt hour today has the same approximate functional utilitarian value as a kilowatt hour tomorrow; the same can't be said for government bond interest payments that vary in value relative to fiscal and economic circumstances on a going forward basis.

Commodity backed currency, nice but negative

Commodity backed currencies represent the extreme of a continuum in terms of a fixed value callable asset. The DeKo posits that interesting choices lie between debt (less certain but high utility assets) and metal (certain but low utility) backed currencies. This relationship is indicated in Chart 2 below.

Types of currency asset

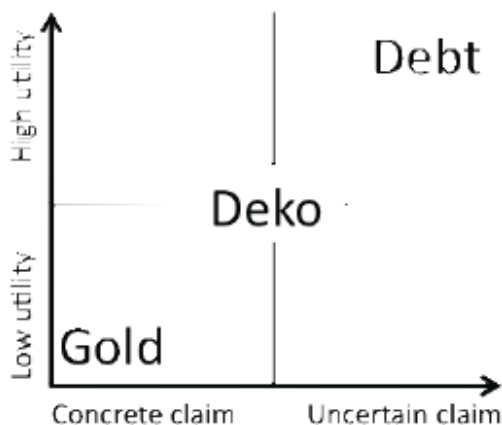
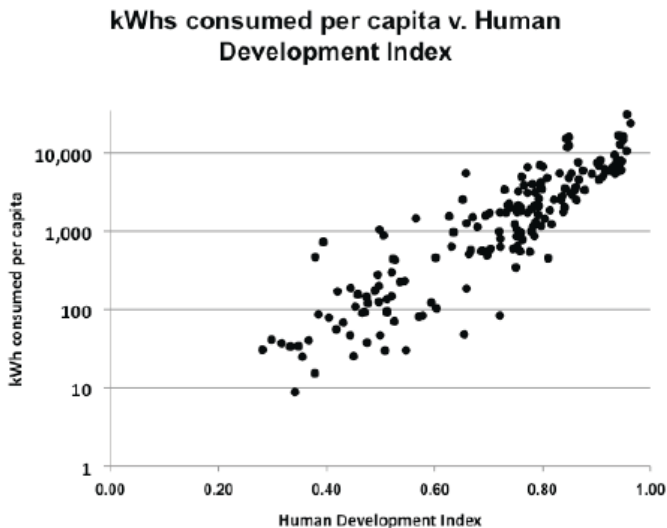


Chart 2

A problem with gold and commodity based currencies is the negative real yields over time due to the associated storage and insurance costs. Real electricity prices are moderately stable over the long run with demand growth tracking GDP closely in most countries over the decades.



Sources: CIA World Factbook 2008, UN Human Development index, Human Development Report 2006
United Nations Development Programme

Chart 3

Electricity has a standardized value and a range of utilitarian purposes. Chart 3 shows a plot of electricity consumed versus the HDI Human Development Index with each dot representing a single country. Humanity is becoming more reliant on energy for maintaining its standard of living. The highly interconnected networks of electric grids have the benefit of being transparent, redundant and adaptive to crisis.

Causation isn't correlation, but an argument can be put forth that readily available affordable energy appears to be a crucial part of developed emerging economies. The opportunity exists for emerging economy central bank holdings to aid effective domestic electrical energy production and distribution. An emerging economy central bank investing in electricity delivery assets may prove more socially beneficial for citizens than purchasing developed nations debt or purchasing gold to sit in its vaults.

Fuel Risk

One interesting option for countries dependant on imported fuel resources for electricity generation is to secure foreign delivery and supply terms for the DeKo in other countries agreed grid delivery points using agreements with foreign generating firms as assets. These facilities, similar to liquidity guarantees at banks, could be set up at issuance and called upon at the appropriate times. By separating delivery point from domestic currency issuance point, political and other risks could be mitigated. The central bank or issuing body holds a portfolio of delivery guarantees and international electricity swaps on its books as assets. The assumption being that the utilitarian value of electricity is stable on a going forward basis. Should the issuing country experience an economic crisis, these foreign delivery assets should retain their value in much the same way that higher rated foreign government debt does for some developing countries. This foreign electricity delivery asset portfolio for a currency issuer is not as radical as it sounds. Many countries' currency strength are assessed relative to their central bank's foreign currency and debt holdings relative to outstanding balance of payments and issued currency.

For countries with fuel import risk another DeKo option exists, namely renewable energy issuance, which may be valued at a premium. Most non-carbon energy resources are upfront capital intensive with small ongoing operation and maintenance costs over their 15-30 year operational lives. Proven non-carbon energy sources include nuclear, hydroelectric dams, geothermal, wind and solar. These non-carbon generating sources contributed to 30.6% of all electricity generated in the U.S. in 2009.³

Fuel agnostic DeKos could be green

Carbon free electricity generation such as hydropower, geothermal, solar, nuclear and wind require limited or no fuel. Large upfront capital combined with marginal operation and maintenance costs represent a different cost and risk structure relative to carbon fuel based electricity generation. Fuel risk is mostly eliminated in renewable energy situations. The intermittent nature of some renewables is less of an issue when delivery obligations are considered over longer periods and in the context of large geographic grids

with baseload equivalent sources available.

A central bank or country wishing to minimize the dependency risks of imported or single fuel feedstock could accelerate renewable energy infrastructure projects by purchasing them with DeKos. During fiscal crises such issuance and the related investments in generating assets or enhanced transmission capacities for efficient electricity delivery may act as a mild stimulant to the economy.

Renewable backed DeKos may trade at a premium due to the mitigated fuel price and availability risk going forward. The importance of the DeKo is as a stable store of value. Most renewables, such as concentrated solar and wind are costly during their early stages of technological development. These technologies benefit from larger stable sources of capital and accelerated development, leading to lower deployment costs going forward.

Accelerated investment in technology driven energy resources drives the experience curves faster in renewable technologies. Research from the International Energy Agency (National Renewable Energy Labs) indicates a 10-20% decline in cost per watt delivered for every doubling in production of renewable generation assets due to experience curve effects⁴. Accelerated innovation due to increased deployments likely reduces future renewable deployment costs, providing benefits for citizens in the form of cheaper energy and potential export trade opportunities for firms who have developed innovative technologies. Depending on the structure of delivery terms, DeKo issuance could be used to spur grid transmission improvements helping scale other renewable projects and increasing electrical grid stability.

One concern is that DeKo issuance may distort electricity markets with overly cheap energy leading to waste. A potential response to such risk is to have the central bank limit delivery obligations to a portion of grid capacity or demand at a given time. An analog behavior in debt-backed currencies is the restriction of some central banks limiting the percentage of domestic debt issued at auction. In the U.S., the Federal Reserve had a 35% self-imposed auction participation restriction rule that has been recently raised to 70% in 2010.

Physical Functionality

The electricity industry is made up of three key functions; Generation, Transmission and Distribution. Generation occurs at power plants, hydroelectric dams, wind farms, nuclear reactors and other industrial scale electricity generating facilities. Transmission occurs using large towers and cables over long distances sometimes hundreds or thousands of miles. Distribution involves stepping down voltage at local substations and distributing electricity to homes and offices.

The DeKo assets are purchased outputs from generating facilities that are then sold to end customers, such as transmission firms, distributors or large industrial electricity users. Transmission and distribution utilities face supply mandates and requirements for uptime that mean a low tolerance for risk. Some regulation of operators is critical to maintain grid uptimes and avoid the monopoly inherent in the network economics of electricity transmission and distribution systems.

A non-monetary factor at work in electricity pricing is the significant real price declines from 1990-1999 that may reflect technology improvements, the rise of natural gas turbines and or deregulation. Technology has made energy cheaper in real terms as efficiencies evolve over time.

The DeKo issuing central bank purchases output from a mix of generating facilities. As such, these firms must have excellent finances or sell power at a discount relative to perceived risk of failure to deliver. DeKo assets are equivalent to super senior or first calls on output power.

The continental U.S. transmission network is made up of four separate networks. Going forward it may make sense to link them up for more efficient transmission and robust operations. If a country was found to not have a robust grid, then electricity delivery assets could be purchased in other secure countries. The assumption being that these countries' PPP for electricity is stable relative to the DeKo.

Many central banks that purchase other countries' assets to back a currency hold a large portion of developed countries' government debt. These assets are often viewed as more stable in value terms than domestic debt. The regulatory and monopolistic

nature of electricity markets requires serious consideration relative to delivery terms and the impacts of a larger player such as a central bank's potential dominance of electricity generation.

Many question the nature of a non-storable asset such as electricity. DeKo assets representing electricity delivered aren't viewed as concrete as claims on gold or a commodity resting in a vault. The response to this argument is that Power Purchasing Agreements (PPAs), utility generating firm debt and other financial instruments relating to the power industry are all based on the delivery and value of non-storable electricity. Electricity as a cheaply distributed form of energy or work has more utilitarian value than gold. As a real-time produced asset, electricity is more difficult to steal in large quantities than gold.

DeKo Financial Instrument

Potential forms of development

A type of DeKo asset exists in the form of PPAs. PPA contracts typically represent 10-20 year agreements between power generators and utility firms for the exchange of power at agreed rates and terms. Before building a new coal or natural gas power plant, a generating firm typically signs a PPA deal with a utility company representing consumers who may act as the transmitter and distributor of power. The utility agrees to buy or take the energy created by the generating firm in exchange for an agreed price. The utilities and industrial companies who agree to take power or energy from power generating firms are known as off-takers

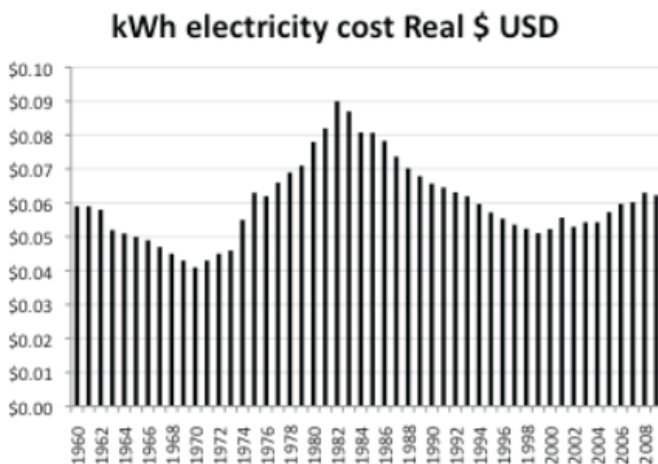
Off-takers agree via PPA contracts to take an amount of power at a given price for a given period of time. After securing PPA terms and price guarantees with a utility, the power generator often uses the PPA off-taker terms and prices to secure project (debt) finance to build the electricity generation facility and lock in the purchase and delivery of fuel with long term contracts. The expected life times of the physical generating facility and fuel agreements are similar to the duration of the original PPA to minimize fuel or operating mismatch risk for the power generator and project financiers.

PPAs function as large chunky non-standardized DeKos. Imagine a collection of bills with denominations of \$100 million or \$500

million equivalents. These bills or contracts are representations of value, but not efficient for retail or consumer trade. Other forms of DeKo type assets are electricity swaps, generating utilities and transmission facilities.

The U.S., like many countries, has an open electricity market with standards for delivery and settlement in place. For the DeKo, an open market determines the value of future deliveries similar to the way open government bond auctions function today.

DeKo assets trade at premiums or discounts relative to the perceived future electricity delivery risk associated with the asset. This premium or risk asset variation is similar to a 10 or 30 year Govt. bond purchased at a premium or discount in the market based on supply, demand and risk perceptions of the bond issuer delivering the annual interest payments and principal.



Source: U.S. Energy Administration

Chart 4

Chart 4 represents Average US Industrial Electricity prices in real (CPI adjusted prices). The real average price of electricity in Chart 4 varies less than the price of gold shown in the Appendix that has an annual median price variance of greater than 30%. The argument can be made that greater price stability makes delivered electric-

ity a more stable store of value reflecting its functional utilitarian market price rather than gold's spurious belief based demand.

The goal of a DeKo backed currency is long term stability in the asset base so that the issued currency acts as a store of value. A store of value from a citizen's perspective is best measured in purchasing power. Purchasing power is the number of goods/services that can be purchased with a unit of currency. Another way of measuring value is utility value, which in economics is a measure of relative satisfaction.

The DeKo backed currency forward asset value has two components, the cost of producing delivered kilowatt hours relative to substitute offers and the utility value of the delivered kilowatt hours. The future dynamics of electricity cost are likely driven by technology improvements, innovations and fuel costs. The future utility value of kilowatt hours delivered is a function of competing electrical suppliers and innovations related to consumption benefits.

The historical price of electricity in real dollars has been fairly stable, while it can be argued the social utility has improved as electricity based innovations provide new value for consumers. The yield or output of a debt backed currency is more currency. In most currency regimes, the purchasing power of future currency declines due to inflation. Inflation means the assets backing a debt based currency have annual interest payments and future principal repayments with a declining utility value.

From a monetary policy argument, inflation adjusted electricity prices peaked at the same time that a strong interest rate policy was being used to shrink inflation during the Volker period at the Federal Reserve. The cost increases in real electricity rates would have acted as a signal if not an actual curb on narrow money issuance of a DeKo backed currency during the late 1970's and early 1980's.

Electricity prices vary broadly depending on location, time of day and other peak demand related issues. These price fluctuations and variances are related to short term localized geographic spikes. Localized energy price variances are dealt with by contracts using qualitative standardized terms for delivery and settlement over longer periods, similar to how PPAs function today.

Cheapest to Deliver

In the bond market the concept of cheapest to deliver indicates delivery of the cheapest asset available to fulfill an obligation. The same holds true for electricity. Utility companies seek a mix of the cheapest stable portfolio of electricity sources over the long term relative to price and technology risks. Utility firms take a diversified portfolio approach to their generating asset mix.

The closest financial debt instrument to a DeKo is a bond STRIP (a series of bond coupons stripped from the underlying bond), paying out continuously. In the DeKo instance, the coupons are redeemed continuously or at some agreed rate and delivered as kW-hs instead of more DeKos. DeKo issuer delivery terms likely involve longer term contracts spanning years determined by issuer and redeemer. The terms are normalized relative to grid capacity, point and rate of electrical delivery. Delivery standardization is done in the U.S. with delivery and performance definitions found in electricity futures and forwards contracts. Delivery terms and remedies for out of contract terms for physical delivery are articulated in contract settlement terms.

It is assumed that DeKos are first issued against cheapest to deliver generating assets as points of delivery. The generating asset owners sell guarantees for issuance against DeKos. DeKos trade at risk spreads similar to corporate or other bonds, meaning their prices vary relative to perceived delivery risk.

The domestic electricity market is large enough as a market to act as the asset backing for the narrow money base. Approximately 3.59 trillion kW-hs were produced and consumed in the US in 2009⁵. This equated to USD \$363 Billion in value, annually⁶. When including forward production curves, fuel swaps, etc. the electricity market appears deep enough to function as a mechanism for basing a currency. For example, as of 2010, the U.S. Federal Reserve had a historically enlarged balance sheet of roughly \$3.0 trillion in assets, which included \$1.0 trillion in mortgage-backed securities.⁷ The typical Fed balance sheet is closer to \$1-1.5 trillion in assets. For those who consider currency to be strictly currency in circulation, the figure is \$829 billion according to the NY Fed in Dec. 2010 with the majority residing outside the US.

DeKo adoption path

Creating DeKo backed currencies is straightforward. Central banks start by purchasing and holding DeKo compliant energy securities meeting DeKo delivery standards. No changes need to happen to physically issued currency. A token purchase of \$100m or \$1 billion of high grade electricity deliverables by a central bank starts the process in any country.

Central banks, like most institutions, have behavioral momentum. Central banks will likely continue purchasing domestic debt or AAA rated foreign government debt until a significant crisis alters beliefs and then behaviors. The argument for central banks to hold government securities is usually that these assets are perceived to represent the lowest risk. Central banks may find this argument flawed in the coming years as many large governments face serious fiscal challenges.

Some questions have been asked, such as: what if the electricity grid goes down? This occurs in periodic spots, but has limited impact on the value of debt and delivery of electricity in the long run. The terms for fail to deliver based upon point of failure identify the associated penalties and damages owed to the parties.

Another question often posed is that electricity delivery assets are a form of debt. Exactly correct, but a fixed form of obligation whose functional utilitarian value in PPP terms doesn't change. Domestic sovereign debt often loses forward PPP value due to inflation, deficit risks or default.

Historically many gold backed currencies have over issued in fractional reserve systems relative to the outstanding calls on gold. This leads to liquidity crises when the gold is called upon by currency holders. The Panic of 1907 (prior to the 1913 establishment of The Federal Reserve in the U.S.) was exacerbated by gold being shipped to San Francisco after the 1906 Earthquake and the fear of a gold shortage relative to note issuance at various East Coast currency issuing banks.

From a monetary policy perspective, issuing more DeKos during a contraction are cheaper as energy demand is lower. Conversely, expanding the currency issuance is more expensive during periods of rapid growth associated with electricity demand. Electricity demand and economic cycles are often counter-cyclical. This

may be useful for a largely self governing monetary policy.

The risk of an electrical asset default exists. The failure is the economic equivalent of bond default in a portfolio of assets. Depending on the size of the default and recovery, the central bank portfolio suffers relative to its exposure. This works in the same way that bonds defaults do. The argument is made that gold doesn't default, but gold can be over issued against in fractional reserve banking and due to its storage and insurance costs has a perpetual negative yield.

The consumer DeKo experience

Current notes and coins issued stay the same for a DeKo backed currency. Dollars, Euro's, Yen, etc. all become DeKo(ized) by the central bank's purchase of electricity delivery assets. Functionally for citizens in the near term, the DeKo looks and works like existing debt backed currencies. The objective is that over the long term DeKo assets hold their value better. Today's DeKo based currency should represent the same utility function as a DeKo in the future.

Any corporate or banking entity could issue DeKos, but in most countries the central bank has a legal monopoly on the issuance of legal tender. Most likely DeKo based currencies will be central bank issued. The focus of the DeKo is on asset base value stability, not the name on the currency or its physical form. Yen, Yuan, Euros, Dollars or Pesos backed by some or all electricity deliverables could be considered DeKo currencies. The DeKo is a method for securing a more stable value currency via the central bank portfolio using electricity delivery assets. For consumers who trust and are familiar with current debt backed currencies, the notes and coins stay the same.

DeKo redemption

Open electricity markets are a recent phenomenon originating in Chile in 1980 and becoming more common in the developed world. Open transmission grids, standards for quality, etc. are required for functioning electricity markets. Deregulation of utility markets in the U.S. and Europe have had challenges, with Enron and California highlighting how things can go wrong. The technical and price impacts of the DeKo need to be assessed to determine deliverable

terms and issuer backing.

Initially, DeKo delivery terms are created around grid constraints. Over time the DeKo market could lead to more stable and cheaper domestic electricity markets. Most electric markets suffer from under investment in transmission facilities. Localized regulators have overly focused on reliability at the expense of innovation, efficiencies and the associated cost reductions.

10 gW-hs delivered over ten years near a metropolitan area with limited transmission and distribution costs and a known stable fuel supply may be worth more than 10 gW-hs delivered over 1 year to a remote area using a price volatile fuel. DeKo asset delivery terms are standardized similar to the way other futures contracts are standardized.

The public won't convert its currency directly to kilowatt hours. The DeKo backed currency isn't kilowatt hours in the pocket the same way that dollars aren't directly convertible into a direct claim onto a portion of the central bank's assets. A DeKo backed currency is a representation of value based on electricity delivering assets. This public function and perception of a DeKo currency is similar to a debt-backed currency, with greater stability. The DeKo stability benefit needs to be articulated in conjunction with the ability to maintain, if desired, physical current note and coin issuance. An energy-backed currency reflects the fiscal promise of physical delivery of electricity, versus debt-backed currencies that are the fiscal promise of a fiscal promise.

Inflation: Currency over issuance

Inflation, according to Keynes, is always a monetary phenomenon; this means too many pieces of paper chasing too few things. The DeKo based currency is predicated upon a central bank maintaining a portfolio of assets approximating 10 kW-hs at some near term duration relative to the issuance outstanding. The value of a currency issued is determined by perceptions of the quality of the asset base representing it. This is best supported by the full transparency of the portfolio and the balance sheet of a central bank.

A deflationary economic contraction (demand recession)

example:

During economic contractions, the cost of issuing DeKos (inflating the money supply) could decline as near term anticipated power demands could decline. At the same time demands for redemption likely declines as the utilitarian value represented by the DeKo is less due to the temporary shrinking electrical demand. The issuer could seek to issue cheaper DeKos at this point to increase the money supply or retain the stronger DeKo issuance outstanding.

Inflationary scenario

Asset based inflation due to reckless credit expansion “broad money” presents a challenge to any economy or central bank. DeKos could be redeemed during rapid economic expansion as the utilitarian value of electricity is considered worth more and called in to meet demand. In such a scenario, the outstanding DeKo supply shrinks, effectively shrinking the narrow money supply acting in a countercyclical fashion aiding economic stability. A hard currency backed only with gold or DeKo private sector assets limits to a degree the monetary abuses and some argue the fiscal flexibility of politicians. For this reason, the risks of energy nationalization are topical when discussing DeKo asset baskets. Countries with a history or perceived risk of energy asset nationalization need to purchase foreign DeKos.

Over issuance of DeKos due to dubious projects or false promises of delivery is a real risk. The nature of these projects and their likelihood of success is a discounting factor on the currency. The same way that sovereign debt has a likelihood of default or trades at a risk premium or discount, the quality of the assets determines a DeKo based currencies relative value. Central banks buying junk are difficult to control. Central banks over issuing currency relative to gold in a vault are also difficult to control. Transparency and openness are excellent defenses against central bank mismanagement. Prior to central banking, countries had competing currency issuers and sometimes allowed other countries’ currencies as legal tender.

Inflation is due to currency over-issuance expansion of broad money (debt). Hyperinflation is currency over-issuance akin to central bank fraud in which assets held are knowingly of little value relative to the outstanding issuance. A currency based on energy re-

lated assets held transparently by a central bank does not eliminate the risk of currency debasement. Gold and silver currency certificates can and have been rescinded by governments. It is important to remember that currencies are representations of value subject to change by governments and changes in value of the assets the currency represents.

Currency crisis and risk management

During the most severe crisis countries give up the power of quasi-captive central banks. When a currency becomes too debased and discredited, consumers and industry start using other currencies for transactions. In the 20th century this often meant countries de facto dollarization as locals preferred US dollars as a store of value and medium of exchange.

DeKo potentially more beneficial in a crisis due to its countercyclical nature

The likely period for delivery demand or DeKos being called in is during or before a crisis. Most likely the current delivery demand is met on an electrical grid. The DeKo delivery asset promise could be issued or designed with a phased redemption schedule or assets could be swapped out, similar to open market operations used by central banks with debt.

A DeKo issuer advantage is the counter cyclical nature of redemption demand. Currency crises associated with liquidity panic and economic crises often go hand in hand. Economic crises are typically related to periods of low electricity demand. During a crisis, the central bank could purchase electricity deliverables, reducing prices for electricity while expanding the money supply. The potentially reduced electricity prices could be a potential across the board economic stimulant at the same time that the money supply is increased.

In Chart 4 the rise in real industrial electricity rates would make DeKo issuance more expensive during the 2001-2007 period when a tightening monetary policy would have been helpful. At this same time the cost of DeKo issuance as reflected in prices post 2008 lessened indicating an easing in the cost DeKo based assets effectively easing monetary issuance.

Emerging economies and developing country benefits

Emerging economies central banks could issue DeKo based currencies with domestic energy assets. This demand for increased electrical generation and related infrastructure in the country to meet the delivery terms of the assets would likely lower prices. Lower real electricity prices appear to be a worthy goal in light of IMF and World Bank mandates for improved standards of living through economic development and stability. The risks associated with electricity dumping and development of robust transmission and distribution have to be addressed.

Developing nations using a DeKo central bank asset policy trade at premiums or discounts based on perceived threats of default, energy nationalization or other risks to meeting promised electricity delivery. If the risks were too high, emerging nations could purchase DeKo assets in less risky nations.

A central bank's foreign currency and debt holdings are effectively a tax at the issuing country's portfolio yield minus its inflation rate. The tax on the central bank holding these assets is the price of perceived stability in the issuing banks asset base. By holding electricity delivery guarantees in a basket of recognized delivery mechanisms, countries may have cheaper, more stable currencies. The assumption is that electricity tracks PPP and that active central bank purchase delivery guarantees may grow the electricity market.

Many emerging countries have poor physical infrastructure and legal statutes combined with scarce capital for electricity market development. In uncertain utility regimes, central bank issuance of DeKos has to be backed up with stable assets and or energy policy reform.

Convexity risk and extreme outcomes via captive central banks

The thesis behind the DeKo is that debt backed currencies are backed by future taxation promises represented as government bonds priced in the currency itself. These future taxation promises presume a government can service its debt load out of tax receipts and be fiscally prudent while possessing stable economic growth. Most government debt service promises are subject to statistical assumptions about taxation, spending and economic growth. As these premises and promises vary over time, a country can find its

debt issuance and currency simultaneously challenged at home and abroad. These twin challenges of limited fiscal policy maneuvering room and currency volatility can have severe economic impacts.

Limited flexibility in monetary policy

Advocates of gold backed currencies often neglect to elaborate on whether they seek a fixed or reserve issuance. A fixed issuance involves X amount of currency fixed to represent Y amount of gold stored. Most gold backed currencies have been of a fractional reserve basis where a fixed amount of gold was held relative to a callable ratio of outstanding bank notes. These fractional reserve currency systems may have \$100 worth of issued notes outstanding backed by \$20 worth of gold, a 5:1 ratio. This follows the standard premise and mechanics of fractional reserve banking. In times of crisis or monetary contraction, the economist's desire to increase the broad money supply in a fractional gold system involves acquiring more physical gold which is difficult on short notice or increasing the issuance reserve fraction creating currency weakness.

Debt backed currencies in fiat systems offer the flexibility of the fractional system with the debt issuer representing the fractional issuance risk. Captive central bank fiat systems are useful offering fiscal and monetary policy options to economic planners. During a liquidity crisis, central banks can purchase debt assets producing liquidity and may coordinate with the government to purchase government debt assets which may be used to fund government driven activity to stimulate the economy. The risk in debt based currency systems is that central bank purchasing activity becomes captive to government issuance needs. A constantly debased currency is a hidden tax on citizens in the form of inflation.

Energy backed currencies are based on the faith of future delivery of electricity from private entities, where as debt backed currencies are usually based upon a governments ability to pay back debt. Electricity issuance represents a "real" consumable good where as government debt is a politically manufactured good. There are AAA quality electricity generating asset equivalents available with which to back a currency.

The ability to expand the narrow and broad money supply at the same time a government is issuing debt in an economic crisis

is viewed by some as a pro-cyclical benefit of debt based currencies. The Keynesian economic theory is that an economy may spend its way out of economic contraction via government allocated stimulus spending.

This Keynesian spending option may be constrained with a DeKo based currency as the government is limited to free market purchasers of its debt rather than having a captive central bank as major debt purchaser.

Money supply can be increased with the DeKo by the purchase of electricity delivery assets. These purchases may be cheaper during a contraction. Large delivery purchases may reduce the cost of energy as a potential stimulus. In energy dependent economies this could be a stimulant allocated via the private sector.

Conclusion

The DeKo is designed as a harder currency than debt backed currencies. DeKo based currencies portfolios are more stable than commodity based assets such as gold. As opposed to other hard asset backed currencies such as gold or silver backed currencies, the DeKo uses assets representing energy delivered as a store of value. A central bank holding a DeKo portfolio offers the benefits of energy infrastructure investments. The DeKo replaces government debt risk for electricity generation and delivery risk. The DeKo is a more stable unit of PPP value with more utilitarian value than stored metals such as gold.

Cultivating and developing energy delivered has more social utilitarian value than stimulating the mining of precious metals. Advances in energy delivery, efficiency and management are more socially beneficial than digging more pieces of metal out of the ground only to put them back into the ground in vaults.

The DeKo as a standard for energy delivered doesn't solve all of the problems of centrally issued currencies and economies. The DeKo has new forms of risk namely energy production and delivery risks. Resolving and managing these risks requires thought and consideration. The ideal DeKo outcome leads to cheaper electricity in the developed and developing world while currencies and economies become long term stable.

The DeKo offers greater currency stability and greater utility than commodity based currencies. The DeKo is designed as a "hard" currency, which may challenge some countries' traditional fiscal and monetary policies or behaviors. This paper poses arguments in favor of the DeKo concept, but acknowledges there are many open questions. Future concepts to explore could be around electricity asset portfolio and delivery normalization, risk management techniques and gradual adoption or migration policies.

Appendix:

London Spot Gold Prices in Dollars

Annual High and Low Gold Bullion Prices
Since 1972

Year	High	Low	% Increase from low- high
1972	\$70.00	\$44.00	59%
1973	\$126.00	\$64.00	97%
1974	\$195.00	\$117.00	67%
1975	\$185.00	\$135.00	37%
1976	\$142.00	\$102.00	39%
1977	\$168.00	\$127.00	32%
1978	\$243.65	\$165.70	47%
1979	\$524.00	\$216.55	142%
1980	\$850.00	\$474.00	79%
1981	\$599.25	\$391.25	53%
1982	\$488.50	\$296.75	65%
1983	\$511.50	\$374.25	37%
1984	\$406.85	\$303.25	34%
1985	\$340.90	\$284.25	20%
1986	\$442.75	\$326.00	36%
1987	\$502.75	\$390.00	29%
1988	\$485.30	\$389.05	25%
1989	\$417.15	\$358.50	16%
1990	\$423.75	\$345.85	23%
1991	\$403.00	\$344.30	17%
1992	\$359.60	\$330.20	9%
1993	\$406.70	\$326.10	25%
1994	\$397.50	\$369.65	8%
1995	\$396.95	\$372.40	7%
1996	\$416.25	\$367.40	13%
1997	\$367.80	\$283.00	30%
1998	\$314.60	\$273.40	15%
1999	\$323.50	\$252.80	28%
2000	\$325.50	\$264.10	23%
2001	\$291.45	\$256.65	14%
2002	\$342.75	\$277.75	23%
2003	\$417.25	\$319.90	30%
2004	\$454.20	\$375.00	21%
2005	\$536.50	\$411.10	31%
2006	\$725.00	\$524.75	38%
2007	\$841.10	\$608.40	38%
2008	\$1,011.25	\$712.50	42%
2009	\$1,212.50	\$810.00	50%
Median			30%
Average			37%

ENERGY COST AS AN INITIAL DRIVING FORCE OF MACROECONOMIC DYNAMICS:RESOURCE (ENERGY) MODEL OF ECONOMIC CYCLE

Autor: Prof. Alexander Bandura

Abstract

A new synthesis and general macroeconomic dynamics (economic cycle) model is proposed. Hidden value of an absolute resource deficit is proposed as an initial and common driving force of macroeconomic dynamics. Unambiguous and numerical definitions for perfect and effective competition, for macroeconomic equilibrium, and for natural and normal price are provided within the model. The absolute resource deficit is a result of cumulative microeconomic nonequilibrium and corresponding market imperfection of all markets. The model was successfully tested using the U.S. economy as a pattern. All the U.S. business cycles during the last 40 years were explained and identified by the absolute resource deficit only. Particularly, statistical relationship between crude oil prices and economic growth rate is explained. The model forecasting efficiency is compared to some of the most accurate probit models (Wright 's and Factor Based). Its main advantages are: no false signals; early recession forecasting – 10-12 months before inception.

1. Introduction

One of the most complicated problems of macroeconomic dynamics is well-timed identification and forecasting of economic cycle turning points. That is a general macroeconomic dynamics analysis in real time. However, modern macroeconomic models and methods face a problem of solving this task properly and unambiguously. As it is demonstrated in Niemira & Klein (1995), in Lahiri & Moore (1992), and in the Release (2011) any change of macroeconomic trend can be defined only post factum, with a considerable lag (up to 24 months). Not a single turning point of business cycle has yet been identified beforehand. Well-timed and precise identification of business cycle turning points is not only a theoretical problem, but also it is crucially important for all economic agent groups – businesses, government agencies, political institutions. For all these

organizations it would suffice to know definite proximity of a turning point at least three months before it occurs. However, within the margins of traditional methods and models we are only able to determine this point definitely with the lag of 4 to 24 months. That is why the well-timed identification of business cycle turning points is in the focus of this work.

To solve the problem we do need to disclose the nature of mechanism, which changes economic trend. Standard models failed to solve it properly as there is no even common opinion about the initial driving force of cycles. As a result, some scholars reject the idea of economic cycles proposing instead the idea of random fluctuations. Random fluctuations, particularly, make identification of a recession starting point quite difficult. Hence, there arises a problem of effective regulation of economic crises and avoiding recessions. Thus, general determination of the nature of macro-economic dynamics' driving force is a key point in solving of the mentioned problems.

1.1 Literature review

In general, there are two types of models that are used for macroeconomic dynamics analysis: structural (theoretical) and non-structural (statistical, stochastic etc). Every type has its specific drawbacks that make the analyses inaccurate.

In fact, all attempts to define any driving factors of a business cycle are made within every structural model. To these factors we can refer: 1) changes in volume of investments and/or interest rates (Keynes); 2) changes in money supply, compression and expansion of banking credit (monetarism); 3) innovation theory (Schumpeter, Minsky); 4) wages changes (Fisher, Dornbush); 5) changes in technology (Cassel); 6) depreciation, reinvestment and expansion of industrial fixed capital (Marx); 7) changes in psychology of economic agents (Pigou, Tobin); 8) theory of rational expectations (Lucas, Sergeant); 9) theory of overinvestment (Hayek); 10) theory of underconsumption (Foster, Castings); 11) institutional theory (Kaletsky, Nordhaus); 12) theory of real business cycles (Kidland, Prescott); 13) price/cost relations, profit margins model (Mitchell, Lescure); 14) multiplier – accelerator interaction models (Clark, Samuelson); 15) Growth-cycle models (Harrod, Hicks, Kaldor); 16) sun spots and weather (Jevons,

Moor) etc. (History..., 1987-90, Niemira and Klein, 1995).

Each of the listed factors is valid for specific market conditions, but none could explain the driving force in general case. Some facts of the real world cannot be explained within any theory (for example, statistical correlation between economic growth rate and crude oil price). According to Samuelson (1993), in general case the driving force could be explained by many factors acting simultaneously. He wrote that all the theories reflect different aspects of the same process, because the factors are functionally interdependent by their nature. Functional interdependence means there is no clear difference between cause and effect. That is any separate factor could be considered as initial one, but at the same time, as local driving force that dominates the others under specific market conditions. In addition, the rest of factors would be explained on the base of this local driving force. However, after economic conditions change the dominating factor and corresponding model change too. Thus, there is no cause-effect type relationship between separate factors. The main problem is an impossibility to identify a trend change definitely when running, and it is much more difficult to forecast it.

It is reasonable to assume (as Samuelson did) that real and initial driving force of the economic cycle (if there is one) should be functionally independent from any other factors, i.e. it should not depend on any combination of market conditions (cause-effect, but not functional relationship). This hypothesis will be advanced, grounded and verified later.

While it is never known beforehand what factors will determine the driving force of economic cycle not only in the future, but also today, majority of economists (including National Bureau of Economic Research (NBER) USA) consider it impossible to determine initial and common driving force of a cycle as noted in Zarnovitz (1999). On the other hand, considerable number of models (factors) that explain the cycles, their localization and absence of cause-effect relations between them is an objective base for some economists to lose belief in cycles and consider economic activity swings as random fluctuations.

Analysis of structural models showed that all of them are characterized by at least two common drawbacks, which can explain

their local character and models' impropriety for real time analysis. At first, precise determination of the long-run "natural" (equilibrium) state of output is difficult, if not impossible. Attempts to determine this state by using "full employment level" of production (or "natural" employment level) are most likely an appropriate theoretical scheme, but they have a small practical importance.

Secondly, the fundamental drawback of the "supply-demand" model is the static nature of analysis. Both supply and demand depend on a big number of independent factors. Using supply-demand approach allows just one factor to be considered, while influence of the rest is assumed away through the *ceteris paribus* assumption. Dynamics, in these models, is thought to be the movement of static (steady) state over time with fixed parameters. Only these two drawbacks could explain the fact that practically all economic laws are only valid for specific market conditions, and models fail to capture universal aspects of macroeconomic dynamics.

Such economists as Schumpeter J., Struve P., Kondratyev N., Clark J., Soros G., and others (Kondratyev, 1989, History., 1987-90) widely discussed inadequate interpretation of dynamics in economic models during 20th-21st centuries. It is interesting that Struve (1923) and Soros (1994) explained the problem of "statics-dynamics" in economic models by saying that specific mathematical methods are used in those models. Methods of mathematical analysis that are used in economics were originally developed for engineering analysis. This creates certain analytical stereotype of mechanicism and conditions static nature of methods in economics. To a certain extent, they are right. However, their explanation reflects rather an effect than a cause. As a result, this explanation is not constructive, because it does not allow us to develop ways of solving problems of "static nature in dynamics". In general, a choice of any mathematical method is determined by basic principles of a model and its assumptions. Per se all typical economic models have static nature.

Two mentioned drawbacks can explain the fact that economic laws are not general, but are only true under certain market conditions. Therefore, it makes impossible to use structural models for macroeconomics analysis in real time. However, principal ability to explain forecast economic processes and events is the main advan-

tage of structural models.

Noted problems of structural models determined preferential use of non-structural models (statistic, stochastic etc) for macroeconomics analysis in real time. Method of "leading indicators" is one of the most widespread examples of this kind of models. Lahiri and Moore (1992) described main drawbacks of such method. The idea of the method is to use a large amount of statistical data (different values and indices of economic activity) for the past period to try to detect any sustainable cause-effect relationships, which may help in identification and forecasting of turning points of economic cycles.

Main drawback of non-structural methods is impossibility to distinguish a true signal from a false one. Besides, a proper choice of indicators' numbers and types is a subjective and ambiguous process. (as demonstrated in Niemira and Klein (1995), the U.S. and Japan use different types and number of indicators for their economy analyses). There is no way to be confident that any leading indicator in one business cycle will remain leading in another one. As shown in Niemira and Klein (1995), in Lahiri and Moore (1992), and in the Release (2011) sometimes the signal of a recession starting point was generated with a lag of 21 months or with a forestalling of 13 months. At other times, signals were generally false. Turning points of the US economy (1990-91 and 2001) recessions were officially identified by NBER in 20-21 months after they occurred. Still, the main advantage of non-structural models is the principal ability to analyze economy in real time and under any market conditions.

Yet, neither structural, nor non-structural models can provide reliable ex ante identification and forecast of macroeconomic dynamics at any point in time. In order to avoid the drawbacks of both model types and to keep their main advantages at the same time, a general macroeconomic dynamics model is presented, here. The noted drawbacks of both model types cannot be eliminated within standard approaches. What prevents us from solving these problems?

2. Material and Methods of the Resource Model

While studying economics history from W.Petty and A. Smith until present (in Kondratyev, 1989, Samuelson, 1993, History., 1987-90, Zarnovitz, 1999), we can notice a common conceptual problem for

any period of economics history and for any model, the problem of “vicious circle” in economic valuation. The problem is price depends on cost, and the last one depends on prices of incoming goods and services.

It means that it is impossible to be confident in rationality (normality) of market valuations for any period. Rather market mechanism provides for some iterations (and correspondingly, time lag) before we may be confident in rationality of market valuations. Number and duration of those iterations mostly depends on a rate of market competition. In the long run, economic or financial crises may be considered as a final iteration with a corresponding market correction.

Thus, standard approaches posit rationality of market valuations, but are unable to verify their rationality rate. Rationality rate of any balance can be definitely identified only post factum, with a considerable lag. The lag is caused directly by the “vicious circle” problem in economic valuations. It is impossible at any moment of time and under any market conditions to verify if the market price is “normal” (“natural”) or not. As a result, such basic economic categories as “normal” (“natural”) price, “perfect” competition, and to some extent, “macroeconomic equilibrium” remain theoretical abstractions, as there is no method to determine them unambiguously and numerically.

As the “vicious circle” problem is naturally inherent to market mechanism, it cannot be solved properly within monetary valuations only. The problem is in the fact that money as a product of exchange (market), evaluate exchange processes directly. At the same time, production processes can be evaluated indirectly only in monetary terms. As a result, accuracy and objectivity of production expenditure evaluation in monetary terms directly depends on efficiency of exchange, on rationality of market valuations, and on competition rate. Only in case of perfect competition, the problem of “vicious circle” is absent and market valuations are rational.

However, resources deficit and increase in number of goods and services cause, actually, imperfect competition at any market. In general, all markets are not perfect, but to what extent? How does this imperfection affect the growth rates? There is no definite answer to this question. The attempt to answer these questions is

presented next.

The "vicious circle" problem may be considered as a visualization of noted above drawbacks of structural and non-structural model types. Implementation of different static states (stationary, stable, steady ones) into economics may be considered as a specific solution of the "vicious circle" problem that provides some reference point among current market valuations. Moreover, noted above problem of economic analysis, referred as a "static character", has no adequate solution. In addition, the "vicious circle" problem causes functional (interdependent, non cause-effect) relationship between the factors, which explain the economic cycles driving force within the structural models noted in 1.1. The same kind functional relationship exists between price and expenditures, as well as between all other economic values termed in monetary form.

If these conclusions are correct, it would be possible to assume that a proper solution of the "vicious circle" problem would lead to avoiding of mentioned above drawbacks of structural and non-structural models and open the way for general (not local) model building. As a result, a new synthesized model of economic dynamics can be proposed. It would contain main advantages of both well-known structural and non-structural models. It would help us to eliminate lag in macroeconomic dynamics turning points identification and to separate a trend from random fluctuation for any moment of time.

2.1. Alternative measure of cost

To solve the "vicious circle" problem Bandura (2003a, 2004) proposed to introduce additional (to monetary) measure of resource expenditures into economic valuations. The idea was that both exchange and production require their own unit of measure in order to reflect specific features of both of these fields. While money is a natural measure for exchange, available energy is proposed as a common measure of resources used in production. Therefore, cost can be measured in both relative (monetary) and absolute (energy) forms.

Original method for energy cost counting was proposed in Bandura (2003b, 2004). Input/Output tables provide a base for this method. To compare current price with energy cost the latter must

be recalculated in monetary form, preserving the interindustrial proportions of corresponding relative energy costs. For this purpose a recalculation coefficient k_0 was proposed in Bandura (2003, 2004). The coefficient k_0 is based on a ratio of the money supply and the sum of primary energy of all resources used in GDP production. Multiplication of each energy cost quantity by k_0 generates a vector of "natural" prices in monetary form (P_0).

This approach allows us to determine unambiguously the natural price, the rate of market imperfection, and macroequilibrium. It is well known that under perfect competition all goods and services are produced using minimum resource expenses (technical efficiency). However, a problem arises in the valuation of resources. In monetary terms, minimum resources mean minimum monetary expenditure. In energy terms, minimum resource use is associated with minimum energy expenditure. Therefore, we have two minima of resource allocation depending on the term of measurement. They are not coinciding, in general. It seems reasonable that the state of minimum resource expenditure for aggregate income production should not depend on measurement terms.

It is natural to assume that the real state of economy, at which the minimum amount of resources is used for GDP production, should not depend on selected measure of those resources. Thus, there is the following determination of macroeconomic equilibrium proposed in Bandura (2003a): long-run macroeconomic equilibrium is determined as a state where "natural" (P_0) and market (P) price levels (GDP deflators) are numerically equal. At the same time, this definition of macroeconomic equilibrium is a definition of perfect competition, as according to classical economics market and "natural" prices numerically coincide only under these ideal market conditions. Separate determination of these prices (market price is determined by demand-supply, and "natural" price is formed by natural laws, by technology structure) and the gap between them ($\Delta P = P - P_0$) allows us to analyze imperfect markets without any assumptions.

Such definition of macroequilibrium erases borders between macroequilibrium of the whole economy and microequilibriums of separate markets, because macroequilibrium here is simply an arithmetic sum of microequilibriums of all markets that make up

economy. Microequilibrium of a separate market is an ordinary balance between supply and demand.

As a result, this approach eliminates the problem of a “vicious circle” in economic valuations as well as the mentioned above drawbacks of typical theories (in particular, static analysis). In addition, we can get rid of any lag in identification of economic values.

In this equilibrium-perfect state aggregate national product would be produced with both minimum monetary and energy expenses and, therefore, with minimum damage to the environment at the same time (as real expenditures of all physical resources are minimized). In this ideal state, a direct proportion between relative market prices and relative specific energy expenditures is established. It means that we choose the same production technology after both monetary and energy optimizations.

2.2. The resource model cycle

The authors propose a basic hypothesis that the current market price should gravitate towards values of such “energy prices” that would exist in a perfect market, or a vector of “natural” price in its classical definition. Taking into account that market and “natural” prices are determined independently and on the ground of different laws, it makes it possible for us to determine a rate of market imperfection (disequilibrium) in general. Then this market imperfection rate is estimated by the value of market price deviation from “natural” price. Basing on this assumption, a new general model of macroeconomic dynamics (economic cycle) is proposed.

This model was tested using the U.S. economy as an example (for a period of 40 years). The test has shown that market price dynamics gravitate towards “energy price” dynamics, and critical points of the proposed model determine turning points of real cycles of the U.S. economy, thus the basic hypothesis is verified. Finally, in accordance to mentioned above definitions of macroequilibrium and perfect competition, the authors proposed a new resource (energy) model of economic cycles (Fig.1), main principals of which were described in Bandura (2003, 2004). The model explains the initial driving force of macroeconomic dynamics for general case. Figure 2 is a scheme of general economic activity dating over time. Macroequilibrium is viewed as a dynamic balance between

levels of market and natural prices (GDP deflators). The trend (curve) of "natural" price is determined independently from market conditions and "supply-demand" influence. Equilibrium curve (of natural price) divides the phases of growth and recession.

If the level of natural prices is higher (lower) than the current market price level, then the latter price is underestimated (overestimated) as compared with natural price. It makes potential for growth (recession) as market production expenditures are higher (lower) than natural ones, and potential profit is higher (lower) than natural one. Any deviation ($\pm\Delta P$) from equilibrium (P_0) causes the rise of resource over-expenditures in energy terms (real resources Δe) or absolute resources deficit. This deficit is "hidden" for standard monetary analysis. Points of O-type (O_1, O_2) are points where this hidden deficit reaches its maximum value. The hidden

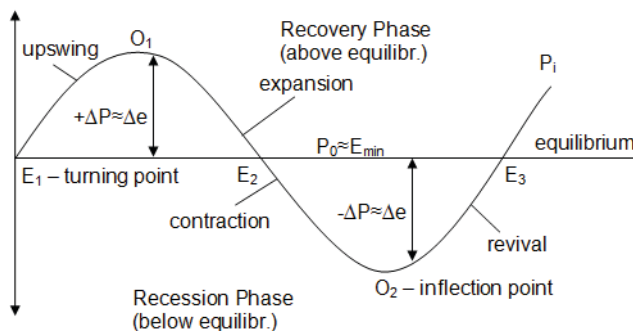


Fig. 1 Resource (energy) model of business cycle
Critical points: E_1, E_2 – macroeconomic equilibrium points, turning points of economic cycle;
 O_1, O_2 – Inflection points, economic growth tendency changing
 E_1, E_2, E_3, O_1, O_2 – five critical points for every cycle.

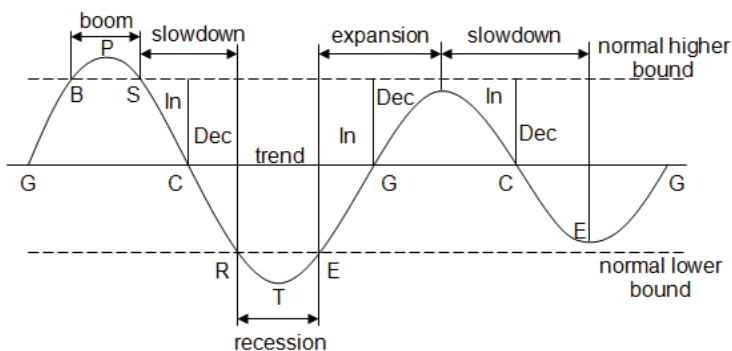


Fig. 2 US National Bureau of Economic Research view of business cycle: Classical business cycle and growth (deviation) cycle schemes.

B – boom; S – slowdown; C – contraction; P – peak; R – recession; T – trough; E – expansion;

G – growth; Inc – increasing rate; Dec – decreasing rate. P, T – two critical points for every cycle.

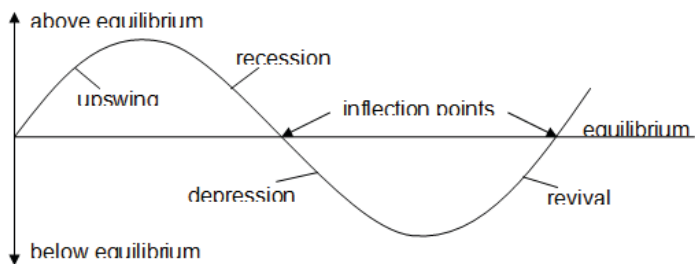


Fig. 3. Schumpeter's view of business cycle. Inflection points – three critical points for every cycle

resource deficit value provides natural limits both for growth and recession (they cannot be endless).

The resource model is a synthesis between structural and non-structural models, as, from one side, every critical point of the model has its theoretical grounding (in distinction from well-known

non-structural models), from the other side, the model includes the principal elements of these non-structural models with different dating principles of economic activity over time (Fig.1-3). As described in Niemira and Klein (1995) Figure 3 reflects American school of macroeconomic dynamics. It describes two versions of real data series dating: classical business cycle and deviation cycle, developed by the NBER. Figure 4 presents Schumpeter's view on cycles dating principles (Austrian school).

As we can see from Figure 1-3, the resource model (which is initially based on theory, but it is not a simple graphic reflection of statistic data) is characterized by five critical points per cycle: three equilibrium points (E-type) and two points of tendency changes within a cycle phase (O-type). None of two critical points of the USA model and of three points of Schumpeter model is theoretically grounded, but every critical point of the resource model has economic and physical essence, as it is a result of the synthesis. It allows us not only to explain the initial reasons of turning points occurring, but also to identify and forecast them reliably, to determine changes of growth rates within every phase of the cycle (O-type.)

3. Forecasting economic cycles

The authors successfully tested the resource (energy) model using the USA economy as a pattern (a period of consideration is 40 years). This test completely proves the basic hypothesis and all definitions and conclusions of the model (real facts coincide with the theory for almost 100%). Earlier this model was tested on the economy of Spain (18 years is a period of consideration) in Bandura (2003b) that additionally proves the model to be general.

Figure 4a presents dynamics of current market price (P_i) and "natural" price (P_0) levels (GDP deflators). This figure shows the business cycle resource model (analogous to Fig. 1), but built up in real time (1970-2008). The base year for price indices calculation chosen here is 1996 (earlier it was 1987, however, the base changing does not affect the analysis results). Figure 5b presented dynamics of real GDP growth rates (%), which is marked by critical points in accordance with the resource model. Comparing Fig. 4a and 4b demonstrates efficiency of macroeconomic dynamics critical points dating in accordance with the resource (energy) cycle model.



As shown on fig.4b points E1, E3, E5, E8, and E10, the model makes it possible to identify recessions long before GDP turns negative, that is because after these points GDP growth only decelerates. If $\Delta P > 0$ (current prices level (P_i) is less than "natural" (P_o) level), the economy is in a phase of growth. If $\Delta P < 0$ (current prices level (P_i) is higher than "natural" (P_o) level), than the economy is in a phase of recession. Intersection points of these prices level curves ($\Delta P = 0$) are turning points of business cycles (of macroeconomic dynamics). In general, initial force that turns the economy to macroequilibrium is proportional to a gap value ΔP . The bigger is the gap, the bigger are hidden energy overexpenditures (Δe) (or absolute resource deficit) above achievable technological minimum. The greater is ΔP , the greater is the force, restoring equilibrium once it is disturbed (Fig.1, 4).

Permanent change of relative prices leads to permanent change (update) of production technologies (sometimes as technology revolutions). Their efficiency in physical (energy) terms is decreasing along with deviation from macroequilibrium state. As a result the energy-termed resources become relatively cheap in monetary terms that leads to their intense consumption and, therefore, to the rising the hidden deficit of those resources. However, over time increasing deficit will lead to the price climb for excessively consumed resources. This over-consumption of resources causes the market prices to rise further. In a case of long stage of growth, it may even lead to a price shock (for crude oil, for example. See section 4.). We can characterize this hidden deficit as an absolute deficit, as its reference level is physical only, and it does not depend on market conditions (it depends just on technological progress).

Outside of perfect markets, market (P) and natural (P_o) prices do not coincide. Separate determination of these prices and gap (ΔP) allows us to analyze imperfect markets without any assumptions. In general, actual market price reflects a balance of all possible market forces and conditions for any moment in time, which allows this analysis to be general as well. However, any standard economic model noted above may be used within this analysis for a special case.

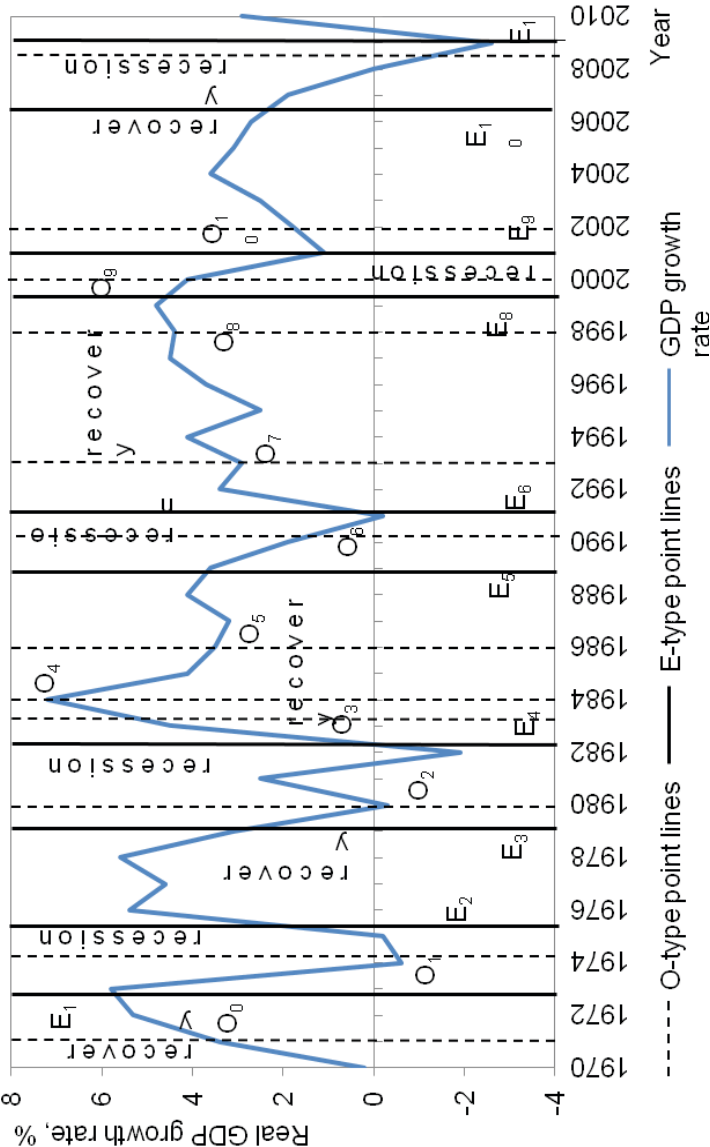


Fig. 4b. Real GDP growth rate for the US economy dated according to critical points of the resource model. Source: U.S. Bureau of Economic Analysis Release

In accordance with the resource (energy) model, recessions in the economy of the USA during the last 40 years occurred in 1969-70, 1973-75, 1979-82, 1989-91, 2000-01. A starting point of the most recent recession (2007-09) in the U.S. was accurately forecasted one year before it had occurred (see also table 1) in Bandura, 2007.

Comparing fig. 4a and 4b, we can see that all (without exception) recession starting points ($\Delta P = 0$) were identified in 6-12 months before (without lags) statistical data was able to show it. During these months the recession potential ($-\Delta P$) grows from zero up to the sufficient level for majority of statistic indicators to prove the recession starting point. For instance, the recession starting points ($E_1, E_3, E_5, E_8, E_{10}$) are identified in 6-8 months before real GDP value became negative and majority of static indicators made the recession evident for everybody. Thus, the ΔP value is really a leading indicator that can be used under all possible market conditions.

Both recovery and recession are characterized by O-type points, which are also critical points in the resource (energy) model. At these points, hidden resource deficit as well as deviation from macro equilibrium state reaches ($\Delta e, \Delta P$) their maximum (for any of cycle phase) (Fig. 1). Theoretically, it means that we should see some slowdown of economic growth rate exactly before these points and growth acceleration just after O-type points. This conclusion is proved by the USA statistics. As shown at Fig.4, where yearly GDP growth rate dynamics are presented, acceleration effect of growth rates just after O-type points is observed after points $O_1, O_2, O_3, O_6, O_7, O_8, O_{10}, O_{11}$. It additionally proves the verity and the general application of the resource model.

On one hand, all the U.S. economic cycles for the last 40 years were explained by the absolute resources deficit (one-factor model). On the other hand, at least four-five local models (multi-factor models) were used for the same period to explain these cycles. Taking into account this fact, we can conclude that the absolute resources deficit ($\Delta e, \Delta P$) is a single and general driving force of macroeconomic dynamics (economic cycles). In this case, all local (typical) models (section 1.1) present not initial driving force of cycles exactly, but its form of manifestation, which depends on current combination of market conditions. Clearly, some new and

unique market conditions may lead to a new local model to be proposed or "old" model to be advanced correspondingly. At the same time, various forms of manifestation or local factors (e.g. change of interest rate, overinvestment, change in money supply, wage rate, excess crediting, and real estate sector crisis, etc) are functionally interdependent, but the absolute resource deficit is functionally independent from its manifestation forms, from any of local factors. From this point, there is a cause-effect (not functional) relationship between the absolute resource deficit and any of local factors. In its turn the hidden resource deficit is a result of cumulative market imperfections (nonequilibrium) caused by different reasons (monopoly, government regulations, market speculations etc.). According to the resource model of macroeconomic dynamics, in general, economy is out of equilibrium, and markets are always imperfect. Economy can reach equilibrium and market can reach perfection for only a moment. Therefore, the initial driving force of macroeconomic dynamics provides objective fundamentals for economic crises. Market mechanism of economic valuations generates economic cycle and crisis endogenously. Clearly, all possible subjective factors (such as market expectations, regulations, speculations, etc) may strengthen or weaken these fundamentals.

It is impossible to find two identical cycles for the USA economy within all analysis period (from 1969 until present). Every cycle has its specific features and configuration inherent just to this cycle. This fact demonstrates why P. Samuelson proposed to consider every cycle as one-factor and multi-factors (complex) model at the same time (Samuelson, 2003). Here, we can realize this idea. On one hand, according to resource model, every cycle is dated on the ground of single indicator ΔP , which characterizes the initial driving force of any cycle. On the other hand, various local and functionally dependent factors (value of money supply, interest rate, innovations level, investments, market participants' expectations etc.) are already embodied into the value of ΔP . In other words, these local factors are manifestation forms of a single initial driving force. Thus, the absolute deficit of resources (ΔP) is a complex and general driving force of aggregated economic activity at the same time.

4. Forecasting crude oil price

One of these tasks is to explain actual statistical correlation between economic growth and crude oil price. A. Greenspan in his last speech (before he retired) as the Head of the Fed (The WSJ, 2003) spoke that there is no model that will be able to explain it, but the explanation is highly important for improving the economy regulation efficiency. Specifically, there is no answer for the question: why oil price growth on 10 dollars per barrel (\$/bbl) in the price range 15-25 \$/bbl actually does not affect the economic growth, however, the price rise on the same value, but in the range 25-35 \$/bbl considerably decreases economic growth? The resource model of macroeconomic dynamics provides this explanation.

To demonstrate it let us additionally consider yearly dynamics of crude oil prices at New York Merchandise Exchange (NYMEX) shown in Fig.5. In the Figure, critical points of economic cycle (E- and O-type) are dated in accordance with the proposed model. At the same time, we consider the dynamics of the USA economy

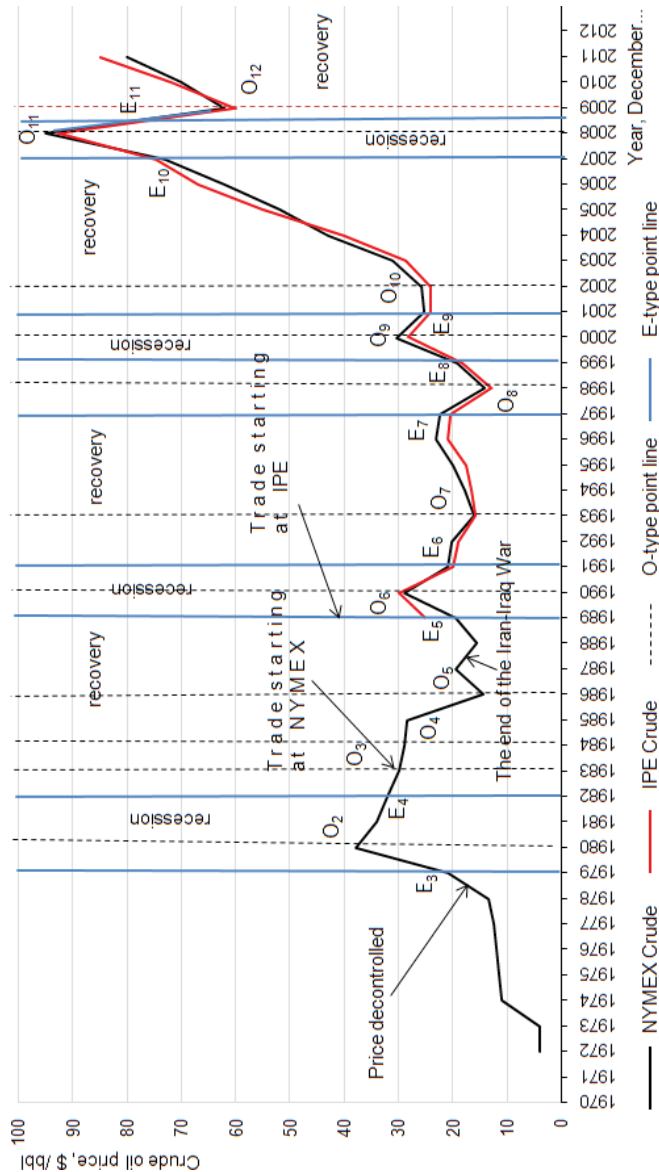


Fig. 5. Average Crude Oil Price dynamics at NYMEX and IPE dated according to the resource model of business cycle. Source: NYMEX Crude Oil Futures Quote.

growth rates (Fig. 4b).

As it is shown in Fig. 4,5 at O-type points (pp. O_3 , O_5 , O_7 , O_8) with $\Delta P > 0$ the tendency of oil prices is changing from decreasing to increasing. At these points, in accordance with the model, the absolute resource (energy) expenditures are the highest, but market oil prices are the lowest (in the range 15-20 \$/bbl, Fig. 5). In this case, a negative (for growth) effect of oil price increase (just after O-type points) is neutralized by diminishing of the hidden absolute resources (energy) expenditures for GDP output.

Because of a sharp reduction of hidden resource deficit, economic growth rates actually do not decrease in spite of oil price growth. Moreover, economic growth rate can even rise slightly (pp. O_3 , O_5 , O_7 , O_8) Fig 4, 5), if decreasing rates of resource deficit (those rates are highest just after O-type points) exceed oil prices growth rates. Actually, after every such point there is a quarter of a year where growth rates considerably exceeded average.

Thus, if an increasing oil price is accompanied by a decrease of the absolute resource deficit, economic growth rates will, actually, not decrease, regardless of the rising oil prices. They can even increase just after O-type points. It makes no difference from which absolute value the price starts rising after O-type points. For example, it makes no difference from which value the price starts rising: from 15-20 \$/bbl after O_3 , O_5 , O_6 , points or from 25-30 \$/bbl after O_8 point.

This also explains the fact that (after p.08) since 2003 the oil price sharp increase during four years in a row did not lead to the USA economy recession. It explains as well why, for instance, in the 3d quarter of 2003 the USA economy growth rates temporarily sharply increased just after O_{10} point (up to 7, 4%). Then, according to the model, the US economy growth rates should slow down as the rate of the resource deficit decrease passed its maximum. Actually, quarterly GDP growth rates did not exceed 4% after 2003. Further decrease of ΔP value (up to $\Delta P = 0$ at E-type points, where the absolute deficit is equal to zero) will lead to the oil price growth rate to be above the absolute resource deficit decrease rate. Then further oil price increase will lead to a slowdown of economic growth rates (near E_5 , E_8 points, where the oil price is in the range

25-35 \$/bbl, Fig. 5).

If ΔP value becomes negative, the absolute resources deficit will start rising again. It strengthens negative effect from the rising oil price. As a result, economic growth rate decreases sharply, and becomes negative; the economy turns into a recession. This scenario was realized during the recent recession ($p.E_{10}$), for example.

As we can see in Fig. 4, 5, the oil price increase just after pp. O_5 , O_7 , O_8 and O_{10} does not influence the growth rates as the hidden deficit decrease supports the growth. It is important to note that the effect of oil price increase on growth rates depends mostly on a business cycle phase (E- and O-type points location), rather than on nominal price value. Thus, the proposed resource (energy) model of economic cycles allows us to explain actual relationship between crude oil price and economic growth rates.

In accordance with the resource (energy) model, the authors propose two simple rules to determine direction of oil price trend (Fig. 1, 4, 5).

- 1) Oil price tendency to decrease (P , \$/bbl, \downarrow) 1) is observed between starting point of the revival phase (from O-type point with $\Delta P < 0$) and the end of the expansion phase (up to O-type point with $\Delta P > 0$). For instance, the price trend is down (\downarrow) between $p.O_2$ ($\Delta P < 0$) and $p.O_5$ ($\Delta P > 0$), between $p.O_6$ ($\Delta P < 0$) and $p.O_7$ ($\Delta P > 0$), between $p.E_7$ ($\Delta P = 0$) and $p.O_8$ ($\Delta P > 0$), between $p.O_9$ ($\Delta P < 0$) and $p.O_{10}$ ($\Delta P > 0$), from $p.O_{11}$ ($\Delta P < 0$) until present (up to the next $p.O_{12}$ ($\Delta P > 0$)).
- 2) Tendency of oil prices to increase (P , \$/bbl, \uparrow) is observed between the expansion phase starting point (from O-type point with $\Delta P > 0$) and the end of contraction phase (up to O-type with $\Delta P < 0$). For instance, the price trend is up (\uparrow) between $p.O_5$ ($\Delta P > 0$) and $p.O_6$ ($\Delta P < 0$), between $p.O_7$ ($\Delta P > 0$) and $p.E_7$ ($\Delta P = 0$), between $p.O_8$ ($\Delta P > 0$) and $p.O_9$ ($\Delta P < 0$), between $p.O_{10}$ ($\Delta P > 0$) and $p.O_{11}$ ($\Delta P < 0$).

During the whole history of crude oil trading at NYMEX, only one short-termed exception from the rule was observed in 1987-88 (Fig.6). However, a strong force major factor (which was acting opposite to the trend) simply explains this single exception from the rule: it was the end of the war between Iran and Iraq (No.2 and No.3 crude oil producers in OPEC by volumes of production). Thus, in general, crude oil (energies) price dynamics is well predictable using

the resource model of business cycle.

In April 2006 oil price reached its “another historical maximum” and exceeded 75 \$/bbl. Again, this provoked the next dispute between economists regarding possible recession, as historical experience evidenced that this maximum was specific for recessions starting points in the past. Relying on this experience economists predicted the beginning of recession when the oil price reached 50, 60, 70 \$/bbl etc. However, ΔP indicator had positive value for all these oil prices. In accordance with the resource model, absolute price value is not essentially important. Much more important is the cycle phase determined by ΔP indicator. Until $\Delta P > 0$, any rise in oil price will not lead to recession. It allows us to identify current situation definitely and without lag.

However, the higher oil price, the faster ΔP value will become negative, in particular, because of the fact that excessive oil price increase accelerates inflation. The value of ΔP was less than zero by the end of 2007. Then oil price increase from this point leads to recession according to the resource model.

That is why in January 2007 we forecasted the starting point of the next recession in the USA as the 4th quarter of 2007 or the 1st quarter of 2008 in Bandura, 2007, (Fig.4). In fact, it was one year before the recession took place. The forecast was 100% accurate, as during the last 40 years, there was not a single mistake in identification of recession starting points in the United States economy. Clearly, the forecast would help to raise economy regulation efficiency and, as a result, to weaken the negative effect of recession or even avoid it at all.

As we can see in Fig. 1, 4a, the last phase of expansion (O_{10} - E_{10}) was the longest one for the last 40 years. Taking into account mild recession of 2001, it could make an illusion that government regulations became efficient enough to avoid deep recessions. The illusion forms too optimistic expectations that provide grounding for creation of numerous “bubbles” in many sectors of the economy (real estate, finance, construction etc). In addition, the longest expansion provides enough time for creation of “bubbles” that substantially strengthened the recession fundamentals, determined by resource deficit (ΔP). This is a way to explain extraordinary depth of the recent recession on the base of the resource model. Clearly,

only anti-bubble actions initiated at least one year before their actual realization could have made the recent recession mild or avoided it at all.

At the same time, the authors made a forecast of oil prices trends for 2007 and most part of 2008. As shown on Fig.4a, 5, oil price was rising between points O_5 and O_6 , O_8 - O_9 , O_{10} - O_{11} . We can divide those intervals of sharp oil price growth between O-type points into two stages: O_5 - E_5 and E_5 - O_6 , O_8 - E_8 and E_8 - O_9 , O_{10} - E_{10} and E_{10} - O_{11} . In spite of oil price sharp increase between points O_{10} - E_{10} (from 2002 to 2006), it was just the first stage of price increase. That is why, when oil price was at the level of 52-55 \$/bbl (in February 2007), the next stage of sharp oil price increase also was forecasted for 2007 and part of 2008 in Bandura, 2007. Then, after p.O11, there was an expected sharp drop in oil price. Table 1 presents the results (accuracy) of several forecasts based on the resource model.

Table1. Accuracy of the authors' forecasts made using the resource model of economic cycles.

Explanation of financial crises nature and their forecasting requires

a separate article, which we are planning to write later.

Thus, the absolute accuracy of the forecasts, which were never revised (permanent revision of forecasts is typical for all in-

Forecasts made in December 2006	Facts of real world
<p>1. The crude oil price is expected to be rising sharply during 2007: from 55 to 70 \$/bbl in summer with its further increase up to next all time high at the end of 2007 and beginning of 2008. New peaks are expected up to next O-type critical point ($p.O_{11}$). Then the price will drop sharply (Bandura, March 2007).</p>	<p>1. The oil price has reached 70 \$/bbl (in July) and 99 \$/bbl (in November) 2007. The price reached 147 \$/bbl in July 2008. The price has dropped sharply (more than 100\$/bbl after July 15, 2008) just after the $p.O_{11}$ passing (in April of 2008).</p>
<p>2. Starting point for the U.S. recession is expected at 4th quarter of 2007 or 1st quarter of 2008. (Bandura, March 2007)</p>	<p>2. The U.S. National Bureau of Economic Research declared the recession starting point as December 2007 in December 1, 2008.</p>
<p>3. Extraordinarily powerful financial crisis is expected to hit in fall (October - November) of 2008. It will occur because of a very short time period (3 months) between two critical points of the cycle, which will cause two consecutive drops of global indices with the same interval of 3 month (July and October)*.</p>	<p>3. The strongest after the Great Depression decline of global market indices in October of 2008. (Bankruptcy of some of the world's largest companies and devaluation of Hryvna – Ukrainian currency)</p>
<p>4. Recession in the U.S. will be replaced by economic growth in July-August of 2009. (Bandura, July 4, 2009a)</p>	<p>4. On September 20th, 2010 the U.S. officially dated the end of recession June 2009.</p>
<p>5. A new financial crisis is expected to hit in the first quarter of 2010. It is expected to be mild with DJIA retreating no less than 800 points. (Bandura, September 7, 2009b)*</p>	<p>5. DJIA fell 817 points from 01.20.10 to 02.09.10, there was a follow up retracement of 1389 points from 04.27.10 to 05.07.10.</p>
<p>6. Since the middle of 2010, growth rate of the U.S. economy will slow down, which will spark talks about possible double-dip recession. Yet, recession will not occur and growth rate will accelerate again. (Bandura, October 5, 2009c).</p>	<p>6. Double-dip recession rumors indeed took place, but growth started accelerating since the second quarter of 2011 and the second dip of recession did not happen.</p>

stitutions occupied with this problem), is an additional confirmation of the model's verity. Additionally, this high forecasting accuracy of recessions is another argument for economic cycles approach (classical) that is in opposition to random fluctuation approach.

5. Comparing forecast efficiency to probit models

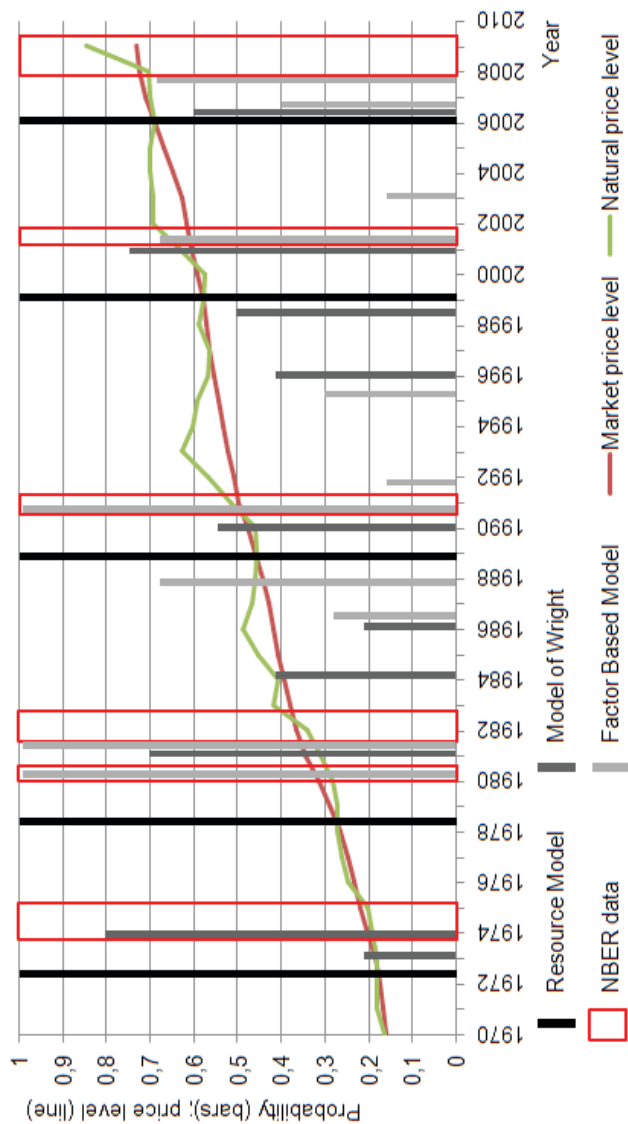
5.1. Interpretation of probability

In Wright's (Wright, 2006) and Factor Based (Silvia et al., 2008) models and in (Berge et al., 2011), in those few cases where probability of a recession is over 90% (1980, 1991), signals are generated too late and almost post factum. In the resource model, signals that indicate inception of recession with complete probability are generated for every recession from 1970 to 2010 6-12 months beforehand, as shown on fig. 6A,B.

5.2. Recessions and slowdowns

Specified models do not show any difference between recessions and slowdowns. They generate the same signals for recessions as for temporary economic weaknesses.

A)



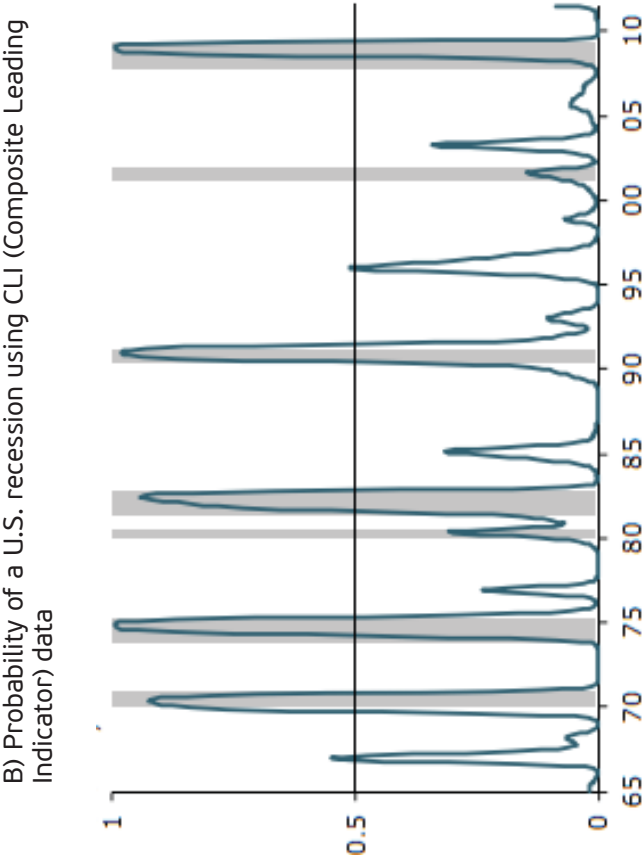


Fig.6 Forecast efficacy comparison of the Resource Model to the Model of Wright and the Factor Based Model and CLI one.

The resource model views recessions and slowdowns differently. For instance, probit models generated signals with a low probability of recession in 1986 and 2002, while the resource model explicitly shows temporary slowdown in these years. In 1996 there really was a very high risk of recession, but in this case resource model showed that the recession would be barely avoided. It is interesting, that probit models showed low probability of recession in 1996, just like in 1986 and 2002.

5.3. False signals amidst uncertainty

Both probit models have misleading signals, which is a common drawback of all nonstructural models (see 1.1). It is difficult to interpret false signals as, for example, Wright's model shows higher probability of recession in 1986, than accurate signals' probability of the next two recessions.

Probit models often give low probability signals that are not followed up by recession. Forecasts, based on such signals carry a lot of uncertainty. As we showed in sec. 1.1, these common drawbacks of nonstructural models – false signals (low probability signals that are not succeeded by recession) – are a direct consequence of a “vicious circle” problem. Therefore, it is difficult to obtain unambiguous forecasts even theoretically, without solving this problem. During the testing period of 40 years, some probit models show better results on one time span, others show better results on another. An important distinctive feature of the resource model is that if it generates a signal, the upcoming recession date is known with an error of one quarter.

The resource model not only hasn't generated a single false signal for the past 40 years, it allowed to “differentiate” recessions from slowdowns. That is a direct result of synthesis of structural and nonstructural model qualities in one business cycle model. The fact that solution of “vicious circle” problem leads to elimination of false signals indicates that the hypothesis, stated in 1.1 is true.

6. Conclusions

In order to solve “vicious circle” problem in economic valuations the author proposes to introduce “available energy” as an additional (to monetary) measure of all resources used in GDP production. It allows us to determine the “natural” price vector quantitatively and unambiguously and to propose, on its base, a new approach for macroeconomic dynamics analysis. Within this approach, we are able to determine the competition perfection rate and macroeconomic equilibrium state in general case. Then we can analyze imperfect markets in real time with no assumptions, to distinguish market fluctuations from a fundamental trend at any moment and to eliminate any lag in identification of economic activity indicators.

The authors proposed criteria of competition efficiency (market perfection rate) both for any certain market, and for the whole economy. In general, macroequilibrium state is equal to perfect competition and can be reached even in a case when all separate markets are out of ideal (normal) microequilibrium ($\Delta P_i \neq 0$). It can happen when “positive” ($P_0 - P \Delta 0$) deviations from equilibrium on some particular markets are neutralized by “negative” ($P_0 - P < 0$) deviations on some other markets. Then definition of general equilibrium by L.Walrus is a specific case of the macroequilibrium definition proposed here (in case when $P_0 - P = 0$).

Within the proposed approach a new general resource model of macroeconomic dynamics (economic cycle) is proposed. It is shown that, in general, the initial driving force of macroeconomic dynamics is a permanent imperfection and disequilibrium of markets. It is embodied in value of absolute and hidden deficit of all resources used in GDP production. As any deviation from macroequilibrium causes the resource deficit to rise, this deficit increase provides an objective limit as for growth and recession phases as, actually, for any economic indicator dynamics.

This initial driving force of macroeconomic dynamics provides objective fundamentals for economic crises. Market mechanism of economic valuations generates economic cycle and crisis endogenously. All possible subjective factors (e.g. market expectations, regulations, speculations, etc) may strengthen or weaken these fundamentals.

The resource model is a synthesis of well-known structural and nonstructural models. Specifically, a complete microeconomic grounding for macroeconomics is provided. In other words, neoclassical synthesis is fully realized, as the macroequilibrium state here is determined as a simple sum of microequilibrium states in all markets of economy.

Any synthesis should provide new possibilities in solving of non-solved problems before. Following examples demonstrate solutions of some of them: 1) explanation of actual statistic correlation between economic growth rates and crude oil (energies) prices; 2) advance in forecasting accuracy of recession starting points.

The resource model actually allows us to identify and forecast recession as early as 6-12 months before its occurring (there are no false signals for the ΔP indicator during the last 40 years). Clearly, it opens for us new possibilities in anti-cycle policy implementation, sustainable growth maintenance and possible elimination of recession at all, as these policies can be initiated at least half a year earlier than they usually are.

Two simple rules to determine direction of oil (energies) price trend is proposed. They are confirmed for the whole period of energies trading at NYMEX.

Taking into account that there was no restricting assumptions during the model elaboration, the model is general and can be used at any market conditions for any country. The model has proved accurate and been tested on the USA economy using a 40-year period data. Earlier this model was successfully tested on the economy of Spain (18 years is a period of consideration) that additionally proves the model to be general.

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For the sake of giving our children and the children of their children an opportunity to realize their mission and to answer the eternal questions of mankind, which we are jet unable to solve, we all need to adopt quite different way of life. The first step is to revise our attitude to fundamental social categories of Money and State.

Human and Resource Economic System is a normative socio-economic model that implies more egalitarian and just society, stable resource use and improvement of environment – instead of its degradation. It is based on principles of absolutely stable currency, backed by energy and water, balanced transactions between economic agents and environment, open-governance and cooperative ethics.

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Recent

Flaws of the Modern Economy

There are four major adverse global economic tendencies, which are both commonly recognized and sufficiently severe to critically undermine the virtues of current neo-liberal economic model:

- Deepening of economic inequality
- Environmental degradation
- Depletion of natural resources
- Systemic crises

The rational value scale of a regular consumer of goods is distorted by the imperfect information as well as under the influence of marketing induced consumerism.

The financial markets instability raises human uncertainty about the future, creates a significant scale of path-dependencies that in turn provide further economic misbalances thus forming a vicious spiral that leads to a large number of adverse social phenomena such as social unrest and crime.

Money

Tired of financial instability, the world needs a radical reform of the monetary system. The backing of the new currency value should become water and energy. This will ensure the stability of the new currency, as well as transparency in the formation of its value.

The abolition of cash will allow more clear conducting of the financial and production planning as well as operational management of public finances. Having a POS-terminal and a payment card integrated in his personal communicational device each person will be able to easily make and receive payments as well as automatically obtain all the available information about the acquired goods and verify its authenticity if necessary.

Abolishing interest for loans purposing the non-consumer needs that can provide long-term productive efficiency increase and spreading of productive capacity as well as eliminating strict collateral rules we can balance the capital access capabilities for existing enterprises and ordinary people willing to start their own business and become a capital owner.

Supply

The system recognizes only two production factors: labour and resources. All the other production factors, admitted by classical economics, are determined as derivatives of labour and natural resources.

The use of scientific achievements in information technologies will allow manufacturers to declare the full production cost chain in order to ensure honesty of pricing and production policy.

Considering economic activity in terms of fundamental processes of energy wasting and accumulation will allow much more objective economical efficiency determination for separate economic entities as well as for the society in general.

Demand

The quantity of vital goods and services that an average human consumes in the course of life in energy terms should be provided to everybody as a social security transfer called the Life Unit.

The improvement of consumers' awareness via implementation of the openness principles and full production cost chain dec-

laration as well as linking prices and costs to energy will enable a significant increase in the effectiveness of consumption.

Every person should be provided with a certain productive capital in order to have no-diminishing level of life guaranteed while the importance of human labour for the economy is continuously reduced.

State

The current level of information technologies for the first time provides possibility to run the state in the form of direct electronic democracy, where all governmental decisions can be made through achievement of consensus in the society involving the will of every interested individual.

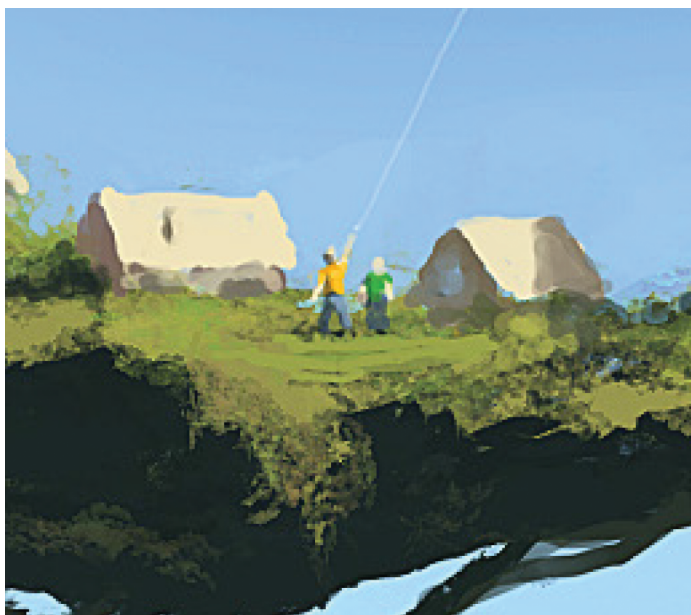
For the purpose of efficient natural and human resources usage as well as for the purpose of systemic risks management and development of production forces in strict correspondence to the society's interests, the government should become the only source of debt capital.

A special attention to financing education and population's literacy increase should play the fundamental role in transition to the new economic principles.

Ethics and Political Philosophy

The profound subliminal fear of future lays in the foundation of a modern "western world" representative's worldview. In modern economy this fear has found its expression in the four principles of economic behaviour: reserving, insurance, privacy and security. The implementation of human and resource economic system will gradually change ethical principles of individual's behaviour from reservedness to openness, from fear to confidence and from individual profit-maximizing competition to cooperation.

Partners





The 40 Foundation

Light over our planet belongs to all; it's omnipresent and is constantly on the move. Every one of us bears a particle of this light and can make it brighter.

- Hares Youssef

The 40 Foundation is a Paris- and Geneva-based charity, which main objectives are support of independence of science and advocacy of multi-disciplinary approach to today's key issues. It has been established in 2008 by Hares Youssef – international businessman, public figure, philosopher and philanthropist.

The 40 Foundation's principal projects:

- Human and Resource Economic System - a synthetic normative socio-economic model and international R&D network.
- First International Social Transformation Conference - in memory of Nicola Tesla. Organized jointly with New Economics Foundation and Global Round Table.
- Nicola Tesla memorial prize in arts and sciences.

Recently supported initiatives:

- The Green Money Working Group
- Eradicating Ecocide Campaign
- Columbus Quest
- Pole to Pole
- "L'Affaire Seznec" – theatrical play by Robert Hossein
- "Another" – literary magazine, edited by Adunis
- The Green Economics Institute Conference Methodology Symposium
- IOD Global Convention 2011

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Contact details:

1, rue François 1er
75008 Paris, France

Tel: +33 1 53 83 88 20

Fax: +33 1 45 63 11 04

haresyoussef@the40.org

www.the40.org



The new economics foundation

NEF (the new economics foundation) is an independent think-and-do tank that inspires and demonstrates real economic well-being.

We aim to improve quality of life by promoting innovative solutions that challenge mainstream thinking on economic, environment and social issues. We work in partnership and put people and the planet first.

NEF was founded in 1986 by the leaders of The Other Economic Summit (TOES) which forced issues such as international debt onto the agenda of the G7 and G8 summits.

We are unique in combining rigorous analysis and policy debate with practical solutions on the ground, often run and designed with the help of local people. We also create new ways of measuring progress towards increased well-being and environmental sustainability.

NEF works with all sections of society in the UK and internationally - civil society, government, individuals, businesses and academia - to create more understanding and strategies for change.

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The World Academy of Art and Science is composed of 650 individual Fellows from diverse cultures, nationalities, and intellectual disciplines, chosen for eminence in art, the natural and social sciences, and the humanities. Established in 1960 by distinguished individuals concerned by the impact of the explosive growth of knowledge, its activities seek to address global issues related to the social consequences and policy implications of knowledge.

The Academy serves as a forum for reflective scientists, artists, and scholars to discuss the vital problems of humankind independent of political boundaries or limits, whether spiritual or physical -- a forum where these problems can be discussed objectively, scientifically, globally, and free from vested interests or regional attachments, to arrive at solutions that affirm universal human rights and serve the interests of all humanity. WAAS is founded on faith in the power of original and creative ideas -- Real Ideas with effective power -- to change the world. Its motto is "Leadership in thought that leads to action."

The spirit of the Academy can be expressed in the words of Albert Einstein: "The creations of our mind shall be a blessing and not a curse to mankind." Its Fellows share the ambition (as the Founders said in their 1960 Manifesto) "to rediscover the language of mutual understanding," surmounting differences in tradition, language, and social structure which, unless fused by creative imagination and continuous effort, dissolve the latent human commonwealth in contention and conflict.

Scientific discovery and technological innovation keep developing instruments of unparalleled power for fulfillment or destruction. We humans, more and more, are taking into our own hands the future evolution of our bodies, our minds, the civilizations we cre-

ate, and the very planet we inhabit. So it is imperative that we guide what we do by what we know, and guide what we know by what we value. The aim of the Academy's founders was to function as "an informal WORLD UNIVERSITY at the highest scientific and ethical level, in which deep human understanding and the fullest sense of responsibility will meet."

The World Academy is incorporated in the State of California and has about 650 elected Fellows from 86 different countries.

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Ethical Markets' mission is to foster the evolution of capitalism beyond current models based on materialism, maximizing self-interest and profit, competition and fear of scarcity. As we move further into the Information Age, we learn that information and knowledge are not scarce, and our economic models can move toward sharing, cooperating and a new abundance. We believe capitalism combined with humanity's growing knowledge of the interdependence of all life on Planet Earth, can evolve to serve today's new needs and our common future - beyond maximizing profits for shareholders and management, to benefiting all stakeholders. We deliver this message to our global market by featuring stories of success.

Ethical Markets showcases the organizations, trade associations, shareholder activities, the mutual funds and pension funds asset managers, financial planners, venture capital groups, innovative technologies and companies, as well as this vision of maturing, socially-responsible, ethical capitalism fitting humanity's aspirations for a more peaceful, just and ecologically sustainable world.

Contact details:

Ethical Markets Media, LLC

P.O Box 5190

St. Augustine, FL 32085

Phone: 904-829-3140

Fax: 904-826-0325

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City of Split

The City of Split

Split is the economic and administrative center of Middle Dalmatia. It is the second largest city in Croatia, with over 200,000 inhabitants, and is the largest city on the Adriatic coast. It emerged from a settlement around a palace built by Roman emperor Diocletian. The city was also important within Yugoslavia.

Split is now a major Croatian tourist destination. The historic center of Split was included into the UNESCO list of World Heritage Sites. Split is said to be one of the centers of Croatian culture. Many new hotels are being built, as well as new apartment and office buildings. Many large development projects are revived, and new infrastructure is being built.

The University of Split was founded in 1974. In the last few years it has grown to a big extent. Now it has 26,000 students and is organized in 12 faculties. Currently the new campus is being built, and it will be finished sometime in 2012. It will house all of the faculties, a large student centre with a sports hall, sporting grounds and a university library.

Contact details:

www.split.hr

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University of Split FACULTY OF ECONOMICS

The Faculty of Economics of the University of Zagreb set up a division in Split in 1971. Starting academic year 2005/2006, a new method of studying is being introduced which is in accordance with the Bologna Process.

In this way, the Faculty of Economics will be a part of a unique European system of higher education (3+2+3). The Faculty offers all levels of the Bologna structured studies at both university and professional levels. It provides students at all levels with exceptional premises for studying, well-organized teaching procedure, but also high levels of other forms of student standard

The Faculty of Economics in Split is the second largest institution of its kind in Croatia. It enrolls around 4,500 students in various study programs and study statuses. At present, the Faculty has 126 employees, out of which there are 88 teachers and 50 outside collaborators from other faculties and from the economy who all teach different courses of study.

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- Department of Quantitative Methods
- Department of Finance
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Nikola Tesla Museum

Saving and sharing the memory

The Nikola Tesla Museum, as the guardian, promoter, and agent of the Nikola Tesla legacy, is the focal point for a broad scope of public attention. One of the most often posed questions is - when, and under which conditions, is Tesla's archive going to be available for public use? Feeling a great responsibility and obligation towards Nikola Tesla's huge body of work, as well as towards everyone wishing to learn more about, first of all, the written part of his legacy - as a first-rate and unique source for diverse researches - we decided to publish our strategy for processing and exploitation of segments of Nikola Tesla's legacy, articulated and contained in the Digitalization, Microfilming, Processing, and Exploitation Project for the Segments of Nikola Tesla's Legacy.

Contact details:

Nikola Tesla Museum

Krunka 51, 11000 Belgrade, Serbia

Tel: +381 (0) 11 24 33 886

Fax: +381 (0) 11 24 36 408

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Community Forge is a non-profit association that designs, develops and distributes free, open-source software for building communities with currencies.

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Our hosted website makes building and managing your community easier, and it's ...

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“The Global Round Table” series – GRT – is an innovative non-party political initiative that brings together: carefully selected economic actors, academia, policy-makers and civil society representatives (including young generation, gender representation). with the aim to:

- provide thought leadership;
- improve the level and quality of information available to economic- and political decision-makers;
- provide inspiration to civil society leaders and the young generation.

The GRT generates direct exchanges of innovative ideas and prospective thinking. Critical issues of our time are addressed from diverse perspectives in a constructive and complementary manner without any presentations or prepared statements.

The prominent “feed-back-” and “feed-forward” role of civil society in this process is unique as is its approach that promotes stimulating dialogue between selected individuals and ensures best practice exchanges with socio-economic relevance across generational-, national-, and cultural boundaries.

The main annual event has until now been held in Budapest, to commemorate the very first GRT held there.

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Contact details:

Presidential Office: Nachtegalenhof 3
B-1933 Sterrebeek
Belgium

Tel: +32-2-30 50 626

e-mail: office@global-roundtable.eu

