

Is a Low Cost Stable Financial System Possible?

Technology has introduced new ways for considering how to design money and the financial system to avoid another crisis that concerns commentators.

Shann Turnbull PhD

sturnbull@mba1963.hbs.edu

Founding member of Sustainable Money Working Group (UK)

Principal: International Institute for Self-governance

Mobile: +61 418 222 378; Skype ID : shann.turnbull

What are the problems?

1. Leading commentators anticipate another financial crisis (BIS 2012; King 2017; Wolf 2018; etc).
2. Cost of financial sector increased by three to four times real economy since 1950's e.g France from 4% to 16% of GDP. Is its growth a sign of inefficiency? Australia 12%, US 22%

Problems of Central Banking

- “Of all the many ways of organising banking, the worst is the one we have today” (King 2010: 18).
- “Will future historians look back on central banks as a phenomenon largely of the twentieth century?” (King 1999:47).
- Confirmed by BoE staff: Ali, Barrdear, Claws, & Southgate (2014) when explaining the Bitcoin technology (2014). Bitcoin is based on a distributed ledger that denies centralised control
- Central Banking is but a specialised form of Central Planning requiring one size to fit all.

Monopoly money misallocates resources

Consider a mind experiment with the assumption that the demand for Foreign Exchange (FX) is in proportion to the population.

Western Australia possess 10% of the Australian population and earns 70% of Australia's FX..

WA citizens earn seven times the FX then they need.

Eastern citizens only earn 30% of the FX they consume.

If each region possessed its own currency then the value of the \$West would be much higher than the \$East.

Manufacturing and the export of educational and tourist services would be invigorated in the East. Local solar cell production would become competitive.

Conclusion: Monopoly money can misallocates resources much more than tariffs or taxes especially in resources based economies like Australia

Why fiat money is not fit for purpose 1

1. Value not specified by any one or more goods or services to create false price signals & market failure, eg Stern Report.
2. Yet biases investment of real resources to financial assets to increase GNP costs by 10 to 20%. Cost not noticed by Productivity Commission that limits its focus on efficiency.
3. Nations cannot control the value of their own money.
4. Volume of money no tied to real economic activity.
5. As asset class money competes with “procreative” assets that are the only way to *increase wellbeing* without increasing human exertion or working hours or increase environmental “well-being”

Why fiat money is not fit for purpose 2

5. Increases inequality from unearned interest income;
6. Interest increases cost of the financial system without corresponding increases in real output;
7. Volume of money not determined by real economic activity but by structure and operations of the system;
8. Money values subjected to volatility inhibiting investment;
9. No environmental feedback to allocate people or resources sustainably on the planet.

Why not use Bitcoins?

1. Bitcoins must be purchased, they cannot be given away to pensioners, unemployed, SMEs or used to finance infrastructure;
2. Their value is indeterminate & volatile;
3. Validating transactions takes time as majority of Bitcoin holders must confirm all transfers;
4. Validation is costly in computer time and energy consumption.
5. System will freeze up when mining stops.

Technology has created better options

Orthodox knowledge, learning and practices concerning money offer little guidance in a digital age. We need to think afresh and go back to common sense and basic principles as to why we need money, to do what, and what are the new types of money that can now be created that are "best fit for purpose?"

Turnbull (2014) introduced “3T” money that is:

1. Tethered to Sustainability Index for each bioregion;
2. Terminating from a negative interest rate;
3. Traceable, when desired.

Answer to research question

Four conditions are proposed to simplify money to establish a stable low cost financial system:

1. Only digital money is used (2 pps)
2. Money is only used as a medium of exchange (1 pp.);
3. Money is not used as a store of value because it has a negative interest rate that terminates its existence. It was called “Speed” money in the Great Depression (12 pps);
4. Money is not a unit of account because the value of money in each bioregion of the world is tethered to an index on how sustainable human society is in each bio-region.

It is recommended that trialling these conditions be encouraged by IMF, European Commission, and governments to provide debt free liquidity in a financial crisis.

Future of digital money

The chairman of Citigroup stated: "We know, at some point, cards are going to go away and it's just going to be digital wallet, digital payments" (Maley, 2017). Already the use of Automatic Teller Machines (ATMs) has reached a "15-year-low" (Bagshaw 2017). Electronic money has growing public support around the world (*The Economist* 2017: 76).

Acceptance of digital money has grown even though it can make every transaction traceable. However there is no reason why digital money could not be encrypted to provide privacy without using expensive and slower block chain technology.

The central banks of Russia and China (Prisco 2016) and Russia (CCN.LA 2016) are proposing to eliminate cash with the express purpose of adopting traceable digital money to minimise fraud, bribery, corruptions, money laundering or the financing of terrorists.

Orthodox views of digital money

Roghoff (2017: 58) rejected the idea of eliminating coins and notes in his appeal for “rethinking of conventional dogma” in his journal article: “Dealing with monetary paralysis at the zero bound: “for reasons of maintaining privacy, providing a safety valve to regulations, and offering a backup payment mechanism during internet/power outages, moving to a completely cashless society remains too high a price to pay simply to expand the central bank toolkit”.

The already wide acceptance of traceable digital money counters the privacy concerns raised by Rogoff, and in any event, this concern can be countered by encryption. Digital wallets powered by cell phone batteries and recharged with distributed renewable power sources counters the Rogoff concern about the unreliability of power supply. The discussion earlier provides evidence that both governments and practitioners believe a cashless society is inevitable.

Why should money carry a cost?

- To avoid money becoming an asset class competing with real goods and assets
- The cost can be considered as a service fee for the convenience of obtaining an acceptable medium of exchange
- The fee allows the public good provided by money to be paid for by its users.
- It substantially reduces the cost of the financial system that becomes more resilient and self-regulating.

What is speed money?

In the Great Depression privately issued notes were issued that required a stamp, sold by the issuer, to be attached each week. Such “Stamp Scrip” accepted in Europe and in the US required stamps of 2% of the face value to be affixed on its back side each week.

The issuer obtained income of $52 \times 2\% = 104\%$ over the year that was used to redeem the note at least at a 4% profit!

Speed money has many other names

1. Stamp Scrip – invented by Gesell 1919
2. Negative interest rate money
3. Demurrage money
4. Depreciating money
5. Rusting money
6. Self-liquidating money
7. Evaporating money
8. Terminating money
9. Cost carrying money
10. Non-use fee money
11. Use it or loose it money
12. Ecological money when value defined by Index
creating “Sustainable Energy Dollars” (SED=\$Z)

Keynes view on Speed money?

Gesell had proposed that a stamp of 0.1% of the face value of the notes be affixed every quarter to create a negative interest rate of 5.4% a year.

Keynes (1936: Chapter 23, part VI) supported the idea and referred to Gesell as “unduly neglected prophet”. Keynes thought the rate “would be too high in existing conditions, but the correct figure, which would have to be changed from time to time, could only be reached by trial and error”.

Keynes also thought money should disappear after mediating exchanges or investment

Contemporary views on Speed money

Buiter, W. H., 2010. Negative Nominal Interest Rates: Three Ways to Overcome the Zero Lower Bound, *North American Journal of Economics and Finance*, (Vol. 20), pp. 213-238.

Haldane, A. G., 2015. How Low Can You Go? *Bank of England*, September, (five months after my UK essay: Why should the UK adopt a digital money?)

Goodfriend, M. 2016, Designing Resilient Monetary Policy Frameworks for the Future, Jackson Hole Economic Policy Symposium, Wyoming.

History of speed money

1920 introduced by hundreds of stores in Germany to promote sales like modern fly-buy points systems;

1931 Issued by coal mine in Bavarian village of Schwanenkirchen to restart operations;

1932 Wörgl Council issue to revitalise Town

1933 Hundreds of other towns in Europe and the US introduced Stamp Script;

1934 Swiss WIR with usage fee - removed 1948;

2003 Regional -2%pq speed money re-introduced in Chiemagauer area of Southern Germany.

2006 German Regio Speed Money Association formed

2011 UK Sustainable Money Working Group formed

How can speed money be less costly?

Consider a business with \$200K sales per week and so revenues of $\$200k \times 52 = \$10.4M$ p.a.

The cost of accepting credit cards charging 2% commission would be **\$208K**.

With speed money banked say only once a week the average cash held would be half of $\$200K = \$100K$ costing 2% per week = \$2K being a cost p.a. of $52 \times \$2K = \underline{\$104K}$ p.a.

Who could issue speed money?

1. Anyone because it is self-financing
2. Local chambers of commerce
3. Other community associations
4. Local governments
5. Regional governments
6. National governments, even those who are in the Euro Zone
7. European Commission, not ECB

Taceable speed money?

- All Bitcoins are tagged to avoid them being duplicated - like numbering notes
- Tagged speed money would inhibit it being used in the “black economy” for tax avoidance, money laundering, bribes, fraud or funding terrorists;
- Greek black economy was estimated at 28% of GDP by World Bank from 1999-2007.
- Likely acceptance as tagged money if gifted to voters such as welfare recipients

US proposal of February 17, 1933

Pettengill-Bankhead Bill for US Gov:

- To issue \$1 billion of Stamp Scrip
- Post office to sell 2% stamps
- Stamp Scrip distributed to each US State in proportion to population for:
 - a. Welfare & unemployment income;
 - b. Building infrastructure to create jobs and increase productivity.
- Post office makes \$40 million profit!
- No government debt, new taxes or QE

What happened two weeks later?

March 4: President Roosevelt inaugurated

March 6: Roosevelt declares bank holiday

March 9: Roosevelt convenes joint sitting of both US houses of Congress and:

- (a) Congressman Steagall reads out first New Deal Bill as no time to print it!
- (b) Bill increases powers of privately owned Federal Reserve to create money and increase government debt
- (c) Bill signed into law same day!

Why IMF, ECB & EC should help

- Avoid Eurozone members exiting;
- Introduce monetary sovereignty to Eurozone nations while improving Euro resiliency;
- Increase growth & taxes by including black economy;
- Use Greece to learn how to create a more efficient, equitable, stable, and sustainable monetary system as outlined in paper;
- Bank of England suggested it could adopt a digital currency and the UK Treasury has a £10 M budget to research opportunities.

Options for defining monetary values:

1. One or more commodities;
2. Fiat money with self-referential values not defined by any one of more real things as also applies to most popular crypto currencies;
3. Bio-regional tether based on local index of sustainability to allocate real resources and the global population for eternity.

Sustainability index created by:

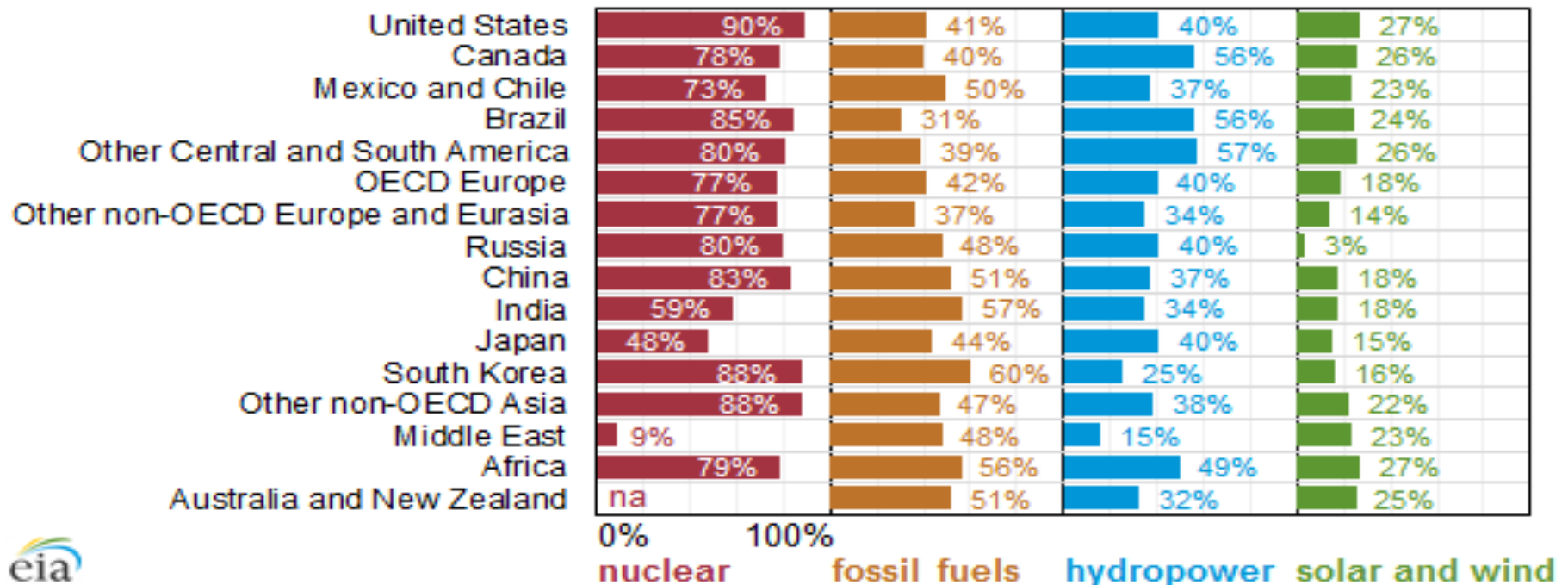
Product of two sub-indexes:

1. How efficiently benign renewable energy (bKwhrs) is consumed from the installed capacity in Kwhrs? (11% to 40% over 5 year average in OECD).
2. How dependent is humanity on only consuming benign renewable energy in their host bio region as a percentage of all other energy consumption ($> 5\%$)

Efficiency Index already produced

Five year average of posted at: <https://www.eia.gov/todayinenergy/detail.php?id=22832>

Electric generator capacity factors in various countries and regions, 2008-12 average capacity factor



Why use renewable energy tether? (1)

1. Energy is essential for modern society. It can create fresh water, food, clothing & shelter to sustain modern life.
2. Preservation of the environment and humanity on the planet is not possible without electricity generated from benign sources of renewable energy.
3. The minimum operating life of investments in renewable electricity generators is 20 years to create a short term stable tether with predictable changes arising from the introduction of more efficient productive technology when for five year rolling averages are used to calculate the tether.

Why use renewable energy tether? (2)

4. A monetary system tethered to an index for Sustainable Energy Dollars (SEDs=\$Z) in region of the planet provides a basis to create market prices that would (i) divert investment from burning coal to reduce and/or eliminate the need for carbon taxing or trading and (ii) encourage humans to reside in regions that can most efficiently obtain and use benign renewable energy.
5. The Internet of Things (IoT) can create data sets that can automatically calculate a \$Z index for each region of the world to counter manipulation that arose in setting the LIBOR or FX rates.
6. Economic values become defined by the ability of the regional environments to sustain humans in perpetuity that is not reliably practical on a global basis for any other types of goods.

Introduction of 3T money

1. Used in 2T form as “Lifeboat helicopter” money in next crisis by private, local government, State governments or National governments;
2. Index producers and/or the likes of Google create SI to gain click bait to promote their business;
3. International investors wanting to minimize FX uncertainty nominate their investment contract in money tethered to Sustainability Index (SI);
4. Entrepreneurs obtain creditable third party insurance on international contracts and attached insurance cost to units of contracts to create 3T money;
5. UN encourages International Accounting Standards Board to establish standard unit of value.

Outcomes from 3T money

Outcomes of 3T money?:

- Establish a stable predictable medium of exchange;
- Avoid value manipulation by speculators;
- Recognize only indirectly over the longer-term changes in production, consumption or technology;
- Minimize the cost of financialization (Bezemer 2018)
- Eliminates financial crisis spreading to another regions;
- Eliminates financial instability within each region;
- Eliminate inflation created by excessive money creation;
- Create incentives for investment in benign renewable energy, storage systems and real assets including houses.
- Reduce and/or eliminate carbon taxing or trading;
- **Nudges the location and size of the population in each region to become sustainable in perpetuity**

Table 2, Existing and Ecological Money

	Diff. between:	Existing money	Ecological value \$Z
1	Money created by:	Government & banks	Consumers, producers, traders and investors
2	Interest rates set by:	Central Bank	Cost of risk insurance
3	Expansion of money:	Government ratios/ regulation	Value of market transactions
4	Value defined by:	Government fiat	Benign renewable energy
5	Unit of value	Not defined	Renewable kwhs (\$Z)
6	Store of value	Yes, subject to inflation	Not a store of value
7	Integrity of value	Indeterminate	Tethered to renewable energy
8	Integrity of system	Exposed to contagion	Little exposed to contagion
9	Choice of currency	Government monopoly	Determined by currency region
10	Inflation control by:	‘Blunt’ policy instruments	Value of renewable energy
11	Structure of money:	Unlimited accrual of interest	Carrying cost limiting life
12	Economic flaw-1	Incentive to own money	Disincentive to hold money
13	Economic flaw-2	Allocates resources to finance	Real assets more attractive

	Difference between:	Existing money	Ecological money \$Z
14	Economic flaw-3	Distorts price relativities	Prices set by renewable energy
15	Financial system cost	Ever increasing	Minimized
16	Financial assets/real	Ratio increases	Incentive to minimize
17	Economic growth	Required to pay interest costs	Accommodates de-growth
18	Social flaw-1	Compounds unearned income	No unearned income
19	Social flaw -2	Concentrates influence	Localizes influence
20	Political flaw-1	Concentrates power	Enriches local democracy
21	Political flaw-2	Low accountability	Cooperative accountability
22	Environmental flaw 1	Incentive to burn carbon	Favours renewable energy
23	Environmental flaw 2	No feedback from nature	Nature controls price signals
24	Ecological feedback	None	Local renewable energy service
25	Sustainability	Highly questionable	More likely

Thank you

Questions?

Follow up contact sturnbul@mba1963.hbs.edu

Sustainable unit of value tether

The retail value of Kwhrs averaged over different sources of benign renewable energy in each bio-region produced and consumed by members of a distribution entity will be described Sustainable Energy Dollars (SEDs=\$Z). Unlike LIBOR and FX price determined privately every consumer/producer could monitor and changes in price setting.

Kwhrs of energy would not become money to avoid the creation of derivatives and speculation. Money would be created by producers, traders, consumers defining the value of their contracts in \$SEDs and obtaining credit insurance to make the contacts acceptable as money. All or part of the insurance fee would attached to the money.

Data sets for a tether

A monetary index for each region of the world could be automatically calculated from the IoT. The IoT would provide at least five sets of data from each currency region on a rolling five-year average. The data sets being:

A= Kwhrs consumed in the region from benign renewable energy sources.

B= Installed Kwhrs capacity of generators using benign renewable energy sources.

C= Kwhrs consumed from non-benign or non-renewable resources.

D= Kwhrs equivalent of energy consumed from non-benign and non-renewable resources.

E= Kwhrs exported from the region produced by benign renewable energy sources.

Formulating an index of sustainable value

The efficiency of utilising installed capacity would become local and export consumption as a ratio of installed capacity. That is $(A+E)/B$. Energy storage need not be recognised as its effect would become recognised by possibly increasing the efficiency of output from the installed capacity.

The Clean ratio is represented by the consumption of electricity from benign renewable energy sources C) as a percentage of consumption from all sources of energy $(C+D)$. That is $C/(C+D)$. D includes burning carbon for energy anywhere including automobiles and aircraft.

$$Z = (A+E) \times C / B \times (C+D)$$

Use of index

- In regions where $C=D=E=0$ the purchasing power of \$Z would be determined by the relative values of $A \div B$. In such situations \$Z would be determined solely by the utilization factor of the generators powered by benign renewable energy. Utilization factors in European OECD countries for the five years from 2008 to 2012 were: Hydro 40%, Wind 22% and Solar 11% (Refer to <https://www.eia.gov/todayinenergy/detail.php?id=22832>). Using these percentages for hypothetical regions without energy storage facilities that were entirely dependent upon solar their \$Z would become half the value of \$Z in regions entirely dependent upon wind. The European OECD utilization factors for Nuclear generators was 77% and for fossil fuel 42%.

Macro stability from parallel money

- The contribution of privately organised parallel exchange systems to macro economic stability was reported by Stodder (2005) in both the US and in Switzerland.
- His US data was based on the International Reciprocal Trade Association (IRTA) founded in the early 1970's and the Swiss data on the WIR with turnover of 2 billion Euros.
- The Swiss WIR illustrates a private credit system independent of government! Greece could follow?

Would market forces limit excessive issue of speed money?

Acceptance of speed money as a supplementary currency could rapidly decline as its use as a medium of exchange becomes saturated.

Excessive issue of Speed Money could result in it being discounted to inhibit its excessive issue?

A private issuer of a supplementary speed money would obtain an incentive to reduce the negative interest rate. Wörgl's conversion fee was little used.

A government issuer of a supplementary speed currency would also have the option of imposing a tax on deposits of competing "slow" official money.

Parallel Greek low cost speed Euros?

- Private sector could unilaterally introduce speed money in some jurisdictions as it has in Europe;
- And/or local or national governments;
- Use paper notes in emergency while adopting cell phone applications and/or existing government issued debit cards rechargeable and from internet that would also collect negative interest payments;
- If adopted nationally then follow proposal by Russia and PRC to replace coins with swipe cards/cell phones as suggested by Haldane 2015

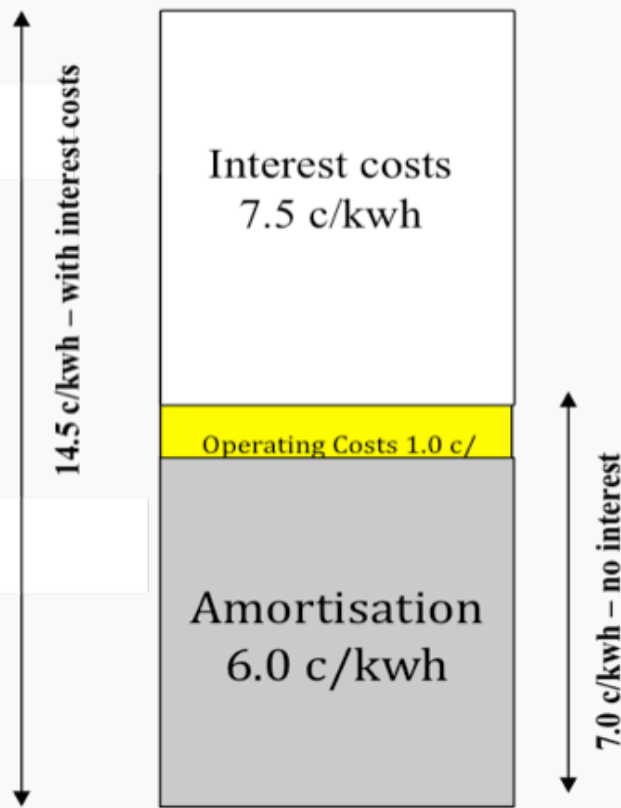
How changing the nature of money changes the nature of resource allocation

Money without interest costs makes sustainable electricity cheaper:

Because renewable energy investment is around three times higher for similar output

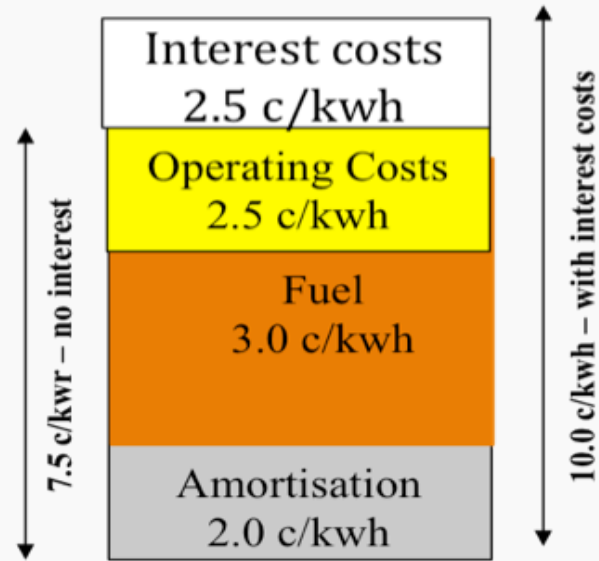
**Indicative figures used to illustrate cost relationships
over 25 year operating life of investments**

Price of hydro, solar, wind, etc. powered electricity
reduces without interest costs from **14.5 to 7.00 c/kwh**



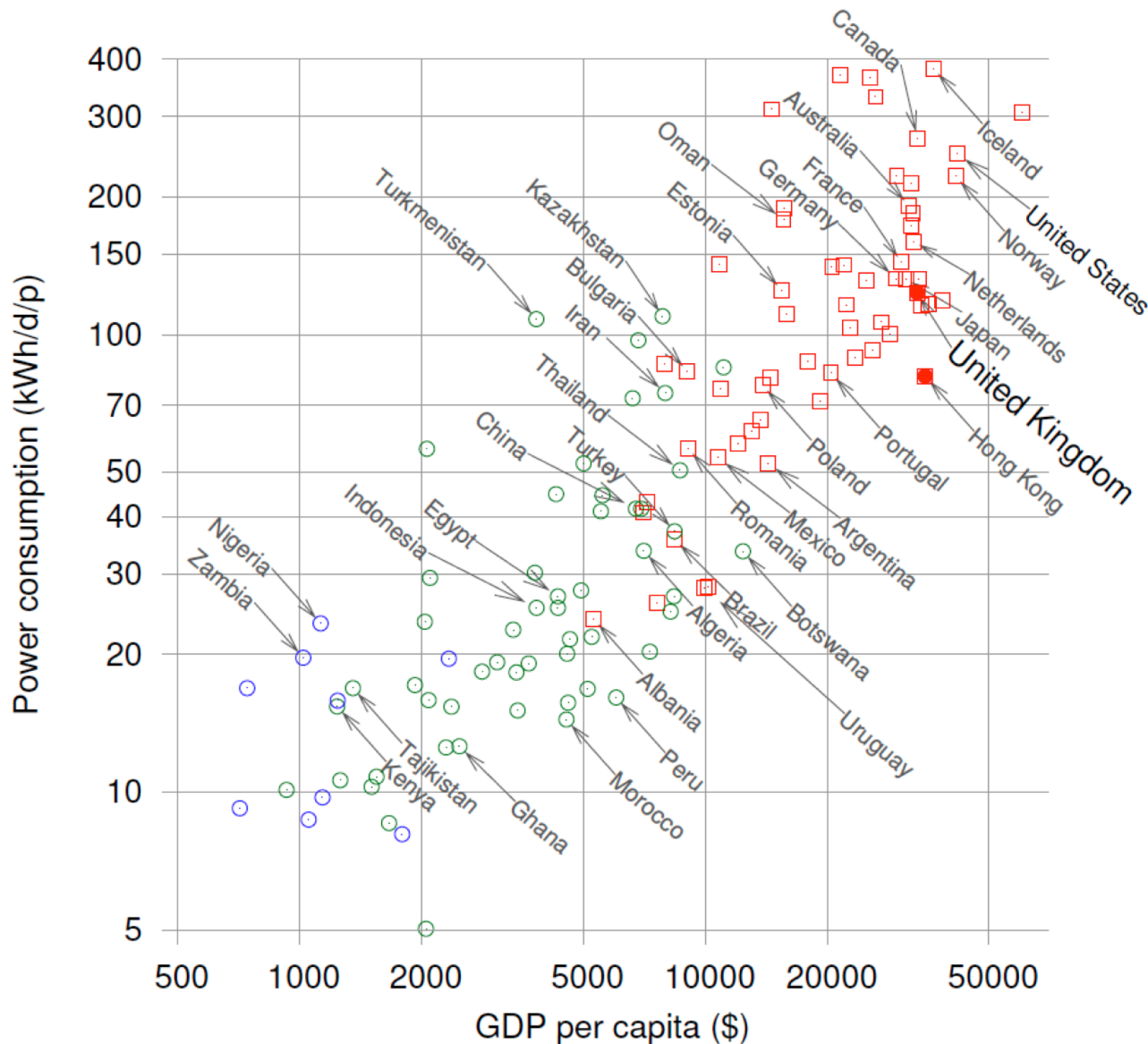
**Renewable
energy**

Price of coal, oil, etc powered electricity
reduces without interest costs from **10.0 to 7.5 c/kwh**



**Non-renewable
energy**

Power Consumption per person v's GDP per person



Goberty & Zitoli (2012),
'Deko: An electricity-backed
currency proposal'
available at:
<http://ssrn.com/abstract=1802166>

Sustainable unit of value tether

To provide a guide as to the relative value of international currencies *The Economist* (2017c) established its own standard reference unit of value:

"The Big Mac index was invented in 1986 by The Economist as a light-hearted guide to whether currencies are at their "correct" level. It is based on the theory of purchasing-power parity (PPP), the notion that in the long run exchange rates should move towards the rate that would equalise the prices of an identical basket of goods and services (in this case, a burger) in any two countries. For example, the average price of a Big Mac in America in July 2017 was \$5.30; in China it was only \$2.92 at market exchange rates. So the "raw" Big Mac index says that the Yuan was undervalued by 45% at that time.

Burgernomics was never intended as a precise gauge of currency misalignment, merely a tool to make exchange-rate theory more digestible. Yet the Big Mac index has become a global standard, included in several economic textbooks and the subject of at least 20 academic studies. For those who take their fast food more seriously, we have also calculated a gourmet version of the index."

Who should create money, control its volume and cost?

1. Private banks & Gov. as at present?
2. Government & bureaucrats only?
3. Private entrepreneurs and giant firms?
4. Computers manipulating crypto currency “block-chains”?
5. Producers, consumers, traders & investors (i.e. market activity)?

Who are members of the Sustainable Money Working Group?

First public meeting, Great Hall, ICAEW, London, February 13th, 2012



Left to right:

Dr Richard Spencer (Host) Head of sustainability, Institute of Chartered Accountants of England and Wales (ICAEW)
Martin Hockly – CEO, Street UK Foundation
Ed Mayo (Chair), Secretary-General Coops UK Limited
Steve Hughes – Economist, British Chambers of Commerce

Formation meeting, London 17 October 2011 *Terrace Café, National Portrait Gallery, London*



Maksym, Ed Mayo, Pat Conaty, Shann, Hares Youseff, Yuriy

Working meeting, London, 15 February 2012



Left to right:

Maksym Putij - Economic adviser, The 40 Foundation
John Longworth - Director-General, British Chambers of Commerce
Yuriy Riphayak - Secretary, The 40 Foundation
Dr Shann Turnbull - Research Fellow, The 40 Foundation
Josh Ryan-Collins - Senior Researcher, Monetary Reform - New Economics Foundation
Ed Mayo - Secretary-General, Co-ops UK Limited

Technology introduces monetary options

Digital technology has introduced new options for designing, using and regulating money besides the 3T policy concerns of Timing, Transmission and Traction.

Swipe card and cell phones make it practical to introduce money with a new 3T architecture of:

1. Tagged to allow integrity of use to be traced;
2. Terminating to remove price distortions, inequality, financialization & control volume.
3. Tethered to sustainable, non-volatile, objective units of value like Kwhrs of electricity generated from benign renewable source any where in the world at different relative values to allocate humans and resources in perpetuity.

Greek Musings about Bitcoin

Greek finance Minister, Yanis Varoufakis reportedly stated (as cited in paper):

- “digital Future Tax-coins (FT-coins) that “could use a Bitcoin-like algorithm in order to make the system transparent, efficient and transactions-cost-free”;
- “Greece will adopt Bitcoin if Eurogroup doesn’t give us a deal”
- Bitcoin Can Be Used in Eurozone “As Weapon Against Deflation”;
- “national supply of Euros that is perfectly legal in the context of the European Union’s Treaties”.