

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

*Christian Arnsperger  
University of Louvain (Belgium)  
Belgian National Science Foundation (F.R.S.-FNRS)  
Email: christian.arnsperger@uclouvain.be*

Presented as a keynote address  
for the First International Social Transformation Conference  
Split (Croatia), July 10-12, 2012

## **1. Introduction**

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*.<sup>1</sup> 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.<sup>2</sup> 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

---

<sup>1</sup> Bernard Lietaer, Christian Arnsperger, Sally Goerner and Stefan Brunnhuber, *Money and Sustainability: The Missing Link* (Axminster: Triarchy Press, 2012).

<sup>2</sup> An excellent overview is provided by Josh Ryan-Collins, Ludwig Schuster and Tony Greenham, *Energizing Money: An Introduction to Energy Currencies and Accounting* (London: New Economics Foundation, 2012).

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.

## **2. The wrong incentives in our current money system**

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 overconsumption.<sup>3</sup> 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 lives.<sup>4</sup> 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 growth.<sup>5</sup> This has little, if anything, to do with people’s greed or with alleged human nature—it has to do

---

<sup>3</sup> Richard Heinberg, *The End of Growth* (Gabriola Island: New Society, 2011).

<sup>4</sup> See Margrit Kennedy, *Geld ohne Zins und Inflation: Ein Tauschmittel, das allen dient*, new revised edition (Munich: Goldmann, 2004).

<sup>5</sup> 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).

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’.<sup>6</sup> 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 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

---

<sup>6</sup> See, for instance, Herman Daly, *Beyond Growth: The Economics of Sustainable Development* (Boston: Beacon Press, 1996).

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).

### **3. Combining sustainable banking and public money creation**

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.<sup>7, 8</sup> 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 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

---

<sup>7</sup> 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).

<sup>8</sup> 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).

imagine that there is no public creation of additional money and that there is an amount  $\Delta C$  corresponding to sustainability-oriented credit creation by banks<sup>9</sup> and that, as a result,  $e$  increases by an amount  $\Delta e$  corresponding to the energy efficiency gains induced by those new investments. If the growth rate of  $e$  is positive, meaning that the sustainability-oriented banks have done a competent job in channeling savings into ‘good’ projects,<sup>10</sup> and if  $v$  is constant while  $P$  increases due to higher oil and gas prices, we will get a negative growth rate for  $E$ .<sup>11</sup> In other words, credit creation for sustainability purposes can lead not just to 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 likely to be 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  $\pi \equiv (\Delta e/e)/(\Delta C/C)$ , as a measure of the project selection skills of banks.

Arguably, social and sustainable banks (such as Banca Etica, GLS Bank,

---

<sup>9</sup> And it is absolutely crucial to note here that  $\Delta C > 0$ , in this ‘alternative’ monetary setup, goes along with  $\Delta M = 0$ : banks can generate credit only by shifting sight deposits into time deposits, i.e., they borrow the money from their clients and create a scriptural shift from one type of account to another, without increasing the money supply.

<sup>10</sup> 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.

<sup>11</sup> Quite simply,  $\Delta E/E = \Delta v/v + \Delta M/M - \Delta e/e - \Delta P/P < 0$  if  $\Delta e/e > 0$ ,  $\Delta M/M = 0$ ,  $\Delta P/P > 0$ , and  $\Delta v/v = 0$ . (Note again that here,  $\Delta M/M = 0$  in spite of the fact that  $\Delta C/C > 0$ .)

Alternative Bank Switzerland, La Nef, and others) that devote their *entire* activity to sustainability-oriented financing, have knowledge and experience which would *make their  $\pi$ -ratio significantly higher than that of classical mainstream banks* that do ‘green’ banking only as a side activity.<sup>12</sup>

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 businesses<sup>13</sup>—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

---

<sup>12</sup> Arguments in this direction (although not using the notion of a  $\pi$ -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.

<sup>13</sup> 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.



and checking accounts,<sup>14</sup> 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 might mean a high level of energy consumption  $E$ , and decreasing this implies taking measures of a cultural and fiscal nature.<sup>15</sup> My point has simply been to explain how, *all other things being equal* (and, in particular, all banks being 'green' and no new money being injected into the economy), 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

---

<sup>14</sup> To be perfectly clear on this point: In the sketchy model here I have assumed that the government creates no additional money at all and that all that occurs is a rise in bank credit through a shift from checking accounts into savings accounts—under the assumption that all such credit is (by the *raison d'être* of sustainability-oriented banks) devoted to sustainability projects or 'ecological investments'. In actual reality this would not be the case and, instead of such a 'pure credit creation' model, we should have a 'money-cum-credit' model where two things happen: on the one hand, the State injects new money into the economy through its public expenditure; on the other hand, banks make credit by transforming some checking balances into savings balances. Whether the net result of these two simultaneously occurring mechanisms leads to a fall in total energy consumption is an open issue and cannot be dealt with simply by having a banking sector that goes 'green'.

<sup>15</sup> Such as those discussed by Tim Jackson, *Prosperity Without Growth: Economics for a Finite Planet* (London: Earthscan, 2009).

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.

#### **4. Introducing complementary currencies**

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'.<sup>16</sup> The idea is that by making CO<sub>2</sub> 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.

---

<sup>16</sup> 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).

Of course, we should calculate emissions correctly. This means 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 CO<sub>2</sub> 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 CO<sub>2</sub> as the South emits more and more, within the contracting global emissions budget).

Next to these emissions permits, an international agency would issue<sup>17</sup> a fixed stock of an ad hoc currency called *energy-backed currency unit* or ‘*ebcu*’.<sup>18</sup> 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

---

<sup>17</sup> 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.

<sup>18</sup> In this paragraph I am following closely the ideas put forward by Richard Douthwaite, *The Ecology of Money* (Totnes: Green Books, 1999).

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 supernumerary permits gradually becomes prohibitive because there are almost no *ebcus* 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 productivity<sup>19</sup>— which implies a wholesale return to so-called ‘eco-technic’ technologies,<sup>20</sup> which are more

---

<sup>19</sup> As forcefully suggested by Tim Jackson, *Prosperity Without Growth*, *op. cit.*

<sup>20</sup> As characterized by John Michael Greer, *The Ecotechnic Future* (Gabriola Island: New Society, 2009).

labor-intensive and more technically unsophisticated, hence less 'heteronomous'.<sup>21</sup>

## 5. Conclusion

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 this short paper 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.

---

<sup>21</sup> 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).