

# White Paper

**What could it take to make the economy green?**

Exploring routes to the biomass society

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and contributing Partners

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# Exploring routes to the biomass society

## **Background:**

Three organizations, The Swedish Sustainable Economy Foundation, The Open World Foundation and ISSS have all been working on various aspects of greening the economy. This white paper presents a synthesis of ideas and conclusions from their work.

**The Swedish Sustainable Economy Foundation** has completed several studies on emission fees. Results show that it is much more effective to put a fee on things that society does not want, than to put fees on things that society DOES want. (VAT and payroll taxes all tax desired outcomes, like thriving economy and people in jobs.)

The other conclusion from the Foundation's work is that by progressively raising the fee, and redistributing the levy back to the economy, for example to each taxpayer's account, the market finds solutions if the speed of increase allows the market to reinvest at a sound rate.

**The Open World Foundation** have looked into the possibilities of combining biochar<sup>1</sup> and biogas production to stimulate a local economy that builds soil, maximizes biomass production and sequesters carbon.

ISSS have been preparing the way for local currencies in Sweden with a proposed pre-study.

## **TWO CHALLENGES: EXTERNALISATION AND LEAKAGE**

### **Externalization**

When fossil fuel is burnt, for example when you push the accelerator to move your car forward, the waste gasses escape into the atmosphere. There is a lot of evidence that this extra carbon dioxide harms the atmosphere. However, the atmosphere does not send a bill. Nor does society. A chain of business – from oil extraction to combustion – exerts pressure on the eco-system and climate system but the economic side of the business – who pays who for what – does not take into account the expense of dealing with climate system harm. This is externalization – when the costs that come from a business chain are borne by society in general and not by the actors – producers, sellers and consumers.

If we are to stop externalization we need to adapt the economic system to take externalities in account. One method, proposed by the Swedish Sustainable Economics Foundation, is to put a fee on taking a potential pollutant into the chain. The fee is raised until the market that the chain is part of responds by ceasing to externalize.

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<sup>1</sup> **Biochar** is a name for [charcoal](#) when it is used for particular purposes, especially as a soil amendment. Like all charcoal, biochar is created by [pyrolysis](#) of [biomass](#). Biochar is under investigation as an approach to [carbon sequestration](#) to produce [negative carbon dioxide emissions](#).<sup>[1]</sup> Biochar thus has the potential to help mitigate [climate change](#), via carbon sequestration.<sup>[2]</sup> Independently, biochar can increase [soil fertility](#), increase agricultural productivity and provide protection against some foliar and soil-borne diseases. Furthermore, biochar reduces pressure on [forests](#). Biochar is a stable solid, rich in [carbon](#) and can endure in soil for thousands of years.<sup>[1]</sup>



If a city or county is to consider framing a path to a green society it will need to consider how to put a fee on the supply chain introduction. Two examples that serve to illustrate the theme of this paper are the introduction of oil into the country and the introduction of material into the waste stream.

In the first case, nations have been talking of import taxes and carbon taxes on fuel. In the second case, the lower the degree of sorting of waste, the more it will pollute as the costs of sorting it will have to be born by society. Here, the expedient thing to do is to tax waste depending on how recoverable it is.

TSSEF suggests levying taxes on these undesirable supply chain introductions and redistributing them back to the economy. This paper builds on that idea as well.

## **Leakage**

Leakage is the flow of money outside the city or county, or country depending on the area being analysed. Net leakage is negative for the local economy. As money flows out it means there is less to be spent locally. If money stays in circulation it can travel around the community increasing the supply of services and jobs and demand for the same.

Leakage coincides with fossil fuel use. Purchase of fossil fuel sends money out along the supply chain to the point of extraction. And not just for fuel. Fertilizer production uses a lot of fossil fuel, too.

Using local, renewable sources of energy and soil improvement helps to keep money circulating locally.

## **We need an economy that, like all good household economies, balances**

A green economy, for the activities within a given geographic area, would be characterized by

- The net use of biomass being no more than equals re-growth
- Employment at high level and residents enjoy an acceptable standard of living
- No net release of nutrients, poisons or carbon dioxide to surrounding areas, the nutrients being recycled within the area.

## **The purpose of local currency: to help bring balance**

Local currencies are introduced primarily to stop leakage. By definition they are only valid in one defined geographic area. However, local currency could be used to address the other challenge of externalization if the fee system could be put in place and adjusted to both put a fee on supply chain introduction of externalities and a method to return the levies collected back into the local economy.

## **THE PROPOSAL IN OUTLINE:**

The city or county prepares to raise the fee on counter sustainable activities and system behaviour. Examples might include raising fees for unsorted waste, or raising congestion charges. The county may even consider taking more subsidy from government taxes as a contribution to its sustainability drive. This could take the form of a “pre-payment” for sequestration of carbon (see the section on pledges to sequester later). Sweden

for example levies a carbon dioxide tax on fuel<sup>2</sup>. If a County pledges to sequester the carbon, then it should receive some or all of the tax.

The city would need to set up a fund to collect money to finance the change with.

The city then works to introduce biochar and biogas plants and the technology needed to collect dry organics for charring and wet organics for biogas. (See the more detailed explanation and diagram below.)

The final piece of the solution is a complementary currency designed to boost local economy and a market that sequesters some carbon, derives energy from renewables and builds productive soil. This part of the sustainable economy needs land-owners on board.

### **Pledges:**

Soil is needed to sequester carbon, so one part of the project is to invited landowners to pledge to sequester carbon using soil enhancements. Doing this boosts productivity so there should be many who would be willing to do this, and pay for the soil enhancement if the price was right.

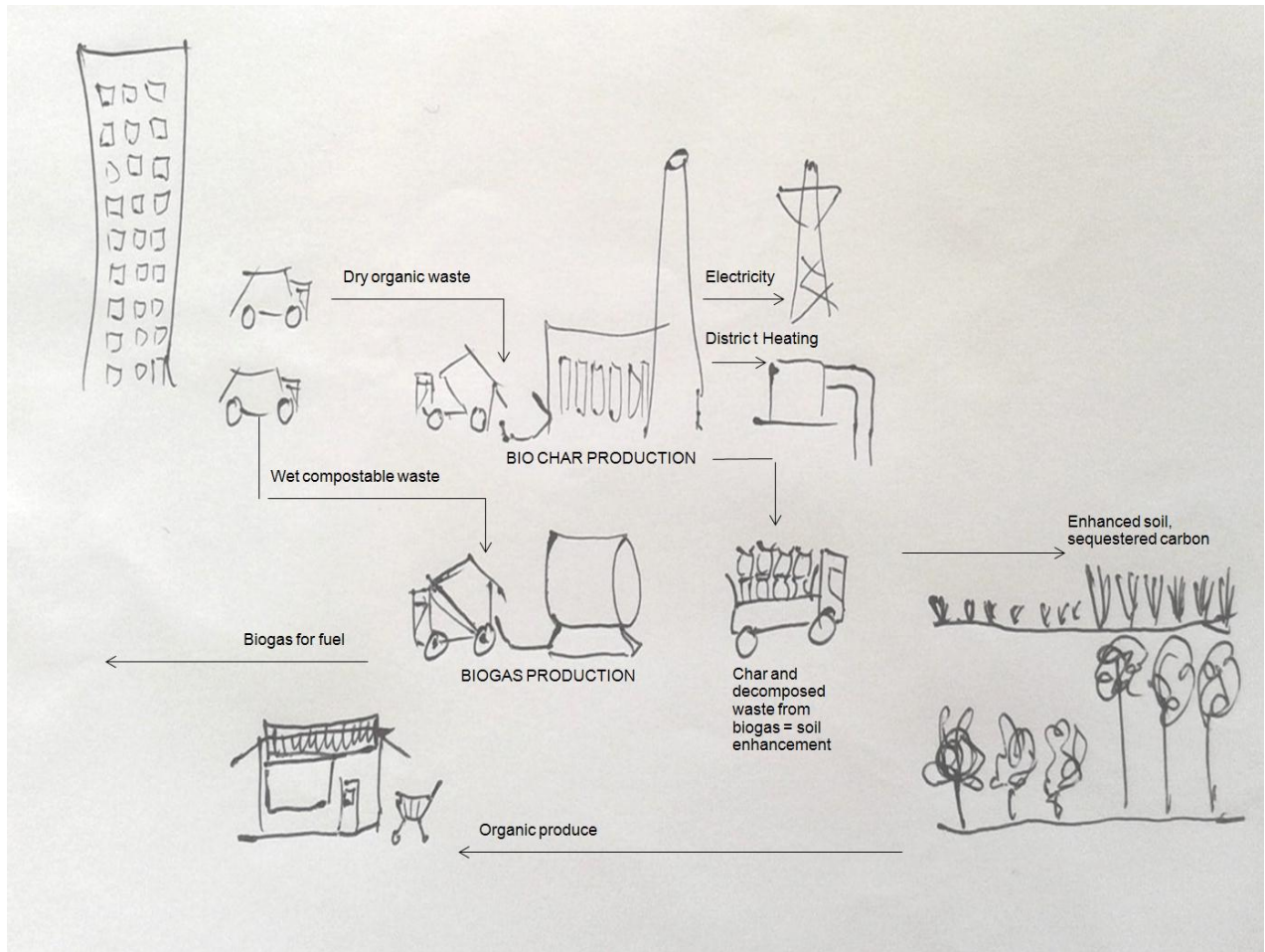
The pledges create a “market” for sequestration by providing an inventory of the total available sequestration capability in the area.

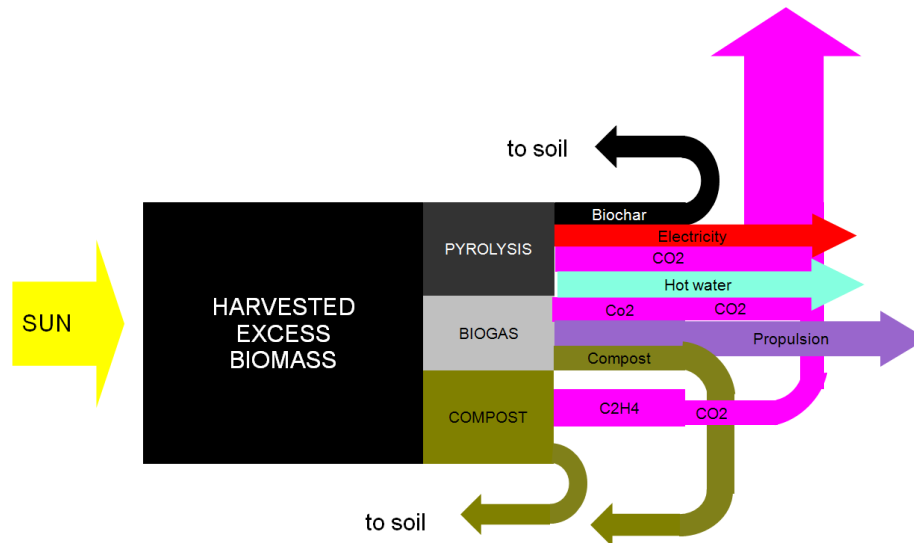
FUND ITEM	UNITS
+ Pledges	Tons Carbon sequestering
+ Government investment	Tons Carbon pledge to sequester
+ Fee income	Collected from raised waste taxation, eg.
- Complimentary Currency	In units, issued as “pre-payment” for pledge to sequester
- Infrastructure	Invested in waste machinery like biochar equipment, biogas, vehicles etc.
+ Service income	From waste stream handling, can be in local or national currency

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<sup>2</sup> Sweden collected some 27 billion SEK in 2012 from Carbon taxes Source; Energimyndigheten

# The renewable, sequestering economy.





### The biomass society

The diagram above shows a technical solution for gaining needed services from biomass, The dry component is made into char and the wet into biogas.

- The char is returned to the soil to sequester carbon.
- The heat can be used to create hot water and electricity
- The wetter fraction can be fermented to produce biogas which can be used to cook, and to propel vehicles and the rotted remains turned into compost.
- The remains can be composted, if combined with biochar it makes excellent soil enhancer.

### The finance:

Fees collected go into the infrastructure fund to be invested in Char and Biogas infrastructure and services. As soon as the first installations are in place the services they provide will generate income from:

- Waste stream management
- Electricity production
- District heating
- Fuel production
- Soil enhancement products

Further boosting of the fund's capital comes from

- Grant from government to sequester carbon.
- Raised fees on "counter-sustainable activities" like unsorted waste.

## Local complementary currency

By the national government giving local government a subsidy to sequester carbon, and by creating a fund to turn waste into sequestered carbon, energy and soil, the local government is effectively “spending” money into the local economy.

After the initial investment in waste handling capability, the services employ local people and could be paid for and bought in local currency.

Sequestration could be paid for in local currency, which could be issued by the infrastructure fund, backed up by the income from services and government sequestration grants.

For example, a person owning an allotment pledges to sequester a certain amount of carbon by digging it into the soil.

For that, the fund issues the owner a number of notes in the currency. When the fund has produced soil enhancement with carbon in it, it offers it for sale in local currency and national currency. The price to the allotment owner is relatively cheaper if they pay in local currency and at the same time they fulfill their pledge.

The currency could even be made available by exchange from national currency, and would be spent locally to favor local firms and keep the money in local circulation.

Were a local farmer to sequester, the benefit would be not only sequestration but a reduction in fossil fuel based fertilizers being used in the area. This could also be noted in the fund’s “Scorecard”. (Note the figures are random, equivalents will be added after the pre-study)

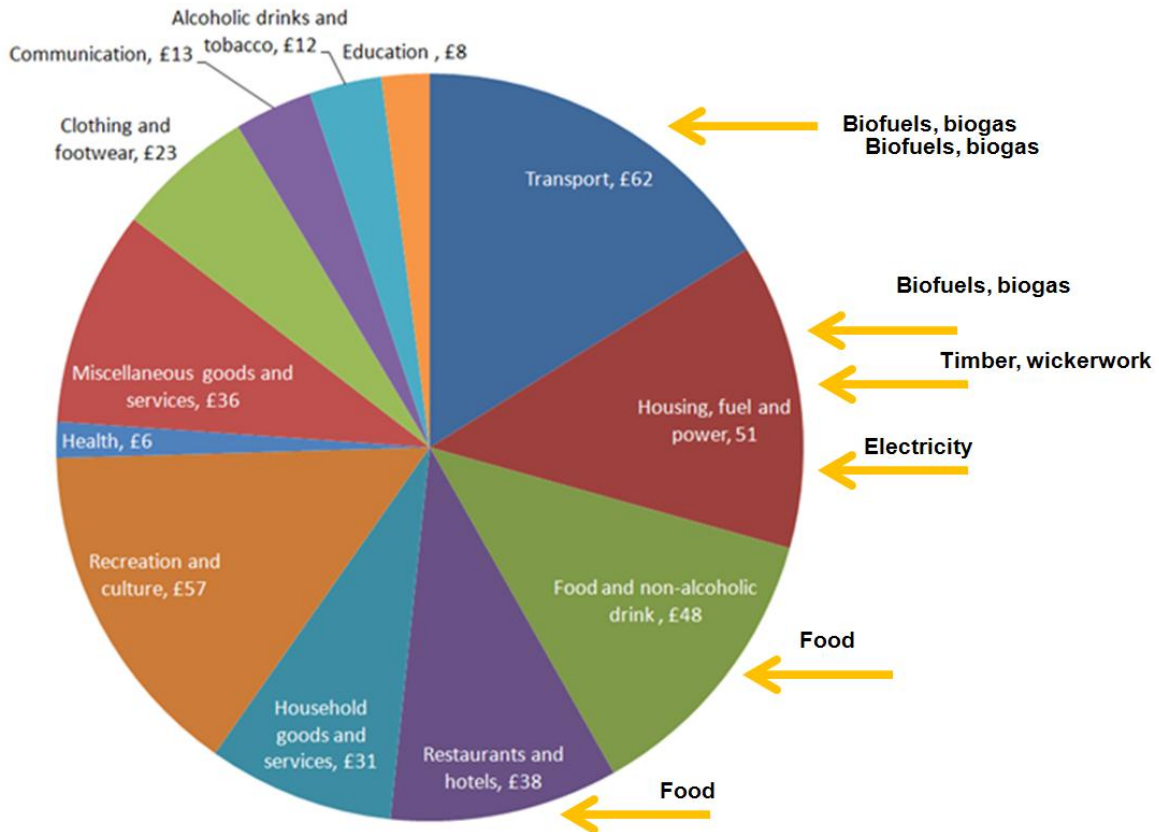
NATC = national currency, LCP = Local currency			
		Funds raised on fees levied	10 million NATC
		Subsidy from government	20 million NATC
		<b>TOTAL</b>	<b>30 million</b>
Pledged sequestration		Actual amount of C in soil improvement sold	BALANCE
3000 TONS		1000 TONS	+ 2000 TONS
Currency issued Against pledges		Bought with national currency	
10, 000 LCP		20,000LCP	+30,000 LCP
PRODUCTS	Amount	Fossil equivalent	Reduced carbon use
Soil improvement	100 TONS	10 TONS	- 3 TONS
BIOGAS	10,000 Litres	10,000 Litres	- 1 TON
Compost	1000 TONS		-
Electricity	1000 MWh	1 Barrel of oil equivalent	- 0,03 TON
Etc....			-
<b>TOTAL FOOTPRINT REDUCTION</b>			<b>- 4,03 TONS</b>

## Which goods and services could a local currency cover?

How much of the local economy could be transacted in the local currency if it were connected to the transition from fossil-fueled activity to biomass?

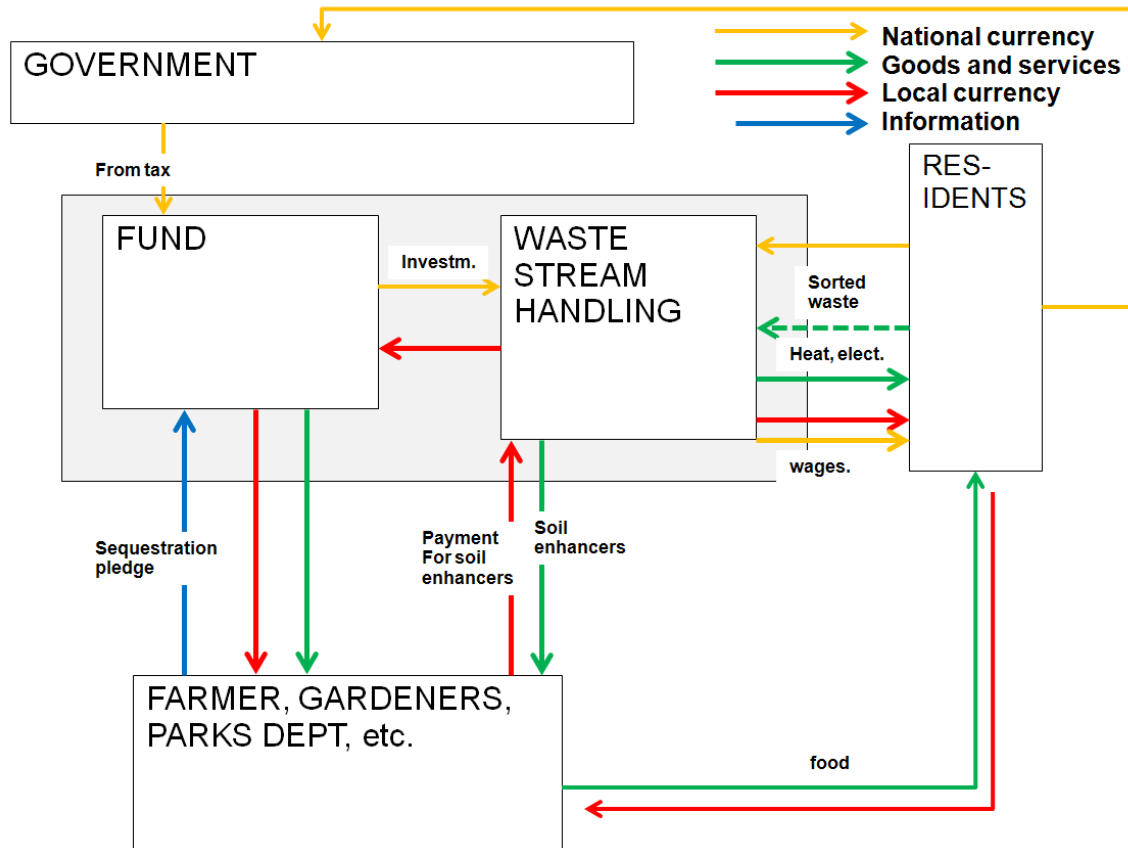
Consider the diagram below which shows the proportion of monthly expenditure for an average UK resident.

Some proportion of the right-hand categories could be served by the local economy. And local sourcing means less reliance on transport.





## Local complementary currency



## Decoupling

In the beginning, the currency will be pegged to the national currency. After a while, however, and you can see this from the diagram above, the local currency flows in a circle and does not need the national currency. At this stage, the value of the local currency will find a natural level.

## Local investment and enterprises

The question arises as to the opportunity for local people to invest in enterprises. As discussed in the monthly expenses diagram above, suitable investments are ones that give – not money – but what investors would otherwise buy with money. This is again essential services like food, electricity, waste management, etc.

If residents pledge to dig bags of soil with biochar in it, into their garden, then the compensation they receive in local currency can be re-invested into, say, a local bio-energy company in the form of pre-payment of services. This pre-payment can be rewarded with a discount on service over time.

Residents can even invest national currency in local businesses. A taxi company running on biogas for example, that gives discounts to shareholders and the biogas comes from locally digested biomass. Just participating in the biomass economy is a sound investment for residents. The biomass that makes the biogas comes in part from waste from resident's homes and businesses.

### **In summary:**

- Money levied on fees for things that are counter sustainable and not desired by society is channeled back into infrastructure and capability that creates jobs and a clean environment.
- The money is converted to local currency by being "spent" into existence with the sequestration pledges to back it up.
- The currency can also be exchanged from national currency so local business owners are favored and the money stays in the area contributing to a healthier local economy.
- The soil improvement products replace fossil based alternatives AND sequester carbon.
- The biogas produced replaces fossil fuel.

### **Taking the ideas forward**

The concepts put forward in this paper need to be tested in order to go forward. The Open World Foundation welcomes suggestions for projects to explore the feasibility of creating economic instruments to usher the transition from the fossil-fueled society to the sustainable, resilient culture of the future.

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### **References**

TSSEF White paper on flexible emissions fees <http://tssef.se/?p=469>

