WHITE PAPER

Rules and Behavior of Vouchers Issued by Producers as Legal Promises of Commodities

**Commodity Vouchers Ricardian Contract Smart Tokens on Ξthereum Protocol**

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# Abstract

The purpose of this paper is to study the usage of vouchers or “tokens” representing commodities like gasoline, fuel, communication fees, crops and other agricultural products, food, services, and all kind of consumables. A commodity good or service has full or partial but substantial fungibility; that is, whose individual units are essentially interchangeable, and the market treats its instances as equivalent or nearly so with no regard to who produced them. We focus on Consumables (also known as consumable goods, nondurable goods, or soft goods) are goods that are capable of being consumed; that may be destroyed, dissipated, wasted, or spent, and in many cases have an expiration date.

We do not treat tokens representing goods that can be uniquely identified, like real estate, land, pieces of art, in most cases having an owner and a property document.

It is no other than the implementation of the concept that “Anyone who offers goods and services for sale in the market is qualified to issue currency” [[1]](#endnote-2), trying to minimize the role any government or monetary authority, or law enforcement, has to play in the system, in a monetary system that we name **C-M-C** (Commodity – Money - Commodity). The term highlights that these tokens are meant to be an intermediary tool for barting, exchange of goods.

We recover some of the ideas of Paul Grignon by which “Credit Coin is a contract backed by promises of future productivity” [[2]](#endnote-3) [[3]](#endnote-4). We take strictly the principle that the promise of the producer has to be a legally binding contract to deliver the goods. The role of the state should be no other than enforce the fulfillment of these freely issued contracts by the producers with the holders. The system should work and stabilize without any further monetary intervention.

The proposal has some resemblances to the works of Samo Kavčič around the marxian concept of commodity-money-commodity money. [[4]](#endnote-5) [[5]](#endnote-6) It broadly shares the goals. However, it proposes a different mechanism, or rather, different mechanics to achieve a similar monetary circulation.

To standardize and make the contract legally binding, we propose to use the Ricardian Contract format for the C-M-C currencies. embedded in the token. A Ricardian contract is a document which is legible to both a court of law and to a software application. Its purpose is to provide digital trading systems of various kinds the solidity of legally binding claims on goods or property.[[6]](#endnote-7) [[7]](#endnote-8)

We describe how small producers can associate in cooperatives or associations and the Ricardian Contract collectively signed and used as framework for the promises. Something like the widespread Marketing Agreements used, for example, by farmers. However, the model also works for a big company.

Finally, we highlight how block-chain technologies with smart contract functions is the technology of choice. As technology, we propose ethereum ERC20 tokens. The Ricardian is stored in swarm, and the hash embedded in the token. To ensure liquidity between C-M-C currencies we propose the ERC228 exchange standard.

There is a Commons or taxes C-M-C currency to rule it all towards community goals.

# Summary of features

We propose a monetary system in which the main medium of exchange is vouchers that are legal documents representing the production promises of the producers. These vouchers are a self-credit of the producers to finance their inputs, and redeemed at the end of the production cycle of the product on delivery.

## Monetary sovereignty

Monetary Sovereignty is understood as the ability of citizens to issue the currency needed for the economy and the management of the Commons, and to keep records of transactions directly, without Intermediaries. Sovereignty involves controlling the money supply in circulation, and sovereignty to issue currency.

Of course not enough, the monetary system must be well designed for the Economy and well managed. The sustainable economy will have the principle of subsidiarity as one of its most determining pillars.

The first sovereignty is that any person or business that offers goods and services for sale on the market is able to issue currency. E.C. Riegel puts it this way in "Flight from Inflation" [[8]](#endnote-9) : *"An aspiring money issuer must, in exchange for goods or services purchased on the market (with money), put their own products or services on the market. This simple rule of equity is the essence of money”.* Since no one is obliged to accept that currency, their acceptance will depend on the credibility of the producer.

The second is the sovereignty (or control over the issuance) of the legal currency that is used for the financing of the Commons in a given community. That is, controlling the money supply of the currency used by the governing body of a community to pay for common services and to collect contributions or taxes. By Community we can understand a state, a republic, but also a regional government, a municipality or any charity organization.

## Market and planning

We are of the conviction that there should be large areas of the economy, in special at local level (see Table 1), in which the management of the commons follows only the common good aims and even uses a different currency (see the tax currency section). The behavior is dictated after democratic decisions. The government mandates, dictates, imposes what each citizen should contribute as taxes, according the adopted criteria, to provide the funding to the common goals, common goals collectively adopted, and carefully planed in the long run (like pensions). In the future horizon, the Unconditional Basic Income is the distribution to the humans of the planed social surplus obtained from the general increase in productivity produced by robots.

We are equally convinced that there is another large area in the economy in which the old market economy and competition performs best. In special, when we face abrupt increases in productivity by disruptive technologies, involving adoption processes by the millions, there is no planning or forecasting capacity to cope with it. Most of these processes have been out of the radar of the smartest Wall Street sharks. There, the state executive intervention should be minimal, if the monetary mechanics includes self-regulated servos and there is an overall legal framework managing the basics. Of course the Community keeps the power to influence the economy through Keynesian demand raising measures.

The paper focuses primarily on voucher money for the market.

## Localization and monetary subsidiarity

We propose as a scenario a closed loop economy, defined as a territory from district to region, covering part of the total GDP, at economy areas for which this size is the optimal and has the adequate economies of scale [[9]](#endnote-10). Table 1 provides a list of industries that could be included, at least partially, in such a closed loop economy.

These islands will need, for now, to live into the hostile waters of Fractional Reserve Banking. It is a model on transitory conditions in which these C-M-C islands emerge under the dominance (and possible hostile actions) of large scale, world trade or national fiat, currencies made out of bank money.

We leave a model for the interrelation of different scale C-M-C currencies as in a “Great Localization and Engagement scenario”, when the power relation of monetary systems has turned upside down, pending for a future elaboration.

In this scenario it is an essential precondition for the model that the local C-M-C currencies cannot be freely traded with general purpose currencies or larger scale currencies. The reason is that a C-M-C system becomes vulnerable to speculation if world trade currencies are let in.

We propose an ecosystem of C-M-C currencies, vouchers, issued by the main production sectors as promises of their future production, expressed in production units. These currencies can be freely traded with each other at the local monetary market.

* we introduce a special subgroup of C-M-C currencies intended to be able to buy long lasting property that have a property title with property shares and property usage rights. We call them “slow” currencies.
* we propose a special public sector C-M-C currency which is used to collect taxes and has special rules.
* we propose a self-credit with no other authorization than the producers themselves, consisting in the the issuance of signed vouchers on their future production, legally valid.

The vouchers are denominated in units of production of that special product. The vouchers can be issued at any time before product in the market, and must have a validity start date and end date, corresponding to their product at the market and expiration dates. Start means the moment when the product is ready for sale. End means the moment when the product perishes.

* There is no assumption of a monopoly of any entity (business or association) over any currency of a productive sector at this local community. Milk producers could associate into one or several cooperatives, each of them with their own currency or vouchers, competing each other. In that sense, C-M-C currencies resemble trade mark bonds, competing with each other.
* As all the money in the system is already self-credit, the system works with no other form of credit or loan.
* In special, the acquisition of long term assets is not considered and does not need to involve any credit.
* Small agents, in special households, not issuing any money, and therefore not having any self-credit money, may have the need of cash-flow credit. Example is he credit card instrument. It makes no sense to increase the monetary mass with money representing goods, if the production of that good is not increased. Therefore, for that purpose:
  + either the cash-flow credit is a zero balance private P2P credit at any of the C-M-C currencies (like a LETs)
  + or it is done in the public sector C-M-C currency, being the public sector authority the only able to regulate over the overall monetary mass of the public sector C-M-C and about how much “out of the nothing” temporary money can be tolerated. All other agents have only their interest as the driver and should not have a say in this social interest parameter

## Double coincidence of wants

We pay a high price for all the above goals. We have made a brutal narrowing of the capacity of money to solve the “double coincidence of wants” problem. We have transferred the “double coincidence of wants” of products problem to a “double coincidence of wants” of currencies.

We obtain an instrument that represents very well the use value after the selling exchange. Old money did that very badly. But it facilitated that you arrived at a selling exchange, whatever bad deal the exchange would become, when you discover what is the real value of your money in terms of goods you get.

The solution is to outsource the double coincidence of wants solution to something else that is not money. It is not the carrier of value anymore, the one that solves both things.

It is a script. We use ethereum Bancor Smart Tokens.[[10]](#endnote-11)

*Smart tokens are a* ***technological solution*** *to the* ***coincidence of wants problem*** *for asset exchange, rather than a labor-based solution as used in traditional (or decentralized) exchanges.*

The Bancor protocol proposes to advance the domain of asset exchange by replacing the need for labor with a technological solution to the existing coincidence of wants problem.

# Issuing promises of production and delivery

The producers issue vouchers on their own C-M-C to finance their production cycle.

The issuance is of a token defined by their association as a Ricardian Contract and used collectively. Large corporations may use exclusive tokens.

It has a given period of validity, starting with month **S** from the signing of the contract, when the products start to be delivered to the market, and ending at month **E**, when products are supposed to perish and withdrawn form the market.

They pay their providers with the vouchers they issue. Typically these costs consist of:

* Labor.
* Utilities (heating, fuel, communications, electricity).
* Any other type of working capital.
* Taxes.
* Contingencies or reserves. Some vouchers may be issued but not released to circulation.
* Margin, meaning the ROI, a reserve for amortization of long term production means, new capitalization or investment in productivity increases, contingency reserves and profits.

We use ***VTS*** for a voucher following the Voucher Trading System (VTS) conventions. [[11]](#endnote-12)

There are many ways to program the issuance of vouchers. The only condition is that, if

then

***S*** and ***E*** are not really a variables, since all vouchers of the same contract have the same Start en End. We keep them visible to analyse the time behaviour of the voucher.

Notice that products may continue to be delivered to the market until month E; vouchers may continue to be delivered until month E.

That is, all vouchers issued along the production cycle addressing a product to be delivered from the month which is the validity start of the voucher have to add to the total foreseen production.

It seems a safe approach to issue vouchers progressively in a quantity as required by the production costs, plus the margin, to also sequentially filling the delivery curve at a future time. The production costs curve and the delivery curve may have different shapes. This approach minimizes the monetary mass in circulation.

For example, farmers may have a peak of costs in two weeks of plow, while harvest, packaging and selling span over two or three months.

Table 2 provides a simulation for a production cycle of one year, for products that once in the market expire in 5 months. In the example, the product delivery follows a strong seasonal curve (as it could be agricultural) while production costs have only moderate seasons and most is steady costs.

However the system gives ample freedom for businesses to design their own issuance policy.

The main freedom is at the policy to issue the quantity corresponding to the margin. We will devote a section to this problem.

Technically, VTS are issued using the Bancor protocol, using as reserve tax money of the Community where the producer operates. The quantity of the reserve is equivalent to the ***vat*** tax for that product. It operates as a *vat* advancement, buying the "lisence to operate". Only registered producers can generate VTS this way. General public needs to go to the exchange market to obtain VTS, or get a transfer.

The system is as simple as explained above. However, we will explore different parts of the monetary circuitry to watch for possible hidden side effects.

# Monetary mechanics

## Pricing at the market

We said that the vouchers are denominated in units of production of that special product. That would be liters, kgs, units, meters …

### Base Units

However, any producer produces a wide range of products under a main header. Farmers of a poor region not jet under intensive mono culture may grow a wide range of crops, a long list like Rice paddy, Cow's milk whole, fresh, Cattle meat, Pig meat, Chicken meat, Wheat, Soybeans, Tomatoes, Sugar cane, Maize (Corn), Eggs in shell, Potatoes, Vegetables, Grapes, Water Buffalo milk, Cotton lint, Apples, Bananas, Cassava (yuca), Mangos, Mangosteens, Guavas, Sheep, meat, Coffee, Palm oil, Onions, dry, Beans, dry and green, ..., etc. The variety can be huge. Imagine a hardware store, just the list of screws. Issuing a special voucher for each of them is unnecessary and very cumbersome. Subsets of these products can be covered under the same C-M-C currency umbrella, following probably more farmers territorial grouping than a precise portfolio of products.

At another variant, the range of products could cover the full recycling cycle, like food, restoration, food waste collection, composting and urban or near rural farming. In this case the C-M-C covers different products of the same cycle.

The only condition is that the Ricardian Contract makes it clear. The fields MERCHANDISES, DEFINITIONS or DESCRIPTIONS, and CONDITIONS provide the necessary fields as usual merchant contracts do.

### Pricing

Pricing can be done the way we are used to for example in travel MILES. MILES is the generic denomination, anchoring into real travel miles at some specific (base) type of trip. Then each real travel mile will have a specific price in MILES depending if it is a first class transoceanic flight or an economy class local flight. LETs operating on services may use the HOUR as the unit of exchange, but the services of high level lawyer may cost you several HOURS per hour.

There seems not to be necessary that producers specify further how much they will produce of each, other than making public the numbers issued of their vouchers (the monetary mass), nor what price they commit to put at each of the articles.

Free market and competition seems to be enough to guarantee the appropriate reaction of the customers against unfair prices or scarcity of products, as at any shopping center today.

What has to be clearly specified in the Ricardian Contract is the range of products against which the vouchers can be redeemed, and the value of the total production promised for a given month, expressed in the base unit of that currency (in the farmers example above, for example in KgCROPS). Value distribution

The producers will aim that the customers perceive fair and stable prices.

If the real production stock of a given month is

By the contract, legally binding, the total value of vouchers issued as a promise for that month has to be able to buy the whole production.

So that, by definition

The prices of the different products are set in a way that

which is no other than the **Quantitative Money Law**.

This is the basic pillar rule, that ***the vouchers issued as a promise for a period has to be able to buy the whole production put in the market that period***, and occupies in the C-M-C system a legal positioning similar to anti-fraud or counterfeiting laws. All contracts should include that legal commitment.

Prices should be set in a way that customers perceive them fair, and expensive products accepted as expensive, and cheap as cheap. This does not need any further regulation as the market reaction, as it is today.

However, this is not enough. The customers should perceive that this corresponds to the expected Stock*(n)* when they accepted the vouchers in exchange of products or services. We analyze this closer at the Redemption Cycle section.

## The redemption cycle

Table 3 provides a simulation of the redemption cycle.

### Overproduction

Overproduction, for example, at getting an extraordinary harvest, is easily solved. Shortly before maturity, the business may issue the missing money, in order to offer more product at the same prices.

The monetary circuit is guaranteed.

All production costs already passed, the increased issuance will be added directly to the margin quantity. It will probably translate into a decreased percentage of sales of the available stock, an increase of products that expire, and as a result into a not so brilliant margin increase, but otherwise the system manages the situation with the business as usual mechanisms.

### 7.2.2. Underproduction

Underproduction, for example, at getting a poor harvest because of bad weather (or, in the worst case, trying to cheat), is solved less easy.

With all issued money in circulation, the monetary mass in circulation cannot be decreased.

An approach could be to issue for the whole expected production

but keep some vouchers in reserve out of circulation until the last minute.

The advantage is that the announcement of the total amount of vouchers issued is an indication of production expected. The drawback is that the cancellation of retained vouchers can only be done trough expiration, which is not transparent to what has happened.

Another approach is to issue vouchers for the amounts just needed to pay for the production costs and then treat all cases as overproduction. The expected production can be announced as a forecast by other means.

If things go worst, and there is a disaster production, and the only option, given the pillar law, is to increase prices, and take on the business shoulders the decrease in credibility, putting into risk the acceptance of future issuance of the business C-M-C. A dead sentence for the business in a normal situation.

But not so different as it works now. After a natural disaster, or a drought, agricultural products may sky-rocket. Everybody will damn the situation, but nobody will blame the farmers for it. However, customers will perceive a clear difference and react differently if it was a cheating trick. Sin carries penance.

But the overall model should work as it is, based on promises backed by credibility. No authority or regulation body should be required putting sanctions. We will see there is an embedded penalty at the uncleared debt of the producer.

The sections "Individual promises, collective promises" and "Debt Clearing" expand on it.

### 7.2.3. Insurance

The effects of production disasters can be mitigated by insurance. Insurance companies will certainly scrutinize the producers responsibilities.

However, it has to be pointed that reparations cannot be done in the producers VTS money. First, VTS means products. Customers cannot be compensated of missing products with fake vouchers. Secondly, after the validity end, no voucher is valid.

Producers can only be helped to pay their unremembered debt, and the money to be used is tax money.

Again, the sections "Individual promises, collective promises" and "Debt Clearing" expand on it.

### 7.2.4. Stock management

Our starting point is products that expire in a fraction of the production cycle, like, typically, agricultural products, say, months. Each industry would work with an average expiring period, and the vouchers would also have an expiring period and thus an expiring date.[[12]](#endnote-13)

The model also applies for durable goods like electronics, hardware, computers, cars or even houses. However, the acquisition process is different. At consumables, the voucher buys the product or service to be consumed. You buy an apple, take it away and eat it. At durable goods there is an intermediate step that certifies the right to use it. This certification may range from a guarantee document for a home appliance, to a registered property document of a house. We will deal with the details in section “Durable capital goods”.

By definition, products on sale will not expire until the end of the valid period. That means that vouchers only expire if some customers have not shown up at the end to redeem them with products.

There are products, like milk derivatives, vegetables or meat that will physically expire. They are continuously supplied on a daily basis and there is no need to issue a voucher for each batch. They will be retired form the shelf's, and the total amount of issued VTS wont reflect these loses. There are marketing techniques that provide the adequate indexes to properly calculate the “effective” quantity of expected sales.

For example, fresh watermelons are delivered at a constant rate between some months from S to E. It is known that on average 10% rot on the shelves. It means we calculate:

In this system, the expiration of products has economic implications, but not monetary implications. If the expiring period *exp* has been properly calculated, the vouchers will be expiring at the same pace as the products, and no monetary stress is produced.

Of course, the voucher holders that don't redeem the vouchers on time will have a loss. The impact should be similar to Silvio Gesell “demurrage”. It discourages any “storage” of vouchers, except for long expiration period vouchers (slow money).

## Promise to Produce, promise to Sell

The system pivots around sales, not around production.

**The promise is a promise to sell.**

It means that, what counts is

We assume that, if there was a sale, its because the product was there.

It has to be read the following way: I make a promise to sell for value VTStotalin that period. It is my business how I get it done. Either I produced the products enough, or bought the products enough to convince customers to pay me for them *VTStotal* in that period

Any other approach pivoted on the real production put on the shelf's involves an intermediate step of a trusted third party making an inventory of products. In our view, this complicates unnecessarily matters.

Apparently, we miss a clear cut register of expectations on unfulfilled promises expressed in product units. Something like I accepted y \* vunit (n) expecting y \* kg Tomatoes, and I got less. It seems we deviate form the strict Commodity term in the C-M-C definition.

But we do not. At sales time, because of the basic pillar law, we converge again to a strict C-M-C definition. At promises time, there is anyhow an uncertainty factor to be build in into the system. If we follow punctually the products inventory path, we would need an external authority to translate it at the end to monetary terms, to impose at the end monetary penalties or rewards.

In this system, lack of product results in price increases that may result in less sales. In the end we get expired vouchers that the producer was not able to put into circulation or the customer was not interested to redeem. Pure monetary Debt Clearing mechanisms may penalize or reward expectations betrayed or surpassed.

The advantage is that it makes the system more flexible.

In the real world there is a mix of producers and sellers. Take a cooperative of crop growing farmers: it is normally the cooperative that puts in place the distribution.

The mechanics is the following:

1. The real producers issue their promises, at their selling price. However, if they circulate them to pay for their costs, they arrive at a unplayable debt, cause no redemption will be made at their name, cause they don't sell. Before circulating and spending, they need an agreement with sellers.
2. The sellers issue their own promises at their selling price. At this moment, we have around double vouchers than production will be. What the sellers do is to come to agreements with producers.
3. When production is ready, sellers redeem from the producers to get the products.
4. At public sales, customers redeem from the sellers.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | issuing | costs | redemption | Producers |  | Sellers |  |
|  |  |  |  | Debt | Liquid | Debt | Liquid |
| Producers issue | VTSP |  |  | -VTSP | VTSP | 0 | 0 |
| Sellers issue | VTSS |  |  | -VTSP | VTSP | -VTSS | VTSS |
| Producers spend |  | VTSP |  | -VTSP | 0 | -VTSS | VTSS |
| Sellers redeem |  |  | VTSP | 0 | 0 | -VTSS | VTSS – VTSP |
| Sellers spend |  | VTSS – VTSP |  | 0 | 0 | -VTSS | 0 |
| Customers redeem |  |  | VTSS | 0 | 0 | 0 | 0 |
| Total | VTSP+VTSS | VTSS | VTSP+VTSS |  |  |  |  |

*VTSP = Vouchers issued by Producers*

*VTSS = Vouchers issued by Sellers*

# Debt clearing

## 8.1. Self credit debt

At making a promise at any month for products to be delivered at a future month, producers issue vouchers to make payments today, and thus acquire a personal debt with the system and at the same time, with the society. It is a self-credit authorized by the society.

The vouchers issued by producer X are annotated as a debt of producer X, in VTS units. This debt annotation should be produced automatically by the smart contract at the producers account.

Remember that VTS are issued using a Bancor protocol restricted to members, using as reserve the tax currency of the Community where the producer operates. The quantity of the reserve is equivalent to the ***vat*** tax for that product. They are issued as a smart token bearing the same Ricardian Contract as all other producers of the same association (say a Coffee Farmers association of a given region).

The VTS themselves are anonymous ERC20 tokens and can be transferred without any identity of the issuer.

Once the producer X releases and circulates these vouchers as a payment for his costs in that C-M-C currency, the vouchers become anonymous and can be used to *cancel* the redemption of any product at any other producer (or seller) associated to that C-M-C currency. What remains private is the debt of producer X.

The vouchers used in cancellation do not go to the producers (or seller) pocket, or wallet or liquid account, where he can spend them. He has spend them already. These cancellation vouchers go to:

1. rescue this producers tax currency reserve at the Bancor protocol, so that he can pay his vat taxes after sales.
2. cancel this producers debt at his account.

Remember that **the promise is a promise to sell**. It means very clearly that producers cannot clear their debt by just delivering products. As explained above, they can only clear their debt by ensuring the sales either selling themselves or arranging a distribution channel that buys their production.

## 8.2. Individual promises, collective promises

The individual promises become individual debts. But once the vouchers start circulating in the market they become as well a collective promise.

We are now in a better position to explain how the system regulates the penalty of the unfulfilled expectations.

Unless there is a general natural disaster, underproduction comes usually from specific underperforming producers, not from all of them.

Normally, a seller will buy from a collection of producers who focus on production and not on selling.

A cheating or under-performing producer will come up with less products than expected. According the basic law, in order to buy these few products, the seller will need to use all the vouchers the producer has issued, cause the provider has to put them at a price covering his full issuance. It means this producer’s products will be much more expensive than the other producers providing the same seller.

|  |
| --- |
| Example:   * A tomato farmer, part of a tomato cooperative, issues 10.000 vouchers denominated in the cooperative C-M-C, namely kgTomato. The cooperative public contract says that holders amy expect to get 1 kg tomatoes for 1 kgTomato voucher. * At doing this, the IT system automatically anotates a 10.000 kgTomato debt to this farmer * Instead of buying production inputs, the farmer spends most of these 10.000 kgTomato to have a good life and other improductive payments. * When the harevest comes, this farmer has only 1.000 real kg of tomatoes to offer * According the pillar law, the vouchers issued as a promise has to be able to buy the whole production put in the market. Therefore, he has to mark his 1.000 real kg of tomatoes as costing 10.000 kgTomato, 10 times more as his colleagues in the cooperative * His harvest will remain mostly unsold, and his 10.000 kgTomato debt mostly uncleared * Now all the penalties applicable to unpaid debt may fall on him |

At taking these products from the provider, the seller will need to go down to the average prices, thus losing money. He will probably prefer to punish this particular producer by not redeeming his products.

The producer will remain with his full debt.

## 8.3. Debt clearing mechanism

Once the expiration period is over, it may turn out that

By any of the reasons explained above, some quantity of vouchers stay not redeemed, and expire by themselves without canceling any debt, or alternatively, have gone to another producer.

These producers that have consumed goods from the society without returning the same value to society have incurred at an overspending. This overspending is unspecific, social.

The restitution of the debt cannot be a reduction of their capacity to issue new vouchers based on promises of their future production. This would punish the whole society with a reduction of the overall future production. The producer has to produce all it can, the products have to be sold, and therefore the vouchers have to be issued.

What we can do is to deduct it from their capacity to spend them for their purposes, by giving these new vouchers to somebody else. Instead of using them for their ROI, they go to somebody else.

The question is to whom these just issued vouchers should be given. It was a social defraud, it has to be a social restitution, and thus a social expenditure.

Lets assume there is an entity, that we call “authority”, to whom these vouchers are given. To see how the monetary system works, this is enough. It could be the same authority that collects taxes, it could be the producers association, it could be some other authority. Its pretty much a political decision to be taken by democratic means, with many variants possible.

In summary, who bears the costs of an expired voucher - ¿the society , the voucher holder or the producer?

There are several actors:

1. The holder (the last holder) bears initially the cost. As the voucher has circulated, its a random holder. If you consider many vouchers and many holders, its a probabilistic distributed cost, which we name “social” cost.
2. The issuer has an uncleared debt. ¿With whom to clear? With the probabilistic distributed creditors. That is, the anonymous random voucher holders, that is, society.

The issuer returns the debt as a tax to the government, and the government will return it to society as public goods or services.

## 8.4. Negative debt or excess cancellation

We can have also the contrary situation: by some reason, there where more sales than promised.

It has to be noted that the excess sales can only consist in redeeming vouchers issued by another producer.

Once the debt for month n of a producer X has been cancelled, any excess of CancelproducerX goes to the producers (or seller) pocket, or wallet or liquid account, where he can spend them before they expire.

## 8.5. Taxes debt

With regards the VAT debt, directly proportional to the sales, it has been advanced in tax currency, as the reserve at issuing the VTS vouchers as smart tokens using the Bancor protocol.

Once rescued, they can be transferred to the Community tax account.

## 8.6. Debt payment mechanics

As the whole system is quite transparent, and outstanding debts as well as tax debts are recorded, and these records can be made accessible to any designated authority, we would prefer to leave it as a voluntary action of each producer.

The authority, same as the the Tax Authority now, can give a margin to the debtors, and could come up with ex-post sanctions if delays are not respected.

# Durable capital goods

We refer in this section to goods that have a long expiration period *exp* and have a price significantly bigger than the monthly cash flow of household or businesses.

Consumables disappear after they are bought (buy an apple, eat it, its gone), but these goods are used once and again, or stay there at disposal, and last for a long time before amortization, from computers (3 years), furniture (10 years), vehicles (15 years), machinery (10 to 20 years), buildings (40 years or more), to civil engineering (100 years or more).

They have an owner, and the ownership is certified by a property title (with shares) or at least a guarantee certificate. The owner has the right to use it, or assign exclusive users, generally for profit (through a renting contract).

As, by large, the main investment of households and businesses in long lasting goods or fixed assets is buildings (or land), we will focus on this example for the reasoning.

The trade of these goods is generally studied using the very paradoxical concept of “financial capital”. But in reality, financial capital is an entelechy, a chimera, constructed on the illusion of “money as a storage of value”. The “financial capital” paradoxical knot can only be cut by two “aha!” conceptual exercises that take this “money as a storage of value” to rigorous terms.

The first “aha!” is that in the real world there is not such a thing as a time tunnel that can transport goods to the future, even less to exactly the moment you chose for your saved money to reappear in the market. So, what exactly happened with the goods this money represented in the past (according the Monetary Fundamental Quantity Law) and you failed to buy, and what goods will pop up in the future out of the nothing that can be bought with this “Lazarus” money? The answer is that only lasting goods store value! Money cant!

The alternative explanation can only be that in the future there is a kind of noise money out of the monetary quantitative normal rules paying for products just sitting there waiting to be bought by the average pop up of money saved in the past. A very complicated and unquantifiable explanation when there is a more simple one: only lasting goods store value! Money cant!

The second “aha!” is that the producers of lasting goods need to survive every day. Manufacturing fixed assets takes usually longer times and bigger costs and concentrated efforts. labor, and part of the working capital, has to be fed with daily consumables to survive and feed the factory. So, what exactly these producers of lasting goods give away, every day, in exchange of these consumables?

The FRB does it by spending the savings of the last sales, which were one-off sales of the whole ownership for the full price, financed by “financial capital”, provided as a mortgage, which results in a monthly payment of the buyer of a loan, with interest.

But all what the builders need to provide the market with houses is to be paid on a monthly basis to continue the works and survive and pay for the materials, plus a profit, and this is precisely how the buyers prefer to pay or can pay, that is, on a monthly basis.

The one-off sales of the whole ownership for the full price is only there to let the FRB go in between and provide a loan with interest (the so called “financial capital”) for the full. But it can be done in a totally different approach based on C-M-C promise money. A way that not only separates the financial capital, it eliminates it once for all.

## 9.1. Self financed mortgages

It consists on nothing more complicated than an exchange, at the currency exchange market, of fast money (short term, short expiration), as issued by the producers of consumables, with slow money (longer term, very long expiration), as issued by the fixed asset producers.

The building industry would, as all other industries, issue their own vouchers to pay for they daily running costs (plus margin). They can be redeemed at any moment in time until the expiration date (say, next 40 years). In return of the redemption of these generic (construction industry) vouchers, the customers get two things:

Shares of a particular property (or building, or machinery, or factory), meaning shares of the property title.

Exclusive usage rights of that property (for example habitation)

The construction voucher Ricardian Contract would describe the details of the agreement, the terms and the conditions. For example, it may say that habitation rights can only be given to somebody having already a 10% of that property, and that habitation rights come along with exclusivity on the acquisition of further shares, and these rights are kept only if the dweller makes a monthly redemption of shares. It may also stipulate what happens if the dweller does not pay and how shares and habitation rights are transmitted to the new dweller. The details can adopt many variants according the market.

All this can be done because the usage of a Richardian contract associated to the voucher, which allows for almost any contractual terms we are used to.

The user has a similar experience as today. He has made some savings. Once a threshold reached, he occupies a house he does not yet own, he engages in a monthly payment until a day where he owns the house and has not to pay any more. The difference is that they do not pay the bank, they pay the builder.

The builders have a more comfortable position with a daily income granted, cause they do not depend on one-off sales, but on a broad constant demand of their vouchers. They get as well long term warnings of the increases or decreases of the demand at looking at the demand for their vouchers, not finding how the market is only when the building is already there.

The only difference is that the ghost nightmare of “financial capital” has gone forever.

## Reselling a fixed asset

A final note on reselling.

If an owner of a fixed asset that was bought with fixed asset vouchers, already redeemed, wants to resell the asset, new vouchers have to be issued to provide the monetary mass.

It means the current owner of the shares has to go to the original manufacturing industry to get newly issued valid vouchers, for free.

This is the principle, and there is no further detail needed for a document centred on monetary issues. However we make some remarks: in order not to give full control to the original manufacturers on the resell market, measures could be studied, like for example the issuing of special resell vouchers by another entity. Some guarantees may also be given: shares may be deposited at a third party until the vouchers are redeemed. In summary, the principle is clear and there are ample options for instruments to guarantee the operation.

# Margin and profits

We have now the concepts needed to deal with the mechanics of the margin.

As we said above, the quantity of vouchers to be issued beforehand has to be for the full price of the whole production, that is, costs plus margin or profit.

However, the real profit cannot be known until the sales have been done and we know how many vouchers have been really redeemed and how much has expired and production has been lost.

Profit is used for two main purposes:

One part goes to investments to improve productivity. It means we exchange our C-M-C vouchers for vouchers representing machinery, or buildings or any other fixed production means. It means **we acquire slow money**. It will not have expired by the time we do our sales.

Another part goes to pay the shareholders their ROI. To simplify, we assume it goes to pay their luxury life. It will have expired by the time we do our sales. Too late if the sales went bad!

The mechanics to deal with the sales uncertainty, and compensate shareholders with a ROI according to sales, is to preventively buy only slow money, and only convert it again to fast money to pay the shareholders once we know the real profit.

# Community and Tax money

Tax money is a special C-M-C currency. In a way, its a cycle that turns counter-clock the other cycles.

Governments deliver goods and services such as healthcare, education, security, infrastructure and others. But they are universally provided not according to payment but according to needs. Citizens provide the funding for these services not according consumption, but according to wealth and other taxes criteria.

It can be treated as a variant of C-M-C money, but it would deserves a full article to properly explain the mechanics. The token should run or have as input the public voting mechanism of the public expenses and incomes. It should have all gradations from public service as a job, to volunteering. It should have all gradations from compulsory taxes to voluntary funding of costs and crowdfunding of public work. We only provide the skeleton of the basics.

The product that is on the market is your citizenship.

The “state” (be it local, regional, national), discuses and approves the Public Budget and the Tax Policy through its democratic bodies.

Each year the “state” pays the public costs (teaches, doctors, police,…) costs by issuing a number of vouchers

It splits it into the direct taxation and indirect taxation.

Then, it puts a price to each citizen according the Tax Policy with his part on direct taxation.

Each year every citizen has to buy the renewal of his/her citizen rights.

It has to be noted that the same procedure can be applied to the financing of other autonomous self-governance social bodies, like NGO ‘s. In this case, it is the volunteers that play the role of public servants.

# Monetary plurality

Open money means that buyers and sellers should be free to use any payment medium that is mutually agreeable to them, including the issuance and acceptance of their own currencies. Only the issuer of a currency should be obliged to accept it as payment, and must always accept it at face value (“at par”).

In the scenario above only labor will easily accept to be paid in the business C-M-C currency. In order to balance their shopping basket, employees will go to the currencies market to obtain the vouchers of the products they need. Instead of a universal currency solving the double coincidence of wants we have as replacement a currency market. The experience with crypto-currency exchange markets shows that this operation is now not more complicated that the monthly exercise of distributing the salary along the different household bank accounts and credit cards, which in fact follow destination paths. As reported by Georgina M. Gomez about the Argentinian experience[[13]](#endnote-14), a moderated multiplicity of targeted currencies is perfectly workable for households.

Utilities have strong dominating positions, cause everybody needs their product, and will probably impose their own C-M-C (fuel, watter, communications, energy). At issuing, the business will probably be forced to exchange their C-M-C currency into theirs before even paying. To be noted that these currencies (except, probably, WATTS in a renewable scenario) have steady prices, steady production and no expiration date, and a certain degree of accumulation is never risky.

All other forms of working capital will probably have a mixed situation, partly accepting the business C-M-C (in special if there is a mutual B2B relationship), party imposing their own C-M-C, and partly using a third party C-M-C, like for example a C-M-C used for B2B barter.

Margin quantity has to be issued at production time, so that the monetary mass covers the full price, which includes margin. Otherwise there will not be enough money in circulation to buy the full production at sales price, only at costs price. However it cannot be spend until sales have been confirmed. But by the time the sales is over, the vouchers have reached their expiration date. We leave to another section where this margin can be exchanged for “provisional storage”.

## Monetary liquidity

### Value metrics

We have been dealing with the value of the C-M-C currencies with respect the goods they represent. We need to deal now with the relative value of currencies, as we need to exchange them with each other.

A landmark concept in contemporary thinking about value is Marx’s labor theory of value, and has remained un-reviewed until very recently. [[14]](#endnote-15) [[15]](#endnote-16)

*“… value is but the embodiment of socially necessary labor, commodities exchange with each other in proportion to the labor quanta they contain” [[16]](#endnote-17)*

This is a very unshakable statement, probably the most convincing explanation possible. As cornerstone of the vault of the theoretical construction it does the job very well. But it remains, as the dark matter for physics, as a necessary piece to complete the consistency of the overall theory, but with weak experimental evidence.

Nobody has ever gone through the multi-exponential explosion of several generations of ancestor labor, goods, materials and instruments that resulted in the manufacturing of our simplest appliance, to see if value reduces in the end to labor value. Except for notable exceptions[[17]](#endnote-18), writings about “the market” very seldom seem to be aware of this supernova of past valuations and comparisons underlying a present market scenario, mostly described as a flat Sunday middle age flea market, just with 9 zeros more.

No supercomputer can do the backwards computation. Instead, the only somehow reliable reference is the wisdom of the crowd, that has some memory (how much their first PC costed) and have to take daily decisions to fill the family basket.

And for them, the most significant information is their own salary, the price of their own work.

To facilitate comparisons, the most reasonable option seems to use as a bridge a currency of an industry that contains the highest proportion of labor used directly as a service for consumption with the “clients”. If the other cost components remain smaller and stable, it could be a good approximation. A high volume of transactions helps against volatility.

The obvious candidate to play this role is the community or tax money, where a big part of the expenditure is teachers, professors, healthcare professionals, social assistants, police, administration officers, army members, firefighters, forest guards, etc.

The value of community money works very much as the original Roman AES, ultimately soldiers salaries, that is, labor.

Public Administrations use very rigid salary policies, based on fixed grades, and the salary for each grade is published in the Official Journal.

The salary of the public servant of the lowest grade would represent quite well the raw, without qualification additions, labor quantum in the context of this particular society, with a given standard of living, what the Unions will consider to be “acceptable”.

For convenience and clarity, lets suppose that these salaries are denominated in HOURS.

The salaries of the higher grades public servants could be expressed as a multiple of this basic unit. By extension, all items of the General Budget of the State.

This reference would expand to become a generalized reference as the time of the hydrogen clocks of the Central Observatories expand to the radios, navigation systems, telecommunication networks, etc., to become the ultimate reference of your watch, alarm clock or microwave timer.

We have a stick stable and universally understandable, for the economic world, as we had with the platinum–iridium bar kept at the Bureau International des Poids et Mesures.

Its very intuitive. Everybody can mentally compare, roughly, what a known person at public service of his same category can buy with his salary to what he can buy, whatever currency the salary is expressed.

We have the measurement standard instrument, now we need to measure.

We propose to implement the tax currency as a Bancor smart token, with some modifiers to some functions, and bearing the connection of the full text of the General Budget. We propose, for clarity, to use as denomination **TXHR**.

### Issuance, Conversion and Exchange of VTS’s

We issue VTS as modified ERC20 smart tokens using Bancor protocol:

adding some fields with some Ricardian Contract metadata, notably the hash where the human readable and human signed contract is stored in swarm, and with the start and end variables used as modifiers for some functions

adding a modifier to the functions of issuing and redeeming. Only registered producers in the given association can use these functions. The rest of the accounts can use the rest of the functions.

An example of issuing parameters could be:

|  |  |  |  |
| --- | --- | --- | --- |
| Smart Token Symbol | VTS | vat | 17,00% |
| Reserve Token | TXHR |  |  |
| Constant Reserve Ratio (CRR) | 100,00% |  |  |
| Initial Token Price | 5,88 TXHR |  |  |
| Initial Deposited Reserves | 1.000 TXHR |  |  |

In this example we have used a vat of 17%, meaning that, for the producers within this token, for each advanced tax money unit they get 5,88 vouchers. To stick to this legally imposed exchange, the CRR has to be 100%.

Table 4 provides an example of issuance and redemption using the same figures of production and sales at Tables 2 and 3.

General public will use a generic Bancor Token Changer to get this VTS in exchange of another VTS.

The initial deposit is made to initially feed the Token Changer in a quantity proportional to the market shares of the different tokens.

# Law

The system should run smoothly and self regulate by market mechanisms except for two rules to be enforced by authority, minimizing the role of any authority:

The pillar law that should be enforced by authority is that ***the vouchers issued as a promise for a period has to be able to buy the whole production put in the market that perod***.

It means, exactly, that producers cannot be discovered selling products at other markets (say euros) letting their vouchers expire. They may put any prices they like, but the total price in C-M-C of all the stock in the C-M-C market has to add to the total value of vouchers issued. If this is granted, they may sell the rest of their production at any other market. We have already seen how they are automatically punished if they want to cheat by allocating too little to the C-M-C market. Enforcing this law may require inspections and other actions by the authority.

There is a prohibition of exchanging any of the C-M-C currencies of the community with any other external currency, outside the mechanisms and institution ruled by the local authority. The main purpose is to avoid the usage of free floating external currencies to purchase significant amounts of future production to speculate without the limiting factors explained above for the internal C-M-C currencies of the community.

All C-M-C currencies of the community can be freely exchanged in the currency market at any exchange rate mutually agreed by the traders. That means that as the maturity of a product approaches, its C-M-C currency will rise in price. This has the beneficial effect to speed up the circulation of the vouchers from the users less certain to need them to the users certain to need to redeem them, thus stimulating that all monetary mass is redeemed. If exchange with external fiat money is regulated, speculation is expected to be minimal since the vouchers have an expiration date, and speculators investing in currencies they don't need by currencies they need have the risk to arrive at expiration when they want to re-invest the gains into the currencies they need for their expenditures.

# Notes about take off

Discount vouchers are widely extended amongst big corporations and retail store networks. Google Play and Apple Store are full of of Apps to manage these vouchers, most of them following adaptations of the Apple Wallet Pass specification <https://developer.apple.com/wallet/>, which are derivations of the Ricardian Contract embedded in the Apple platform.

## Adoption

We could see an easy adoption of the economic agents at regional levels if the necessary implementation, design and technology support is given. The support does not need to be for free.

Big corporations play in these circuits small amounts of their overall turnover. In order to get the more popular economical agents to risk more significant amounts of their business into an increasing virtual circle, some institutional framework should be provided.

- Monitoring of the pillar law.

- A protected internal currencies exchange market, that keeps them protected against the main vulnerability, which is external speculative capital.

One mechanism of protection is not to allow external exchanges in the electronic exchange market, but nothing prevents exchanges between particulars. Another layer of protection is to raise a membership barrier, by which only members can hold the vouchers (a particular C-M-C, or any of the C-M-Cs of the region). Membership can be associated to the citizenship accounts, but it is making the system a bit more cumbersome.

The existence of a Tax Money C-M-C facilitates things. Its the “water” currency in which all the others may “swim”. As the universally wanted currency, it may facilitate the “double coincidence of wants” between C-M-C currencies.

## 14.2 Technology

The only technology able to scale up to numbers, has flexibility to build all functions and parameters, has low design costs and no investment costs, easy to implement home banking interfaces as well as easy to use smart phone Apps suited for the daily shopping, is ethereum <https://www.ethereum.org/>

### Smart contracts

A contract is a mutually agreeable arrangement of rules among mutually suspicious parties so they may cooperate with limited risks to each other's mischief. It is a game both are willing to play because both expect to win. A conventional contract is passive paper interpreted at great expense by lawyers and courts.

A smart contract is written in program code, in which the logic of the program's execution enforce the terms of the contract. A smart contract is a computerized transaction protocol that executes the terms of a contract. The general objectives are to satisfy common contractual conditions (such as payment terms, liens, confidentiality, and even enforcement), minimize exceptions both malicious and accidental, and minimize the need for trusted intermediaries. Related economic goals include lowering fraud loss, arbitration's and enforcement costs, and other transaction costs.[[18]](#endnote-19)

In the ethereum[[19]](#endnote-20) technology smart contracts are pieces of code that live on the blockchain and execute commands exactly how they were told to. They can execute scripts to read other contracts, make decisions, send ether and execute other contracts. Contracts will exist and run as long as the whole network exists, and will only stop if they run out of gas or if they were programmed to self destruct. The most used language to write etehereum contracts is Solidity.[[20]](#endnote-21)

However, not necessarily ethereum smart contracts include information to reengineer back the original (human readable) legal clauses and terms it does enforce.

### Ethereum Standard Tokens

Although Ethereum allows developers to create absolutely any kind of application without restriction to specific feature types, and prides itself on its "lack of features", there is nevertheless a need to standardize certain very common use cases in order to allow users and applications to more easily interact with each other. This includes sending currency units, registering names, making offers on exchanges, and other similar functions. A standard typically consists of a set of function signatures for a few methods, eg. send, register, delete, providing the set of arguments and their formats in the Ethereum contract [ABI language](https://github.com/ethereum/wiki/wiki/Ethereum-Contract-ABI).

[ERC 20](https://github.com/ethereum/EIPs/issues/20) is a standard for Transferable Fungibles, also known as tokens, coins and sub-currencies. It has a series of common methods that result in common interfaces, so that any client designed to read “tokens” will be able to read any token.

### Ricardian Contracts

The Ricardian contract is a method of recording a document as a contract at law, and linking it securely to other systems such as accounting for the contract as an issuance of value.

A Ricardian contract is a document which is legible to both a court of law and to a software application. Its purpose is to provide digital trading systems of various kinds the solidity of legally binding claims on property, so that you and your partners can concentrate on the business opportunity. [[21]](#endnote-22) [[22]](#endnote-23)

It is robust through use of identification by Cryptographic hash function, transparent through use of readable text for legal prose and efficient through markup language to extract essential information.

Ethereum Smart Contracts designed as Ricardian Contracts would fulfill all the original requirements of Nick Szabo. The ethereum technology swarm[[23]](#endnote-24) would provide the original document storage plus the required hash.

An ancestor of vouchers written as Ricardian Contracts is the Generic Voucher Language data model.[[24]](#endnote-25) However, in the original design, vouchers were conceived as numerated, and to propagate by transfers and splitting, like shares or lottery bonds. Here we move from “minted” VTS to “accounting” VTS.

### 14.2.4 Ethereum Ricardian Tokens

The ethereum Standardized Contract APIs for Transferable Fungibles, ERC: Token standard 20, provides the basis for the executable part of a Ricardian contract. [[25]](#endnote-26)

As regards the semantic part, the swarm protocol allows to bind any ethereum ERC: Token standard 20 token to a human readable and legal valid document through it swarm hash.[[26]](#endnote-27)

Its the intersection of the two components that can create a blockchain based and legally valid currency that is a promise of a real world good. [[27]](#endnote-28)

**Conformance to the ethereum ERC20 Token standard**

To be compliant with the standard, the token has to have functions that can be called trough the following methods

* function **totalSupply**() constant returns (uint256 totalSupply)
* function **balanceOf**(address \_owner) constant returns (uint256 balance)
* function **transfer**(address \_to, uint256 \_value) returns (bool success)
* function **transferFrom**(address \_from, address \_to, uint256 \_value) returns (bool success)
* function **approve**(address \_spender, uint256 \_value) returns (bool success)
* function **allowance**(address \_owner, address \_spender) constant returns (uint256 remaining)
* event **Transfer**(address indexed \_from, address indexed \_to, uint256 \_value)
* event **Approval**(address indexed \_owner, address indexed \_spender, uint256 \_value)

**Conformance to the Ricardian contract**

In order to be readable as a Ricardian Contract following fields should be present. However, only those used as variables need to become smart contract variables. Other informative fields could be stored into a single string (up to the available memory), ideally using an XML convention with a known namespace. [[28]](#endnote-29) Others are not strictly necessary and stored as metadata in swarm.

Association and Producers fields

* string \_brandname; // the name you are normally known by in the street
* string \_shortname; // short name is displayed by trading software, 8 chars
* string \_longname; // full legal name
* string \_address; // formal address for snail-mail notices
* string \_country; // two letter ISO code that indicates the jurisdiction
* string \_registration; // legal registration code of the legal person or legal entity
* address \_registryBzz; // swarm hash of the signer human readable registry document

**Token fields** (shared in the smart contract)

* uint256 totalSupply;
* string voucherTokenName;
* uint8 decimals;
* string voucherTokenSymbol;
* address voucherTokenLogoBzz; // swarm hash of the voucher icon or logo
* uint8 validity\_start; // start date of the contract. Validity period of the voucher to redeem merchandises

uint8 validity\_end; // end date of the contract. Provides restrictions on the validity period of the voucher

Contract fields

* address contractBzz; // swarm hash of the signer human readable contract
* string[] merchandises; // Provides restrictions on the object to be claimed
* string[] definitions; // Includes terms and definitions to be defined in a contract
* string[] conditions; // Provides any other applicable restrictions

### 14.2.5 Bancor Smart Tokens

Bancor Protocol smart tokens Contracts[[29]](#endnote-30) are tokens that follow ERC 20 Token standard and have additional functions and standard ABIs to manage token exchanges, namely ERC: Token Changer Standard, #228[[30]](#endnote-31), in short ERC228.

New smart tokens can be created simply by depositing an initial reserve/s and issuing the initial token supply. Alternatively smart tokens can be initiated through a crowdsale, where a part of the proceeds is allocated as the initial reserve.

The methods of the smart tokens are:

Smart Tokens

* function issue(address \_to, uint256 \_amount) modifier onlyProducers
* function destroy(address \_from, uint256 \_amount) modifier onlyProducers
* function disableTransfers(bool \_disable)
* event NewSmartToken(address \_token)
* event Issuance(uint256 \_amount)
* event Destruction(uint256 \_amount)

**Bancor Changer**

A smart token with, additionally:

* function **reserveTokenCount**() public constant returns (uint16 count)
* function **reserveTokens**() public constant returns (address[] reserveTokens)
* function **reserves**(address \_reserveToken) public constant
* function **change**(address \_fromToken, address \_toToken, uint256 \_amount, uint256 \_minReturn)
* event **Change**(address indexed \_fromToken, address indexed \_toToken, address indexed \_trader, uint256 \_amount, uint256 \_return);

The adaptation to the general protocol is that only users with some boolean producers = true can issue or sign the redemption of the tokens.

**Ecosystem of smart contracts**

* a standard ERC20 token for the community token
* a smart ERC20 Ricardian and ERC228 per voucher, the community token as reserve
* a smart token as Token Changer between vouchers, with all vouchers as reserve

# 15. Conclusions

We have tighten the concept of money very close to the marxian concept of COMMODITY – MONEY – COMMODITY, by never allowing MONEY to become abstract or universal, always stranded to some description of the COMMODITY it represents, tied to the time this COMMODITY is in the market, and tied to the producer that will produce it.

As a drawback we have a tolerable increase in the effort to manage a Monetary plurality at the currencies exchange market. Blockchain technology lowers very much this barrier.

As benefits we have:

* Eliminated financial capital, the need for FRB, the need for banks and the need for interest.
* Provided companies with steady working capital and granted cash flow.
* Provided fixed capital manufacturers with tools to smoothly adapt for long terms market variations.

# Tables

## Table 1 Sectors that could be included in a closed loop economy at an enlarged urban area

|  |  |  |
| --- | --- | --- |
| Unit | City/District | Extended Urban area and Region |
| Distance km | 50 | 300 |
| Population | 100.000 | 2 million |
| Production | Urban Farms, Vertical Farming | Farms |
|  | Construction | Construction materials |
|  | Small Manufacturing | Advanced manufacturing, Just in Time assembly |
|  | Micro renewable’s | Renewable farms |
|  | Textile makeup | Food processing |
|  | Civil works | Food recycling |
|  |  | Composting |
|  |  | TV production |
|  |  | Transport infrastructure |
|  |  | Vehicle assembly |
| Distribution | Proximity shops | Big shopping centres |
|  | Fresh food | Food packaging |
|  | Daily consumables | Clothing |
|  | Entertainment | Seeds and agricultural products |
|  | Clothes |  |
| Services | Schooling | University |
|  | General medical care | Regional and specialty hospitals |
|  | Repair | Public health |
|  | Brico, DIY | Police, Security |
|  | Restaurants, Hotels, Tourism | Legal services |
|  | Waste recycling | Industrial recycling |
|  | Public transport (bus, subway) | Public transport (regional train) |

## Table 2 Issuance cycle

## Table 3 The Redemption Cycle

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Month | New Stock | % sold | Sold | Stock | Due Vat |
| 1 | 0 VTS |  | 0 VTS | 0 VTS | 0 VTS |
| 2 | 0 VTS |  | 0 VTS | 0 VTS | 0 VTS |
| 3 | 0 VTS |  | 0 VTS | 0 VTS | 0 VTS |
| 4 | 0 VTS |  | 0 VTS | 0 VTS | 0 VTS |
| 5 | 0 VTS |  | 0 VTS | 0 VTS | 0 VTS |
| 6 | 81.413 VTS | 30,00% | 24.424 VTS | 56.989 VTS | 4.152 VTS |
| 7 | 7.763 VTS | 70,82% | 22.796 VTS | 41.956 VTS | 3.875 VTS |
| 8 | 5.868 VTS | 73,19% | 20.978 VTS | 26.846 VTS | 3.566 VTS |
| 9 | 5.791 VTS | 60,17% | 16.108 VTS | 16.530 VTS | 2.738 VTS |
| 10 | 4.641 VTS | 55,77% | 11.571 VTS | 9.600 VTS | 1.967 VTS |
| 11 | 4.641 VTS | 54,43% | 8.824 VTS | 5.418 VTS | 1.500 VTS |
| 12 | 4.641 VTS | 65,53% | 8.824 VTS | 1.236 VTS | 1.500 VTS |

%sold is arbitrary numbers

## Table 4 Issuing with a tax reserve

|  |  |  |  |
| --- | --- | --- | --- |
| Smart Token Symbol | VTS | vat | 17,00 % |
| Reserve Token | TXHR |  |  |
| Constant Reserve Ratio (CRR) | 100,00 % |  |  |
| Initial Token Price | 5,88 VTS/TXHR |  |  |
| Deposited Reserves | 1.000 TXHR |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Activity | RESERVE |  | PRICING |  | VOUCHER |  |
|  |  | TXHR Received | TXHR Reserve | Effective VTS Price | Resulting VTS Price | VTS Issued (Redeemed) | VTS Supply |
| Month | Create VTS |  | 6 TXHR |  | 0,17 TXHR |  | 35 VTS |
| 1 | Issue | 2.199 TXHR | 2.205 TXHR | 0,17 TXHR | 0,17 TXHR | 12.938 VTS | 12.972 VTS |
| 1 | Sales | 0 TXHR | 2.205 TXHR | 0,00 TXHR | 0,17 TXHR | 0 VTS | 12.972 VTS |
| 2 | Issue | 2.521 TXHR | 4.727 TXHR | 0,17 TXHR | 0,17 TXHR | 14.832 VTS | 27.804 VTS |
| 2 | Sales | 0 TXHR | 4.727 TXHR | 0,00 TXHR | 0,17 TXHR | 0 VTS | 27.804 VTS |
| 3 | Issue | 2.639 TXHR | 7.366 TXHR | 0,17 TXHR | 0,17 TXHR | 15.525 VTS | 43.329 VTS |
| 3 | Sales | 0 TXHR | 7.366 TXHR | 0,00 TXHR | 0,17 TXHR | 0 VTS | 43.329 VTS |
| 4 | Issue | 2.521 TXHR | 9.887 TXHR | 0,17 TXHR | 0,17 TXHR | 14.832 VTS | 58.160 VTS |
| 4 | Sales | 0 TXHR | 9.887 TXHR | 0,00 TXHR | 0,17 TXHR | 0 VTS | 58.160 VTS |
| 5 | Issue | 2.199 TXHR | 12.087 TXHR | 0,17 TXHR | 0,17 TXHR | 12.938 VTS | 71.098 VTS |
| 5 | Sales | 0 TXHR | 12.087 TXHR | 0,00 TXHR | 0,17 TXHR | 0 VTS | 71.098 VTS |
| 6 | Issue | 1.760 TXHR | 13.846 TXHR | 0,17 TXHR | 0,17 TXHR | 10.350 VTS | 81.448 VTS |
| 6 | Sales | -4.152 TXHR | 9.694 TXHR | 0,17 TXHR | 0,17 TXHR | -24.424VTS | 57.024 VTS |
| 7 | Issue | 1.320 TXHR | 11.014 TXHR | 0,17 TXHR | 0,17 TXHR | 7.763 VTS | 64.786 VTS |
| 7 | Sales | -3.875 TXHR | 7.138 TXHR | 0,17 TXHR | 0,17 TXHR | -22.796VTS | 41.991 VTS |
| 8 | Issue | 998 TXHR | 8.136 TXHR | 0,17 TXHR | 0,17 TXHR | 5.868 VTS | 47.859 VTS |
| 8 | Sales | -3.566 TXHR | 4.570 TXHR | 0,17 TXHR | 0,17 TXHR | -20.978VTS | 26.881 VTS |
| 9 | Issue | 985 TXHR | 5.554 TXHR | 0,17 TXHR | 0,17 TXHR | 5.791 VTS | 32.672 VTS |
| 9 | Sales | -2.738 TXHR | 2.816 TXHR | 0,17 TXHR | 0,17 TXHR | -16.108VTS | 16.564 VTS |
| 10 | Issue | 789 TXHR | 3.605 TXHR | 0,17 TXHR | 0,17 TXHR | 4.641 VTS | 21.206 VTS |
| 10 | Sales | -1.967 TXHR | 1.638 TXHR | 0,17 TXHR | 0,17 TXHR | -11.571VTS | 9.635 VTS |
| 11 | Issue | 789 TXHR | 2.427 TXHR | 0,17 TXHR | 0,17 TXHR | 4.641 VTS | 14.276 VTS |
| 11 | Sales | -1.500 TXHR | 927 TXHR | 0,17 TXHR | 0,17 TXHR | -8.824VTS | 5.453 VTS |
| 12 | Issue | 789 TXHR | 1.716 TXHR | 0,17 TXHR | 0,17 TXHR | 4.641 VTS | 10.094 VTS |
| 12 | Sales | -1.500 TXHR | 216 TXHR | 0,17 TXHR | 0,17 TXHR | -8.824VTS | 1.270 VTS |

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