Emerging trend of complementary currencies systems for environmental purposes: changes ahead?

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Introduction

In the classification they propose for complementary currencies (CC) systems, Bernard Lietaer and Margrit Kennedy (2008) underline the very small number of projects with environmental aims. Indeed, using CC systems for environmental purposes is a trend that seems to be only progressively emerging in Europe. However, this emerging trend has not been left unnoticed by academics (Seyfang, 2006, Blanc 2010, Blanc and Fare, 2010).

The objective of this paper is to contribute to the research on CC and environmental sustainability by providing an analysis grid based on the systematic identification of the constitutive parameters of two pioneering CC projects with environmental aims. This analysis grid is also intended to serve as a building tool for an innovative CC scheme that is being designed in the framework of the Belgian Science Policy INESPO Project. Besides, this paper sheds light on the importance of the conceptual framework used to design CC systems aiming at behavioural changes for sustainability, and on the changes that using CC as environmental policy instruments could bring.

Complementary currencies systems and sustainability

There are only a very limited number of projects using CC to promote environmental sustainability compared with, for instance, the impressive number of Local Exchange Trading Systems (LETS) which were developed around the world with mainly social purposes[1]. This can partly be explained by the fact that using CC for environmental aims is an emerging concept that, in most cases, has needed the participation of public authorities to materialise. In comparison, LETS have started being developed since the early '80s on a community and grassroots basis. This bottom-up creation process greatly reduces the need for the important administrative and structural developments that have been witnessed in environmentally aimed projects.

Three projects were initially selected as highly representative of CC systems with environmental aims. In the following sections, two projects (NU-Spaarpas and E-portemonnee) that have pioneered this emerging trend in Europe, are analysed. It did not seem appropriate, however, to perform the same analysis with the third selected project (Biwa Kippu), amongst others, because it is but a proposal at this stage. Therefore, the third system will be introduced in the discussion about CC as environmental policy instruments at the end of this paper.

NU-Spaarpas

NU-Spaarpas was launched in the City of Rotterdam (NL) as a loyalty card scheme to be used in participating independent retail shops (van Sambeek and Kampers, 2004). This CC system aimed at promoting 'greener' consumption and behaviour. The basic principle of the system was that when a card holder bought a product in a participating shop, he was rewarded with more points when purchasing a 'green' product than when purchasing a regular product. Besides, some eco-friendly behaviours, like recycling, were also rewarded with points. The

1 1,500 LETS worldwide, according to the reference site www.lets-linkup.com, January 2011.

points earned could then be used for a variety of products and services like 'gifts' in the participating shops, entrance tickets for events or one-day passes for public transportation.

A complementary objective of the project was to strengthen the competitiveness of local small and medium enterprises by offering them the advantages of belonging to a large-scale loyalty scheme. Since 'green' products were granted more points, it could also be expected that shops would be interested in proposing (more) of those products.

The NU-Spaarpas project started in May 2002, after a development phase headed by a private consultancy firm. Important financial resources were necessary to develop and run the project, with costs related to human resources and promotion, as well as to technology development and hardware. Those costs were mostly covered by the European Commission in the framework of the LIFE III Environmental Programme and by the Province of South Holland. The role of public authorities was not limited to funding the project, however, and local authorities also actively supported it. Indeed, three departments of the Rotterdam Municipal authorities were involved in the NU-Spaarpas project.

Another striking characteristic of the NU card scheme was its strong private component. As said before, the project was designed and headed by a private consultancy firm. Besides, a partnership was established with a cooperative bank, and, most importantly, the private sector played a key role in the loyalty scheme, with a number of participating small and medium enterprises that peaked around 80 in June 2003 (van Sambeek and Kampers, 2004). The NU project can thus been framed as an 'eco-business-behavioural' project, originating in a private initiative that succeeded in finding public and private support.

Designed in a top-down fashion, the project targeted the 'grey mass' of consumers that were neither pro-environmental, nor anti-environmental. This explains the inclusive position that was adopted regarding the list of shops participating to the scheme, and the products rewarded with points. All kinds of products were rewarded in the loyalty scheme, whether 'green' or not, with the products identified as 'green' receiving more points. This inclusive position was also adopted to target a large basis of consumers. At its peak time, the project included 10,000 cardholders and 100 participating shops. The project came to a halt end 2003.

E-portemonnee

The project E-portemonnee, which was initiated in Overpelt (Province of Limburg, BE) with the name 'Zet milieu op de kaart' (literally put the environment on the ship card) is another case that illustrates the emerging trend to use CC systems as instruments for sustainability policies. The aim of this CC system, which is still running, is to promote sustainable behaviours (Bond Beter Leefmilieu, 2005). In order to do so, the system functions with two lists: a list of sustainable actions (e.g. switching to green electricity, following composting courses, placing a 'no pub' sign on the mail box) and a list of rewards (e.g. entrance tickets for the municipal swimming pool, tickets for public transports, energy saving lamp bulbs). By performing the targeted sustainable actions from the first list, participants earn points that they can use to obtain services or products from the second list.

This project, which is also fairly recent, was jointly set up by a non-profit organisation and 'Afvalintercommunale Limburg.net' (i.e. the structure put in place by the towns/cities of the Province of Limburg for waste management). In 2003, the project was accepted for financial

support by the Flemish Government, on top of the financing and resources provided by Limburg.net, with a total budget lower than 100,000 Euros (Bond Beter Leefmilieu, 2005). After a development phase, the project was launched in November 2005 in the town of Overpelt for a trial period that lasted until 31 October 2006. Building on the success of this trial phase, Overpelt carried on with the project and 5 other towns in the Province of Limburg joined E-portemonnee as well.

Even more so than in the case of NU-Spaarpas, public authorities played a central role in the development and implementation of E-portemonnee. Limburg.net was very active in bringing the project to life, and the Flemish authorities provided financial support. Besides, and most importantly, the implementation of the project took place at the level of the participating towns. Indeed, the decision to enter the scheme, as well as the financing and operating of the CC system was in the hands of municipal authorities. Each participating town had to build its own set of two lists, one with the actions rewarded, and one with the communal services and products offered, with the help of the NGO. In this sense, E-portemonnee is very much anchored in the local community and used as an instrument for sustainability policies.

Compared to NU-Spaarpas, a major similarity is the use of the scheme as a policy instrument in a top-down approach with an important part played by public authorities. However there are striking differences in the exclusive focus on behavioural changes, and the leading role of public authorities in E-portemonnee. Indeed, the consumption aspect is, to a great extent, absent from E-portemonnee: it is mostly everyday life practices that the project is aiming at changing. There is no loyalty scheme attached to E-portemonnee and hence, no economic development objective for local SME's. The role of the private sector is limited principally to sponsoring the project (e.g. through offering products for the reward list). In line with this, public authorities are heading the project, and have decision power at most of the management levels of the project.

Another difference is the scale of the two projects: the population in Rotterdam is close to 600,000 people, while Overpelt has less than 15,000 inhabitants. The participation rate to the CC system was, reportedly, higher in the E-portemonnee scheme than for the NU-Spaarpas. Indeed, according to the figures provided in the final report of the projects, 20% of households used the system in Overpelt (Bond Beter Leefmilieu, 2005), while the number of cardholders peaked aroud 10,000 in Rotterdam (van Sambeek and Kampers, 2004), for a population around 600,000 and 300,000 households approximately, (Gemeente Rotterdam, Centrum voor Onderzoek en Statistiek, 10-11-2010). Budgetary lines were also of another order of magnitude between NU-Spaarpas, and E-portemonnee which has a running cost estimated approximatively to 3,000 – 5,000 Euros for each participating town per year (Joachain et al. 2009).

This brief description of both systems highlights the fact that CC systems with environmental aims can show similarities but also be designed in very different ways regarding objectives, architecture and management. Indeed, CC systems are defined by many parameters, such as the form and value of the CC, the rules to obtain and use the CC, the motivation factors used, etc. Therefore, a general description of CC systems such as given above for NU-Spaarpas and E-portemonnee appears insufficient for a systematic comparison. This sheds light on the necessity to have a tool that would identify parameters that are constitutive of CC systems.

We have developed such a tool in the framework of the Innovative Instruments for Energy Saving Policies (INESPO) project carried out in the framework of the Science for a

Sustainable Development Programme of the Belgian Science Policy[2]. Indeed one of the core tasks of the INESPO project is to build a new policy instrument that integrates CC in order to promote energy savings in the household sector. The methodology to design the CC part of INESPO rests on the analysis of previous systems and the building of a grid that identifies constitutive parameters in a systematic way. This grid was developed in an iterative manner, with feed-back at each stages between what was identified for existing CC systems and what was necessary to build the new INESPO CC system. The double objective of allowing a systematic comparison of previous systems and serving as a building tool for the new INESPO system sets very clearly the framework in which this grid was developed. It is important to stress this point before presenting a synthetic view of the grid, because, as stated by Blanc (2010, p. 1), "different objectives may lead to different typologies". Another point to underline is that the grid developed in the framework of the INESPO project is only intended to provide a systematic view of the constitutive parameters of a CC system, and not of the complex interactions between those parameters. In this respect, it is foreseen to carry out, in a later stage of the INESPO project, a dynamic analysis to complement the static analysis presented in this paper.

The grid: an analysis and building tool

The work carried out to build a grid of elements that constitute a CC system, shed light on three pillars that are determinant for the architecture of the system. The following terminology was chosen for those three pillars: the rules, the user access points and the management. The next paragraphs summarise the work developed in Joachain et al. (2011) and are intended to give an overview of the main findings related to those three pillars, and of the way they can apply to existing systems (NU-Spaarpas or E-portemonnee) or to the building of a system, taking INESPO as an illustration.

Rules

The rules relate to motivating the people to get onboard, as well as operating the system and defining the currency itself. Table 1 shows the three pillars of CC systems, as well as all the parameters related to this first pillar. In table 1, E-portemonnee is taken as an example of analysing a system with the grid.

Motivation

When designing a CC system, the first logical step, once the objective(s) are set, is to decide how to motivate people to get onboard. According to what is shown in table 1, three main parameters are impacting the motivation to participate to CC systems: the model chosen, as well as the way to obtain and use the CC units. The (potential) disincentives are to some extent the counterpart of the choices made for the model, as well as for the obtaining and using of the CC units. However, (potential) disincentives also comprise more aggregated problems such as technological choices that can make the CC system not user-friendly enough for instance.

2 Under grant INESPO SD/EN/09

Looking at what has been done for NU-Spaarpas and E-portemonnee, it is obvious that the models used are very similar. Indeed, in both systems CC units are given to the participants to reward desired behaviours. How would this kind of model apply to the INESPO project? Based on the objective of INESPO, which is to promote energy savings in the household sector, such a model seems an interesting option to motivate people to participate.

To differentiate this kind of model from grassroots CC systems based on reciprocity (i.e. LETS, Time Banks), the term 'push' or 'rewarding' model was chosen instead of 'voluntary'. Indeed, there are two major ways for CC systems to develop: they can emerge from a grassroots dynamic or be engineered in a top-down manner. In both cases the systems can be voluntary, but the term 'rewarding' is consistent with the fact that the INESPO project is intending to create a policy instrument with a top-down approach.

In the two examples of systems with environmental aims that have been analysed, there does not seem to be much of a choice regarding the model used. However, CC systems are in a process of rapid and continuous evolution, and new choices are emerging for the model, as will be discussed later in this paper.

Motivation should also play a leading role in deciding how the CC units will be earned and used in systems based on a rewarding model. It is straightforward that what is proposed as a reward (i.e. the way to use the CC units) is essential, but the importance of the earning process should not be underestimated as a motivational factor. Indeed, the earning process can most probably draw boundaries in the public, with some being receptive to what is proposed and others more reluctant. In NU-Spaarpas, for instance, there was an objective of inclusivity in the project, of reaching the 'grey mass', that led to including rewards for non 'green' products and services in a scheme designed for sustainability.

Clearly, a trade-off will be necessary at this point between the objectives of the project, the need for objective measurement, technological constraints, and what makes sense to the participants. Similarly, when deciding about the rewards, a balance will also have to be found between attractiveness and staying in line with the objectives of the project (e.g. avoiding a rebound effect).

Operation

In previous paragraphs, we have presented parameters linked to the motivation of people to get onboard. The choices made for the motivation, as well as the objectives of the project will lead to decisions for operating the CC system, as well as for designing the currency itself. This section is focusing on the parameters for the operational aspects of the CC system. In a very practical sense, the operational aspects of the CC system translate the vision for the system into rules that will apply to the participants.

It comprises what people must do for obtaining CC units. Typically this obtaining mechanism will be defined by a list of behaviours and the number of CC units each behaviour gives right to. In the case of E-portemonnee, this list was adapted for each participating town but would typically comprises behaviours like switching to/using green electricity, following composting course/composting, placing/using a condensation boiler, using reusable nappies, placing a 'no pub' sign on the mail box , etc.). There is an equivalence in points for each rewarded behaviour (e.g. using 100% green electricity is worth 300 points per year). In the case of NU-Spaarpas, buying in participating shops allowed to earn points, with more points being given

for 'green products', and rules were also established for other behaviours (e.g. related to waste or recycling).

It can also be foreseen that CC units be directly bought with official currency, eventually at a discounted rate.

Once the rules have been established regarding how to obtain CC units, the trajectory of those CC units in the system have to be defined. Most importantly, the designers of the system should decide whether the CC units should be encouraged to cycle in the system, or not. There seems to be opposite rationale between encouraging cycling and direct exiting. Indeed, cycling seems more related to a system designed to foster exchanges (e.g. WIR in Switzerland, Chiemgauer in Germany or RES in Belgium), while direct exiting seems more appropriate to behavioural changes that do not include purchasing or investment behaviours (e.g. E-portemonnee in Belgium). The number of actors and dependencies between them (e.g. shops buying and selling items to each others) could be a limitative factor for cycling, while the goods and services proposed as a reward, or the easiness of conversion seems to be more central for direct exiting.

Currency

As for the operational aspects of the CC system, choices have to be made regarding the currency itself. This step of the system design is dependent on the former decisions taken for the objectives and operating of the CC. However, the questions raised regarding the currency can impact the operational part of the system. The process of defining the rules is thus iterative, so that the decisions taken for the currency are consistent with those regarding operation and vice versa.

The form and the value of the currency will literally determine what the CC is. For instance, the CC will consists in NU points stored on a smart card, or Ithaca hours paper notes, or E-Portemonnee points stored remotely on an electronic account in a database.

Those examples illustrate the choices that have to be made regarding the form. A first basic choice is whether to use paper or electronic money. Electronic money can either be stored on a smart card, or remotely in a database, with the necessity for identification. Several possibilities exist for identification, like identity card (E-Portemonnee), a smart card (NU-Spaarpas), a SIM card (mobile phone), etc. Different aspects will influence the decision taken regarding the form of the CC, amongst which, the traceability of the CC units requested for security reasons, or, on the contrary, avoided in order to protect privacy. Practicality of the system will also play a role in the decision, as well as other factors like technical constraints, the acceptability of the system by business intermediaries if any, the level of security requested and the costs linked to transactions. From the user's point of view this parameters will play on the easiness and acceptability of the CC system.

The value is a critical choice for the architecture of the system, in the sense that it fixes the CC currency vis-à-vis an external value or not. Taking the example of the INESPO project, the value of the CC could be 1 kWh (or 1 spared kWh) for instance. In this sense, the value of the currency would be fixed vis-à-vis a physical unit. On the contrary, the choice not to fix the value of the currency - using let's say INESPO as the CC value - leaves the door open to defining INESPO's with an informal value of 1 INESPO = 1 kWh (or 1 spared kWh), but also in relation to other behaviours like insulating, buying economic lamp bulbs, etc.

Other parameters, like how long the CC is valid (lifetime), whether or not it is convertible in official currency (convertibility), or if it loses value/ give interest with time (demurrage/ interest) further determine the CC.

The other two pillars: User Access Point and Management

This paper is focusing on the first pillar of CC systems, the rules. Findings related to the two other pillars will be developed in further publication, and the objective of the following paragraphs is limited to giving a first overview of some parameters that are relevant for those pillars. However, because they relate closely to what has been exposed for the first pillar, links with the INESPO project will be made for the most important parameters from 'currency flow management' and 'operations network / back office' aspects of CC systems.

Probably the parameter that influences the most the architecture of the CC system at this stage is the one named 'CC processing' (in operations network / back office). Indeed, this parameter defines, in a very practical way, the internal mechanism for the emission of CC units. With this parameter, it is the entire issue of the need for objective measurement of CC systems that is brought into consideration. Indeed, the behaviours that are rewarded have to be measured, and a formula set to emit a corresponding amount of CC units. For the INESPO project, this was, indeed, a central issue. The innovative answer that was found to the measurement issue was to couple the CC system with a Smart Meter (SM) system that provides the requested objective measurement. Since this paper is focused on the CC part of the INESPO project, we will not get into further details regarding the SM architecture of the system (see Joachain et al., 2011). However, as can be guessed, finding the right conversion formulas and technological answers for this parameter is one of the major challenges of the INESPO project.

User Access Point relates to the interactions between the users of the CC system, and the system itself. Beyond thinking in terms of what interactions are necessary or desirable, it is also a matter of defining how those interactions will take place. In the case of the INESPO project, with a combination of CC and SM one or more devices are required on which users will interact with the system. Each device must be conceived with a clear idea of its intended usage(s), such as the simple consultation of earned points, a feed-back on energy consumption or an interface for exchanging points against goods or official currency in the case convertibility is foreseen. In the INESPO project, at least one device is always required for measuring the energy consumption: the smart meter that will be installed in each household. Other device types may be used for further interactions between the users and the CC-SM system, like mobile phones, personal computers or dedicated terminals used by merchants as a support for the CC earning and exchanging.

Setting-up adequate rules and developing efficient user access points are fundamental, but the entire system will not run very long unless it is correctly managed. This includes issues related to governance, stakeholders, currency flow management and operations at the network / back-office level. We will not go into further details on the management issue and only suggest that the premature ending of the NU-Spaarpas project in Rotterdam could be an interesting case study on the importance of taking all the aspects of management into account in environmental CC projects.

Attitude Behaviour Choice (ABC) or social practices? Conceptual frameworks for behavioural changes do matter

In the preceding paragraphs, the idea was to go 'down the bones' of existing CC systems, in order to come up with an instrument for building the INESPO system. This resulted in a grid of parameters, with some playing a major role for the architecture of the system, as well as a logical sequence to design the new system. However, in the following paragraphs, we argue that the conceptual framework used for behavioural changes deeply influences the perception of the potential of a CC system such as INESPO, as well as the choices made for the parameters.

Although the purpose of this paper is not to describe the INESPO project, it must nevertheless be underlined that designing energy saving measures aiming at behavioural changes is already a major breakthrough in the current policy agenda. Indeed, up to now almost all efforts have been directed at energy efficiency. However, at least two factors combine that might lead policy makers to consider the role of behavioural changes in energy saving for the household sector. Firstly, despite continuous energy efficiency gains in the last ten years, household energy consumption is still growing (European Environment Agency, 2010). Secondly, many voices have risen to call attention to the importance of behaviours in energy related matters (Shove and Walker 2010, Maréchal 2010, Gram-Hansen, 2009, Anker-Nilssen, 2003 or Røpke 2001). This nonetheless leaves the question open of which framework will be used to understand the meaning and the determinants of energy consumption behaviours. Most of the material explained in the following paragraphs is taken from Joachain (2010).

A mainstream choice: the ABC model

Building on the work of Bamberg and Schmidt (2003), two theories are taken into consideration in this section, not because those theories were built to explain energy consumption behaviour, but because they are commonly used to explain it. Those two theories are: Ajzen's Theory of Planned Behavior (Ajzen, 1991) and Triandis Theory of Interpersonal Behavior (Triandis, 1977, 1980). Besides, it seemed also appropriate to take the conceptual framework developed by the psychologist Stern to explain environmentally significant behaviour (Stern et al., 1999 and Stern, 2000) that is partly built on the Norm-Activation Model (Schwartz, 1977; Schwartz and Howard, 1981).

Beyond the particularities of each theory, common denominators make them, in our view, belong to a same paradigm. All three models try to integrate the complexity of understanding behaviour within the same individual choice linear causality paradigm. This implies that individual choice is central for obtaining the desired energy savings. Besides, those theories suppose a linear causality chain between, in a simplified version, attitude, intention and behaviour. Of course, those theories have reached a greater level of complexity amongst other because empirical studies have shed light on paradoxes and inconsistencies between attitudes and behaviours. But, by integrating more and more explanatory factors and determinants, those theories also leave the choice for policy-makers to select the ones that fit best with their own policy agenda. Taking into account the influence of mainstream economics in policy making, it is clear that the possibility of deploying innovative measures is limited.

According to such ABC frameworks, the role of public authorities could be understood as finding and acting on determinants of individual choice, removing obstacles and favouring

motivators so that people change their behaviours in a more environmental-friendly manner. In this light, the potential of the INESPO project would rest on the fact that the CC system acts as a rewarding system, while the coupling with the SM infrastructure provides feed-back. The creation of the system itself might also be considered as changing the internal and external context in which the behavioural changes have to take place. The main focus in the choice of the parameters would be to concentrate on rewards that can motivate individuals, as well as providing a feed-back in the most user-friendly manner via the SM infrastructure and marketing the new system to create a positive perception of the project.

What remains unchallenged with such ABC conceptual frameworks is that energy saving is a matter of individual choices. It is necessary to turn to the emerging framework of social practices to challenge this main postulate.

The nascent framework of social practices applied to energy consumption issues

Theories of social practices can offer a rather different view on energy consumption in the households. Taking the definition proposed by Reckwitz (2002, p. 249) a practice is "a routinized type of behaviour which consists of several elements, interconnected to one other: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge." Practice theories do not follow the path of mainstream economic theories where the social is the product of the interest of rational individuals neither do they follow the path of social theories that place social order and norms at the forefront. In practice theories, the social is to be found in all the constitutive elements of practices (i.e. routinized bodily activities, mental activities, 'things', knowledge, etc). Regarding the aspect of knowledge, for instance, the social can be found in knowledge too, because it is not understood as single individuals' knowledge, but as collectively shared knowledge.

A striking difference with usual frameworks is the level at which the analysis is carried out. Unlike in ABC or economic theories, the analysis is not carried out at the level of the individual, neither is it carried out at the level of normative structure, as it is done when using sociological frameworks. The object of investigation is practice, as defined here above. This opens up a promising new field of research regarding household energy consumption that, amongst others, Shove and her colleagues have started pioneering (Shove and Walker, 2010, p. 472-473). Much theoretical and empirical work still has to be carried out, but even in its nascent state, social practice theories applied to energy saving in the households already provide innovative insights.

Using the social practice framework has implications for the potential of the INESPO project, and the design of its architecture. Indeed, social practice theories are anchored in the reproduction by different agents, at different times of routines implying interconnected forms of bodily and mental activities, as well as things and background knowledge. Social reproduction is thus what keeps practices alive. However, as underlined by Warde (2005, p. 141), when talking about practices: "They are dynamic by virtue of their own internal logic of operation, as people in myriad situations adapt, improvise and experiment". The potential of the INESPO project might thus be reframed in terms of its capacity to make energy consumption practices evolve in a more sustainable direction. This involves, firstly, to understand and define energy-consuming practices performed in households, and secondly, to design the system in order to make those practices evolve.

Meaning is an aspect of social practice theories that could be promising in this respect. People do consume energy, but it is just a consequence of practices that are meaningful to them. Røpke (2009) stresses the importance of meaning which is, according to her, a key component of practices (together with competence and material aspects).

Closely related to the question of meaning, the question of the reward(s) offered by a practice sheds a new light some aspects of energy consumption. As Warde (2005, p. 148) points out, "it is not so much things in themselves, but rather the place within different practices that is afforded by the possession or control of goods and services which is the basis of contentment, social acceptability and recognition." It follows that, if practices are meaningful to people, and carrying them in a skilful way offer them important rewards, people will go on doing them. Besides, the observed trend for practices is to multiply, in what Peterson has termed 'omnivorousness' (see, for instance, Peterson 1992 and 2005).

This might be one of the reasons why awareness raising campaigns about consuming less energy might not reach their targets. Indeed, if people are engaged in carrying out practices, of which energy consumption is merely a consequence, communicating about their energy consumption might not be the most relevant policy. A practical consequence of this for the INESPO project would be not to use the kWh as a reference for issuing the CC units, but rather, to the extent that the SM infrastructure allows objective measurement, to link the CC units earned with changes in practices. If empirical studies show, for instance, that washing laundry at high temperature and with a high frequency has a significant impact on household energy consumption, the target might then be to promote new practices in this field, and to reward them with CC units.

Finally, it can also be argued that the social construction of practices also offers interesting insights, regarding the role of public authorities in shaping practices (Shove and Walker, 2010). This can also shed a new light on the use of CC as environmental policy instrument.

Complementary currencies systems as environmental policy instruments: changes ahead?

Changes can come from many places. The preceding paragraphs shed light on how an emerging conceptual framework like the social practice theories could change the perceived potential and the choices made for the design of the INESPO project. The fact that CC systems are used as policy instruments could also bring changes. The analysis of NU-Spaarpas and E-portemonnee shed light on the importance of the role played by public authorities. When we looked at the first pillar of those CC systems (i.e. the rules), there did not seem to be much of a choice regarding the model used to design the architecture of the system and to motivate people to get onboard. Both NU-Spaarpas and E-portemonnee used a rewarding model. However, as was suggested, CC systems are in a process of rapid and continuous evolution, and new choices are emerging.

Indeed, a proposal was made in 2010 for a CC system that would serve as an environmental policy instrument in Japan, but based on a very different model. Lietaer and Takada (2010) proposed a CC scheme to restore the ecosystem of Lake Biwa in Shiga Prefecture that would not rest on a voluntary basis. In essence, the idea behind this type of model is that public authorities make it mandatory to handle in a certain number of CC units at the end of a given

period. The public authorities determine how those CC units can be earned, and establishes a proper mechanism to allocate the CC units. In the case of Lake Biwa, the proposal was built around the obligation of earning the CC units through activities to restore the eco system of the lake.

The use of CC systems as policy instruments has already caused major changes to the CC systems themselves, compared to grassroots LET's, for instance. Blanc (2010, p. 6) has termed the NU-Spaarpas scheme as "a forerunner of a fourth generation [*of CC systems*] that seems to be progressively emerging." If the BIWA project or another project using a similar regulatory model is implemented, this would put such a CC system on a radically different path from the voluntary systems that prevailed up to now. This kind of system would not necessarily exclude a grassroots contribution, for instance in participating to establishing the list of actions for earning CC units. Arguably, such a regulatory system would have the advantage of mobilising a major fraction of the population while not weighting on public funding. However, the social acceptability is a crucial point that cannot be overlooked and will depend, amongst others, on weighting the advantages and disadvantages of such a system against alternative solution to attain similar objectives.

It is too soon to conjecture about the future of systems based on a regulatory model. It is also probably too soon to know if conceptual frameworks based on social practice theories will change the agenda of policy makers, or even if policies aiming at behavioural changes will be put in place regarding energy savings. However if CC are increasingly used as instruments for environmental policies, it is very likely that changes are indeed ahead!

Conclusion

The analysis of the two CC systems (NU-Spaarpas and E-portemonnee) that was carried out in the first section had the aim of going 'down the bones' of those systems in order to provide a structured and systematic view of their constitutive parameter. This work was synthesised in a grid. In turn, this grid is intended to be used as an instrument to build the new CC system needed for the INESPO project. Eventually, this grid could serve as the basis for a more general typology in the future. However, bones are not enough to make a CC system thrive. Flesh is also needed, that could come from knowing more about the expectations of partners and individuals that will carry the system. In the framework of the INESPO project, for instance, a better understanding of motivation factors and social acceptability of the system is foreseen through the organisation of focus groups. But bones and flesh are still not enough. As was shown with ABC and social practice theories, the importance of the conceptual framework should also not be underestimated. If appropriate attention is given to bones, flesh and conceptual framework, CC systems might become convincing instruments for environmental policy, which might, in turn, bring major changes to CC systems as well.

SYSTEM ARCHITECTURE	E-PORTEMONNEE
Rules	
Currency	
Form	Electronic remote
Value	Points
Informal value	Soft equivalence 100 points = 1 euro
lifetime	Not specified
Convertibility buying	No
Convertibility selling	No
Demurrage	No
Operation	
Obtaining Earning	list of actions set up by each town (typically: switching to/ using green electricity, following composting course/ actions as compost master/ composting, placing/ using a condensation boiler, reusable nappies, placing a 'no pub' sign on the mail box , etc.) with an equivalence in points (for ex. using 100% green electricity is worth 300 points per year)
Obtaining Buying	No
Using Cycling	No
Using Exiting	list of rewards set up by each town (typically: services like tickets for municipal swimming pool, for sports centre or movies, also for public transportation, membership in associations, // products like battery chargers, rechargeable batteries, energy meters, reflective armbands, eco shower heads, energy saving lampbulbs, discount voucher by recycling shops, Oxfam vouchers, composting containers,
Motivation to participate	
Model: Push-pull-quota	Push (rewarding model)
Obtaining	
Using	
Disincentives	
Penalty	No
User Access Point	
Access point / terminal for CC management	
Intended usage	
Device type	
Internal connectivity	
External connectivity	
Measurement registers	
Tamper resistance	
Feed-back media	
Feed-back format	
Feed-back frequency	
Feed-back motivator	
Input capabilities Support	
Access point / terminal for SM management	
Management	
Governance	
Stakeholders	
Currency flow management	
Operations	
Network/ Back-office	

Table 1: the grid and its application to E-portemonnee for the first pillar 'rules'

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