

Assessment of the potential of Renewable Energy Sources Cooperatives (REScoops) in Spain towards Sustainable Degrowth

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Abstract

The transition to renewable energies is at the heart of the Sustainable Degrowth (SD) proposals due to its potential to relocalize and democratize the energy generation in a sustainable way. In this paper, we review the development and current situation of the Renewable Energy Sources Cooperatives (REScoops) in Spain, assessing their strengths, barriers and opportunities as a means towards SD. This is an interesting case study since, unlike other European countries, they have recently arisen in a regulatory and economic hostile context, which have induced particular organizational and operating structures.

We identify strengths coherent with SD in common with social enterprises such as the focus on satisfying needs rather than creating new ones, the high motivation and awareness of the members, and the capacity to provide social and environmental benefits. In terms of barriers to SD, we find difficulties to combine membership growth with participation, a low integration with other social enterprises and a risk of denaturation of the intended change. Also, within a growth paradigm, REScoops may simply add new energy generation to the mix, without transforming it. We find a dominant perception that renewables could substitute fossil-fuel generation without challenging the system. Finally, not all renewable technologies might be compatible with a SD approach. To date in Spain, REScoops: (1) remain very minorital; (2) have barely managed to promote new generation; (3) have only focused on electricity; (4) show a weak (although increasing) collaboration between them. The reversal of these trends would increase their potential towards SD. Moreover, we find great opportunities to promote independent research about the transition to RES in Spain which may contribute to push towards a distributed energy generation system in the country.

Table of contents

1. Introduction	2
2. REScoop clustering	4
3. REScoop development in Spain	5
3.1. The Spanish electricity market	5

3.2. Development of Spanish REScoops	7
4. Discussion: Spanish REScoops as an instrument towards SD	10
5. Conclusions	14
Acknowledgments	14
References	14

Key-words: Spain, renewable energy, energy transition, degrowth, cooperatives

1. Introduction

Societies metabolize energy and material flows in order to remain operational (D’Alisa et al., 2014; Krausmann et al., 2008). However, the global human system has reached such a size that this metabolism is increasingly affecting the regular functioning of the Biosphere and critically threatening its equilibrium (Rockström et al., 2009; Steffen et al., 2015a, 2015b). This situation can largely be attributed to advanced industrial countries due to the huge inequalities in terms of energy and raw materials use in relation to the Southern ones. For example, in terms of energy use, 1/3 of the world population today consumes 2/3 of the produced energy, mainly in the form of fossil fuels (BP, 2015).

The average world energy consumption per capita has increased almost 4 times (10–15 times in advanced industrialized countries) since the Industrial Revolution (Smil, 2008). Whether these energy consumption intensification trends are to be followed by Southern countries is challenged by a body of literature in expansion that disputes the conventional view of the vast abundance of non-renewable resources, especially in the field of fossil fuels (see for example (Capellán-Pérez et al., 2014)), but also for other fuels and materials (Bardi, 2014; Valero and Valero, 2014). Considering the link between energy use and economic activity, which is very strong and without any sign of absolute decoupling globally (e.g. (Bithas and Kalimeris, 2013; Brown et al., 2011; Stern, 2011; Tverberg, 2012; Warr et al., 2010)), the Sustainable Degrowth (SD) paradigm proposes that the current advanced industrial countries reduce their energy consumption to allow the Southern ones increasing theirs while increasing human well-being and enhancing ecological conditions at the local and global level, in the short and long term (D’Alisa et al., 2014; Schneider et al., 2010). In this context, the transition to Renewable Energy Sources (RES) is thus proposed as an essential instrument to reduce the dependency on fossil fuels and their associated environmental impacts in the so-called energy transition.

Although the transition to RES can be designed under a conventional economic growth paradigm, their particular biophysical characteristics could facilitate the design of technologies consistent with the SD approach. For example, their lower power density (de Castro et al., 2013; Smil, 2015; Wagner, 2014) allows for the design of distributed networks that may be managed in a more democratic way. Their modularity and capacity to generate energy at local level allows for the development of bottom-up, local and participative initiatives (Kunze and Becker, 2015; Schneider et al., 2010). Moreover, the generation of energy at local level allowed by RES erases the need of geopolitical control from the advanced economies over regions of the world in terms of strategic energy resources, which often results into regional conflicts and wars (e.g. Middle East). Thus, RES offer a key transformative potential from a political point of view

Taking all these considerations into account, the collective ownership in RES has been pointed out as a suitable instrument towards SD (Huybrechts, 2013; Kunze and Becker, 2015). Specifically, Renewable Energy Sources Cooperatives (REScoops) refer to a business model where citizens jointly own and participate in renewable energy and energy efficiency projects. They are commonly defined by sharing the following principles: a) voluntary and open membership, b) democratic member control, c) economic participation and direct ownership, d) autonomy and independence, e) education, training and information, f) cooperation among cooperatives and f) concern for community. It should be noticed that fulfilling these principles does not implicitly mean to be a cooperative from a legal point of view; thus, a non-cooperative organization can be a REScoop. REScoops have emerged during the last decades and their development is, in general, still limited at this stage (except for countries such as Denmark and Germany). Nevertheless, they are significant in number and around 2,400 organizations were reported as REScoops across Europe.¹ Two main economic functions can be distinguished relating to renewable energy: the production of renewable energy and the supply of renewable energy, typically under the form of electricity.

Several REScoop examples dealing with renewable energy production can be found across Europe. Schreuer and Weismeier-Sammer (2010) presented a review of the REScoop situation for 5 Western Europe countries. In Denmark, the great majorities of REScoops corresponded to wind power production that started as bottom-up initiatives in the 70s, typical consisting of general partnerships rather than cooperatives. These initiatives comprised by 2002, 40% of installed wind power capacity (Gotchev, 2015). Netherlands presents a similar REScoop typology with the movement beginning in the late 1980s. Nevertheless, REScoops had traditionally minor importance in terms of installed capacity and the role they played in Denmark is held by small private investors. However, according to Agterbosch et al., (2004) they may have been catalyst actors for the renewable energy development during the last years. In UK, the REScoop development has occurred more recently from 2000, but it is still marginal. They consist on a very broad variety of community energy projects, term coined and supported by the government.² They cover several RES technology and are typically co-owned by commercial investors. Germany is another model regarding REScoop development. First REScoops arose in the early 20th century to ensuring electricity supply in rural areas, but bloomed in the late 1980s. Similarly to Denmark, they started as wind power cooperatives but have recently turned into photovoltaic (PV) production, giving rise to PV cooperatives. Finally, the case of Austria deserves special mention. In Austria, the REScoop movement is mainly based on biomass district heating systems instead of traditional electricity-based REScoops (Madlener, 2007). These biomass district heating systems allow converting the farm waste into heat that is transferred and sold to the neighbours by a piping system. Additionally, wind power REScoops have emerged following the example found in other countries (Enzensberger et al., 2003). Even though there is not a straightforward explanation for addressing the existing differences in the level of development of REScoops in different countries, the ecologist and anti-nuclear movement as well as the socio-political situation can be regarded as key factors.

Regarding the supply of renewable energy, particularly electricity, it is more difficult for REScoops, as it has only recently liberalized and is still controlled by a small number of

¹ <http://REScoop.eu/>.

² <https://www.gov.uk/guidance/community-energy>

electrical companies and the electricity grid is often owned by the historical electricity provided in each country (Huybrechts, 2013).

In Spain, unlike other countries in Europe, the REScoop movement is at a very early stage of development and has arisen as a reaction to the deficient liberalisation of the energy market which in combination with the economic crisis from the year 2008 has generated substantial levels of energy poverty, to the increasing politization of the energy issue from 15M (2011) and the shift of the Spanish Government policies against renewables (Haas, 2016; Romero-Rubio and de Andrés Díaz, 2015). Spanish REScoops can be regarded as an interesting case study since, unlike other European countries, they have recently arisen in a regulatory and economic hostile context, which have induced particular organizational and operating structures to deal with the regime resistance (Haas, 2014; Som Energia Bilbao and Som Energia Navarra, 2015).

The remaining of the paper is structured as follows: section 2 describes the clustering of the different REScoop typologies applied. Section 3 reviews the development and current situation of REScoops in Spain. Section 4 discusses their strengths, barriers and opportunities as a means towards SD.

2. REScoop clustering

REScoops show different organizational and operational structures that fit in the definition given by REScoop.eu presented in the Introduction of this paper. Thus, a more detailed categorization is necessary to better understand the casuistic of projects within the REScoop framework. (Rijpens et al., 2013) presented a classification of REScoops based on cluster analysis and the following REScoop organizational models were so identified:

REScoop #1: Local group of citizens

Commonly created around specific local renewable energy project and therefore, commonly with no growing perspective. They operate at a local basis by the volunteer work of the members who at the same time are the single investors of the REScoop. This typology is commonly referred to as RES community projects (Romero-Rubio and de Andrés Díaz, 2015) and can be mainly regarded as internally oriented niches with a more limited regime transformation potential. However, as niches they have the capacity to scale-up and trigger substantial changes (Docì et al., 2015).

REScoop #2: Regional-national REScoop

Started by a group of citizens with an internal or external motivation and presents a bottom-up spread developing several renewable energy projects. They operate at a regional/national basis by a combination of volunteer work of the members and the work of the employees. Financial sources come from the members but can also present external investors. In occasions, REScoop #1 can evolve to type #2. In comparison to REScoop #1, they show a more externally oriented nature, having most of them the RES transition as one of their objectives.

REScoop #3: Fully integrated REScoop

Similar nature than REScoop #2 but it owe and control the whole supply chain from production to consumption which means partial independency to the utilities and several regulative constraints. They are usually old cooperatives that started in a very specific context possibly

coming from REScoop #1 and REScoop #2, since the fully integration of the energy supply chain presents more limitation nowadays owing to the presence of big companies with virtual monopoly of parts of that chain.

REScoop #4: Network of REScoops

It consists of a REScoop model that is made up from several REScoops. Once an organizational and operational structure is conceived, this is shared at different locations by a common root and maintaining links with the aim of optimizing the operation and a compensated balance between scales of economies, time and resources. Thus, this common ground provides stabilization through sharing learning processes and generic rules. One example is Energy4All³ in UK which is formed by 20 smaller cooperatives.

REScoop #5: Multi-stakeholder governance model

The cooperative is not only formed by individual members but other agents of the energy supply chain such as consumers, producers, workers, communities, partners, etc., which clutters the governance structure. This REScoop model can exist at different levels from the local to the regional. One example of REScoop #5 is the French Enercoop⁴ made up of 10 regional cooperatives that are integrated at national level. In few words, it can be stated that REScoop #4 is based on horizontal integration and REScoop #5, otherwise, seeks vertical integration.

REScoop #6: Non-energy-focused organization

Organizations which business core is not related to RES which under specific conditions decide to set up renewable energy project as complementary to their main activity. The structure of that organization is commonly reproduced in the management of the project. In a way, similarities in the scale can be found with REScoop #1 but they have a very different origin and motivation.

3. REScoop development in Spain

3.1. The Spanish electricity market

In Spain, the Law 54/1997 opened the production and retailing to the free market (European regulation implementation), whose technical and economic management was carried out by the State up to 1997. In that moment, and along an adaptation process of 12 years, the transportation activity began to be managed by a semi-private company (REE, with a public share of 20%) and the local distribution activity remained as natural regional monopolies of a few companies that made up the UNESA trade association. Thus, the free market is restricted to the production and retailing activities.

The new regulation also aimed at improving energy efficiency and promoting energy sources with lower environmental impacts. In order to recognize the benefits given by renewable energy technologies, the so-called Special Regime was set up, that grouped together these technologies with waste valorisation and cogeneration (large hydro is not considered as RES). The objective was to set special technical and economic conditions that help the taking off of these novel

³ <http://energy4all.co.uk/>

⁴ <http://www.enercoop.fr/>

technologies. This regime lasted with some modifications up to 2012. Since that date, the Special Regime was suppressed (Royal Decree 2/2012) and a set of additional measures were taken in order to face the Pricing Deficit⁵, a failure of the Spanish electric system that implied a cumulated deficit of 26,000 € owed by the consumers to the big electric companies (Romero-Rubio and de Andrés Díaz, 2015). Renewable energies were pointed out as the main responsible for that deficit by more political than technical reasons, and a set of Royal Decrees have been approved during the last years with catastrophic consequences for the sector.

From the consumer point of view, even though all the energy is mixed at the transportation level and purchased at the same hourly price resulting from the electricity market (Ciarreta et al., 2014), renewable energy can be demanded by the consumers by the mechanism of Renewable Energy Certificates (REC). These RECs are annually recognized by the National Markets and Competition Commission (CNMC) to the green producers and are transferred to the retailing companies which offer them to the consumers who demand green energy. This allows to index part of the energy production to part of the energy consumption. Owing to the relatively high share of renewable energy, higher than the demand of renewable energy, RECs are actually transferred free of charge but there is an underlying implicit project for a future REC market. The non-regulated transferability of RECs has attracted attention from critics, who report that RECs do not distinguish between RE technology and could lead to eventual cases of double accounting. Alternative REC voluntary systems have emerged to prevent it (Bürger, 2007).

It should be remarked the lack of transparency showed by the electricity system management, giving rise to initiatives with the aim of auditing the transportation and distribution costs, which are currently self-audited by REE and the utilities, and afterwards accepted by the Estate. However, the Parliament prevented these initiatives to progress. At the same time, Spain has the fourth highest electricity price for household consumers in EU-28, as of end of 2014 (Eurostat, 2015), being increased by 70% since liberalization in 1997. This fact implies rates of fuel poverty above 15% (Tirado Herrero et al., 2014), that, in combination with the high rates of unemployment (20.8% in December 2015) (Eurostat, 2015), results in a very complex and rooted social problem.

In few words, the Spanish Electric System is characterized by a strong collusion between the big electric companies and Government interests that corresponds to the close alliance between business and policy makers. This collusion is very well exemplified by the “revolving doors” phenomenon, where multiple examples exist of chair exchanges between Government and electric companies administration positions (Greenpeace, 2013). Even though it infringes upon the citizens, it ensures the economic success of those companies, which under the official discourse can be identified as of “public interest”. This matches with the fact that the Spanish companies have a profit margin of 6.78, much higher than the European average of 2.62.

⁵ In the year 2000, facing a situation of high costs of the electricity to the consumers, the Spanish Government, under the consideration that this was an isolated situation, incurred a debt with the electric companies to be returned in the future by the consumers as part of the electric bill. Far from being an isolated case, this situation continued over the years, giving rise to an ever-growing debt commonly known as Pricing Deficit.

3.2. Development of Spanish REScoops

Two important periods can be identified on the Spanish recent history related to electric cooperatives: firstly, the last decades of XIX century, when many local businesses (some of which would afterwards evolve to REScoop #3) emerged; and secondly, since 2010, when some organizations classified as REScoop #2 have been founded. These organizations have been founded as non-profit cooperatives (in many cases, but not always) aimed to promote an energy transition focusing on the energy democracy and regional development.

These organizations enter upon the activity of electric power retailing through renewable energy sources. Its approach to this activity, however, is far from the approach of traditional companies. The cooperative is focused “*on satisfying needs, not creating new ones*”; they also try promoting the development of new RES power plants, and they are usually focused on citizen involvement on energy – related aspects.

Thus, some general features classified in mentioned three bases (electric power retailing-RES generation- participation) can be identified in these cooperatives, even though different levels of development and nuances on how each organization develops their activities can be found.

- **Electric power retailing.** They undertake the electric power retailing through renewable energy sources, which is guaranteed by means of aforementioned Renewable Energy Certificates. The cooperatives purchase in the Spanish electricity market by a market agent, either cooperative market agent or traditional one. As REScoop, its objective is not to sold as much energy as possible, but promoting a rational energy use and increasing the awareness about it amongst its members.
- **RES generation.** These cooperatives also focus on promoting the development and investment into RES power plants. Regarding energy generation, the target of these cooperatives is to generate as much energy as necessary to cover at least their memberships’ consumption. However, so far, only one of second wave cooperatives has reached the objective of developing new RES production plants. In this case, there is an internal reflection amongst its members about sustainability criteria for the construction of renewable based facilities and the model that the cooperative must boost; issues related to land occupancy, distribution along the territory, relocation of impacts or economic activity are discussed to define a common criteria about the projects. That is, the effects the projects have on the economic and social fabric are taken into account in the definition of these criteria.
- **Participation.** They also focus on members’ participation and social innovation by means of voluntary groups devoted not only to promote the values of the cooperative, but also to train and raise awareness about the current energy model (both at state- and global-scale levels), the necessity of an energy transition and the involvement in regional associative networks or create links with other cooperatives in- and outside the energy sector.

At the same time, two different phases can be identified in the 2nd wave so far: the first phase encompasses the 2010-2012 period, when three cooperatives emerged in different places: Som Energia (2010, Girona); GoiEner (2012, Gipuzkoa); and Zencer (2012, Málaga). Following these models, other cooperatives focusing on the Spanish electricity market can be found in REScoop which have gradually emerged based on this model in Spain since 2012 (Energética

and Nosa Enerxia, both founded in 2014). Some general features of these organizations are presented next.

Som Energia was the first of this sort of cooperatives in Spain. It was founded in 2010 by staff and students of University of Girona to promote the energy transition in combination with an economically viable business model, and currently has more than 25,000 members and 34,000 customers along the state (May, 2016). Its rapid growth is astounding, which has been supported by studying of similar cooperatives in Europe as well as the umbrella organization of European Energy Cooperatives.

Since 2011, Som Energia undertakes the deregulated activity of electric power retailing through a cooperative market agent, being the first 2nd wave – cooperative to assume this activity. Moreover, with the aim of promoting a rational energy use, different strategies focussed on efficiency improvements to reduce the energy consumption of its customers have been put into practice during the last years, such as including in the bill detailed information about the energy consumption (taking advantage of smart meters), comparisons with other similar households and tips addressed to a more efficiency use of the energy.

As far as RES generation is concerned, it must be remarked the fact that Som Energia is the only second wave - REScoop that has nowadays its own RES production so far. Several RES power plants have been started up during the last four years, even developing new strategies for adapting to the different legal contexts. Its case will be presented in more detail in the next section.

Regarding members' participation and social innovation, it has a very strong influence on the cooperative conception and structure. In fact, its website gives great visibility to this option. With this aim in mind, Som Energia is organized on a decentralized structure which runs from bottom to top and not other way round, based on about 65 local groups (February, 2016). Each group is independent to act, attract new members and organise information campaigns. Besides the activities previously mentioned, these groups also can organize yearly a meeting on its corresponding city in order make easier for cooperative members along the state to follow and participate in the annual general assembly and elections, without moving from the city, via live stream. The will of improving the members' participation and the adaptation of the communication channels to the constant growth of the cooperative has been constantly in the organization agenda. This commitment for the transparency and participation, as well as its political and democratic approach, is carried to all spheres of the organization; as a way of example, in words of (Kunze and Becker, 2014), "the cooperative website is commendable in terms of transparency of documents and the involvement of workgroups". The sum of all these aspects fosters an increase of the sense of belonging of cooperative members.

In 2014 the cooperative reported benefits.

GoiEner. It was incorporated as a nonprofit cooperative in 2012, two years later than Som Energia, following a similar process. Taking into account the description given on its website, it shows many similarities with Som Energia.⁶ GoiEner also undertakes the activity of electric power retailing by purchasing in the Spanish electricity market, but in this case, by a trading

⁶ <http://www.goiener.com/>

agent of a traditional company (Gnera), which is also in charge of managing its renewable energy certificates. Due to the regulation context, no RES generation plants have been developed by this cooperative so far. In regard to its internal organization and member involvement, no references to local groups or similar are found in its website, but like other mentioned organizations, several cooperative members work as volunteers. In May, 2016, the cooperative had not developed RES power plants, and it had 4,390 members and managed 4,570 electricity contracts.

EnergÉtica. Founded in 2014. In this case, they came to a cooperation agreement with Som Energia. By means of this agreement, Som Energia commits to manage the activity related to electric power retailing business of EnergÉtica during a first stage, in which EnergÉtica can strengthen and increase its economic autonomy. In May 2016, this cooperative had already 375 members and 230 customers.

NosaEnerxia: Founded in 2014, they follow a similar path to EnergÉtica, but in this case, the cooperation agreement was with GoiEner. In May, 2016, this cooperative had 192 members and 133 customers.

The main characteristics of these organizations are summarized in Table 1.

Table 1: Main indicators of the Spanish REScoops compared with the numbers from UNESA.

REScoop	Creation	Members (july 2015)	Contracts (july 2015)	Energy retailed GWh ⁷ (2014)	Own generation % (2014)
Som Energia	2010	20,700	26,100	45	≈ 6%
Zencer	2011	850**	1,010**	3.3	-
GoiEner	2012	3,350	3.235	3	0%
Solabria*	2013	60	30	0	-
Nosa Enerxía*	2014	123	36	0	-
EnergÉtica*	2014	146	-	0	-
UNESA ⁸	-	-	27,700,000 (dec. 2013)	182,000 (2013)	112% (2013)

*These REScoops subcontract the retailing activity with another REScoop (Goienor or Som Energia).

** Data for May 2015.

In order to define a scope for this paper, only those Spanish cooperatives referred on REScoop website have been considered in the study. However, it must be highlighted that more similar organizations can be currently found in Spain with similar characteristics, such as Enercoop in

⁷ Fuente: “Sistema de garantía de origen y etiquetado de la electricidad. Año 2014” <http://cye-energia.com/wp-content/uploads/2015/04/GarantiasEtiquetadoElectricidad2014.pdf>

⁸ Informe de supervisión del mercado minorista de electricidad. Informe de Supervisión del Mercado Minorista de Electricidad - Actualización a Diciembre de 2013. <http://www.cnmc.es/es-es/energ%C3%ADa/energ%C3%ADael%C3%A9ctrica/mercadominorista.aspx>

Crevillente (Alicante). The majority of Spanish cooperatives referred in REScoop webpage are focused on electricity. There is an exception, Barrizar, which centre its efforts on thermal energy management through renewable sources.

4. Discussion: Spanish REScoops as an instrument towards SD

This article represents a first attempt to review and analyse the potential of REScoops as an instrument towards SD in Spain. Energy is a critical factor for SD, and thus REScoops have the potential to be a key factor towards SD.

The identified strengths, barriers and opportunities of the Spanish REScoops as an instrument towards SD are listed in Table 2. Some of them are derived from being social enterprises (e.g. (Johanisova et al., 2013)), others from being REScoops and share common elements with other projects along the world (e.g. (Kunze and Becker, 2015)), and others from operating in the particular context of Spain.

Table 2: Strengths, barriers and opportunities of the Spanish REScoops towards SD

	STRENGTHS for Degrowth	BARRIERS for Degrowth	OPPORTUNITIES for Degrowth
...derived from being a social enterprise	<ul style="list-style-type: none"> • Focus on social and environmental dimensions. • Not-for-profit companies: profits are directed to cover operating costs and required investments. • Focus on satisfying needs, not creating new ones. • High level of awareness of the members, which enhances its stability and robustness. 	<ul style="list-style-type: none"> • The growth (and territorial spread) of the cooperatives hinders the active participation of members. • Due to the focus on alternative dimensions, not-for-profit companies are less “economically” competitive; they live in a context alien to them (profit maximization and growth of the companies) • Risks of instrumentalization and denaturation of the intended change (“hybrid models”). Potential denaturation effects (Huybrechts, 2013): <ul style="list-style-type: none"> - As a result of the interaction with agents of the regime for fast benefits/impact. - As a result of starting operating following the logic of the regime: in-and-against the market concept. 	<ul style="list-style-type: none"> • Improve participation methods. • After certain level of growth of each REScoop, mutation toward more simple interrelated structures. • Active cooperation with the social economy of the country. • Project a public image that transmits the benefits of the REScoops for the society in order to survive in an adverse context. • Innovation and participation as a means towards adaptation. • Collaborate with other groups/associations/businesses interested into promoting RES and SD transition.
... derived from specifically being REScoops	<ul style="list-style-type: none"> • Re-localization of the energy production, relocalizing impacts but also economic activity (e.g. jobs) • Decentralized functioning and democratic decisions 	<ul style="list-style-type: none"> • REScoops may prosper in a growth system by just adding (renewable) energy production without challenging the growth paradigm. • Dominant assumption among members that a 100% RES generation system can substitute fossil fuels and sustain the current socio-economic (growth) system. • Potential rebound effect in the case of energy efficiency improvements. • Not all renewable technologies are sustainable: environmental impact 	<ul style="list-style-type: none"> • Promote debates between the members of the REScoops about the growth/SD paradigms, the RES potential, the sustainability of technologies, etc. • Promotion of alternative, independent research related with the transition to renewable energies (most of the private research directed by traditional utilities), • Sustainable design and fabrication of the systems: types of materials, recyclability, location of the manufacture industries. • Give priority to “simple” technologies that can be manufactured locally and with

		(e.g. solar systems on land)	local materials and knowledge.
Particularities of the Spanish context			
	<ul style="list-style-type: none"> • Discussion on sustainability criteria for the construction of renewable-based facilities (e.g. Som Energia discussion document⁹) • Focus on energy efficiency improvements to reduce consumption (e.g. Effipeople of Som Energia) • Adaptative at different scales (territory, temporal) and eventualities (e.g. Recuperaelsol, GenerationkWh), • Exploration of “energetic interest rates” vs. monetary one (e.g. GenerationkWh), • Cooperation between some REScoops (e.g. starting cooperatives subcontract the electricity retailing with already established cooperatives). • Great capacity of spreading new ideas at social and political level (e.g. cases of Barcelona and Pamplona for the creation of public municipal companies, projects for municipalizing the electric power distribution networks by the <i>Xarxa per la Sobirania Energètica</i>, assistance agreements to confront energy poverty, etc.) • Hybrid organization: enterprise and social movement (e.g. volunteers, local action groups, etc.) • Empowerment action that might serve as model for other transformative projects. 	<ul style="list-style-type: none"> • Weak social economy, • Weak collaboration between REScoops • Small generation promoted and owned by the REScoops, • The retribution of the investments in some cases is very high (e.g. 4% for projects of Som Energia), • Main focus on electricity (i.e. 20-25% of the final energy of Spain) • Most of the renewable energy generation in Spain is owned by traditional utilities. • There are more RECs than demanded, this is a symptom of a lack of RES electricity demand. • Even if REC demand increases, there is a risk of double accounting risks owing the lack of traceability. • Constraints the integration of renewables in the electric system. • Inherent contradiction: Spanish REScoops do not have as explicit objective the achievement of a SD system. 	<ul style="list-style-type: none"> • Objective: increase own generation of energy, at least to cover membership consumption. • Distribute the generation of energy over the territory following the distribution of members. • Promote the electrification of the final demand. • Expand to other energy types than electricity. • Deepen energy efficiency programmes, • Reduce or even remove the (monetary) interest rate of the projects; expand alternatives such as “energetic interest rates” (e.g. GenerationkWh). • Spread of the model (increase in the membership of the existeing REScoops and increase in the number of REScoops). • Collaboration between REScoops exists (e.g. <i>Unión Nacional de Cooperativas Eléctricas de Energías Renovables</i>). • The will to collaborate with other agents interested in the RES transition such as the Px1NME or RES producers.

⁹ <http://es.slideshare.net/SomEnergia/13-reflexin-sobre-los-criterios-de-sostenibilidad-en-som-energia>

Spanish REScoops are characterized by a strong and motivated social base. Despite the hostile regulatory and economic context, the model is expanding and multiplying along the country. They have become powerful agents of communication and training for the society about the importance and challenges of the energy transition. They have also shown a great capacity of spreading new ideas at political level. The collaboration between REScoops is constant and increasing, (e.g. starting cooperatives subcontract the electricity retailing with already established cooperatives –Goiener with Noxa Energia and Enerplus, Som with Energética-, and jointly running power centrals -e.g. Valteina hydropower plant), having recently created a permanent collaboration framework, the *Unión Nacional de Cooperativas Eléctricas de Energías Renovables* (UNCEER). Also, strong collaboration with other groups interested in the transition to RES in Spain (Px1NME, associations of RES producers, etc.). These strengths reveal a successful model of social empowerment that might serve as model for other transformative projects in the country.

The barriers to the SD potential of the Spanish REScoops arise mainly from two main factors: (1) REScoops have to operate in a (growth) context “in and against the market”, and (2) no Spanish REScoop explicitly aims towards SD¹⁰. As a consequence, their potential to push towards a SD society is substantially reduced. In order to cope with the increasing size and territorial spread of the REScoops, the improvement of participation methods are key for their successful development. Due to the focus on alternative dimensions, not-for-profit companies are less competitive; they live in a context alien to them (profit maximization and growth of the companies). Indeed, as systemic change requires involving a broad array of partners, some of which are inevitably less “alternative” and have interests in maintaining extant institutional arrangements, each further diffusion step comprises both the potential of deeper change and the risks of instrumentalization and denaturation of the intended change (Huybrechts, 2013). To the moment, Spanish REScoops remain as a negligible component of the energy system (in both retailing and production, e.g. Som Energia, the only REScoop producing electricity, covers just 6% of the consumption of its memberships). Moreover, Spanish REScoops currently focus solely on electricity, which is just around 20-25% of the final energy consumed in the country. Efficiency improvements (and associated reduced energy bill) in a context of economic growth will likely drive the consumption of additional goods and services, thus compromising the objectives of absolute energy demand reduction.

Spanish REScoops have the opportunity to increase their generation of energy, at least to cover membership consumption, with an effort to distribute the generation of energy over the territory following the distribution of members to respect the principle of proximity. Since electricity currently represents a limited share of the final energy consumption, efforts should be made to: (1) promote the electrification of the final demand and (2) expand the business to other energy types. Moreover, efficiency programs should be strengthened in order to achieve absolute reduction of the energy demand. Spanish REScoops constitute a laboratory of social and economic innovation with a strong emphasis in participation, which is key from a SD perspective. This could be used to promote debates between the members of the REScoops about the growth/SD paradigms, the potential of renewable energies or the sustainability of different technologies. In particular, priority should be given to “simple” technologies that can be manufactured locally and with local materials and knowledge (Kerschner et al., 2015).

¹⁰ Conclusion extracted after examining the internal regulation (*Estatutos*) from the Spanish REScoops.

Experiences such as the “GenerationkWh” are very interesting from a SD perspective since they shift interest rates of the investments from a conventional monetary to an energetic perspective. In fact, some authors defend that zero (monetary) interest rate should be implemented in SD economy (Kallis et al., 2012). Finally, the recently created collaboration scheme between REScoops (i.e. *Unión Nacional de Cooperativas Eléctricas de Energías Renovables*) represents an excellent opportunity to increase the cooperation between entities in the country with similar objectives and philosophy in order to become an influential actor in the energy transition to RES in Spain in the next years.

5. Conclusions

Energy generation, property and management is a key element of designing a Degrowth society. REScoops have contributed to bring the “energy case” to the social debate in Spain. Degrowth as an interpretation frame can provide additional orientation, strengthen the political dimension and provide legitimacy. In this sense, we find great opportunities to promote debates between the members of the REScoops about the growth/Degrowth paradigms, the RES potential, the sustainability of RES technologies, etc; as well as the promotion of related, alternative independent research. The ultimate objective is to contribute to the successful development of REScoop in Spain through the co-production of knowledge between the activists and their real world performance on the one hand and scientific proponents with their discursive practices on the other hand.

Social enterprises should not be seen as “solutions” on their own but rather as laboratories of alternative economic practices and as one among other pillars on which alternative economies can be conceived and built (Huybrechts, 2013). In the words of Horvat (1982), even though cooperatives are not likely to be a major, or even a very important, instrument of socioeconomic transformation, the cooperative movement can contribute greatly to the creation of an appropriate atmosphere, to consciousness raising, to the delegitimation of private ownership with its social hierarchy and authoritarianism. In this sense, Spanish REScoops may play a relevant role in the future.

This text has been written in haste and has many imperfections, for which we apologise.

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