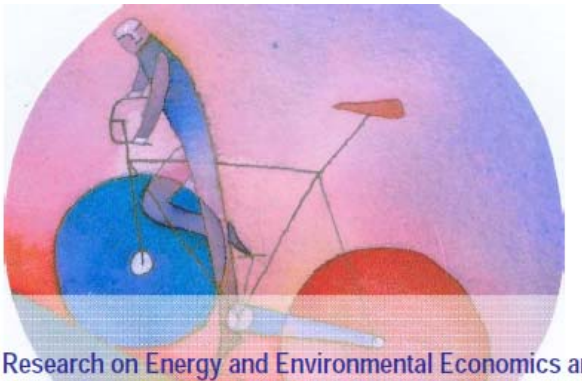

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Community energy in Italy: heterogeneous institutional characteristics and citizens engagement

Dr Chiara Candelise[1]*, Dr Gianluca Ruggieri[2]

Abstract

Community energy (CE) initiatives for investments in the energy sector have been progressively spreading across Europe and are increasingly proposed as innovative and alternative approaches to guarantee higher citizens participation in the transition toward cleaner energy systems. This paper focuses the attention on Italy, a Southern European country characterized by relatively low CE sector development. It fills a gap in the literature by eliciting and presenting novel and comprehensive evidence on the recent Italian CE sector development. Through a step-wise approach it systematically map and review Italian CE initiatives, exploring heterogeneity in their institutional characteristics and analysing implications in terms of outcomes delivered and citizens' engagement. It finds a very novel CE sector, still at its niche level and characterized by a wide diversity of implementation approaches. The analysis allows to identify two alternative patterns in institutional characteristics which differently shape citizens engagement and outcomes delivered. The role of policy and its relevance for a renewed CE sector growth is also highlighted and discussed.

KEYWORDS: Community energy, Institutional characteristics, Renewable energy, Citizen participation, Energy cooperatives

JEL: O13, O35, P13, P32, Q4

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1. Introduction

Commitments and efforts in reducing GHG emissions as well as increasing concerns over energy security have triggered the transitioning of the EU energy system toward higher proportion of clean energy generation and reduction of energy use through the implementation of energy efficiency measures (EU Commission, 2014, EU Commission, 2009, EU Commission, 2012). In most of the EU much of the transition to decarbonized energy systems has to date been led by major investors and large companies (Hall et al., 2016, Kempener et al., 2015), but smaller players as well as citizens and local communities are increasingly playing an active role in delivering clean energy investments. Transition toward decentralised energy systems and progressive liberalization of energy markets have left space for an active role of energy users, which are turning into "prosumers" or co-providers of energy services (IEA-RETD, 2014). While consumers' participation to energy transition is increasingly concerning the policy makers (EU Commission, 2015, IEA-RETD, 2014, ILO, 2013), community energy (CE) and shared ownership approaches for investments in the energy sector have been developing worldwide (ILO, 2013, van der Schoor and Scholtens, 2015, Yildiz, 2014, REN 21, 2016). They enable citizens to collectively develop and manage energy projects, presenting a different model of ownership than traditional business organizations (Bauwens et al., 2016, Boon and Dieperink, 2014, Seyfang et al., 2013, Yildiz et al., 2015).

Literature on CE approaches have often defined them as social, grassroot innovation (Reinsberger et al., 2015, Seyfang et al., 2013, Hatzl et al., 2016), where non-market resources such as social norms, environmental concerns, trust and community identity are important determinants and drivers behind their emergence and constitution (Wirth, 2014, Kalkbrenner and Roosen, 2016, Walker, 2008, Seyfang et al., 2014, Boon and Dieperink, 2014, Bomberg and McEwen, 2012). They are deemed to be a suitable option to provide access to energy services and investments to a significant portion of potential end users of distributed generation and energy efficiency measures, in particular for those lacking of sufficient capital or of a suitable area to develop the project (BMWi, 2016, DECC, 2014, REScoop 20-20-20, 2015, Papa Francesco, 2015). Several contributions have emphasised how they can allow distribution among citizens of the benefits and incomes originating from energy investments (Slee, 2015, Bauwens, 2016, Holstenkamp and Kahla, 2016, Fleiß et al., 2017, Saunders et al., 2012, Gottschalk et al., 2016), also contributing to local development (Phimister and Roberts, 2012, van der Schoor and Scholtens, 2015) and fostering social cohesion (Rogers et al., 2012, Walker et al., 2010, Slee, 2015). It has also been stressed how CE can increase local acceptance of renewable energy (Breukers and Wolsink, 2007, McLaren Loring, 2007, Walker et al., 2014).

CE initiatives are not a new phenomenon and have existed since late 19th, early 20th century in several European countries, including Germany and Italy (REN 21, 2016, Yildiz et al., 2015,

Spinnicci, 2011). They have since been firstly associated with renewable energy production with the rise of wind cooperatives in Denmark in the late 1970s and with new waves of citizens' initiatives after Chernobyl disaster in 1986 (in particular in Germany and Belgium). But, it is from the 2000s that they began emerging as new paradigms of people engagement in the energy transition, facilitated and driven by the last decade's energy system liberalization and transition toward more decentralised energy systems (REN 21, 2016).

However, the degree of recognition of the potential contribution of citizens to the energy transition and the level of deployment of CE initiatives still varies considerably across Europe, with community energy strongly spread in the north, particularly in countries such as Denmark, Germany and the UK, and far less developed in Southern Europe (Huybrechts and Mertens de Wilmars, 2014, Yildiz et al., 2015, REScoop, 2012, Bauwens et al., 2016, Seyfang et al., 2013). For example, Germany hosts more than 800 energy cooperatives, accounting for about 34% of the citizenship (Yildiz, 2014) whereas in countries like Spain or Greece less than ten initiatives have been reported (REScoop, 2012). Indeed, most of the academic literature researching dynamics, drivers and conditions for implementation of CE initiatives tends to look at North European countries (Bauwens et al., 2016, Bomberg and McEwen, 2012, Hall et al., 2016, Seyfang et al., 2013, Walker and Devine-Wright, 2008, Yildiz et al., 2015, Boon and Dieperink, 2014, Hatzl et al., 2016).

This paper instead focuses the attention on a Southern European country characterized by lower levels of CE sector development: Italy. Apart from a recent research looking into the role of Italian civil society in energy transition (Magnani and Osti, 2016), there is very limited academic literature on Italian CE initiatives and no contribution has to date provided a systematic review of the sector. To fill this gap this paper uses a qualitative and descriptive approach to search, analyse and present comprehensive evidence of CE initiatives emerged in the country within the last decade. As experienced in other northern European countries (DECC, 2014, Seyfang et al., 2013, Yildiz, 2014, Yildiz et al., 2015, Spinnicci, 2011), they can take multiple forms depending on the level of citizens' financial involvement, ownership and co-determination implied by the initiative's legal structure and governance and the type of activity proposed. Thus, the first objective of this study is to systematically map and present empirical evidence on Italian CE initiatives, to explore their heterogeneity in order to disentangle and analyse their institutional characteristics. A second objective is the analysis of the impact of such institutional characteristics on outcomes delivered and citizens' participation. Several contributions in the literature concerned with understanding people willingness to invest in the CE sector have been highlighting how institutional factors could affect citizens' investment motives (Bauwens et al., 2016, Mignon and Bergek, 2016b, Mignon and Bergek, 2016a, Bergek et al., 2013, Holstenkamp and Kahla, 2016). This paper instead focuses the attention on how the heterogeneity of Italian CE initiatives' institutional characteristics can shape levels and forms citizens engagement as well as the outcomes delivered to them. Indeed, the

overarching aim of this study, besides providing a comprehensive picture and understanding of the emerging Italian CE initiatives, is to provide initial evidence of their implications for citizens and local communities. It is asked: How much participatory has been the process? How many citizens have been involved and in which form? Which are the monetary and non-monetary benefits accruing from the initiatives and how they affect citizens' engagement?

Through a step-wise approach this paper firstly characterises the Italian CE sector presenting results of its systematic review, then draws upon comparative analysis of two specific case studies to further investigate and discuss CE institutional characteristics and their implications in terms of citizens' engagement. The paper is structured as follows: Section 2 defines the boundaries of the analysis and introduces the methodology adopted. In Section 3 presents results of the systematic review of the Italian CE sector, leading into Section 4 which discusses in more details two specific case studies. In Section 5 final discussion of results and of potential policy implications.

2. Methodology

2.1 Defining community energy

Civil society engagement in energy markets can take several forms (DECC, 2014, ILO, 2013) and the concept of CE is subject to different interpretations within the academic literature. Some define it in a broad sense: any sustainable energy initiative led by no profit organizations, not commercially driven or government led (Walker and Devine-Wright, 2008, Hall et al., 2016), others have stressed the grassroots innovation nature of CE, as driven by civil society activists and by social and/or environmental needs, rather than rent seeking (Seyfang et al., 2014). Overall, citizens' participation is commonly identified as a major defining characteristic of CE, but it can encompass a wide range of initiatives: green associations, collective purchasing of energy services, community or local authority led schemes for renewable energy implementation, community programmes for energy poverty alleviation (Hain et al., 2005, Yildiz, 2014, St. Denis and Parker, 2009). Such variety would in turn imply different levels and forms of participation and co-determination of citizens in energy services provisions (Yildiz et al., 2015, Seyfang et al., 2013, Walker et al., 2010, Wirth, 2014). As several other relevant contributions in the literature (Seyfang et al., 2014, Seyfang et al., 2013, Walker, 2008, Walker and Devine-Wright, 2008, Yildiz, 2014, Goedkoop and Devine-Wright, 2016), this paper take a specific perspective in interpreting citizens' participation in energy service provision by focusing on CE initiatives:

1. which imply a form of citizens ownership or financing of an energy project, and control over the initiatives (along the process dimension);

2. where citizens directly benefit from the outcomes of the initiative (along the outcome dimension).

This study will not focus on other forms of civic engagement in the energy service provision, such as green associations, collective purchasing of energy services and ethical consumerisms, although present and active in the Italian energy ecosystem and in some instances involved in emerging CE initiatives studied in this paper (Magnani and Osti, 2016). The historical hydroelectric cooperatives constituted in Italian Alpine regions at the beginning of the twentieth century are also not included in the analysis. They are very specific and currently not replicable cases, enjoying as a group of special legal status which in particular allow them to own and manage the local distribution network. Instead, this paper specifically looks at paradigms of citizens' financial and ownership involvement in energy initiatives which has begun appearing in Italy and the rest of Europe since late 2000s (REN 21, 2016, Yildiz et al., 2015). They are mostly initiatives focused on development of renewable energy production facilities and, most of all, differentiate themselves from Italian historical cooperatives as they don't benefit of their special legal status and cannot own local distribution networks.

2.2 Addressing heterogeneity of CE institutional characteristics

Heterogeneity in the CE sector, represented by a wide diversity of actors, objectives and organizational forms, has been highlighted and analysed by several contributions in the literature (Bauwens, 2016, Seyfang et al., 2013, Abundance Generation, 2014, Yildiz et al., 2015, REN 21, 2016, Pallett et al., 2017). Walker and Devine-Wright (Walker and Devine-Wright, 2008) propose a framework of analysis to characterize CE projects which identify two key dimensions: the *process dimension*, interpreted as the "who the project is developed and run by"; and the *outcome dimension*, i.e. "who the project is for and benefits in economic and social terms". According to this framework energy initiatives would span between two extreme situations, as pictured in Figure 1 (left). In the quadrant bottom left cases in which the project is developed by an institution external to the community, with minimal or no involvement of citizens, and only producing returns for such institution and diffuse shareholders (e.g. a utility developed wind farm). On the other hand of the spectrum projects implying citizens' participation and bringing returns and collective benefits to local communities, i.e. quadrant up right in Figure 1 (left). While recognising the possibility of several possible combinations of process and outcome within the latter the authors identify different typologies of projects, i.e. those that place more emphasis on the participative nature of the process (viewpoint A), while others are more concerned with the redistribution among citizens of the project benefits (viewpoint B).

This paper adopt such framework of analysis, but takes a step further by focusing only on initiatives falling in the top right quadrant, i.e. community energy initiatives, and extending it to include a wider set of variables. The *process dimension*, is here interpreted not just as the 'who' but also by the 'how', looking at who proposes the project, but also eliciting evidence on a set of variables and qualitative information on its development dynamics, legal framework, organizational structure and citizens co-determination. This evidence lead into shaping the *institutional characteristics* of Italian CE initiatives, which are here defined as the combination of formal and informal rules and structures affecting objectives, internal organization and interactions between actors involved in CE initiatives (Ostrom, 2005). In particular, in the context of CE sector they are affected by two major features: an economic element (as CE initiatives are organizations operating in the energy market which can create revenues for their members) and a community/participatory element. The overall institutional structure of CE initiatives is affected by the relative weight of these two elements, which can skew them toward more market or community based logics in their dynamics of development and operation (Hatzl et al., 2016). The *outcome dimension*, is here explored by looking at both monetary and non-monetary benefits offered and distributed among citizens. The resulting bi-dimensional framework of analysis used in this paper is pictured in Figure 1 (right), accounting for the following two dimensions: 1. *the institutional characteristics* dimension, which span from initiatives more market based and less participative in their dynamics of creation and organizational structure to those more driven by community logics and achieving higher levels of citizens' participation; 2. *the outcome dimension*, where initiatives differentiate themselves from the type of benefits offered, i.e. economic returns versus a wider range of non-monetary benefits to their members and the wider community. Despite recognising that reconciling the heterogeneity of Italian CE initiatives' institutional characteristics to this two dimensional framework is over simplifying the complexity of the CE sector ecosystem, it is nonetheless useful to characterize them and analyse the implications in terms of outcomes delivered and dynamics of citizens engagement.

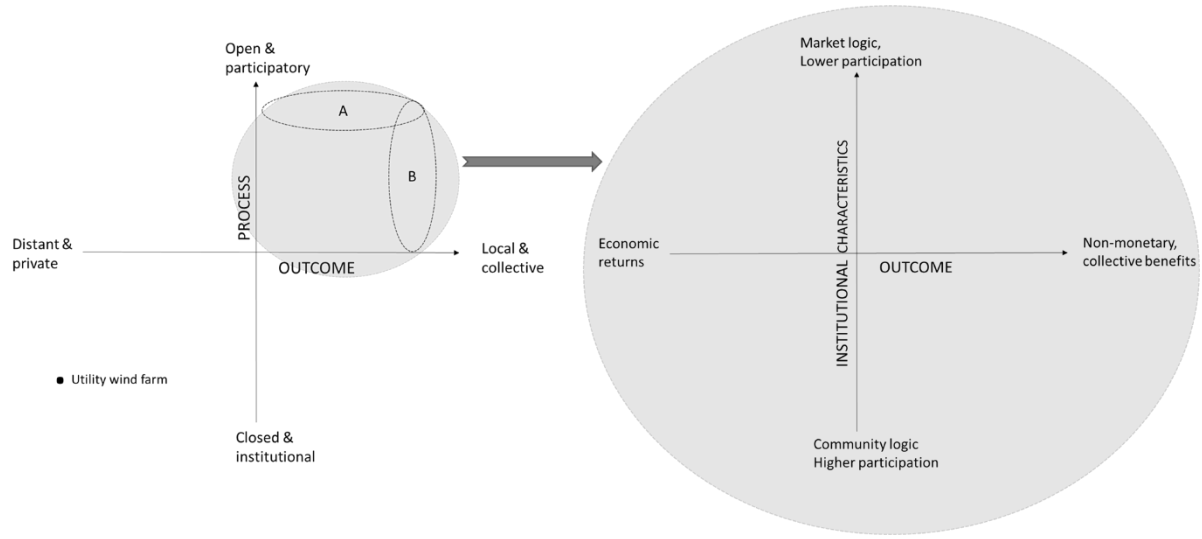

Figure 1. *Evolution of analytical framework to characterize CE initiatives along a two dimensional space (Authors' elaboration on (Walker and Devine-Wright, 2008))*

2.3 Evidence and data gathering

The step-wise approach has been taken (Figure 2). The first step has been a systematic review of Italian CE sector. As a comprehensive database of Italian community energy initiatives is not existent, they have been identified through web based searches and grey literature, and contacting relevant Italian organizations and stakeholders. These included regional and national organizations working on environmental and sustainable energy issues (such as Energoclub, Gas Energia), the Italian ethical bank which has been supporting several CE initiatives (Banca Etica), researchers active in the field (Magnani and Osti, 2016) and the REScoop energy cooperatives inventory (REScoop, 2012). Interviews with representatives of such organizations as well as snowballing from personal contacts has allowed mapping the Italian CE sector. Despite the majority of the population has certainly been targeted, it is realistic to assume that some initiatives have slipped through the searching net. This could in particular apply to early stage and civil society led projects not connected to relevant networks and without web presence. The systematic review has allowed identifying fourteen CE projects in Italy providing a level of financial and/or ownership involvement of citizens.

Once initiatives have been identified data collection has been qualitative and longitudinal, through semi structured interviews with one to two representatives of each of them. In some instances further communication exchange with the representative has been needed (both in person and through emailing) in order to fine tune and better understand information and data gathered. Evidence has been gathered along the process and the outcome dimensions, in particular:

a. *Dynamics of creation*, including information on the timing, on the proponent and on the approach adopted for the development of the initiative. In particular bottom up approach are defined as the cases in which launch and development of the project are driven by citizens or other types of grassroots organizations. In the top down approach instead is another institution (i.e. a local authority or a private company) leading the process, defining structural features of the project and facilitating the project development and the citizens' involvement.
b. *Type of activity and economics*, including information on: their primary activity (whether energy production, energy consumption, energy services or a mix of those), characteristics of the projects implemented (e.g. technology type, plant size), projects investment cost, and geographical scope of the initiatives (in particular whether citizens involved are geographically close to the project (local) or spread over the national territory (national)).
c. *Organizational structure*, including legal form of the project (e.g. cooperative, limited company or other forms), instrument offered to the citizens (i.e. equity or debt), ownership and level of citizens' involvement, and financing structure (i.e. self-funded, bank loan, coop funds or a combination of those).
d. *Monetary benefits*, returns on investment offered, including potential saving on electricity bills.
e. Any *other services and benefits* accruing from the project (e.g. other energy or community services provided).

Initiatives searches and subsequent data collection lasted just above a year, from March 2015 to May 2016. Data collected has been organized and analysed together with interviews transcripts and notes. Qualitative content analysis along the dimensions identified above and in accordance to the research objectives of the study has been used to structure data and qualitative material gathered. The result is a comprehensive picture of the heterogeneity of the Italian CE sector, including the analysis of process and organizational dynamics shaping different initiatives, their relative outcomes as well as level and forms of citizens' engagement. Following on, an in depth study of two specific and ongoing CE initiatives which provides additional evidence to discuss how institutional characteristics affect and shape citizens participation and outcomes delivered in the Italian CE sector. Results are finally discussed and implications for policy making are presented.

***Figure 2**. A step-wise approach to investigate Italian CE sector*

3. Results of systematic review of Italian CE sector

3.1 Process: dynamics of creation and organizational structures

Apart from three bottom up projects initiated by either a group of citizens or green associations, the majority of the CE initiatives have followed a top down approach, i.e. they have been proposed and led by an institution other than a community or a group of citizens (Figure 3). Among those, half have been proposed by municipalities and the other half by commercial actors, i.e. a company or a municipal utility. The first result emerging from this evidence is the role of local authorities: in several instances they have been a strong driver in facilitating or coordinating the project, or in providing the assets to develop the initiative, such as public building rooftops, or creating the local regulatory and financing framework conditions to allow it. This reinforce recent literature views on their potential key position in facilitating energy transitions and influence local energy system change (Hannon and Bolton, 2015, Rutherford and Jaglin, 2015, Legambiente, 2015, Legambiente, 2016).

As also experienced in other countries (REN 21, 2016, Yildiz, 2014) the legal structure adopted vary, including limited companies, non-profit associations and cooperatives, which account for about 60% of the sample (Table 1). Cooperatives are the legal form mostly used in the European CE sector (Huybrechts and Mertens de Wilmars, 2014, REScoop 20-20-20, 2013, Yildiz et al., 2015, REN 21, 2016) and are generally deemed to provide the best institutional framework for locally owned and participatory approaches to renewable energy projects. They encompass both the social and economic dimension in their scope and are characterised by a 'one head one vote' decision making process, thus providing high levels of co-determination (Yildiz et al., 2015, ILO, 2013, Sagebiel et al., 2014, Viardot, 2013, Huybrechts and Mertens de Wilmars, 2014).

However, the level of participation and co-determination of citizens is not determined only by the legal forms adopted (and the relative internal governance as defined by national laws and regulations), but also by the level of citizens' ownership as well as wider involvement and influence on the project development and management. Evidence shows that, apart from two initiatives only offering the opportunity to finance a renewable project through the purchase of bonds, the majority of the initiatives offer participation to citizens through equity stakes (Table 1). However, among the latter, there is no clear correlation between the use of cooperative as legal form and the implied level of participation and co-determination of citizens. For example Dosso Energia and Kennedy Energia are limited companies, but fully owned, financed and managed by citizens located close to the renewable generation plant (Garotta, 2015, Morbi, 2016). Similarly, the Comunità Energetica San Lazzaro has been totally financed and managed by citizens (which also enjoy the relative economic returns and participate to the company governance) despite the municipality has retained the formal ownership and the legal form adopted is an association (Feltrin, 2015). Vice versa, evidence show cooperatives among initiatives reaching lower levels of participation and co-determination. They are those developed by companies and/or with a strong top down approach, i.e. Energyland, Masseria del Sole and Comunità Solare. The first two have been promoted by a company, which have firstly fully developed the renewable energy project to offer participation to citizens in a second phase. However, they reached lower levels of citizens ownership than initially planned and through longer processes than other initiatives (several months versus e.g. less than a month for Kennedy Energia (Garotta, 2012, We for Green, 2015)). Similar experience Comunità Solare, where ownership has been offered to citizens once PV systems had been already developed by local ESCOs resulting in very low citizens involvement (less than 1% citizens' ownership) (Setti, 2016).

Overall, initiatives proposed by companies and with a strong top down approach have been developed with lower involvement of citizens and their organizational structure implies lower citizens' co-determination. This also emerge from the financing structure adopted: both the three cooperatives proposed by a company and the project proposed by a municipal utility have been initially financed through some form of project financing and then opened to citizens' financing in a second phase. Instead, initiatives promoted by communities and municipalities have been founded through direct financial contribution of citizens. Thus, evidence presented highlights how the level and the forms of citizens involvement is not much affected by the legal structure chosen but rather by initiatives' objectives and by the dynamics of their development and implementation. In particular, initiatives promoted by commercial actors and more inspired by market logics tend to have lower levels of participation and citizens co-determination than those based on stronger community logics.

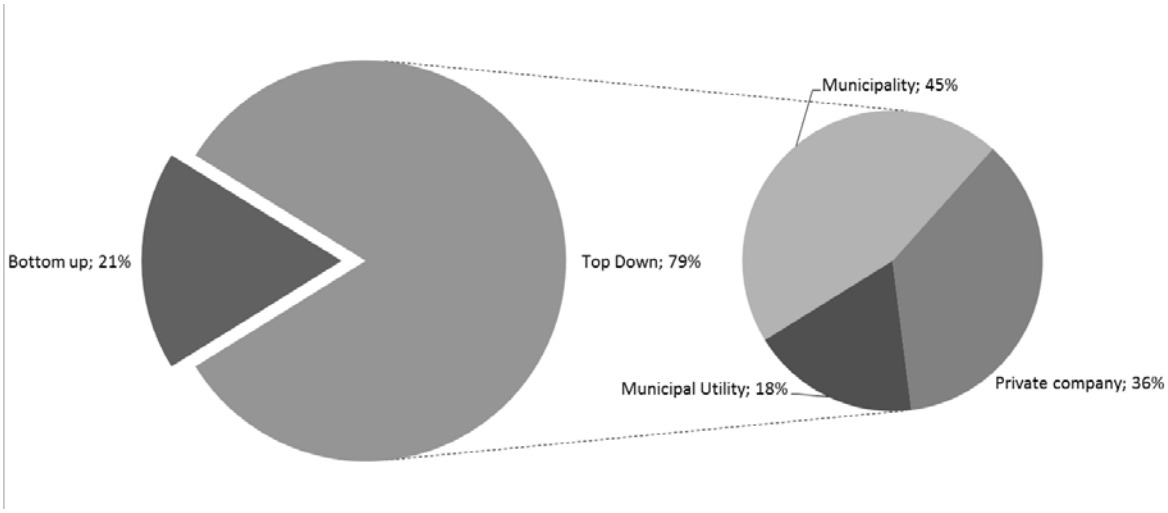

Figure 3. Dynamics of creation: top down versus bottom up approach and proponents

3.2 Process: type of activity and timing

CE projects have been deployed since the second half of the 2000s (Table 2), particularly since 2010 onwards. This timing coincides with the increase in distributed renewable energy capacity installation in Italy as a result of the implementation of renewable energy support measures, in particular feed in tariffs (FiT) schemes for photovoltaic (PV) systems (Antonelli and Desideri, 2014, GSE, 2011) (Figure 4). Apart from one initiative providing electricity supply (È Nostra) and one dedicated to wind, electricity production from PV systems is in fact the primary activity across the whole sample (Table 2). PV technologies have been benefiting from generous and uncapped FiT schemes since 2008 (Antonelli and Desideri, 2014), which have guaranteed fixed long term tariffs and net-metering to PV system owners. Such strong policy support, combined with remarkable reductions in PV modules and installation costs since 2010 (Candelise et al., 2013, Marigo and Candelise, 2013) has made PV investments quite profitable and relatively low risk in the wider context of the Italian energy sector. These favourable conditions have been a major driver for the development of Italian CE sector, opening a window of opportunity for the development of PV systems by proponents generally not equipped to deal with large, complex and high risk project development in the energy sector.

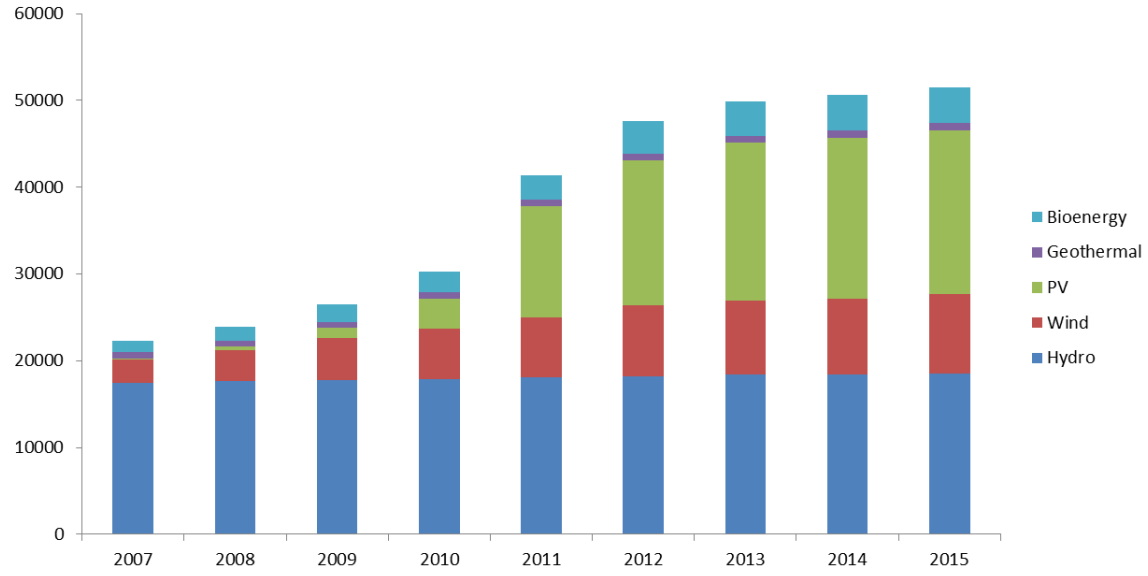

Figure 4. Renewable cumulative installed capacity in Italy, 2007-2015 (GSE, 2014, GSE, 2016)

CE sector dependence from PV FiT incentives is clearly shown in Figure 5, which highlight how the majority of renewable energy plants have been developed between 2008 (date of implementation of first FiT scheme) and 2013 (date of discontinuity of FiT support to PV). The only CE initiatives still developing renewable energy plants after 2013 are those promoted by commercial actors or the larger initiatives with a national scope in their activities (i.e. Retenergie, Impianto Eolico Monte Mesa, Masseria del sole and Fattorie de Sole (the last two developed by the same company, ForGreen – see also Section 4).

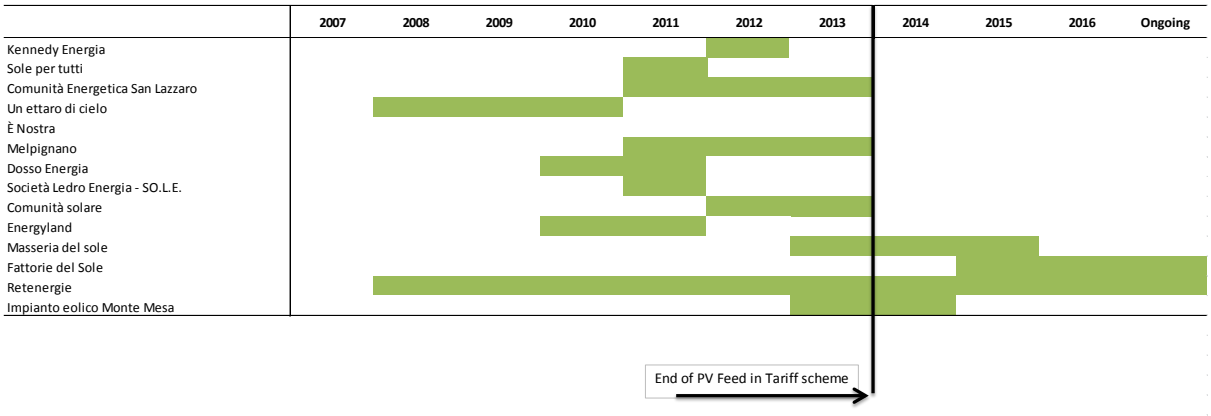

Figure 5. Timing of renewable energy plants development across CE initiatives

Overall, it emerge a CE sector to date mainly characterized by the development of rather small, 'ad hoc' initiatives with a strong local focus. Indeed, while PV systems installed vary in size and application, the majority are small/medium size projects, more easily developed and financed by actors with lower experience in the energy sector (see Table 2). The focus on smaller, roof mounted PV plants has also been reported by some representatives interviewed as a consequence of a deliberate choice of community or municipality led projects to focus activities on investments perceived more sustainable and with lower impact on the local environment than large ground mounted plants (Garotta, 2015, Morbi, 2016, Retenergie, 2009). The largest projects (ground mounted PV systems in the MW range and a wind farm) are developed by the initiatives led by commercial actors, either company or municipal utility (see also Table 1). They respond to stronger market logics in their operation: they tend to develop larger projects thanks to their higher internal technical knowledge and expertise which makes easier the founding and development process; they also are more connected with economic networks which allow them to get access to capital more easily, making them able to develop more complex projects and bear higher risks (e.g. the risk of not raising enough capital among citizens to finance the investment).
Finally, from a closer look at the initiatives' primary activity two distinctive typologies of initiatives emerge (Table 2):

- about 65% of the sample have the development of a single renewable generation project (mostly PV), as unique primary activity. They are here defined as Energy Production Projects (hereafter EPP). The main logic behind their constitution is the maximization the distribution among their members of the revenues accruing from the operation of a renewable generation project, in most cases a profitable PV plant. In this sense, they follow a market based logic in their dynamics of development.
- The other initiatives instead develop multiple local renewable projects rather than simply aggregating citizens around the financing and development of a specific renewable electricity plant. Their objectives go beyond energy generation by developing energy and social services to benefit both cooperative members and wider local communities. As such they are more community based in their institutional characteristics. They are here defined as Multiple Energy Services (hereafter MES).

3.3 Outcomes: monetary versus non-monetary benefits

Returns on investment offered to citizens vary quite substantially, from 8% to about 1% (Table 3). Such variation is particularly striking considering that most initiatives have been investing in the same technology, PV systems (see Table 2). This can be partly explained by the size and typology of the PV system: larger ground mounted plants allow higher economies of scale in the investment

(both in terms of initial capital costs and transaction costs) and therefore higher returns than smaller roof mounted systems. However, what makes stronger impact on the monetary returns offered to citizens is the typology of the initiative and the institutional characteristics shaping them. Higher returns, around 6-8% (Table 3), are offered by more market based EPPs. The only exception is Sole per tutti whose lower returns compared to other EPP initiatives are due to the inclusion of roof insulation in the initial total investment cost. In some instances EPPs also offer other small monetary and non-monetary benefits, but usually associated to the renewable plant developed, such as electricity bill saving or royalties for municipalities offering assets for the plant (e.g. roof or field) or education and dissemination activities. Among EPPs, the initiatives promoted by companies are the most profitable (at about 8%). Thanks to their commercial background, companies could develop larger and more profitable plants and also bring in additional monetary benefits by providing electricity bill saving schemes developed with a national electricity supplier (i.e. Energyland, Masseria del sole, Fattorie del Sole – see also next section). Hence the market based institutional structure of the EPPs becomes more pronounced when proponents are commercial actors.

The MESs offer on average lower returns on the investment, around 1,5-3%. However, as also further discussed in the next section, they tend to have more complex financing and organizational structures, and redistribute revenues from investments in renewable generation projects across a wider set of activities. MES are explicitly constituted to enable citizens participation to energy transition in a wider sense, empowering communities to collectively change their energy, social and economic context (Retenergie, 2008, Setti, 2016). Beside fostering deployment of renewable generation plants, they have also been deploying a wider set of energy and community services to citizens (Table 3), including domestic energy efficiency audits and consultancy, collective purchasing of energy services (for PV systems, storage, electric bikes and cars as well as wider services such as insurance, banking, internet provision) as well as wider community development schemes (such as information campaign or activities with schools).

3.4 Emerging institutional characteristics and relation to outcomes

The systematic review presents a quite heterogeneous Italian CE sector. Nonetheless, the framework of analysis developed in Section 2 can be used to position the fourteen Italian CE initiatives identified in the bi-dimensional space created by their range of institutional characteristics and outcomes delivered (Figure 6). Two opposite positions clearly emerge: in the quadrant bottom left the market based, EPPs initiatives promoted by commercial actors, offering higher economic returns to citizens but lower participation; in the quadrant top right the MES initiatives, shaped by stronger community logics, achieving higher citizens' engagement, but

offering to citizens' lower economic returns, despite coupled with a set of additional community benefits. The other quadrants present initiatives with more 'hybrid' characteristics. In the top left quadrant EPP initiatives, which despite being more market based in their type of activity and outcome delivered, are promoted by community or municipalities and have achieved high levels of citizens' participation and co-determination. Finally in quadrant bottom right two initiatives conceived with a community based logic, to provide citizens with a set of monetary and non-monetary benefits, but ended up being less participatory than MES initiatives.

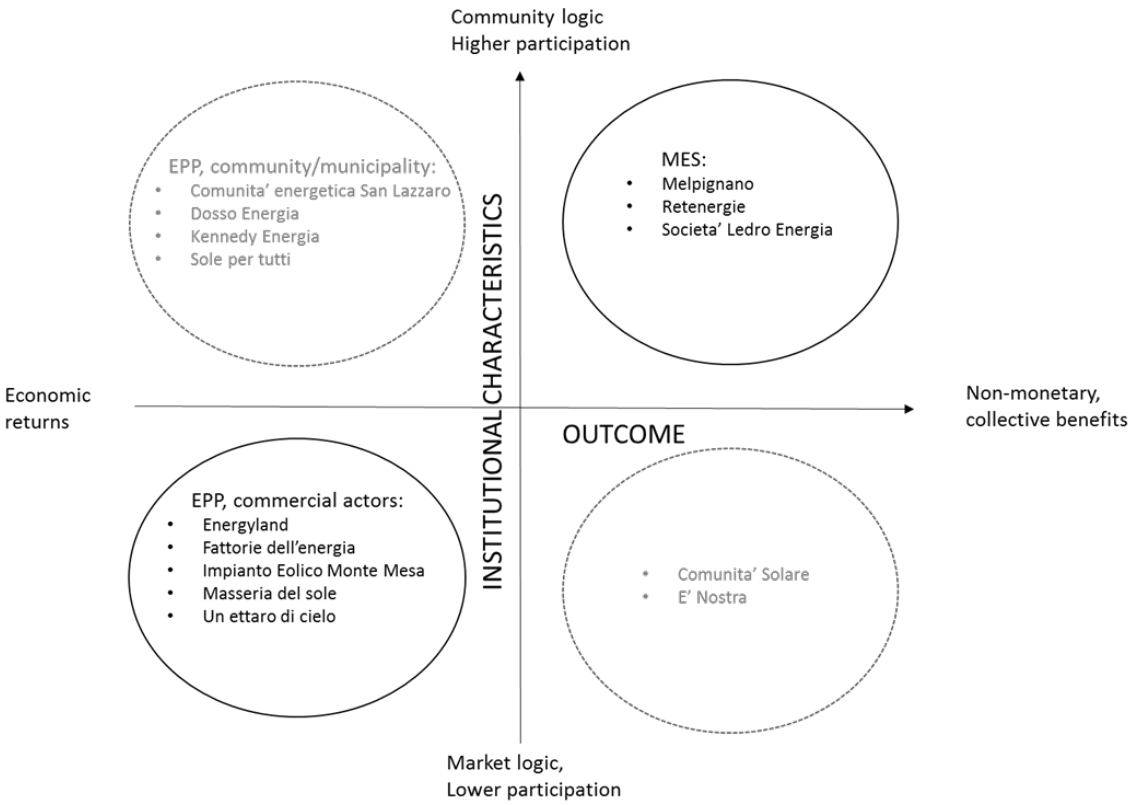

Figure 6. *Characterizing Italian CE initiatives in relation to institutional characteristics and outcomes*

4. Case studies analysis

To further explore how heterogeneity of CE initiatives affects outcomes delivered and shapes citizens' engagement two case studies are selected, belonging to the two opposite institutional characteristics identified in Figure 6: a MES project (Retenergie) responding to stronger community logics and three company led EPPs (Energyland, Masseria del sole and Fattorie del Sole – here grouped together as promoted by the same company (ForGreen)), more shaped by market

logics. They have also been selected as they share relevant common features: both use the cooperative as legal form and have succeeded in implementing more than one renewable generation project. Moreover, they both have a national scope in their activities and they can be identified as 'succeeding' examples: they are the only two still operating to date and being able to replicate project implementation (apart from È Nostra which is a unique project focused on electricity supply rather than production). To study evolution and implications of their institutional characteristics it is relevant to firstly present the main development stages of the projects.

4.1 Retenergie

Retenergie has been founded in 2008 with a strong bottom up approach, by twelve citizens without any relevant previous experience in the field and without any major external funding contribution. Its aim was to "*contribute to a new economy based on the principles of environmental sustainability, sobriety and solidarity*" by promoting renewable production and supply as well as energy efficiency services (Retenergie, 2008). Within five years Retenergie had installed seven roof mounted PV systems and in 2015 has acquired two additional PV plants (Table 4). The cooperative has been growing steadily in members (Table 4) which have been progressively involved through public meetings and campaigning in collaboration to social and environmental associations, collective purchasing groups and other actors in the solidarity economy. It is a national initiative organized in territorial nodes in order to facilitate the development of local initiatives (each node has a small budget for its activities). Renewable plants development are mainly financed through members/citizens contributions (about 70% of the total investment, with the remaining 30% covered by debt from Italian ethical bank) which can take two forms: 1. citizens can buy equity of the cooperative capital (minimum quote of 500€) or, 2. they can finance the cooperative through social lending. In the first case returns for citizens depend on the annual profits of the cooperative and on the assembly decision on whether to redistribute them or keep them as reserve capital (to date the assembly has never earmarked any return on the capital invested, Table 4). Social lending returns are instead defined ex ante depending on the length, i.e. in 2015 Retenergie has been offering annual returns from 1.5% to 3% for two years to six years bonds. Beside development of renewable generation plants Retenergie also offers a series of other services, which are granted against a membership of 50€ for those that have not already invested in the cooperative. They include: discount on different services and products (insurance, internet providers, bank services, magazines and books); collective purchase groups for PV, storage systems and electric vehicles. Retenergie has also established a network of energy advisors that offer discounted domestic energy audits to the members of the cooperative. Since 2015 Retenergie has managed to continue its activities in the renewable energy sector by

developing in 2016 a wind power project (60 kW turbine located in Sardinia) and an energy efficiency project ESCO project (the energy retrofit of a building in Vicenza) (Retenergie, 2017).

Table 4. Retenergie, summary of activities

	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Cumulative number of PV plants	0	0	5	7	7	7	9
Cumulative capacity installed (kWp)	0	0	171	446	446	446	630
Cumulative investment by citizens (k€)	0	0	628	1 278	1 278	1 278	1 575
Cumulative number of members	147	230	368	541	694	814	911
Return on capital	0	0	0	0	0	0	0
Return on social lending	3.5%	2.5%	2.5%	3%	3%	2%-3%	1.5%-3%

4.2 ForGreen

ForGreen is a limited company born as a spinoff of an Italian multi-utility in 2010 (ForGreen, 2010) with the aim of developing PV systems and energy efficiency services. Currently ForGreen is a supplier of electricity from renewable sources as well as a developer of EPPs. The first project, Energyland, was a 1MW ground mounted PV plant in Verona province. The project was initially fully financed by a local finance company (Finval) and opened to the participation of citizens in a second moment. It was intended mainly as a local project, addressed to people living in the Verona province. Citizens could invest in portions of the plant, each meant to finance 1kW of the PV plant at a cost of 3,600€, of which 1,000€ is contribution to cooperative capital and 2,600€ is social lending. Citizens gets annually: 1. return on the capital invested, decided annually by the assembly, here assumed to vary between 0 to 4%; 2. one twentieth of the social lending contribution, i.e. 130€ per year per portion; 3. the value of electricity bill savings for 1000kWh per year, per portion (for a varying electricity price, here assumed between 0.17€ and 0.20€/kWh). Accounting for the variability of return on capital (0-4%) and of the electricity price (0.17€ to 0.20€/kWh), this sums up to a return of 6.5% to 8.8% on the total investment (Table 5). The value of electricity bill savings accounts for the higher share of returns offered to citizens (~500-600€ per year). The initial aim was to involve around 333 people each contributing for 3 kW (Zanini, 2010), in order to cover the full investment cost of 3.6€ millions (ForGreen, 2017). In the end about 123 households have joined the cooperative, for a total of approximately 1€ million (~28% of the total investment) (We for Green, 2015).

Table 5. ForGreen, summary of Energyland offer and financial scheme

Portion	3 kW
Initial investment	10,800€
Capital	3,000€
Lending	7,800€
Annual return on capital (variable)	0€ to 120€ per year (0%-4%)
Annual restoration of the lending	390 € per year (7,800€/20 years)
Annual electricity free of charge, kWh	3,000 kWh
Value of electricity bill saving	510€ to 600€ per year (0.17-0.20€/kWh)
Total return	6.5% - 8.8%

The group of people that initiated the Energyland project decided to replicate the scheme on a national scale. In 2011 ForGreen had developed a new 1MW PV plant in Apulia region, which was financed by the company through bank loan. In 2014 a new cooperative (Masseria del sole) was set up to give people the chance to invest in this PV plant. A national campaign was developed through public meetings and the involvement of a national radio (Lifegate Radio). The financial scheme was very similar to Energyland with calculated expected returns for citizens investing of 8% (over 15 years). As in the case of Energyland participation has been lower than initially planned, with 187 households joining the cooperative out of the about 300 initially planned (We for Green, 2015). A third initiative was started in 2015 (Fattorie dell'energia) and the project is still ongoing. The three projects have been structured with the aim of supplying green electricity to its members through an electricity bill saving scheme, which represents a relevant component of the guaranteed return (Table 5): the electricity produced by the PV plants is sold to an electricity supplier and each member of the cooperative gets an annual amount of kWh free of charge for each kW purchased (Table 5). The change of supplier for each member is associated with the purchase of cooperatives shares, thus the size of the three cooperatives allowed ForGreen to have bargaining power on the electricity supply market. This in addition to its commercial background and previous activities in the electricity sector.

4.3 Comparing institutional characteristic and their outcomes

The two case studies are both answers to the overarching aim of citizens' engagement in energy service provisions, but follow different development objectives and dynamics: Retenergie respond to stronger community logics whereas ForGreen initiatives are more shaped by market logics.

Several considerations on the implications of such diverse institutional characteristics on outcomes delivered and citizens' engagement can be made.

- Firstly, the routes to participation are different. In Retenergie citizens can choose to participate in different ways, i.e. buying equity of the cooperative capital, financing through social lending or simply acquiring the membership to benefit of wider energy and community services. Citizens' participation requires an active decision over the options offered. It also implies sharing the risks of the evolution of the cooperative's activities as both returns and other benefits offered to citizens are subject to the strategic decisions of the cooperative assembly on profits redistribution. ForGreen initiatives instead simply offer purchase of portions whose size and characteristics, including the expected returns, are defined ex ante. Citizens only have to choose the number of portions they are interested to purchase and are not involved in the definition of the conditions of the offer nor share major financial risks of the projects.
- Second, their organizational structures implies different levels of citizens' influence on cooperative activities and co-determination. In both cases citizens are part of the cooperatives board of directors. However, in the case of ForGreen cooperatives the board is only responsible for ordinary administration, as most relevant features of the projects are decided ex ante by ForGreen management. On the contrary, the board of directors of Retenergie, beside ordinary administration, respond to the assembly which is made of citizens and defines strategic directions. These include decisions on redistribution of profits, on new investments and services provision as well as delivery of wider strategic activities such as the definition of an ethical code of activity.
- Third, outcomes delivered differ. ForGreen EPPs offer higher and certain returns: approximately 8% rate of return considering all the monetary benefits, which compares to a reported 0-3% range accruing from Retenergie investment options. Thus ForGreen allow higher revenues redistribution among its members, but on the other hand citizens participating to Retenergie also benefit of a range of other non-monetary outcomes and energy services.
- Fourth, different investment options and returns offered trigger different citizens' investment behaviours. Literature on citizens' investment motives while stressing the important role of environmental and social motives in defining willingness to participate in CE initiatives, leading into more norm driven investments by their members (Bauwens, 2016, Bomberg and McEwen, 2012, Holstenkamp and Kahla, 2016, Kalkbrenner and Roosen, 2016), it also highlights the relevance of combining financial attractiveness with environmental and social concerns to galvanize citizens engagement (Reinsberger et al., 2015). Moreover, recent contributions report evidence of positive correlation between return motive and the size of the investment in the case of more market driven CE

initiatives (Fleiß et al., 2017, Holstenkamp and Kahla, 2016). Evidence of the two case studies here presented reinforce these conclusions. In particular, Retenergie has been offering a combination of investment options: social lending, economically more convenient for the citizens (shorter duration and higher return) and investments in capital, more convenient for the cooperative (longer duration and lower return). Nevertheless, Retenergie always managed to reach its objective of having at least half of its financing in capital contribution. By the end of 2015 one and a half million had been raised through citizens (Table 4), of which 48.9% capital and 51.1% social lending. Moreover, data shows that out of over 900 members, 402 members have contributed to capital (with average investment of 1,914€) and 108 members to social lending (with an average investment of 7,458€). This indicates a majority of investments by motivated individuals willing to provide 'patient' capital with no expectations of immediate returns (Bauwens, 2016, Bomberg and McEwen, 2012). Thus community logics in institutional characteristics tend to attract more norm driven investments, when compared to market based ForGreen EPPs where investments are mainly return driven. In addition, data show a higher investment quota in return driven investments: Retenergie members' average investment in social lending is higher than average contribution to capital and in a similar range of ForGreen initiatives average investment (i.e. 11,000€ for Energyland and 7,500€ for Masseria del sole).

Overall, while ForGreen's EPPs offer better returns on citizens' investments and potentially lead to higher revenues redistribution across the Italian population, initiatives characterized by stronger community logics such as Retenergie imply stronger citizens' involvement and co-determination, and offer a wider set of energy and community services to its members.

Comparing and assessing the relative effectiveness in terms of citizens engagement, economic benefits and wider impact on citizens and local communities of the different institutional characteristics of CE initiatives is not in the remit of this study. It is probably not possible unless values and relative weights are associated to the various outcomes generated. On one hand more structured evidence needs to be elicited on monetary benefits accruing to citizens involved in CE initiatives and their potential implications in terms of income redistribution across the Italian population (both at local and national level). On the other, a robust valuation of the non-monetary outcomes as well as of benefits accruing from citizens' participation itself would also be needed to allow comparison. These would include not only the value of environmental and social services provided to the communities by some initiatives (such as the MESs), but also a valuation of the intangible benefits such as potential increase in community identity, sense of trust, empowerment and revitalization of communities accruing from citizens participation to energy service provision (Bauwens et al., 2016, Bomberg and McEwen, 2012, Goedkoop and Devine-Wright, 2016, Seyfang et al., 2014, van der Schoor and Scholtens, 2015, Walker et al., 2010, Pallett et al., 2017).

Moreover, particularly if the question is addressed from a social planner perspective, an assessment of the relative importance of redistribution of revenues across the population versus citizens' inclusion and wider social capital formation also needs to be considered. Answering these research questions will be subject of future research. Indeed, structured and well informed evidence (both quantitative and qualitative) of the economic and societal benefits (from the quantification of income redistribution to a more qualitative valuation of socio-economic impacts) of CE approaches would constitute a valuable resource to inform policy making in this field.

5. Concluding discussion and policy implications

This paper elicits and presents novel evidence on CE initiatives emerged in Italy within the last decade, filling a gap in the literature to date mainly focused on northern European countries characterized by more developed CE sectors. The findings of this study contribute to better understand the heterogeneity of Italian CE sector, which constitute an essential basis for any future policy design in the field. This research revealed several key issues to be taken into account and addressed when future potential growth and development of Italian CE sector are considered. Firstly, it is a very heterogeneous and pinning down specific characteristics of the sector as a whole has not been possible. Despite being all founded with the aim of directly engaging citizens in energy service provision through ownership and financing, Italian CE initiatives have been developed following diverse process dynamics, by different actors and through varying organizational structures. Nonetheless, within such variety two main typologies of initiatives have emerged, characterized by different institutional characteristics: those more market based, generally constituted to maximize redistribution among its members of the economic returns accruing from the operation of a renewable energy plant; and those more community based in their development logics, whose objectives go beyond the development of a single renewable project to encompass delivery to participant citizens of a wider set of energy services and/or community benefits. The former tend to be more effective in terms of economic return offered and therefore of revenues redistribution among citizens. The latter have managed to reach higher levels of citizens' participation and co-determination. However, concluding on one of the two typologies is the most effective has proven challenging and further research needs have been identified. Overall, the complexity and multiplicity of the sector's characteristics and the resulting outcomes can pose challenges to the policy maker in taking decisions e.g. on why and how to support the sector. Therefore, a better understanding of Italian CE sector institutional characteristics and how they shape citizens engagement and outcomes delivered is an important initial step in orienting policy actions in the desired directions. For example, it can help in informing policy making in the need of balancing out objectives of income redistribution and of

delivery of wider non-monetary outcomes (e.g. in terms of environmental and social benefits and strengthening of local communities cohesion and social capital) accruing from the initiatives.

Second, the systematic review presents a novel Italian CE sector still at its niche level. It has been to date mainly characterized by the development of rather small, 'ad hoc' initiatives, for the majority dedicated to PV system deployment and with a strong local focus. Its development has been largely dependent on generous PV FiT schemes, which have made PV investments quite profitable and relatively low risk. This has triggered the development of CE initiatives from proponents generally not equipped to deal with project development and financing of large scale investments (and the associated risks) and more interested in smaller scale, locally sized renewables deployment. In order to scale up and move from niche level, the Italian CE sector would need to be able to develop larger renewable energy projects, or replicate smaller local ones, or to move to other types of activities including energy efficiency measures and other energy service provision (e.g. district heating, smart grids). However, this has to date proven challenging, in absence of a supporting policy framework specifically directed to CE sector. Moreover, the changing energy policy context implying progressive reduction of risk reducing support mechanisms such as FiT and the reintroduction of market-based support (such as capacity and auction based mechanisms) create less favourable conditions for the development of community based initiatives. Indeed, since the discontinuity of PV FiT support in 2013, only the two largest initiatives have been able to develop new plants (i.e. Retenergie and ForGreen's EPPs – see Section 4), as able to either develop larger and riskier projects (thanks to their commercial background) or to leverage their acquired experience and national, rather than local, dimension. Community based and smaller initiatives have proven to be less prepared to face such policy changes as less equipped to look for possibly more complex and risky investments.

In order to foster further development of new CE initiatives some regulatory barriers need to be removed and new policy tools could be considered. Firstly, the regulatory framework should be revised in order to allow collective self-consumption and provide the right for community energy projects to sell their electricity directly to third parties, for example to multifamily residential building or to small commercial/industrial blocks or districts (Battisti, 2016, Legambiente, 2017). This would increase profitability of investments in renewable plants by maximising the value of the electricity produced, a provision particularly relevant in absence of direct policy support to renewables deployment. Several contributors across EU are advocating for such regulatory changes (Balch, 2015, Legambiente, 2016, REScoop, 2016) and provisions for making "*consumers active and central players on the energy markets of the future […] and give them the possibility to produce and sell their own electricity*" have been included in the recent EU commission Winter Package (EU Commission, 2016). Second, policy support to CE sector could be provided through CE specific measures or policy tools embedded in energy policy framework, as experienced in several North European countries currently characterized by fairly developed CE sectors. These include

direct support to CE initiatives through: tax exemptions, as implemented in the UK and Denmark; or improved access to capital through preferential loan conditions and access to dedicated government investment funds as implemented in Germany and Scotland (Bauwens et al., 2016, Scottish Government, 2015, Hall et al., 2016). Policy tools embedded in the energy policy framework include: planning policies restricting renewables plants ownership (or a portion of it) to local actors, as e.g. implemented in Denmark for wind plants development in the early 2000s (Bauwens et al., 2016)); or preferential treatments to CE projects within renewable support schemes. Examples of the latter are: preferential treatments within FiT scheme in the UK (Hargreaves et al., 2013, Seyfang et al., 2013); a recent proposal of preferential treatments in wind energy auctions in Germany (Holstenkamp and Kahla, 2016); or higher electricity selling prices for RES plants crowdfunding among local citizens included in the recent France's Energy Transition for Green Growth Act (Embassy of France, 2016)). The recent EU Commission Winter Package suggests that national states should "consider" community and citizens participation within support schemes, despite not providing explicit requirement for national regulators to support it (EU Commission, 2016). The potential of EU citizens contribution to renewable energy and demand side flexibility has been recently estimated in about 83% of EU citizens becoming 'energy citizens' by 2025 (Kampman et al., 2016). However, to reach this target stronger efforts would be needed both at EU level and in countries characterized by smaller CE sector development as Italy. Evidence on Italian CE sector and its institutional characteristics presented in this paper is an initial step toward providing policy makers with structured evidence to support effective policy design in the field.

Table 1. Process – Dynamics of creation and institutional structures

Project	Proponent	Approach	Legal form	Instrument offered to citizens	Ownership	% citizens ownership	# citizens involved	Financing structure
Sole per tutti	Municipality	Top down	coop	Equity	Citizens	100%	62	40% equity (citizens) + 60% debt (bank)
Retenergie	Community	Bottom up	coop	Equity/Debt	Citizens	100%	~900	70% citizens + 30% debt (bank)
E' Nostra	Associations & Companies	Top down	coop	Equity	Citizens + Proponents	80%	300	80% equity (citizens) - 20% (proponents)
Melpignano	Municipality	Top down	coop	NA	Citizens	100%	136	100% debt (bank + legacoop)
Energyland	Company	Top down	coop	Equity	Citizens + Company	~ 30%	123	Initially financed through private company capital, then opened to citizens
Masseria del sole	Company	Top down	coop	Equity	Citizens + Company	~ 90%	187	Initially financed through debt (bank), then equity opened to citizens
Fattorie del Sole	Company	Top down	coop	Equity	Citizens + Company	Still open	Still open	Initially financed through debt (bank), then equity opened to citizens
Società Ledro Energia - SO.L.E.	Community	Bottom up	coop	NA	Citizens	NA	260	NA
Comunità Energetica San Lazzaro	Municipality	Top down	Association	Equity*	Municipality*	100%*	74	100% equity (citizens)
Comunità solare	Municipality	Top down	Associations	Equity**	Citizens + local ESCO**	0.5%	25	NA
Kennedy Energia	Municipality	Top down	Ltd company	Equity	Citizens	100%	50	100% equity (citizens)
Dosso Energia	Community	Bottom up	Ltd company	Equity	Citizens	100%	64	100% equity (citizens)
Impianto eolico Monte Mesa	Municipal Utility	Top down	Ltd company	Bond	Municipal Utility	0%	NA	NA
Un ettaro di cielo	Municipal Utility	Top down	Ltd company	Bond	Municipal Utility	0%	300	Initially financed by company then opened to citizens. 50% equity (Mun. Utility) + 50% debt (citizens)

* Municipality formally owner of the PV system, but investment financed by citizens association, who manages the project and gets returns out of it

** Initiative proposed by municipality, PV systems developed by local ESCO which then open owneship to citizens

Note: Highlighted in grey initiatives which have achieved lower levels of citizens participation

Table 2. Process – type of activity and timing

Project	Start date	Primary activity	Technology	Plant size, kWp	Investment cost € (Per generation plant)**	Geographical scope	Typology
Energyland	2011	Electr. Production	PV	1,000	3.6M (1M allocated to citizens)	Local	EPP
Masseria del sole	2013	Electr. Production	PV	999	~1M	National	EPP
Fattorie del Sole***	2015	Electr. Production	PV	999	~1M	National	EPP
Kennedy Energia	2012	Electr. Production	PV	100	170k	Local	EPP
Sole per tutti	2011	Electr. Production	PV	102	450k*	Local	EPP
Comunità Energetica San Lazzaro	2013	Electr. Production	PV	20	49k	Local	EPP
Un ettaro di cielo	2008	Electr. Production	PV	1000	5M	Local	EPP
Impianto eolico Monte Mesa	2013	Electr. Production	Wind	8,000 (4 windmills)	NA	Local	EPP
Dosso Energia	2010	Electr. Production	PV	109	330k	Local	EPP
Comunità solare	2012	Mix (Electr production & energy services)	PV	1,378 (56 plants)	Not applicable	Local	MES
Melpignano	2011	Mix (Electr production & energy services)	PV	180 kWp (33 plants)	Not applicable	Local	MES
Società Ledro Energia - SO.L.E.	2007	Mix (Electr production & energy services)	PV	99 (2 plants)	NA	Local	MES
Retenergie	2008	Mix (Electr production & energy services)	PV	630 kWp (9 plants)	Not applicable	National	MES
E' Nostra	2014	Elect. Supply	-	-	Not applicable	National	Elect. Supply coop

* Includes cost of roof insulation

**Investment costs are indicated only for initiatives focus on the development of a single electricity production plant

*** Acquisition and refinancing of an already operating ground mounted PV plant

Table 3. Outcomes

Project	Returns on investment	Other monetary benefits to citizens/municipality	Typology	Other energy/social services
Energyland	6.5-8.8%*	Electricity bill savings for citizens (proportional to quota)	EPP	None
Masseria del sole	~8%	Electricity bill savings for citizens (proportional to quota)	EPP	None
Fattorie del Sole	Still open	Electricity bill savings for citizens (proportional to quota)	EPP	None
Dosso Energia	~6%	Municipality get annual rent for school rooftop use	EPP	Wider social engagement promoted by pre-exhisting green assosiation
Kennedy Energia	~6%	Municipality gets value of electricity bill savings	EPP	Education activities in schools promoted by people involved in Kennedy energia
Un ettaro di cielo	5,5% (7 years bond); 6,5% (12 years bond)	None	EPP	Offered to citizens 25 allotment gardens on the PV gournd mounted plant field
Impianto eolico Monte Mesa	6,5% (7 years bond)	Royalties to municipality (~100k€/year)	EPP	Education activities (guided tours for schools)
Sole per tutti	~3%	None	EPP	School providing roof space also gets roof insulation. Some of the electricity bill savings invested in the school activities
Comunità Energetica San Lazzaro	NA	Municipality gets value of electricity bill savings	EPP	Promotion of energy efficiency schemes on local public buildings
Società Ledro Energia - SO.L.E.	NA	NA	MES	Promoted: local collective electricity purchasing scheme; local electrical bike sharing scheme
Retenergie	1.5%-3%	Monetary benefits (in various forms) for citizens providing assets (e.g. schools providing rooftops)	MES	Collective electricity puchasing scheme for: domestic Pv systems, domestic storage, EV and other services (insurance, internet, bank services, editorial). Collective scheme for domestic energy efficiency audit
Melpignano	Not applicable	None	MES	Electricity bill savings for end users providing assets (citizens). Scheme for water distribution and reduction of plastic bottles use
Comunità Solare	~3.5%**	Annual electricity bill discount of 50€ for 20years for citizens	MES	Scheme for domestic energy efficiency audit. Collective purchase scheme for: electric bike, EV, energy efficient appliances
E' Nostra	2%	None	Elect. Supply coop	Working on pilot distribution of smart meters to cooperative members

* including value of electricity bill savings for 1,000 kWh per year, per quota

** including value of electricity bill savings for 50€ per year for 20 years

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