Grenoble
Ecole de
Management

FONDATION TUCK
The Future of Energy

Business lab for society

Energy community ecosystem

Tuck Foundation « The Future of Energy », September 2019

Authors: Sebi Carine and Vernay Anne-Lorène

Table des matières

Tuck Foundation « The Future of Energy »
Energy community ecosystem

Authors

Carine Sebi, Assistant Professor, Project Manager
Anne-Lorène Vernay, Assistant Professor

Grenoble Ecole de Management (GEM)
Univ Grenoble Alpes ComUE
12, rue Pierre Semard
38000 GRENOBLE, France
Main contact email: carine.sebi@grenoble-em.com

With the assistantship of Julien Doutre

Remark: Internal and confidential report – do not publish

Executive summary

The power sector was historically designed as a strongly centralized and hierarchical system that was to be managed by central governments and large national state-owned mono or oligopolies. Various developments indicate that this situation is going to change and that citizen will play a more important role in the sector in the years to come. One way through which citizen can participate to the energy transition is by taking part in an energy community. Searching through the literature shows that there is not a unique and broadly accepted definition of what an energy community is. The first ambition of this study is to propose a typology based on two axes in order to embrace the diversity of initiatives that exist: i) whether the community has a citizen or public (like municipalities) governance, i.e. "citizen-centric" (which is the main focus of this study), or an initiative with private governance that targets the non-residential (e.g. C&I) or aggregated customers, i.e. "business centric"; ii) whether the energy community manages its grid or exchanges, i.e. "physical", or whether members or resources are geographically dispersed, shared and using existing national infrastructures, i.e. "virtual".

Citizen-centric energy communities are expected to have a central role to play in the energy transition and as such are attracting a lot of attention from policy makers. By drawing on domestic savings, citizen can contribute to financing decentralised renewable energy production through energy communities. This vow of independence implies the emergence of a new disruptive business model where social welfare is distributed and managed by citizens. It is also a way to increase citizen acceptance and mitigate resistance against new local infrastructure and technologies related to energy transition. However, energy communities led by citizens also face multiple barriers and their full potential is not exploited yet. Despite their

promise to contribute to the energy transition, the potential of energy communities is not fully realised yet and their future is uncertain. Their economic model is predominantly led by public policy such as the feed-in tariffs or other public incentives. They highly depend on their member's willingness to volunteer which present some drawbacks such as availabilities, professionalism, social and economic changes, etc.

Our literature review also reveals two gaps in the literature. First very little publication focused on the French context. Our in-depth study about the French context reveals that similar to their European counter parts, French energy communities face a number of technologic, financial, organizational, and legal barriers impeding their emergence and growth. We specifically observed that existing support scheme favour the development of large renewable energy project which may constraint the growth of energy communities, larger projects being more difficult to start with. Costs of grid connection is a central barrier, especially in more rural areas. Risk management and especially in the early project phases is an important barrier for energy communities. Similarly finding affordable insurance is problematic. Second, even though some scholars highlighted the importance of "inter-organisational" actions among cooperatives and the need for energy communities to coordinate their actions little is known about how this support is organized and structured. We argue that analysing how this support is structured would enrich our understanding of the challenges faced by energy communities in fulfilling their potential to contribute to the energy transition. This research stems from the observation that energy communities are rather vulnerable alone but that they can be robust collectively if they cooperate with the right actors. It compares French and Dutch energy community ecosystems with the aim to better understand how an ecosystem should be structured to support the emergence and growth of energy communities and ensure that they can transform the energy sector and empower citizens to take part in it.

We discuss the role played by keystone actors. It argues that keystones can help the ecosystem grow and induce change in the energy sector if they can become umbrellas for energy communities that are diverse in their mission and objectives. On the contrary, if they drive a co-evolution process that increases homogeneity, keystones may reduce the energy ecosystem to a niche, limiting its capacity to transform the energy sector. Then we argue that the capacity of energy communities to transform the energy sector also depends on how the ecosystem is structured locally. More specifically, it depends on the density of cooperative of communities and their capacity to sustain their activities over long periods. Cooperative of communities have a pivotal role to play as catalysers and we recommend designing institutional support so as to help these organizations be created and sustained over time. Third, transforming the sector requires changing the prevailing dominant logic to one that is more favourable to citizen engagement. The paper suggests that energy communities are more likely to induce change in the dominant logic if the energy community ecosystem both compete and develop symbiotic relation with incumbent. Competing with incumbent pushes them to innovate and better meet the needs of energy communities. Developing symbiotic relations can accelerate change and lead to the emergence of a virtuous cycle where actors co-evolve towards a novel logic.

Introduction

The power sector was historically designed as a strongly centralized and hierarchical system that was to be managed by central governments and large national state-owned mono or oligopolies (Domanico, 2007). The energy sector has been organised for decades around strategic long-term decisions concerning the sector are decided by a few dominant actors as illustrated by the development of nuclear power in France (Topçu, 2013). Citizens have been largely excluded from its governance (Bauwens, Gotchev, & Holstenkamp, 2016). Various developments indicate that this situation is going to change and that citizen will play a more important role in the sector in the years to come (Corsini, Certomà, Dyer, & Frey, 2019).

One way through which citizen can participate to the energy transition is by taking part in an energy community. Energy communities involve groups of citizens, social entrepreneurs, public authorities and community organisations participating directly in the energy transition by jointly investing in, producing, selling and distributing renewable energy (Interreg Europe, 2018), or by implementing information campaigns or actions helping citizens to better manage their energy production and consumption. Powered by collective intelligence, knowledge and know-how sharing, energy communities are shaped by the willingness and inventiveness of citizens. These latter mobilize collaborative techniques and more horizontal and collegial organizational mode. Energy communities are seen as means to help finance the transition, increase social acceptance and push citizens to develop more virtuous behaviour (Vasileiadou, Huijben, & Raven, 2016; Yildiz, 2014) and are expected to play a prominent role in the energy transition (Berka & Creamer, 2018; Capellán-Pérez, Campos-Celador, & Terés-Zubiaga, 2018; Eitan, Herman, Fischhendler, & Rosen, 2019; Varho, Rikkonen, & Rasi, 2016).

This aims of this research is fourfold. First, searching through the literature shows that there is no broadly accepted definition of energy communities. As stressed by Seyfang et al. (2013:988) energy communities "represent many types of actors and organisational form, multiple sets of objectives (not all of which related to energy) […] and many different practical strategies and technologies to achieve their goals". While various authors have attempted to describe and classify energy communities (ref), proposed typologies still cannot encompass all the diversity of energy communities that exist. Our first aim is therefore to propose a new and all encompassing typology if energy communities and to illustrate this typology with examples for energy communities worldwide.

Second, literature shows various drivers and motivations for energy communities (Kalkbrenner and Roosen 2015; Seyfang et al, 2013; Bomberg and McEwen, 2012). It also shows that energy communities are very vulnerable (Seyfang, Hielscher, Hargreaves, Martiskainen, & Smith, 2014). They face multiple barriers that impede their development and growth ranging from economic, financial, organizational, and legal factors (Gorroño-Albizu, Sperling, & Djørup, 2019; Mirzania, Ford, Andrews, Ofori, & Maidment, 2019). The second aim of this research is to conduct a thorough literature review and develop a complete overview of drivers and barriers to energy communities.

Third, the literature review showed that very few academic publications focus on the French sector specifically, with the exception of (Yalcin Riollet, 2014). The third aim of this research is to analyze in detail French energy communities, what they aim to achieve and the challenges they face.

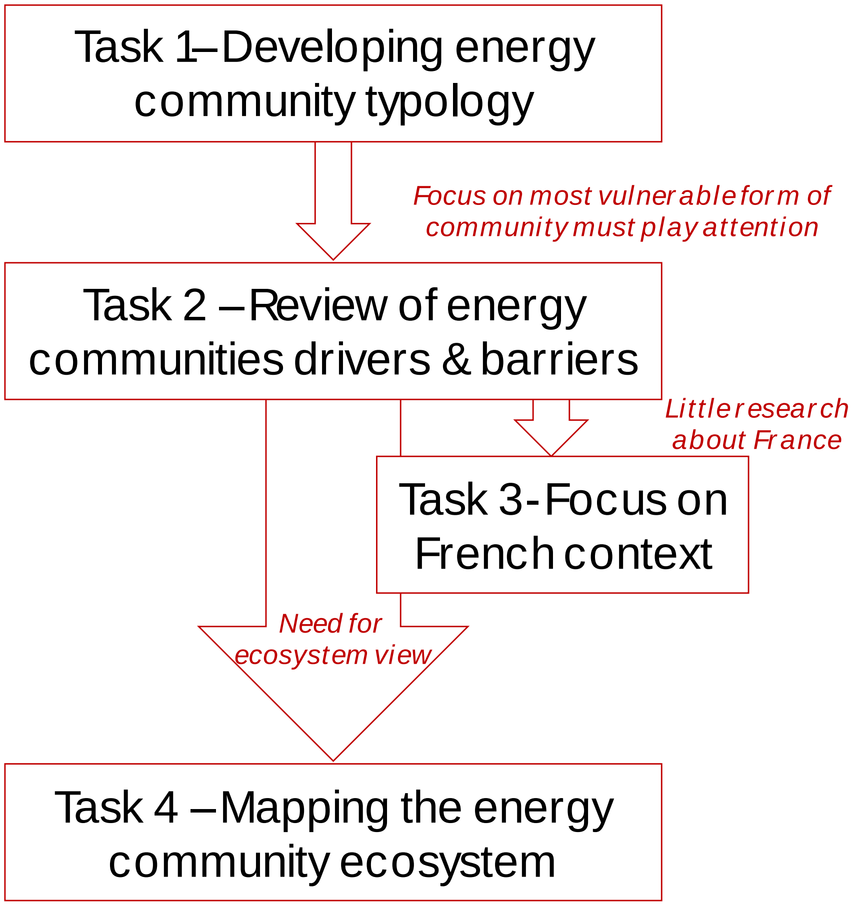
Fourth, so far, a lot of research has focused on barriers to the development of individual energy communities. Kooij et al. (2018) pointed to the fact that energy communities need external supports (e.g. networking, lobbying, financial, and technical) to grow and flourish. While a single community is rather fragile, they can be robust collectively if they cooperate with the right actors (Lancement & Cadre, 2018). However, we have limited knowledge about how this support is organized and structured. We propose taking an ecosystem perspective to analyze and discuss the role supporting organizations play in the emergence and growth of energy communities. The second aim of this report is to identify characteristics an ecosystem should have to help energy communities emerge, grow and eventually fully their potential to transform the energy sector.

The Report is organized as follows. We will first present how the research has been design and the data that has been collected. This includes introducing the two national context for which we did a comparative analysis. Task 1 then discusses the variety of energy communities that exist and proposes an all-encompassing typology supported by some illustrative cases. Task 2 presents the literature review. This includes publications that look at drivers behind energy communities and what motivates people to take part in an energy community. Moreover, it also includes an overview of challenges faced by energy communities. Task 3 provides a specific analysis for the French context, presenting the state-of development and the challenges reported by energy communities interviewed. Task 4 Introduces ecosystem theory and the kind of question it helps raise about energy communities. It then analyses and compares energy community ecosystems in France and in the Netherlands. Task 5 discusses the findings and provides conclusions and recommendations. Finally we present work done to disseminate the research outputs.

Research design

The research has been designed as follows (see Figure 1).

Figure 1: Research design



First, we conducted a literature review and interviews with an energy community expert to understand the breadth behind the energy community concept (see task 1.1). We analysed more than 20 different types of energy communities worldwide and used these inputs to develop a typology of energy communities (see task 1.2). We also conducted small case studies to illustrate the various type of energy communities that exist (see task 1.2).

Second, we also conducted a thorough literature review. Using google scholar or Science Direct, we gathered articles that mention key words such as "energy community", "energy cooperative", "community energy" "citizen-led" and energy project. A total of 66 papers have been analysed (see section Bibliography). This literature review underlined why energy communities are considered important for the energy transition and what motivates citizen to take part in such initiative (see task 2.1). It also highlighted some of the general challenges faced by energy communities and identify some success factors (see task 2.2).

Finally, the literature review confirmed the dependence of citizen-led energy communities to the presence of supporting organization. However, we have limited knowledge about how this support is organized and structured. We selected two countries where energy communities are supported politically (this excluded the united Kingdom where policies have become unfavourable to energy communities led by citizens). Our final choice went for two very different contexts: the Netherlands where the ecosystem is mature and France where energy communities are starting to emerge and gain importance. There are numerous advantages to comparing the energy communities and its ecosystem from different countries. First, it can highlight the differences of maturity as the Dutch projects tend to grow faster and are usually more developed than French ones. It also permits to better understand the different citizen motivations and level of involvement. Finally, it is especially useful when one wishes to connect the global context of each country with communities and their necessarily locally focused concerns.

Analysing energy community ecosystems in France and in the Netherlands represented the core of our research. It is based on both secondary and primary data. Secondary data includes institutional report used in order to get a good understanding of the energy communities movement in each country and their state of development. We also used it to identify communities, ecosystem actors and specialists to contact for interviews. Moreover, Primary data in form of 41 semi-structured interviews conducted with experts, energy communities and their supporting organisation was used to understand the challenges faced by energy communities and the role supporting organisations play in overcoming them. Three thematic protocols have been set up according to the type of actors interviewed. Protocols are available in French in Appendix 1. Table 1summarizes the type of information gathered during the interviews. Table 2 provides additional details about the interviews conducted.

Finally, the literature review also revealed that, except for (Yalcin-Riollet 2014) that study an energy cooperative, few publications focus on the French context. That is why we have chosen to conduct a more thorough analysis of the French context (see task 3). This includes gathering detailed information about 50 French energy communities to understand what the phenomenon represents in France exactly. We used data from Energie Partagée which is mandated by the French energy agency ADEME to map and gather existing or on-going collaborative energy project experiences in France. Energie Partagée censes 141 energy communities in France and provide relevant preliminary quantitative information on energy community globally. Based on Energie Partagée census we selected a sample of representative energy communities to screen into more details around 50 communities (or 35% of Energie Partagée national census). Data gathered included the kind of energy produced, the type and volume of production from each community, the number of members, the region where it is located, the main ecosystem partners, the status, scope, date of creation and a few other information (see Appendix 2). These data are very useful because we can have a more quantitative approach that can be put in relation with the qualitative work to articulate global and local view of the energy community world. We also conducted interviews with 11 energy communities to understand what their ambitions are and the challenges they face. Moreover, we organised a workshop bringing together 4 energy communities in Isère and Rhône region as well as a public energy agency to discuss about the challenges they face in their daily activities. Finally, we initiated a survey to energy communities. This online survey was distributed to the communities we met. It also was distributed to its members by “Energie Partagée”. This survey’s goal is to have a better understanding of the many social logics that led communities member to choose their community, how they want to involve and who they are, in a sense of sociodemographic values. The survey is available in the Appendix 3. Data is still being collected and has not been analysed yet.

Table 1 : type of interviews conducted and their use in the analysis

Actor	Use in Analysis
Experts	Understand global national dynamics Highlight main challenges faced by energy communities Identify ecosystem actors
Energy Community	Understand how they work and are organized Clarify what their ambitions are Highlight the barriers they face to reach their ambitions Identify ecosystem actors they rely on and what for
Supporting organizations	Understand how they support or interact with energy communities, how this has and may continue to evolve Clarify how they finance their activities Highlight how they describe the challenges faced by energy communities

Table 2 : details about the interviews conducted

#	Type of actor	Name of the organisation	Role of the interviewee	Duration	Date	Mode
1	Energy community	Buxia	Active member	2H	05/02/2019	Face to face
2	Energy agency	HESPUL	Regional coordinator	1H08	07/02/2019	Telephone
3	Association	Centrales Villageoises	President	2H14	11/02/2019	Face to face
4	Energy community	Bretagne Energie Citoyenne	President	1H05	12/02/2019	Telephone
5	Energy community	Ercisol	President	1H10	14/02/2019	Telephone
6	Energy agency	CLER/Agence locale de l'energie Bretagne sud	Director	1H05	15/02/2019	Skype
7	Energy agency	Ademe	Engineer	1H15	18/02/2019	Telephone
8	Energy community	Cowatt	President	1H45	19/02/2019	Telephone
9	Energy community	Forestener	President	1H	20/02/2019	Face to face
10	Energy community	ICEA	President	1H	20/02/2019	Skype
11	Energy agency	ECLR		1H30	21/02/2019	Skype
12	Researcher	CEREMA	Project manager	1H30	27/02/2019	Telephone
13	Energy community	Solaire d'Ici	President	1H30	07/03/2019	Face to face
14	Municipality	Ville de la Buisse	Active member	1H	13/03/2019	Telephone
15	Energy agency	AURAEE	Project manager	1h15	20/03/2019	Telephone
16	Association	DAISEE	Active member	1h30	21/03/2019	Telephone
17	Energy community	Solaire d'ici	Active member	1h30	26/03/2019	Telephone
18	Energy community	Buxia	President	1h40	27/03/2019	Face to face
19	Energy community	Gresi21	President	1h15	28/03/2019	Face to face
20	Energy supplier	Enercoop	Regional coordinator	1h35	01/04/2019	Telephone
21	Crowdfunding	Energie Partagée Investissement	Investment manager	1h	03/04/2019	Face to face
22	Energy community	123 soleil	President	1h20	28/05/2019	Telephone
23	Energy community	Les ailes de Taillard	Engineer	1h	11/06/2019	Telephone
24	Association	Coopawatt	Coordinator	1h20	26/03/2019	Telephone
25	DSO	Enedis	Vice territorial director	1h40	16/06/2019	Face to face

26	Municipality	Ville de Grenoble	Head of energy transition department	1h05	03/06/2019	Face to face
27	Independent researcher	AS I research	Independent researcher	1h31	18/04/2019	Telephone
28	Energy community	Energiek Schiedam	Founder	56 min	18/04/2019	Telephone
29	Energy supplier	Samen OM	Director	43 min	16/05/2019	Telephone
30	Energy community	Watbeters	Founder	33 min	30/04/2019	Telephone
31	Energy community	Kennemer energie	Communication director	1h10	20/05/2019	Telephone
32	Energy community	AGEM	Director	59 min	17/05/2019	Telephone
33	Association	RESCOOP NL	Director	1h13	16/05/2019	Telephone
34	Cooperative	HOOM	Director	1h17	09/05/2019	Telephone
35	Energy community	Calorie	Director	1h01	17/05/2019	Telephone
36	Energy supplier	Energie van ons	Director	49 min	17/05/2019	Telephone
37	Association	Buurkracht	Communication director	44 min	11/12/2015	Face to face
38	Independent researcher	Expert	Independent researcher	1H05	14/02/2017	Telephone
39	Independent researcher	Questions, Answers and More	Independent researcher	53 min	22/07/2017	Telephone
40	Energy supplier	DE Unie	CEO	1H01	18/11/2015	Face to face
41	Energy supplier	Greenchoice	Account manager for energy cooperatives	1H	21/07/2016	Skype
42	Energy supplier	Qurrent	Managing director	36 min	02/12/2016	Face to face
43	Crowdfunding	Greencrowd	Director	49 min	24/03/2017	Skype
44	Association	Nudge	Operational director	44 min	24/03/2017	Skype
45	DSO	Alliander	CSR Manager	47 min	17/02/2016	Skype
46	Energy community	Energy for all	President	1h05	02/05/2019	Skype
47	Charity	Pure Leapfrog	President	55 min	02/05/2019	Skype
48	Researcher	Exeter University	Researcher	44 min	17/06/2019	Skype
49	Equipment manufacturer	Expert	Marketing Director	75 min	07/05/2019	Face to face

Introducing French and Dutch contexts

The following section presents the national context specific in which energy communities and their ecosystem have been studied, as well as the data collection process.

Two different national energy policy contexts

France, among the most centralised energy market of the world

Even if France has been pushed by the EU to liberalize its energy market for three decades now, the liberalisation has been completed since 2007. Though, the electricity market is still ranked among the most centralized countries. Indeed the historical national electricity incumbent EDF leads the market on both market and grid levels. On capacity and generation side, EDF's shares exceed 80%. On transmission and distribution, the grid is managed quasi exclusively (95%) by EDF through its subsidiaries (RTE (for transmission) and Enedis (for distribution) (Wokuri, Yalçın-Riollet, & Gauthier, 2019). While liberalisation has arisen between suppliers, it does not exist between producers as EDF is playing a central role. The French government has commissioned EDF to purchase photovoltaic or wind electricity produced at regulated feed in tariffs (above the market price). However, since 2016 a second potential buyer, Enercoop, has been authorized by decree to purchase at these regulated rates.

Today in France, primary energy consumption is composed by 40% of nuclear, 29% of oil, 16% of natural gaz, 11% of renewables (hydro, photovoltaic, wind, biomass, etc.) and 4 % of coal. There is therefore a strong potential - more than 49% - for primary energy to be decarbonized. In the wake of the Paris Climate Agreement, France has committed to cutting greenhouse gas emissions by 2050 to 75% below 1990 levels. To help achieve this ambitious target and as part of its energy transition strategy, France wants to increase to set a share of renewable energy in gross final energy consumption of at least 20% in 2020 and 32% in 2030, and to lower final energy consumption to 50% below 2012 levels by 2050. The main statutory provisions regulating the renewables energy sector in France is contained in the Energy Transition for Green Growth Act.

Completely liberalised market for more than 15 years in The Netherlands

The energy economic model was completely liberalized in the Netherlands in 2004. During the sole year of 2018, 18% of Dutch households changed energy supplier in this way. In comparison in France, 75% of French residential and non-residential sites were at regulated selling rates, and under a quarter of households had switched suppliers in ten years. In the Netherlands, energy suppliers compete for access to local renewable energy generation plants, giving citizens' initiatives greater bargaining power compared to France.

Annual CO_2 emissions represent 10 tonnes per inhabitant in The Netherlands –or two times higher compared to France- and do not decrease at the expected pace. Indeed, 80% of electricity is produced from fossil fuels (20% coal and 60% gas), compared to 8% in France.

In the frame of the 2020 EU goals (also known as the "20-20-20" targets), The Netherlands intends to raise the share of energy consumption produced from renewable resources to 14% by 2020, and at least 27% by 2030 (2030 EU climate package). But as France, the Netherlands is among members putting EU 2020 renewables target at risk. In November 2018, the International Court of The Hague confirmed, on appeal, the condemnation of the Dutch government to intensify its efforts against climate change.

Energy communities evolve differently in both countries

In France, the latest census carried out by the Énergie Partagée Association - that supports renewable energy community projects and which gathers most energy communities at national level - counts nearly 300 energy projects (~ 0.5 communities for 100,000 inhabitants), of which 56 % are PV panel on rooftops. These energy projects gather 11,000 citizen shareholders and produce 65 GWh/year (i.e. 0.2 % of France's annual renewable electricity production in 2016). Since 2014, the number of these initiatives was multiplied by four (Energie Partagée, 2019). This increase has been led by a change in the French legislation, more precisely by the definition of new article in the French energy code (L. 314-28, article 111) adopted in 2015 in the Energy Transition for Green Growth Act (LTECV). This latter offers the possibility for joint stock companies and cooperative companies willing to develop renewable energy production projects to propose to inhabitants or communities to take a share of their capital, or to participate in the financing of the project (Energie Partagée, 2017). Besides a national fund '*Enercit'* was created in 2018 by the Ministry of Energy Transition to co-invest in community energy projects with the particularly to help the initiatives during the development phase. In the long run, in the wake of the Paris Climate Agreement, France has committed to cutting greenhouse gas emissions by 2050 to 75% below 1990 levels. To help achieve this ambitious target and as part of its energy transition strategy, France wants to increase to set a share of renewable energy in gross final energy consumption of at least 20% in 2020 and 32% in 2030, and to lower final energy consumption to 50% below 2012 levels by 2050. French energy communities actors ambition to represent 15% of renewables infrastructures by 2030.

In The Netherlands, according to the Local Energy Monitor HierOpgewekt, 484 communities are active (~ 2.8 communities for 100,000 inhabitants). Nearly 70 % of all cooperatives is working on energy saving, 75 % on solar and 20 % on wind projects. The energy cooperatives gather 70,000 Dutch citizens (or 1 % of all Dutch households). The solar power capacity of cooperatives reached 74,5 MWp in 2018 (i.e. 2 % of all installed solar power in The Netherlands), and the wind capacity was close to 16 MW in 2018. Energy cooperative are growing quite rapidly in the Netherlands. In 2018 for instance the number of cooperative increased by 20 %. This stronger positive trend - compared to France - can be explained by the fact that Dutch energy communities are part of a more mature and favourable regulatory and policy environment. For instance, the distribution system operator finance the community national information-sharing platform. And energy suppliers compete for access to local renewable energy generation plants, giving citizens' initiatives greater bargaining power compared to France. The country has also included in its climate agreement a dedicated target: local actors should hold 50% of the renewable electricity capacity (excluding off-shore) by 2050.

Task 1: Developing energy communities typology

Task 1.1: Taxonomy of energy communities, a literature review

Searching through the literature in the academic or practitioner sphere shows that there is not a unique and broadly accepted definition of what an energy community is (Brummer, 2018). As stressed by Seyfang et al. (2013:988) in referring to discussion of the energy community sector: “This is a highly diverse sector representing many types of actors and organisational form, multiple sets of objectives (not all of which related to energy) […] and many different practical strategies and technologies to achieve their goals. It is therefore exceedingly difficult to pinpoint specific features of the sector as a whole”. The same point is stressed by Becker, Kunze, & Vancea, (2017:26): “Community energy covers a variety of empirical phenomena, yet a systemic operationalisation of its different organisational features is still at an early stage”. Consequently, defining energy community is difficult given these varied forms (Hicks and Ison 2017) and the fact it covers a broad range of activities (Corsini et al., 2019).

Hoicka & MacArthur (2018) explain energy community’s objectives and organisations are different from one country to another because of different jurisdiction, policy mix, etc (Kooij et al 2018). Indeed the term “Energy community” has different meaning across geographies, due to cultural differences and policies governing the energy transition and the energy system decentralization. In Europe, the latest policy directive “Clean Energy Package” has defined new rights for energy consumers and “citizen energy communities”, putting citizens at the centre of the community debate. While in other geographies, the broader community energy model tends to include all kinds of energy consumers, involving citizens and C&I (Commercial & Industrial) business customers. And this model is spreading and now reaching many regions across the world, not only OECD countries.

Some scholars attempted to clarify and order the various form of energy communities through typologies, such as:

- Walker & Devine-Wright, (2008) highlight the distinction between energy communities and other renewable energy installations though the differences in related processes (“who the project is by”) and outcomes (“who the project is for”);
- Van de horst (2008) assesses what role social enterprise can play in the development of the renewable energy sector and identifies seven types of entrepreneurial and consumer activity that social enterprise can play along the renewable energy supply chain
- Bronin and McCary (2013) identify five possible micro-grid considerations for energy energy communities, taking into consideration: 1) the number of users; 2) the number of real estate parcels that the microgrid serves; 3) the ownership of the parcels; 4) whether or not the grid infrastructure crosses public streets
- Heinskanen et al. (2010) make a distinction between geographically local communities; sector-based communities; interest-based communities; virtual communities
- Moroni, Alberti, Antoniucci, & Bisello, (2019) make a first distinction between place-based and non-place based communities on the basis of a potential correspondence between the community and a specific area. The second distinction relies on whether the community shape solely for energy purposes (i.e. managing energy production, consumption or purchase) or with a wider range of objectives (including other types of

goods and services like goals encompassing share management of energy issues, among others).

Aforementioned typologies illustrate the diversity of initiatives that can fall under the energy community umbrella: they differ in their mission, in who drives the community and whose needs the community aims to fulfil. We argue that previous literature shows that two characteristics of energy communities are primordial. First, energy communities do not have to have a strong geographical anchorage and be physically linked to a specific area. A community can also be virtual and regroup users that are not collocated but that share similar values. Second, while energy communities can focus on citizens, they may also target private firms. In fact, a lot of recent entrepreneurial activity targets the non-residential sector. We posit that to understand the energy community phenomenon in all its breadth and really grasp how it can disrupt the energy sector, these two aspects are primordial. This is why in the next session we propose a new all-encompassing typology of energy communities based on these two aforementioned characteristics:

- Axe 1: *citizen* or *business* centric interests of the community, following the typology proposed by Walker and Devine (2008) "who the project is by" and "who the project is for". Typically as soon as a community has a private governance and is targeting C&I or bundle of customers, we consider it is business centric community.
- Axe 2: *physical* versus *virtual* in the same spirit as Heiskanen (2010) that make a difference between local or non-local communities or as Moroni (2019) with their distinction between place non-place based community, we propose here to distinguish the physical communities that manage energy at the local level (e.g. local grid ownership or prosumerism) with little or no interaction with centralised energy stakeholders from the virtual communities that use the national grid to develop their activities and services.

Task 1.2: Proposed typology of energy communities

The first ambition of this study is to propose a typology in order to embrace the diversity of initiatives that exist.

As Moroni et al. (2019), we tend here to give a "non ideological" definition of energy community. Indeed they noted that a vast majority of articles have a tendency to give to energy community an intrinsically positive connotation and suggest "a need for a more in-depth debate" on the various form of energy community possible and abandoning the assumption of a unitary approach. Eagle et al (2017) similarly observe the literature is rich with references to community energy as a response to environmental problems but the narrative surrounding community energy "consistently frames the community aspect as a positive, a social grouping where co-operation, interdependence and progress flourish. The discourse is often full of "rose coloured presumptions' about the nature of communities and their relationships with renewable energy". Moroni et al state the term community "denotes the existence of a group united by particular interests and/or ideas and following particular rules to guaranty their satisfaction though collective actions". We will therefore here stick to the same definition as Moroni et al. (2019) in this section.

As argued earlier, we propose to base this typology on two axes: i) whether the community has a citizen or public (like municipalities) governance, i.e. "**citizen-centric**", or an initiative with private governance that targets the non-residential (e.g. C&I) or aggregated customers, i.e. "**business centric**"; ii) whether the energy community manages its grid or exchanges, i.e. "**physical**", or whether members or resources are geographically dispersed, shared and using existing national infrastructures, i.e. "**virtual**". We will first explain in more detail these axes and then present and provide illustrations for each of the four types of energy communities resulting from this typology. A summary of the typology can be found in Table 3.

To begin with, energy communities differ depending on who initiate them and how they are governed. One typically thinks about energy communities as not for profit initiatives resulting from citizen movements. These communities are driven by citizens and/or municipalities and have a governance structure that secures that these actors have an important say in how the community functions. The newly adopted Renewable Energy Directive recast (RED II) by the European Union (EU) includes for the first time (in Article 22) a definition of a 'renewable energy community' that corresponds to this vision of what an energy community is. The text defines it as: "A legal entity: i) which, according to applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects owned and developed by that community; ii) whose shareholders or members are natural persons, local authorities, including municipalities, or SMEs; iii) whose primary purpose is to provide environmental, economic or social community benefits for its members or the local areas where it operates rather than financial profits." (Interreg, 2018). However, in recent years, we have seen more and more private firms developing offers that also claim to allow the creation of energy communities. These firms for instance do that by allowing big (like C&I) or bundle of customers to engage in peer-to-peer exchanges thereby participating in the creation of value (Wainstein & Bumpus, 2016). Hence, a first axe divides energy communities as the result of citizen or business centric initiatives.

Moreover, another important difference between the energy communities is the type of interaction they create with their resource and production/service: whether it is bound or not to a physical territory. A second axe thus considers whether the initiative results in the creation of a *physical* or *virtual* community. The *physical* would fit to communities that gather members producing and managing their energy to respond to their needs or interests, like local distributed energy resource (DER). This includes microgrids, community self-consumption or local energy management systems. The *virtual* would rather fit to members who want to develop and participate in the energy production plants no matter if the energy supplied by the community is consumed locally or sold to national grid, i.e. not bound to a physical restricted territory.

The field study should identify the elements that make up these two types of energy communities. Those virtual and physical actors help to understand some of the defining points of energy community, such as the role of locality in the building of the community.

Based on these two axes, four types of energy communities exist:

1. Collective self-consumption
    - Local integrated energy community
    - Neighbourhood energy community
2. Local utility
    - Private Micro Utility
    - Neighbouring energy utility

3. Cooperative
   - asset sharing community
   - energy sourcing community
4. Facilitator
   - Virtual community
   - energy sharing community

Table 3 : Typology of energy communities

	Citizen centric	Business centric
Physical	**1-Collective self-consumption** 1.1 Local integrated energy community 1.2 Neighbouring energy community	**2-Local utility** 2.1 Private micro utility 2.2 Neighbouring energy utility
Virtual	**3-Cooperative** 3.1 Asset sharing energy community 3.2 Energy sourcing community	**4-Facilitator** 4.1 Virtual community 4.2 Energy sharing community

Type 1-Collective self-consumption

Among the collective self-consumption communities, we distinguish two sub-types: 1) Local integrated community Energy Company and 2) Neighbouring energy community.

Sub-type 1.1-Local integrated community energy

120 years ago, the early development of energy systems was made of small-scale electricity systems, sometimes complemented by other energy or water networks. These “public services” companies were then managed by local authorities, municipalities (city level, small territory) or cooperatives (regional level, larger territory).

Traditional activities of local integrated community energy are either concentrated on narrow (i.e. electricity only) or wider scopes (i.e. multi-utility: electricity generation, distribution and retail, gas distribution, district heating, public lighting, even water distribution). In the future, these communities may play an increasing role in the EV fleet management, storage management…This model - which has a strong community DNA - has survived quite unchanged in many places.

In Europe, some of these small local utilities with DSO (electricity distribution licence) status are affiliated renewable energy communities, like for instance RESCoop Italy. Other European examples include the Stadtwerke in Germany (see box below), rural cooperatives SICAE (*sociétés d'intérêt collectif agricole d'électricité* in French) or Régies (local distribution companies) in France.

Box 1: Stadtwerke - Germany’s municipal utilities

The distribution system in Germany is the most complex in Europe, with around 900 distribution system operators serving 20,000 municipalities. This includes the four large companies as well as about 700 *Stadtwerke* (municipally owned utilities) and a number of regional companies. The four large DSOs—RWE, EnBW, E.ON, and Vattenfall—operate a significant portion of the distribution grid through concession contracts with municipalities. Under these contracts, municipalities rent out their distribution franchise for up to 20 years. Under the Energy Industry Act, these concession agreements have to be renegotiated under non-discriminatory rules and can be cancelled. It is worth noting that there is a movement today for Stadtwerke to take over their own grid operations as many concession contracts come up for review.

Source: https://www.agora-energiewende.de/fileadmin2/Projekte/2014/CP-Deutschland/CP_Germany_update_1015_web.pdf

In the USA, example of local integrated energy community include the *munis* (contraction of municipality and utilities) federated at the American Public Power Association (APPA) or the coops that are federated at National Rural Electric Cooperative Association (NRECA) level.

Sub-type 1.2-Neighbourhood energy community

The **neighbouring energy sharing community** type encompasses citizen initiatives that facilitate the creation of an energy community that has strong local roots. In this case the scale at which the initiative takes place is important and its success partly depends on whether people know and interact with one another. Buurkracht in the Netherlands supports groups of neighbours who want to make a difference in their local environment.

The success of this kind of initiative depends on the presence of local champions that can help maintain some equipment and provide technical support to their neighbours. People want to participate in the energy transition and make a difference in their neighbourhood. In this case, many of them are willing to spend some time to see to it that the projects get realised

At a smaller geographical scale and within limited geographical boundary, this new form of community model is thus appearing, allowing consumers to access to local energy resources.

In Europe, it is referred to as “Community self-consumption” (called sometimes “collective self-consumption”), while in North America the terms “shared solar” or “virtual net metering” prevail. These neighbouring energy sharing communities includes several models as the Sunchain experiment in France or Comunità Solare Locale in Italy (see boxes below).

Box 2: Sunchain, when the blockchain renews solar energy (FRANCE)

In Prémian, southern France, a blockchain project developed by Sunchain is providing six consumers with solar power and certifying transactions – which also involve local distribution system operator Enedis.
A community of homeowners, small businesses and public entities in the French village of Prémian, in the southern Occitanie province, is sharing the solar power generated by a PV system under a self-consumption regime administered by the local municipality.
Under the system, transactions between community members are fraud-resistant and transparent thanks to a dedicated blockchain technology.
The project has a 28 kW rooftop array on a building in the municipality which is supplying electricity to six consumers: a school building, a post office, another municipal building, a cultural center, a private house and a bakery – all of them behind a public substation for the transformation of electricity from medium to low voltage.
The project’s economic model relies on a €52,000 investment by the municipality, which is supplying power to the six consumers for free. Participants contribute to the costs of plant

operation through a membership fee to an ad-hoc association which passes it on to the municipality. Surplus power is sold by the municipality to local renewable energy provider Enercoop at a rate of €0.04/kWh.
Source: https://www.pv-magazine.com/2019/01/10/blockchain-system-prepares-morning-croissants-under-a-six-building-self-consumption-project-in-france/

Box 3: Comunità Solare Locale in Italy

Comunità Solare Locale (Local Solar Community) of Casalecchio di Reno (Italy), a small town with a population of about 36,000. The Casalecchio di Reno energy community was the brainchild of a group of Bologna University researchers who managed the technical administrative side of the project, but it then developed autonomously in economic-management terms. Their idea was taken up by a group of users in the town of Casalecchio di Reno, who founded the Comunità Solare Locale in March 2014: 23 families set up this community in the form of a private association. About eighty community members have now (2018) joined the project in various capacities. To date (2018), 17 public buildings and spaces have been identified (schools, swimming pools, gyms, the town hall, the cemetery) and made available by the local council for shared photovoltaic plants, covering an area of around 4500 square metres.
A Centre for the Comunità Solari Locali, was also founded which established a network for this kind of Comunità Solari Locali and offered support to those seeking to join the project. Each Comunità Solare is independent, however, and uses the network for (1) energy consultants; (2) support for specific needs; (3) exchanges of ideas and opinions on the various experiences
Source: Moroni, Alberti, Antoniucci, & Bisello, (2019)

Type 2-Local utility

The type "local utility" includes two sub-types: 1) Primate Micro utility (PMU) 2) Neighbouring energy utility.

Sub-type 2.1- Private micro Utility

Some large infra customers have been historically allowed to own and operate private energy systems serving multiple business customers over large private areas, like for instance large airports. A special regulation for the electricity distribution license applies to such installations.

These "private micro-utilities" (PMU) can be seen as an extension of community model. They are mainly applicable for industrial or commercial parks, but also for residential areas. Indeed, citizens may be included in such PMUs in addition to business customers, but the governance, administration and operation is usually given to a private energy company such as ESCO (ex. ENGIE), Utility-affiliated companies (deregulated branches ex. Vattenfall UK).

European policy makers have classified those networks as "private networks", thus making a clear distinction from the "citizen energy communities", which are community managed ("energy democracy") and are generally non-for profit organizations. However in other geographies, like North America, such systems are called “community energy systems” or community microgrids” (see Table 4 on the naming according to geographical areas).

Table 4: Naming of PMU across the world

Location	Namings
UK	“iDNO“ (independent Distribution Network Operator)
Autralia	“Embedded network“, “community energy network“
India	“SEZ “ (Special Economic Zone)
USA	“campus/community microgrid “
China	“New distribution grid company“, “incremental utilities“
France	“closed network” or “réseaux fermés” in French (highly restricted, demo projects)
Germany	“closed network” or “Geschlossene Verteilernetze” in German
Belgium	“Réseaux fermés” (less restrictions vs France)
EU generally	“private network“, “closed network” (outside Clean Energy Package directives)

New regulations are set up in some regions to break the monopoly of the distribution utilities by introducing competition for new “grid pocket” extensions. It started in Australia with the “embedded networks” or in UK with “IDNO” (Independent Distribution Network Operators- See box below) fifteen years ago.

Compared to national DSO, these communities have historically cheaper network ownership & operation costs. They are now extended to optimization of local energy system with DER.

Box 4: Independent Distribution Network Operators in UK

IDNOs develop, operate and maintain local electricity distribution networks. IDNO networks are directly connected to the Distribution Network Operator (DNO) networks or indirectly to the DNO via another IDNO.
Each of the 14 DNOs covers a separate geographical region of Great Britain. IDNOs own and operate smaller networks located within the areas covered by the DNOs. IDNO networks are mainly extensions to the DNO networks serving new housing and commercial developments. There are currently 13 licensed IDNOs (e.g. Eclipse Power Limited, The Electricity Network Company Limited, Vattenfall Network Limited, etc). IDNOs are regulated in the same way as DNOs, except the IDNO licence does not have all the conditions of the DNO licence. OFGEM regulates the amounts that IDNOs can charge their customers for using their networks via a ‘Relative Price Control’. This requires IDNO charges to be capped for all customers at a level broadly consistent with the DNO equivalent charge.

Source OFGEM (https://www.ofgem.gov.uk/electricity/distribution-networks/connections-and-competition/independent-distribution-network-operators)

Sub-type 2.2-Neighbouring energy utility

The neighbouring energy utility differs from its previously described sister “neighbouring energy community” (see type 1.2) by its management that is led by a private *collective self-consumption*. It can allow peer to peer trading of electricity by people living in the same neighbourhood, like for instance in Norway Smart Energi (https://www.smartenergi.com/), or sharing energy like in the Mieterstom model in Germany (see box below).

Box 5: Mieterstrom model in Germany

In the end of July 2017, the German law on the promotion of tenant electricity (Gesetz zur Förderung von Mieterstrom) entered into force. With this law, tenants shall benefit from the energy transition. In fact, the law promotes landlords or system operators. Prior to this law, renewable electricity generated mostly by PV panels on the roof of houses or electricity generated by combined heat and power units (CHP) was mostly not used directly in the building but fed into the national electricity grid. The reason was the complex business model for selling the electricity to the users and the relatively small economic benefit for the system operators. The new model makes the electricity supply to the tenants more attractive, since the system operator receives a supplement for the tenant electricity of about 2.2 to 3.8 cent/kWh in addition to the money the tenant pays for the electricity. This is most attractive in areas where grid charges are high like in Berlin or Hamburg.

Source: https://www.buildup.eu/en/node/55543

Type 3-Cooperative

Among the physical citizen-centric communities with distinguish three sub-types: 1) asset sharing community, 2) energy sourcing community.

Sub-type 3.1- Asset sharing community

Asset sharing communities are at the core of this study (see task 2, 3 and 4) and of the European “Renewable Energy Community” (REC) model. These communities encompass citizen and public initiatives that aim to have an impact on the energy transition. Their aims and achievements include investing in local energy production (e.g. buxia energie, see box below). Local energy production is (partly) financed via crowdfunding campaigns, offering local people the possibility to participate by buying shares. Involved volunteer citizens and different public actors compose the core group of this community, they can know themselves and meet on a regular base. However, most of the citizens that buy shares do not participate this much in the community life and they don’t know each other since their participation is mainly based on a monetary aspect without other personal investment. “Centrales villageoises” is a good example of asset sharing community. It regroups a lot of small municipally led energy community, sprayed in the east of France. They also give citizens the possibility to participate via the acquisition of shares. People that are involved in such projects are mostly motivated by energy transition and participative democracy, since the profitability of these structures is very low. It is a very concrete way to develop renewable energy in local areas. The origin of this community type has been developed first in Germany and Denmark as cooperatives.

Box 6: Buxia Energies in France

Buxia Energies is a small citizen led community (150 members) aiming at producing renewable energy (initial projects of 9KWc capacity from PV on municipality rooftop buildings) in the city of La Buisse and its surrounding. The energy that Buxia is generating, was first sold to EDF at regulated feed in tariffs (above the market price). However, since 2016 a second potential buyer, Enercoop, has been authorized by decree to purchase at these regulated rates. Since 2018 Buxia decided to sell its production to this alternative supplier. Buxia is now setting up partnership with ENERCOOP and Energie Partagée Investissement (EPI) to develop a bigger project (500KWc).

Source: Authors

Sub-type 3.3 Energy sourcing community

Energy sourcing community at regulated retail market, like Community choice aggregations (CCAs) in the US that are local governmental entities that procure electricity on behalf of retail electricity customers within a certain geographic area (see box and figure below).

Box 7: Community choice aggregations in USA

CCAs may be run directly by a city or county government or by a third party through a contractual arrangement such as a joint powers agreement. Often called a hybrid utility model, a CCA partners with local investor-owned utilities that continue to provide consolidated billing, transmission, and distribution of electric power to their shared customers. CCAs first emerged in the late 1990s as a few US states began to pass legislation enabling electric aggregation. A key feature of the enabling legislation in eight states is that it allows CCAs to form such that the CCA becomes the default electricity provider and customers may opt out in order to return to utility service. The opt-out structure increases program participation relative to a voluntary “opt in” structure, meaning CCAs can aggregate relatively large customer bases, providing economies of scale and buying power in wholesale markets. The “choice” component of the term CCA reflects a key feature of aggregation: CCAs can choose the electric resources that supply their community and may choose to offer more renewable energy than the incumbent utility (see Figure *2*).

Source: NREL

Figure 2: Community choice aggregation

Source: NREL

Energy sourcing community at deregulated retail market as Green retailer (utility licence), which correspond to the model of Enercoop in France. Enercoop is the sole French energy supplier that creates a direct link between energy community producers (via its own energy community network) and final consumers. On the one hand, Enercoop helps communities in their legal and finical development as well as in their financial structuration. On the other hand, some energy communities are selling their production to Enercoop instead of the national and "obliged" incumbent electricity supplier EDF, allowing Enercoop to warranty to its clients that 20% of its supply come from renewable energy produced by private homeowners, SME and energy communities. What is invoiced to consumers is thus paid back to the cooperative's producers.

Type 4-Facilitator

Finally the type facilitator (or aggregator) gathers 1) virtual campus and 2) energy sharing community.

Sub-type 4.1- Virtual campus

A virtual campus is a community-related organization enabling economies of scale and maximising self-consumption for commercial and industrial customers over utility wires, i.e. not bound to a physical restricted territory.

Virtual campus administrates either multiple sites owned by single corporation (e.g. a commercial retail chain with more than 100 sites over a large territory) or multiple independent companies owned by various corporations, like for instance the Urban Solar Energy (Greater Lyon area) in France.

Box 8: Urban Solar Energy (France)

Based in Lyon, Urban Solar Energy is the leading integrator of photovoltaic panels. The vision of this supplier is to provide short-circuit energy by bringing production areas closer to urban consumption areas. For Urban Solar Energy, by equipping the roofs of certain cities with photovoltaic panels, the annual production generated could cover almost all the consumption of the inhabitants of this city.
In order to guarantee 100% self-consumption for its customers, Urban Solar Energy has created and developed virtual storage: "THE ideal battery". Physical storage is still in its infancy: too expensive, limited and especially not environmentally friendly. Urban Solar believes that it is possible to bring a better profitability to photovoltaic installations if the surplus produced is used more efficiently.
During a period of high production, we can use these to supply other consumers located nearby and allow you to reuse them during periods of night or low sunlight.
Halfway between self-consumption with storage and collective self-consumption, this innovation simplifies the management of surpluses while providing an immediate economic gain without heavy investment.
Concerning the price of your virtual storage, 1 € HT per kWp* will be charged per month for a battery with no time limit. *For a 6 kWp power plant, the monthly cost is 6 € HT per month.
Source: Authors

Sub-type 4.2 Energy sharing community

The energy sharing community type encompasses initiatives that facilitate the creation of an energy community composed of people that are not acquainted with one another but that do share a common objective. There are two types of community-based energy initiatives. First, firms that develop platform-type business models to connect customers to one another and allow them to engage in peer to peer interactions with each other in the community.

Vandebron in the Netherlands for instance allows people to become part of a solar collective and buy excess power from each other people. Beegy solar in Germany allows owners of solar panel and home battery systems to become part of a community to which they can sell their energy when they have too much or buy energy when they do not have enough. These firms operate on a national basis. Second, firms that act as aggregators and connect people to a joint energy production. Windcentrale in the Netherlands for instance allows people to become co-owner of a wind turbine and use the electricity that their part of the turbine produces to decrease their electricity bill. In both cases, people are brought together by a common objective to actively participate to the energy transition and gain in autonomy from large incumbent companies without having to spend a lot of time and energy on the initiative.

These communities are similar to the neighbouring energy utility except their scope of action is not limited to local areas and operate over utility wires, in longer distances. There exist various admin modes:

- Startup admin with electricity retailer licence. For instance the Sonnen community is a community of sonnenBatterie owners. Its members can share their self-produced energy with other members of the sonnen community. Since members are exclusively using energy from the community, there is no need for a conventional energy provider anymore (see Box on Sonnen).

Box 9: Sonnen (Germany)

The German battery producer Sonnen was founded in 2010 and is one of the leading intelligent home storage producers. The company's headquarter is located in Wildpoldsried in Bavaria (Germany). It has sold over 10.000 batteries in markets worldwide (e.g. Central Europe, USA, Philipines, Australia). The sonnenBatterie eco is an energy storage solution for private households that uses intelligent software to manage energy throughout the day - enabling the use of solar power at night. The battery is linked to a renewable energy generator, e.g. a PV plant, that can store self-generated power. The sonnenBatterie includes weather forecasts and electricity consumption behaviour data into an energy management system. Sonnen's value-creating activities can be separated into two areas: Producing intelligent energy storage systems and secondly operating a nationwide energy community. In this community, prosumers can sell excess power to other community members or buy electricity during times when there is no sufficient self-generated electricity. The user of the battery and community can control these processes on a desktop or a mobile device. In general, Sonnen proposes an intelligent energy storage, energy independency and usage transparency to its customers. Sonnen sources their revenues with battery sales and community memberships. Customer engagement is moderate during product usage as they supervise the energy budget. In terms of the sonnenBatterie, Sonnen focuses on production, research & development and national marketing, whereas local licensed retailers sell and install batteries to private households. Sonnen's major partner is the PV solution provider Sungevity. Sonnen's major battery competitors are mainly Tesla, Samsung and Panasonic. Sonnen's major community competitors are Lichtblick and local energy community cooperatives (sonnen).

Source: file:///C:/Users/sebi173329/Downloads/Attachment_0.pdf

- Utility admin, retailer business extension : E.On solarcloud (see boxes below), Vattenfall/Powerpeers

Box 10: E On Solarcloud

E.ON introduced recently to its customers, the option to store electricity without using a battery.Owners of solar PVs can feed energy directly into the E.ON SolarCloud without any limit. The SolarCloud is a virtual energy account that allows consumers to access stored energy to meet individual demands. The new SolarCloud system will help customers to save on the purchase and installation costs of a physical storage device.
Customers are able to save up an electricity credit balance, which will be beneficial in winter, when during favourable conditions, they can supply 100% of their power requirements through their own PV system. E.ON will be using SolarCloud to explore the potential of the German market, with more than 1.6 million operators of solar systems today. According to E.ON, there are another 10 million roofs in Germany that are suitable for installing PV systems. Customers still have the option to operate their system with a battery and a storage tank can also be retrofitted at any time.
Since last year, E.ON has been offering a cloud solution in conjunction with the E.ON Aura battery storage system. However, this solution only allowed solar power to be loaded into the cloud when the aura storage tank is completely filled.
Source: https://www.smart-energy.com/regional-news/europe-uk/eon-introduces-solarcloud/

- Virtual Net Metering is a bill crediting system for community solar. It refers to when solar is not used on-site but is instead externally installed and shared among subscribers. In this case, you receive credits on your electric bill for excess energy produced by your share of a solar garden.

Box 11: Center for Sustainable Energy in USA

The Center for Sustainable Energy (Solar Market Pathways° is working to expand the awareness, effectiveness, and use of virtual net metering in California and beyond. Virtual net metering enables multi-meter property owners to allocate a solar system's energy credits to other tenants, thereby giving solar access to multifamily homes and other multi-tenant facilities. Virtual net metering allows for strategic placement on sites such as commercial rooftops, brownfields, and municipal land, which can optimize grid operations and aid local economic development.

Source: DOE

To complete this analysis of energy community typology, we intend to collect during the year 2020 data from additional semi-structured interviews with experts and combine with the present desk research methodologies for longitudinal case analysis.

Task 2: Review of communities drivers and barriers

We have chosen to concentrate the following research to the citizen-centric energy communities that are the most fragile. The literature review below reveals these types of communities highly depend on public support for their development and because they are driven by volunteers, they have access to limited resources (e.g. time; specialized knowledge). In other words they need support to emerge and grow. This makes the analysis of energy communities supporting ecosystem particularly relevant.

For a sake of simplicity and in the following pages of this report, we will call a "citizen-centric energy community" simply an "energy community". Today in Europe, there are around 3,000 energy communities across Europe, according to REScoop, the federation of European energy communities, which links over 1,250 cooperatives and one million citizens. It is expected that energy communities can substantially contribute to the energy transition (Carpène, 2018). The European Commission recognised for the first time their role in the frame of a proposed legislative measure of the Clean Energy package (2016). European Commission estimates that by 2030, more than 50 GW of wind and more than 50 GW of solar could be owned by energy communities, representing respectively 17 % and 21 % of installed capacity. A recent study estimated by 2050, almost half of all EU households could be involved in producing renewable energy, about 37% of which could come through involvement in an energy community (CE Delft, 2016). It is expected that these citizen initiatives will develop thanks to digital technologies and will become firmly established in the institutional landscape and take up more and more space in local public action (Lancement and Cadre, 2018).

Task 2.1: Energy communities, a review of drivers and motivations

Energy communities have in common their understanding that "solving energy issues requires integrated solutions at all societal and institutional levels" (Klein & Coffey, 2016). Issues that are not taken, or insufficiently taken, into account by the existing institutional and policy framework, with first of all the ecology and environmental impacts (Foxon, 2011). By drawing on domestic savings, energy communities can contribute to financing decentralised renewable energy production (Johnson & Hall, 2014). This is especially important given that public authorities often lack the means to finance local renewable energy production and private companies are reluctant because of high transaction costs and risk-return concerns related to these local and small projects (Vasileiadou et al., 2016; Yildiz, 2014). Many energy communities are developing renewable energy projects that are by definition carbon free, or other type of actions including the changing of behaviours toward more efficient and sustainable consumption. Second, there is a strong willingness of citizens to produce energy independently to the centralized distribution and generation grid in a collective action, via a cooperative for instance. And this vow of independence implies the emergence of a new disruptive business model where social welfare is distributed and managed by citizens. Even if the profitability of the projects is not a prerequisite, the benefits are directly valorised by local actors. Indeed, beyond the reduction of greenhouse gas emissions, there are many benefits for the communities involved, including economic development, the creation of new local jobs, cheaper energy, self-sufficiency, community cohesion and energy security. Finally, citizens participating in communities look for empowerment through local and financial governances offering them an opportunity to take action to the energy transition - "the energy transition to energy democracy" as defined by Rescoop.

Many researchers also highlight that energy communities can increase citizen acceptance and mitigate resistance against new local infrastructure and technologies related to energy transition (Azarova, Cohen, Friedl, & Reichl, 2019; Interreg Europe, 2018; Rogers, Simmons, Convery, & Weatherall, 2008; Viardot, 2013). By providing a direct link between the production of local energy and private individual consumers (investing in it), these communities reply to this vow of energy independence and implies the emergence of disruptive model where social welfare is distributed and managed by citizens. Finally, by educating people about energy, empowering and promoting actions for the more vulnerable consumers, energy community can also fight for energy inequalities and energy poverty (Brummer, 2018; Capellán-Pérez et al., 2018; Saintier, 2017) and offer access to 'affordable energy' (Berka & Creamer, 2018). On a different perspective, Francisco and Taylor (2019) discuss how to make energy feedback data more accessible, understandable and useful for citizen at a community scale.

The literature identifies institutional conditions that can enable or constrain community initiatives (Provance et al 2011; Kooij et al 2018). These conditions are most of the time connected with the regulatory and policy environment (Oteman et al 2014). Formal institutions, such as feed-in regulations, rules for grid connection or tax incentives, have been identified as success factors to the emergence of community energy or energy cooperative projects (Bolinger et al., 2001; Bolinger, 2005; Breukers and Wolsink, 2007). In the case of Finland, Varho et al (2015) identify these communities as one of the main driver to reach energy transition goals and highlight the importance of policy to support these initiatives in the long-run. But in other country, e.g. Spain, the political economical context is often found as the main barrier of community development (Capellan Perez et al; 2018).

Many articles analyze the main motivations and willingness that lead the citizen to contribute to the realization of these projects. Kalkbrenner and Roosen 2015 surveyed German households owners of renewable energy systems and found their "willingness to volunteer was higher than their willingness to invest money" emphasizing the social importance of this movement in addition to environment concerns. In the same way, Seyfang et al, 2013 analyse British households and found that often it is "more about the community than the energy". Through Scottish case studies analysis, Bomberg and McEwen (2012) explain how/why community energy groups mobilize and the political dynamics surrounding it. They found symbolic resources related to citizen motivation were highly important in the process and driving community toward success. Curtin et all (2019) look particularly to citizen's preference in investing in energy community in less mature country, such as Ireland. They found that motivation was higher for wealthier households that matters particularly to investment in the technology. Because of high risk aversion and low return the amount of investment are low particularly compared to equity required for large projects. The general positive attitude of community members is driving the project but can represent at the same time their main weakness because of their volunteering engagement (lack of time, professionalism, ageing of volunteering force, etc) (Berka and Creamer, 2017). Some scholars also examine cultural influences such as the anti-technology (e.g. coal, nuclear, wind, etc) and alternative energy movements (Breukers and Wolsink, 2007; Enzensberger et al., 2003;Toke et al., 2008;Johansson and Laike, 2007; Liebe and Dobers, 2019;Karnøe and Jørgensen, 1995)) as well as familiarity with cooperative ownership structures (Bolinger, 2001). Finally (Rogers et al 2008) look at the public perception (social norms) of these energy communities.

Task 2.2: Energy communities, a review of barriers

Despite their promise to contribute to the energy transition, the potential of energy communities is not fully realised yet and their future is uncertain (Capellán-Pérez et al., 2018; Gorroño-Albizu et al., 2019; Hufen & Koppenjan, 2015; Proka, Loorbach, & Hisschemöller, 2018; Seyfang et al., 2014). Scholars identified many barriers that result either from exogenous or endogenous factors. Among the exogenous ones, the literature identifies a strong dependence on the national policy and legal framework (Herbes, Brummer, Rognli, Blazejewski, & Gericke, 2017; Mirzania et al., 2019; Oteman, Wiering, & Helderman, 2014). Indeed, there are limits to what civil-society led projects can achieve on their own and they require consistent policy support (Seyfang et al., 2014). Adequate rules for grid connection for instance have been identified as key to the emergence of energy communities (Bolinger, Wiser, Milford, Stoddard, & Porter, 2001; Breukers & Wolsink, 2007). Energy communities' economic model is also predominated led by public policy such as the feed-in tariffs (FIT) or other public incentives (Herbes et al., 2017). Tews, (2018) discusses and criticizes the fact that many projects could not emerge without these aids. Mirzania et al (2019) illustrate this strong dependence with the British case, when the government decided to remove the FIT in 2016: "a move that dramatically affected the renewable energy industry in general and the community renewable energy sector in particular." Lastly, biophysical conditions under which the project is developed shape the type and potential of the community according to the availabilities of local renewables resources (e.g. wind speed, solar hours, …) and the local planning (urban versus rural) (Kooij et al., 2018). Concerning endogenous factors, energy communities highly depend on their member's willingness to participate. Citizens taking part in these projects are principally led by hedonic motivations (Dóci & Vasileiadou, 2015) and the idea of being part of a local social movement (Kalkbrenner & Roosen, 2016; Seyfang, Park, & Smith, 2013). Some scholars also examine cultural influences such as the anti-technology (e.g. coal, nuclear, wind, etc) and alternative energy movements (Breukers and Wolsink, 2007; Enzensberger et al., 2003;Toke et al., 2008; Johansson and Laike, 2007; Liebe and Dobers, 2019;Karnøe and Jørgensen, 1995) as well as familiarity with cooperative ownership structures (Bolinger, 2001) that stimulate the development of energy community. These types of engagement present some drawbacks such as availabilities (lack of time), professionalism (insufficient level of knowledge and skills), social and economic changes (ageing of volunteering force), etc. (van der Schoor & Scholtens, 2015)

All these researches mainly focus their scope of analysis on individual energy communities by conducting longitudinal case studies (Lakshmi & Tilley, 2019; Lehtonen & Okkonen, 2019; Mahzouni, 2019; Yalçın-Riollet, Garabuau-Moussaoui, & Szuba, 2014) or taking a country specific prism (examples include (Herbes et al., 2017; Koirala et al., 2018; Mirzania et al., 2019; Yildiz, 2014).

This analysis reveals two gaps in the literature. First except for the study of Yalcin-Riollet (2014) very little publication focused on the French context. In task 3 we propose doing an in-depth study about the French context. Second, even though some scholars highlighted the importance of "inter-organisational" actions among cooperatives (Bauwens et al., 2016) and the need for energy communities to coordinate their actions (Proka, Hisschemöller, & Loorbach, 2018) little is known about how this support is organized and structured. We argue that analysing how this support is structured would enrich our understanding of the challenges faced by energy communities in fulfilling their potential to contribute to the energy transition. In task 4, we propose taking an ecosystem perspective to analyse energy communities and their supporting organizations.

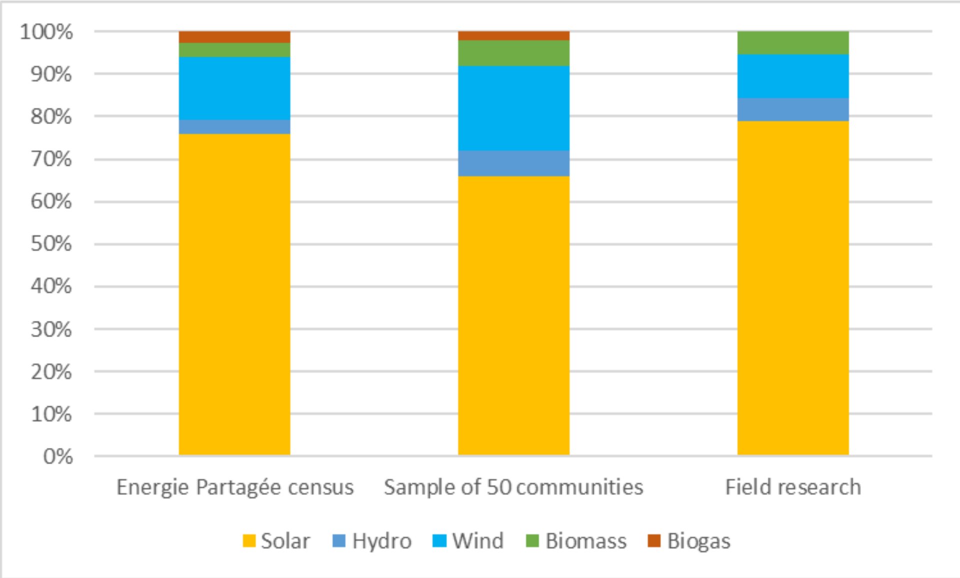
Task 3: Focus on energy communities in France

Task 3.1: French energy communities – state of development

2 main types of projects: solar and wind power plants

The large majority (75%) of energy communities develop solar (rooftop PV) power plants, and wind power plants represent 15% of these kind of projects. Other types of projects concern small hydro, biogas or biomass projects, but are rare (see figure 1).

Figure 1: Distribution of energy communities by type of energy and source of information



Roof PV Solar are by far the most common, the cheapest and the easiest technology for community to set up. As a result, they are spreading in all the territory, particularly in the South of France thanks to favourable sunny climatic conditions. Generally, the first solar projects developed by a community have a capacity comprised between 9KWc and 36KWc. We observe many solar communities that want continuously to grow as they often start with these small capacity projects. Generally they are willing to scale up size of the next projects develop bigger project with capacity up to 100KWc. While wind energy communities look directly for a long-term achievement with private partnerships, so if they are willing to develop another project they usually create a new cooperative. Usually PV projects do not exceed 100KWc to remain eligible to feed-in-tariff. Indeed, above a capacity of 100KWc, projects are not anymore eligible for feed-in-tariff and should reply to call for tenders launched by the French Regulator, CRE. The regulator selects projects according to best purchase price offer and project capacity. Wind power plants have a capacity ranging from 5 to 12 MW. There is a high concentration of wind farms in the west of France (windy landscapes), more precisely in Britany, where the first project was erected (Beganne).

The governance and structure of the French energy communities is roughly identical from one to another and based on the principle of "one person = one vote". It is a collegial governance with the following types of stakeholders: i) citizens (shareholders, associations, salaries); ii) public authority (local collectivity and agency); and iii) private stakeholders/investors. But the technology used (PV solar, solar thermal, wind, hydro, biomass or biogas) is defining the needs, the scope of actions, the internal organization and the type of actor of a given community. Projects are set thus up differently accordingly. For instance, the type of shareholders is variable according to the capacity of the power plant. For projects with small capacity, like rooftop solar PV, shareholders will generally prefer to invest in local projects even if the profitability of the project is low but in which than can be more involved in the decision making process. Some others look more for profitability and are willing to invest on projects at national level, identified for instance thanks to a crowdfunding platforms, like *Energie Partagée Investissement*. This kind of projects are generally bigger, like wind projects. To sum up, small solar energy plants set up by communities offer a low profitability (below 1%) and is mainly funded by local activist, while wind energy projects offers a better profitability (around 4%) and shares are more expensive and members are waiting return on investments.

The number of citizens involved, directly (as active membership) and indirectly (as shareholder) is roughly the same across communities. Generally a PV roof top project is launched with 40 citizen shareholders, and established ones can gather around 150-200 participants. Wind based power plants gather generally between 150 and 250 shareholders. Active memberships are essential for sustaining communities' actions and growth, particularly for the smaller projects for which many tasks are done by volunteers.

Task 3.2: Challenges faced by French energy communities

Similar to their European counter parts, French energy communities face a number of technologic, financial, organizational, and legal barriers impeding their emergence and growth.

A strong dependence on national and regional support schemes

Energy communities are strongly dependent on public support schemes. In France existing support schemes and the way they are allocated have mainly two impact on energy communities. First energy communities depend on feed-in tariffs. Interviews revealed that many energy communities start with very small roof-top PV project around 9kWc. However because of ever decreasing feed-in tariffs these projects are no longer viable pushing energy communities to start bigger projects if at least 36 kWc. Many interviewee expressed their concerns that this will make it more difficult for energy communities to be initiated. Moreover, if projects are equal or bigger than 100 kWc, project developers have to apply to call for tenders to be able to receive public support. The CRE then selects the cheaper offers within its capacity limit. Interviewees mentioned that projects that are not located in the south of the country are always less profitable and cannot win the tenders. Furthermore, to benefit from feed-in-tariffs, energy communities are not free to choose which energy suppliers to sell their power to. They have to sell the power they produce to EDF. Since 2016, a second potential buyer, Enercoop, has been authorized by decree to purchase at power at regulated rates (with a maximum installed capacity of 100 MW). However, many barriers exist for energy communities that want to make the switch. For instance, they have to wait for a year before they can ask Enercoop to purchase their power. Moreover, they have to pay a transfer fee.

We have also observed that geographical difference. Some Regions have developed specific support schemes to help energy communities to be created. The Occitanie region for instance offers 1 euro per euro of citizen invested (with a maximum of 500 euros per citizen). This make the financial context more suitable in some region then other which may explain why project are not equally spread throughout the country.

Grid connection – a recurring problem

Another important barrier relates to grid connection. When interviewees were asked to give examples of difficulties they faced, the large majority of them mentioned Enedis. This is illustrated by the following quote: « what explains the lengthiness of this project and also almost killed it in the grid connection cost of Enedis which is absolutely not viable". According to an interview cost of grid connection can vary between 1000 € and 50,000 €. This has a very important impact on the economic feasibility of the project. Moreover, interviewees criticized grid connection costs for lacking transparency. For instance, one interviewee explained that they has asked a quote from a subcontractor of Enedis in order to anticipate grid connection costs in their overall budget plan. However, the cost estimated by the subcontractant was twice as low as the cost as the official quote they obtained from Enedis, compromising the realisation of their project.

Here again important differences exist depending on the geographical location of the project. The grid has historically been design in a descending manner with large centralised power plants producing power transported up to very remote location in rural areas. When a new renewable energy production plant needs to be connected to the grid, project developers have to pay for the grid to be reinforced. These costs are usually much higher in rural areas where the grid has less capacity. This can compromise the success of the project. As explained by one interviewee, "even if a project makes sense locally, it is a barrier and mainly in more rural areas".

To work around this problem energy communities may ask the municipality to reinforce the grid before they realise their project. However, this requires the energy community to have the support of the municipality and is only possible if the municipality has the budget to pay for the reinforcement.

Managing human resources

Volunteers are the pillars of energy communities that cannot exist without sufficient active involvement from citizens. Volunteers are central because they are needed to perform a number of very operational activities (e.g. recruit new shareholders, find new generation sites, etc.). It avoids subcontracting and significantly reduce the costs of operation. As explained by one interviewee and similar to other volunteer-based organizations one of the challenges energy communities face "is link to their capacity to renew volunteers, the volunteer workforce and to maintain it on the long term ».

Again, the interviews revealed important differences depending on the social structure of the area where the energy community is being created. Energy communities in rural areas where many people are retired usually have less difficulties finding volunteers and keeping them. In Urban areas however, energy communities often involve young professionals and have difficulties securing their involvement for longer period of time. One interviewee for instance explained: "we have people that are more mobile. […] It is a real problem for us. We have a high turnover of sometimes less than 3 months". This creates specific needs for information and knowledge management not to lose all the knowledge that volunteers accumulated when they leave and be able to transmit it to new ones.

Moreover, skills and expertise of the volunteer base strongly influence what the energy communities will or will not be able to do. The interviews indicates that “double hats” are a common phenomenon in energy communities. Active members often either come from the energy sector or are linked with local public authorities. Energy communities where the double hat phenomenon is important are able to overcome problems by drawing on the personal networks of their members. The interviews also revealed that active members of energy communities often are people (in fact often men) with a technical and/or an energy background. One interviewee for instance explained: “we bring energy production on the table so we attract men that have a technical background or that are prokject minded. There are much less women”. Communities have difficulties attracting members with other profiles. Some energy communities for instance mentioned lacking members with digital communication skills.

Energy communities – what for?

Another important barrier identified relates to finding attractive ways to communicate about the projects being conducted. Even though there is a clear trend in people waiting to have more of a say in what takes place around them and in wanting to consume things that are produced locally and traceable, this does not reflect yet in people’s willingness to participate and support energy communities. As one interviewee explained: “it is weird when we see the mobilisation against climate change. There are many people mobilised for these types of events. But when it is about implication on the question on collective energy production, it is less strong”. Energy communities interviewed frequently complained that they have difficulty raise interest for their project, even when they are considered as rather successful by their peers. As explained by another interviewee, “people who took that in the energy community are people that are quite sensitive to the subject. We do not mobilize the broader public, far from that”.

Local public authorities between support and constraints

The interviews revealed that many projects depend on the support of local public authorities for their realisation. Besides providing their help in financing grid connection costs, municipalities can be important contributors to energy communities. They can buy shares in the energy community. We have also seen various examples where the energy community had been initiated by the municipality. Municipalities also often let energy communities install (for a very marginal price) PV panels on the roofs of public buildings (such as schools for instance). Municipalities may also be passive supporters of energy communities. They can allow energy communities to communicate about their project in municipal newsletter for instance or offer rooms to organise meetings.

However, municipalities can also be the source of various constraints. Projects that take place in larger municipalities for instance have to interact with various departments in the municipality and this is not always very simple. As one interviewee explained: “the urbanism department blocks us, the juridical department blocks us, the architects first says yes and then no”. These additional constraint can result is lengthier projects or projects that do not get realised at all.

Raising money - a problem of credibility and low return on investment

Energy communities also have difficulties financing their project. Many interviewees experiences difficulties to obtain loans from the bank even though they benefit from feed-in-tariffs for 20 years from the government. As explained by one interviewee, “mais les banques sont assez frileuses plutôt de l'aspect gouvernance et de l'aspect multi-sociétariat ». Moreover, energy communities also need to raise money from local stakeholders. However, they are not able to propose attractive returns on investment and are often not willing to. As one active member explained: "take the Livret A. it is also more interesting to invets money in our energy community! But it is clear that people do not do that to make money. If we are doing to pay 1, 1.5, maximum 2%, we do not know, the GA will decide. But in any case we do not do that for the bucks”. Even though this approach is quite commendable, this surely limits the number of people who may want to take parts in a project developed by an energy community.

Difficulties to manage risk

Energy communities also mentioned that risk management is very complicated for them. Before realizing a project, they have to conduct all kinds of studied (e.g. to check the technical and economic feasibility of the site, to find out what the cost would be of connecting the new production capacity to the grid). It frequently happens that the studies show that the projects are not feasible. Project developers usually cover these costs by developing a portfolio of project, the benefit from successful projects covering the costs of feasibility studies for unrealised ones. However, energy communities cannot do that and these studies can represent real burdens on their financial sustainability. To remedy this problem, the national fund Enercit was created in 2018 by the Ministry of Energy Transition to co-invest in community energy projects with the particularly to help the initiatives during the development phase. However, it is meant to support rather large projects (bigger than 250 kWc). Small energy communities do not have access to specific support schemes and are dependent on regional support if any. In Auvergne Rhône Alpes, the region provides support for energy communities to finance these feasibility studies.

Insurance

Finally, a very operational problems that energy communities are facing is to find an affordable insurance. Many interviewees explained that finding an insurance is very difficult, especially when they want to develop project on roof tops. And when they find one, they are often asked to pay high insurance premium. This is because insurance companies do not have standard offers for these types of projects and as one interviewee explained “do not understand what energy communities want”. Because they rent the roofs on which the PV panels are installed, they are conducting project on buildings that do not belong to them. Some interviewees explained that they were asked to take the insurance normally proposed to prime contractors which has a very high premium even when they were not performing that role. Others said they had to pay the insurance of a service provider which is also very expensive.

Task 4: Mapping the energy community ecosystem

All previous mentioned researches mainly focus their scope of analysis on individual energy communities by conducting longitudinal case studies (Lethonen 2019; Yalcin-Riollet et al 2014; Lakshmi and Tilley 2019; Mahzouni 2019) or taking a country specific prism (examples include Yildiz 2014; Herbes et al 2017; Mirzania et al. 2019; Koirala, et al 2018). However, some scholars highlighted the importance of "inter-organisational" actions among cooperatives (Bauwens et al., 2016) and the need for energy communities to coordinate their actions (Proka, Hisschemöller, et al., 2018). In line with Kooij et al. (2018), we posit that energy communities need external supports (networking, lobbying, financial, and technical) to achieve their main goals. We argue that analysing how this support is structured would enrich our understanding of the challenges faced by energy communities in fulfilling their potential to contribute to the energy transition. In the next section, we propose taking an ecosystem perspective to analyse energy communities and their supporting organizations.

Existing literature focus and discuss mainly the factors of success through the individual community perspective. However, surrounding actors or cross-functional activities among communities are essential for these initiatives to facilitate their development. Bauwens et al (2016) highlight the importance of "inter-organisational" actions among cooperatives enabling them to survive in their fragile environment. In line with Kooij et al (2018) we argue that energy communities need external supports (networking, lobbying, financial, and technical) to achieve their main goals.

The existing research has almost exclusively studied the emergence of energy communities through a country specific prism. These articles screen the energy communities at the national level to get a better understanding of their organization or institutional structure, financing, and membership. Examples include Yildiz 2014; Yildiz et al 2015; Kalkbrenner and Roosen 2015; Herbes et al 2017; Brummer 2018; Holstenkamp and Kahla 2016 for the pioneering country Germany, Seyfang et al. ,2014; Mirzania et al. 2019; Seyfang et al. 2013 for the United Kingdom, Petersen, 2018 for Denmark, or Koirala, et al 2018; Vasileidou 2018 for The Netherlands. Some other articles focus on longitudinal case studies and gather empirical data from one individual community to assess their potential and replicability (Lethonen 2019; Rogers et al 2008; Rogers et al 2012; Yalcin-Riollet 2014; Lakshmi and Tilley 2019; Mahzouni 2019). Finally country benchmarking analyses permit to highlight national best practices that could be taken as example for other countries (Gonzalez et al 2019), or identify common features of communities across countries (Bauwens et al, 2015; Azarova et al 2019). In the following, we introduce ecosystem theory and the kind of questions it helps raising about energy community ecosystem. We then compare energy communities ecosystem in France and the Netherlands.

Task 4.1: Literature review on ecosystem theory

Introducing the ecosystem concept

The concept of ecosystem is a metaphor borrowed from biology to refer to a group of organizations that interact with one another and are interdependent (Boons & Bocken, 2018; Jacobides, Cennamo, & Gawer, 2018; Tsujimoto, Kajikawa, Tomita, & Matsumoto, 2018). It recognizes that organizations do not exist in isolation but depend on resources and capabilities of others (Håkansson & Snehota, 1995). The concept has gained in importance both from scholars and practitioners in the fields of strategy (Adner, 2017; Teece, 2016) and management of technology and innovation (Adner & Kapoor, 2010; Kapoor & Lee, 2013). The concept of ecosystem has been used to study how a set of interrelated organization can develop new products, services or technologies when they operate autonomously but are interdependent (Jacobides et al., 2018; Tsujimoto et al., 2018). This interdependence comes from the fact that organizations develop assets that complement one another and increase each other's market value (Brandenburger & Nalebuff, 1997). These complementary assets can be very diverse, ranging from access to distribution channels, connections with end customers, or the provision of knowledge and expertise (Teece, 1986). A central argument is that for the ecosystem to succeed actors have to coordinate themselves and may also need to engage in joint innovation activities (Adner, 2012; Adner & Kapoor, 2010; Kapoor & Lee, 2013).

Scholars have emphasized different aspect of the ecosystem concept depending on their objectives. Focus has either been on what Adner (2017) calls ecosystems-as-structure or ecosystems-as-affiliation. The first focuses on a given value proposition that depends on the interaction of multiple actors to materialize (Adner, 2017). The second is "characterized by a large number of loosely interconnected participants who depend on each other for their mutual effectiveness and survival." (Iansiti & Levien, 2004: 8). This paper builds on the latter perspective. The main reason behind choosing the perspective of ecosystems-as-affiliation is that this paper is interested in understanding the dynamics surrounding citizen-led energy communities. Even though energy communities share the will to place citizens at the core of the energy system, they do not all achieve that in the same way – in other words, and recalling Adner's words, not all energy communities try to materialize the same value proposition. As such, we posit that dynamics surrounding the emerging of citizen-led energy communities are interesting to analyse from a more macro perspective looking at the emergence of a somewhat heterogeneous phenomenon instead of as materialization of a focal value proposition.

In ecosystems-as-affiliations, the ecosystem is a community of organizations that affect each other through their activities (Teece, 2007). Members of the ecosystems may be customers, suppliers, technology providers, business associations, and knowledge sharing platforms (Iansiti & Levien, 2004; Moore, 1996). This strand of literature stresses the fact that organizations belonging to the ecosystem have a "shared fate" (Iansiti & Levien, 2004): the performance of individual actors depends on the performance of other actors in the ecosystem. Various studies also point to the role of keystone players - also called lead firm (Williamson & De Meyer, 2012) or ecosystem captain (Teece, 2016) – in the emergence and evolution of the ecosystem (Teece, 2007). The health of the ecosystem depends on keystones' success in creating common complementary assets that others can build on to develop their own offerings (Iansiti & Levien, 2004). Scholars also show that different dynamics can be at play within the ecosystem (see Boons & Bocken, 2018): some organizations may for instance compete with one another for access to resources; others may have mutualistic relationships meaning that the success of one benefits the other; some organizations may also have symbiotic relations and reinforce one another. When they do they may start to co-evolve with one another and adapt to each other's capabilities (Iansiti & Levien, 2004; Teece, 2016).

Ecosystem theory to study energy communities: question raised

We argue that analysing energy communities and their supporting organizations from an ecosystem-as-affiliation perspective – further referred to as ecosystem perspective - can provide new insights an help better understand the role supporting organizations play in the emergence and growth of energy communities. Taking an ecosystem perspective allows analysing three ecosystem characteristics. First, it encourages analysing the functions that are fulfilled by ecosystem actors by looking at the type of support ecosystem actors provide. This will provide information about how well the ecosystem functions. An ecosystem may not function well if some functions are missing for instance or not sufficiently present. Linked to this, it is also interesting to look at which trophic level the functions are being fulfilled Tsujimoto et al., (2018): are these functions provided locally, regionally, or nationally, why and how does this influence ecosystem dynamics?

Second, to understand how healthy an ecosystem is, one may look at ecosystem resources (Jacobides et al., 2018). Resources may be financial, human, material (Boons & Bocken, 2018). Energy communities strongly depend on public policies (Mirzania et al., 2019; Oteman et al., 2014), and especially the extent and the way in which they allow the ecosystem to access financial resources. Understanding how much resources are available, where these resources come from, and how they flow in the ecosystem (Boons & Bocken, 2018) may help explain why an ecosystem performs better than another. Moreover, it may also be interesting to look at the type of relationship that exist between the energy communities ecosystem and incumbents in the energy sector. Do they compete for resources or are there any symbiotic relations (Boons & Bocken, 2018)?

The third ecosystem characteristic that is interesting to analyse relates to the type of ecosystem actors that are present. One may look at whether these actors are dedicated to energy communities or whether they are incumbent organizations long active in the energy sector. One may also consider whether they are public or private organizations, for profit or not for profit. Such an analysis would provide information about the level of diversity present in the ecosystem. Ecosystem diversity influences how resilient the ecosystem is to change (Tsujimoto et al., 2018), a higher diversity leading to more resilience (Göthlich & Wenzek, 2004; Loreau, 2010). Moreover, additional insights about ecosystem resilience may come from analysing whether keystone actors are present (Iansiti & Levien, 2004) and the type of organisation fulfil that role and where their resources come from.

We posit that understanding how an ecosystem functions, the type of support it provides, the resources it has access to and the diversity of actors that composes it will provide additional and novel insight to understand the dynamics behind the emergence and growth of energy communities.

Task 4.2: Comparing French and Dutch energy communities.

Central to energy communities ecosystem are the communities themselves. We have observed important differences between French and Dutch energy communities. To understand these differences, it is first important to highlight that even though their objectives are similar – they all aim to empower citizens to take part in the energy transition and participate in local renewable energy production – French and Dutch energy communities are rather different when it comes to how they try to achieve their goal.

The first difference concerns the type of activities they organize. In France, energy communities usually focus on collecting investments of citizens in order to buy and install local renewable energy capacities. Few have diversified their activities to include animations around energy saving measures for instance. In the Netherlands, energy communities often have very diverse activities including energy production, energy efficiency, energy literacy, collective buying of electricity and sometimes even electric mobility. They may also conduct short-term research projects for local public authorities. Three reasons may explain these differences. First, the movement is more recent in France and practitioners explained that developing renewable energy production is the typical way to start an energy community as it directly provides visible and concrete results. Many interviewees mentioned considering broadening their scope even though they have not done so yet because of lack of means or experience. Moreover, energy communities in France often do not have enough members to be able to organize activities such as collective buying of electricity. Finally, another reason may be that in France, many municipalities have created local energy agencies that are in charge of supporting energy literacy, energy efficiency and energy communities do not want to compete with already existing public organizations.

A second difference relates to the “raison d’être” of energy communities, to their identity. This is linked with the characteristics of their national energy sector. In the Netherlands, the energy mix is strongly based on fossil fuels (e.g. 80% of Dutch electricity is generated from fossil fuels, Enerdata) and the sector is dominated by three large energy companies, two of which have been acquired by foreign companies. Moreover, while many Dutch consumers have green electricity contracts, very little renewable energy is produced locally, most being imported from Scandinavian countries. To give an order of magnitude, in 2017, 69% of Dutch consumers had a green electricity contract (ACM, 2017) while renewable accounted only for about 15% of Dutch electricity consumption (CBS, 2018). This may explain why cooperatives often use words like “from us for us” or “from our own ground” and their strong focus on moving away from fossil energy towards what the local energy monitor calls “positive energy”. In France, the situation is very different. First, the energy mix has a low carbon intensity (e.g. 8% of French electricity generated from fossil fuels, Enerdata) due to a high share of nuclear and hydropower. Moreover, the sector is dominated by one national champion. Energy communities often exist to fight against the supremacy of this national champion and bring citizen at the heart of a decentralized energy production. They are also often created to offer an alternative to nuclear power. As explained by one of the experts interviewed, energy communities “often result from citizen initiative from activists that begin projects”. This may also explain the why French energy communities find it important to communicate about their governance model and the fact that it is often based on a “one person one voice principle”.

Task 4.3: Comparing ecosystem functions and actors

Energy community ecosystems in France and in the Netherlands include a variety of supporting organizations. The data showed that they fulfil four categories of functions: 1) lobbying; 2) networking and knowledge sharing; 3) technical and commercial support; 4) financial support. In this section, we present each of the functions generally. We then compare how they are fulfilled in both countries and by which type of actor, especially focusing on points of divergence.

Moreover, the empirical investigation revealed an important actor that we named cooperative of communities and that plays a hybrid role at the crossing of these four categories. These cooperative of communities are also presented and discussed. Results are summarized in Table 5.

Table 5: Main ecosystem actors in France and The Netherlands

	France	**The Netherlands**
Lobbying	Lobbying is rather distributed among the national key players: Enercoop, Energie Partagée, etc.	Consolidation of lobbying actors within the single entity Energie Samen
Networking	Networking is not yet converging with Energie Partagée Association as the main national player and Centrale Villageoise on the East of France	Structured knowledge platform Hier Opgewekt at national level
Technical /commercial	Single main active supplier Enercoop	Diversity of competing suppliers, including the communities themselves
Financing	National central actor for big projects (i.e. above 1 MW) and concentrating mainly on leveraging funds (Energie Partagée)	Completely liberalized and diversified source of revenues (feed-in Tariff, client's fees, targeted customers, etc)

Lobbying

Energy communities propose a new model for the energy system, one based on more decentralized and renewable energy; a model in which not only big private firms but also citizens should have a say in the governance. To exist and grow, energy communities need to be recognized by policy makers as an important actor and be given a space in this hyper-regulated sector (Kooij et al., 2018). That is why the first function in the ecosystem includes lobbying activities. Lobbying for energy communities is usually done by associations or NGOs, like Rescoop at EU level.

The main difference between France and The Netherlands is related to the diversity of interests that are represented. In France, lobbying is done by two sister organisations: Energie Partagée, an association which supports and finances renewable energy projects and Enercoop that is a green energy supplier. These organizations have overlapping governance structures and represent the interests of citizens and public authorities that are driving sustainable energy initiatives. In the Netherlands, historically various organizations have been created, each supporting a specific interest: Pawex represents the interest of individual wind turbine owners, many of whom are farmers; ODE decentral represents the interest of renewable energy producers and consumers; Hoom is a cooperative supporting local energy savings; Rescoop NL supports citizen-led initiatives to produced renewable energy. These actors realised that they all have a common vision: the energy transition cannot be realised without active participation of citizens. In 2018, they decided to create a single overarching organisation, Energie Samen ("Energy Together" in English). By merging, they expect that speaking as a single voice will reduce confusion and give them more lobbying power to shape policies to their advantage.

Knowledge sharing and networking

The second function concerns networking activities. Energy communities are very localised projects driven by volunteers. Even though previous research showed that active members often have sectorial expertise (Radtke, 2014), the complexity and the norms imposed by the energy sector create high barriers to entry for energy communities. That is why sharing knowledge and best practices is especially important for energy communities. Even though knowledge sharing often takes place bilaterally between energy communities themselves, dedicated association also exist that centralise information, provide tools to facilitate decision-making and organize events to create a network of members of energy communities. These associations also map on-going collaborative energy project experiences in the country making them more visible both individually and as a movement.

In the Netherlands these activities are structured around a single knowledge sharing platform, Hier Opgewekt ("produced here" in English) which is set up at the national level. Moreover, it is interesting to mention that incumbent energy suppliers and even distribution system operators also help individual energy communities navigate national policy schemes. In France, two competing structures exist both covering large part of the French territory: Énergie Partagée Association (EPA or "Shared Energy Association" in English) and Centrales Villageoises ("village power plant" in English). Both French associations support citizen projects but Centrales Villageoises promotes smaller ones and under the condition it is implemented using local resources and competences (social and solidarity economy).

Even though at the surface the ambition of French and Dutch knowledge sharing platforms seem quite similar, we observe important differences regarding what these platforms do exactly. In France, both structures support rather homogeneous local energy community developing activity based on citizen and territory engagement, with a clear objective of becoming more independent from national incumbents. In the Netherlands, Hier Opgewkte offers a place where energy communities can challenge how they can best reach their objectives; they can question their identity and purpose. For instance, they discuss the pros and cons of interacting with energy incumbent actors or discuss the tensions between being volunteer-based and employee-based. Moreover, the Dutch platform has also done a lot of efforts to develop communication tools in the form of stories that energy communities can use to raise local interest.

Financial support

The third function in the ecosystem is financing. For energy communities, finding money to finance the projects they want to realise is a crucial activity. Even though some communities chose to collect funds on their own, others rely on crowdfunding platforms for instance to help them set up the campaign and raise funds from citizens that live more or less close to the projects they want to realize. Similarly, managing the distribution of dividends to their shareholders is also something they need to organize well. This is especially important given that the money they raise often comes from citizens who invested part of their savings in the energy community. Crowdfunding platforms can also help energy communities take care of this in a professional manner. To enable their implementation, dedicated funds help the financing of these projects during risky moments such as during the development phase.

Crowdfunding of renewable energy projects is organised differently in the two countries. In France, even though many private crowdfunding platforms exist one actor clearly stands out as a central actor for energy communities: Energie Partagée Investissement (EPI). EPI facilitates the collection of citizens' funds and invests in renewable energy production sites led by citizens. It has become an obligatory passage point for big projects (e.g. wind or solar farms with a capacity exceeding 1MW). In the Netherlands, this is more distributed and various actors, often private are active in this niche.

Operational and technical support

Finally, the last function revolves around actors that provide operational and technical support. To realise projects, energy communities need to take care of a very large number of tasks. This includes identifying suitable sites, performing impact assessment studies, negotiating contract with site owners, selecting and acquiring technical components, contracting with service providers for electrical engineering or opportunity assessment studies, securing grid-connection, finding insurances, organising and following installation, monitoring the plant and performing maintenance activities, sometimes also selling electricity to their members. In most of the cases, energy communities do not have the internal capacity to internalise all these activities and subcontract them to professional organisations. Moreover, energy communities also need to invest a lot of time to communicate about who they are, what their mission is in order to mobilize citizens. They do so by publishing tracts, creating a website, organising events. Our interviews revealed that energy communities, especially when they have been initiated by technically minded people, need help to better communicate to the general public.

Among the two countries, we noted three main differences. First, technical and operational support in France is often performed by local energy agencies or local institutions of Energie Partagée Association all financed by public funds. In the Netherlands, this function is mostly organized by organizations coming from the private sector. Second, energy suppliers play an important role in both countries. However, in France only one supplier, Enercoop, is involved. In the Netherlands, several energy suppliers provide services including both technical/legal and financial supports, like Greenchoice and the historical incumbent Eneco or Engie. Third, in both countries cooperatives have been developed to increase the autonomy of energy communities towards incumbent actors. In France, everything is centralised around aforementioned Enercoop that allow energy communities to indirectly supply electricity to their members and to bypass incumbent energy suppliers. In the Netherlands however, various actors exist covering larger part of the value chain. Cooperative energy suppliers exist at the national (e.g.OM), or the regional level (e.g. Energie van ons in the North or Achterhoekse Energie in the East) that allow cooperative supplying electricity to their members. Moreover, cooperatives also exist that provide specific services to energy communities, service that require economies of scale. Ecode for instance offers since April 2018 an ICT platform specifically tailored to the needs of energy communities. Another example is HOOM that developed tailored support and coaching for energy communities that want to promote energy efficiency.

Task 4.4 Cooperative of communities: local catalysers

The analysis revealed that at the intersection between the four functions, cooperatives of communities play a very important role. They can centralise and mutualise information; they act as intermediaries providing access to the supporting ecosystem; they can make it possible to initiate larger projects; and they can become energy communities trustee locally. Doing so, these cooperative of communities act as local catalysers speeding up the growth of the ecosystem locally.

To begin with, realizing projects can be very time consuming for energy communities. When the project is completed, volunteers have gained a lot of knowledge and expertise. However, many interviews also mentioned that volunteers do not always have the motivation to carry on another project putting an end to the growth of the community. Besides, to realise projects, initiators of energy communities need to understand the norms and rules prevailing in the sector and this requires specific knowledge and expertise (van der Schoor & Scholtens, 2015). To address this issue, we have observed both in France and in the Netherlands that, after the successful realisation of the first project, a few active members often create a cooperative of communities with as purpose to ease the burden on future project initiators. They provide local support for all kinds of operational activities regarding technical, commercial, financial or networking issues. These cooperative of communities often have a pre-defined scale of action usually encompassing a few municipalities with a common identity. Gresi 21 in France for instance, encompasses municipality in the area known as Gresivaudan. Similarly, Kennemer Energie in the Netherlands encompasses all the areas in the so-called Kennemerland. That way they can also have a good overview of all the ongoing projects or initiatives and represent a “one-stop shop” to link potential volunteers with projects.

Moreover, cooperative of communities also represent intermediaries between initiators and the supporting ecosystem. They allow access to the ecosystem even for individuals that do not belong to the existing networks. Moreover, in France specifically, we have observed that several small energy communities do not meet the conditions required by the ecosystem actors (e.g. generation capacity exceeding 1MW) to benefit from their support. They depend on their own capabilities and resources to develop and grow. We find that what these communities manage to achieve heavily depends on the personal network that their founders are able to mobilize. For small energy communities, setting up a cooperative of community can be a way to benefit from the ecosystem without formally drawing on it. However, we have also observed that there is a tendency for energy communities to grow and evolve towards projects that fit the characteristics required by the ecosystem.

Furthermore, small energy communities often do not have the capacity to realise large renewable energy projects such as wind farms on their own. When they want to take up the challenge, we have observed that they often join with other energy communities in their region and mutualise their resources. In the municipality of Dordrecht for instance, two cooperatives, the energy cooperative of Dordrecht and Drecht Energy, have joined forced to build a wind turbine in an industry terrain. Similarly in France, some cooperatives wanting to diversify their activities, invest in bigger projects - they could not carry on alone - with other partners. This is the case of the Chamole citizen-led wind farm community that has been bought by a group of cooperatives, namely SEM Énergies Renouvelables Citoyenne, la SCIC Jurascic, la commune de Chamole, ERCISOL et Énergie Partagée.

Finally, energy communities lack credibility as energy actor. Interviews indicate that this lack of credibility comes from three reasons. First citizens have long been excluded from the energy sector and are not considered as credible partners. Moreover, the turnover of volunteers can sometimes be fast. This implies that people who follow projects change rather frequently. This is a source of uncertainty for actors (i.e. clients, suppliers and partners) that energy communities need to collaborate with. Finally, energy communities develop projects that should be operating for a few decades. Being volunteer driven raises questions about whether they can sustain themselves other such long periods. We argue that cooperative of communities can represent the trustee for energy communities locally. They may take over the management of projects if initiators leave and are not replaced. If they are able to support enough projects and be remunerated for that, they may be able to move to a hybrid structure (partly volunteer partly employee based) resulting in a more stable organisation, especially able to take care on daily activities. Here we observed important differences, namely that in the Netherlands the financing of these actors comes both from public funds and from energy communities themselves that pay them to outsource some activities. In France however, energy communities hardly have the means to pay for their cooperative of communities who mostly rely on volunteers or on local public funding if available.

Task 4.5: Comparing ecosystem resources

The way an ecosystem functions is highly dependent on its access to resources. Even though different types of resources may be important, we will focus on the one we consider the most crucial for energy communities: financial resources. Energy communities and their ecosystem are strongly dependent on public financial support at local, regional and national level. How much financial resources they can obtain will have two major impacts on energy communities and on organizations in their ecosystem. First, it will influence their capacity to have employees. Focusing on energy communities, they strongly depend on the implication of volunteers that can perform different services (e.g. recruit new shareholders, find new generation sites, etc.). It avoids subcontracting and significantly reduce the costs of operation. However, the interviews revealed that when they have the ambition to grow and keep on developing projects, being able to finance someone becomes crucial. Similarly, the quality of the services ecosystem actors can provide to energy communities depends on their capacity to have employees performing daily activities. Second, how much financial resources energy communities can access will also determine how financially attractive their projects are for their members. Indeed, even though most energy communities are not looking for profit, they do promise some return on investments to their shareholders or to members that buy solar or wind shares.

We will first focus on resources available to energy communities. In both countries, the revenues of energy communities depend on the level and structure of national subsidies.

In France, energy communities generate revenue by selling kWh of renewable electricity. They benefit from feed-in tariffs that are digressive over time. Because of that, important differences can be observed depending on the size of the projects realized. Big projects (with energy capacity exceeding 1MW) are able to distribute “attractive” returns on investments, namely above 3% and present their project as profitable to their shareholders. Smaller projects however, are less economically attractive, and communicate returns on investments that are quite marginal and usually only slightly higher than the national regulated savings account “Livret A” which was at 0.75% in 2019. In fact, the priority of small energy communities is to reach a balanced budget. Moreover, we also observed important differences within the country. Indeed, some regions created grants to support energy communities. Region Occitanie in the South of France for instance provides 1 euro per euro invested by citizens, increasing the financial viability of the renewable energy projects.

In the Netherlands, energy communities have more diverse sources of revenue and the size of the project is not a differentiating factor in determining their economic viability. Similar to French communities, they also get money per kWh they deliver. One of the prevailing support mechanism called "Stimulation of Sustainable Energy Production" (SDE +) which compensates for the difference between the price of the technology and the market value. For PV projects, the same level of subsidy applies to all project ranging from 15kWp to 1MWp. When energy communities choose this scheme, citizens can invest in the project and receive dividends similar to what happens with large French energy projects. Another support mechanism is called the postcode scheme. This subsidy allows individuals that own part of a renewable energy capacity that is located in the same or in an adjacent postal code area to deduct the energy that their share produces from their monthly electricity bill and benefit from tax reduction on the electricity that their share produces. This scheme creates a potential additional revenue for energy communities. Indeed, central to the postcode scheme are energy suppliers that act as intermediary and it has become common practice for energy supplier to pay energy communities a fee for each of their member that becomes their customer. Finally, Dutch energy communities also usually charge a small membership fee that gives access to the activities they organise.

Moreover, governments in both countries are (planning to) set up a special fund to finance the development phase of energy communities projects. Many interviewees mentioned that development phase is costly and risky for energy communities. Many projects are not realised because energy communities have difficulty financing this phase. In comparison with project developers, energy communities, especially when they are just starting, also do not have the means to spread risks over multiple projects. Energy communities and their representatives have lobbied government to remedy this situation. In France, this resulted in the creation of a fund managed by Energie Partagée called EnRCiT and in the Netherlands the government agreed to create a development fund which is still in development.

It is also interesting to discuss how ecosystem actors are financed. In the Netherlands, some ecosystem actors are financed by incumbents from the energy sector. Hierpogewekt in charge of network and knowledge sharing is partly financed by the three biggest Dutch DSOs. Similarly, the cooperative of communities HOOM benefits from a starting fund paid by the DSO that initiated it. Incumbents do not participate in financing the French ecosystem. In both countries some ecosystem actors are also directly financed by energy communities. This is the case of crowdfunding platforms such as Energie Partagée Investissement or Greencrowd for instance. An important difference however is that in The Netherlands energy communities are able to finance larger parts of the ecosystem. They for instance pay for training, tools or other kind of support that cooperative of communities offer them. In France, the ecosystem appears more dependent on public support. Energie Partagée Association for instance strongly depends on funding provided by the French government via the French environment and energy agency (ADEME). Similarly, French cooperative of communities rely either on volunteers or on support from public institutions at the municipal or regional level.

Task 5: Synthetizing the conclusion and recommendations

Ecosystem diversity

Our data shows that the Dutch ecosystem revolves around a few national keystones that take care of lobbying and knowledge sharing. For other functions (financing and technical and operational support) there is no clearly identifiable keystone as various actors compete to provide energy communities the complementary assets they need. This results in an ecosystem that appears as a single phenomenon at a high level but that spurs a lot of diversity at the local level as energy communities can draw on the supporting ecosystem that corresponds best to their own mission and objective. It also creates an environment favourable to innovation as actors have to differentiate themselves to be more attractive for energy communities. In the French case however, two sister organizations act as keystone for most of the ecosystem functions that have been identified. The empirical investigation also revealed that, to be able to access the ecosystem and the complementary assets it provides, energy communities tend to evolve in order to fit with the dominant model supported by these organizations.

Ecosystem theory stresses that keystones play a key role in shaping the development ecosystems (Moore, 1996; Teece, 2016). Our research sheds light to the ambiguous role keystones can play in energy community ecosystems. On the one hand, when they represent umbrellas for a wide variety of initiatives, they can be the key to securing institutional support from government (Kooij). On the other hand, concentrating too much influence in a single keystone may be detrimental for the long-term development of the ecosystem. Because of their central position, keystones dictate the co-evolution process (Lewin & Regine, 1999; Peltoniemi & Vuori, 2004) and their role may be detrimental in the long run if it leads to an increasing level of homogeneity in the ecosystem, a characteristic known to be unfavourable for innovation (e.g. (Grabher, 1993)).

Local keystones

The data also highlight that national actors are not the only ones that can act as keystone in the energy community ecosystem. Cooperative of communities embedded locally are also important keystone players that can act as catalyser and boost the growth of the ecosystem. Individual energy communities are centred around a few actively involved citizens that are able to initiate and realise concrete projects in their local environment (Dóci & Vasileiadou, 2015). For energy communities to start having an influence on the energy sector they need to grow and recruit more members. Cooperative of communities can mutualize tools, knowledge, and network can make it easier for initiators to realize their project thereby decreasing barriers to entry. They help project to be replicated in more places locally. Moreover, cooperative of communities can be intermediaries between project initiators and a broader supporting ecosystem which individual initiators are not always able to access. The data suggest that the optimal geographical coverage of these cooperative may vary depending on their own mission and on the local context. However, to be able to support energy communities we observed that cooperative of communities have to find their own optimal size. One the one hand they have to cover a large geographical space to support enough project and if possible be able to move to an employee-based structure. Being less dependent on the active involvement of volunteers can make them less vulnerable and more likely to sustain themselves over time (Kooij et. al, 2018). On the other hand, they should be local enough to be able to provide personalized support to initiators, allow physical contacts among community members, and raise trust (Koirala et al., 2018). This is crucial to build the social capital necessary for these organizations to succeed (Walker, Devine-Wright, Hunter, High, & Evans, 2010).

Link with existing system

Finally, our data indicate that the dynamics between energy community ecosystem and incumbent actors from the energy sector is quite different in both countries. In France, the ecosystem develops as an independent entity that interacts with incumbent actors only by necessity. Incumbents hardly contribute to the ecosystem and French energy community ecosystem develops as a separate niche that competes for resources with the rest of the sector. In the Netherlands, the situation is more contrasted. On the one hand, part of the ecosystem seeks to empower energy communities to become autonomous and compete with incumbent actors. On the other hand, part of the ecosystem is pragmatic and collaborates with energy incumbents if it facilitates access to complementary assets (e.g. specific expertise) or allows increasing revenues. Besides, incumbents also contribute to financing some of the keystone players. This suggests that Dutch energy communities are seen as credible organizations to work with by incumbents.

We argue that having both competing and symbiotic relations with incumbents make the Dutch ecosystem more likely to transform the sector. Previous research showed that because of their established market presence, incumbents have the capacity to transform mass markets, something small new entrants have difficulties to achieve (Hockerts). Transforming the energy sector will require changing the dominant logic of actors in an industry (Bidmon) and especially the dominant logic of incumbents. It implies changing the shared understanding of how to best create and capture value in an industry (Sabatier et al., 2012). Recent research suggests that reinforcing effects between three mechanisms are needed to induce change to a dominant logic: undermining existing logic, creating a new logic and complementing the novel logic (Vernay et al; 2019). We argue that by competing with incumbents, the energy community ecosystem contributes to undermining existing logic centred around the utility and showing that an alternative logic that empowers citizens is possible. These mechanisms are further reinforced by involving incumbents, leading to the emergence of a virtuous cycle that could induce change in the dominant logic (Vernay et al, 2019).

Research dissemination and research agenda

Paper presented at conferences:

- Sebi C., Vernay A.-L., Doutre J., 2019. Mapping the energy community cooperation chains, ECEEE Summer Study 2019, ECEEE, France
- Doutre, J. Vernay A.-L., Sebi C., 2019. Barriers and opportunities for French citizen led energy communities. International Conference on New Pathways for Community Energy and Storage, 6-7 June 2019

Publications in online media:

- Vernay A.-L., Sebi C., 2019. Communautés énergétiques : quand les citoyens bousculent le marché de l'électricité. The Conversation : online. 16 May 2019. https://theconversation.com/communautes-energetiques-quand-les-citoyens-bousculent-le-marche-de-lelectricite-116848
- Vernay A.-L.., 2019. Transition énergétique et pouvoir du citoyen. 8 April 2019. https://rcf.fr/actualite/environnement/transition-energetique-et-pouvoir-du-citoyen
- Sebi C, & Vernay C. 2019. Quel écosystème pour soutenir les communautés citoyennes énergétiques ? Xerfi Canal – Date à définit (novembre/décembre 2019)

Presentations in public event

- Vernay A.-L. 2019. Communauté énergétique, vraie ou fausse révolution. Presentation given during the « Rencontre de l'énergie » on the 10th of April 2019
- Sebi C., 2019. Experience the Future of Energy – EFEX Conference 2019 "The role of energy communities in energy trabsiution", 25th September 2019
- Sebi C., Vernay A.-L., Workshop about energy communities organised during Sharing Grenoble on the 5th of April 2019
- Vernay A.-L. 2019. Communauté énergétique, vraie ou fausse révolution. Participation to a panel during Enerplan's second annual summer school on self-sufficiency on the 12th of September 2019.

Articles to be published in peer-reviewed journals

- Vernay A.-L., Sebi C. Energy communities and their ecosystems. A comparison of France and the Netherlands. To be submitted to technology Forecasting and Social Change
- Sebi, C., Vernay A.-L., and Mallot, A. A typology of energy communities. To be submitted to Energy Policy
- Sebi C., Vernay A.-L., French energy communities – an overview of state of development and challenges. To be submitted to Energy Policy
- Gauthier C., Sebi C, & Vernay A.-L., Understanding citizens' motivation tob e part of energy communities in France? To be submitted to Energy Policy

Bibiography

ACM. (2018). Energiemonitor 2018: Consumentenmarkt elektriciteit en gas Retrieved from https://www.acm.nl/sites/default/files/documents/2018-06/energiemonitor-2018_0.pdf

Adner, R. (2012). *The wide lens: A new strategy for innovation*. London, England: Penguin.

Adner, R. (2017). Ecosystem as Structure: An Actionable Construct for Strategy. *Journal of Management*, *43*(1), 39–58. https://doi.org/10.1177/0149206316678451

Adner, R., & Kapoor, R. (2010). Value creation in innovation ecosystems: How the structure of technological interdependence affects firm performance in new technology generations. *Strategic Management Journal*, *31*(3), 306–333. https://doi.org/10.1002/smj.821

Azarova, V., Cohen, J., Friedl, C., & Reichl, J. (2019). Designing local renewable energy communities to increase social acceptance: Evidence from a choice experiment in Austria, Germany, Italy, and Switzerland. *Energy Policy*, *132*, 1176–1183. https://doi.org/10.1016/j.enpol.2019.06.067

Bauwens, T., Gotchev, B., & Holstenkamp, L. (2016). What Drives the Development of Community Energy in Europe? The Case of Wind Power Cooperatives by Thomas Bauwens, Boris Gotchev, Lars Holstenkamp: SSRN. *Energy Research & Social Science*, *13*, 136–147.

Becker, S., Kunze, C., & Vancea, M. (2017). Community energy and social entrepreneurship: Addressing purpose, organisation and embeddedness of renewable energy projects. *Journal of Cleaner Production*, *147*, 25–36. https://doi.org/10.1016/j.jclepro.2017.01.048

Berka, A. L., & Creamer, E. (2018). Taking stock of the local impacts of community owned renewable energy: A review and research agenda. *Renewable and Sustainable Energy Reviews*, *82*, 3400–3419. https://doi.org/10.1016/j.rser.2017.10.050

Bidmon, C. M., & Knab, S. F. (2018). The three roles of business models in societal transitions: New linkages between business model and transition research. *Journal of Cleaner Production*, *178*, 903-916.

Bolinger, M., Wiser, R., Milford, L., Stoddard, M., & Porter, K. (2001). States Emerge as Clean Energy Investors: A Review of State Support for Renewable Energy. *The Electricity Journal*, *14*(9), 82–95. https://doi.org/10.1016/S1040-6190(01)00246-9

Boons, F., & Bocken, N. (2018). Towards a sharing economy – Innovating ecologies of business models. *Technological Forecasting and Social Change*, *137*, 40–52. https://doi.org/10.1016/j.techfore.2018.06.031

Brandenburger, A. M., & Nalebuff, B. J. (1997). *Co-Opetition* (1 edition). New York: Currency Doubleday.

Breukers, S., & Wolsink, M. (2007). Wind power implementation in changing institutional landscapes: An international comparison. *Energy Policy*, *35*(5), 2737–2750. https://doi.org/10.1016/j.enpol.2006.12.004

Bronin, S.C., & McCary, P.R. (2013). Peaceful Coexistence. *Public Utilities Fortnightly*, pp. 38-42

Brummer, V. (2018). Community energy – benefits and barriers: A comparative literature review of Community Energy in the UK, Germany and the USA, the benefits it provides for society and the barriers it faces. *Renewable and Sustainable Energy Reviews*, *94*, 187–196. https://doi.org/10.1016/j.rser.2018.06.013

Capellán-Pérez, I., Campos-Celador, Á., & Terés-Zubiaga, J. (2018). Renewable Energy Cooperatives as an instrument towards the energy transition in Spain. *Energy Policy*, *123*, 215–229. https://doi.org/10.1016/j.enpol.2018.08.064

Carpenè, L. (2018). Projets citoyens dans les renouvelables, où en est la France *? The Conversation* ; https://theconversation.c /projets-citoyens-dans-les-renouvelables-ou-en-est-la-france-103728.

CBS. (2018). Mainly more green electricity from solar power. Retrieved from https://www.cbs.nl/en-gb/news/2019/09/mainly-more-green-electricity-from-solar-power

CE Delft. (2016). *The potential of energy citizens in the European Union*. Retrieved from CE Delft website: http://www.cedelft.eu/publicatie/the_potential_of_energy_citizens_in_the_european_union/1845

Corsini, F., Certomà, C., Dyer, M., & Frey, M. (2019). Participatory energy: Research, imaginaries and practices on people' contribute to energy systems in the smart city. *Technological Forecasting and Social Change*, *142*(May 2019), 322–332.

Dóci, G., & Vasileiadou, E. (2015). "Let's do it ourselves" Individual motivations for investing in renewables at community level. *Renewable and Sustainable Energy Reviews*, *49*(September 2015), 41–50.

Domanico, F. (2007). Concentration in the European electricity industry: The internal market as solution? *Energy Policy*, *35*(10), 5064–5076. https://doi.org/10.1016/j.enpol.2007.04.014

Eitan, A., Herman, L., Fischhendler, I., & Rosen, G. (2019). Community–private sector partnerships in renewable energy. *Renewable and Sustainable Energy Reviews*, *105*, 95–104. https://doi.org/10.1016/j.rser.2018.12.058

Enerdata 2019. *Global Energy & CO2 Data* http://globaldata.enerdata.net/home/

Foxon, T. J. (2011). A coevolutionary framework for analysing a transition to a sustainable low carbon economy. *Ecological Economics*, *70*(12), 2258–2267. https://doi.org/10.1016/j.ecolecon.2011.07.014

Francisco, A., & Taylor, J. (2019). Understanding citizen perspectives on open urban energy data through the development and testing of a community energy feedback system. *Applied Energy*, 256, 113804.

Gorroño-Albizu, L., Sperling, K., & Djørup, S. (2019). The past, present and uncertain future of community energy in Denmark: Critically reviewing and conceptualising citizen ownership. *Energy Research & Social Science*, *57*, 101231. https://doi.org/10.1016/j.erss.2019.101231

Göthlich, S. E., & Wenzek, H. R. (2004). *Underlying principles of business ecosystems.Institute for Business Value.* Mannheim: Institute for Business Value.

Håkansson, h., & Snehota, I. (1995). *Developing Relationships in Business Networks*. New York: Routledge.

Heiskanen, E., Johnson, M., Robinson, S., Vadovics, E., & Saastamoinen, M. (2010). Low-carbon communities as a context for individual behavioural change. *Energy Policy*, Volume 38, Issue 12 , 7586-7595.

Herbes, C., Brummer, V., Rognli, J., Blazejewski, S., & Gericke, N. (2017). Responding to policy change: New business models for renewable energy cooperatives – Barriers perceived by cooperatives' members. *Energy Policy*, *109*, 82–95. https://doi.org/10.1016/j.enpol.2017.06.051

Hockerts, K., & Wüstenhagen, R. (2010). Greening Goliaths versus emerging Davids - Theorizing about the role of incumbents and new entrants in sustainable entrepreneurship. *Journal of Business Venturing*, *25*(5), 481-492.

Hoicka, C. E., & MacArthur, J. L. (2018). From tip to toes: Mapping community energy models in Canada and New Zealand. *Energy Policy*, *121*, 162–174. https://doi.org/10.1016/j.enpol.2018.06.002

Hufen, J. a. M., & Koppenjan, J. F. M. (2015). Local renewable energy cooperatives: Revolution in disguise? *Energy, Sustainability and Society*, *5*(1), 18. https://doi.org/10.1186/s13705-015-0046-8

Iansiti, M., & Levien, R. (2004, March 1). Strategy as Ecology. *Harvard Business Review*, (March 2004). Retrieved from https://hbr.org/2004/03/strategy-as-ecology

Interreg Europe. (2018). *A Policy Brief from the Policy Learning Platform on Low-carbon economy*. Retrieved from European Union and European Regional Development Fund website: https://www.interregeurope.eu/fileadmin/user_upload/plp_uploads/policy_briefs/2018-08-30_Policy_brief_Renewable_Energy_Communities_PB_TO4_final.pdf

Jacobides, M. G., Cennamo, C., & Gawer, A. (2018). Towards a theory of ecosystems. *Strategic Management Journal*, *39*(8), 2255–2276. https://doi.org/10.1002/smj.2904

Johnson, V., & Hall, S. (2014). Community energy and equity: The distributional implications of a transition to a decentralised electricity system. *People, Place and Policy Online*, *8/3*, 149–167.

Kalkbrenner, B. J., & Roosen, J. (2016). Citizens' willingness to participate in local renewable energy projects: The role of community and trust in Germany. *Energy Research & Social Science*, *13*, 60–70. https://doi.org/10.1016/j.erss.2015.12.006

Kapoor, R., & Lee, J. M. (2013). Coordinating and competing in ecosystems: How organizational forms shape new technology investments. *Strategic Management Journal*, *34*(3), 274–296. https://doi.org/10.1002/smj.2010

Klein, S. J. W., & Coffey, S. (2016). Building a sustainable energy future, one community at a time. *Renewable and Sustainable Energy Reviews*, *60*, 867–880. https://doi.org/10.1016/j.rser.2016.01.129

Koirala, B. P., Araghi, Y., Kroesen, M., Ghorbani, A., Hakvoort, R. A., & Herder, P. M. (2018). Trust, awareness, and independence: Insights from a socio-psychological factor analysis of citizen knowledge and participation in community energy systems. *Energy Research & Social Science*, *38*, 33–40. https://doi.org/10.1016/j.erss.2018.01.009

Kooij, H.-J., Oteman, M., Veenman, S., Sperling, K., Magnusson, D., Palm, J., & Hvelplund, F. (2018). Between grassroots and treetops: Community power and institutional dependence in the renewable energy sector in Denmark, Sweden and the Netherlands. *Energy Research & Social Science*, *37*, 52–64. https://doi.org/10.1016/j.erss.2017.09.019

Lakshmi, G., & Tilley, S. (2019). The "power" of community renewable energy enterprises: The case of Sustainable Hockerton Ltd. *Energy Policy*, *129*, 787–795. https://doi.org/10.1016/j.enpol.2019.02.063

Lancement, K., & Cadre, R. (2018). *L'action citoyenne, accélératrice de transition vers des modes de vie plus durables*. Retrieved from Commissariat général au développement durable website: https://www.ecologique-solidaire.gouv.fr/sites/default/files/Th%C3%A9ma%20-%20L%27action%20citoyenne_0.pdf

Lehtonen, O., & Okkonen, L. (2019). Energy cost reduction creates additional socioeconomic benefits– The case of Eno Energy Cooperative, Finland. *Energy Policy*, *129*, 352–359. https://doi.org/10.1016/j.enpol.2019.02.018

Loreau, M. (2010). Linking biodiversity and ecosystems: Towards a unifying ecological theory. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *365*(1537), 49–60. https://doi.org/10.1098/rstb.2009.0155

Mahzouni, A. (2019). The role of institutional entrepreneurship in emerging energy communities: The town of St. Peter in Germany. *Renewable and Sustainable Energy Reviews*, *107*, 297–308. https://doi.org/10.1016/j.rser.2019.03.011

Mirzania, P., Ford, A., Andrews, D., Ofori, G., & Maidment, G. (2019). The impact of policy changes: The opportunities of Community Renewable Energy projects in the UK and the barriers they face. *Energy Policy*, *129*, 1282–1296. https://doi.org/10.1016/j.enpol.2019.02.066

Moore, J. F. (1996). *The Death of Competition: Leadership and Strategy in the Age of Business Ecosystems—James F. Moore—Livres*. Retrieved from https://www.amazon.fr/Death-Competition-Leadership-Strategy-Ecosystems/dp/0887308503

Moroni, S., Alberti, V., Antoniucci, V., & Bisello, A. (2019). Energy communities in the transition to a low-carbon future: A taxonomical approach and some policy dilemmas. *Journal of Environmental Management*, *236*, 45–53. https://doi.org/10.1016/j.jenvman.2019.01.095

Oteman, M., Wiering, M., & Helderman, J.-K. (2014). The institutional space of community initiatives for renewable energy: A comparative case study of the Netherlands, Germany and Denmark. *Energy, Sustainability and Society*, *4*(1), 11. https://doi.org/10.1186/2192-0567-4-11

Proka, A., Hisschemöller, M., & Loorbach, D. (2018). Transition without Conflict? Renewable Energy Initiatives in the Dutch Energy Transition. *Sustainability*, *10*(6), 1721.

Proka, A., Loorbach, D., & Hisschemöller, M. (2018). Leading from the Niche: Insights from a Strategic Dialogue of Renewable Energy Cooperatives in The Netherlands. *Sustainability*, *10*(11), 4106.

Radtke, J. (2014). A closer look inside collaborative action: Civic engagement and participation in community energy initiatives. *People, Place and Policy Online*, *8*(3), 235–248. https://doi.org/10.3351/ppp.0008.0003.0008

Rogers, J. C., Simmons, E. A., Convery, I., & Weatherall, A. (2008). Public perceptions of opportunities for community-based renewable energy projects. *Energy Policy, 36*(11), 4217–4226. https://doi.org/10.1016/j.enpol.2008.07.028

Sabatier, V., Craig-Kennard, A., & Mangematin, V. (2012). When technological discontinuities and disruptive business models challenge dominant industry logics: Insights from the drugs industry. *Technological Forecasting and Social Change, 79*(5), 949-962.

Saintier, S. (2017). Community Energy Companies in the UK: A Potential Model for Sustainable Development in “Local” Energy? *Sustainability*, *9*(8), 1325. https://doi.org/10.3390/su9081325

Seyfang, G., Hielscher, S., Hargreaves, T., Martiskainen, M., & Smith, A. (2014). A grassroots sustainable energy niche? Reflections on community energy in the UK. *Environmental Innovation and Societal Transitions*, *13*, 21–44. https://doi.org/10.1016/j.eist.2014.04.004

Seyfang, G., Park, J. J., & Smith, A. (2013). A thousand flowers blooming? An examination of community energy in the UK. *Energy Policy*, *61*, 977–989. https://doi.org/10.1016/j.enpol.2013.06.030

Teece, D. J. (1986). Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research Policy*, *15*(6), 285–305. https://doi.org/10.1016/0048-7333(86)90027-2

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, *28*(13), 1319–1350.

Teece, D. J. (2016). Business Ecosystem. In M. Augier & D. J. Teece (Eds.), *The Palgrave Encyclopedia of Strategic Management* (pp. 1–4). https://doi.org/10.1057/978-1-349-94848-2_724-1

Tews, K. (2018). The Crash of a Policy Pilot to Legally Define Community Energy. Evidence from the German Auction Scheme. *Sustainability*, *10*(10), 3397.

Topçu, S. (2013). *La France nucléaire. L’art de gouverner une technologie contestée*. Seuil.

Tsujimoto, M., Kajikawa, Y., Tomita, J., & Matsumoto, Y. (2018). A review of the ecosystem concept—Towards coherent ecosystem design. *Technological Forecasting and Social Change*, *136*, 49–58. https://doi.org/10.1016/j.techfore.2017.06.032

Van der Host, D., (2008). Social enterprise and renewable energy: Emerging initiatives and communities of practice. *Social Enterprise Journal 4(3):171-185.*

Van der Schoor, T., & Scholtens, B. (2015). Power to the people: Local community initiatives and the transition to sustainable energy. *Elsevier Renewable and Sustainable Energy Reviews*, *43*(March 2015), 666–675.

Varho, V., Rikkonen, P., & Rasi, S. (2016). Futures of distributed small-scale renewable energy in Finland—A Delphi study of the opportunities and obstacles up to 2025.

Technological Forecasting and Social Change, *104*, 30–37. https://doi.org/10.1016/j.techfore.2015.12.001

Vasileiadou, E., Huijben, J. C. C. M., & Raven, R. P. J. M. (2016). Three is a crowd? Exploring the potential of crowdfunding for renewable energy in the Netherlands. *Journal of Cleaner Production*, *128*, 142–155. https://doi.org/10.1016/j.jclepro.2015.06.028

Viardot, E. (2013). The role of cooperatives in overcoming the barriers to adoption of renewable energy. *Energy Policy*, *63*(Decembre 2913), 756–764.

Wainstein, M. E., & Bumpus, A. G. (2016). Business models as drivers of the low carbon power system transition: A multi-level perspective. *Journal of Cleaner Production*, *126*, 572–585. https://doi.org/10.1016/j.jclepro.2016.02.095

Walker, G., & Devine-Wright, P. (2008). Community renewable energy: What should it mean? *Energy Policy*, *36*(2), 497–500. https://doi.org/10.1016/j.enpol.2007.10.019

Williamson, P. J., & De Meyer, A. (2012). Ecosystem Advantage: How to Successfully Harness the Power of Partners. *California Management Review*, *55*(1), 24–46.

Wokuri, P., Yalçın-Riollet, M., & Gauthier, C. (2019). Consumer (Co-)Ownership in Renewables in France. In J. Lowitzsch (Ed.), *Energy Transition: Financing Consumer Co-Ownership in Renewables* (pp. 245–270). https://doi.org/10.1007/978-3-319-93518-8_12

Yalçın-Riollet, M., Garabuau-Moussaoui, I., & Szuba, M. (2014). Energy autonomy in Le Mené: A French case of grassroots innovation. *Energy Policy*, *69*, 347–355. https://doi.org/10.1016/j.enpol.2014.02.016

Yildiz, Ö. (2014). Financing renewable energy infrastructures via financial citizen participation – The case of Germany. *Renewable Energy*, *68*, 677–685. https://doi.org/10.1016/j.renene.2014.02.038

Appendix

Appendix 1 : Protocol grids

Grille d'entretien pour les acteurs de l'écosystème

- Présentation de la structure
- Pouvez-vous présenter votre structure ?
- Quand et pourquoi vous être créé ?
- Comment êtes-vous financé ?

LIEN AVEC LES COMMUNAUTES ENERGETIQUES :

- Avec quelles communautés énergétiques travaillez-vous ? – une zone géographique spécifique ? pourquoi ?
- Comment êtes-vous entré en contact avec les communautés (ou l'inverse) ?
- ***Quel type d'aide pouvez-vous leur proposer ?***
- Vous accompagner les projets de leur émergence à l'exploitation. Pourquoi tout couvrir ? est-ce que cela a toujours été le cas ? Quel type d'aide pouvez-vous leur proposer ? est-ce que vos services ont évolué dans le temps ? si oui pourquoi ?
- Participez-vous aux décisions prises dans le cadre de la communauté énergétique ?
- ***Lors de votre interaction avec les communautés, comment évalueriez-vous leur degré de maturité ?***
- Quelles différences entre vous et la structure des centrales villageoise ?

DEFIS PRINCIPAUX DES COMMUNAUTES ENERGETIQUES :

- Classification des projets énergétiques citoyens :

	Faire un geste	Devenir incontournable
Relation contractuelle		
Volontariat		

- Défis différents en fonctions du type de communauté.
- A votre avis, quels sont les défis principaux auxquels les communautés énergétiques doivent actuellement faire face ?
- Comment envisagez-vous d'adapter vos services face à ces défis ?
- Y-a-t-il des acteurs ou parties prenantes qui étaient ou sont toujours réticentes au développement des communautés énergétiques citoyennes ?
- Quels rôle pour les pouvoirs publiques ?
-
- Sur votre site vous mentionnez le besoin de changer d'échelle et expliquez faire de la mise en réseau et établir des connections. Est-ce que vous pourriez détailler ? votre rôle ? pourquoi ces actions ?
- comment envisagez vous la suite pour assurer la pérennité de NOM ACTEUR ECOSYSTEME ?
- Est-ce que des structures similaires à la vôtre existent ailleurs en France ?
- Et concernant le futur, quels seraient les défis hypothétiques que devront relever les structures de production d'énergies telles que les communautés énergétiques ?

- Y a-t-il des freins au développement des communautés énergétiques en France. Le cas échéant quels sont-ils ?
- Y-a-t-il des acteurs ou parties prenantes qui étaient ou sont toujours réticentes au développement des communautés énergétiques citoyennes ?
- Dans le contexte néerlandais on note que pour grossir et pour assurer leur pérennité, les communautés ont besoin de se professionnaliser. Qu'en pensez-vous ? est-ce que les communautés françaises en auraient l'envie également ?
-

PARTICIPATION CITOYENNE

- 14- On observe une recrudescence d 'initiatives citoyenne, notamment par le biais de nombreuses communautés énergétiques. Pourriez-vous nous donner votre interprétation sur ce phénomène ?

Grille d'entretien avec acteur énergétique historique

Présentation de la personne interviewée

1. Pouvez-vous vous présenter en qq mots ?

Enedis : financement

Vous êtes financé via le TURPE qui est payé par les producteurs et par les consommateurs.

2. Est-ce que vous pouvez m'expliquer comment ça marche ? (en fonction de la puissance) côté producteur surtout.
3. Les utilisateurs payent le Turpe et paye également le raccordement. N'est-ce pas payer deux fois pour la même chose ? le Turpe (et ces récentes augmentation) vise à donner les moyens financiers d'adapter le réseau à la transition énergétique (décentralisation de la production, autoconsommation, qualité des bâtiments) ainsi qu'aux nouveaux usages (compteurs intelligents Linky, voitures électriques, etc.)
4. Quel est le lien entre la CRE et Enedis ? Tarif qui est défini par la CRE ? comment ca se passe ?
5. Aux Pays-Bas, les consommateurs payent en fonction de la puissance et non de l'utilisation. Savez pourquoi la préférence a été donné à l'utilisation en fr. quel avantage et quel inconvénient surtout vis-à-vis nouvelles demande de réappropriation (d'autoconsommation)?

Rôle d'Enedis vis-à-vis des communautés énergétiques citoyennes :

Enedis est un acteur incontournable pour les communautés énergétiques citoyennes.

6. Comment décririez-vous le rôle d'Enedis vis-à-vis des projets énergétiques citoyens ? de cette demande de réappropriation citoyenne ?
7. Si on suit la vie d'un projet, pouvez-vous retracer comment se passent les interactions entre les communautés et Enedis ?
8. Qu'est-ce qui a changé dans votre organisation depuis les premiers projets énergétiques citoyens ? Est-ce que vous avez des processus plus standardisé ?
9. Nous avons compris que le coût de raccordement est important pour déterminer si un projet être économiquement viable ou non. (2 axes prix + durée de validité).
   a. Comment est calculé le tarif de raccordement des installations ?
   b. Histoire de durée de validité du devis – une entreprises qui a porté plainte ? besoin de payer pour obtenir un devis ?
10. Est-ce que des évolutions sont à prévoir dans les mois qui viennent ?

Vision d'Enedis à propos des communautés énergétiques citoyennes :

11. Expliquez-nous pourquoi, quasiment chaque communauté interviewée nous a présenté Enedis comme l'un des principaux freins à leur développement
12. Dans votre post en réponse à notre tribune vous dites : Comment faire de la pédagogie auprès de tous sur un sujet où l'approche technique ne coïncide pas forcément avec l'attente sociale. Est-ce que vous pouvez expliquer ce que vous voulez dire exactement ? en quoi ça ne coïncide pas ?
13. Dans sa tribune le DG d'enedis explique que les projets énergétiques citoyens peuvent être néfaste pour l'accès à l'énergie. Pourquoi ? Aujourd'hui on note de forte inégalité territoriales entre les régions qui ont une centrale nucléaire ou de gros barrage et celle qui n'en ont pas en terme de revenu fiscaux + l'énergie peut être un moyen de créer de la richesse localement mais c'ets justement dans les régions rurales que les coûts de raccordements sont les plus chers. Est-ce que dire que les communautés réduisent l'accès n'est pas prendre le problème à l'envers ?
14. Au NL on observe que le DSO joue un rôle plus actif, et va même financer le réseau national des communautés énergétiques. Comment analysez-vous cela ? est-ce envisageable pour Enedis ?

2- Avec quelles communautés énergétiques travaillez-vous ?

3- Comment êtes-vous entré en contact avec les communautés (ou l'inverse)

4- Quel type d'aide pouvez-vous leur proposer ?

5- Participez-vous aux décisions prises dans le cadre de la communauté énergétique ?

6- Lors de votre interaction avec les communautés, comment évalueriez-vous leur degré de maturité ?

DEFIS PRINCIPAUX DES COMMUNAUTES ENERGETIQUES :

7- A votre avis, quels sont les défis principaux auxquels les communautés énergétiques doivent actuellement faire face ?

8- Comment envisagez-vous d'adapter vos services face à ces défis ?

9- Concernant ces différents aspects, en quoi l'écosystème peut avoir un rôle à jouer :

10- Et concernant le futur, quels seraient les défis hypothétiques que devront relever les structures de production d'énergies telles que les communautés énergétiques ?

11- Y a-t-il des freins au développement des communautés énergétiques en France. Le cas échéant quels sont-ils ?

12- Y-a-t-il des acteurs ou parties prenantes qui étaient ou sont toujours réticentes au développement des communautés énergétiques citoyennes ?

13- Dans le contexte néerlandais on note que pour grossir et pour assurer leur pérennité, les communautés ont besoin de se professionnaliser. Qu'en pensez-vous ? est-ce que les communautés françaises en auraient l'envie également ?

PARTICIPATION CITOYENNE

14- On observe une recrudescence d ‘initiatives citoyenne, notamment par le biais de nombreuses communautés énergétiques. Pourriez-vous nous donner votre interprétation sur ce phénomène ?

Grille d’entretien pour les communautés énergétiques

1. Pourriez-vous nous expliquer rapidement qui vous êtes et quel est votre rôle au sein de NOM COMMUNAUTE?
2. Etes vous satisfait de ce que NOM COMMUNAUTE a réalisé jusqu’ici ?
3. Comment envisagez-vous la suite ?
4. Qu’est-ce qui a permis à NOM COMMUNAUTE d’atteindre ses objectifs selon vous?
5. Nous avons compris que plusieurs membres fondateurs ont plusieurs casquettes. Pouvez vous nous aider à identifier ces casquettes
6. Nous avons identifié les tâches que les coopératives doivent réaliser afin de se créer et réaliser leurs projets.
Inclure un tableau plusieurs colonnes pour
- les tâches
- si elles sont compliquées à réaliser/requiert du temps de bénévole ou des compétences spécifiques
- vers qui ils peuvent (ou se sont tourné) afin d’obtenir un soutien pour réaliser cette tâche
- quelles tâches ils souhaiterait pourvoir externaliser s’ils en avaient les moyens

6. Qu’est-ce qui manque dans l’écosystème pour vous apporter le soutien dont vous avez besoin ? ou qu’est-ce qui vous a manqué afin de réaliser votre projet plus rapidement/sereinement
7. La France fait le choix de financer des agences régionales et des têtes de réseaux. La Hollande fait le choix de donner aux coopératives un budget de lancement.
Quelle situation vous parait la plus favorable et pourquoi ?
8. Nous avons identifié un certain nombre de facteurs macro-environnementaux qui peuvent compliquer le développement des coopératives comme NOM COMMUNAUTE. Les principaux sont-ils représentés ?
    a. Prix de vente de l’électricité trop bas/diminution des subventions impactent la faisabilité économique des projets et demande de réaliser des projets de plus grande envergure
    b. Manque de transparence dans le coût de raccordement au réseau
    c. La réglementation qui évolue trop souvent et est difficile à suivre
9. Quel est le pouvoir de lobby des coopératives ? qui exerce ce pouvoir ? que souhaiteriez que ces lobbys fassent exactement pour faciliter la vie des coopératives ?

Grille d’entretien pour les experts

Ecosystème des communautés énergétiques en France :

Nous avons identifié différents types de communautés énergétiques en France, que nous avons présenté dans ce tableau (que l’on montre à ce moment à l’interrogé). Pensez-vous qu’il y ait d’autres catégories à ajouter auxquelles nous n’aurions pas pensé ?

Voici l’écosystème des communautés énergétiques en France que nous avons créé (que l’on montre à ce moment à l’interrogé). Pourriez-vous commenter et discuter avec nous *de ses différents éléments constitutifs ? Avons-nous selon vous oublié quelque chose ? Auriez-vous positionné différemment certains acteurs ?*

Professionnalisation des communautés énergétiques en France :

On observe dans d'autres pays, comme les Pays Bas par exemple, que les communautés en viennent à se professionnaliser, passé un certain stade d'évolution. Pourriez-vous nous donner votre avis sur ce phénomène au vu du contexte français ?

Pensez- vous que passé un certain stade l'investissement en temps et les compétences requises vont nécessiter l'embauche de professionnels du secteur de l'énergie au sein même des communautés ?

Dans le contexte néerlandais on note que pour grossir et pour assurer leur pérennité, les communautés ont besoin de se professionnaliser. Qu'en pensez-vous ? est-ce que les communautés françaises en auraient l'envie également ?

Défis principaux des communautés énergétiques :

A votre avis, quels sont les défis principaux auxquels les communautés énergétiques doivent actuellement faire face ?

Comment envisagez-vous d'adapter vos services face à ces défis ?

Concernant ces différents aspects, en quoi l'écosystème peut avoir un rôle à jouer :

- *Aspect règlementaire et légal*
- *Risque financier*
- *Nature organisationnelle*

Et concernant le futur, quels seraient les défis hypothétiques que devront relever les structures de production d'énergies telles que les communautés énergétiques ?

Y a-t-il des freins au développement des communautés énergétiques en France. Le cas échéant quels sont-ils ?
Y-a-t-il des acteurs ou parties prenantes qui étaient ou sont toujours réticentes au développement des communautés énergétiques citoyennes ?

Participation citoyenne

On observe une recrudescence d 'initiatives citoyenne, notamment par le biais de nombreuses communautés énergétiques. Pourriez-vous nous donner votre interprétation sur ce phénomène ?

Lors de votre interaction avec les communautés, comment évaluez-vous leur degré de maturité ?

Appendix 2 : Screening of 50 French energy communities

Table 6

Name of the cooperative	Interviewed	Production							Total installed capacity
	Y/N	Solar/roof	Solar/field	Solar thermal	Wind	Hydro	Biomass	Biogas	kWc
Buxia Energie	Yes	x		x					198
Energy Citoyenne	yes	x							106
Ercisol	yes		x			x			1080
ICEA	yes	x							162
Prats de mollo	yes	x		x		x		x	
Gresi21	yes	x							450
BEC	yes	x							70
123 soleil	yes		x						250
Les ailes de taillard	yes				x				0
Min a watt	yes	x							512
forestener	yes						x		480
Jurascic	no	x			x				3MW et 108,3KWc
Hydro cévénole	no					x			320
Lucisol	no	x							200
Ferme éolienne d'Avessac	no				x				10 MW
Biocop du mantois	no	x							52KW
La jacterie	no				x				60MW
Isac watts	no				x				8,2 MW
combrailles durables	no	x							545
le solaire du lac	no	x							9
Les grands fesnes	no				x				10,8 MW
Champs chagnots	no				x				9 MW
Dwatts	no	x							147
Monts énergie	no	x							1000
chaudières modul'R	no						x		1080
soleil du grand ouest	no	x							249
ENR Chantrerie	no	x					x		234 et 12GWth chaleur
Conflent Energie	no	x							54
Tener'if	no	x							561
La limouzinière	no				x				6,15 MW
Zusamme solar Colmar	no	x							400

Name of the cooperative	Interviewed	Production							Total installed capacity
	Y/N	Solar/roof	Solar/field	Solar thermal	Wind	Hydro	Biomass	Biogas	kWc
Energie coopérative du ponant	**no**	**x**							**48**
Les ailes de crêtes	**no**				**x**				**2400**
parc éolien des rimalets	**no**				**x**				**18000**
Les énergies d'aganagues	**no**				**x**				**2000**
Centrale solaire la petite vicompté	**no**		**x**						**9200**
Bain d'énergie	**no**	**x**							**100**
centrales villageoises de Bruche mossig piemont	**no**	**x**							**300**
Démosol	**no**	**x**							**407**
Lycée vaucanson	**no**	**x**							**9**
Watt sud morvan	**no**	**x**							**360**
SEC87 Courcellas	**no**				**x**				**10000**
Parc éolien des tilleuls	**no**				**x**				**12500**
ENERCIT IF	**no**	**x**							**1500**

Table 7

Name of the cooperative	Other actions		Legal status	Belongs to a cooperative of cooperatives
	Energy efficiency	Other, precise	SAS/SCIC, etc	EPI, Centrale villageoise, other
Buxia Energie			**SAS**	**No**
Energy Citoyenne			**SAS**	**No**
Ercisol			**SAS**	**EPI**
ICEA			**SCIC**	**EPA**
Prats de mollo		**autoconsommation**	**SEM**	**no**
Gresi21	**x**		**SAS**	**centrales villageoises**
BEC		**autoconsommation, animations aupres du grand public**	**SAS**	**no**
123 soleil			**SAS**	**no**
Les ailes de taillard			**SAS**	**no**
Min a watt		**autoconsommation**	**SAS**	**Cowatt, EPI**
forestener				
Jurascic			**SCIC**	**no**
Hydro cévénole			**SARL**	**No**
Lucisol			**SAS**	**No**
Ferme éolienne d'Avessac			**SAS**	**Energie citoyenne en pays de vilaine**

Name of the cooperative	Other actions		Legal status	Belongs to a cooperative of cooperatives
	Energy efficiency	Other, precise	SAS/SCIC, etc	EPI, Centrale villageoise, other
Biocop du mantois		économie d'énergie sur l'eau chaude	SAS	
La jacterie			SAS	
Isac watts			SAS	
combrailles durables			SCIC	
le solaire du lac			SCIC	
Les grands fesnes			SAS	
Champs chagnots		acquisition d'éolienne existante	SEM	
Dwatts			SCIC	EPA
Monts énergie			SAS	
chaudières modul'R			SCIC	
soleil du grand ouest		toit d'une biocoop en autoconsommation	SAS	EPA
ENR Chantrerie		autoconsommation	SAS	
Conflent Energie			SCIC	EPA
Tener'if		propriété de energie partagée	SAS	EPA
La limouzinière		propriété de enrcoop et energie partagée, acquisition d'éolienne		EPA
Zusamme solar Colmar		projhet franco-allemand		EPA, FESA
Energie coopérative du ponant			SCIC	
Les ailes de crêtes			SAS	EPA
parc éolien des rimalets		contestation: http://asper.unblog.fr/projet-eolien-des-rimalets/	SAS	
Les énergies d'aganagues				
Centrale solaire la petite vicompté		site sur une ancienne d&charge, investissement citoyen exclusivement vie EPI	SEM	
Bain d'énergie		projet hydro	SCIC	EPA
centrales villageoises de Bruche mossig piemont			SAS	
Démosol			SAS	
Lycée vaucanson			SCIC	
Watt sud morvan				
SEC87 Courcellas		contestation et recours, difficultés de raccordement		
Parc éolien des tilleuls			SEMER	EPA
ENERCIT IF			SAS	

Table 8

Name of the cooperative	Ecosystem partners			Number of shareholders	Number of active members/volunteers
	Financial	Communication	Technical	#	#
Buxia Energie	Enercoop	EPA	installateur local	180	10
Energy Citoyenne	Region	EPA	installateur local	141	
Ercisol				182	35
ICEA	Region	EPA	installateur local	192	
Prats de mollo	Region, ADEME				
Gresi21				300	
BEC	enercoop	EPA	mairie de Lorient	106	

Name of the cooperative	Ecosystem partners			Number of shareholders	Number of active members/volunteers
	Financial	Communication	Technical	#	#
123 soleil	enercoop, ADEME, Region occitanie		mairie de Luc sur Aude	250	
Les ailes de taillard	collectivités/citoyens/EPI	collectivité	développeur privé		
Min a watt	EPI, Enercoop	EPA	Mairie de Nantes	140	12
forestener					
Jurascic	EPI, Region			670	
Hydro cévénole	EPI,				
Lucisol	EPI, Region	EPA, agence locale de l'énergie	Energ'éthique 04	104	
Ferme éolienne d'Avessac	EPI	EPA	Site a Watts développement	32 (EPI)	
Biocop du mantois	EPI	EPA			
La jacterie	EPI			380	42
Isac watts	EPI, clubs d'investisseurs	collectivités			
combrailles durables	EPI, clubs d'investisseurs, la Nef, credit coopératif	collectivités		300	
le solaire du lac					
Les grands fesnes	EPI, communauté de communes, développeur privé	EPA		220	
Champs chagnots	EPI , SERGIES				
Dwatts	NEF, collectivités territoriales, region			67	6
Monts énergie	collectivités territoriales	coopawatt		93	
chaudières modul'R				89	
soleil du grand ouest	EPI,Enercoop,Biocoop				
ENR Chantrerie	EPI, club d'investisseur				
Conflent Energie	EPI via la Nef, region			78	
Tener'if	EPI			77	
La limouzinière	EPI,Enercoop, La Nef			142	
Zusamme solar Colmar	EPI, la nef, FESA energie, Region Alsace			52	37
Energie coopérative du ponant				40	12
Les ailes de crêtes	EPI, collectivités locales, ALE, Developpeur privé, enercoop, autres cooperatives éolienne			350	
parc éolien des rimalets					
Les énergies d'aganagues					
Centrale solaire la petite vicompté	EPI				
Bain d'énergie	EPI				
centrales villageoises de Bruche mossig piemont		centrales vollageoises			

Name of the cooperative	Ecosystem partners			Number of shareholders	Number of active members/volunteers
	Financial	Communication	Technical	#	#
Démosol	region nouvelle aquitaine, ADEME				
Lycée vaucanson	region centre val de loire				
Watt sud morvan					
SEC87 Courcellas					
Parc éolien des tilleuls					
ENERCIT IF	Region	ADEME			

Table 9

Name of the cooperative	Scope (local/national subscribers)	Employees	Subsidies/grant		ROI (interest rate of shares)
		#	FIT	regional/natyional subsidies	in %
Buxia Energie	local	0	Yes	Regional	0 %(reinvestment)
Energy Citoyenne	local	0	Yes	Regional	0,01
Ercisol	national	0			4% net
ICEA	local	0	Yes	Regional	0
Prats de mollo					
Gresi21	local	0	yes	regional	0,03
BEC	local	0	non		1% net
123 soleil				regional	5/6% avant impot
Les ailes de taillard	national				
Min a watt	local	0	Yes		
forestener					
Jurascic	national			regional	
Hydro cévénole					
Lucisol	national		yest (CRE)	regional	0,025
Ferme éolienne d'Avessac	national		yest (CRE)		
Biocop du mantois					
La jacterie	national				
Isac watts	national				
combrailles durables	local		yes		0
le solaire du lac	local		yes		
Les grands fesnes	national				
Champs chagnots	national				
Dwatts	local		yes	regional	
Monts énergie	local		yes		
chaudières modul'R	local	yes			
soleil du grand ouest	local		non		
ENR Chantrerie					
Conflent Energie	local		yes	regional	

Name of the cooperative	Scope (local/national subscribers)	Employees	Subsidies/grant		ROI (interest rate of shares)
		#	FIT	regional/natyional subsidies	in %
Tener'if	national	yes			
La limouzinière	national	yes			
Zusamme solar Colmar	national				
Energie coopérative du ponant	local				
Les ailes de crêtes	local	yes			
parc éolien des rimalets					
Les énergies d'aganagues				regional	
Centrale solaire la petite vicompté	national	yes			
Bain d'énergie					
centrales villageoises de Bruche mossig piemont	local	no			
Démosol	local	no			
Lycée vaucanson	local	no		regional	
Watt sud morvan					
SEC87 Courcellas					
Parc éolien des tilleuls	national	no			
ENERCIT IF	local	no			

Table 10

Name of the cooperative	Date of creation	Region	Website
Buxia Energie	2016	AURA	http://www.buxia-energies.fr/
Energy Citoyenne	2015	AURA	https://energy-citoyennes.org
Ercisol			http://ercisol.com/
ICEA	2016		https://icea-enr.fr/
Prats de mollo			https://daisee.org/
Gresi21	2016	AURA	https://gresi21centralesvillageoises.com
BEC	2009	Bretagne	https://www.bretagne-energies-citoyennes.org/
123 soleil	2008	Occitanie	https://123soleil.luc-sur-aude.fr
Les ailes de taillard		AURA	https://www.ailesdetaillard.fr/
Min a watt		Centre val de loire	https://cowatt.fr
forestener			
Jurascic	2016	Bourgogne franche comté	https://www.jurascic.com

Name of the cooperative	Date of creation	Region	Website
Hydro cévénole	2016	Occitanie	https://je-souscris.energie-partagee.org/decouvrir-nos-projets/detail/hydro-cevenole
Lucisol	2014	PACA	http://lucisol.fr/
Ferme éolienne d'Avessac	2006	Centre val de loire	https://je-souscris.energie-partagee.org/decouvrir-nos-projets/detail/la-ferme-eolienne-davessac
Biocop du mantois	2008	Ile de France	https://je-souscris.energie-partagee.org/decouvrir-nos-projets/detail/biocoop-du-mantois
La jacterie	2010	pays de la loire	https://je-souscris.energie-partagee.org/decouvrir-nos-projets/detail/la-jacterie
Isac watts	2014	Bretagne	https://je-souscris.energie-partagee.org/decouvrir-nos-projets/detail/isac-watts
combrailles durables	2009	AURA	http://combraillesdurables.org
le solaire du lac	2019	AURA	https://lasolairedulac.fr/documents/
Les grands fesnes	2011	pays de la loire	https://je-souscris.energie-partagee.org/decouvrir-nos-projets/detail/les-grands-fresnes
Champs chagnots	2018	Poitou Charentes	je-souscris.energie-partagee.org/decouvrir-nos-projets/detail/champs-chagnots
Dwatts	2016	AURA	https://www.dwatts.fr/
Monts énergie	2015	AURA	http://www.montsenergies.fr/
chaudières modul'R	2015	AURA	https://www.ere43.fr
soleil du grand ouest	2015	bretagne	https://energie-partagee.org/projets/soleil-du-grand-ouest/
ENR Chantrerie	2017	pays de la loire	https://energie-partagee.org/projets/enr-chantrerie/
Conflent Energie	2014	Occitanie	http://conflentenergie.free.fr/
Tener'if	2017	Ile de France	https://je-souscris.energie-partagee.org/decouvrir-nos-projets/detail/tenerif
La limouzinière	2014	Nouvelle aquitaine	https://je-souscris.energie-partagee.org/decouvrir-nos-projets/detail/la-limouziniere
Zusamme solar Colmar	2015	grand est	https://energie-partagee.org/projets/zusamme-solar-colmar/
Energie coopérative du ponant		Bretagne	http://www.brestenergiecitoyenne.fr/energie-cooperative-du-ponant/
Les ailes de crêtes	2014	champagne ardennes	https://energie-partagee.org/projets/les-ailes-des-cretes/
parc éolien des rimalets	2006	Nouvelle aquitaine	https://energie-partagee.org/projets/vent-en-marche-87/
Les énergies d'aganagues			http://www.energies-aganagues.org/
Centrale solaire la petite vicompté	2012		https://energie-partagee.org/projets/centrale-solaire-de-la-petite-vicomte/
Bain d'énergie		Est	https://fr-fr.facebook.com/pg/bainsdenergies/about/?ref=page_internal
centrales villageoises de Bruche mossig piemont		Est	https://energie-partagee.org/projets/centrale-solaire-de-la-petite-vicomte/
Démosol	2016	Nouvelle aquitaine	https://www.demosol.fr
Lycée vaucanson	2017	Centre val de loire	https://energie-partagee.org/projets/energie-citoyenne-en-touraine/
Watt sud morvan			https://energie-partagee.org/projets/watt-sud-morvan-71/
SEC87 Courcellas	2006	nouvelle aquitaine	https://energie-partagee.org/projets/parc-eolien-de-courcellas/
Parc éolien des tilleuls	2009	Centre val de loire	https://energie-partagee.org/projets/parc-eolien-des-tilleuls/

Name of the cooperative	Date of creation	Region	Website
ENERCIT IF	2016	Ile de France	https://energie-partagee.org/projets/enercitif/

Appendix 3 : Survey on French energy communities' members

Questionnaire à destination des acteurs de communautés énergétiques

Bonjour, dans le cadre d'une étude menée par Grenoble Ecole de Management sur les communautés énergétiques, nous avons rencontré des membres de plusieurs coopératives énergétiques. Afin de compléter notre étude nous souhaiterions vous faire remplir un court questionnaire qui vise à mieux comprendre vos pratiques et attentes vis-à-vis de votre communauté. Vos réponses sont anonymes. Les données agrégées seront utilisées uniquement à des fins de recherches en sciences sociales et économiques. Nous définissons une communauté énergétique citoyenne comme une association ou coopérative à but non lucratif au sein de laquelle les citoyens prennent part à la gouvernance et menent des actions en faveur de la transition énergétique (ex. la production d'énergie renouvelable, actions de sensibilisation, sobriété énergétique). Merci d'avance de votre participation. Cordialement. Carine Sebi (Professeure Assitante), Anne-Lorève Vernay (Professeure Assistante), Julien Doutre (Assistant de Recherche), Grenoble Ecole de Management

Page Break

A combien de communauté énergétiques appartenez vous ?

○ 0 (14)

○ 1 (15)

○ 2 (17)

○ Plus de 2 (18)

Skip To: End of Survey If A combien de communauté énergétiques appartenez vous ? = 0

Display This Question:

If A combien de communauté énergétiques appartenez vous ? = 1

Or A combien de communauté énergétiques appartenez vous ? = 2

Or A combien de communauté énergétiques appartenez vous ? = Plus de 2

Quel est le nom de votre communauté?

____

Display This Question:

If A combien de communauté énergétiques appartenez vous ? = 2

Or A combien de communauté énergétiques appartenez vous ? = Plus de 2

Quel est le nom de votre seconde communauté?

____

Display This Question:

If A combien de communauté énergétiques appartenez vous ? = Plus de 2

Quel est le nom des autres communautés à laquelle vous appartenez ?

____

End of Block: choix de la communauté

Start of Block: Engagement au sein de la communauté

*

Quel rôle jouez-vous au sein de la communauté? (vous pouvez choisir plusieurs réponses)

▢ Actionnaire ou détenteur de parts sociales (2)

▢ Membre actif (3)

▢ Participation dans un collège, conseil d'administration ou de gestion (5)

▢ Autre (6) ____

Combien d'actions ou de part sociales avez vous achetées?

- ◯ 1 (1)
- ◯ 2 (2)
- ◯ 3-5 (3)
- ◯ 6-10 (4)
- ◯ 11+ (5)
- ◯ Aucune (6)

Depuis combien de temps avez-vous rejoint la communauté énergétique?

- ◯ Moins de 3 mois (1)
- ◯ De 3 à 6 mois (2)
- ◯ De 6 mois à 1 an (3)
- ◯ De 1 à 2 ans (4)
- ◯ De 2 à 3 ans (5)
- ◯ Plus de 3 ans (6)

Page Break

Par rapport à votre communauté, diriez-vous que vous êtes

- ◯ Très peu engagé (1)
- ◯ Peu engagé (2)
- ◯ Assez engagé (3)
- ◯ Très engagé (4)

Display This Question:

If Quel rôle jouez-vous au sein de la communauté? (vous pouvez choisir plusieurs réponses) = Membre actif

Participez-vous aux événements organisés par la communauté (par exemple les assemblées générales)

- ◯ Jamais (1)
- ◯ Parfois (2)
- ◯ Souvent (3)
- ◯ Systématiquement (4)

Display This Question:

If Quel rôle jouez-vous au sein de la communauté? (vous pouvez choisir plusieurs réponses) = Membre actif

Comment évalueriez-vous votre connaissance des actions menées par votre communauté?

- ◯ Très faible (1)
- ◯ Faible (2)
- ◯ Bonne (3)
- ◯ Très bonne (4)

Page Break

Quelles sont les trois raisons majeures qui vous ont poussé à rejoindre votre communauté énergétique?

- ☐ Limiter le réchauffement climatique (1)
- ☐ Faire partie d'un mouvement associatif/coopératif (2)
- ☐ Privilégier une production d'énergie locale et citoyenne (3)
- ☐ Produire sa propre énergie (4)
- ☐ Militer à une échelle locale (5)
- ☐ Créer une alternative à l'énergie nucléaire (8)
- ☐ Créer une alternative aux énergies fossiles (13)
- ☐ Avoir un placement rentable (10)
- ☐ Donner du sens à mon épargne (11)
- ☐ Réduire ma facture énergétique (14)
- ☐ Sortir de la dépendance vis-à-vis des énergéticiens historiques (ex: EDF ou Engie) (15)
- ☐ Protéger la santé de ma famille (16)
- ☐ Essayer un autre modèle de production (17)
- ☐ Développer des solutions bénéfiques pour tous (18)
- ☐ Reprendre le pouvoir sur les acteurs traditionnels (19)
- ☐ Autre (12) ____

Selon vous, quelles sont les trois raisons majeures qui ont poussé les autres membres de la communauté à s'engager?

- ☐ Limiter le réchauffement climatique (1)
- ☐ Faire partie d'un mouvement associatif (2)
- ☐ Privilégier une production d'énergie locale et citoyenne (3)
- ☐ Produire sa propre énergie (4)
- ☐ Militer à une échelle locale (5)
- ☐ Créer une alternative à l'énergie nucléaire (13)
- ☐ Créer une alternative aux énergies fossiles (8)
- ☐ Avoir un placement rentable (10)
- ☐ Donner du sens à mon épargne (11)
- ☐ Réduire ma facture énergétique (14)
- ☐ Sortir de la dépendance vis-à-vis des énergéticiens historiques (ex: EDF ou Engie) (15)
- ☐ Protéger la santé de ma famille (16)
- ☐ Essayer un autre modèle de production (17)
- ☐ Développer des solutions bénéfiques pour tous (18)
- ☐ Reprendre le pouvoir sur les acteurs traditionnels (19)
- ☐ Autre (12) ____

Page Break

Selon vous, comment la majorité des gens perçoivent les communautés énergétiques ?

○ Projet militant écologiste (1)

○ Projet innovant (2)

○ Inconnue pour la majorité des gens (3)

○ Projet d'économie sociale et solidaire (4)

○ Projet décentralisé par et pour les citoyens (5)

○ Je ne sais pas (6)

○ Autre (7) ____

Page Break

Quelles sont les deux valeurs les plus importantes à vos yeux qui doivent être représentées dans votre communauté?

▢ Développement local (1)

▢ Transition énergétique (2)

▢ Implication des citoyens (3)

▢ Convivialité (4)

▢ Indépendance vis-a-vis des acteurs énergétiques historiques (5)

▢ Partage (au sens économie du partage) (6)

▢ Respect de l'environnement et préservation des ressources naturelles (9)

▢ Innovation (10)

▢ Aucune valeur importante à mes yeux (7)

▢ Autre (8) ____

Quelle est la mission principale de votre communauté?

- ◯ Créer de la richesse sur le territoire (1)
- ◯ Permettre une montée en compétence localement (2)
- ◯ Faire adhérer les citoyens à la production d'énergie locale (3)
- ◯ Développer des projets qui n'auraient pas vu le jour sans la communauté (10)
- ◯ Faire changer les mentalités (4)
- ◯ Avoir un impact sur la transition énergétique (réduire les émissions de gaz à effet de serre) (5)
- ◯ Produire une énergie locale (6)
- ◯ Rémunérer les actionnaires (7)
- ◯ Réduire la facture énergétique (11)
- ◯ Proposer une alternative aux acteurs traditionnels (12)
- ◯ Je ne sais pas (8)
- ◯ Autre (9) ____

Page Break

Dans quelle mesure êtes-vous d'accord avec les affirmations suivantes concernant votre communauté énergétique ?

	Pas du tout d'accord (10)	Plutôt pas d'accord (9)	Plutôt d'accord (14)	Tout à fait d'accord (7)	Ne se prononce pas (11)
La participation citoyenne est forte (2)	○	○	○	○	○
L'ancrage territorial est marqué (4)	○	○	○	○	○
Elle a un impact sur la transition énergétique (5)	○	○	○	○	○
Elle améliore l'acceptabilité sociale des énergies renouvelables (7)	○	○	○	○	○
Elle renforce le lien social (entre les membres qui la composent) (11)	○	○	○	○	○
Elle a un impact auprès des élus (leur montrer qu'un autre modèle est possible) (9)	○	○	○	○	○
Elle a une impact auprès des acteurs privés (leur montrer qu'un autre modèle est possible) (10)	○	○	○	○	○

Concernant votre investissement dans la communauté énergétique, considérez-vous qu'il s'agit ?

	Pas du tout d'accord (4)	Plutôt pas d'accord (3)	Plutôt d'accord (2)	Tout à fait d'accord (1)	Je ne sais pas (6)
D'un placement sûr (1)	○	○	○	○	○
D'un placement rentable (2)	○	○	○	○	○
D'un placement éthique (3)	○	○	○	○	○
D'un placement d'avenir (4)	○	○	○	○	○
D'un placement qui a du sens (5)	○	○	○	○	○

Avez-vous un autre jugement concernant votre investissement dans la communauté énergétique qui ne figure pas dans la précédente question?

____

Page Break

Quelle est votre principale attente concernant l'avenir de votre communauté énergétique?

- ○ Elle doit mener à bien de nouveaux projets (1)
- ○ Elle doit devenir plus rentable (2)
- ○ Elle a atteint des objectifs énergétiques (3)
- ○ Elle a atteint des objectifs de rentabilité (9)
- ○ Elle doit servir de modèle (4)
- ○ Elle doit changer d'échelle (5)
- ○ Je ne sais pas (6)
- ○ Autre (7) ____

Quelles actions vous paraissent prioritaires?	Pas du tout propritaire (1)	Un peu prioritaire (2)	Prioritaire (3)	Très prioritaire (4)	Ne se prononce pas (5)
Recruter de nouveaux bénévoles (1)	○	○	○	○	○
Améliorer les procédures en interne (2)	○	○	○	○	○
Mutualiser les compétences avec d'autres communautés présentes localement (3)	○	○	○	○	○
Travailler sur la communication auprès des habitants les plus proches des actions menées par la communauté (4)	○	○	○	○	○
Collaborer avec des développeurs (6)	○	○	○	○	○
Diversifier les activités en menant des actions de sensibilisation (7)	○	○	○	○	○
Diversifier les activités en proposant des conseils énergétiques (économies, modes de vie, etc.) (8)	○	○	○	○	○

Diversifier les activités en développant d'autres types de production (réseau de chaleur, etc.) (9)	○	○	○	○	○

Souhaitez-vous rajouter une autre action que vous jugez prioritaire qui ne figure pas dans les propositions précédentes?

____

Page Break

Quelle est selon vous la position des acteurs suivants vis à vis des communautés énergétiques en général?

	Pas du tout favorable (1)	Pas favorable (2)	Neutre (6)	Favorable (3)	Très favorable (4)	Je ne sais pas (5)
La CRE (1)	○	○	○	○	○	○
Enedis (2)	○	○	○	○	○	○
EDF (3)	○	○	○	○	○	○
Enercoop (4)	○	○	○	○	○	○
Energie Partagée (5)	○	○	○	○	○	○
Les Centrales Villageoises (11)	○	○	○	○	○	○
Les élus locaux (6)	○	○	○	○	○	○
La Région (7)	○	○	○	○	○	○
Les développeurs de parcs éoliens ou solaires (8)	○	○	○	○	○	○
L'ADEME (9)	○	○	○	○	○	○
Le gouvernement (10)	○	○	○	○	○	○

Comment jugez-vous le soutien apporté par les acteurs suivants à votre communauté?

	Acteur non concerné (6)	Très mauvais (1)	Mauvais (2)	Bon (3)	Très bon (4)	Je ne sais pas (5)
Enercoop (1)	○	○	○	○	○	○
Les élus locaux (2)	○	○	○	○	○	○
La Région (3)	○	○	○	○	○	○
L'ADEME (4)	○	○	○	○	○	○
Energie Partagée Association (5)	○	○	○	○	○	○
Energie Partagée Investissement (6)	○	○	○	○	○	○
Les Centrales Villageoises (7)	○	○	○	○	○	○
Enedis (8)	○	○	○	○	○	○
Votre réseau personnel (9)	○	○	○	○	○	○
D'autres communautés énergétiques (10)	○	○	○	○	○	○
Les développeurs de parc éoliens ou solaires (12)	○	○	○	○	○	○

Quel est le fournisseur d'électricité à votre domicile?

○ EDF (1)

○ ENERCOOP (2)

○ Autre (3)

○ Je ne sais pas (4)

End of Block: Pratiques d'engagement diverses

Start of Block: Qui êtes-vous?

Comment avez-vous pris connaissance de l'existence de votre communauté énergétique?

○ Bouche à oreille (1)

○ Famille ou amis (2)

○ Tract (3)

○ Site Internet (4)

○ Fournisseur d'énergie (5)

○ Média militant (6)

○ Média généraliste (7)

○ Média Public (collectivités, ministère...) (8)

○ Je ne sais pas (9)

○ Autre (10) ____

Est-ce que vous communiquez activement sur l'existence de votre communauté énergétique à votre entourage?

- Oui (1)
- Non (2)

C'est presque fini! Sur cette dernière page, nous vous posons quelques questions démographiques qui nous servirons uniquement à des fins statistiques. Merci de votre participation.

Etes-vous?

- Un homme (1)
- Une femme (2)

Quel est votre âge?

- 18-25 ans (1)
- 26-35 ans (2)
- 36-50 ans (3)
- 51-65 ans (4)
- Plus de 66 ans (5)

Quelle votre situation professionnelle?

- Salarié (1)
- Travailleur indépendant (2)
- Sans-emploi (3)
- Retraité (4)
- Etudiant (5)
- Autre (6) ____

Votre diplôme le plus élevé :

- Aucun diplôme ou enseignement primaire (1)
- Collège (2)
- Bac (3)
- Bac + 2 (4)
- Bac + 3 (licence) (5)
- Bac + 5 (master) (6)
- Doctorat (7)

Habitez-vous à proximité de votre communauté énergétique?

- Oui (1)
- Non (2)
- Je ne sais pas (3)

Concernant votre commune de résidence, il s'agit:

- ◯ D'une grande agglomération (+ de 100 000 hab) (1)
- ◯ D'une ville moyenne (+ de 20 000 hab) (2)
- ◯ D'une ville de petite taille (+ de 5000 hab) (5)
- ◯ D'un Bourg (+ de 1000 hab) (3)
- ◯ D'un Village (- de 100 hab) (4)
- ◯ Je ne sais pas (6)

Concernant votre domicile, il s'agit:

- ◯ D'une maison (1)
- ◯ D'un appartement (2)
- ◯ D'une maison mitoyenne (3)

Etes-vous propriétaire de votre logement?

- ◯ Oui (1)
- ◯ Non (2)

Faites-vous ou avez vous fait partie d'un conseil municipal?

- ◯ Oui (1)
- ◯ Non (2)

Dans quelle mesure vous sentez-vous compétent-e dans les domaines suivant ?

	Pas du tout compétent -e (1)	Un peu compétent -e (2)	Compétent -e (3)	Tout à fait compétent -e (4)
La gestion d'entreprise (1)	○	○	○	○
La communication (2)	○	○	○	○
La vente (3)	○	○	○	○
Le secteur de l'énergie (4)	○	○	○	○
La gestion de projet (5)	○	○	○	○
La prise de décision (6)	○	○	○	○

End of Block: Qui êtes-vous?

IMPACT

GRENOBLE ECOLE DE MANAGEMENT
BUSINESS LAB FOR SOCIETY

une école CCI GRENOBLE

12, rue Pierre Sémard
38000 Grenoble - France
+33 4 76 70 60 60
info@grenoble-em.com

64/70 rue du Ranelagh
75016 Paris – France

grenoble-em.com

FOUNDING MEMBER GIANT