Community power: why, how and what for?

How is France sitting compared to the leading countries?

Final report – July 2019

Call topic addressed:	**New relationships between energy systems and communities**
Project title:	Community power: why, how and what for?
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1. PROJECT DESCRIPTION

1.1. CONTEXT

Almost everywhere in the world, from developing to developed countries, provinces, cities or rural areas, citizens are moving away from dependency on large electrical grids to localized energy production - a move that goes hand-in-hand with renewable energy development.

In the US, hundreds of cities such as Brooklyn, Austin, Denver or Charlotte are placing urban green energy at the frontline of the climate fight and community power as a mean of achieving their objective.

Australia adopted a national Community Energy Strategy in 2015, whereas Japan has organized the 1st World Community Power Conference in November 2016 and signed the Fukushima Community Power Declaration on the same occasion.

In Europe, the Commission launched the Covenant of Mayors in 2008 to endorse and support the efforts deployed by local authorities in the implementation of sustainable energy policies. Signatories of the Covenant of Mayors have committed to implement action plans (SEAP[1] & SECAP) before 2030, promoting energy efficiency and the use of energy from renewable sources in a local authority's territory.

Remunicipalisation of the grid, integrated community energy systems, community ownership, national Community Energy Strategy, renewable energy cooperatives, self-sufficient and smart cities, here are some of the more or less "new" relationships developing between energy systems and communities in many European countries.

Although in a quite unevenly way across countries, this decentralized way of investing, generating, self-consuming, and /or supplying energy on a municipality, regional or local community basis, is booming, introducing new opportunities and challenges to the energy systems and, more specifically to the electricity market and distribution grids.

1.2. OBJECTIVES

In this rapidly changing framework, this study proposes to analyze and compare different community power models.

➲ It starts by drawing-up a global state of the art of community energy around developed countries worldwide.

➲ Then, thanks to an in-depth study of the situation in Denmark, Germany, England and Scotland, the study describes the common motives and various forms of community energy structures and models developed in each of these countries. It presents legal contexts, partnerships and support schemes implemented in different ways to:

- display a high level political will in favor of community energy,
- alleviate the financial burden of communities/address access to finance,
- simplify procedures for citizens and small investors
- and facilitate access to the grid.

➲ Building on the previous sections, the report examines how France sits compare to the leading countries with regard to community power development (number and type of projects, political will, legislation, access to finance, support schemes, etc.).

➲ It then focuses on specific case studies aiming at presenting the diversity existing between four innovative models of community power (2 in the UK, 1 in Germany and 1 in Spain), before ending with a conclusion wondering about the future of community energy in a post FiT (Feed-in Tariff) new world.

[1] SEAP : *Sustainable Energy Action Plan / SECAP : Sustainable Energy and Climate Action Plan*

2. INTRODUCTION:

The Future of Energy call for proposal 2018 topic 1 "**New relationships between energy systems and communities"** is interested in better understanding how the decentralized, diffuse electricity generation technologies like solar and wind have the potential to redefine the relationships between the energy system and the communities.

However, before going further, an essential part of this work starts in explaining that the answers to most the questions asked[2] rely heavily on the way, countries and authorities understand and apprehend the term "Community" and, more specifically, "Energy Community."

Surprising as this may seem, until mid 2019 (while this study started in September 2018), very few countries had clearly defined the concept of "Energy community".

Table 1 demonstrates 6 distinct but interconnected meanings for community (Walker, 2011).

> " *There is no consensus on a precise definition of 'community power'. It can relate to education and raising public awareness around energy efficiency, it may emphasize self-sufficiency and even production of energy by the community itself. 'Community' may also range from one or two people living in close proximity, to a large group of geographically dispersed individuals that share a common interest*". Client Earth 2013
>
> " *Just as there is no one size fits all definition of 'community', there is no one definition of Community Renewable Energy. These projects come in many shapes and sizes, growing from the diverse needs and available resources of the local community. It might be anything from PV on a school roof to a four-turbine wind farm on the edge of town to a small hydro system owned by two nearby villages. Projects vary by technology, size, structure, governance and funding options. Even people's motivations for setting such a project up vary*". Community Power Agency 2018

Table 1 : different meanings of « community » (Walker, 2011)

Community as…	*Explanations*
Actor	*A subject that can interact with others and make changes through various forms*
Scale	*The position of a group of people within a hierarchy of interacting scales of action*
Place	*A certain geographical boundary where people live together (Musall & Kuik,2011)*
Network	*A group of individuals who share a common interest (e.g. investors in a cooperative project (Conaty, 2011))*
Process	*A way of involving people to collaborate.*
Identity	*People's perception of who they are and what they should do in their daily life.*

In some examples, "Community energy" is understood as 'community as network', simply bringing benefits to shareholders (who might be far away from energy generation, instead of to local people), whereas, in other cases, "community" will more often be apprehended as place, with a location focus.

Furthermore, as for the meaning of energy community, Walker and Devine-Wright (2008) have identified two dimensions:

- the process dimension that draws attention to who a project is developed and operated by: for example, Enercoop, the French Cooperative, developed and operated by French citizens,
- The outcome dimension focuses on who a project is for, such as in the cases of most British Community Energy projects, specifically dedicated to fight against fuel poverty and aiming at supporting local groups of citizens.

More recently, S. Moroni et al.[3] proposed an energy community taxonomy based on two pairs of options which generate a four-cell matrix:

[2] Questions asked : which business and governance community energy models have been developed in different countries? At what scale (size/geography of community, volume of energy produced)? Which are the driving forces? What are strengths and weaknesses of the different models? What are the key success factors?

[3] Energy communities in the transition to a low-carbon future: A taxonomical approach and some policy dilemmas - Stefano Moronia, Valentina Alberti, Valentina Antoniucci, Adriano Bisello – Journal of Environmental Management – 15 April 2019

- a first distinction between “place-based” and “non-place-based” communities
- a second distinction between communities which take shape solely for energy purposes (“single-purpose” energy communities) and “multipurpose” communities with a wider range of objectives.

Table 2 : types of energy communities according to S. Moroni et al. (in Journal of Environmental Management 236 (2019) 45–53)

	Non-place-based communities	**Place-based communities**
Single-purpose	Non-place-based communities set up for the sole purpose of producing, managing or purchasing energy in accordance with shared rules	Place-based communities set up for the sole purpose of producing, managing or purchasing energy in accordance with shared rules
Multi-purpose	Multi-purpose non-place-based communities set up for the purposes of sharing production, management or purchasing of various goods and services including energy	Place-based communities set up for the purposes of sharing production, management or purchasing of various goods and services including energy

These numerous possibilities to interpret Renewable Energy Community inevitably results in a wide array of variations and models, but the coming sections try to present, as far as possible, common features among countries.

3. GENERAL OVERVIEW OF COMMUNITY POWER IN DEVELOPED COUNTRIES

3.1. IN NORTH-AMERICA

3.1.1. USA

Several forms of community renewable energy may exist in the US:

- Community-owned renewable, owned locally by members of the community (very few[4])
- Shared renewable, that may or, more often, may not be locally owned, but the community can share the output

US Community energy

> Shared renewable
> Community solar programs = solar gardens = 1300 MW in 2018
> Virtual Net metering
> Municipality-owned, not-for-profit public power utilities

For wind power, the scale of most wind farms makes them expensive, and their remote location makes sharing electricity output with the typical US policies nearly impossible. The result is that very small percentage of total installed wind power capacity is part of a community renewable energy project, an infinitesimal share of wind power capacity is community-owned and none have shared output.

Whereas, for solar power, the situation is very different and community energy in the US can almost exclusively be likened to community solar, referred to as solar garden or shared solar plant.

In numbers, the growth of community solar within the last few years has been explosive – having gone from 26 MW installed in 2011 (enough to power about 8,000 homes), to a total of over 1 300 MW by the end of 2018 (~ 13 % of US solar photovoltaic installed capacity in 2018[5]).

Community solar can refer to both 'community-owned' projects as well as third party-owned plants whose electricity is shared by a community. Ones can think of community solar as something that homeowners "subscribe" to. The primary purpose of community solar is to allow members of a community the opportunity to share the benefits of solar power even if they cannot or prefer not to install solar panels on their property. A resident can either own a few of the community array's solar panels or rent them in order to get discounted energy rates without having to make any up front purchase. Issues like maintenance, warranties and equipment are not a factor with community solar, because all of those elements are handled by the owner. Project participants benefit from the electricity generated by the community solar farm, which costs less than the price they would ordinarily pay to their utility.

Various states[6] have adopted virtual net metering (VNM[7]) and/or more comprehensive shared energy program[8] legislation to support and guide community solar programs.

Finally, if, in the US, opportunity for community renewable energy has often coalesced around "shared solar" municipality-owned, not-for-profit public power utilities[9] still owned by 2,000 small towns to large cities such as Georgetown or Denton, deserve to be mentioned as another model of community energy.

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[4] Community owned energy projects are rare as they face a major challenge in raising capital because the owners of the wind or solar project are often distinct from the property owner, and spread over a wide geographic region.

[5] In 2018, the U.S. solar market installed 10.6 gigawatts (GW) of solar photovoltaic (PV) capacity whereas cumulative operating solar photovoltaic capacity in the US stands at 62.4 GW in the end of 2018, about 75 times more than was installed at the end of 2008.

[6] At least 21 states have adopted or proposed legislation that played an important role in spurring the growth of community solar, including legislation providing mandates for both virtual net metering and shared energy programs but Minnesota, Arizona, Colorado, and Massachusetts are the clear leaders for community solar installed capacity in the US.

[7] Virtual Net Metering (VNM), also referred to as aggregated or community net metering – is a bill crediting system for community solar. It is an incentive that is shared among multiple people who own a share of a community solar array. The amount of virtual net metering credits you receive depends on the size of your share in the community solar system. VNM can be "all customers" meaning all utility customers are eligible to participate in virtual net metering, "limited" meaning eligibility is limited by technology, utility type, or customer classification, "utility choice to offer" meaning utilities are allowed to offer virtual net metering, but are not obligated to or finally "on-bill crediting" meaning that State law mandates that certain utilities credit an owner's or subscriber's electric bill for the amount of electricity generated by a community solar project.

[8] Examples of comprehensive Shared energy programs : the « Green Tariff Shared Renewables Program » in California mandates that as much as 600 MW of community solar be installed by 2019, the "Community solar gardens Act" in Colorado, the Solar Energy Jobs Act in Minesotta.

3.1.2. Canada

Canada community energy

> Co-operative electricity generation projects
> 210 MW of community owned capacity in Ontario
> Community frequently related to First Nation and Métis (Arboriginal)

Canada has a long history of co-operative and municipal activity in the energy sector. Since 1940, more than 715 co-operatives incorporated to provide power services. The vast majority of these (561) were electricity distribution co-ops formed mainly in the provinces of Alberta and Quebec in the 1940s and 1950s. These provided powerlines for rural areas in the provinces at a time when electrification rates were low and provincial governments were ideologically opposed to developing large-scale public power grids. Most of these have now sold, or, in the case of Québec, been incorporated into the public power system. Sixty-one co-operative rural electric associations (REAs) continue to operate in the province of Alberta.

Canada does not have a set of strong national energy policies nor community energy policy at national level. It has built its energy infrastructure on a province-by-province basis with big differences between Manitoba, Quebec, Newfoundland and British Columbia all having heavy reliance on hydro and others such as Ontario, Nova Scotia, and New Brunswick, for example, all having traditional reliance on coal for electricity.

However, there are funding opportunities for local energy project development. One of these, the ecoENERGY for Aboriginal and Northern Communities is aimed at First Nations communities and provides for project costs of up to $250,000. It ran from 2011 to 2016, and was not renewed, but an additional $10.7 million was allocated in 2016 for off grid and diesel reliant northern communities[10].

Furthermore, over 200 co-operative electricity generation projects have emerged across Canada since 1990. Most of these projects are concentrated in the province of Ontario (clear national leader in terms of community energy) due to its 2009 Green Energy and Economy Act support for the community power sector more broadly (including First Nations, municipalities and non-profits).

Unlike its big US neighbour that has very little community owned renewable projects, Canada, and more specifically, Ontario, had in 2016, close to 2.5 times[11] as much community-owned renewable energy capacity as the entire United States (approximately 210 MW vs. 106 MW) if projects developed by municipalities and local utilities are included alongside projects that qualify for community set-asides and price adders.

Projects with Aboriginal investment (First Nation and Métis) add another 850 MW, amounting to more than 1000 MW of renewable energy generation in Ontario with some level of community involvement and/or control (far behind Germany, where over 25,000 MW is community owned).

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[9] Not-for-profit public power utilities provide electricity to customers (both domestic and businesses) at the lowest rates (nearly 15 % less than prices offered by private utilities.

[10] These policies are important, as diesel generation is the primary source of power for many remote and rural areas of Canada's North. In Nunavut, for example, there is no provincial power grid and the population is 100% dependent on imported diesel. Some communities are accessible only by seasonal (ice) roads or by airplane, and can be hundreds of kilometres from the closest major settlement. It is in these areas that community energy systems in Canada may provide the most obvious benefits in terms of improving local facilities, reducing exposure to fuel costs, and lower emissions energy sources.

[11] Source of information: TREC – http://www.trec.on.ca/wpcontent/uploads/2016/06/TREC_Primer_Jun28_Approved_Final-LR.pdf

3.2. IN JAPAN

Japan community energy

> Citizen fund raising
> ~250 community power entities, minor in terms of MW capacity
> Grid connection issues
> More and more solar sharing communities of farmers
> A few municipality mi-grids
> A big variety of business models

Inspired by movements developed in Denmark and Germany, community power projects started to appear in Japan in the early 2000s, especially after the Fukushima nuclear disaster.

In 2001, the Hokkaido Green Fund 1st community owned wind turbine was established. When Hokkaido Green Fund and its supporters decided to construct their own wind turbine, they faced a financing problem, partly because Japanese banks had never financed renewable energy projects before. As a newly established non-profit organization without outstanding assets, Hokkaido Green Fund barely stood a chance to get the necessary ¥100 million. In the process of researching the possibility of citizen funded raising, the Institute for Sustainable Energy Policies (ISEP) helped to establish that such a project was legal and possible in Japan. Then, the target amount of money (¥141.5 million) was collected from 217 investors, the rest of the cost being covered by a bank loan. After the successful first project, Hokkaido Green Fund kept supporting new projects in other areas and twelve citizen wind turbines had been built, most of them owned by the local communities.

Lida City project, in 2004, was Japan's 1st citizen-funded distributed solar PV project.

In May 2014, the Japan Community Power Association was established as a network aimed at creating a sustainable society through community-driven projects.

In November 2016, Japan held the 1st World Community Power Conference and adopted the Fukushima community power declaration.

In the end of 2016, Mr S. Furuya from Institute for Sustainable Energy Policies (ISEP) assessed about 250 legal entities: community power enterprises in Japan, amongst which 45 MW in solar PV, 37 MW in wind power and 19 community oriented power supplier but since then, he gave up the survey considering it involved issue of definition: "I always wonder if a certain project is community power or not". According to People Power Station, there would be over 550 community power projects existing today in Japan.

In addition to these community power enterprises, it should also be mentioned two other forms of community energy development that have especially developed in response to the main barrier to community energy in Japan: **the grid connection issue**. Municipalities with microgrids have sprung up in dozens around the country as well as farmers solar sharing projects.

1. To exemplify the first case, the city of Higashi Matsushima (north-east coast of Japan), with 40,000 inhabitants chose to construct micro-grids and de-centralized renewable power generation to create a self-sustaining system capable of producing an average of 25 % of its electricity without the need of the region's local power utility. In addition to the solar capacity, there is 480 kWh of battery capacity along with a 500 kW biodiesel generator to provide backup capacity." As of 2016, the energy has been managed by HOPE Electricity, a local power company run by Higashi Matsushima that reinvests profit back into the city.
2. Because the regional electric power systems are still vertically integrated in Japan, those transmission system operators are not independent from the conventional utilities and not ready for flexible grid management. The suspension of additional grid connections was therefore announced and it became impossible to connect utility-scale ground mounted solar projects. Only small distributed (under 50 kW) systems, which do not require tough negotiation for the grid connection, were still feasible for communities. In the end, a total of 1,166 kW solar system was installed by October 2017 and an additional 500 kW are to be installed soon by Iitate Electric Power (a community producer/supplier of farmers). (Cf. https://medium.com/thebeammagazine/solar-sharing-for-the-future-generation-the-story-of-iitate-electric-power-in-fukushima-c28efd5d7e41).

Today in Japan, community energy entities are extending their business from electricity generation to biomass heat supply, energy efficiency, electricity supply and so on and the business model development is very different, varying from community to community.

3.3. IN AUSTRALIA

Community energy is a fairly new concept in Australia. The first community renewable energy project started in 2011 in Victoria (state of southeastern Australia) : ***Hepburn Springs Wind Farm*** (hepburnwind.com.au/) was the first site in Australia to build a community owned wind farm. The site has two wind turbines which feed power to the local community.

Since then community energy has grown steadily to a point where by early 2019 there are at least 105 community energy groups developing, delivering and/or operating renewable energy projects. 2 community wind projects are already operating and over 80 solar projects.

Australia community energy

> About 105 community energy groups
> Mostly solar projects "behind the meter"
> National Community Energy Strategy published by a coalition of associations
> Lack of support /no dedicated policy at federal level

In 2015, a National Community Energy Strategy was published after a long drafting and consultation process by a coalition of associations involved in the promotion of renewable energies with the support of the Australian Renewable Energy Agency (ARENA).

However up to now, this "bottom up" national community energy strategy has not translated into a national policy nor a regulatory framework specifically aiming at promoting community energy projects at federal level.

The Australian Government has set a renewable energy target for around 23 per cent of the country's electricity supply to be sourced from renewable energy by 2020 but with no specific target related to community renewable energy. However a specific scheme is dedicated to small scale projects : the Small-scale Renewable Energy Scheme that produces Small-scale Technology Certificates (STCs). The SRES rewards homes and businesses that install eligible smallscale power generators such as solar panels, and small-scale wind or hydro systems.

While the RET is a federal scheme, there are also a number of state-based renewable targets : Queensland has a target to reach 50 per cent of the state's electricity supply sourced from renewable energy by 2030 ; South Australia, 50 per cent by 2025 and Victoria, 40 per cent by 2025. These states are motivated to support community energy as community-scale projects sit between utility and household scale (a missing part of the existing market) and because they contribute to the objectives of cleaner, more affordable energy and secure supply. In 2017 Victoria became the first state in Australia to trial Community Energy Hubs ($1 million pilot program involving three hubs across regional Victoria.

The Australian market encourages rooftop solar "behind the meter" (electricity produced is used on-site). Many of community energy projects are based on community investments or community donations with a few based on genuine community ownership. In Australia, grid connected solar doesn't tend to make sense at smaller scales as they must compete with larger scale projects (10MW - 400MW).

Currently there are three main models of community energy projects in Australia:

Table 3: main community energy models in Australia

Models	Operating principles	Examples of successful projects
Donation model	Donations can come in the form of grants or many 'crowdfunded' donations from individuals. Donations can be used as a gift to the project, or as a loan. The advantage of the latter is that donated funds can be re-used in a type of revolving fund.	**CORENA** (Citizens Owned Renewable Energy Network Australia): revolving fund sourced from individual donations (corenafund.org.au) **The People's Solar**: crowdfunidng platform for community energy projects (thepeoplessolar.com) **Totally Renewable Yackandandah** : a local citizens' group, formed in 2014, with the aim of powering this small Victorian town with 100% renewable energy and achieving energy sovereignty by 2022 (totallyrenewableyack.org.au)
Community-investment model	In this model similar to community investment schemes existing in Denmark or Spain, citizens choose to invest in renewable energy projects	**Hepburn Springs Wind Farm** (hepburnwind.com.au) **ClearSky Solar** (clearskysolar.com.au) : the clearsky model aims to develop projects at the $100,000 size, often on the rooftop of mid-sized businesses who don't want to make the upfront capital investment. ClearSky limits each project to 20 investors and typically offers returns from 5-8%. The projects are each set up under a trust mechanism. An investment offer usually sells out within 24hrs, demonstrating that project development is the bottle neck. **Pingala cooperative** (pingala.org.au) has created a robust investment community by partnering with small businesses. **Sydney Renewable Power Company** has funded a 520kW solar array on the roofs of the International Convention Centre by raising $1.4m in 2017 from a wide range of investors incluging citizens (www.sydneyrenewable.com)
Bulk-buy model	Bulk buy models emerged as rooftop solar started to become popular. In return for reducing the costs of customer acquisition, equipment providers often provide a benefit to aggregators, or discounts to the community of buyers. Most bulk-buy projects are once-off initiatives.	**Sun Crowd** (suncrowd.com.au) is currently running bulk buy initiatives for solar systems with battery storage. **Victor Harbour Council** (victor.sa.gov.au/solar) granted the tender for their solar program to Zen Energy in 2009 to provide a reliable solar panel installation service to residents. **Our Solar Future** (oursolarfuture.nsw.gov.au/) use independent community groups such as the Alternative Technology Association or the Moreland Energy Foundation (MEFL) to provide the vetting services.

3.4. IN EUROPE

As detailed in section 4 dedicated to the in-depth study of community power in Denmark, Germany, England and Scotland, the way Member States have implemented and developed community energy is heterogeneous, both in its approaches and in its motives. However, some political decision taken at the European level, since over ten years and, very recently in mid 2019, are progressively showing the way for a much more important role of citizens, local authorities and, generally speaking Local Renewable Energy Communities in energy transition

Community Energy (CE) in Europe

> Over 3 000 energy cooperatives
> Scotland, Wales and the Netherlands with targets related to CE development
> Greece, only member States allowing Virtual Net Metering system
> Big differences of CE models between countries
> Since, 2019, an official role, definition and rights for renewable energy communities.

According to searchers from the Scottish organization, James Hutton Institute, "Citizen-driven Renewable Energy (RE) projects of various kinds, known collectively as community energy (CE), can be divided into 3 phases in Europe:

- The environmental movements of the 1960s and the "oil shocks" of the 1970s when the first wave of Community Energy innovations included cooperatives (e.g. in Denmark, Sweden and Germany) in the absence of support from governments and banks;
- A second wave relates to the mainstreaming of renewable energy and associated government support mechanisms. In Scotland, UK, strong public support was given to community energy, and a new form, the Community Development Trust[12], emerged and was later replicated elsewhere in the UK;
- Third phase began in 2007-2008 and lasted most of the subsequent decade. Community energy initiatives formed around this time were strongly focused around democratization of energy and citizen empowerment in the context of rising energy prices, a weak economy, and a production and supply system dominated by excessively powerful multinational energy firms. At the same time, the liberalisation of the electricity market has made it possible for community-owned renewables projects to start supplying energy to their members.

However, until 2019, despite over 3 000 renewable energy cooperatives throughout Europe and the singular political commitment of Scotland, the Netherlands, Greece and Wales[13] in developing community energy projects, Europe had no guidelines, no target, no specific legislation and even no definition of "energy communities" to assist citizens or local authorities involvement in energy projects.

But, since 2018, thanks to the work carried out on the 'Clean Energy Package', setting a new framework for climate and energy until 2030, the situation is changing:

In its revised Renewable Energy Directive (REDII) adopted on the 11th of December 2018, art 2 (16), the European Commission **defines "renewable energy community" as a legal entity**:

> ☞ (a) which, in accordance with the 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 that are owned and developed by that legal entity;
>
> ☞ (b) the shareholders or members of which are natural persons, SMEs or local authorities, including municipalities;
>
> ☞ (c) the primary purpose of which is to provide environmental, economic or social community benefits for its shareholders or members or for the local areas where it operates, rather than financial profits;

[12] Development trusts are a particular type of partnership organization - one that offers benefits to the local community and has advantages for many public bodies, non-profit agencies and funders. While there is no one model for Development Trusts, they do have common characteristics of being concerned with the regeneration of an area, not for private gain, aiming for long term sustainability, and community based and accountable.

[13] Scotland was the first in 2011 to set targets of community and locally owned renewable energy capacity / In 2018, the Netherlands have reached a new Climate Agreement, including a community energy target that requires all new wind and solar projects to be at least 50 % owned by the local community / Greece is the only Member State allowing"virtual net metering" system, which allows benefits generated by renewable electricity to be shared across buildings in the same municipality – even though they may be situated kilometres apart / The Welsh Government's renewable energy targets has two objectives related to local ownership for its renewable energy projects.

Furthermore, art 22 of the same directive, details the renewable energy communities' rights and obligations as well as responsibilities of Member states for providing them an enabling framework to facilitate their development (see below).

Article 22
Renewable energy (RE) communities

1. Member States shall ensure that final customers, in particular household customers, are entitled to participate in a renewable energy community while maintaining their rights or obligations as final customers, and without being subject to unjustified or discriminatory conditions or procedures that would prevent their participation in a RE community, provided that for private undertakings, their participation does not constitute their primary commercial or professional activity.

2. Member States shall ensure that renewable energy communities are entitled to:

(a) **produce, consume, store and sell RE**, including through renewables power purchase agreements;

(b) **share**, **within the renewable energy community, RE** that is produced by the production units owned by that renewable energy community, subject to the other requirements laid down in this Article and to maintaining the rights and obligations of the renewable energy community members as customers;

(c) access all suitable energy markets both directly or through aggregation in a non-discriminatory manner.

3. Member States shall carry out an assessment of the existing barriers and potential of development of renewable energy communities in their territories.

4. Member States shall **provide an enabling framework to promote and facilitate the development of RE communities**. That framework shall ensure, inter alia, that:

(a) unjustified regulatory and administrative barriers to RE communities are removed;

(b) RE communities that supply energy or provide aggregation or other commercial energy services are subject to the provisions relevant for such activities;

(c) the relevant distribution system operator cooperates with RE communities to facilitate energy transfers within RE communities;

(d) RE communities are subject to fair, proportionate and transparent procedures, including registration and licensing procedures, and cost-reflective network charges, as well as relevant charges, levies and taxes, ensuring that they contribute, in an adequate, fair and balanced way, to the overall cost sharing of the system in line with a transparent cost-benefit analysis of distributed energy sources developed by the national competent authorities;

(e) RE communities are not subject to discriminatory treatment with regard to their activities, rights and obligations as final customers, producers, suppliers, distribution system operators, or as other market participants;

(f) **the participation in the RE communities is accessible to all consumers, including those in low-income or vulnerable households**;

(g) tools to facilitate access to finance and information are available;

(h) regulatory and capacity-building support is provided to public authorities in enabling and setting up RE communities, and in helping authorities to participate directly;

(i) rules to secure the equal and non-discriminatory treatment of consumers that participate in the RE community are in place.

5. The main elements of the enabling framework referred to in paragraph 4, and of its implementation, shall be part of the updates of the Member States' integrated national energy and climate plans and progress reports pursuant to Regulation (EU) 2018/1999.

6. Member States may provide for RE communities to be open to cross-border participation.

7. Without prejudice to Art. 107 and 108 TFEU, Member States shall **take into account specificities of RE communities when designing support schemes** in order to allow them to compete for support on an equal footing with other market participants.

4. IN-DEPTH ANALYSIS OF COMMUNITY ENERGY MODELS IN FOUR LEADING COUNTRIES

4.1. DENMARK

4.1.1. The Electricity market (in brief)

The Danish electricity system consists of two non-synchronous areas: West Denmark and East Denmark. West Denmark is part of the European continental electricity system, while East Denmark is part of the Nordic electricity system. Given its situation between the predominantly hydro- Nordic electricity system and the thermal Central European electricity system and thanks to strong transmission links to neighboring countries, Denmark benefits from these different systems and plays an important role as a transit country for transport of electricity between the Nordic countries and Central Europe. Denmark's strong electrical interconnection with its neighbours contributes to a robust grid capacity adequacy and to the cost-effective integration of renewables.

The Danish electricity market is an integral part of NordPool, the Nordic electricity market.

➊ Electricity generation

In Denmark, there are around 100,000 large- and small-scale electricity-generating facilities. In 2017 electricity generation from renewable energy sources accounted for 21,043 GWh and represented 71% of total electricity generation in Denmark (source: en.energinet.dk). The remaining 29% is generated at central power stations and to a lesser extent at small-scale decentralized CHP plants.

Denmark has set ambitious national energy targets: the country aims to cover 55% of its total energy consumption by renewables in 2030, and to be free of fossil fuels in 2050.

Electricity generation from renewable energy sources is dominated by wind power, representing 70% of electricity generation from renewable sources and 50% of total electricity generation in 2017 - the highest share among all IEA countries. Wind power play an important role in the transformation of the Danish energy system to reach the national targets.

Solar power only represents slightly less than 4% of electricity generated from renewable sources but its share has been rising rapidly since 2012.

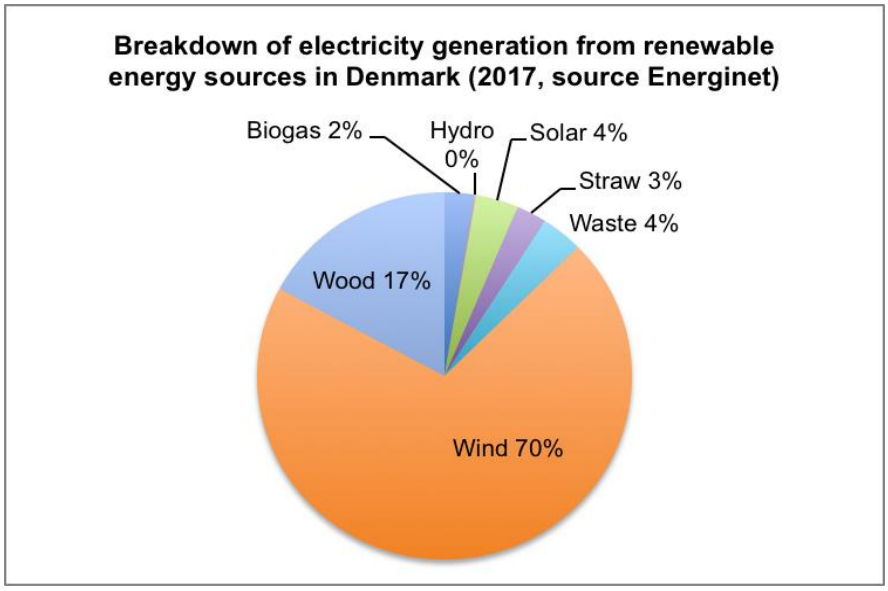

Figure 1 : Denmark's electricity generation from renewable energy sources (2017

❷ Transmission and distribution networks

About the TSO

Denmark's transmission system is 6,144 km long.

The Danish Transmission System Operator (TSO) Energinet.dk is responsible for the daily operation of the electricity system and for maintaining security of supply. It is a completely state-owned company not allowed to build up equity or pay dividends to its owner, the Danish Ministry of Energy, Utilities and Climate. Energinet.dk is regulated under a strict cost plus regime, which means that the company can in principle only recover "necessary costs" by efficient operations and a "necessary return on capital".

About the DSOs

There are about 50 Distribution System Operators (DSOs) in Denmark. The total length of the distributions grid is 159,000 km (at a voltage level under 60 kV) and the distributions grid covers a total number of 3,300,000 consumers. The DSOs are restricted to act only within an independent company and to participate exclusively in license-related activities.

The DSOs in Denmark are challenged with an increasing amount of decentralized production, in particular due to the growth of wind power and photovoltaic modules. As part of their grant to distribute electricity, the DSOs must connect these decentralized production plant to the power grid. The decentralized production has reversed the traditional downstream role for the DSO who now must provide a grid that can direct electricity from the decentralized production plant and back up to the transmission grid.

❸ Energy supply

The Danish retail electricity market is fully liberalized since 2003. Currently there are over 70 active retailers but depending on their location, Danish electricity consumers can freely choose between about 40 suppliers.

To favor an effective competition in the electricity retail market, the Danish parliament introduced the so-called *wholesale model* on 1 April 2016, also known as the *supplier centric model* (SCM). One important effect of the SCM is the introduction of mandatory combined billing for consumers.

Since the supplier-centric model entered into force on 1 April 2016 in Denmark, electricity suppliers have become the main point of contact in the electricity retail markets and they have to fulfill the tasks of invoicing, setting up rates and many other obligations related to final consumers.

In addition Denmark introduced the so-called DataHub: a single repository for all relevant consumer data on electricity, operated by the TSO Energinet. Customers retain complete ownership of their data, and suppliers must be granted permission to access and use these data.

Denmark's electricity costs are average in the EU, but taxes increase the price to the highest in Europe. Among the IEA countries, Denmark has the highest electricity prices for households and the highest taxes on household electricity: in 2016, households paid USD 330/MWh on average, of which taxes accounted for 64% (source: IEA).

❹ Energy regulation

Electricity regulation framework

In Denmark there are two energy regulation authorities with complementary roles:

- The Danish Energy Agency develops the legal framework for production, transmission, and distribution of electricity, and for competition, consumer protection and security of supply.
- The Danish Utility Regulator (DUR) created in on July 1, 2018 replaces the former Danish Energy Regulatory Authority (DERA). The DUR annually determines a revenue cap for each of the Danish DSOs. For a given distribution company, the revenue cap is fixed as a "regulatory price" per kWh multiplied by the expected kWh transported in the coming year. The cap ensures that fixed price tariffs are not raised. DUR also determines the maximum allowed return on grid assets. In accordance with the Danish Electricity Act (DES), the maximum allowed return is fixed to the yield of a long-term mortgage bond rate plus 1 percentage point. Either the revenue cap or the maximum allowed return on grid assets restricts the allowed income of DSOs. DSOs may apply to DUR for an increase of the revenue cap in order to cover necessary investments due to public requirements or new supply areas that are not included in the general obligation of distribution network companies to maintain and develop the network.

Electricity producers hold balance responsibility for the electricity produced at their own plants. They can transfer this responsibility to a *Balance Responsible Party* (BRP). A BRP is a market participant approved by and party to an agreement with the TSO Energinet.dk regarding assumption of balance responsibility. A BRP must be linked to all production and consumption metering points as well as to all physical electricity trading.

Electricity from renewable energy sources is traded under the same conditions as other sources.

Renewable Energy Sources (RES) regulatory framework

New installations that produce electricity from renewable sources (including community power projects) have priority access to the grid. Energinet (TSO) and the DSOs cooperate to ensure this network access.

Energinet can only reduce or alleviate prioritized electricity generation if the reduction of electricity generation from other installations is not sufficient to maintain the technical quality and balance within the electricity supply system.

Prioritized access also applies to electricity from tendered offshore wind farms in accordance with the Danish RE Act as they can only be curtailed under special circumstances and against compensation for operational loss.

In Denmark the municipalities are in charge of the planning process of onshore wind turbines up to 150 meters and the Danish Energy Agency is in charge of the off shore wind turbines.

The Danish territory is divided into urban-zones and land-zones (rural areas). Any development in the land-zone including wind turbines need a special land-zone permission.

The coastal zone is given special attention. The Danish Planning Act defines coastal zone as a three-kilometer zone from the coastline. If a municipality wants to settle wind turbines onshore in the coastal zone, this requires special planning and functional justification, such as especially favorable wind conditions.

4.1.2. Historical background and motives for community energy

Denmark has a long history of community-owned energy supply since the 1970's. The development of community energy is closely linked to two major drivers: the promotion of renewable energy sources (in particular wind energy) in order to ensure a stable and secure energy supply, and the strength of the cooperative movement.

Denmark's energy policy was severely influenced by the oil crises in the 1970s. At that time the country was heavily dependent on fossil fuels. Consequently, the Danish government started a program to support renewable energy sources. Denmark was a pioneer in developing wind power and has installed wind turbines onshore since the 1970's. At the end of the 1970s support given to installations and advantageous feed-in tariffs for electricity produced by wind turbines led to the creation of a bottom-up market for small kW-wind turbines while power utilities focused on developing MW-wind turbines. Between 1980 and 2000, the focus laid more on small turbines with a power below 500 kW. In the year 2000, the slightly larger turbines started to become very prominent and today they are the most used type of turbine with the largest installed capacity. Between 2000 and 2013, the number of turbines larger than 2 MW increased substantially, resulting in the fact that those turbines now provide a higher installed capacity compared to the 500 to 999 kW ones. Remarkably, the overall number of turbines in Denmark has decreased while the installed capacity has constantly increased. All these developments are due to the fact that Denmark has focused more on offshore wind power resulting in the fact that fewer, but larger turbines are needed.

Another characteristic of the Danish wind energy sector is the historical presence of wind energy cooperatives. The cooperative movement is deeply rooted in the Danish culture. It began in the late 19th century when dairy farmers voluntarily joined to collectively sell their milk production. The dairy cooperative model quickly expanded to other economical sectors and became a widespread organizational model based on local initiatives: " cooperatives " became the way of organizing all common practical matters among the Danish rural population, including the generation and supply of energy.

Many of the wind turbines in the 1980s and early 1990s were owned by local cooperatives. At the end of 1990s, more than 175,000 households owned 80% of all wind turbines in Denmark, either on individual basis or as members of cooperatives[14]. By 1996 there were around 2,100 wind cooperatives in the country[15].

However, the share of community-owned turbines has significantly decreased with the liberalization of Denmark's electricity market: over the past 15 years, many of the Danish policies and subsidy schemes that helped to establish the wind cooperatives have been phased out. For example, the subsidy for set-up costs and the guaranteed tariff for wind energy (feed-in-tariff) have both been removed. Since then, utilities and large energy companies have been playing an increasing role in the establishment and ownership of wind turbines in Denmark, especially as regards large offshore wind farms. In 2002, cooperatives owned about 40 percent of the total number of 6,300 turbines installed, and over 150,000 households owned shares in wind power cooperatives[14]. Single owners (mostly farmers) owned approximately 40 percent and utilities the remaining 20 percent[14]. By 2004 the number of households owning shares in cooperatives had decreased to 100,000 and by 2009 to 50,000[14]. In 2008 the Promotion of Renewable Energy Sources Act (see next chapter) attempted to reinforce citizen participation in local renewable projects, but this has not solved all problems for cooperatives. The development of renewable energy cooperatives has also slowed due to the development of more market-based mechanisms for renewables, such as auctions and tenders. The number of new wind turbine cooperatives after 2009 is difficult to quantify but new wind power projects mostly tended to be developed and owned by energy utilities and professional project developers. According to the Danish Wind Turbine Owners association (DK VIND), by 2010 only 15 percent of all turbines in Denmark were owned by about 300 cooperatives. In 2014 there were still about 300-400 wind power cooperatives with local people holding a majority of shares.[16]

4.1.3. National policy, support schemes & legal structures

Historical support schemes

The Danish Government supported the renewable energy industry early on, through various subsidies, tariffs and taxes that also benefited to community renewable energy projects. Historically, the main support mechanisms available were investment grants for wind turbines from the Danish state in the 70s and 80s, tax exemptions for income from wind turbines and, from the mid-1980s, fixed feed-in tariffs including guaranteed grid connection, purchase obligations and priority transmission for wind power producers.

Moreover, Denmark fostered the development of small-scale RE technologies through a pool of EUR 3.35 million per year. Throughout the 1980s and 90s, several more Government initiatives and policies encouraged local ownership of wind turbines.

Over the last 20 years, the regulations have changed and the national framework has become less supportive for wind cooperatives.

After a reform of the electricity sector in 1999, Denmark enacted new rules for wind power support. Wind turbines authorized between 2000 and 2002 as well as those already in operation received a 25 percent lower Feed-in-Tariff (FIT) and payment duration was limited. This reduced economic feasibility for new wind projects and considerably slowed down the creation of new cooperatives. The support mechanism was drastically changed in 2003 with the implementation of a fixed FiP scheme. Producers received the Nord Pool market price plus a fixed maximum premium. Moreover, all new producers had to market their electricity directly on the wholesale market. Consequently, between 2003 and 2008, no new cooperatives were created while many existing ones dissolved. Meanwhile, the government had set up attractive incentives for decommissioning and repowering old turbines, which were often owned by cooperatives. Many cooperatives then dissolved and sold off their turbines to private actors.

[14] Source : Wassink 2001 cited in « Who owns an energy transition? Strategic action fields and community wind energy in Denmark" (Franziska Mey,Mark Diesendorf, Elsevier, January 2018).

[15] Source : Paul Gipe (1996). "Community-Owned Wind Development in Germany, Denmark, and the Netherlands".

[16] Source : Bauwens, Thomas & Gotchev, Boris & Holstenkamp, Lars. (2016). What drives the development of community energy in Europe? The case of wind power cooperatives. Energy Research & Social Science. 13. 136-147. 10.1016/j.erss.2015.12.016.).

In 2008, the support mechanism was reformed again with the Promotion of Renewably Energy Sources Act. This act increased the fixed premium payment, which made cooperative wind projects economically feasible again. However, with increased turbine sizes, capital investments for wind projects have also increased and financing cooperative wind power projects has remained challenging. Cooperatives have thus increasingly sought alternative funding resources. One of these was the creation of a trading company called Vindenergi Denmark, which purchases and trades electricity at Nord Pool on behalf of wind power cooperatives and other individual producers. Vindenergi Denmark is organized as a non-profit cooperative owned exclusively by its members. Although there are no official figures, it is estimated that two thirds of all cooperatives trade with Vindenergi Denmark.

The 2008 Promotion of RE Act also introduced an obligation for all new wind projects to offer a minimum of 20% ownership to local people within 4.5km of the turbines. This was meant to improve public acceptance of wind turbines. However this did not favour the wind cooperatives as cooperative projects tend to be replaced by “20 percent projects” where individual citizens participate to large-scale private-led projects.

In addition, a public guarantee fund was established to support the financing of preliminary investigations, planning, etc. by local wind power cooperatives (see below).

Current support schemes

Grid access and cost sharing model

In Denmark turbine owners only have to pay for the connection to the closest technically feasible point of the grid (connection point). The local grid company (DSO) or the TSO is required to connect onshore wind turbines to the grid and bears the costs for the expansion and strengthening of the grid.

The grid operator is statutorily obliged to expand the grid in order to guarantee the efficient transmission of electricity “with a special attention given to renewable energy sources”.

Financial support schemes

Energinet provides guarantees for loans taken out by local associations of wind plant owners and other local communities such as cooperatives to finance feasibility studies prior to the construction of wind-energy plants.

To be eligible a project must involve at least 10 members a majority of which must either be residents of the municipality, or live within 4.5 km from where the installation will be constructed.

In case of off-shore wind turbines, the municipality must have a coastline located within 16 km from the site. Each project can receive a maximum guarantee of 500,000 DKK (≈ € 67,260).

The guarantees fund has a total budget of 10 million DKK (≈ € 1.34 million). It is financed through the so-called Public Service Obligation (PSO): a surcharge on electricity consumption paid by every consumer. Wind energy plants up to 25 kW, solar energy installations up to 50 kW and other technologies up to 11 kW are fully exempted from paying the PSO.

In addition, electricity producers using all or part of the electricity produced for their own needs are completely or partially exempt from paying the PSO.

Following a new law passed in November 2016, the PSO payment will gradually is being gradually reduced from 2017 and is to be abolished in 2022 for all electricity consumers. Support for renewables will be financed through the national budget.

Simplified procedures for small projects

In Denmark the municipalities are in charge of the planning process of onshore wind turbines and the Danish Energy State Agency is in charge of the offshore wind turbines.

Renewable facilities with a capacity of 10 MW or less are not obligated to apply for a permit to generate power (but have to comply with certification scheme)

Wind turbines below 25 kW only have to notify municipalities that the project complies with construction laws.

In order to assist local authorities with the planning processes, a Wind Turbine Task Force was established in 2008. A web platform – Vidinfo.dk – was introduced in 2013 as a joint initiative by the Danish Energy Agency, the Environmental Protection Agency, the Nature Agency, national TSO, Energinet.dk, and the Transport Authority The platform compiles information on wind turbines from all the relevant national authorities’ websites to citizens, municipalities and wind turbine developers.

4.1.4. The state of community energy in 2018

In Denmark there is no official definition of community energy. Most community energy is related to wind power which is by far the dominant renewable energy source in Denmark.

Currently there are two main forms of community renewable energy projects:

- **Cooperative ownership model** where renewable energy installations (mostly wind turbines) are owned by local citizens, farmers, businesses, municipalities and other local entities who utilize wind energy to support and reduce energy costs to the local community.

- **Co-owned community energy projects** ("20% projects") where citizens participate by investing in large-scale projects often led by energy utilities. This type of projects has been promoted by the 2008 Promotion of Renewable Energy which introduced an obligation for all new wind projects to offer a minimum of 20% ownership to local people within 4.5km of the turbines.

As stated previously there are no official figures on the current share of community-owned wind turbines as since 2001, ownership in wind turbines is not centrally registered anymore. The Danish Wind Industry Association could not provide any recent figures either. A literature review suggests that there might still be around 300 active wind cooperatives in Denmark. Although by 2001 cooperatives had installed over 85% of wind turbines, today wind cooperatives probably account for less than 20% of existing wind power capacity.

In May 2019, Denmark had a total of 5 968 on-shore wind turbines and 558 offshore wind turbines with a total installed capacity of 6 123 MW[17]. Out of these, according to a recent study by H.-J. Kooij et al.[18] about 18% (1082 MW) are estimated to be locally owned by citizen cooperatives (549 MW), farmers and local landowners (484 MW).

[17] Source : Master Data Register of Wind Turbine (Danish Eenergy Agency)

[18] Between grassroots and treetops: Community power and institutional dependence in the renewable energy sector in Denmark, Sweden and the NetherlElsevier - ands - Henk-Jan Kooij,Marieke Oteman,Sietske Veenman,Karl Sperling,Dick Magnusson,Jenny Palm,Frede Hvelplund - Elsevier – March 2018

4.2. GERMANY

4.2.1. The Electricity market (in brief)

In total there are 4 major electricity-generating companies, 906 grid operators, 130 electricity traders and 1200 electricity suppliers in Germany.

❶ Electricity generation

Among the German electricity producers there are four major companies: E.ON, RWE, EnBW and now EPH (that bought the generation capacities of Vattenfall), also known under "The big four". Formerly, the major four used to have a very high market share, up to 80% but this has changed with the progress of renewable energies. None of them is state owned. Next to the former "big 4" it is the municipal utilities (Stadtwerke) that are the most important players in the market. Their market share is 25%. There are about 1000 of them in Germany.

❷ Transmission and distribution networks

- The transmission system In Germany, the maximum voltage transmission grid is owned by four independent transmission system operators (TSOs) - TenneT, 50Hertz, Amprion and TransnetBW -, which are responsible for the operation, maintenance, and development of their respective sections of the grid. It is their job to regulate the power supply, including balancing fluctuating power from renewables with more predictable conventional generation.
- The distribution grid (< or = to 110 kV) brings power directly to consumers and is operated by a large number of regional and municipal operators. On 10 November 2017, there were 879 distribution system operators registered with the Federal Network Agency in Germany. Close to 800 (90 %) of these DSOs operate networks with less than 100,000 connected costumers. The total length of Germany's distribution grid is 1,679,000 km.

In order to adapt both its transmission and distribution grids to the coming changes (strong increase of decentralized renewable share versus decrease of centralized sources of energy), Germany is currently will spend 50 billion € by 2025 to build new lines and make lines enforcements[19].

❸ Energy supply

In 2016, there were more than 1,000 energy supply companies active in the German electricity market. More than half of these companies supply less than 10,000 customers.
Power suppliers must pay the TSOs a "grid fee" for the use of their network, which is ultimately passed on to the consumer.

❹ Energy regulation

Besides the Federal Network Agency (*Bundesnetzagentur, BNetzA*) which acts as the leading regulatory authority on the federal level, there are regulatory authorities on the level of each state. These regulatory authorities mainly deal with smaller electricity networks which fall outside the scope of the BNetzA (that is, networks with less than 100,000 customers connected and which do not cross state borders).
Germany is the first country in terms of expansion and implementation of renewable energy for the production of electricity. An aggressive policy of energy transition, the Energiewende, placed it as the European leader in renewable energy. For this, the German government has planned the shutdown of all nuclear power plants by 2022 and the closure of all coal plants before 2038. This energy transition plan has a high cost that directly affects the price of the final electricity bill. The costs include renewable energy aids, plans to dismantle nuclear power plants and aid to regions affected by the closure of thermal power plants and coal mines.
The production of electricity from renewable energies accounted for 39% of all electricity produced in 2018 but it is still far from the target of 65% by 2030. Among the renewable energy, wind energy highlights, covering 21% of all electricity production. Behind are the solar photovoltaic, with 7.8%, and biomass, with 7.6%.

[19] One of the main obstacles for the development of renewable energies include the fact that large parts of the electricity production from renewable sources takes places in the north of Germany (mainly onshore and offshore wind farms), while a lot of the consumption happens in the south of Germany. To integrate more renewable energies, the grid will need to be heavily expanded.

Since early 2017, following the amendment to the law on renewable energies (EEG 2017), the purchase price of renewable energies is no longer set as before by the State through the Feed-in Tariff system but, through tenders. Only small installations, less than 750 KW (for photovoltaic (PV[20]) and onshore wind) and less than 150 KW for biomass, are exempt and continue to receive a fixed amount of support (feed-in tariff).

Electricity from renewable sources is mainly supported through a market premium scheme. For most installations, the award and the level of the market premium is determined through a tendering scheme. However, small power plants up to 100 kW are still supported by a feed-in tariff. The criteria for eligibility and the tariff levels are set out in the Renewable Energy Sources Act (EEG 2017).
Plants for the generation of electricity from renewable sources shall be given priority connection to the grid. Furthermore, grid operators are obliged to give priority to electricity from renewable sources when purchasing and transmitting electricity. Moreover, those interested in feeding in electricity may demand that the grid operator expands his grid.
In recent years, Germany has become the European paradise of electricity self-consumption. In 2018, the number of 100 000 self-consumption installations with batteries was reached, thanks in large part to government aids for this type of facility.
The electricity bill in Germany has strongly increased over recent years for all consumers, especially for domestic consumers who are paying the highest average electricity price in Europe.

4.2.2. Historical background and motives for community energy

Germans first set up renewable energy installations, such as photovoltaic (PV) panels and wind turbines in the 1990s. In 2000, the Renewable Energy Act (EEG) was passed, guaranteeing fixed feed-in tariffs for anyone generating renewable power for a 20 year period. This further encouraged households to install PV panels on their roofs, either feeding the electricity they produced into the grid, or consuming it themselves.
Citizens have also banded together to invest in larger scale installations that would be too expensive for single individuals alone. For more than two decades, various legal forms of ownership have allowed citizens to own solar parks and wind turbines.

As a federal republic, most energy policy in Germany is conducted at the federal level. Germany benefited of two main factors, supported by a favourable policy, explaining the strong development of community energy:

- The energy cooperative movement
- The remunicipalisation context

❶ Germany is one of the pioneering countries of the cooperative movement; it has a strong tradition and culture of forming cooperatives[21] and social enterprises (trading for social or environmental purposes). Its birth is owed to Friedrich Wilhelm Raiffeisen (1818-1888). Using land of all the farmers together as collateral against individual loans, farmers were able to seek credit from banks. According to L. Sridhar (UFU), “this belief in self dependency within the village or the region as well as the idea of creating value as a group, remains the cornerstone of German cooperatives even today”.

[20] New PV systems up to 100 kWp receive a fixed feed-in tariff• New PV systems between 100 and 750 kWp must sell their energy by direct marketing.• New PV systems over 750 kWp are required to partake in calls for tender and may not be used for self-production.• Self-consumed PV energy is taxed above a certain nominal power (approx. 10 kW) with 40% of the current EEG surcharge, which means that the PV electricity generation costs increase by approx. 2.7 € ct / kWh. (Source: Fraunhofer ISE).

[21] A cooperative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise. The primary feature of a cooperative is that, no matter the percentage of contribution by a member, each person only gets one vote.

In the beginning of 2000s, the growth of energy cooperatives has been attributed to several factors amongst which:

- Amendments to the Renewable Energy Sources Act in 2004 and 2008 that ensured Feed-in Tariffs (FITs) and priority access to the grid for renewable energy sources and fall in solar PV prices
- Changes to cooperative establishment laws in 2006 with the aim of increasing ease of doing business for cooperatives (admission of "investing" members, changes to minimum capital requirements, various simplifications, etc.).

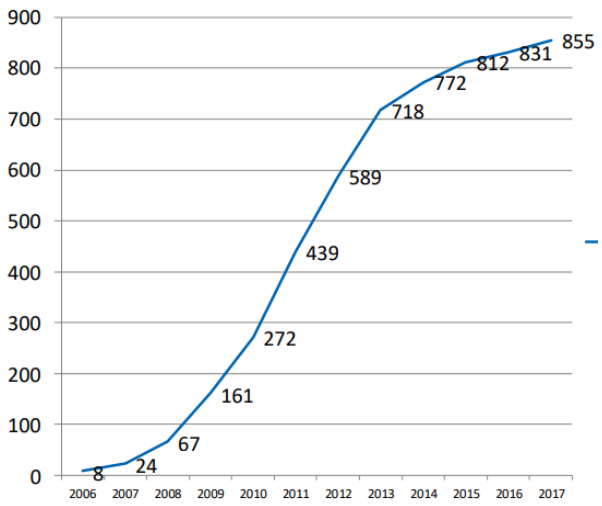

Figure 2 : evolution of energy citizens cooperatives (ECC) in Germany since 2006

Source: Ergebnisse der DGRV Jahresumfrage 2018

The Deutsche Genossenschaften und Raiffeisen Verband (DGRV), an umbrella organization that represents all cooperatives (including non energy cooperatives) found in its 2012 study that the mere idea of making money or ecological considerations were not the primary reason for people founding cooperatives. Instead, promotion of renewable energy and regional development, were the primary reasons for their growth. As a start, energy cooperatives were essentially a rural development movement with local organizations for the local people.

But energy cooperatives also developed in Germany for energy independence and climate action motives (in 1997, in the years after Chernobyl, the residents of the small town of Schönau, in Baden-Württemburg were tired of the indifference of the energy suppliers so they got together and bought back the grid). Today, ElectrizitätsWerke Schönau is one of the largest renewable energy suppliers in Germany with around 130,000 users). With the same ecological concern, other forms of energy cooperatives (without local focus) such as Greenpeace Energy[22] - that has its main membership base from Greenpeace supporters all over the country and from people who are interested in ecological issues- have also developed thanks to a favourable climate policy.

❷ The creation of new municipal companies in Germany has been cited as being crucial to the success of community energy projects since:

- Local authorities provide space for renewable installations owned by energy co-ops – usually land on the outskirts of a town or city, or rooftops of public buildings (schools, town halls, etc.).
- informational and technical support to help individual citizens and community groups navigate regulatory and other hurdles that exist in setting up community power projects are usually provided by the city, or through the municipal energy company.

In 2005-2006, the remunicipalisation trend in the German energy sector has taken two main forms: turning back previous privatizations and forming new local utilities where a regional supplier (often private) was active before. From small cities such as Wolfhagen[23] to the second largest town of Germany, Hamburg, hundreds of cities took the grid back into public ownership.

"*The country accounts for 347 remunicipalisation cases since the year 2005, with the energy sector clearly making up the biggest part with 284 remunicipalisations overall*" - Sören Becker.

[22] Greenpeace Energy started supplying energy to its customers by the year 2000 and has today over 23000 members, most of whom are also consumers. It also has a subsidiary "Planet Energy" involved in energy generation.

[23] In Wolfhagen, the president of the Stadtwerke wanted to go further and to make it become 100 % renewable by 2015. To raise the millions needed to build the wind farm, the town sold a quarter of the energy firm's shares to locals in a citizens' co-op. The co-op has seats on the board of the company, giving residents a direct say over how their utility is managed.

Why has this remunicipalisation process occurred in Germany and why, more specifically in the energy sector?

Amongst the reason provided, experts list the following ones:

- Strong traditions of local utilities with the so-called "Stadtwerk" (public or municipal utilities)
- The opening-up of the German energy sector through the energy transition (Energiewende)
- Mistrust[24] and disappointment with the performance of private operators, especially with the "Big Four" energy corporations, criticised for slowing down the adjustment of energy grids to decentralised generation
- Phasing out of concession contracts as a window of opportunity: concession contracts were normally signed for 20 years, and most had to be renewed in the first decade of the 2000s.
- Low interest rates on communal credits with the availability of cheap money for municipal investments thanks to the European Central Bank's low interest policies
- Local political processes and local political will as there has been a strong push for many municipalities to become carbon neutral or energy self-sufficient. Local governments have typically engaged in the supply, production and distribution of energy through the form of Stadtwerke[25], based upon regional (Bundesländer) Municipal Codes, which determine the limits of their economic engagement.

Finally, the strong policy and widespread public support (i.e: use of municipal funds to implement energy efficiency measures, retrofitting or infrastructure improvements, providing on formational support such as available roof space for solar installations in the local area, simplifying administrative procedures or prioritisation of renewables at local level) for community ownership of renewable energy generation, at länder, regional or municipal levels, also explain why community energy has so well improved in Germany, especially during the years 2005 to 2014.

4.2.1. National policy, support schemes & legal structures

Even though there is no explicit national policy support for community energy in Germany, the country has benefited from a strong culture of cooperatives, a favourable context with the FiTs, as well as a high level of leadership, and municipal autonomy.

Strong regional/local political support

As previously tackled, in Germany, political support mostly originated from Bundesländer and municipalities, creating an enabling legislative environment for community power with a mixture of tools and means:

- Laws to encourage renewables through the establishment of regional targets. In Baden Württemberg, for instance, a Wind Decree establishes a 10% target for production of'domestic' wind power by 2020.
- Local energy network and supply is also a unique element of local self-government (kommunale Daseinsvorsorge), which is guaranteed by the German Constitution. With this authority, local governments have a right to decide whether to fulfil the tasks of local network and supply, either as a public enterprise under direction of the local government, or through a contract with another private enterprise. The ability of local governments to establish and operate local grids independent of larger networks is a useful tool for small communities that want to become self-sufficient based on renewables. In Feldheim, for exemple, the electricity grid is owned by Energiequelle GmbH and Co. WP Feldheim 2006 KG.
- Municipalities committing themselves to becoming '100% Renewable Energy Regions' or 'climate municipalities'.
- Municipal energy companies providing informational, administrative and technical support to community groups.

[24] Inertia of Big Energy in making the switch to renewables and worryingly large share of coal in German's energy mix.

[25] Stadtwerke are usually organised as limited liability companies or public companies. The Stadtwerke may be owned by the municipality itself (publicly owned), or by a private company through shareholding structures – either entirely, or partially. Where publicly owned, the Stadtwerke may contain a governance structure that allows local residents to be involved in decision making.

With municipalities as new grid owners and operators, profits are oriented towards developing network grid expansion to accommodate increased feed-in from local renewable energy sources. Furthermore, renewables installations are given extra priority in grid connection, for instance through reduced connection times, and direct support and advice in getting necessary permits and licensing.

Offering financial support

First, the stability of the mechanisms support, in the form of guaranteed purchase tariffs (Feed-in Tariffs – FiTs) has significantly contributed to the development of community projects, in the period 2000 to 2014. This law provided for the guarantee of a 20-year feed-in tariff (FIT) and the obligation for the network operator to buy electricity from renewable sources as a priority.

In addition to FiTs, renewable energy projects can access long-term and low interest loans from Germany's State-owned development bank, Kreditanstalt für Wiederaufbau (KfW), whereas local cooperative banks are also active lenders in the sector.

With an interest rate between 1 and 4% over a period of up to 20 years, loans from KfW and local cooperative banks make it considerably easier to finance projects while increasing the return on investment for members.

Legal structure and ownership models

The legal framework in Germany provides three main business models enabling citizens to participate in the financing of RES projects: Energy cooperatives (eG), Limited partnerships with a limited liability company as a general partner (GmbH & Co) and, to a lesser extent, Civil partnerships (GbR).

- Limited partnerships with a limited liability company as a general partner (Gesellschaft mit beschränkter Haftung & Compagnie Kommanditge-sellschaft, abbreviated as GmbH & Co. KG) is a limited partnership (KG) in which the general partner (*Komplementär*) is a limited liability company (GmbH). The GmbH is fully liable for the GmbH & Co. KG's debts and liabilities. As cooperatives, the liability of the limited partners (*Kommanditisten*) is limited to their respective share of the partnership capital but the model of GmbH & Co KG separates the project development and management from equity provision with investors only being able to engage in extraordinary circumstances. Distribution of income among the shareholders is structured according to their investment. The limited opportunities for shareholder to be active can be an advantage for citizens who prefer not being engaged in the business issues. Hence, citizen participation through closed-end funds is not always regionally confined (community of interest). Due to the relatively large investment volumes, this model, also named "closed-end funds" is the most common legal business model for citizen participation in wind farms in Germany ("Bürgerwindparks").

  The limited liability company is usually the wind developer, who holds unlimited liability and organises most of the logistics behind getting the wind farm approved and installed. The limited partnership is made up of the local people wanting to invest in wind power; they often initiate a project in their area and do much of the local consultation. Members of the limited partnership (the share holders) can be from anywhere in Germany; often 20-30% are local people. The revenue from the project is distributed according to level of investment (number of shares). Generally, shareholders contribute 25% of the finance and 75% is debt held by the company. A number of banks, including government bank, offer low-interest loans for wind project development.

- Civil partnerships (Gesellschaft bürgerlichen Rechts or GbR), particularly adapted for small to medium scale local community solar PV projects (with investment volumes of a few €100,000) is an uncomplicated option (for its set up an informal agreement suffices and authorised capital is not necessary). The partners of the company have unlimited liability against their personal assets for all obligations of the GbR, which is the main disadvantage of this legal form.

- Energy cooperatives (eingetragene Genossenschaften – eG), constitute the organizational form that has become the most relevant regarding active participation in local energy policy in Germany (especially in solar PV projects) thanks to several advantages[26] compared to the previous forms of ownership models.

[26] Advantages of cooperatives: partners are generally not liable individually thus making the model attractive for larger projects and, unlike GmbH & Co KG, they are linked explicitly to the promotion of their members' goals which generally include social principles and values including communal self-help and the provision of quasi-public goods. Many different actors, such as municipalities, citizens, and companies can participate.

In 2017, there were 855 registered energy cooperatives in Germany. The big majority are generation/production cooperatives that possess power generation facilities (both electricity and heat) or hold investments in companies that operate them. However, around 20 % are distribution/transmission cooperatives that operate local electricity grids or local district heating networks. Finally, a small number may be trading cooperatives or other energy cooperatives that do not fit into the previous mentioned value chain.

In contrast to the power generation mix from renewable energies (strongly dominated by wind energy), most German production cooperatives use solar PV[27], then wind, biomass and finally hydropower where thermal generation (solar-thermal and geothermal) play a marginal role.

Bavaria is the federal state with the largest number of energy cooperatives, followed by Baden-Württemberg and Lower Saxony.

The majority of these energy cooperatives are relatively small with a majority (over 60 %), having up to 1 million € capital at their disposal and only 20 % with over 2 million € capital. In 2017, on average, these energy cooperatives had a capital of 1,424 599 €. Additional capital is therefore needed to realize projects, which is mainly provided by loans from cooperative banks.

In terms of membership, the number of members has increased over years and nearly 50 % of energy cooperatives have between 100 to above 200 members, most of whom are men older than 35 years old, university graduates and belonging to higher income groups. As shown on the diagram at right, municipalities can be members of energy cooperatives but in only 1 % of the cases in 2017.

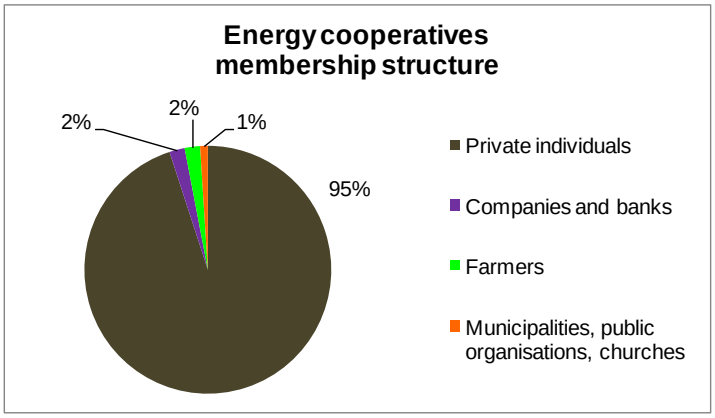

Figure 3: membership structure of Germany's energy cooperatives

However, the number of new energy cooperatives has been declining since 2011[28] and even more since 2014 for a number of reasons such as a sinking number of new solar installations and an increase in new wind parks where GmbH & Co. KG is the favoured business structure and the introduction of the auction, tendering system to replace feed-in tariffs.

[27] This is because wind farm projects have mostly adopted the GmbH & Co. KG model, where voting rights depend on the proportion of capital invested, not on the traditional “one member, one vote” cooperative principle.

[28] In 2011, 167 new energy cooperatives have been created, against 54 in 2014 and 24 in 2017. (Source: DGRV – 2018)

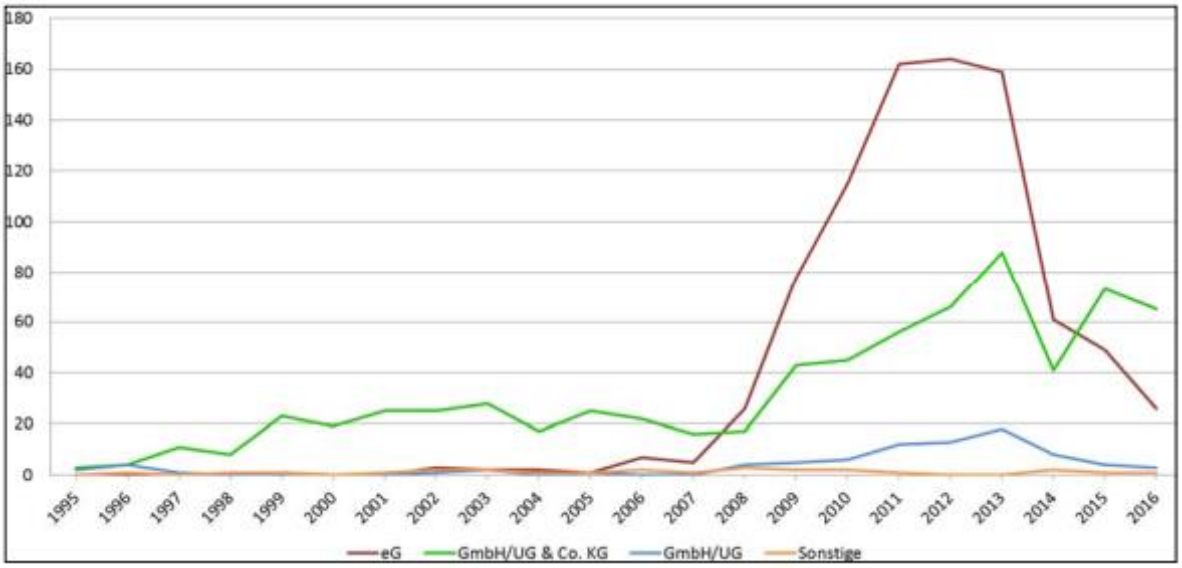

Figure 4: evolution of the legal structures of community energy projects in Germany

Source: Development and State of Community Energy Companies and Energy Cooperatives in Germany - Leuphana University-Lünebourg

As shown on the previous diagram, 2014 is a turning point, marking the shift from the cooperative model to the GmbH & Co. KG model. According to F.Kahla, L. Holstenkamp, J.R. Müller and H. Degenhart from Leuphana university, "*in 2014, the number of newly founded energy cooperatives decreased and the decline could only partly be compensated by an increase in the number of limited partnerships with a limited liability company as general partner (GmbH & Co. KG). This shift from the cooperative model to the limited partnership model is linked to a shift in the predominant electricity generation technology. An increase in onshore wind energy can be observed while photovoltaics had to struggle with a shrinking market. Moreover, more bankruptcies and liquidations have been observed since 2009 for community energy companies and energy cooperatives*".

4.2.2. The state of community energy in 2018

Although much of the figures and information provided in the following paragraphs focus on the recent state of community energy related to electricity generation, German citizens and municipalities are also strongly involved in district heating networks, energy efficiency and local supply of electricity. Community energy in Germany does not restrict to ownership in the production of renewable electricity.

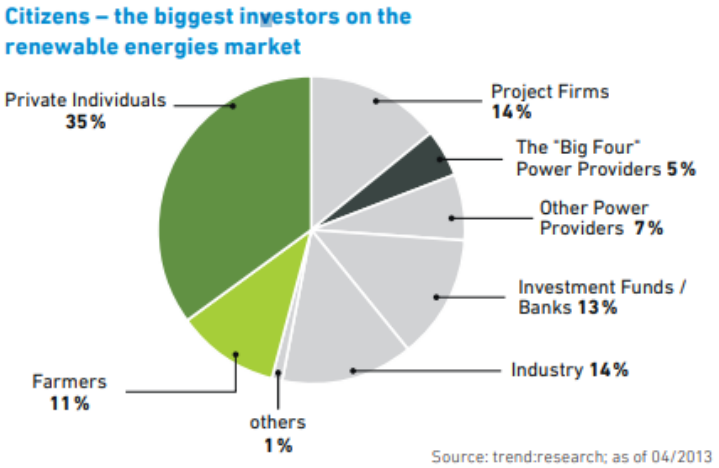

Figure 5: share of citizen investment in Germany's renewable energy projects

- Over 1,000 energy supply companies are active in the German electricity market, amongst which local public utilities (generate 84 billion kilowatt hours of electricity per year). They also manage around 45 % of electricity distribution networks in Germany (source: Verband kommunaler Unternehmen e.V. – 2016).
- The Agency for Renewable Resources (FNR) lists over 190 bioenergy villages which produce electricity and supply local heating needs by burning food and animal waste in combined heat and power plants (Cf. Jühnde experience).

- Many cities with publicly owned Stadtwerke (municipal utilities) have gone or are in the process of going 100 % renewable and are usually organized as energy communities where local inhabitants own a certain percentage of the Stadtwerke shares (such as in Wolfhagen - Hessen).

According to a survey carried out by trend:research GmbH and the Leuphana Universität Lüneburg, nearly half (46.6 %) of the total RE capacity installed in Germany was owned by citizens and collective citizens' energy initiatives before the introduction of the auction scheme in 2014. Since then, and even worse since 2017, trends seem to reverse slowly but surely.

Already between 2014 and 2016, the pilot bidding rounds on ground mounted photovoltaic systems verified the concerns regarding a loss of actor plurality and the exclusion of small players. The majority of the capacity awarded went to bidders with more than one bid and bidders who feature intercompany ties with other successful bidders. Confronted with these results, the government adopted the Renewable Energy Act (EEG) that entered into force in January 2017 with a special set of rules aiming at ensuring citizen energy cooperatives are not disadvantaged compared to financially strong institutional bidders.

The revised EEG, for the first time legally defined the term "citizens' energy". Paragraph 3 EEG 2017 defines a citizens' energy company (CEC) as an entity:

- which consists of at least ten natural persons with voting right
- in which at least 51 % of the voting rights are held by natural persons which live in the urban or rural district in which the onshore wind energy installation is to be erected,
- in which no member or shareholder of the undertaking holds more than 10 % of the voting rights of the undertaking"

Paragraph 36g also defines special rules that solely apply to citizens' energy companies (CEC):

- the allowance to submit a bid before the granting of the construction permit (pursuant to the Federal Immission Control Act (§ 36g(1)), and
- the allowance of longer realisation times for project implementation of up to 4.5 years compared to 2.5 years for "ordinary" bidders (§ 36g(2)).

However, the results of the first auction in May 2017 translated into an overwhelming success of bidders that made use of the special rules for citizens' energy companies[29]. The relaxed requirements helped citizen energy cooperatives to turn out as the "big winners" in the three first rounds of wind auctions as in the 3rd round, in November 2017, they secured 98 % of the tendered projects.

But, in reality, the Bundesnetzagentur (Federal Network Agency) revealed, in a press released dated August 2017, that;" *The majority of the awards for bids of citizens' energy companies go to companies whose bids make it clear that they are at least organizationally assigned to a single project developer[30] […] Saxonian UKA Group[31], the second biggest developer of on-shore wind energy project in Germany.* "

In June 2018, stunned by this unintended result, the German Bundestag decided to suspend these privileges until 2020, after criticism of a "flawed legal definition of the new actor group 'citizen energy'." In the two last bidding rounds of 2018 and the first of 2019 (February), things went worse for citizens projects whose share, out of total winning projects, has dropped from 98 % in 2017 to nearly none (less than 17 %).

[29] In sum, the successful bidders privileged as CEC were set up by a very small number of professional project developers, who do not act as shareholders or members of the CEC—according to the legal definition—but as general contractors or service providers. A brief analysis about the winners of the second round revealed that a lot of the successful CEC were formally founded just a few days before the auction deadline. They also have similar names, for example "Umweltgerechte Bürgerenergie", and—although the planned erection site is located in different municipalities—the registered office of those formally distinct CEC is the same and situated in the Saxonian town Meißen, identical with the postal address of UKA.

[30] This one takes most often the form of a limited partnership initiated by 10 natural persons (of which the most often employees of the developer) for minimal capital. This form allows to respect all the criteria relating to local governance and the distribution of capital. But,on the other hand, the real project company controlled by the developer, acts as "general partner" that brings almost all the funds, but without being included in social capital, and keeping full control over the operational decisions of the project. A limited partnership is a form of business in which a limited partner provides the bulk of the funds but entrusts the administration of the company to the general partner.

[31] UKA-connected CEC dominated the second bidding round with a 68 % share of the total awarded volume.

According to the German Renewable Energies Agency, citizens' energy ownership of renewable energy capacity has seen a 4% decrease, from 46 to 42 % between 2012 and 2018.

Today, the evolution of citizens' projects in Germany, especially in the field of wind energy, is unclear as the moratorium decision (concerning the advantages allocated to citizens projects), taken by the German Government until 2020, has indeed stopped circumvention of the rules but has also strongly reduced the development of cooperative projects carried by local actors. In 2019, Germany certainly remains one the champion country for self-consumption and innovative solutions such as the Sonnen community or the development of virtual power plants but, after a tremendous period of development and until Germany clarifies the rules and criteria that solely apply to its "citizens' energy companies", the future of big capacity renewable energy community projects seem somewhat compromise.

4.3. ENGLAND AND SCOTLAND

4.3.1. The Electricity market (in brief)

Supplying energy to homes across the UK involves three key elements: making electricity through generation, transporting gas and electricity and selling it to the customer. Energy companies can work in any of these different areas, and some operate in all of three of them.

❶ Electricity generation

Most electricity is generated at large power stations connected to the national transmission network. However, electricity can also be generated in smaller scale power stations which are connected to the regional distribution networks. The number and type of power station built is the decision of each individual company based on market signals and government policy on issues such as the environment. There are over 2000 electricity producers in the UK, from large multinationals to small, family-owned businesses or citizen cooperatives running a single site, the renewable energy power stations representing 29 % of total electricity generated in the UK in 2018 (source: Department for Business, Energy and Industrial Strategy).

❷ Transmission and distribution networks

There are two types of electricity network: transmission and distribution. Transmission networks carry electricity long distances around the country at high voltages. Distribution networks run at lower voltages and take electricity from the transmission system into homes and businesses.

- The transmission system is run by National Grid. National Grid owns and manages the transmission network, which transports electricity at high voltage, suitable for large power generators and industrial-scale consumers. It is responsible for balancing the system and making sure that the supply of electricity meets the demand on a second-by-second basis.
- The Distribution network transports electricity at a lower voltage to businesses, homes and embedded generators. There are 14 licensed distribution network operators (DNOs) in Britain and each is responsible for a regional distribution services area (i.e: the DNO in charge of Nottingham area is Western Power Distribution (East Midlands) plc, private company). Each operator is responsible for maintaining its grid infrastructure and setting up new grid connections for embedded generators in its area. The 14 DNOs are owned by six different groups. These companies each supply electricity and gas to millions of homes around the UK, dominating the energy market[32].
  DNOs are progressively transitioning to become DSOs (Distribution System Operators), which means they adopt a much wider role of managing the energy, as well as the infrastructure, in their areas.

❸ Energy supply

Licensed electricity suppliers are companies that are responsible for managing the power supplied to every home, business, embedded generator and public facility, such as street lamps. They are required to forecast the power and demand in their accounts and to notify National Grid of their position. If their actual energy position is different from what they have forecasted, National Grid charges them for their imbalance.
In June 2018, there were 73 active licenced suppliers in the UK, amongst which, two owned respectively by the city council of Bristol and the city council of Nottingham: Bristol Energy Limited and Robin Hood Energy Limited.
Suppliers buy energy in the wholesale market and sell it on to customers. They work in a competitive market and customers can choose any supplier to provide them with gas and electricity.
Most suppliers source some or all of their power through Power Purchase Agreements.

[32] Currently, the UK's energy market is dominated by six large utilities (i.e. British Gas, EDF, E.ON, RWE, Scottish Power and Scottish and Southern Electric, known as the 'Big Six'), which provide energy for about 90% of the domestic customers. These companies refer to as the 'Energy Utility Company (EUCo)' business model, meaning that they charge customers for the number of energy units (e.g. gas and electricity) sold.

❹ Energy regulation

The electricity and gas markets are regulated by the Gas and Electricity Markets Authority, operating through the Office of Gas and Electricity Markets (Ofgem). Ofgem's role is to protect the interest of consumers by promoting competition where appropriate. Ofgem issues companies with licences to carry out activities in the electricity and gas sectors, sets the levels of return which the monopoly networks companies can make, and decides on changes to market rules.

4.3.2. Historical background and motives for community energy

Despite its tradition of development trusts, the pretty recent history of community energy in the UK can be divided into two periods: until 2014 and the publication of the first national Community Energy Strategy and after 2014.

Before 2014: development of community energy projects with dedicated support schemes

- 2002: The Renewables Obligation, placing an obligation on UK electricity suppliers to source an increasing proportion of the electricity they supply from renewable sources came into effect in England, Wales, and Scotland, followed by Northern Ireland in 2005. Main support mechanism for large scale renewable electricity projects.

- 2010: introduction of the Feed-in Tariffs (FIT) scheme to promote the uptake of smaller scale renewable and low-carbon electricity generation technologies (up to a capacity of 5MW, or 2kW for CHP). Main support mechanism for smaller scale renewable electricity projects.

- 2010: launch of the Ynni'r Fro Welsh programme to support the development of community renewable energy initiatives. Ynni'r Fro is a 5 year Welsh Government programme (2010-2015[33]) to support the development of community renewable energy initiatives. It uses European Structural Funds to offer social enterprises grant aid, loans, free and independent hands on advice and information.

- May 2010: commitment of both the Conservative and Liberal Democrat parties in page 17 of the Coalition Agreement program to "encourage community-owned renewable energy schemes where local people benefit from the power produced and allow communities that host renewable energy projects to keep the additional business rates they generate".

- In 2011, the Scottish Government set up a target of 500 MW of community and locally owned renewable energy capacity operating in Scotland by 2020 and announced the launch of the Community And Renewable Energy Scheme (CARES) loan fund.

  This new scheme aims to provide loans towards the high risk, pre-planning consent stages of renewable energy projects which have significant community engagement and benefit. The scheme is managed on behalf of Scottish Ministers by Local Energy Scotland. Any locally-owned renewable energy projects which provide wider community benefits, up to 5 MW, requiring financial outlay prior to planning consent is, in principle, eligible.

- 2013: launch of a Call for Evidence to individuals, local authorities, organizations in the private, public and voluntary sectors and communities concerning Community Energy.

As a result, in **January 2014, the "Community Energy Strategy**" is published, about which Rt Hon Edward Davey MP, Secretary of State for Energy and Climate Change will say: "*For too long, community energy has been a policy footnote, with all the focus on big generators and individual households – all but ignoring the potential of communities to play a key role*. [...] *With community energy we win as a nation, with a diverse, increasingly home-grown green mix contributing to energy security and decarbonisation. We are also re-empowering local communities – to create jobs, to share the profits of investment, to work together to save*

[33] This programme was replaced in 2016 by the Ynni Lleol funding initiative that continue to provide expertise and financial support to communities and small businesses (administered by the Energy Savings Trust (EST). As of Feb 2018, the Ynni Lleol has provided financial support to 22 community energy projects.

energy, save money and cut energy bills too". Rt Hon Edward Davey MP, Secretary of State for Energy and Climate Change.
And, in November 2014, launch of the Urban Community Energy Fund (UCEF) aimed to help de-risk the development of community energy projects at the critical early stages. Over the 20 months that UCEF was open, a total of 123 community organizations applied for funding and 75 grants were awarded.

After 2014: or how to adapt Community power in a post-subsidy business environment with a strong reduction in English incentives but a strongly supportive Scottish Government

This period is dominated by a contrasted environment between England and Scotland with:

- In England, in 2015, a strong reduction of Feed-In-Tariffs, especially for small-scale solar installations (cut by almost 90 %) before a definitive end in March 2019, the removal of various forms of tax relief –EIS[34], SEIS[35] and SITR[36] which were being used to raise high risk development funding for investors in community energy, the announced closure of UCEF, without forgetting to mention early closures of the Renewable Obligation for solar PV and onshore wind in 2015/2016.

- Whereas, in 2017, the Scottish Government has increased their target to 1 GW of community and locally owned renewable energy capacity by 2020, and 2 GW by 2030 and opened a new CARES funding round with up to £5 million available.

In terms of motives and from the Government perspective, putting communities in control of the energy they use have several benefits such as:

- helping maintain energy security and tackle climate change
- increasing the acceptance of renewable projects
- building stronger communities
- allowing local growth
- creating local jobs
- lower energy bills and reduce fuel poverty

The latter benefit: achieving lower electricity prices and reducing fuel poverty being quite certainly the most important and frequent motive in support of community energy since many years and still today, in 2019.

Whereas, from the point of view of other stakeholders (citizens, farmers, community groups, local authorities, etc.), the three most important motives for involving themselves and/or investing in renewable energy community are, by priority order:

- to generate a return to support their community's development or their own business (until march 2019, through the Feed in Tariff for solar PV or wind projects)
- to reduce their energy costs associated with imported power and, as consequence, decrease fuel poverty
- for environmental reasons (reduce their carbon footprint)

4.3.3. National policy, support schemes & legal structures

In the UK, the development of Community power relies mainly on a mix of 5 main tools:

❶ Providing a strong political support:

The Scottish government started in 2009 – 2011 with its own Renewables Action Plan with a 100% renewable energy target for 2020 and a target of 500 MW of community and locally-owned renewable energy by 2020. But, in the end of 2016, 666 MW of community or locally owned renewable energy capacity spread over 17 950 individual renewable energy installations amongst which 81 MW community owned.

[34] Enterprise Investment Scheme (EIS) offering a number of tax breaks to investors who buy shares in small, private companies (launch in 1994)
[35] Seed Enterprise Investment Scheme (SEIS). Very similar to EIS but designed for investing in even smaller companies, and providing even more generous tax breaks (launch in 2012)
[36] Social Investment Tax relief (SITR)

Since the target set up in 2011, has already been exceeded, the Scottish Government has increased the target to 1 GW of community and locally owned renewable energy capacity by 2020, and 2 GW by 2030. It also established a public Community Benefit Register, maintained annually by Local Energy Scotland to assess the progress of community energy projects

Similarly, though a little later, England, in addition to the publication of its Community Energy Strategy in 2014, established a new Community Energy Unit in Department of Energy and Climate Change (DECC) to work with communities and local authorities and provide a step-change in the support offered to community energy projects. This unit included various working groups, amongst which, one dedicated to "community energy grid connections".

More recently, in September 2017, the Welsh Government's renewable energy targets included two objectives related to community energy:

- for 1 GW of renewable electricity generation to be locally owned by 2030
- for all renewable energy projects to have an element of local ownership by 2020.

❷ Simplifying procedures for small projects approval at local level, including community in planning policies:

For example, in Scotland the government has developed a comprehensive 'Community Energy Toolkit', which provides a broad range of information for community groups that are interested in starting a community energy project and the Scottish Planning Policy states: – "There is potential for communities and small businesses in urban and rural areas to invest in ownership of renewable energy projects or to develop their own projects for local benefit. Planning authorities should support communities and small businesses in developing such initiatives."

Amongst others, in England, the Department for Communities and Local Government (DCLG) has issued guidance on how local authorities should go about backing local communities in renewable energy development. And in Scotland the government has developed a comprehensive 'Community Energy Toolkit', which provides a broad range of information for community groups that are interested in starting a community energy project.

Some Local Development Plans such as the Cornwall Local Development Plan 2010-2030 states that " Particular support will be given to renewable and low carbon energy generation developments that: a. are led by, or meet the needs of local communities; and b. create opportunities for co-location of energy producers with energy users, in particular heat, and facilitate renewable and low carbon energy innovation".

Finally, in England solar PV is pre-approved to be installed on slanted roofs without the need for individual permission. Scotland and Wales go even further, also pre-approving solar to be installed on flat roofs, providing even more flexibility to community projects.

❸ Addressing access to finance for communities:

In the whole UK, a number of funds have been established, and are still operational (except the first one): the Urban Community Energy Fund (stopped in 2015), CARES (the Scottish Community and Renewable Energy Scheme), the Rural Communities Energy Fund[37], the Islington Community Energy Fund, the Community and Environment Fund, the industrial Strategy Challenge Fund, Low Carbon Infrastructure Transition Programme - LCITP : aimed at overcoming challenges within local supply, electrical grid constraints and energy storage and Community Benefits of Civic Energy - COBEN : focused on developing local-energy plans across public and community shareholders in 4 locations of the West and North of Scotland, etc. Most of these funds come in the form of grant-to-loan schemes in order to limit investment risks for communities especially during the development phase but have generally retracted over last years.

[37] The Rural Community Energy Fund (RCEF), is a £15 million programme, jointly funded by the Department for Environment, Food and Rural Affairs (Defra) and the Department for Business, Energy & Industrial Strategy (DBEIS). It supports rural communities in England to develop renewable energy projects which provide economic and social benefits to the community. The fund provides up to approximately £150,000 of funding for feasibility and pre-planning development work to help projects become investment ready.

❹ Providing equitable grid access for community power projects:

Although electricity from renewable energy sources is not given priority in terms of grid development in the UK, the Community Energy Grid Working Group implemented several actions to improve community energy groups' experience of the network connection process: DNOs, as part of a wider push to improve transparency, are improving: the information on network capacity (cf. publication of updated network capacity maps: https://www.nationalgridet.com/get-connected/network-capacity-map, the transparency in costs and connection offer terms. DNOs and community groups have been working together to explore opportunities to work together in future smart grid trials under the Low Carbon Network Fund and Network Innovation Competition and ensure there are no barriers to participation.

❺ Allow communities as suppliers or fully licensed suppliers of electricity for consumers:

Most community energy projects in both England and Scotland are connected to the grid and sell their power to the purchasers under Power Purchase Agreements and the system does not enable direct local supply of power from local generators. However, the system is changing thanks to several options developed by the Government and Ofgem for communities to supply electricity directly to local consumers. DNOs, Ofgem and Regen have developed and published guidelines to help community groups better understand what options they have for local supply of energy: "Local supply: options for selling your energy locally" Cf. editions 2 and 3: (https://www.regen.co.uk/wp-content/uploads/Local_Supply_Options_for_Selling_Your_Energy_Locally__Edition_2__2016.pdf).

As a result, UK saw new types of supplier entering the market such as Robin Hood Energy, Bristol Energy and Our Power,[38] owned by public bodies and with an explicit local benefit focus (although their market activities extend GB-wide). Other local authorities and community groups have entered into white label type arrangements with existing suppliers to provide energy to their consumers. (For more information, Cf. Robin Hood Energy case study).

❻ Create a regulatory framework conducive to innovation

Ofgem's Innovation Link launched the regulatory sandbox service in February 2017. It enables innovators to trial new products, services and business models that cannot currently operate under the existing regulations. As such, experiences with the proposed solutions are expected to further contribute to the Future Retail Market Design project.

In October 2017, Ofgem launched the second window and received 37 expressions of interest. All of these trials seek to maximise the benefits of locally-produced (and sometimes stored) electricity for trial participants. Each trial involves electricity supply to a small number of domestic customers and lasts two years from the date the letter was issued (all trials are to be completed by summer 2020). In all cases, consumers have agreed to join the trial, can opt-out at any time, and they will pay no more for their energy than if they had not participated. At the end of each trial, the innovators will produce a report on what has been learnt. The Trent Basin case study is one of these projects that has been selected by Ofgem to experiment collective storage of solar electricity combined with grid optimization, electricity efficiency and an innovative model where the ESCo was granted an exceptional authorization for supplying electricity directly to the local customers. (Cf. case studies monographs).

[38] Our Power was developed by a network of Scottish local authorities and Registered Social Landlords / Housing Associations but ceased its activity in 2018.

Table 4: legal structures commonly used by community energy organizations in UK

Name	Governance	Limited liability ?	Fundraising (NB all can take out loans)	Asset lock?	Charitable status?	Eligible for SITR*?	Recognized in FITs**?
'bona fide' Cooperative	> Purchase share to become member > Run for benefit of shareholders > One shareholder one vote	Yes	> Can issue Community Shares[39]	Possible	Difficult	No	Yes
Community Benefit Society ('bencom')	> Run for benefit of wider (defined) community > One shareholder one vote	Yes	> Can issue Community Shares	Yes	Possible	Yes	Yes
Community Interest Company (CIC)	> Run for a defined social purpose.	Yes	> Can issue bonds > Can issue ordinary shares	Yes	No	Yes	Yes
Company Limited by Guarantee	> Nominal fee to become member (often £1) > One member one vote	Yes	> Can issue bonds > Cannot issue shares	Possible	Possible	Yes if charitable status	Yes if charitable status
Charitable Incorporated Organization/ Scottish CIO	> Nominal fee to become member (often £1) > One member one vote	Yes	> Can issue bonds > Cannot issue shares	Yes	Yes	Yes	Yes
Charitable Trust (unincorporated)	> Board of Trustees	No – trustees individually liable	> Can issue bonds > Cannot issue shares	Yes	Yes	Yes	Yes

Sources: Databuild 2014, Community Shares Unit 2015, Thorlby 2011, HM Treasury 2016
** Social investment Tax relief.*
*** Additional benefits were available for community organizations and education providers on the FIT scheme up to the 1st of April 2019.*

[39] Unlike ordinary shares, community shares give each shareholder one vote, regardless of the number of shares they have purchased.

Although Limited Companies[40] statute is increasing, the most dominant form of business structure used by community energy groups are still today:

- Community Benefit Societies (BenComs) (47%)
- Co-operatives (Co-ops) (19%)
- Community Interest Companies (CIC) (13%)
- The remaining includes Charities, Limited Companies, as well as unregistered or unconstituted organizations.

BenComs are intended to benefit the community as a whole, whereas co-operative societies are mainly intended to benefit their members. This may widen the scope of activities that the organization can engage in and also means they may be eligible for charitable status, which a group working only for the benefit of its members cannot be. BenComs may also establish an 'asset lock'. This means that if the society is converted into a company or is closed down, the assets cannot be distributed to its shareholders beyond the value of their original investment, thereby ensuring the purpose of community benefit is maintained.

Finally, another form of organizational structure in the UK consist in the introduction of wholly owned private companies that exist only to sell electricity and distribute returns, leaving their not-for-profit parent organization to concentrate on community development.

[40] companies limited by guarantee do not formally link membership with fundraising, and are therefore able to offer membership for as little as £1, which it could be argued is yet more financially inclusive.

4.3.4. *The state of community energy in 2018*

⇨ The share of electricity from renewable sources (based on gross electricity consumption) in 2017 in the UK: 29,4 % (source: BEIS).

⇨ The % of installed renewable capacity under community ownership in the UK was **248 MW in 2017**
- **168 MW in England, Wales & Northern Ireland (dominated by solar PV projects)**
- **~80 MW in Scotland (dominated by wind projects)**

Community Energy England, Wales, Northern Ireland and Scotland define "Community energy" through particular definitions of "Community Organization" and "Energy group" where:

- Community organizations are organizational bodies where owned or managed (entirely or in part) by individuals from a community to the benefit of a defined area or group
- Energy groups are groups involved in one or several of the following activities:
  - Energy generation
  - Energy storage
  - Energy efficiency and demand reduction
  - Electric vehicles or low carbon transport initiatives

In England, Wales and Nothern Ireland, community energy represented 302 distinct projects including 204 projects in electricity generation and 79 projects in energy efficiency, demand management, energy storage or low carbon transport initiatives.

Whereas in Scotland, the Scottish Government has requested that 'community and locally owned renewable energy' be defined as technologies producing heat and/or electricity from a renewable source, where the owner of the installation is in one of the following categories:

- A community[41] group
- A local Scottish business[42]
- A farm or estate
- A local authority
- A housing association[43]
- 'Other public sector and charity' (charities, universities, colleges, etc.)

Table 5: community and locally owned renewable energy capacity operational in Scotland

Ownership category	Operational capacity (MW)
Community	**~80**
Farms & estates	280
Housing association	58
Local authority	124
Local businesses	89
Other public / charity	65
TOTAL	**697**

Source: Energy Saving Trust (June 2018)

Breakdown of community energy/technology

Technology	Operational capacity (MW)
Wind	60
Biomass	6
Hydroelectric	6
Heat pump	2
Energy from waste	3
Solar PV	2
Other	< 1
TOTAL	80

697 MW of community or locally owned RE capacity spread over 17 950 individual RE installations amongst which 81 MW community owned.

Over the last years, there has been a slow-down in new projects in the UK as in most other countries. However, in Scotland the situation has generally been better thanks to a supportive government, an active community energy membership body – Community Energy Scotland-, an efficient support schemes "CARES", a long tradition of community organization, finally, to permanent adaptation and innovation to develop direct local supply options (see, here for example)

[41] Communities are defined as communities of place, i.e. based around a sense of shared location. They often have charitable status.

[42] Note that this excludes Scottish businesses whose main purpose is to develop renewable energy projects on land they do not fully own, at a site distant from their office.

[43] Housing associations are providers of social housing within Scotland, other than local authorities. They are usually stand alone associations.

5. HOW FRANCE SITS WITH REGARD TO COMMUNITY POWER?

5.1.1. The electricity market in brief

❶ Electricity generation

Unlike other western European countries, France generates some 73 per cent of its electricity from nuclear power, the balance coming mostly from various hydro-electric power stations.

According to D. Bour from Enerplan, there were only 28 000 solar PV self-consumption plants in France in the end of 2018, against 1,5 million in Germany, 750 000 in United Kingdom and, 630 000 in Italy.

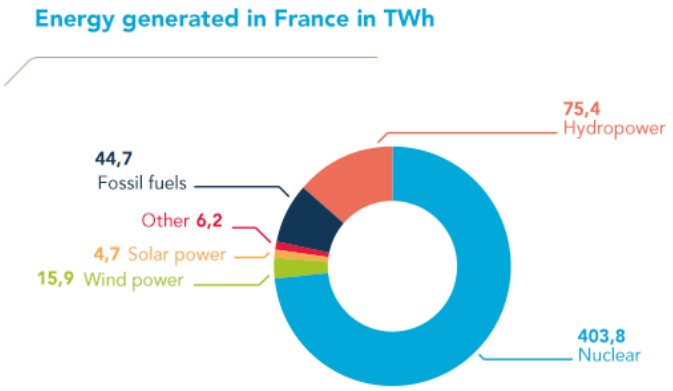

Figure 6: France electricity mix (2017, source RTE)

Within the framework of the European directive for the Energy and Climate package, France has committed itself to a share of renewable energies accounting for 23% of final energy consumption by the year 2020. This implies increasing the share of renewable energies in electricity generation to 27% compared to today's 19% share.

❷ Transmission and distribution networks

With nearly 105,000 km of lines and 2,710 substations, the French transmission grid is the biggest in Europe. It is operated by RTE, the French TSO.

In France electricity distribution networks belong to local authorities (French municipalities or groups of municipalities). Except for a handful of historical local energy distribution companies (LDCs), no local authority manages its energy distribution networks by itself. Most authorities have subcontracted the management and operation of their electricity networks to public distribution network managers through public service delegation. This delegation is legalised through a concession agreement.

The main public distribution network manager is Enedis, which covers 95% of mainland France.

❸ Energy supply

The electricity supplier produces his electricity, or he buys it either on the wholesale markets to producers or to EDF at ARENH's regulated tariff. He resells it to end consumers. Finally, he collects and get paid via the electricity bill from which he returns approximately one third to the grid operators (transmission and distribution) and another third to various organizations in the form of taxes.

The electricity supply market is fully liberalized since 2007. As a consequence of this opening, non-historical suppliers, so-called alternative suppliers, have entered the retail electricity market and consumers can choose between two types of offer:

- market offers whose prices are set freely by the suppliers;
- the regulated tariffs , set by the government and only offered by incumbent suppliers (EDF and the 162 local distribution companies 162, LDC)

In 2018, there were 39 active electricity suppliers (LDC excluded), amongst which 23 dedicated to residential sites. EDF remains the leader with slightly over 80 % of market share despite an average loss of 100,000 customers per month. The main beneficiary of this erosion is Engie, (formerly GDF Suez) with around 11.5 % of the market, followed by the first alternative supplier "Direct Energie" (recently acquired by Total), which managed to capture around 5 % of the market on its own. All other suppliers then hold less than 1 % of the

market, amongst which, the energy cooperative enercoop whose model has attracted 70 000 customers in 13 years.

France's electricity is among the cheapest in Europe.

❹ Energy regulation

The CRE, the Competition Authority and the Direction Générale de la Concurrence, de la Consommation et de la Répression des Fraudes (DGCCRF – Department for competition, consumers and fraud) are independant entities tasked with enforcing adherence to the new market regulations.

5.1.2. Historic background and motives for community energy

Although very recent in France, the development of community energy has really started after 2015 and can be divided into two big periods around this pivotal year.

The first initiatives in the field of energy citizens projects appeared fifteen years ago. Initially carried by groups of citizens, they also relied on the support of local communities. Among the pioneering projects, ones can mention: Éoliennes en Pays de Vilaine (Ille-et-Vilaine), initiated in 2003 and.the unusual project of the Mené municipality in Côtes d'Armor in 2005.

These two britany projects, in addition to playing a role in the increase of the local energy production to answer the problem of fragility of the electrical network, were mainly initiated because of a thirst for independence and a will of value generation at local scale. In Collinée, one of the 7 villages of the Mené municipality, even the building of the town hall is autonomous in energy. Mayor Jacky Aignel, has been developing a project of energy self-sufficiency aiming at producing as much energy as possible to have a certain autonomy. The municipality spends 10 million € each year for its energy supply. "We thought that it could be a good idea that these 10 million € go to and are used for the benefit of people from the local area".

In the years 2010-2014, under the initiative of certain regions and after the creation of Energie Partagée[44], community energy improved slowly in Poitou-Charentes or Languedoc-Roussillon with the supporting mechanism: "1 € invested by the citizens, 1 € brought by the region" and with the creation of networks such as "Local and Renewable Citizen Energies - ECLR" or "Taranis".

However, this first period of sporadic projects was characterized by a constraining environment in terms of community participation, fundraising (crowdfunding and general public offering) and legal structures that may be used for renewable energy projects. Certain legal forms of companies were not allowed to make public fund raising or under strict conditions (i.e. capped to 100 000 €) whereas local authorities could not participate and hold shares in the capital of a simplified joint-stock company SAS.

At that time, whereas the motivations for community energy projects could be quite diverse: mistrust towards utilities, awareness that energy savings are possible at local scale, desire for energy independence, the adhesion and involvement of local actors in renewable energy projects became more and more important for their acceptance and massification.

5.1.3. National policy, support schemes & legal structures

The development of community energy projects in France has really started recently, just after 2015. Although the country has no dedicated strategy nor specific targets in terms of community energy development, the adoption of the 2015 Energy Transition Act not only set ambitious targets for the development of renewable energies, increasing their share to 32 % of the final gross consumption, but also created provisions favoring the development of participative and citizens projects. The true development of citizens involvement in renewable energy projects over these two last years is due to the changes in legislation and support mechanisms concerning two key aspects:

- Facilitating access to finance, both from calls on public funding and from external funding (bank loans for 60 to 80 % of total financing), equity as well as debt financing.

[44] Energie Partagée is a bicephalous organization, created in 2011, composed of an association in charge of supporting local renewable energy projects and a limited partnership with a share capital named "Energie Paratgée Investissement", investment tool that collects the participation of private and institutional investors in the social and solidarity economy to take shares in renewable energy projects.

- Implementing a participative bonus in the auction/tendering process in order to encourage citizens involvement and governance in renewable energy projects subject to the tendering process.

Facilitating access to finance:

Indeed, in an even more striking way than for private renewable energy projects, community energy projects, involving citizens and/or municipalities, are usually led by people who are not professionals or experts in the fields, who don't have a portfolio of dozens of other projects to spread risks (especially during the developing stage that include the impact assessment, connection request, public consultation and permitting procedure), and who don't concentrate the great investment capacities required by renewable energy projects. Cash-flow challenges, related to time discrepancies between heavy expenditures at the outset of the projects (before approval and even before total constitution of capital) and first incomes, are common to all community projects, but more serious in some countries than in others and far more important in wind energy projects than in other less capitalistic projects.

Nevertheless, a succession of laws and orders adopted respectively in 2014, 2015 and especially in 2016 have clearly relaxed the access to financing and ease the development of participative (without governance) and citizens projects.

First, in order to remove the barriers to the development of participative financing (crowdfunfing), Ordinance no. 2014-559 of 30 May 2014 has defined a new regulatory framework allowing legal security of transactions and protection of investors for lending and investment platforms.

This first ordinance was then completed by a series of other orders adopted in 2015 and 2016, to open access to crowdfunding to local authorities[45], to allow crowdfunding platforms to collect up to 2,5 M€ per project[46] against 100 000 € beforehand, to identify web-platforms that meet the requirements of French legislation with the creation of a label (certificates delivered by ACPR[47]), whereas decree no. 2016-1272 of 29 September 2016 set a specific participatory finance regime for renewable energy projects.

Then, art 109 to 111 & art 119 of Law n° 2015-992 of 17 august 2015 and its implementing decree have facilitated the financing of renewable energy projects allowing citizens and local authorities (municipalities, inter-communal groups, regions and departments) to participate in both equityt-capital and debt financing. This act specifically allows:

- Art 109: local authorities can directly participate and hold shares in the capital of a simplified joint-stock company SAS whose object is the production of renewable energies, located on their territories.

- Art 111: authorizes commercial companies (SAS, SA), local mixed economy companies (SEM) and cooperatives (SCIC), formed into project companies for the production of renewable energy, to open part of their capital to residents who live in the vicinity of the project site, and to the relevant local and regional authorities in whose territory it is located.

From now on, the financial participation of citizens and local authorities in renewable energy projects in the form of equity or debt participation with the company leading the project is facilitated.

Implementing a participative bonus in the tendering process

Over the last three to four years, the European guidelines required that renewable energies, becoming more mature, be progressively confronted with the market. This has resulted in almost all European countries in an evolution of support mechanisms. To this end the feed-in tariffs, which constituted the main support mechanism so far, has progressively been replaced with the so-called "compensation mechanism" or "Contract for Difference" which consist in allocating a premium tariff to renewable electricity producers on top of the sale price they get on the electricity market, in order to cover the costs of their installations and ensure their profitability. Depending on the technology and size of the installation, the French regulation foresees that the premium tariff is allocated either through direct guaranteed contracts ("guichets ouverts") or through a tender procedure.

[45] Order n° 2015-1670 of 16 December 2015

[46] Order n° 2016-1453 of 28 October 2016

[47] ACPR : Autorité de contrôle prudentiel et de résolution.

As shown in the table here-under, the guaranteed contracts (guichets ouverts) system is mainly dedicated to small capacities projects. It avoids putting projects promoters in competition, it does not demand for the cumbersome financial guarantees required at the time of submission of tender documents (big amounts of money lost in case the project is not selected) and it also saves the costs of subcontracting the answer to the call for tender (usually too complex for non professionals).

Table 6: main RE technologies subject to a tender procedure in France

Renewable Energy (RE) Technology	Projects "protected" by the guaranteed contracts system - Guichets ouverts	Subject to a tender procedure/ auction	
		Feed-in tariff	Feed-in Premium
Onshore wind	Any wind park comprising up to 6 WTGs with an installed power capacity of less than or equal to 3 MW per WTG		Any plants > 3 MW per generator and 6 generators*
Off-shore wind	None		All - Any capacity
Solar PV	< 100 kW	100 to 500 kW - simplified procedure	500 kW to 3 MW
Solar Self-consumption	< 100 kW		100 to 1000 kW
Biogas from waste	< 500 kW		500 kW to 5 MW

* Consideration is given to a new draft tariff order for wind power, which should come into force in June 2020 and could increase the scope of the call for tender obligation (less costly for public finances) to wind parks comprising up to two wind generators with an installed power capacity of less than or equal to 3 MW per WTG, instead of the 6 generators of 3 MW each max, currently in effect.

In France as in most other countries having implemented tender, auction or bidding rounds, a common concern arose: how to offer the same opportunities to RE community projects to be selected as to private projects led by big developers and utilities?

France[48] is one of the very few Member States that has tried to answer this question. In its 2015 Energy Transition Act, a specific mechanism was introduced in order to encourage the financial participation of local actors (citizens and local authorities) in the relatively big renewable energy projects subject to the tendering process. This incentive measure is named “the participative or participatory bonus” and has, since its implementation in 2016, already been modified several times.

In its most recent version, this bonus grants additional public support (increase in the remuneration premium of between 1 and 3 €/MWh over the total duration of the support contract) to the project promoter and takes two forms:

- A bonus for integration of crowdfunding, ”participative financing”: the project holder benefits from an additional 1 €/kWh if he raises 10% of the total funding (equity capital + debt) from citizens and/or local communities
- A bonus for citizens projects, partially owned by local actors – “participative investment”: the project holder benefits from an additional 3 €/kWh if he raises 40% of the equity capital from local citizens and authorities with new eligibility criteria related to financial instruments[49], added in order to reinforce the effective access of citizens investors to the governance of the projects.

Finally, 2018 marked the creation of EnRciT, a venture capital fund whose objective is to help the development of renewable energy projects led by citizens and communities in local territories. Endowed with 10 million euros by the Caisse des Dépôts et Consignation, Ircantec and Crédit Cooperatif, this fund should be used to finance about 150 projects over a 10 years period.

[48] Germany also made an attempt with the implementation of privileges for Citizens Energy Companies in wind auctions rounds but put on hold its experiment until 2020. Ireland, in its Renewable Electricity Support Scheme published in 2019 has announced that in each auction round after RESS-1, a volume of capacity will be allocated to community-led projects and that this volume will range from 5 % to 15 %.

[49] Shareholders loans, obligations and convertible loans that may finance equity without governance are now prohibited to benefit from the 3€/MWh bonus (although they were frequent instruments used until then).

Legal structures

According to the information report of October 2016 on implementation of Law on the Energy Transition for Green Growth (LTECV), direct equity financing may be in the form of shares or in the form of current account contributions. The legal status of project companies that host citizens in their capital is different, but the status of simplified joint-stock companies (SAS) prevails, before that of cooperative societies of collective interest (SCIC) and, to a lesser extent, that of semi-public companies (SEM).

> SAS (Simplified Joint Stock Company), is a common status among citizen projects. The operation of a SAS is very flexible, it does not require a minimum capital, the statutes can be customized and provide for cooperative governance if desired. Until 2016 and the changes in legislation mentioned in the previous paragraph, SAS did not allow participation of local authorities in capital and they were not able to draw on the savings of the public. Now, local authorities can enter the capital of SAS and SAS can directly call on public funding up to 100 000 € over a period of 12 months. Isac-Watts is an interesting example of a SAS created in 2012 to lead the wind project in Severac-Guenrouët.

> A Cooperative society of collective interest (SCIC) is a cooperative society of commercial form with selfless management. It takes the form of a public limited company (SA), a simplified joint-stock company (SAS) or a limited liability company (SARL), with variable capital. Its membership must be multiple (multi stakeholders). It associates obligatorily three types of members: employees of the cooperative or producers, beneficiaries (customers, users, local residents, suppliers ...) and contributors (for example, public authorities within the limit of 50% of Scic's share capital, associations, communities, corporations, volunteers, etc.)) to produce goods or services of collective interest for the benefit of a territory or a sector of activity. According to the general principle of cooperation, each member has one vote at the general meeting ("one partner = one vote"), regardless of his share in the share capital. SCIC falls under common law taxation.
However, compared to German Energy cooperatives, SCIC suffer from a certain rigidity that affect their economic viability. Whereas german eingetragene Genossenschaften (eG) have no minimum for capital entry, have no constraints for benefits sharing and are generally more flexible (for example, with regard to the obligation to set aside reserves), French SCIC require a minimum capital entry of 18 500 € for SA, are obligated to put in indivisible reserves (at least 57.5% of the result-untaxed), need a costly statutory auditor and are constraint in terms of benefits sharing. As a result of this lack of flexibility of French cooperatives, their development is less important than in Germany. However, the SCIC statute remains a deliberate and conscious choice for all those projects willing to integrate democratic governance and provide environmental, economic or social community benefits.

Enercoop, created in 2005, is an example of French SCIC. Enercoop is a supplier of electricity produced from renewable energy 100 % purchased through Power Purchase Agreements from 237 independent small renewable energy producers. The price paid to purchase electricity from the renewable energy producers is fixed to allow a return on investment sufficient to ensure the development of each renewable technology. As a direct consequence of its fair-trading principle, the price of electricity paid by the customers is also 15 to 20 % more expensive than the average market price of electricity but, unlike the price required by other suppliers, remain stable over recent years. It has 70 000 customers, 40 000 members, 180 employees and 11 regional cooperatives. Enercoop reinvests its benefits in new means of production and energy management measures. Enercoop is also a founder and a member of Energie Partagée Investissement (partnership limited by shares).

> Semi-Public companies or territorial authority enterprises (SEM) are public limited companies which have economic and financial partners with private capital (the Caisse des Dépôts et Consignation is frequently a partner of French SEM) and in which territorial authorities (at the level of the commune, département or region, or an association of such authorities) have a majority shareholding (> 50 %) and pilot the governance. The minimum amount of share capital needed to set up a Local Semi-Public Company is 37 000 € when the company launches an issue for general subscription, and 225,000 € when it does not. For some small municipalities and in the case of large wind power projects (>10 million €), SEM companies, at least 51% of whose capital must be held by local authorities, can be too cumbersome to manage. The SEM “Nievre Energies” is involved in the financing of the wind project in Clamecy Oisy.

5.1.4. The state of community energy in France in 2018

It should be specified that, in France, as in other Member States, such as Germany and Spain, the definition and the understanding of “community energy”, still seem confused. In France, “community energy” translates more often into financial participation rather than “actors located in the proximity of the renewable energy projects, involved both financially and in the governance of projects, the primary purpose of which is to provide environmental, economic or social community benefits”, although these latter characteristics are close to the French designation of “citizens projects”.

Actually, officials from Energie Partagée Association have confirmed being working with DGEC (General Directorate of Energy and Climate) on the translation of “Renewable Energy Community” into the French context. The term “citizens projects - projets citoyens”, used up to now in France, should be modified and could be replaced by “Sociétés locales et collectives de production d’énergie renouvelable – Local and collective corporations of renewable energy production”, in order to meet the definition provided by the Revised Directive of Renewable Energy in December 2018.

According to A. Rüdinger (Iddri) and Energie Partagée, there was 308 Renewable Energy (RE) "citizen" projects by the end of 2018, 60% of which are solar projects of moderate size (photovoltaic rooftop clusters), 17% terrestrial wind power and a few citizen projects of micro-hydro or collective anaerobic digestion.

The Energie Partagée Investissement fund, for its part, doubled its share capital compared to the end of 2015, with nearly 17 million euros raised from 5,300 shareholders at the end of 2018

Furthermore, french crowdfunding platforms, are either specialized in ENR projects (Lumo, Enerfip, Lendosphère and Akuocoop), or generalist platforms that occasionally present ENR projects to their funders, such as Lendopolis or Wiseed. Thanks to the legislation changes in 2015 and 2016, the average annual amounts of money collected by crowdfunding platforms to finance RE projects, have boomed from 120 k€ in 2014 to 38,7 M€/year in the end of 2018[50], breaking down into: 153 projects, a total capacity of 1.131 MW, 65% of the amounts invested in solar energy projects, wind power representing 21% of the amounts collected, compared to 50% in 2016 and 45% in 2017.

"A loss of speed that can be explained by the difficulties encountered by the wind sector in France, by more complex financial schemes but also by the tendering system, "says GreenUnivers. (*Source: Crowdfunding Barometer 2018[51] - Financement Participatif France and GreenUnivers*).

The first results of tenders rounds, published by the French Energy Regulator “CRE” at the end of 2018, reveal the attractiveness of the participative bonus scheme for project holders integrating the participation of citizens and/or local authorities in the financing of their projects. All sectors combined, 36% of the winners from CRE call for tenders have committed themselves to the participatory bonus. However, this average rate hides disparities between renewable energy technologies.
The participative bonus has been particularly used for ground-based photovoltaic projects with rates higher than 70%, while its use remains more limited for other sectors (only 23 % for wind energy and 20 % or less for other technologies).
Indeed, as A. Rüdinger clearly explains in - Les projets participatifs et citoyens d’énergies renouvelables en France-, “the risks of failure to raise funds in crowdfunding increase with the amount of the collection. Therefore, for the same goal of 40% equity investment, the amount to be collected can vary by a factor of 1 to 100 between a medium-sized wind project and a solar project on a roof of limited power. This could possibly explain why the participatory bonus remains for the moment little mobilized for the onshore wind, in spite of its financial attraction and its interest to reduce the risks of local opposition”.
However, it is yet too early to assess how the new eligibility criteria to benefit from the 3€/MWh bonus for those “real citizens” projects with governance, are impacting the number of projects applying to the call for tenders and are effectively encouraging or not RE community projects (according to the European REDD definition).

With regard to the future of community projects in France and after the recent changes in legislation, showing an effort from the government to encourage their development, two main challenges remain:

[50] The current modes of participative financing are, in decreasing order: the loans (or crowdlending), the donation and equity financing.

[51] The 2018 barometer also provide with the following information: the average net rate of return of crowdfunding in renewable energy for citizens in France is 4.94%. The heat networks represent 6.96% of the amounts collected, biogas 3.85%, hydraulics 2.8% and energy efficiency 1.42%.

1. Obtain an exemption for wind energy projects comprising up to 6 generators with an installed capacity of 3 MW each that are defined as citizens projects, so that they can still benefit from the guaranteed direct contracting system (guichets ouverts) and don't have to go through the auction procedure;

2. Revise the legislation relative to self-consumption, notably the two restrictive conditions set for collective self-consumption[52] , defined as "electricity produced and consumed by several consumers and producers located on the same low-voltage grid and linked together through legal entity", as these two conditions hinder its development.

[52] Authorized by the decree of 28 April 2017, collective self-consumption consists of sharing photovoltaic production between one or more producers and one or more consumers. But two restrictive conditions are set for collective self-consumption and limit its scope:
• Firstly, the withdrawal and injection points must be located downstream from the same MV / LV transformer station (medium voltage / low voltage).
• Secondly, these producers and consumers must be related to each other within the same legal entity.

6. CASE STUDIES OF COMMUNITY POWER

This section aims at presenting the key aspects of four innovative models of community power. For more details about each case study, a monographic report is available upon request.

6.1. ROBIN HOOD ENERGY (NOTTINGHAM, UK)

Project summary

Robin Hood Energy (RHE) is a not-for-profit ESCo (Energy Service Company) aiming to make energy more affordable for all, especially for Nottingham people. It is one of the two fully licensed supplier owned by a local authority in the UK, with Bristol Energy Limited. It was set-up with an investment of € 20 million (mix of loans and share purchases from Nottingham's city council).

Key targets: offering competitive prices and green electricity to all and fighting fuel poverty.

Key facts

Project launch date: September 2015

Type of project : not-for-profit community energy service company (owned by local authority)

Investment : € 20 million

RE sources : mix (Guarantees of Origin)

130,000 customers in the UK

Main achievements

After only 3 full years of existence, Robin Hood Energy managed to reach a break-even position thanks to a regular increase of its customer numbers (+ 30 % in 2018 - 130,000 customers nationwide), to a good quality service and a strict management. Starting with 30 employees in 2015, it now employs over 200 employees in its Nottingham offices.

RHE launched a discounted tariff (- 5 % below standard rate) for Nottingham residents. In the last 12 weeks of 2018 it saw customers on that tariff more than double. In 2019, it supplied over 1 in 10 households in Nottingham. It now has one of the lowest Standard Variable Tariffs bases in the industry and still works hard to drive that base even lower, compared to upwards of 60% for the majority of the "Big 6" electricity suppliers[53].

All of the electricity provided to UK homes and businesses is green since July 2018 (Renewable Energy Guarantees of Origin + a very tiny bit of Power Purchase Agreement supply with Smartest Energy), at no extra cost.

Impacts on local communities

Robin Hood Energy's most remarkable societal impacts deal with energy efficiency measures and the fight against fuel poverty (see monographic report for more details). In particular, Robin Hood Energy fought hard in favor of a new system that would protect the most vulnerable consumers – prepayment customers - against fuel poverty. This battle waged in partnership with the energy regulator Ofgem and the Competition and Market Authority resulted in the adoption of a temporary Prepayment Meter Price Cap[54] that came into force on 1 April 2017. It applies to prepayment meter customers on a non-fixed deal and without an interoperable smart meter. Suppliers can price to the level of the cap or below it, but cannot charge more.

Over 1,500 customers also received a Warm Home Discount payment in 2018 from RHE, before obligation[55] and with the will to provide extra help to people struggling with their energy bills.

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[53] Currently, the UK's energy market is still dominated by six large utilities (i.e. British Gas, EDF, E.ON, RWE, Scottish Power and Scottish and Southern Electric), known as the "Big Six").

54 A separate price cap applies, since the 1st of January 2019, to customers on a standard variable or default energy tariff.

[55] As a rule, any energy supplier with more than 250,000 customers must offer the Warm Home Discount scheme to the core group eligible for it, but some smaller suppliers, such as Robin Hood Energy, who do not meet that criteria voluntarily participate.

6.2. TRENT BASIN (NOTTINGHAM, UK)

Project summary

The project is located within Nottingham Waterside, an area widely acknowledged as one of Nottingham's least developed assets. This innovative project arises from the work developed by Project SCENe's consortia, enabled by Innovate UK funding and the Energy Research Accelerator ERA. It brings together companies involved in the energy supply chain with key industry players, academics and buyers of energy efficient homes on site to deliver new models for community energy schemes. Using novel consumer engagement tools and a focus on business model development the consortium is developing and testing business model templates that could be used by other developers of large-scale housing projects all over the UK.

Key facts

Project launch date: 2013

Type of project: community solar power generation and storage demonstrator

Investment: € 6,7 million

250 households when achieved

Key targets: to provide a practical solution demonstrating how to minimize the use of fossil fuel generated energy, lower energy costs, smoothing out the load curve and reduce carbon emissions.

Main achievements

As most demonstrator projects, the Trent Basin project is being implemented in several stages.
Phase one completed in spring 2016 provided 46 low-energy family homes.
Phase two consists in building a further 31 homes, and should be completed by the end of 2019.
By the end of phase five, 250 households and one school should benefit from the project.
In April 2019, in addition to the 46 energy efficient homes built and monitored, the project includes an urban solar panel farm[56]. As houses are built, these panels will be transferred from the solar farm to the roof of each home. A suite of in-home energy monitoring devices allows residents access to the information they need to make informed choices about their energy use.

Renewable energy generated by solar panels is then stored in Europe's largest community energy battery: a 500 kW battery with a 2.1 MWh storage capacity supplied by Tesla and switched on June 2018.

The project is capable of yielding large data sets on consumer behavior regarding energy use. The researchers hope their findings will inform an innovative business model that can be rolled out nationally to increase the take up of community energy schemes across the UK.

Impacts on local communities

In order to change behaviors and teaching Trent Basin residents to become more and more energy efficient users, the Nottingham University has developed an on-site Community Hub facility, with a giant interactive screen-wall allowing visualizing energy data. It also holds seminars for residents and people interested in moving to the community, with a physical space for them to interact and discuss energy and sustainability.

A Community Fund has been created as soon as the first Trent Basin residents moved in. The arrangement put in place by igloo (the developer) in partnership with the residents, consists in allocating a small element of the Service Charge in the lease to continue feeding the Community Fund that was initially established with £ 5 000. The Community Fund is used for the marketing, animation and promotion of the Trent Basin development and area in ways that make a contribution to the wider neighborhood and community.

Initially founded as a limited private company by SmartKlub who manages it, Trent Basin Energy Services Company (ESCO) is intended to be co-owned by Trent Basin residents, who will be invited to get involved with project decision making and will be entitled to an agreed share of any surplus income.

[56] The decision of installing a solar farm prior to the construction of new houses was an informed choice just in time to benefit from the end of the feed-in tariffs in December 2018.

6.3. WILDPOSDRIED (GERMANY)

Project summary:

Wildpoldsried is a village with 1,200 households in Bavaria, Germany. It is recognized for its exceptional achievements in renewable energy production.

From 2000 until 2009, many RE projects were initiated, financed and managed by citizens individually. Several households get their heat from a 4.7-kilometer district grid financed through a local cooperative whereas other inhabitants also owns shares in a network that delivers gas to three co-generation plants.

From 2010, a second period started with additional renewable plants. The local grid operator and the municipality started to face a big electricity surplus. Wildpoldsried was therefore selected for an ambitious experiment financed by the German Ministry of Economic affairs and Energy (BMWi) that involved establishing a smart grid. IREN[57]s smart grid research projects, with Siemens as a leader, were launched to maintain a balance between energy production and consumption.

Key facts

Project launch date: 2010 (second phase)

Type of project: community RE power generation with smart grid.

47 MWh of renewable electricity in 2018

Investment: € 26,6 million (last phase)

Over 250 households equipped with RE

≈ 900 citizens invested in a local RE project

In 2015, two additional communal wind mills were commissioned with a total investment of € 26.6 million. Over 500 Wildpoldsdried residents and of the neighboring village invested € 9.9 million whereas the remaining € 16.7 million was financed through a bank loan.

Key targets: to produce 100 percent of local electricity from renewable energy sources and set up innovative solutions to maintain balance between production and consumption.

Main achievements

In addition to five biogas plants, 5,350 kWp of photovoltaic, 9 wind turbines and the hydropower system, the town is also home to several municipal and residential biomass heating systems and 2,100 m² of solar thermal systems. Five private residences are heated by geothermal systems and passive house techniques have been used in some new construction. One is also likely to see a fair number of electric cars dotting about.

In 2018, 46,546 MWh of electricity (100% from renewable energy sources) were generated in the municipality, more than seven times the consumption in the municipality. The 9 wind plants on Wildpoldsried corridor produced a total of 31,324 MWh of electricity, representing, alone, 5 times the electricity consumption of all the inhabitants.

Impacts on local communities

Wildpolsdreid residents who have invested in wind turbine construction get about 6% return each year. This profit comes from the sale of surplus energy produced by the wind turbines to the local electricity supplier.

Annual profits for the city after the sale of the electricity surplus amount about six million euros, resulting in very low local taxes.

Thanks to its leading role in the development of renewable energies, the village became famous and attractive not only for tourism but also for energy companies and pilot projects financed at both European and national levels. In the last years more than more than 670 visitor groups from all over the world have visited Wildpoldsried. Innovative companies have come to settle, such as Sonnen GmbH, a manufacturer of batteries for storing excess power produced from wind and sun. Smart grid research projects are experimented with Siemens for the purpose of being useful for the local grid operator but, more widely, to the whole country.

[57] IRENE is a €6 million investment project. One third of the money is being contributed by the two partners; the rest comes from Germany's Ministry of Economics and Technology.

6.4. ALCOLEA DEL RIO (SPAIN)

Project summary:

Alcolea del Rio's solar plant has been the first community power project 100% financed by a consumer cooperative in Spain (without requiring any subsidy or bank loan). Located in a small village in Sevilla Province, is part of Som Energia's « Generación kWh » initiative, a program based on an innovative investment model: consumers (members of the cooperative) that participate in the investment scheme supply a free 25-year loan to Som Energia to help finance the construction of new community-owned RES plants. In exchange, they receive « energy interests » rather than financial interests. In concrete terms, each participant decides to invest an amount based on his annual electricity's consumption (1 share = € 100). For a € 100 share, each shareholder benefits each year during 25 years from about 200 kWh at cost price which allows a significant reduction on the electricity bill compared to market price. Som Energia guarantees that the loan is fully paid back by the end of the 25 years period.

Key facts

Project launch date: 2016

Type of project: community solar power generation and distribution

Production capacity: 2,160 kW

Annual production: 3,500 MWh/year

Equivalent electricity consumption: 1 300 households

Investment: € 26,6 million (last phase)

2,182 citizens shareholders

Key targets: to demonstrate that it is possible to create profitable community-owned RES generation projects despite the hostile national context (with no financial support).

Main achievements

2 182 persons participated to the financing of Alcolea del Rio's solar plant for a total investment of 2.041.025 €. The plant was constructed and started operating in 2016, after the government announced the sun tax and the withdrawal of incentives to the production of renewable energy. Since then it has already generated 9,290,555 kWh.

The production of the plant is equivalent to the electrical use of approximately 1,300 homes, and so far has saved the emission of 3,576,863 kg of CO_2.

Based on this first success, two other solar plants have been financed through the « Generación kWh » programme. The second one, Fontivsolar plant near Avila is in production since February 2019.

Impacts on local communities

« Generación kWh » is a non-place-based community model: any member of the cooperative can invest in the scheme whatever his/her location is. In Alcolea del Rio's case, being a small village, few local citizens have invested in the programme. The project itself generated some local economic benefits especially during the construction phase. Som Energia also pays a rent for the land to the municipality. Since the electricity produced is sold to the grid (due to the legislation), the direct economic impacts are now more limited as the exploitation and maintenance does not require many local jobs (about 1-2 persons). However Som Energia's approach generates indirect community impacts as the cooperative's benefits are reallocated to finance local groups' activities including local meetings and presentations, awareness raising about energy efficiency measures, training sessions, initiatives fighting fuel poverty in partnership with local authorities and associations, joint buying of solar panels… 53 Som Energia local groups are currently active in different regions of Spain.

In addition, being the first project of its kind in Spain, Alcolea del Rio's solar plant has attracted many visitors and generated a lot of media impact (television reports, press articles, official visits…).

6.5. LESSONS LEARNT FROM THE CASE STUDIES

Although the four case studies are very different, we can observe some common ground especially when analyzing the difficulties and success factors.

First, in each of the four projects, citizens' involvement and/or involvement of the local authority has been a key success factor allowing a fast proceeding of the project.

Second, the main difficulties deal with either the lack of public support schemes or the unstable policy framework related to renewable energy sources that deeply affect the profitability of community renewable energy projects. Even if Alcolea del Rio's project demonstrates that it is possible to successfully run a community energy generation project without any support, subsidy or even bank loan, dealing with administrative burden and financing the initial investments remains a key challenge in most countries.

Third, the societal and environmental benefits of such community energy projects are undeniable and are not limited to quantified direct economic impacts or reduction of CO_2 emissions. They help raise awareness about energy savings and climate change issues, contribute to building a strong local community by strengthening the sense of neighborhood, increase local acceptance of renewable energy production plants and definitely demonstrate the business case for an innovative decentralized energy model.

7. CONCLUSION

According to a Delft study, “The potential of energy citizens in the European Union”, almost half of EU households could produce renewable energy by 2050, about 37% of which could come through involvement in a cooperative. The study concludes that when demand response, energy storage and energy efficiency are included, 83% of Europe’s citizens could participate in the energy sector by 2050.

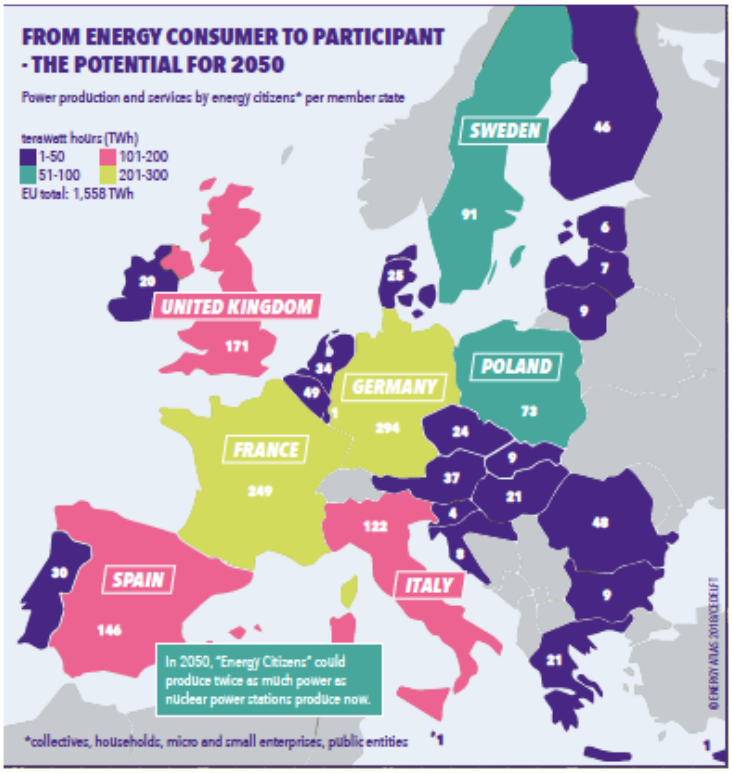

Figure 7: community energy potential in European countries for 2050

Source : Unleashing the power of community energy power (Energycities, Friends of the Earth Europe, Greenpeace, REScoop – 2018)

And, according to Rescoop, in 2050, “Energy citizens” could produce twice as much power as nuclear power stations produce now, with huge potential for France.

We have seen throughout this study that the understanding and definition of community energy from one country to another and within a same country could be different and, consequently, that legal forms and models of community power projects were as varied as they were numerous.

In Germany, although citizens and local authorities are involved in a variety of energy projects (supply, storage, energy efficiency but also district heating), generation limited partnerships with a limited liability company as a general partner (GmbH & Co. KG) and energy cooperatives, that are respectively involved in solar and wind power plants or hold investments in companies that operate them, constitute the most frequent form of citizens ownership.

In the UK, community groups have typically invested to generate a return to support their community’s development. The predominant model in Scotland has been one where a non-profit community trust has set up a trading subsidiary to develop a wind or hydro project to generate income from the sale of power. Many community projects are motivated by social objectives and fuel poverty reduction. As such, in the UK, and, most notably in Scotland, development trusts or community benefit companies are prominent. Both of these are managed by a board of community representatives, returning income to the community as a whole, rather than just investors. Bencoms (Community Benefit Society) and energy development trusts enable whole communities to benefit, even when individuals cannot afford to participate. Quite a few of these projects are developed hand in hand with rehabilitation projects, in partnerships with local authorities, charities and occasionally with sustainable estate developers, to improve energy efficiency, insulation and reduce electricity bills (Cf. “Heat Smart Orkney” project as an example).

In Spain, although not as developed as in other countries, community energy is growing quite rapidly despite a quite hostile environment thanks to innovative approaches from the main renewable energy cooperatives and a strong citizen movement promoting an alternative energy model. A recent shift in the Spanish government’s energy and climate change policy is likely to bring new opportunities for community energy projects especially as regards shared self-consumption projects.

In France, where energy has traditionally been highly centralized, the increase citizen participation in energy has mainly translated into a great interest for crowdfunding in renewable energy projects with initiators of the projects being, from case to case, municipalities or local citizens. However, successful “real” community projects, with citizens governance, have also been developed and are still improving, though slowly, thanks to the expertise, dynamism, and inventiveness of local networks and associations such a “Energie Citoyenne

en Pays de Vilaine" or specialist companies such as Energie Partagée Investissement. SAS, SEM, SCIC[58], the most frequent legal structures for citizens projects, and various forms of public-private partnership-shareholding makes it possible for a community, while being a majority shareholder, to outsource part of the risk, thanks to the financial contribution of the private sector.

Nonetheless, a broad tendency can be identified. After a growth in the period 2010-end of 2017, community energy projects, in most European countries are declining. Low prices, FiTs decrease, high risks during the development phase, lack of security for investors, complicated permissions process, grid connection costs and general profitability difficulties are typical challenges that community projects have been used to coping with and adapt to, but, since very recently, they have to face, in Germany, Denmark, the UK, France and may other Member states, the removed of FiTs in 2019-2020 and the obligation to participate in auction prior to building permissions.

As a result, there has already been a significant drop off in the number of community projects in many countries, not to talk of a dramatic stop of wind community projects in Germany. This raises the questions of how to adapt community power in a post-subsidy business environment without Feed-in Tariff and are community projects doomed to remain small capacity and small investment projects?

To try answering these questions, looking at what is happening in Scotland, where the situation remains generally better than the rest of Europe, may be of interest. Scotland's community energy four main success factors are:

1. A strongly supportive Scottish Government (who has set and even increased its target to 1 GW of community and locally owned renewable energy capacity by 2020, and 2 GW by 2030) with a continuity of support through CARES – the Community and Renewable Energy Scheme (CARES provides start-up funding, pre-planning loans, post-consent loans and innovation funding. A new funding round was opened in 2017 with up to £5 million available).
2. A strong tradition of community organization, especially in the more marginal / peripheral areas, along with strong economic drivers to identify sustainable economic activities
3. A highly committed and supportive community energy membership body, "Community Energy Scotland", which has continuously sought ways to help community groups overcome funding, policy and technical obstacles to development
4. Strong interest in innovation, in part driven by large areas where the electricity network is weak, driving innovation to develop direct local supply options (storage, flexible demand, collective aggregated smart projects, etc.)

Similar to the Renewables Energy Directive, which now defines 'renewable energy communities', the Electricity Directive contains a definition of 'citizens energy communities' (CECs), based on membership, governance and purpose that is different from traditional profit-oriented energy companies and can be active throughout all the power sector (not only renewable energy). In 2019, citizen participation has become a governing principle of Europe's energy market and Member States will have to enable this principle. Over the coming months and in order to comply with this new context, EU countries will have to continue modifying their respective national policy in order to allow more room and a greater role to citizens. Amongst the actions to implement to achieve far more citizens participation, the following should be considered in priority:

- Adopt and share a clear definition of "Renewable Energy Community"
- Setting national objectives and targets to boost the uptake of community:
  - One specifically for self-consumption rooftop solar PV
  - One for renewable energy technologies, even big capacities that could translate into % of RE community projects/capacity / Number of energy communities / Number of members in energy communities, etc.
- Create a specific tranche for community energy generation projects in the Contract for Differences (CfD) mechanism/ guaranteed direct contracting system (guichets ouverts).
- Better inform common citizens about their potential role in the field of energy and electricity.

"Community Energy" (CE) is found in diverse legal, organizational and financial forms and may involve participation in project development (process), and/or sharing collective benefits (outcomes). Though often considered to be sustainable, democratic, decentralized, grassroots, cooperative and local, many CE projects may address only one of these aspects. In fact, engaging with a complex emerging phenomenon is a non-trivial task, which the energy research community is just beginning to address". Source: Social innovation in Community Energy – James Hutton Institue, British and German searchers.

8. APPENDICES

8.1. SYNTHESIS TABLE

Table 7: community energy frameworks in the main countries studied

	Denmark	France	UK	Spain	Germany
Political will and driving forces	National policy supporting community participation in wind power projects	No clear national policy despite recent supportive measures in favor of participative financing and/or local projects No clear definition of RE Community	National strategy with targets of community and locally-owned RE in Scotland + targets of locally-owned RE in Wales Clear definition of RE Community	No clear definition of RE Community	No national policy support but culture of cooperatives and municipal autonomy No clear definition of RE Community
Priority Motive	Increase local acceptance of wind farms in order to meet national RE targets and ensure supply security	Thirst for independence and value generation at local scale	Generate a return, achieving lower electricity prices and reducing fuel poverty	Social crisis and strong grassroot movement promoting an alternative energy model	Maintaining acceptance of renewable energy projects (phasing out of nuclear energy)
Legal structures	Wind cooperatives++ "20% projects" with citizens holding at least 20% of shares	SAS+++ SCIC/SEM	Bencom (Run for benefit of wider defined community) / Development Trusts	Energy cooperatives Neighbors' communities	Energy cooperatives (run for benefit of their members) and GmbH & Co.KG
Specific support	"option-to-purchase" scheme obliges wind energy project developers to offer 20% shares in new wind projects to local citizens	Participatory bonus	None	None	None
Financial schemes	Guarantee fund for wind energy cooperatives Wind power plants ≤ 25 kW, PV plants ≤ 50 kW and other technologies ≤ 11 kW are fully exempted from paying the PSO	EnRciT Energie Partagée Investissement	CARES + Ynni Lleol funding + Rural Community Energy Fund + other national/local funds + Triodos bank	None	Low interest loans from Kreditanstalt für Wiederaufbau (KfW) and from cooperative banks

	Denmark	France	UK	Spain	Germany
Access to the grid / Development stage	> Non discriminatory approach for connection > Electricity from RE sources is given priority > Developers only have tp pay connection to the connection point (reinforcement costs paid by the DSOs) > Simplified procedures for small RE projects	> Electricity from RE sources is not given priority > Developers bear both grid connection and reinforcement costs. > Permitting procedures long and complex (Developing an onshore wind farm in France currently takes up to 8 years-*Source: Wind and energy in Europe 2018*).	> Electricity from RE sources is not given priority. > Plant operators pay part of the TNUoS (sec. 14 Part 2 CUSC), the remaining amount is paid by suppliers. Benefits (lower charges) for embedded generators who are connected directly to the distribution network. DNOs provide capacity maps to show where there is capacity on the grid	> Electricity from RE sources is given priority > The plant operator shall bear the connection costs and If the expansion is to the benefit of the plant operator only, he shall bear the costs of the expansion (Art. 32.2, 44, 45 RD 1955/2000).	> Electricity from RE sources is given priority. > RE project developers only pay for connection costs[59]. The costs for optimizing, boosting and expanding the grid are borne by the consumers. > Reduced delays for connections and permitting procedures (~3 year)
Average domestic electricity consumption (kWh/capita/year)	5,700	5,000	3,900	3,950	3,100
Average retail price of electricity for households (2500 -< 5 000 kWh/year) in c€/kWh					
Energy and supply	3.9 c€/kWh	6.13 c€/kWh	10.18 c€/kWh	8.58 c€/kWh	7.25 c€/kWh
Network costs	5.8 c€/kWh	5.37 c€/kWh	4.61 c€/kWh	4.29 c€/kWh	6.49 c€/kWh
Average retail price of electricity (excl. taxes)	9.7 c€/kWh	11.5 c€/kWh	14.79 c€/kWh	12.87 c€/kWh	13.87 c€/kWh
Taxes (inc. VAT)	21.2 c€/kWh	~ 6,04 c€/kWh	~3,6 c€/kWh	10,96 c€/kWh	~15,80[60] c€/kWh
Average retail price of electricity (Taxes included)	30.8 c€/kWh	17,54 c€/kWh	18,39 c€/kWh	23,83 c€/kWh	29,5 c€/kWh

[59] In Germany, if the grid operator assigns to a plant a grid connection point other than the most closely located or technically and economically most suitable one, he shall bear the resulting incremental costs (§ 16 par. 2 EEG 2017).

60 Germany chooses to levy a larger share of low-carbon policy costs on domestic consumers with some industrial consumers largely/wholly exempt. In contrast, in the UK costs are shared more evenly across domestic and industrial consumers, with relatively limited compensatory measures available for some categories of large industrial consumers.

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