THE POWER OF COMMUNITY ENERGY

Analysis of Energy Cooperatives in the Partner Countries. Denmark, Poland, Turkey and Germany

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Impressum

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Introduction

The EU Renewable Energy Directive (REDII) has acknowledged the role of citizens as key actors to achieve a sustainable and participatory energy transition and has entitled them to produce, consume, sell, and store renewable energy. Community energy projects are defined as initiatives in which citizens are either owners or have a meaningful say in the running of renewable energy or energy related services. They have different legal forms and are increasingly opening up opportunities for citizens to participate in the energy market and to benefit their local communities. Yet, national legal frameworks and public support differ among European countries.

In this context, the “Power of community energy” project presents this overview that describes the national situation of energy cooperatives in the partner countries: Denmark, Poland, Turkey and Germany. It is the result of the joint work of four NGOs –INFORSE (Denmark), SIE (Poland), TROYA (Turkey) and WECF (Germany)– aiming to promote empowerment, exchange and networking on the topic of energy communities and cooperatives.

The overview provides insights about country-specific context, regulations, barriers and opportunities for the development of energy cooperatives, which are the most common type of energy communities, so that the gained knowledge about well-functioning practices contribute to mobilise the partners and encourage the “energy community spirit."

PROJECT PARTNERS

[1] INFORSE Europe is member of the International Network for Renewable Energy, which is a worldwide NGO network working for implementation of sustainable energy solutions by exchange of information, awareness creation, formulation and implementation of strategies, and lobbying of international forums.

[2]SIE- Społeczny instytut ekologiczny (Social Ecological Institute)- is a non-profit association that works for the benefit of ecology and building public support for sustainable development and the protection of biodiversity.

[3] Troya Çevre -Troy Environmental Association- is a non profit NGO that works in sustainable local development, The organization has also a renewable energy cooperative for local development of the members that live in the field.

[4] WECF is a nonprofit network dedicated to a gender just and healthy planet for all. The international network consists of over 150 women’s and civil society organizations implementing projects in 50 countries.

ENERGY COOPERATIVES

General Information

Definition

Definition, organizational forms, and financing models of a cooperative might vary among countries. However, there are some common elements defined by the International Cooperative Alliance (ICA) that guide the functioning and internal governance of cooperatives around the world. In general, the ICA defines a cooperative as "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" (ICA, 2018). Therefore, cooperatives operate under seven principles:

1. Voluntary and open membership
2. Democratic control of members
3. Economic participation of members
4. Autonomy and independence
5. Education, training and information
6. Cooperation between cooperatives
7. Concern for the community

The earliest forms of cooperatives were established in the United Kingdom around 1840. A famine motivated a group of waivers to organize themselves to make food available to the people in the community through joint purchases (REScoop, 2020, p. 31). Nowadays, cooperatives are involved in various topics such as food, housing, transportation, finance, and energy and can provide sustainable business models. In the energy sector, cooperatives are increasingly becoming a suitable option because they enable communities to address proactively their energy needs, while contributing to their local economies.

In Europe the work of energy cooperatives work is mostly based on renewable energy sources (REScoop, 2020, p. 31). Nevertheless, their activities can exist in different forms. While some energy cooperatives are more tightly linked to one exclusive economic function, such as consumption or production, others combine different economic activities (production, consumption and distribution) (REScoop, 2020).

08| Analysis of Energy Cooperatives

Country-specific regulatory frameworks determine the organizational structure of the cooperative. Yet, in general terms, they differ from commercial actors in energy markets in certain respects (Wierling, et al., 2018). First, cooperatives enable direct participation and ownership and, therefore, involve a wider public. Second, they seek non-commercial benefits such as the fostering a sense of community. Lastly, members are motivated to accelerate the transition to sustainable energy systems (e.g., phasing out nuclear power, regaining local ownership and control over energy supply) (Wierling, et al., 2018).

With energy cooperatives, "the traditionally passive consumer is becoming an energy prosumer, co-owner of renewable energy facilities and community energy participant" (Caramizaru & Uihlein, 2020). Recent statistics show that there are about 3,500 so-called renewable energy cooperatives, which are found mostly in North-Western Europe (RESCoop MECISE, 2019). Estimates show that energy communities could own about 17% of installed wind capacity and 21% of solar energy by 2030 (European Commission, 2016) and by 2050, nearly half of EU households are expected to produce renewable energy.

Even though the first energy cooperatives can be traced back to the beginning of the 20th century, cooperative development started especially in the second half of the 1970s. The oil crisis of 1974 obliged energy-dependent countries to search for new and alternative energy sources. Communities living in remote and relatively low-populated areas started to produce and consume energy locally, using solar, wind and biomass (Troya Çevre, 2017a). Further developments were seen especially in the 90's in Europe and the model spread worldwide in the 2000s due to technological improvements and reductions of the price of renewables. More than 20% of the renewable energy power plants all over the world today are operated by communities and individual users (Troya Çevre, 2017a)

Some Western European countries have valuable experiences in the implementation and successful management of energy cooperatives and set an example for others. In countries such as Germany and Denmark, electricity development included many cooperatives, where farmers and other rural communities organized electricity production and distribution in their area.

Opportunities and purposes

Energy cooperatives provide numerous benefits to their members and users. Firstly, cooperatives are contributing to the democratization of the energy sector as citizens are more concerned with political, social, and financial aspects of renewable energy deployment (Yildiz, et al., 2015). This also pushes the interest in the energy provision. Moreover, cooperatives are creating new social mechanisms for learning and using renewable technology, helping economic development, and encouraging participation of the local population in energy policy implementation. The motivations of the members to set up an energy cooperative are manifold and include helping to decrease fossil-fuelled energy usage, profitable revenues, return on investment, amounts of energy, democratic and legal structures of cooperatives, and confidence between members and boards (Yildiz, et al., 2015). Additionally, being a part of renewable energy cooperatives (REC) might reduce the Not in My Back Yard (NIMBY) effect (Capellán-Pérez, et al., 2018) and increases the self-efficacy for bottom-up measures.

Common goals of renewable energy cooperatives are:

1. meeting the energy needs and pushing a successful energy transition towards 100% renewable energy supply,
2. obtaining economic value by selling the surplus energy to the grid,
3. reducing energy losses as a result of the installation of energy systems locally, reducing energy prices by preventing monopolization in the energy sector,
4. giving society a voice in the field of energy,
5. reducing the negative environmental effects of fossil sources with clean energy production, and
6. reducing energy dependency rates of the country (Troya Çevre, 2017b)

Additional opportunities are related to the promotion of gender equality. Cooperatives have proven to be forms of citizen participation that facilitate women's empowerment and gender justice. Women have traditionally been underrepresented in the energy field at the policy-making and implementation level and in the energy industry itself (IRENA, 2019). Yet, the renewable energy sector and the different forms of community energy offer a wide range of opportunities to expand women’s participation and to address issues that negatively impact women.

Because of their core principles, energy cooperatives could provide specific benefits for women such as equal access in the whole energy value chain (including jobs, funding and profits), control over energy production and consumption, and opportunities to participate in local economies, thereby becoming economically empowered. Moreover, energy cooperatives increase the level of participatory democracy and female leadership (Fraune, 2015). In this regard, cooperatives have two relevant instruments to assure women's effective participation: high female ratio and gender quota. Given that every member has one vote, an equitable ownership distribution ratio (gender ratio) positively contributes to women's participation in decision-making. Furthermore, cooperatives can establish a participation quota in the management and supervisory board (Fraune, 2015).

In general, gender just energy cooperatives are catalysts for social and economic inclusion and political empowerment at the local level. Decentralized, democratic and pluralist energies strengthen agency and capabilities of women and men and promote human well-being beyond access to energy and heating solutions.

Legislation for energy cooperatives

The most recent and relevant legislation at the EU level is the Renewable Energy Directive (REDII), adopted in 2018. The Directive acknowledges citizens as actors in the energy system and give the new rights regarding production, consumption, sell and storage of renewable energies. According to REScoop (2020), thanks to the REDII, now "people, local authorities, and small and medium-sized enterprises (SMEs) can establish legal entities to produce renewable energy" (p. 15), which a crucial first step to encourage many more people-powered renewable energy projects.

Moreover, the legislation is a call to national governments to support energy communities by creating enabling legal frameworks, simplifying administrative proceedings, and assessing the barriers and potential of community energy in the specific context of the country.

SPECIFIC SITUATION OF ENERGY COOPERATIVES IN THE PARTNER COUNTRIES

DENMARK

GENERAL INFORMATION[1]

In Denmark there is a long history of community owned energy supply. The electrical power production was owned by consumer cooperatives and municipalities; power production was generally based on the non-profit principle. This was changed when Denmark implemented the European Internal Energy Market policy liberalizing the energy supply and allowing companies to take over the power plants.

Today the district heating, which is widely spread in almost all Danish towns being by far the largest source in terms of heat supply, is still organised in a form of non-profit companies owned by consumer cooperatives and municipalities.

In the 1980's and 1990's the major part of windmills raised in Denmark were owned by local citizens organized in cooperatives. Today only 20% of the local windmill projects are reserved for local citizens' ownership. This has been an important factor in the rising number of local protests.

Solar cells for electricity production were very limited in Denmark until the recent 2-3 years. Until the end of 2012 Denmark had net-metering (NEM) for households installing up to 6 kW PV cells. It was working during the whole year therefore households could produce solar electricity mostly in summer and 'get it back' from the grid in winter and during the night. This system in combination with declining prices of solar panels and with information campaigns by a few utilities, NGO groups and small local firms resulted in a big rise in the numbers of small photovoltaic (PV) plants. The number of PV cells rose from 4,100 in January 2012 to 89,500 in 2013 (Wierling, et al., 2018).

This positive development made the electricity producing companies and the majority in the Danish Parliament to react. The system was too attractive for consumers, therefore the rules were changed. From 2013 one-hour net-metering combined with a feed-in tariff (FIT) was introduced. The feed-in tariff is also available to cooperative PV plants. A maximum installed PV capacity per year was set to 20 MW within the feed-in tariff.

[1] This information was collected in the framework of the EU-funded Project "Community Power", in which INFORSE-Europe participated. Further information can be founded at the link https://www.communitypower.eu/en/denmark.html

The feed-in tariff declines every year. The introduction of the feed-in tariff system opened up for PV plants owned by cooperatives, but there are still a number of legal barriers blocking the establishment of new plants.
The Ministry of Climate, Energy and Utilities is the responsible authority for energy cooperatives in the country.

DEFINITION OR JOINT UNDERSTANDING OF ENERGY COOPERATIVE

In the Danish context, it does not exist a generally agreed definition. However, the following three main forms are to find:

- A joint energy supply system owned by the energy users in a non-profit cooperative structure. This is typically heating companies and electric distribution companies, sometimes including with side-activities as for instance internet providers.
- A joint investment in for instance wind power, where typically local people invest in shares in one or more wind turbines. The legal structure is often an "Interessentskab" (a type of cooperative investment society), but it can also be other cooperative structures. As with other cooperatives, typically there is one vote for each member not for each share.
- A citizens' energy community or renewable energy community following the new EU energy directives. These are new structures, where some are under establishment, so the legal structures and similarities with existing energy cooperatives are not clear yet.

NUMBER OF ENERGY COOPERATIVES

According to INFORSE Europe, energy cooperatives in Denmark are classified into three groups: district heating, electricity distribution and wind power.

- **District heating cooperatives:** 350 cooperatives
- **Electricity distribution companies:** around 49 cooperatives
- **Windpower owning communities:** around 150 cooperatives.

In addition, there are a few solar electricity communities and one citizens' energy community under establishment.

LEGAL FRAMEWORK FOR ENERGY COOPERATIVES

The main legal structures vary depending on the sector in which the cooperative operates and can be listed as follows:

- District heating cooperatives follow rules for cooperatives with limited liability and non-profit status (managed by Ministry of Industry, Business, and Financial Affairs) and the Danish Heat Supply Act [2] (Monopole regulation with non-profit status), managed by the Ministry of Climate, Energy and Utilities.
- Electricity supply cooperatives follow rules for cooperatives (as above) and the Danish Electricity Supply Act [3], (monopole regulation with limited profit) managed by the Ministry of Climate, Energy and Utilities.
- Windpower communities are following rules similar to cooperatives, but they do not need to be non-profit.

STAKEHOLDERS

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OPPORTUNITIES AND BARRIERS FOR ENERGY COOPERATIVES

For heat and electricity supply/distribution companies the main barrier is national legislative proposals to force them to become private businesses, which is mainly driven by market-leaning politicians from right-wing parties and consulting companies like McKinsey.

In the case of heating companies, the competition with individual heating is also an issue, where, for instance, subsidies for individual heat pumps will limit their potential development.

[2] Heat Supply Act (No. 347 of 2005). 2005-05-17
[3] Electricity Supply Act (No. 279 of 2012). 2012-03-21

Windpower communities face three main barriers:

- Private developers reserve potential wind power sites aggressively with agreement with farmers, etc.
- Support for wind power is favouring large-scale investors as current tendering for supplier require guarantees and finance that upstarting cooperatives hardly can get.
- Limited knowledge of the opportunities and current rules among local people in many of the areas with potential for more windmills.

POLAND

GENERAL INFORMATION

In Poland, energy cooperatives still exist only in theory and their activities are regulated by an outdated legislation. Currently, energy cooperatives face several operation restrictions. For instance, they may operate in no more than three neighbouring communities, cannot operate on the territory of municipalities, and cannot have more than 1000 members. Moreover, cooperative installations cannot generate more than 10 MW of electricity, 30 MW of heat, or more than 40 million m3 of biogas per year. Last but not least, cooperative's sources of electricity, biogas or heat must be designed to cover at least 70% of the cooperative's members' energy needs. In this regard, it is important to consider that the basis for calculation is not the volume of energy produced, but the demand of the members of the cooperative, which would vary with the cooperative's growth.

The task of developing regulations for energy cooperatives, after the change of the Polish government in autumn 2020, was assigned to the Ministry of Climate and Environment. Surprisingly, the development of regulations for other collective prosumers and energy communities has been assigned to the Ministry of Development, Technology and Labour, which is confusing and most will likely interfere with the optimal creation of new regulations for collective prosumers.

DEFINITION OR JOINT UNDERSTANDING OF ENERGY COOPERATIVE

The cooperative law in Poland, regardless of the subject, is based on a very old law from 1982 [4], which is increasingly in need of amendment. It defines the formal requirements for the operation of all cooperatives -their establishment, rules of membership, methods of operation, management-. Therefore, this law also applied to (in any case it had not excluded) cooperatives established for some sort of common energy management.

In August 2019, an amendment [5] to the Polish Act on Renewable Energy Sources (RES)[6] came into force, which defined a separate concept of "energy cooperative" and introduced it to the Polish legal system. Unfortunately, instead of incentives and new opportunities, it has provided a set of inexplicable restrictions on territorial coverage, generated power, membership and balancing rules. The introduction of the new legislation was not accompanied by any national introduction and promotion campaign on the subject, nor are there any examples of Polish good practice. Not surprisingly, the term "energy cooperative" is still not widely understood. Even industry journalists10 and ex-prime minister's advisors sometimes confuse the essence of cooperatives with business-oriented autonomy energy clusters.

NUMBER OF ENERGY COOPERATIVES

To date, not a single energy cooperative has been established in Poland. The first one ("EISALL" - 3 enterprises and 1 household, 20kW PV installation-) has been registered in spring 2021 but it is still not operational, due to prolonging legal procedures. There was one attempt in 2014 in south-eastern Poland (the "Our Energy cooperative", in Lubelskie region). It had been planned to build and manage several agricultural biogas plants, but with the enforcement of the regulation on energy cooperatives, they have disappeared. Officially, there are not energy cooperatives on paper nor in the register of the KOWR (National Support Center for Agriculture). An interesting initiative, based on photovoltaic panels, is starting to operate in Krakow (Krakowska Elektrownia Społeczna/ Krakow Community Energy Plant), but it is set up as an investment cooperative not thanks to, but in spite of recent regulations which in fact it has to by-pass.

[4] Act of 16 September 1982, Cooperative Law. 1982.09.16
[5] RES Amendment Act (No. 1524 of 2019). 2019-07-19
[6] Renewable Energy Sources Act (No. 478 of 2015). 2015-02-20

LEGAL FRAMEWORK FOR ENERGY COOPERATIVES

In Poland, renewable energy is regulated by many legal acts, but the most important is the Renewable Energy Act, adopted in 2015. Energy cooperatives can offset the amount of electricity fed into the distribution grid with the amount of electricity withdrawn from the grid for the cooperative's own consumption at a ratio of 1 to 0.6 (virtual net metering). Furthermore, the law stipulates that no levy related to the Renewable Energy Act must be paid for the electricity generated by all renewable energy plants (including wind, solar, biomass and biogas) of an energy cooperative and subsequently consumed by all electricity consumers of the electricity cooperative. This aspect has introduced incentives for collective self-consumption.

Regarding RE installations operated by a cooperative, the Polish Renewable Energy Act sets limits on the capacity of the cooperative. Specifically, it determines that the aggregate capacity of the cooperative cannot exceed 10 MW (in the case of heat production: the total achievable thermal capacity may not exceed 30 MW; in the case of biogas: the total annual capacity of all plants may not exceed 40 million m3); and the cooperative should able to generate at least 70 % of the electricity consumed annually by its members.
Further initiatives for the introduction of energy cooperatives into the Polish legal system came from the Ministry of Agriculture in 2019, in an attempt to create favourable conditions for farmers to develop cooperatives producing energy from biogas and biomass. Thus, the registration of energy cooperatives has been entrusted to the above-mentioned institution. It is only to perform registration functions, but it is still not prepared and unable to provide comprehensive, detailed information to interested parties.

To date, only the upper chamber of the Polish parliament (senate) has come up with a legislative initiative to remove the most serious barriers in the regulations governing the operation of (still non-existent) energy cooperatives in the country. Since this is an initiative from the opposition, there is little hope that these amendments will be voted through the parliament. Thus, it drives public attention around the issue.

STAKEHOLDERS

The main stakeholders in the Polish context are:

- The Ministry of Agriculture, especially the Deputy Director of the Department for Climate and Environment
- The Ministry of Climate and Environment, responsible for REDII implementation, especially the new Director of RES Department.

- Krajowy Ośrodek Wsparcia Rolnictwa – National Center for Agriculture Support
- Power grid operators, legally obliged to connect and bill energy cooperatives when they finally appear. Yet, they have no specific knowledge how to do it.
- NGOs advocating for better legislation, such as ClientEarth Prawnicy dla Ziemi (law), Frank Bold Poland (law), Polish Green Network (climate & environment, alliance of associations), Społeczny Instytut Ekologiczny (Social Ecological Institute), and Energy Cities Polska.

OPPORTUNITIES AND BARRIERS FOR ENERGY COOPERATIVES

In Poland, several barriers, mainly administrative and legal, hinder the development of energy cooperatives. SIE lists the restrictions as follows:

- Current regulations - a set of restrictions for potential energy cooperatives that the government itself cannot explain. Cooperatives are not free to manage their own generated energy and balancing the surplus given to the grid is very unfavourable.
- Lack of financial incentives. Neither national nor regional authorities want to plan financial nor advisory support for energy cooperatives, while they are not sure who will benefit from their development.
- Critical shortage of good practices - joint effect of novelty and distrust.
- Lack of authentic, strategic support from authorities.
- Persistent governmental approach to energy cooperatives as to purely economic tools for energy efficiency improvement in SME.
- Half a century of destruction of Polish cooperative tradition by forced collectivization modelled on the USSR. Low public trust in neighbours-based common business.
- Extreme regulatory risk – a long track record of abrupt changes in energy law, especially in RES, especially in recent 6 years.
- Uncertainty of due future funding – Both local and regional authorities, planning their future spending priorities under an unprecedentedly high EU budget, are unsure whether and how to reserve funds to support energy cooperatives in their operational programmes for the next 7 years, for such initiatives do not exist in Poland.
- Lack of information and promotion campaign and – what is far worse – no point in conducting it. The promotion of such absurd, unprofitable regulations as exist today, would not only be a waste of time and resources but it would also be counterproductive as it might reinforce the negative opinion about energy cooperatives as such. When the regulations finally change, an educational campaign would be much more difficult and costly.

Regarding opportunities, the most important ones are related to the EU Green New Deal, the EU's very green budget, and the REDII Directive, which forces member countries to change in favour of energy consumers and any energy communities by the half of 2021.

The required regulations concerning individual self-consumption (established by the article 21 of REDII) can be considered as completed because individual self-suppliers with an installation of max. 50kWp benefit from levy-exempt self-consumption. However, there is still no regulation on collective self-supply in Polish energy law, which constitutes a significant gap. Moreover, the imposed restrictions on energy communities' capacity, rights and membership constitute rather a barrier than an opportunity for development.

A study generated in the framework of the project "Co2mmunity" [7] shows that despite unfavourable social and economic conditions -mainly related to the post-war history of the 20th century and to the favouring of fossil-based energy projects due to geopolitics and the country geological structure-, there is increasing awareness and the country is becoming more open to new technologies. Therefore, access to information on the implementation of community energy projects is of paramount importance.

TURKEY

GENERAL INFORMATION

Turkey is experiencing a rapid increase in rooftop solar systems. Households and municipalities have been involved in the installation and operation of the systems, especially for the last 2 years. Yet, in these installations, local participation is not emphasized at all, which constitutes a significant shortcoming.

The solar energy industry has shown a huge development in the country thanks to the publication of the "Regulation on Unlicensed Electricity Generation in Electricity Market" in 2013 [8].

[7] Publication in Polish available at http://co2mmunity.eu/wp-content/uploads/2020/03/Co2mmunity-handbook-PL-Podr%C4%99cznik-Polska.pdf
[8] Regulation on Unlicensed Electricity Generation in Electricity Market (Official Gazette n. 28783). 2013-10-02

Even though the regulation targets more individual users, it also paved the way for cooperatives. An amendment to the Regulation in March 2016 introduced the concept of "renewable energy cooperative" into the Turkish law for the first time, which gave an impulse to the creation of cooperatives. Although many cooperatives have not yet started to operate, they are gaining increasing attention as they will positively impact local development and the development of the solar energy sector. Moreover, cooperatives are seen as key for climate change adaptation strategy as they contribute to reduce the country's imported energy dependency (Özgül & Koçar, 2020).

The T.C. General Directorate of Cooperatives of the Ministry of Commerce is the responsible authority for energy cooperatives.

DEFINITION OR JOINT UNDERSTANDING OF ENERGY COOPERATIVE

Renewable Energy Cooperatives (REC) emerged as part of the national strategy to increase the share of renewable energy sources by 2023. In this context, energy cooperatives benefit from regulations that enable them to operate without establishing themselves as a company and obtaining a license (Özgül & Koçar, 2020). The allowed capacity of the cooperative varies according to the number of members and their consumption needs: cooperatives with less than 100 members are allowed to install up to 1MW while 2 MW are allowed for cooperatives with up to 500 members, 3 MW can be installed by a cooperative with up to 1000 members and a maximum of 5 MW can be installed for cooperatives with more than 1000 members (EPDK, 2018).

Motivations to participate in an energy cooperative vary among members. According to the Cooperatives General Directorate, in the Turkish context the most important aspects are:

- To produce energy from renewable sources that will be consumed by the local people and, thus, to reduce dependency on the centralized energy system.
- To obtain economic value by selling the generated energy to electricity distribution companies and to spread the capital to the base
- To provide employment and to contribute to local development
- To give the communities a say in energy decision-making in order to prevent monopolization, and
- To reduce the negative environmental impacts of fossil sources by producing clean energy.

NUMBER OF ENERGY COOPERATIVES

The first energy cooperative of the country -Aegean Electricity Energy Production and Consumption Cooperative- was established in 2014. Since then, the creation of cooperatives has experienced a rapid increase. In a study about the current development of energy cooperatives in Turkey, Özgül & Koçar (2020) identified 46 cooperatives distributed across the country. They are concentrated mainly in the Aegean and the Central Anatolia Regions. The same study indicates that most participants in energy cooperatives are older men (the average age is 46.6 years), well-educated citizens and citizens interested in technical issues.

LEGAL FRAMEWORK FOR ENERGY COOPERATIVES

In Turkey, the legal framework for the development of energy cooperatives was initiated when the Turkey Cooperatives Strategy and Action Plan (TUKOSEP) identified the energy sector as an area with high cooperative potential (Tülin Keskin, 2019). The Turkey National Renewable Energy Action Plan [9], also recommended to establish energy cooperatives in Turkey in order to produce energy from renewable resources (Tülin Keskin, 2019).

The "Regulation on Unlicensed Electricity Generation in the Electricity Market" [10], originally issued in 2013 and updated in 2019 through the Official Gazette numbered 30772 on 12 May 2019, enabled individual consumers to combine and generate electricity. The regulation aims to create opportunities for small power plants in the electricity market, to provide electric energy for consumers, and to reduce the loss in electric energy. With the amendment of the same regulation in 2016, renewable energy cooperatives were allowed to produce electricity. According to this regulation, cooperatives have to be established by at least 7 subscribers of the same type (e.g. residential or commercial subscribers), their consumption has to be combined (measured with a common counter) and they have to be located in the same distribution region (Tülin Keskin, 2019).

[9] Presented under Directive 2009/28/ EC

[10] The Act was abrogated and replaced in 2019 by a new regulation introduced by the Official Gazette 30772 on 12 May

STAKEHOLDERS

Troya identified the following stakeholders in Turkey:

- T.C. General Directorate of Cooperatives of the Ministry of Commerce
- NGOs
- Electricity suppliers
- Energy cooperatives
- Citizens

OPPORTUNITIES AND BARRIERS FOR ENERGY COOPERATIVES

The Turkish National Renewable Energy Action Plan and the Regulation on Unlicensed Electricity Generation in the Electricity Market opened up new opportunities in the sector. However, with the update of the Regulation in 2019, two restrictive articles were introduced for energy cooperatives:

- Solar panels can only be installed on the roof and facade and installation on land is not allowed. For wind turbines a Ministry's permit is required.
- Cooperative partners must be connected to the same counter. In other words, they must live in the same building. Despite these preventive decisions, those who want to invest in renewable energy collectively are still trying to establish a cooperative and to organize lobby.

Özgül and Koçar (2020) found that cooperatives see the current policy framework as a barrier for cooperative development. Legislation is deemed insufficient and creating uncertainty about the potential of REC. Furthermore, some social prejudices towards REC prevail. The failure of housing cooperatives and the potential use of agriculture land for implementation of solar power plants resulted in a negative image of this type of associations.

Cooperatives also face financial constraints. On the one hand, only a few cooperatives have enough own capital to invest in PV projects and, thus, they depend on European Union funds and loans (Özgül & Koçar, 2020). On the other hand, the financial system imposes some barriers to cooperatives, i.e. loan interest rates towards renewable energy investments are high and cooperatives are rendered unable to access credit (Tülin Keskin, 2019).

GERMANY

GENERAL INFORMATION

Community energy is not a new concept in Germany. Rural electrification and installation and operation of local distribution grids in the first half of the 20th century were widely developed by electricity cooperatives (Volz, 2012), which by the end of the 1920s numbered more than 6000. However, most “old” electricity cooperatives were dissolved due to market and political pressures. Currently, there are 44 remaining “old” cooperatives whose survival has mainly depended on market strategies for the creation of economies of scale such as mergers and acquisitions, geographical expansion, and cooperation with other cooperatives or private companies (Holstenkamp, 2015).

Energy cooperatives have played an important role in the German energy transition. The so-called Energiewende (Energy Transition) has led to a decentralization of energy production and thus to a new wave of energy cooperatives. Particularly, between 2008 and 2013 the country experienced a real boom of energy cooperatives as the number increased from 24 to 718. Nevertheless, the number of new cooperatives dropped dramatically after reforms to the National Renewable Energy Act (Erneuerbare Energie Gesetz, EEG)[11]

The activities of the "new" energy cooperatives are primarily in the field of renewable energies, especially in solar energy (PV) and local heating (NW). Yet, some cooperatives have ventured into urban planning and transportation projects (e-mobility). Further fields for development are associated with energy savings and energy efficiency, which also important pillars of a sustainability-based energy system (Volz, 2012).

In Germany, the Federal Ministry for Economic Affairs and Energy (abbreviated BMWi) is the responsible authority for energy cooperatives.

[11] Erneuerbare-Energien-Gesetz (EEG 2000). 2000-03-29.

DEFINITION OR JOINT UNDERSTANDING OF ENERGY COOPERATIVE

According to the Renewable Energy Agency (AEE), in Germany, the term "community energy" encompasses not only cooperatives but other legal forms that allow citizen participation including limited liability partnership projects, civil law associations, and cooperation with municipal utilities. Legally, citizen participation in energy projects is defined by the Renewable Energy Act (§ 3) that defines "community energy company" as any company:

a. That consists of at least ten natural persons as voting members or voting shareholders,
b. In which at least 51 percent of the voting rights are held by natural persons who, for at least one year before the bid submission, have been registered with their principal place of residence in the independent city or county in which the proposed onshore wind energy facility is to be constructed, and,
c. In which no member or shareholder of the company holds more than 10 percent of the voting rights in the company.

All forms of community energy have proved to provide benefits in three areas:

- Local economic returns: investments flow back into the local economy.
- Political trust: community energy is a way of instilling in people the trust that the State, in all of its official functions, can be made to work for them.
- Social cohesion: community energy brings together neighbours otherwise increasingly separated from each other (Morris, 2019).

Energy cooperatives are a form of "citizen energy" (Bürgerenergie). Cooperatives are regulated by the German Cooperative Societies Act (GenG) [12] which defines cooperatives as societies whose purpose is to promote economic, social or cultural benefits of their members through joint-business operations. In 2006, an amendment of this Act facilitated the establishment of new cooperatives in the social and cultural sectors and for groups aiming to build something specific such as sustainable energy projects (Morris, 2019).

In general terms, German energy cooperatives are conceived as a form of citizen participation that mainly works for decentralized, independent and ecological energy production. Therefore, they enable citizens to contribute to energy transition and climate protection, while investing in local and regional energy projects.

[12] Genossenschaftsgesetz (GenG 1989). 1889-05-01

Their activities are mainly related to the construction and operation of plants for the generation of electricity (e.g. biogas plants, photovoltaic plants, wind or hydropower plants, etc.) or local heating supply (e.g. combined heat and power plants, biomass heating plants, biomass cogeneration plants, etc.). The Renewable Energy Agency (AEE) explains that in the German case, energy cooperatives have been crucial in terms of public support given that they focus more on community benefits and less on investor's returns.

Klagge and Meister (2018) explain that, as any cooperative, energy cooperatives are guided by member orientation, which means that the cooperative pursues a common goal of its members; and the principles of identity (members are providers and users) and democracy (each member has one vote regardless of the number of owned shares).

NUMBER OF ENERGY COOPERATIVES

Every year, the Federation for German Cooperatives (Deutsche Genossenschafts- und Raiffeisenverband -DGRV) publishes a survey on the current status of energy cooperatives. According to it, in 2019, a total of 883 energy cooperatives, with over 200.000 members, were active in the field of renewable energies. That year 14 cooperatives were founded. Moreover, the cooperatives had 2.9 billion euros investments in renewable energies and prevented the emission of 3.39 million tons of CO2 (DGRV, 2020).

LEGAL FRAMEWORK FOR ENERGY COOPERATIVES

As mentioned above, the legal framework for energy cooperatives comprises two main laws: the German Cooperative Societies Act (GenG, 1989), amended in 2006, and the Renewable Energy Act (EEG).

The main changes benefiting energy cooperatives introduced by the amendment of the Cooperative Act were:

- an extension of the minimum time limitation for members to pay their fees from the previous 3 years to 10 years (the executive board can be held liable at that point);
- only three people are needed to found a coop (down from seven);
- cooperatives with fewer than 20 members only need a single-person board, not two executive and three supervisory boards members; and
- reporting obligations were reduced for cooperatives with annual sales revenue below one million euros (Morris, 2019).

The EEG was originally passed in 2000 as a turning point in the German energy transition towards renewable energies and has since then been amended several times. The law introduced changes to the feed-in tariff (FIT) system for electricity from renewable sources, thereby creating incentives for investments in photovoltaics and other renewable energy.

Thanks to the Renewable Energy Act, the amendment of the Cooperative Act and very engaged citizens, energy cooperatives and other forms of citizen-led energy initiatives showed a remarkable growth. All of these initiatives contributed to 47% of installed renewable energy capacity in 2012 and energy cooperatives accounted for 9% (Bauwens, et al., 2016; Viardot, 2013; Müller & Holstenkamp, 2015; Klagge & Meister, 2018).

Recent information on the effect of Energiewende on the renewable share and the community participation in Germany shows that in the third quarter of 2019, 42.9% of the electricity produced in Germany was generated by renewable energy sources, compared to 31.6% in 2016.

However, in the same way that the EEG incentivized the creation of cooperatives, it is also considered responsible for the decrease in the number of newly established cooperatives that the country has experienced since an amendment in 2014. With this amendment, competitive auctions [13] have been introduced and now, the government sets the maximum volume to be built, and bidders determine prices. Cooperatives planning wind power plants and photovoltaic plants bigger than 750 kWp need to take part in the auction, in which the prices for the produced energy are not known. The Federal Network Agency (Bundesnetzagentur) announces the auction and investors can submit their bids. It takes time and risk capital, which is very difficult for energy cooperatives. Auctions and restrictive approval procedures constrain community power.

STAKEHOLDERS

In a market analysis of community energy in Germany, the Leuphana University explains that the main stakeholders of energy cooperatives are:

- Citizens
- Civil society (networks, associations)

[13] An auction is a competitive process for planning and installing renewable energy power plants (mainly wind and PV fields bigger than 750kWp). The energy project developers bids against each other to supply energy via long-term contracts at the lowest possible price. They do not know the price when starting the auction.

- Regional farmers
- Local authorities
- Municipal utilities
- Cooperative financial sector
- Trade and industry sector
- Energy plants manufacturers
- Energy suppliers
- Project developers
- Energy associations like "Bündnis Bürgerenergie-BBEn", "Bundesverband Erneuerbarer Energien-BEE", and "Deutsche Genossenschafts- und Raiffeisenverband –DGRV"

OPPORTUNITIES AND BARRIERS FOR ENERGY COOPERATIVES

Important opportunities for energy cooperatives are associated with the diversification of their economic activities and participation in other sectors such as e-mobility, urban planning, and energy refurbishment of existing buildings.

Primary barriers to the development of the cooperative sector have been imposed by the amendments to the EEG in 2014 and 2021. As explained by Klagge and Meister (2018), "the EEG amendment of 2014 led to a phase-out of FITs and to the introduction of auctions and tender procedures for renewable electricity production, thus rendering the most important (FIT-based) business strategy of many small(er) players like RE-cooperatives unfeasible. Rather, the need to participate in auctions and tender procedures confronts them with higher transaction costs, increased financial risk and additional hurdles. Not surprisingly, this marks the end of the boom of energy cooperatives in Germany" (p. 3)

According to the German Renewable Energy Agency, energy cooperatives face two main obstacles when submitting bids for auctions. First, community projects tend to be discouraged to compete again in an auction if they fail because they only have a project at the time. In other words. They cannot spread losses across multiple projects as done by private corporations. Second, community projects are geographically inflexible: their focus on the local market hinders their participation in projects with better conditions (solar or wind conditions).

The Federation of German Cooperatives (DGRV) considers that the last amendment of the EGG (2021) imposes new barriers and opportunities to energy cooperatives, especially regarding photovoltaic production. With this amendment, operations of energy cooperatives will be hampered by the compulsion of tendering for roof solar plants between 300 kW and 750 kW. This is because these plants, if they want to remain in the legal subsidy system, will only receive 50% of the electricity generated. The remaining 50% is to be consumed themselves or marketed directly. Thus, the lowering of the tender limits to 300 kW further limits the main business field of energy cooperatives (photovoltaic systems below 750 kWp). On the other hand, the amendment adjusted the tenant electricity model and eased the obligations for smart meter installation, which will allow cooperatives to develop new business models. Further opportunities are derived from experience in auctions and exchange of models for energy cooperatives.

DISCUSSION

CHAPTER 3

Discussion

Taken together, these country cases show that the development of energy cooperatives in a country depends on the existing experiences, cultures as well as local and national policies and frameworks. While the type of energy source to be used in the electricity generation depends on the country's natural resources, supportive and easing laws enforced by the state can be counted as the most important prerequisite. The late development of energy cooperatives, especially in countries like Turkey and Poland, can be explained by bureaucratic barriers and lack of support from the State.

Strong traditions of community ownership and social enterprises are the main drivers in countries like Denmark and Germany, which have the highest numbers of citizen-led energy projects in Europe (Caramizaru & Uihlein, 2020). Although energy ownership is well developed in these countries, in many Eastern European countries, it is still in an initial stage. Some hesitation derives from historic reasons such as communist control and the misuse of cooperative solutions during that time. To face such problems at the national context, it is important to emphasize the activities and benefits of the project and how they can be shared with everyone rather than the legal form (Rescoop, 2020).

Some historical events sped the transition to renewables in Western Europe. In Denmark, the OPEC embargo and Fukushima explosion led Denmark to shift away from fossil fuel in order to promote energy security and to reduce its dependence on imported oil (nearly 80% of its energy share). In this context, collective anti-nuclear networks laid the foundations for the creation of cooperatives (Mey & Diesendorf, 2018; Rüdiger, 2014). In the German case, even though renewable energy legislation was not new in the country, the Fukushima Daiichi nuclear disaster in 2011 caused a leap in the number of energy cooperatives. The explosion led to the decision to phase out nuclear energy in Germany by 2022 and to accelerate the low-carbon energy transition, known as the "Energiewende". As a result, Germany is one of the countries with the highest share of renewables in the world with the help of passionate activists and their communities.

The situation in other countries differs. In Poland and Turkey, governments have set up barriers to the development of community energy. For instance, Polish regulations restrict the functioning of cooperatives at the associative (number of members), the regional (no urban areas) and operative level (electricity capacity). At the same time, lack of political will has delayed the implementation of European initiatives. Further concerns emerge from lack of information on the benefits and forms of community energy, which increases citizens' reluctance to participate. Furthermore, the national conservative and right-wing populist political party in power in Poland might represent a setback in the implementation of environmental policies.

While Denmark and Germany are leading as exemplary countries when it comes to cooperative development and State support, they have been also subjected to limiting and decelerating laws. In Denmark, the power generation projects are opened to private companies, which takes the power from citizens away. Only a limited number of windmills –accounting for 20% of the total- are reserved for the citizens now. National legislation proposals force electricity supply/distribution companies to become private businesses. Also, the last amendment of the German EGG imposes new barriers to energy communities and lacks the implementation of the Renewable Energy Directive II (REDII).

Therefore, the role of the State is key to overcome barriers to development of community energy. National legal frameworks need to be updated in order to reduce bureaucratic work and to provide financial incentives to citizens. Networking among cooperatives is also crucial for cooperatives to be able to get lessons and learn about best practices, be more active and stand in solidarity by keeping each other up to date and exchanging essential information.

Overall, as explained by the Caramizaru and Uihlein (2020), the long-term sustainability of cooperatives "will be dependent on the development of viable business models moving towards innovative financing and remuneration schemes, smart technologies, national regulatory support and their wider social acceptance and degree of citizen participation." (p. 2).

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