UNIVERSITA' DEGLI STUDI DI PADOVA

DIPARTIMENTO DI SCIENZE ECONOMICHE ED AZIENDALI

"M.FANNO"

CORSO DI LAUREA MAGISTRALE IN
BUSINESS ADMINISTRATION

TESI DI LAUREA

"ENERGY COMMUNITIES: BARRIERS TO AND BENEFITS FROM THEIR IMPLEMENTATION WITH THE VIABLE BUSINESS MODEL: AN ENERGY COOPERATIVE CASE STUDY FROM TURKEY"

RELATORE:

CH.MO PROF. SILVIA RITA SEDITA

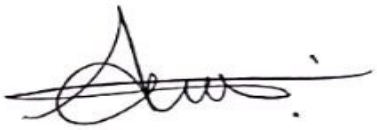
LAUREANDO/A: AHMET SAHIN

MATRICOLA N. 1233767

ANNO ACCADEMICO 2021 – 2022

Il candidato dichiara che il presente lavoro è originale e non è già stato sottoposto, in tutto o in parte, per il conseguimento di un titolo accademico in altre Università italiane o straniere.
Il candidato dichiara altresì che tutti i materiali utilizzati durante la preparazione dell'elaborato sono stati indicati nel testo e nella sezione "Riferimenti bibliografici" e che le eventuali citazioni testuali sono individuabili attraverso l'esplicito richiamo alla pubblicazione originale.

The candidate declares that the present work is original and has not already been submitted, totally or in part, for the purposes of attaining an academic degree in other Italian or foreign universities. The candidate also declares that all the materials used during the preparation of the thesis have been explicitly indicated in the text and in the section "Bibliographical references" and that any textual citations can be identified through an explicit reference to the original publication.



Firma dello studente

Abstract

Energy communities are gaining increasing attention along with their bottom-up, decentralized energy generation characteristics to reduce carbon emissions and foster energy transition in response to climate change mitigation. This study aims to investigate the barriers surrounding energy communities, the benefits they create, and the implemented business model in the development of energy communities. This study examined an energy cooperative case study based in Turkey using semi-structured interviews with the thematic analysis method. Analysis of the respondents demonstrated that while the institutional barriers were the most critical barriers hindering, the community building and self-realizations were the most significant benefits deriving from energy communities' dissemination. The business model's value proposition contained social, environmental, and economic elements, and the costs were covered by own equity capital. This research responds to the question concerning the barriers to and benefits from energy communities by exploring the implemented business model, particularly investigating an energy cooperative in Turkey. On this basis, it is recommended that policymakers should consider creating a consistent, long-term enabling legal framework for the development of energy communities. Further studies are needed to comprehend better these results' essence with mixed research methods.

Keywords: Energy communities, barriers, benefits, energy cooperative business model, decentralized energy, energy transition.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

EC	Energy Community
EU	European Union
RE	Renewable Energy
RED	Renewable Energy Directive
ED	Energy Market Directive
REC	Renewable Energy Communities
CEC	Citizen Energy Communities
NIMBY	Not In My Backyard
UK	United Kingdom
SME	Small and Medium-Sized Enterprises
NGO	Non-Governmental Organization
REScoop	European Federation of Citizen Energy Cooperatives
GHG	Greenhouse Gas
NREAP	National Renewable Energy Action Plan
MENR	Ministry of Energy and Natural Resources
EBRD	European Bank for Reconstruction and Development
YEKDEM	Feed-In-Tariff Mechanism in Turkey
RE-ZONE	Renewable Energy Resource Zone
TFEC	Total Renewable Energy in Total Final Energy Consumption
IEA	International Energy Agency
SCT	Special Consumption Tax
TOGG	Turkey's Automobile Joint Venture Group
UNFCCC	United Nations Framework Convention on Climate Change
INDC	Intended Nationally Determined Contribution
NCCAP	National Climate Change Action Plan
USD	United States Dollar
TRY	Turkish Lira

Introduction

This chapter and its subsequent sections focus on energy communities, barriers to and benefits from their implementation, energy cooperatives business models, Turkey's energy outlook and summary of Turkish energy communities' development, the applied methodology, followed by the results section.

Energy community topics are gaining increasing attention, along with the importance of reducing carbon emissions in response to climate change mitigation. To tackle these challenges, as an alternative to fossil-based energy sources, the energy community promises an array of contributions aimed for green energy transition, systematically designing the electricity production at the community level from renewable energy sources. The transition towards decentralized clean energy generation by collective energy actions has started in the last few years. However, there are still significant steps to take in order to complete the transformation. Thus, an in-depth analysis of barriers and benefits surrounding energy communities and their business model can assist decision-makers in designing more effective supporting strategies to empower the diffusion of community-driven renewable energy initiatives.

One of the most common types of legal entity for energy communities includes energy cooperatives, an essential stakeholder to contribute to the sustainable green energy transition. Their inherent characteristics have embedded socially driven motives and flexibility in finding a feasible solution for local communities' expectations where top-down, market-driven enterprises struggle to meet (Ruggiero et al., 2019). Due to the dominant influence of centralized energy companies, energy cooperatives are way smaller in terms of both the number of members and revenue generation in competing them on equal feet. Therefore, ECs are required to create viable business models to overcome challenges coming from traditional market-oriented energy incumbents. Thus, in addition, to deepen the knowledge regarding existing barriers and explore the benefits from the energy community's implementation, it is also necessary to enlarge the knowledge to discover feasible business models for energy cooperatives.

While some researchers have investigated the barriers, drivers, benefits, and motivations that impact participation in ECs (Allen et al., 2012; Bauwens, 2016; Brummer, 2018; Cass et al., 2010; Engelken et al., 2016; Herbes et al., n.d., 2017; Soeiro & Ferreira Dias, 2020a; Strupeit & Palm, 2016; G. Walker, 2008). Other researchers have examined the business models of citizen-led energy initiatives, organizations, projects (Aslani & Mohaghar, 2013; Dilger, Jovanović, et al.,

2017; Dilger, Konter, et al., 2017; Engelken et al., 2016; Frantzis et al., 2008; Gabriel & Kirkwood, 2016; Hall & Roelich, 2016; Herbes et al., n.d., 2017, 2021; Richter, 2011; Strupeit & Palm, 2016). However, systematic investigation of the energy cooperatives business model taking into account the barriers and benefits surrounding them has been neglected or stayed limited in previous studies.

The master's thesis has aimed to contribute to the existing literature by setting three primary research objectives, which are following:

- To investigate the barriers surrounding the development of energy communities in the Turkish context.
- To examine the benefits generated for the local community deriving from the energy communities in Turkey.
- To explore the business model contemplated by the selected energy community, namely, Troya Renewable Energy Cooperative in Çanakkale, Turkey.

The method used for the research is a case study method; collecting both primary data via in-depth semi-structured interviews and secondary data from existing sources allows the author for profound and meaningful input from participants and the use of previous research and documentation materials. Thus, the research is focused on collecting a variety of in-depth views and opinions of members involved in the selected renewable energy cooperative, namely Troya Renewable Energy Cooperative Çanakkale, Turkey.

The present paper tackles the following three research questions explicitly:

1. What are the barriers that energy communities are facing?

2. What are the benefits generated for society deriving from energy cooperatives?

3. Which business models do energy communities/cooperatives contemplate for their energy communities?

CHAPTER 1: Literature Review

The purpose of this chapter is to provide a critical review of the existing academic literature on community energy projects. This chapter encompasses five main parts; the first part, introduces the definition of energy communities (Section 1). In the second part of the chapter, various barriers to building community energy has been reviewed (Section 1.1). The third part of the chapter critically evaluates existing benefits deriving from energy communities (Section 1.2). In the fourth part of the chapter, the literature business model concept applied in energy communities is reviewed (Section 1.3).

1. Definition of Energy Communities

Dealing with climate change and reaching zero net carbon targets for Europe by 2050 (European Commission. European Climate Pact, 2021) significantly require a well-aware and empowered society for sustainable energy transition actions. In addition to existing measures, for instance, energy efficiency increase, this energy transition needs the replacement of fossil-based sources by several renewable energy sources. Therefore, citizen-led renewable energy initiatives bottom-up approaches underline the importance of decentralized energy-related practices involving private citizens. In this regard, citizens' tendency towards becoming active players in energy markets as prosumers acknowledged by the European Commission's Clean Energy for All Europeans Package will play an important role. (Smil, V., 2010) The European Union (EU)'s primary directives, namely the Renewable Energy Directive (RED II) 2018/2001/EU (European Commission. Clean Energy for All Europeans Package) and the Energy Market Directive (ED 2019) 2019/944 (Eur-Lex. Directive (EU) 2018/2001), define energy communities as *"renewable energy communities"* and *"citizen energy communities."* While the community is referred to as geographical proximity or a community of interest (Eur-Lex. Directive (EU) 2019/944), its primary characteristics are involvement in collective decision-making processes and benefit-sharing among the citizens. (G. Walker, 2008) The citizen-driven motives are at the center of CE that can perform the following activities: "the generation, transmission, distribution, energy storage and supply of electricity from renewable energy sources." (G. Walker & Devine-Wright, 2008). Moreover, the legal formation of CE practices can vary, including cooperatives, SMEs, and NGOs. In order to define the CE organizations, several criteria should be met, such as:

1. Natural persons must hold the majority of the voting rights in a given EC
2. The majority of the shares in a given EC must be owned by citizens who live in the area

3. The majority of seats in the board of directors must be reserved for citizens who live in the area
4. The feasibility of participation of local community members is arranged (Eur-Lex. Directive (EU) 2019/944).

1.1 Barriers surrounding energy communities

In this section, barriers that energy communities are facing will be identified by using the conceptual barrier models (Weber, 1997). The reason for selecting Weber's model is, firstly, it allows the author to conceptualize in-depth the multidimensional complexities of barriers energy communities confront. Secondly, it has already been applied to the barriers of community energy (Brummer, 2018) for a comparative literature review. Four distinct categories of barriers are following: 1. Institutional barriers, 2. Obstacles conditioned by the market, 3. Organizational barriers, 4. Behavioral barriers.

1.1.1 Institutional barriers

Regarding the institutional barriers, the impediments can be found in the lack of efficient energy policy mechanisms, regulation, legal conditions, complicated bureaucratic processes, which reflect a complex environment for further dissemination of decentralized RE communities. This argument has been frequently deepened in various other studies on energy communities and citizen-led energy initiatives, for example in (Aslani & Mohaghar, 2013; Bracken et al., 2014; Engelken et al., 2016; Herbes et al., 2017; G. Walker, 2008). The success or failure of local community REs is highly dependent on energy policy innovation. Often voluntary-based, unsalaried staff characteristics of RE cooperatives unable them to hold specialized managers and adequate sources of information to overcome various issues related to the initial development phase of legal formation of cooperatives, membership, latter unclear energy production, and service-related national legislations. Sokolowski's (Sokołowski, 2020) paper on regulating the energy community in national laws and policies indicated that administrative and regulatory barriers might derive from incompetent provisions, which consequently become burdens for the overall operation of RECs. Furthermore, as in Article 22 (4)(a), RED II explicitly reveals that these barriers are not justified thus should be removed.

1.1.2 Obstacles conditioned by the market

Indeed, there is not a clear-cut distinction where boundaries of obstacles generated by the market and institutional barriers are explicitly defined. As Weber indicates, "market conditions strongly

depend on institutional constrains and prerequisites." Adjusting legal aspects of renewable energy generation in favor of big corporations against vulnerable citizen-owned renewable energy projects is one of the most significant obstacles. As in Denmark 2000, after deregulating the restrictions such as planning schemes and specific regulations in favor of community-owned wind power initiatives, it led to an increase in costs for planning. Thus, commercial players enjoyed the privileges of paying higher prices and acting faster in the market than energy cooperatives. (Bauwens et al., 2016) According to Seyfang, G., & Smith, A. (2007), grassroots innovations such as citizen energy activities must be protected by means of tax breaks and subsidies from market competition in order to enable the development of energy communities until they can compete in the market where the rules are market-oriented and conventional. Moreover, this obstacle has also been by (Boon & Dieperink, 2014) that impediments to the formation of locally driven renewable energy organizations can also be found due to the unfairly allocated taxable allowances occurring in an unequal playing ground.

1.1.3 Organizational barriers

The energy cooperatives' social systems and organizational structure shape an organization's likelihood of survival. The relatively small size of renewable energy cooperatives and the organizational dichotomy in the market versus community orientation influence an organization's capability to capture sufficient value to cover high organizational expenses and provide instruments for salaried work (Dilger, Konter, et al., 2017; E. T. Walker & McCarthy, 2010). The insufficient level of advanced business knowledge and organizational incapability create an obstacle to energy cooperatives since they lack the sector knowledge and strategy to tackle complex regulations on the sale of electricity they produce to sell back to their members and the fast-changing ecosystem of renewable energy communities (Magnani & Osti, 2016). Additionally, the managers' cognitive barriers, such as the high-perceived risk and intense risk aversion, were recognized impediments when asking for a loan or investing in larger projects. Moreover, the initial investment in renewable energy technologies and obtaining financial sources is a complex process demanding favorable institutional settings and experienced managers (Herbes et al., 2017; Özgül et al., 2020).

1.1.4 Behavioral barriers

The issues hindering the deployment of energy communities can be found in individual's attitudes, values, social norms, and lifestyle patterns towards community renewable energy production. The historical legacy associated with understanding collective ownership of production means may differ in various cultural contexts. For instance, the negative experiences in housing cooperatives

in Turkey and perceived negative meanings attributed to cooperatives in centralized economies in Eastern European countries are anticipated to negatively influence citizens' participation in energy communities (Beckmann et al., 2015; Özgül et al., 2020). On the other hand, the acceptance of renewable energy technologies is highly dependent on influencing one's own life. When it is the case, the so-called NIMBY (not in my backyard) may cause a local resistance towards the construction of RE plants, thus hindering particularly at the initial phase of the development of the energy communities (Schweizer-Ries, 2008; van der Horst, 2007).

1.2 Benefits derived from energy communities

In this section, the identified benefits that energy communities are likely to generate will be reviewed by using Brummer's conceptual benefit categories (Brummer, 2018). The reason for selecting Brummer's structure is that it allows the author to classify the multiple benefits of energy communities in a distinguished way. Seven distinct categories of benefits are following: 1. Economic benefits, 2. Education and acceptance, 3. Participation, 4. Climate protection and sustainability, 5. Community building and self-realization 6. RE generation targets, 7. Innovation.

1.2.1 Economic benefits

There can be varieties of economic aspects classified such as receiving dividends or lower electricity prices that both foster citizen participation and allow them in increasing their household income. On top of it, the most common economic benefit has been recorded as a reduction in energy bills as renewable energy is less costly than the retail tariff and can be added to the grid through a feed-in tariffs system (Caramizaru et al., 2020). Energy cooperatives can also generate economic profit deriving from the sale of electricity to the grid (Magnani & Osti, 2016). In addition to this, another economic return to energy cooperatives is found within the relationship of being prosumer and the grid operator. While self-generated and unpurchased energy consequently brings an economic return to energy communities, they also let the grid operator benefit from reducing power flows with the consequent reduction of losses (Devine-Wright, 2005; di Silvestre et al., 2021). Moreover, energy communities also generate local jobs and avoid the region's outflow of financial resources (Becker & Kunze, 2014).

1.2.2 Education and acceptance

Under this section, benefits are identified in two categories: increasing the communities' education in energy-related topics and raising awareness in acceptance of renewable energy. The educative advantages comprise an overall better understanding of renewable energy technologies, but more

than that, energy savings consciousness through educational activities appears crucial to influence communities' lifestyles, thus strengthening sustainable energy consumption (Becker & Kunze, 2014). In the UK, some schools' energy demand is covered by wind and solar photovoltaics installed as promotional energy projects by community-driven initiatives to stimulate further students' awareness and community ties (van der Horst, 2008). Another common benefit identified is the acceptance of renewable energy; often knowledgeable communities participating in renewable energy installations through ownership helps to gain a positive attitude. While the high level of local support significantly raises the chances of the development of RE construction, the unengaged community may be harmful (Boon & Dieperink, 2014).

1.2.3 Participation

The participation of citizens in various local energy activities is positively escalating the energy transition via control over decision-making in renewable energy ownership from a bottom-up approach (Caramizaru et al., 2020). Citizen participation in financing renewable energy establishment within territory facilitates the codetermination of public affairs such as energy supply (Yildiz, 2014). On this occasion, (Hoppe et al., 2015) also pointed out that encouraging active citizen participation leads to an organizational transition in local authorities, focusing on how these authorities could revitalize citizen energy initiatives for greening local energy systems. Furthermore, the participation of local communities can be seen in contributing to the policy-making process since the strengthened community in the energy transition is less likely to be controversial, thus enabling improvement in reaching renewable energy policy targets (Devine-Wright, 2005). One can also say individuals' participation in energy communities further reinforces the energy communities for capacity building for low-carbon communities to break existing social limits via designing new capacity for social transformation (Middlemiss & Parrish, 2010).

1.2.4 Climate protection and sustainability

Ensuring sustainability of communities along with energy communities' environmentalist characteristics such as reducing the carbon footprint is often considered significant benefits in terms of climate protection and sustainability (Bomberg & McEwen, 2012). Further, influencing community members' choices towards more environmentally friendly consumption can deliver sustainable lifestyle practices. For instance, Courant d'Air cooperative explicitly declares some of its mission as stimulating citizens to the usage of renewables and boosting consciousness on climate change, fossil fuels, and nuclear energy as social goals (Caramizaru et al., 2020). In addition, according to (G. Walker et al., 2007), for exploring a model of climate change governance in energy

policy, community-based renewable initiatives accommodate significant value in facilitating the localization of climate mitigation.

1.2.5 Community building and self-realization

Another crucial benefit of energy communities appears to bring out its potential as the empowered community with a better spirit among people. The literature also suggests that joining in ECs is highly contributive to the enhancement of social cohesion (G. Walker, 2008). Moreover, community-owned energy generation practices provide the benefits of extending the ties in the local population thanks to feelings of control and self-sufficiency. For instance, it was noted that increased attention from media regarding what has been achieved via community power brought a sense of pride (Musall & Kuik, 2011). One can also say that community energy practices accelerate the transition towards low-carbon communities by holding the environmentally-friendly motives that create cultural capacity for community building. (Middlemiss & Parrish, 2010). Another social incentive contributing to community building is a sense of commitment, examining alternative modes of living, and displaying those alternatives to the current energy system are feasible (Seyfang, G. 2009). Such social incentives may raise the effectiveness of one's mobilization and strengthen positive behavioral change (Goedkoop & Devine-Wright, 2016).

1.2.6 RE generation targets

The consequence of global climate change has generated an urgency to change fossil-based energy sources towards more renewable ways. Thus, the governments are forced to deliver specific targets in renewable energy production by facilitating innovative energy policy mechanisms. In this regard, the involvement of energy communities accelerates the speed to reach defined targets, benefiting from the fostering of renewable energy generation from the local dimension (Hain et al., 2005). For instance, Germany’s Renewable Energy Act sets ambitious targets for energy transition, such as generating at least 80% of its power generation from renewable energy sources; thus, varieties of financial and technological incentives are provided to involve community energies to reach ambitious targets (Ropenus & Henrik Klinge Jacobsen, 2015; Ruggiero et al., 2019). Additionally, Denmark's encouraging green energy transition is predicted complete independence from fossil fuels by the year 2050; in order to achieve this target, community energy initiatives are nourished by operating jointly with municipalities (kommuner) (Oteman et al., 2014).

1.2.7 Innovation

While (Seyfang & Smith, 2007) implement the term "grassroots innovation" to describe citizens' bottom-up solutions for sustainable development, (Hoppe et al., 2015) acknowledged that community-led "grassroots innovations" maintain social innovations that emerged at the local level. Moreover, (Hielscher et al., 2011) elaborated that community energy projects are innovative in the sense of changing people's usual energy-related practices and upholding citizens' potential to transform societal structures. Furthermore, from the technical innovation perspective of energy communities, they are identified as "prosumers." (Butenko, 2016) As prosumers, energy communities perform various activities in energy markets, such as production using renewable energy technologies and self-consumption of produced electricity within the community resulting in affordable and clean energy for the citizens (Kalkbrenner & Roosen, 2016).

1.3 Business model concept in energy communities

1.3.1 Business model frameworks

The business model concept is often applied in academic research and management practitioners as a classification and visualization tool for companies and their activities. Despite the widespread use of the framework, there is still no commonly accepted definition of a business model exists (Zott et al., 2011). The definition of (Osterwalder et al., 2005) business model appears relevant for this research first due to its widely cited presence in the business literature second its existing implementation in energy communities (Dilger, Konter, et al., 2017; Engelken et al., 2016; Herbes et al., 2017; Reis et al., 2021). Thus, the author decided to adopt Osterwalder and Pigneur's business model framework. The model consists of nine building blocks, and it introduces the required "key activities," "key resources," "key partners" to offer specific "value proposition" to certain "customer segments" with particular "channels" and "customer relationship" at the exchange of "revenue streams" with implied "cost structure." First, the implementation of nine building blocks in energy communities is revealed in the following section. Secondly, the scope of this thesis is limited to the energy cooperatives; therefore, the archetype of energy cooperatives is presented.

1.3.2 Energy community business model concept

Even though community-driven characteristics of energy communities principally distinguish them from market-driven energy enterprises. However, the energy communities must guarantee their shareholders the return of their investment in various ways, including cheaper energy supply,

trading surplus generation, and self-consuming (Tounquet et al., 2020). In addition to an economic value such as dividend distribution, the *value proposition* also encompasses the choice of environmentally-friendly energy production technologies and societal change by citizens' active involvement as prosumers, allowing them to participate in decision-making and holding ownership of assets (Koirala et al., 2016). Referring to EU directives, the *key activities* constitute local energy generation, storage, supply, consumption, aggregation, trading, e-mobility, and energy efficiency services. In terms of *key resources* include members' financial and social contribution to the project, the land available for installation of energy generation and storage plants, financing resources coming from both members and partners. Also, government incentives schemes and facilitating regulatory frameworks for energy communities are considered resources. *The customer segment* is identified as households, SMEs, public entities. The composition of identified customers segment is also within the scope of *key partners* along with technology providers, external investors, energy suppliers. Considering the citizens' participation in energy communities, they are both consumer and project facilitators; thus, the *customer relationship* is integrated with *channels* since it is essential to establish a direct personal relationship with customers. In terms of *costs structure,* firstly, research cost of the viability of the project needs to be performed via economic and technical analysis. Secondly, initial upfront investment costs of generation, storage, distribution assets are classified. Thirdly, licensing legal fees and the costs incurred for the usage of public distribution networks and finally, the reinvestment costs for further project development. The *revenue streams* derive from the sale of shares, surplus energy generation and energy efficiency service sold, energy contracts with suppliers, government-supported subventions, and incentives. Furthermore, the business model concept of energy community is created by (Reis et al., 2021) is displayed in Fig.1.

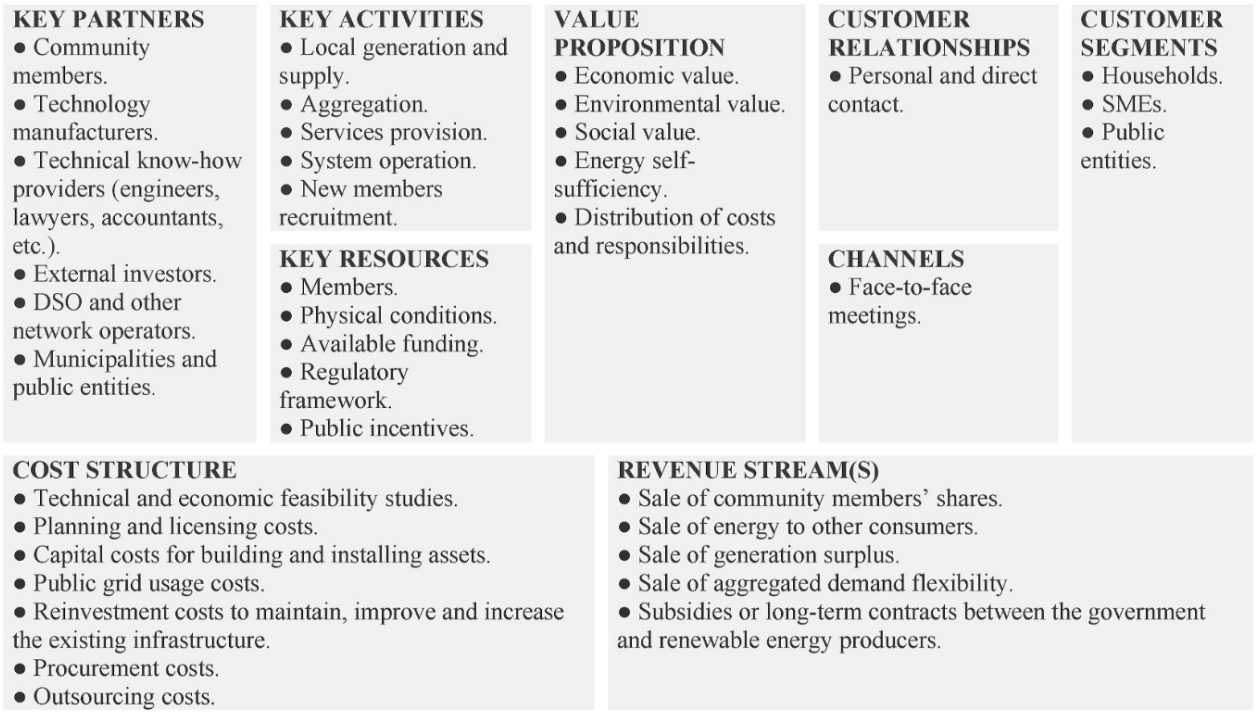


Figure 1: Energy Community Business Model Concept (Reis et al., 2021)

1.3.3 Energy cooperatives as the business model archetype

Several legal and organizational structures permit citizens' participation in renewable energy initiatives. The most common and fast-growing form of energy community is energy cooperatives in Europe (Caramizaru et al., 2020). In 2021, there are about 1900 renewable energy cooperatives registered in the European federation of citizen energy cooperatives (REScoop.eu) and accounted for 1.250.000 active citizens in Europe. The energy cooperatives are a typical example of community-driven energy practices in which consumers collaboratively raise financial sources to own energy production facilities and generate their energy (Wierling et al., 2018). In addition to open and voluntary participation, another crucial democratic governance characteristic of energy cooperatives is the voting mechanism since the decisions taken are based on one member one vote principle (Caramizaru et al., 2020). Two significant terms define energy cooperatives business formation. First, the geographical proximity or "communities of place" in energy cooperatives turns out to be cooperatives engaging with energy activities such as self-consumption and sale of energy surplus. As a result, the value created is reinvested for community regeneration. Secondly, "communities of interest" refers for energy cooperatives via locals' financial participation with share purchase for the power plants ownership to tackle with market-driven enterprises in the energy market (Bauwens, 2016; Reis et al., 2021; Tounquet et al., 2020; van der Schoor et al., 2016). Depending on the national regulatory framework, energy cooperatives may also be involved

in operating the distribution network that allows them to define the cost of energy usage for end-users. They can incentivize self-consumption through dynamic pricing schemes and exclude cooperative members from paying the costs regarding transmission and other system operators incurred by the distribution system operator (Brown et al., 2019; Reis et al., 2021). For instance, in France, energy cooperatives exercise the right to access the market either directly or through aggregation and act by the distribution system operator to facilitate energy within the community (Bridge Horizon 2020 EU, 2019). However, in Sweden, collective self-consumption within a building is permitted when all apartments belong to the same grid connection but not when electricity is conveyed over a grid covered by grid permission (Frieden et al., 2019). Also, some cooperatives are formed to provide affordable clean energy to their members at cheaper or market comparable prices (Herbes et al., 2017). Others may act as retail energy cooperatives changing tariffs above retail competitors, justifying the gaps with the numeration of suppliers (Bauwens, 2019). Moreover, the energy cooperative business model created by (Reis et al., 2021) is displaced in Fig.2.

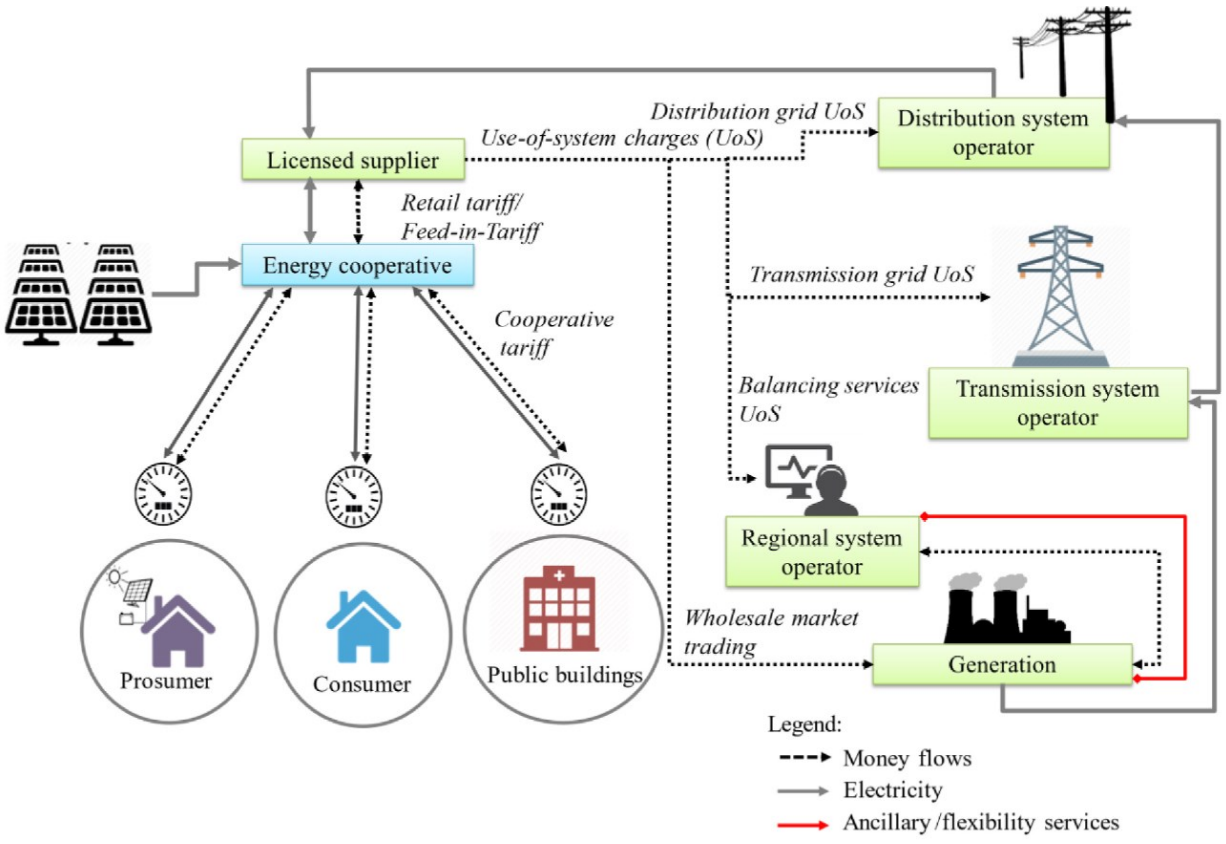


Figure 2: Energy Cooperative Business Model (Reis et al., 2021)

CHAPTER 2: Turkey's Energy Outlook

The purpose of this chapter is to explore Turkey's overall energy outlook. This chapter encompasses eight main parts, and the first part introduces Turkey's comprehensive energy transition policy (Section 2). In the second part of the chapter, the Eleventh Development Plan of Turkey has been reviewed (Section 2.1). The third part of the chapter evaluates Turkey and renewable energy (Section 2.2). The fourth part of the chapter reviews the literature on Turkey's the transportation and energy consumption (Section 2.3). In the fifth part, Greenhouse Gas (GHG) emission reductions strategy is reviewed (Section 2.4). The sixth part of the chapter has analyzed the renewable energy support mechanisms (Section 2.5). In the seventh part of the chapter, the Turkish legal framework for energy communities is reviewed (Section 2.6). The final part of this chapter composes the development of energy communities in Turkey (Section 2.7).

2. Turkey's overall energy transition policy

Turkey is a rapidly developing country and energy dependency is sharply increasing. (Arto et al., 2016) According to the International Energy Agency database, Turkey's net energy import was accounted for 75.21% in 2015. The Turkish energy market is characterized by growing energy demand and dependency on energy imports. In order to deal with the country's growing demand and energy import dependency, starting from 2001, Turkey has applied major market reforms. Turkey shifted from the centralized, vertically-integrated energy market model and has completely privatized electricity distribution. Moreover, the country has performed significant changes in the energy market, particularly in renewable energy and energy efficiency lawmaking, through new regulatory frameworks (The World Bank, 2015). The primary objectives in transforming Turkey's energy market were establishing financially solid, durable, transparent, and competitive markets under independent regulation to guarantee reliable and affordable energy supply to consumers taking into account an environmentally-friendly approach.

As a candidate country to join the European Union, Turkey is working diligently on the actions towards the EU's requirements. Energy is one of the critical chapters, and relevant EU directives on the Promotion of the Use of Energy from Renewable Energy Sources require Member States to draw and promote a National Renewable Energy Action Plan (NREAP). Turkey has scheduled this action plan signaling its commitment to renewable energy targets and EU accession (National Renewable Action Plan for Turkey, 2014). In 2014, The National Renewable Energy Action Plan was presented by the Ministry of Energy and Natural Resources (MENR) with the collaboration of

the European Bank for Reconstruction and Development (EBRD), Deloitte, and MENR for the period of 2013 – 2023 in line with the methodology and requirements of the EU. NREAP evaluates Turkey's renewable energy policies and potential and contains a number of indicative targets for the different renewable energy technologies to reach a total capacity of 61 gigawatts (GW) by 2023.

In 2017, MENR announced a comprehensive policy called The National Energy and Mining Policy (National Energy and Mining Policy, 2017). Three primary pillars, namely security of supply, localization, and predictability in the markets, were at the center of the announced policy. Focusing on the localization part, Turkey has established a strategy to increase local energy production to boost the country's energy security and reduce high dependency on energy imports. Thus, it has focused on the expansion of domestic renewable energy resources. Turkey has already surpassed its target of 38.8% of power generation from renewables specified out under the Eleventh Development Plan (2019-2023).

Moreover, Turkey has ambitious goals in line with other countries to increase the mix of renewables to reduce greenhouse emissions. In addition to announcing the feed-in-tariff mechanism (YEKDEM) for further accelerating the dissemination of renewable energy in 2010, Turkey has also announced a new strategy. This strategy is called the "renewable energy resource zone (RE-ZONE) competition mechanism," to promote the investors to empower the country's capacity in building renewable energy equipment in Turkey. Hence, following the realization of the RE-ZONE strategy, Turkey is planning to become one of the supplier countries of renewable energy technologies and equipment in the region (Bayraktar, 2018; International Energy Agency, 2021).

2.1 Eleventh Development Plan (2019-2023)

The Eleventh Development Plan of Turkey for 2019-23 forms forth important targets for energy as one of the plan’s sectoral focus areas. One of the targets is settled on renewable energy sources in this context, including increasing the share of renewable energy sources in electricity production from 32.5% to 38.8%. Turkey has also seen a substantial increase in renewable energy, mainly by hydro, strengthened by government support schemes. Looking ahead, for increasing the role of domestic and renewable energy, Turkey has a target to commission 10 000 MW each of solar and wind capacity over 2017-27. It expects that by 2023, 84% of new power capacity will be generated from domestic sources, of which 76% will be renewables, while by 2027, 82% will be generated

from domestic sources, of which 61% will be from renewables (Eleventh Development Plan (2019-2023), 2019).

2.2 Turkey and renewable energy

Turkey continues to notice increasing percentages of renewable energy consumption mostly driven by growth in hydro, wind and solar power. In 2018, the share of renewable electricity accounted for 60% of total renewable energy in total final energy consumption (TFEC). The rest was distributed under the category of heat mostly generated from geothermal and bioenergy, solar energy's contribution appears also significant. When it comes to the share of renewable energy such as biofuels in transportation sector, it is accounted very small (see Figure 3.). Turkey is among the International Energy Agency (IEA) member countries with reasonable renewable electricity penetration rates. Turkey has a significant potential for renewable energy resources, notably solar, wind, and geothermal. The following stage of renewable electricity growth will need regulatory and administrative changes if Turkey expects to utilize its full potential and accelerate the deployment supporting climate goals up to 2030 (International Energy Agency, 2021 Review Turkey, 2021).

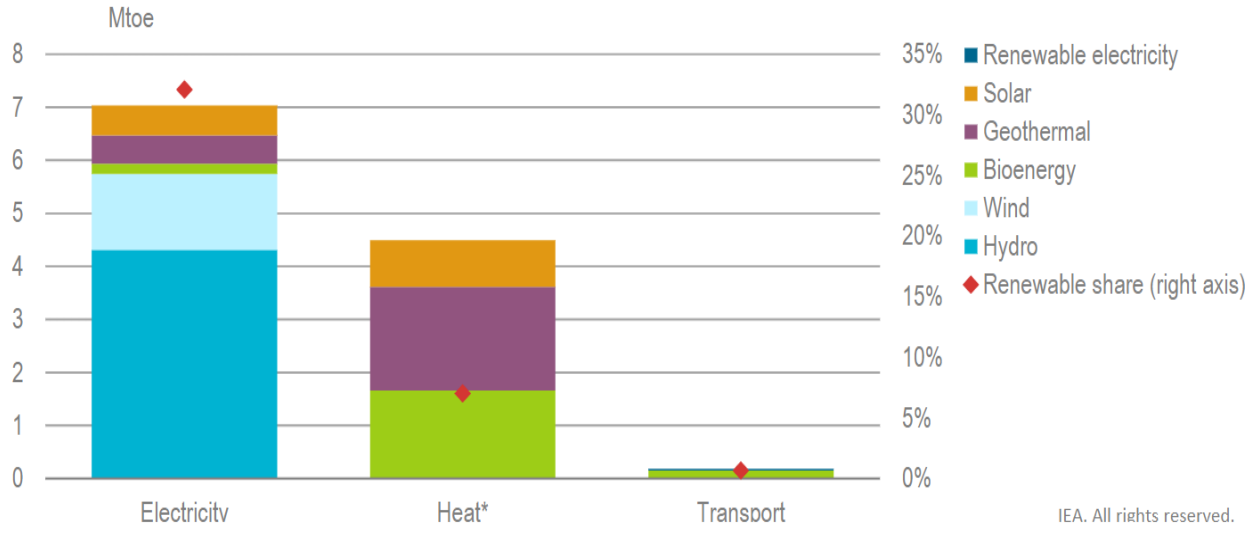


Figure 3: Renewable energy as a percentage in total final energy consumption, Turkey, 2018.
IEA (2020), World Energy Statistics and Balances (database), www.iea.org/statistics

While hydropower used to dominate renewable energy generation in Turkey, wind and solar energy sources have increased significantly in the last ten years (see Figure 4). Hydropower stayed the most significant source of renewable electricity and accounted for 29.2% of total electricity generated in 2019. Although there was a sudden drop due to a drought in 2014, hydropower's contribution to electricity generation has increased about tripling since 2000.

Wind power is the second-biggest source of renewable electricity. The country's FiT system, in wind power Turkey, has witnessed remarkable growth in the last decade and accounted for 7.2% of total electricity generation in 2019. The rest of renewable electricity was generated from solar photovoltaics, and geothermal energy accounted for 3.5% and 2.9% of the country's total electricity generation. While the contribution of geothermal and bioenergy in total electricity generation are nearly doubled in the time horizon of 2016 to 2010, Solar PV electricity production has risen even more robust in two years from 2017 to 2018; a remarkable increase accounted for 182%.

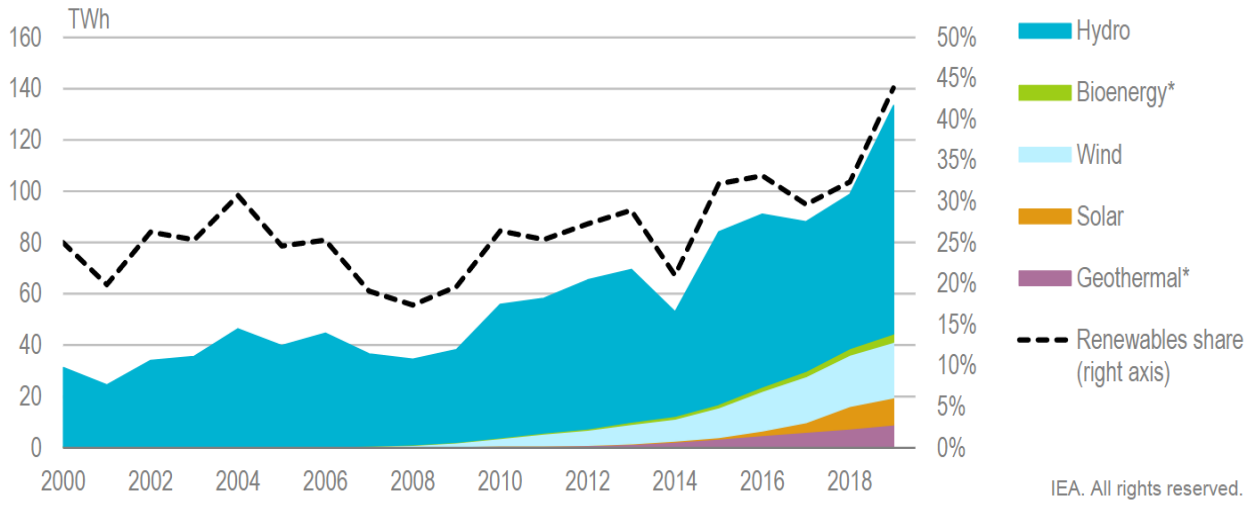


Figure 4: Renewable energy in electricity generation, in Turkey, 2000-19.
IEA (2020), IEA World Energy Statistics and Balances (database), www.iea.org/statistics

When it comes to electricity generation from renewables, it was accounted for 44% of total electricity generation in 2019. Considering this, compared with IEA member countries, Turkey is placed as the eleventh-highest share of renewables in electricity generation (median level), with a second-highest geothermal share, the seventh-highest hydro share, and third-lowest share of bioenergy (see Figure 5) (International Energy Agency, Energy Policy 2021 Review Turkey, 2021).

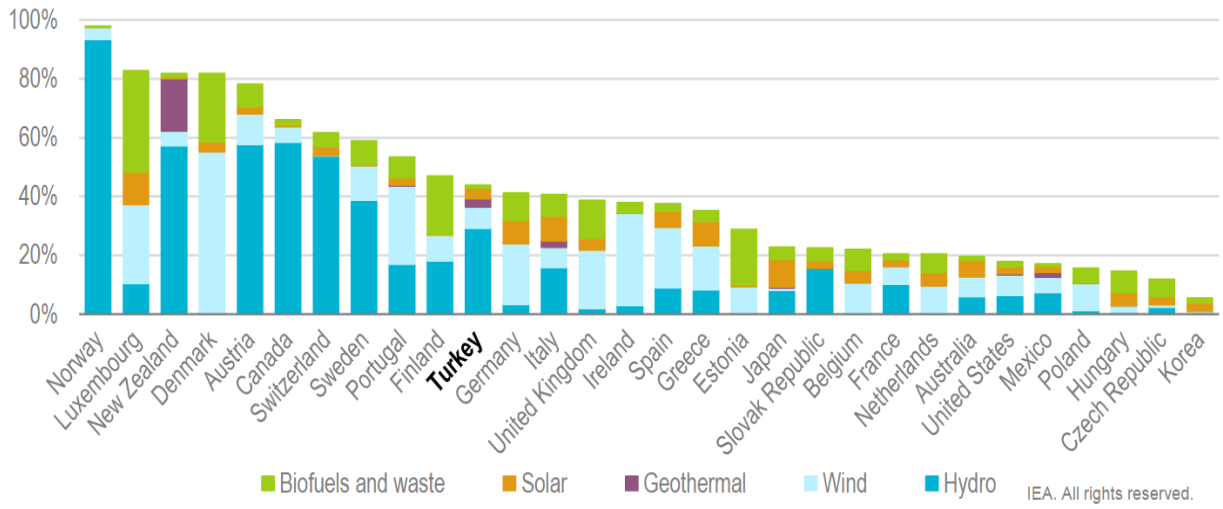


Figure 5: Renewable energy as share of total electricity generation in IEA member countries, 2019. IEA (2020), IEA World Energy Statistics and Balances (database), www.iea.org/statistics

2.3 Turkey's transportation and energy consumption

In 2019, the EU's latest official information regarding the share of renewable energy sources utilized for transportation was accounted for 7.6% in 2017 (European Commission, 2019). Turkey has a relatively modest biofuels program for the transportation sector. The government offers a special consumption tax (SCT) for domestically produced biodiesel. Still, the share of renewable energy such as biofuels in transportation is very small. (International Energy Agency, Energy Policy 2021 Review Turkey, 2021). Turkey's total energy demand for the transportation sector is accounted for 26%, which means Turkey's energy demand for transportation is higher than the demand for the agricultural sector and less than the energy consumption of the industry and buildings.

The CO2 emission of the transport sector is more than 1/5 of Turkey's total emission. The primary rationale for such a large ratio is due to the energy composition of the transportation sector, which mainly includes oil products. Consequently, it means its share in total consumption is more than 99%. The electricity consumption's share in the transportation sector is 1%, including 0.5% renewable energy (Erat et al., 2021; Saygin et al., 2019). In this regard, in order to decrease the country's CO2 emissions, Turkey determined to construct domestic electric vehicles. For the first time, Turkish domestic electric vehicles were produced and introduced by Turkey's Automobile Joint Venture Group (TOGG) in December 2019.

It has been forecasted that in 2030 Turkey will deliver 2.5 million electric vehicles and 1 million charging stations, indicated by SHURA Energy Transition Center's report (Saygin et al., 2019). It is foreseen that TOGG will produce 100% electric and zero-emission cars by 2022.

2.4 Greenhouse Gas (GHG) emission reductions strategy

Turkey demonstrates significant performance in decreasing GHG emissions by clean energy technology transition. It is foreseen to become the fifth-biggest renewable energy country in Europe by 2024 and the 11th in the world (Anadolu Agency (AA) Energy, 2019). Following the United Nations Framework Convention on Climate Change (UNFCCC) Conference of Parties framework, Turkey committed to reducing greenhouse gas (GHG) emissions by up to 21% from a business-as-usual level by 2030. Turkey's growing economy and level of development restrict its capability to lower emissions levels from current levels. The increase of renewables, including solar and wind, is essential to meeting the targets. However, the Paris Agreement has not been ratified by Turkey, and it may update its Intended Nationally Determined Contribution (INDC) following changing circumstances. Turkey does not have a plan to peak in its emissions. The country's domestic CO2 reduction strategy is summarized in the 2010 Republic of Turkey National Climate Change Strategy 2010-2023 and its implementing program, the 2011 National Climate Change Action Plan (NCCAP) 2011-2023. Central principles of the NCCAP include an improvement in energy efficiency and an expansion of renewable power. Turkey will require to revise its NCCAP and National Climate Change Strategy by the end of 2023 at the latest. Studies to update the NCCAP will start in 2020 to complete the goals within three years. Long-term (2030-50) policy and strategy options will also be considered (Republic of Turkey National Climate Change Strategy, 2010; Erat et al., 2021; International Energy Agency, Energy Policy 2021 Review Turkey, 2021).

2.5 Renewable energy support mechanisms

2.5.1 Feed-in tariffs mechanism

In order to enable the growth of renewable energies capacity, including wind, solar, biomass, hydro, and geothermal, Turkey has presented various support mechanisms under the Renewable Energy Support Mechanism (Yenilenebilir Enerji Kaynakları Destekleme Mekanizması, commonly referred to as "YEKDEM") including a feed-in tariff. In addition to this stable return through a feed-in tariff, additional premiums for establishing locally produced equipment for renewable energy production have been provided as part of the support mechanism. Since 2011, this support mechanism has been placed and lasted ten years on 1 June 2021.

The Turkish Presidency issued a decree (Decree No. 3453) (the "Decree") on 30 January 2021 regarding the new support mechanism for the dissemination of renewable energy generation, which has become active from 1st July 2021 until 21 December 2025. The most significant change in the new YEKDEM mechanism is the currency change. Formerly feed-in tariff and incentives on locally produced components were paid in US Dollars (USD) however with the new support mechanism the incentives are paid in Turkish Lira (TRY) nonetheless limiting the price based on USD. With the introduction of this Decree, YEKDEM feed-in tariff prices have been declined (see Figure 7); nevertheless, the currency change of payment from USD to TRY.

The former YEKDEM mechanism provided was based on USD due to a natural hedge against inflation. With the newly introduced TRY-based scheme, the Turkish Precedency has anticipated relevant parties' concerns regarding the fair price adjustment mechanism for effectively foreseeing and saving the relevant parties' revenues fluctuation due to the inflation and foreign exchange rates. Therefore, the Decree has addressed this issue by introducing an inflation-based price escalation mechanism, and the prices fixed will be revised every quarter, with the first adjustment started on 1 April 2021, by the formula specified in the Decree. (YEKDEM, 2021; Ciftci Law Firm, 2021).

Type of Power Plant		Previous YEKDEM Price (USD/kWh)	New YEKDEM Price (TRY/kWh)	Change in the YEKDEM Price[1]
Hydroelectric		0.073	**0.40**	- 25%
Wind		0.073	**0.32**	- 40%
Geothermal		0.105	**0.54**	- 30%
Biomass	Landfill gas or waste tyre processing facility	0.133	**0.32**	- 67%
	Biomethanisation generation facility	0.133	**0.54**	- 44%
	Thermal disposal facility	0.133	**0.50**	- 49%
Solar		0.133	**0.32**	- 67%

Figure 6: Renewable Energy Support Mechanism Prices (YEKDEM, 2021; Ciftci Law Firm, 2021).

[1] Calculated based on the USD-to-TRY exchange rate as at 30 January 2021, which was USD/TRY: 7.31.

2.6 Turkish legal framework for energy communities

In Turkey, energy cooperatives are regulated as the unlicensed power generator by Act No. 6446 of 2013 (Energy Market Regulatory Authority, 2013), the Regulation on Unlicensed Electricity Generation in the Electricity Market. In May 2019, Turkey approved new legislation regarding

self-consumption and compensation of surplus electricity. The primary purpose of the new regulation is to allow consumers to cover their electricity needs from their generation plants which must be in the same distribution region, and consumers must be placed close by to the generation facility (Energy Market Regulatory Authority, 2019). The regulation further defined the unlicensed electricity generation activities of natural and legal persons as limited to their own needs. The excess electricity can be shared with other consumption buildings belonging to the same persons within the same distribution area. Moreover, the regulation also permitted consumption aggregation utilizing the same connection point and/or with a common meter. Even under Turkish law, self-consumption is allowed; the person authorized for the relevant administrative procedures is legally bound for the administration of all users, which disadvantages the application of collective self-consumption.

Cooperatives are classified as legal persons. Hence, they are allowed to perform electricity generation via consumption aggregation, and due to their legal person characteristics, any legal responsibilities deriving from the legislation bind the legal personality of cooperatives rather than the members (Coşkun, 2019). Regarding collective self-consumption, cooperatives are not privileged when it comes to the condition that requires the members to utilize the same connection point or whose consumption can be measured from a single common meter (EMRA, 2019). Thus, the dissemination of energy cooperatives as energy communities has been hindered by the condition in Turkey.

EU Directives, namely RED II and ED 2019, referring to RECs and CECs concepts, are unspecified in Turkish energy legislation even though Turkey has accepted the Directives of the EU (see Figure 7). Thus, without legal personality, as in the case of RECs and CECs, producing electricity from renewable sources is limited by legislation since community-driven collective energy generation is allowed exclusively for natural or legal persons with the same connection point or when the consumption can be measured with a single common meter. Therefore, the mentioned conditions are not in favor of the vast majority of people to generate their electricity (Biresselioglu et al., 2021).

	REC/CEC	Community-Based Collective Generation	Smart Meters	Data Flow
Turkey	• Not defined	• Very limited • Only possible for those who are in the same tariff group and either connected to the same connection point or having energy consumption measured with a single common meter	• Legal infrastructure exists • Implementation is limited	• Regulated and permitted

Figure 7: Turkey's outlook on legal framework and the condition of smart meter rollout and associated data flow (Biresselioglu et al., 2021).

2.7 Summary of development of energy communities in Turkey

In Turkey, the establishment of renewable energy cooperatives is found very recently. The energy cooperative is mentioned for the first time in the "National Cooperative Action Plan" prepared in 2012 (Republic of Turkey Ministry of Customs and Trade, 2012). Also, in the "Turkey National Renewable Energy Action Plan" (NREAP) published in 2014.

Since 2014, when the Regulation on Unlicensed Electricity Generation in the Electricity Market was published, it can be said that the solar energy sector in Turkey has been accelerated. Initially, this regulation was targeted more individual users, but it also paved the way for cooperatives. With the amendment made in the regulation in March 2016, the concept of "renewable energy cooperative" was introduced into Turkish Law for the first time. This regulatory change has been seen with establishing ten energy cooperatives in 2016. Although they are not yet operational, this momentum will continue to increase, and energy cooperatives will enable our country to take essential steps in climate change adaptation. Cooperatives, which will positively impact local development, also contribute to the development of the solar energy sector. GÜNDER, one of the most influential sector associations, has paved a positive way because it brings together sector representatives in this field and especially encourages individual/cooperative establishments.

What makes cooperatives superior in this model is their energy democracy. Cooperatives are a model that we care about in terms of turning the small consumer in the local area into an investor. In particular, it is essential to ensure more efficient use of local resources, ensure local economic development, and create new employment opportunities locally. (Kaya, 2017; Buke, 2018)

In Turkey, renewable energy cooperatives have attracted considerable attention in recent years by reaching 46 energy cooperatives in 2020. This is mainly due to the Turkish energy policy and arrangement of the Renewable Energies Act (Özgül et al., 2020). Turkey's Regulation on Unlicensed Electricity Generation in the Electricity Market of 2019 enables citizens to satisfy their

electricity needs from their generation plant, located nearby the point of consumption. However, certain legal conditions are hindering the diffusion of energy communities. First, although cooperatives are included among the legal entities that can carry out electricity generation for collective self-consumption purposes, however, benefitting from the generated electricity is limited to citizens using the same connection point or whose consumption can be measured from a single common meter (EPDK, 2019). Thus, the dissemination of cooperatives as energy communities has been hindered by this condition. Second, after accepting EU Directives, namely RED II, ED 2019, there is still no update in the national legal framework where the concepts of RECs and CECs remain unclear. Hence, community-driven energy generation without a legal personality as in RECs / CECs is only authorized for natural persons or legal entities in the same tariff group with the same connection point or when the consumption is measured from the single common meter. This legislation has restrained the diffusion of energy communities. (Biresselioglu et al., 2021)

On the other hand, Energy Market Regulatory Authority has started to offer a Green Energy Tariff price structure allowing customers to cover their electricity needs from renewable sources without incurring extra charges in the bills due to the change from standard to the green tariff. Additionally, while more than half of the existing 46 energy cooperatives are self-financed, there is also significant impact in the increased number of energy cooperatives deriving various actors such as from Agriculture and Rural Development Support Agency providing financial resources from the EU, non-governmental organizations and municipalities (Özgül et al., 2020). The research conducted by Özgül et al. (2020) on renewable energy cooperatives from the STEEP perspective (social, technical, economic, environmental, political) revealed essential insights into the current circumstances of Turkish energy cooperatives. First, from the social point of view, voluntary-based characteristics of energy communities cause limited time dedication for energy cooperatives' activities; thus, inefficient workload allocation hinders the development of energy cooperatives. Furthermore, the community members' willingness to emphasize the importance of locally generating renewable energy positively contributes to the widespread use of RE technologies. Even if the public prejudice against the term "cooperative" still lives due to the housing cooperatives' negative legacy, the promotion on overcoming this barrier is known. In terms of technical perspective, the lack of know-how and capabilities implementing RE technologies were recorded as common issues.

Regarding the economic viewpoint, the traditional REC business model based on PV is the most preferred model due to members' risk-averse characteristics. Some members have explicitly stated

that cooperatives need to develop new business models. Otherwise, they face the risk of closing down. The Ministry of Energy and Natural Resources announcement about the end of purchase guarantee at the end of 2020 also further accelerated the necessity of a new business model. Lack of financial resources was an essential matter to members and management since only a few cooperatives are financially self-sufficient; others are mainly financed by the EU's financial support and loans. In terms of environmental standpoint, the members have demonstrated their motivation to engage with REC is that they believe that renewable energy technology enables them to live in a better world. Still, more than that, it is an eco-friendly and clean energy source. Regarding the political aspect, the insufficient policy mechanism about renewable energy cooperatives and uncertainty about whether there will be an improvement in the regulation are primary concerns and barriers.

CHAPTER 3: Methodology

This chapter provides a detailed discussion of the research paradigms and methodologies applied in the present study. The research methodology was designed to ensure a framework that addresses this study's overall aim, research objectives, and research questions, ultimately providing a meaningful contribution to community energy fields. Hence, the first part of the chapter (Section 3.1) describes the applied case study methodology and its rationale. Data collection methods are explained in the second part of the chapter (Section 3.2). The third part of the chapter (Section 3.3) represents analysis methods for the collected data.

Finally, this chapter includes this study's research methodology and methods, which aimed to understand energy cooperative members' perceptions of barriers to, benefits from energy communities, and their implemented business model. The chosen case study approach enables the analysis of Troya Renewable Energy Cooperative in Canakkale, Turkey. The case study presents the opportunity to explore a particular phenomenon in a real-life context using both primary and secondary data.

3.1 Case study methodology

The research approach for this study selected is an exploratory case study that aims to specify the opinions of energy cooperatives members' towards the notion of energy cooperatives barriers surrounding, benefits from, and implemented business model. According to Mayer (2015), an exploratory research design is a way of pursuing unique insights into a situation and explaining an unknown phenomenon, such as in this study, where there is little previous knowledge about opinions of energy cooperatives members. According to Yin (2018), a case study is: "an empirical method that investigates a contemporary phenomenon (the "case") in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident."

This study uses a qualitative method to allow the researcher to evaluate respondents' opinions and explore questions to get to the phenomenon's root (Harding 2018). Merriam and Grenier (2019) remark that an essential characteristic of qualitative research regards meaning to be socially constructed by those who experience and interact with the world, while in quantitative research, the reality is perceived as something fixed or measurable. Qualitative methods are used to collect data, facilitate the research question's complexity, and provide richness to the situation that quantitative approaches would otherwise not brighten (Hanson et al., 2011). While qualitative

studies utilize a limited and small sample, and where this research takes note of that limitation, the approach is still considered helpful as participants can deliver data beyond what could potentially be captured by a quantitative study (Brandenburg and Caroll 1995).

When designing a case study, two approaches need to be considered: single and multiple case studies. Before engaging in data collection, the researcher should determine whether a single or multiple case study is appropriate, stated by (Yin 2018). This study seeks to collect detailed and complete data relevant to the research questions within a specific time range, and therefore a single case study was considered suitable. It furnishes the author with the possibility to characterize the case and investigate a situation that not many researchers have focused on (Saunders et al., 2009).

Yin (2013) claims that if the researcher requires only to study a single group, then a single case study is the best choice, mainly if the aim is to capture the setting and necessities of an everyday occurrence. This study seeks not to compare cases; hence, a comparative or multiple case study was not considered. A single case study was deemed relevant for this research since the researcher seeks to gain an in-depth understanding of a phenomenon arising in a limited context.

3.2 Data collection

Creswell and Poth (2016) recognize that there could be several possible case candidates to research for any given study and that the researcher should be able to select the best system to study depending on its knowledge value. Many energy cooperatives in Turkey could have fit the criteria for this study. However, the current researcher has selected the Troya Renewable Energy Cooperative because it is the only member of REScoop from Turkey. REScoop is the European federation of citizen energy cooperatives. Troya Renewable Energy Cooperative was also chosen because they have published several handbooks for forming energy cooperatives reports in the energy communities' sector, but most importantly, they are the first and only organizer of Energy Cooperatives Conferences in Turkey.

The case study investigation is backed by a literature review and empirical data collection from the Troya Renewable Energy Cooperative members in Canakkale, Turkey. Firstly, a widespread literature review was used to inform the thesis on critical issues linked to the topic. Secondary data from existing sources can be helpful in multiple ways, allowing the use of previous research and documentation material and avoiding duplication of previous data (Yin, 2018). The below-mentioned three sources of literature were especially of relevance for this research:

1) Academic and policy literature on energy communities in journals such as Journal of Environmental Policy & Planning and Environmental Politics, Energy Policy and books.

2) Policy and governmental literature on energy policy such as government reports, NGOs' and experts' reports.

3.) Other existing records include community energy projects' websites and media reports.

The literature review was started in October 2021 and examined previous research on community energy in Europe. Also, previous academic literature was utilized to develop the theoretical framework, choosing case studies and developing the methodology used in this research. Previous academic literature also provided an understanding of critical issues affecting community energy development, particularly Europe.

Secondly, primary data was collected via semi-structured interviews with the selected energy cooperative's members to elicit their views on research questions in the energy community project in Turkey. Questions for the interviews were carefully chosen through an in-depth investigation of the literature and were designated to lead the participants toward sharing their natural and unique experiences about the research topic (Arthur and Nazroo 2012). The questions were open-ended, allowing participants flexibility in describing their interpretations (Galletta 2013). The reason for choosing semi-structured interviews was that it allowed the researcher to join into a conversation with the evidence; thus, it allowed the other to structure and ask the relevant questions – a condition required for case study researchers (Yin 2018).

The interviewees (members of the energy cooperative) were initially contacted by e-mail and phone, using a standard description to explain the aims of the research. The interviewees were also asked to enlarge the study's sample size and thus inform other members via their communication channel on participating in the research project.

A total of 4 semi-structured interviews were conducted during the research in January 2022. All interviews were in Turkish (see Appendix 2) and conducted via video call and recorded in the Zoom platform. The interviews lasted an average of 1 hour, with the shortest interview being (38 minutes) and the longest (1 hour and 14 minutes). The total recorded interview time for the 4 interviews was (3 hours 58 minutes). The interview questions were translated into English (see Appendix 1) and transcribed by the author.

3.3 Methods of data analysis

This research used thematic analysis as the method of data analysis. Thematic analysis is a method that allows for both the inductive and deductive interpretation of transcript data. This analysis is conducted via a systematic classification process of coding and identifying themes and categories to draw descriptive or explanatory conclusions around the identified themes and categories (Gale et al., 2013).

The thematic analysis helps investigate both manifested and hidden details, even focusing on the manifest or recurring themes. The thematic analysis seeks to comprehend the hidden meaning of the manifest themes as attributed to it by the research participants through interpretation (Joffe and Yardley, 2004).

Data analysis was conducted simultaneously with data collection (Merriam and Tisdell 2016), which allowed the author to assess and adjust the questions, ensuring they were clear and understood by participants. Before the analysis, interviews were recorded and transcribed verbatim. When the data were transcribed, all the transcripts were spot-checked to ensure accuracy (MacLean et al., 2004). Afterward, it was followed by data coding, which is essential for providing a structure for analyzing text (Neuendorf 2016). All the transcripts were printed and coded manually using descriptive coding before transferring them into the QDA Miner Lite qualitative data analysis software. Upon further reading the transcripts, the reiterative process of aligning assigned codes to the underlined texts continued. To check whether a code was assigned correctly, transcripts were compared to see if formerly assigned codes reflected the same concept throughout.

Consequently, all the transcripts were imported into a qualitative data analysis software – QDA Miner Lite. The researcher repeated the same process of coding using the software. While more texts have been analyzed through this process, the conclusion was that no further additional code or category was upcoming.

CHAPTER 4: Results

This chapter introduces the main research findings stemming from the semi-structured interviews. The empirical results are analyzed on three principal categories and several codes: participants' views on barriers affecting the energy cooperative, benefits that the energy cooperative generates, and the implemented business model in Canakkale, Turkey. However, new categories and codes emerged throughout the semi-structured interviews, namely: members' interpretation of EC, the drivers, the international collaboration for further dissemination, initiatives for the development of EC, and some proposals given by research participants. These findings are also provided. The final tree illustration of categories and codes is presented below (see Figure 8). Tables are created to summarize a number of research participants' perspectives or opinions to represent the data better. Verbatim quotations are also used to provide more detailed perspectives. For confidentiality motivations, names are replaced as 'research participants.'

Figure 8 below demonstrates the frequency of the discussed categories. According to the data, 41 quotations accounted for in the barriers category in the total. The most significant barrier with 21 quotations covering more than %50 of the entire barrier codes was 'institutional barriers.' It has been followed by 'behavioral barriers' and 'obstacles conditioned by markets' with 8 and 7 quotations, respectively. The least significant barrier was accounted for 5 quotations. The quotations in terms of benefits accounted for 64 in total.

At the same time, the most significant benefit is noted as 'community building and self-realization' with 12 quotations. Respectively, 'innovation' with 10, 'participation' with 9, 'RE targets' and 'economic' with 8 and the fewest quotation with 5 was identified as 'climate protection and sustainability' however 'drivers' category also needs to be considered as it is highly challenging to determine a clearcut for instance with the code 'climate change and environmental commitment.' Additionally, a code called 'women's empowerment and gender equality has been added with 5 codes.

Regarding the implemented business model, the business canvas model is applied based on the data gathered (see Figure 21) and it is explained considering the blocks the model incorporates.

	Count	% Codes	Cases	% Cases
Drivers				
Climate Change and environmental commitment	7	4.2%	4	100.0%
Fossil-based energy generation	5	3.0%	4	100.0%
Green energy and lifestyle	8	4.8%	3	75.0%
International Collaboration				
Heinrich Böll	1	0.6%	1	25.0%
EU Projects	8	4.8%	4	100.0%
REScoop	2	1.2%	1	25.0%
Thesis and research collaboration	2	1.2%	1	25.0%
Iniatiatives				
Organizing conferences on ECoop	12	7.3%	4	100.0%
Ministries and results	4	2.4%	2	50.0%
Energy Community Interpretation				
Decision-making	3	1.8%	2	50.0%
Energy transition	1	0.6%	1	25.0%
Energy democracy	4	2.4%	3	75.0%
Energy efficiency	2	1.2%	2	50.0%
Barriers				
Institutional barriers	21	12.7%	4	100.0%
Obstacles conditioned by market	7	4.2%	4	100.0%
Organizational barriers	5	3.0%	3	75.0%
Behavioural barriers	8	4.8%	4	100.0%
Benefits				
Economic	8	4.8%	4	100.0%
Education and acceptance	7	4.2%	4	100.0%
Participation	9	5.5%	4	100.0%
Climate protection and sustainability	5	3.0%	4	100.0%
Community building and self-realization	12	7.3%	3	75.0%
RE generation targets	8	4.8%	4	100.0%
Innovation	10	6.1%	4	100.0%
Women's empowerment and gender equality	5	3.0%	3	75.0%

Figure 8: The frequency of the discussed categories and codes flow (Author-generated via QDA Miner Lite).

Regarding the new categories and codes that emerged throughout the semi-structured interviews above (see Figure 8), there have been 59 quotations identified in total. While the 'drivers' category has included 'climate change and environmental commitment,' 'fossil-based energy generation,' and 'green energy and lifestyle' codes, the category of the drivers was the most-discussed category with a total of 20 quotations in new emerged categories.

Respectively, the category of 'initiatives' for the development of EC has included 2 codes, namely 'organizing conferences on ECoop' and 'ministries and results,' and it was the second-most mentioned category with 16 quotations. Then, 13 quotations were identified for the 'international collaboration' category for further dissemination of energy cooperatives with codes such as

‘Heinrich Böll,' 'EU Projects,’ ‘REScoop,’ ‘thesis and research collaboration.’ The ‘members interpretation of EC’ was another newly identified category with 10 quotations associated under 4 codes, namely ‘decision-making,’ ‘energy transition,’ ‘energy democracy,’ and ‘energy efficiency.'

4.1 Drivers of energy communities

Although the drivers of energy communities were not contained in the scope of this research, however during data analysis, it is noted as a significant element to reveal the factors leading to the development of the investigated energy cooperative case study. Therefore, the author has included them (see Figure 9), namely *climate change and environmental commitment, fossil-based energy generation, green energy and lifestyle.* Moreover, the distribution percentage of the codes in the category of drivers is illustrated (see Figure 10).

	Count	% Codes	Cases	% Cases
Drivers				
Climate Change and environmental commitment	7	4.2%	4	100.0%
Fossil-based energy generation	5	3.0%	4	100.0%
Green energy and lifestyle	8	4.8%	3	75.0%

Figure 9: The category of drivers and codes flow (Author-generated via QDA Miner Lite).

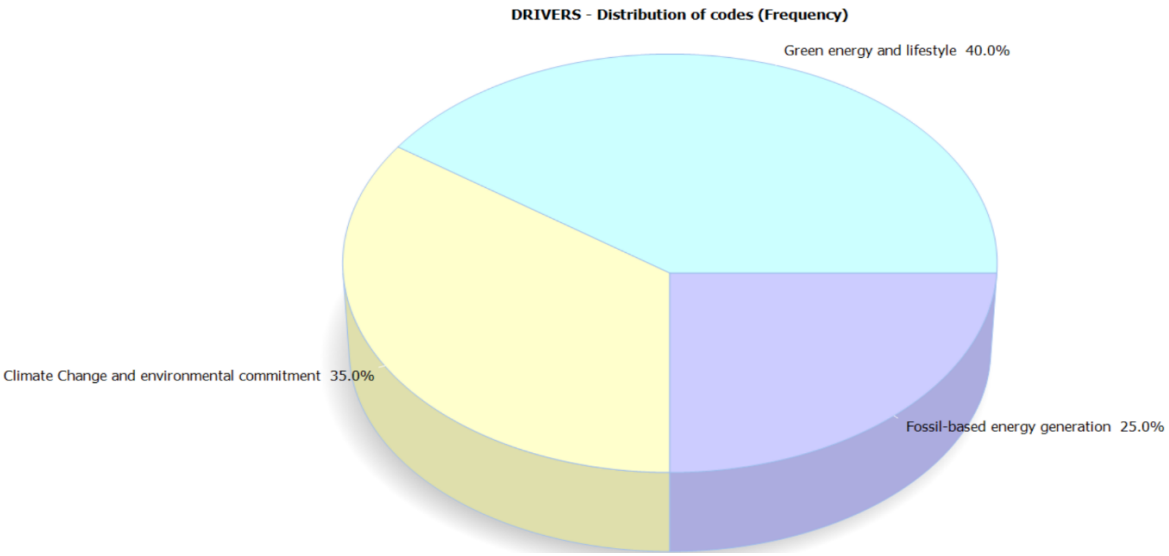


Figure 10: The distribution percentage of the codes in drivers’ category (Author-generated via QDA Miner Lite).

4.1.1 Climate change and environmental commitment

It can be seen from Figures 9 and 10 that the second-most important factor driving the establishment of energy cooperative with 7 quotations was climate change and environmental commitment, likewise other energy cooperative counterparts. As in line with (Soeiro & Ferreira Dias, 2020b), research outputs revealed and emphasized that the most crucial reason for the emergence of energy cooperatives is ethical and environmental commitment. The research participant 1 (RP1) highlighted that: *"I founded the Troya Environment Association in 2009 with my seven friends to convey climate change issues to local people and carry out activities. There were two factors that triggered us during these activities. The first of these is fossil-driven energy production, one of the most important causes of climate change. Therefore, we focused on how we can organize energy production modes consisting of renewable energy sources."* Concerns about environmental degradation caused by existing energy production methods are additionally mentioned by (RP4): *"At that time, there were two thermal power plants in Çanakkale, and due to this reason, there was air pollution, loss of productivity in the surrounding lands, and the villagers' complaints."*

Furthermore, one of the research participants (RP2) further added: "*People who say that the share of renewable energy should be much higher also worry about climate change. We are also, for example, people who have adopted renewable energy sources instead of fossil powers, worry about climate change, are sensitive to the environment, and pay attention to their consumption in this direction. These are all interconnected things.*" (RP3) supported the idea above by alluding that: *"My story with energy cooperatives began with being more conscious about the environment and learning more about the environment. As a life purpose; When I asked why am I in this world, it started with "I need to do something for the environment and nature."*

4.1.2 Fossil-based energy generation

The fewest quotations were identified for the fossil-based energy generation code and accounted for 5 in the drivers' category (see Figures 9 and 10). Mainly it is due to the establishment of several coal-fired thermal power plants in the territory where the energy cooperative is currently based. According to (Caramizaru et al., 2020) community energy's origin is commonly related to environmentalist movements driven by anti-nuclear sensations. The reflection of similar sentiments can be found in Turkey's energy community development considering the RP1's previous response involving the foundation of the Troya Environment Association in 2009. Moreover, (RP1) is also underlined that: *"within the scope of the regional development program carried out in Çanakkale*

in 2012, it was decided to build 14 thermal power plants in Çanakkale's Biga region. In order to prevent this, we carried out activities on the spread of renewable energy and its adaptation to society." In addition to this, while (RP2) underlying the intersection of fossil-based energy generation and climate change further stressed that: *"as I just said, one of the things that we are most worried about, who say that we should switch from fossil fuels to renewable energy, is climate change. The two are very interconnected."* This statement was also emphasized by another research participant (RP4): *"Our story started in 2012-2013 when the government made a plan scale of 1/5000 in Çanakkale and Balıkesir regions. At that time, 14-15 thermal power plants were planned to be built in Çanakkale. After all, with thermal, you are trying to get energy from there by using fossil fuels."*

4.1.3 Green energy and lifestyle

Regarding drivers in the development of the energy cooperative, the most noteworthy driver was labeled as green energy and lifestyle accounted for 40% of the total distribution of drivers. While clarifying the variousness of drivers in community renewable energy, Bauwens, (2016) argued that a community of interest is represented by some common bond such as a shared feeling of attachment in specific matters. Hence, the strongest bonds for the research participants are the similar characteristics in their lifestyle and shared understanding of green energy. Regarding this, when the government decided to build thermal power plants in the region, research participant (RP4) underlined this situation with the following quotation: *"While we were thinking about what we could do, of course, none of us had a style of going out and protesting – we decided to produce clean energy ourselves and sustainably use renewable energy. Then we thought about whether this cooperative model is possible."* One of the research participants (RP2) noted that: *"Green energy is ideal for us, both in terms of my profession (electrical and electronic engineering) and my perspective on life. We are aware that this is a more challenging production and consumption process. We started such a project together with our friends because the idea of cooperative, green energy and renewable energy are also suitable for our lives."* In addition to that (RP3) reinforced the comment above, who stated: *"While fossil resources are dug up and harmed to nature, on the one hand, energy cooperatives are a much cheaper, clean, non-harming formula that brings different people together, is easy to manufacture, durable, and does not produce waste."*

Furthermore, several participants stated that green energy and lifestyles are major drivers of their engagement to energy cooperatives. These perspectives are expressed in Table 1 below.

Table 1: Excerpts on green energy and lifestyle

Participant	Excerpt
RP4	*"...the priority point of our cooperative; is knowing that it puts clean energy replacing what we consume."*
RP2	*"People who think like us and are interested in renewable energy also prefer products, for example, not from Chile but produced in the neighboring village, to support local producers."*

Source: Author-generated

4.2 International collaboration for dissemination of EC

The contribution of multiple international collaborations was noted by several participants as a critical element of the development of the energy cooperative. Therefore, the category of international collaboration with 4 codes (see Figure 11) has been added to deepen the analysis and enrich the research quality. Furthermore, the distribution of all relevant quotations is illustrated (see Figure 12).

	Count	% Codes	Cases	% Cases
International Collaboration				
Heinrich Böll	1	0.6%	1	25.0%
EU Projects	8	4.8%	4	100.0%
REScoop	2	1.2%	1	25.0%
Thesis and research collaboration	2	1.2%	1	25.0%

Figure 11: The category of international collaboration and codes flow (Author-generated via QDA Miner Lite).

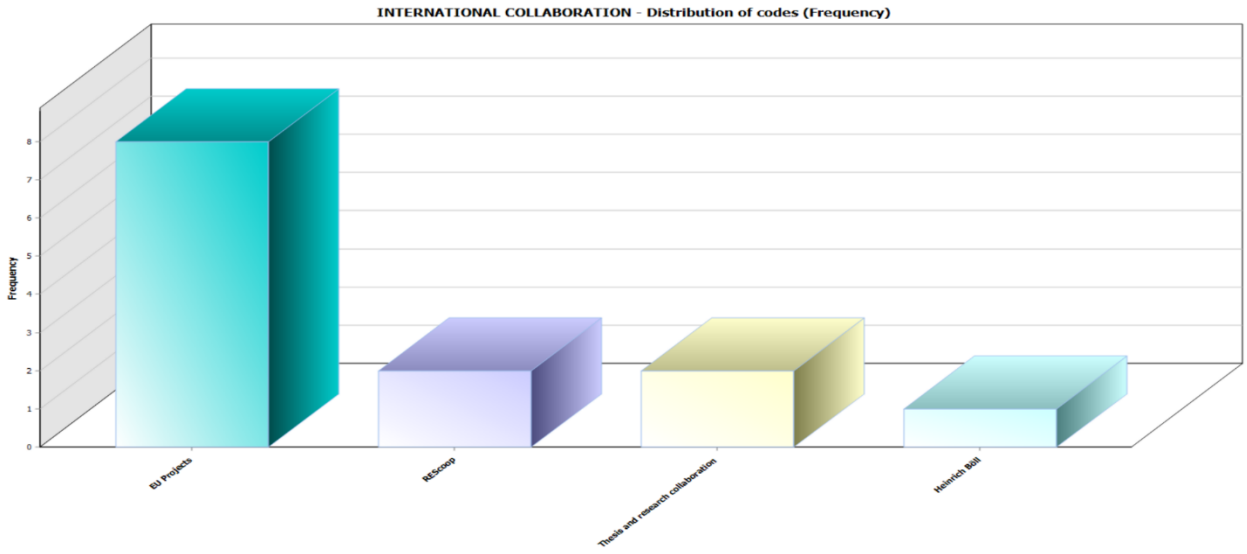


Figure 12: The distribution of quotations based on the codes in international collaboration category (Author-generated via QDA Miner Lite).

4.2.1 Heinrich Böll

The Heinrich Böll Foundation is a German legally independent green political foundation. The foundation's primary considerations involve green visions and projects, and activities are organized for policy reforms, and through international networks, it contributes to political and socioeconomic transformations via civic engagement and political dialogue (Heinrich Böll Foundation). In this regard (RP1), while explaining the collaborations they created, they carried out activities for the first time to bring the idea of a renewable energy cooperative to Turkey. (RP1) stated: *"We started our lobbying work on what we could do. One of our biggest supporters in this regard has been the Turkish branch of the Heinrich Böll Foundation."*

4.2.2 EU projects

Under the international collaboration category, with 8 quotations mentioned by all research participants (see Figure 11), the EU projects code has been identified as the most significant factor (see Figure 12) in disseminating the energy cooperatives in Turkey. In the beginning, when cooperative members faced the situation of thermal power plants installation in their region, how important it was for them to participate in EU projects, one of the research participants (RP1) expressed: "*We did not know the energy community or energy cooperative concepts. As part of the Erasmus project, we carried out in 2012, we discovered the concept of energy cooperative in Belgium and had the opportunity to examine their practices."* The role and contribution of EU projects in terms of knowledge and practice sharing about different legislations and business models from foreign countries, (RP3) highlighted: *"We learned a lot thanks to EU projects. For example, we learned that the legislation is more flexible in Georgia. We had the chance to learn a lot of new models that there are very advanced models in the Netherlands and Germany. They created very different models for the economic generation and how to reach local citizens. For instance, when you get stuck with the legislation, you can use those models as an alternative. Thanks to these EU projects, you have the chance to learn new models about what can be done."*

On the other hand, the abovementioned quotation is supported considering the international characteristics of cooperative concept by a statement from (RP2): *"Through EU projects, we communicate with other international cooperatives and try to get to know us. I also think that, in essence, energy cooperatives are an international social network as a structure."* Furthermore, the potential implementation of the practices and research outputs of the EU projects' on energy cooperatives, possible legislative contribution deriving from the EU projects' examples to

overcome Turkey's unstable legislative framework, pointed out by another research participant (RE1): "*In this sense (legislative), we intensively follow the activities and studies in Europe and try to implement them with our projects. For example, there is a project that our cooperative has just started and approved under the European Union's Horizon 2020 research and innovation programme. In this project, the cooperative partners' houses will now be in contact with each other. Everyone will see each other's energy production and consumption, and in this way, we will increase energy savings and efficiency. Moreover, with this project, we will design a model in which these houses, which are partners of the cooperative, take control of energy-related activities, and this project will last for two years in total."* Moreover, as at the Isle of Eigg island research in Scotland, Chmiel et al. (2015) revealed ensuring the reliable electricity supply in off-grid settings. The same research further involves lessons, especially for the developing countries' energy security manners. The policy-makers and users have not been familiar with successful models of an off-grid electricity supply. Thus, it should not be considered a momentary or a pre-electrification choice, causing inaccurate or wrong impressions influencing their decision-making. In this regard, one of the research participants mentioned the upcoming project: *"For example, there is a project which we are currently discussing with Greece on energy independence in the islands. This project is based on the citizens living on the island to generate their own electricity needs and exchange energy without being connected to the grid."*

4.2.3 REScoop

REScoop is the European federation of renewable energy cooperatives, founded in 2011 in Belgium. It empowers energy cooperatives by raising their voices in the European energy debate. Their primary objectives are the following: representation of REC and CEC to European policy-making processes, assisting both established and at the start-up phase of cooperatives, facilitation of international exchanges and cooperation among energy cooperatives, promotion of the cooperative business model in the energy sector (REScoop.eu). Moreover, Coen (2010) claimed that some citizen-driven energy initiatives have arisen under the name of REScoop to oppose the centralized corporate hegemony in the energy sector and protect available lands Huybrechts & Mertens, (2011). In this regard, REScoop has also played a crucial role in disseminating the bottom-up citizen-driven energy cooperatives by having 2 quotations, as in the case of Troya Renewable Energy Cooperative in Turkey. Therefore, the author included the code of REScoop to better shed light on the development of energy cooperatives since the (RP1) stated that: *"In the meeting organized by REScoop in 2014, where the experiences of energy cooperatives from various*

European countries were shared, we had the opportunity to get to know energy communities/cooperatives closely." The same research participant to underline the importance of this international collaboration for them also added: *"As Troya Energy Cooperative, I need to highlight that one of our most important features is that we are the only partner of Rescoop in Turkey."*

4.2.4 Thesis and research collaboration

There are 2 quotations attributed to the thesis and research collaboration code. At the end of the interviews, the research participants were asked whether they would add final comments and/or examples. Consequently, thesis and research collaboration code has appeared a vital component in developing academic and sector knowledge about energy cooperatives, as Engelken et al. (2016) argued that as transfer of technical know-how from the industrialized world to developing countries in the case of Turkey. (RP1) highlighted the limited and inadequate information about renewable energy communities in Turkish academia and nonetheless mentioned the research activities they carry out to overcome this challenge by remarking: *"Since the concept of renewable energy cooperatives is very new, we want the knowledge in this field to be developed and disseminated quickly. We have been involved in 3 international studies together with you. We had the opportunity to support these three projects about the Troya Energy Cooperative. One of them was to be part of a doctoral thesis in Germany. We took part in another Energy Cooperatives thesis conducted at the University of Melbourne, Australia."*

Furthermore, the limited knowledge in the energy cooperative sector is stressed with the perspective expressed in Table 2 below.

Table 2: Excerpts on thesis and research collaboration

Participant	Excerpt
RP1	*"...it makes us happy and proud to be a part of the research subjects of our work in the international arena. However, at the same time, this is an indication of our inadequacy as in Turkey. Unfortunately, there are no academic studies in this field in Turkey."*

Source: Author-generated

4.3 Initiatives for development of EC in Turkey

This section presents the research respondents' statements on the initiatives taken for the initial phases of energy cooperatives and advancing their condition in Turkey. Therefore, the energy cooperatives' development flow is determined under the initiatives category with 2 codes (see Figure 13). Moreover, the distribution of all relevant quotations is displayed (see Figure 14).

	Count	% Codes	Cases	% Cases
Iniatiatives				
Organizing conferences on ECoop	11	6.7%	4	100.0%
Ministries and results	4	2.4%	2	50.0%

Figure 13: The category of initiatives and codes flow (Author-generated via QDA Miner Lite).

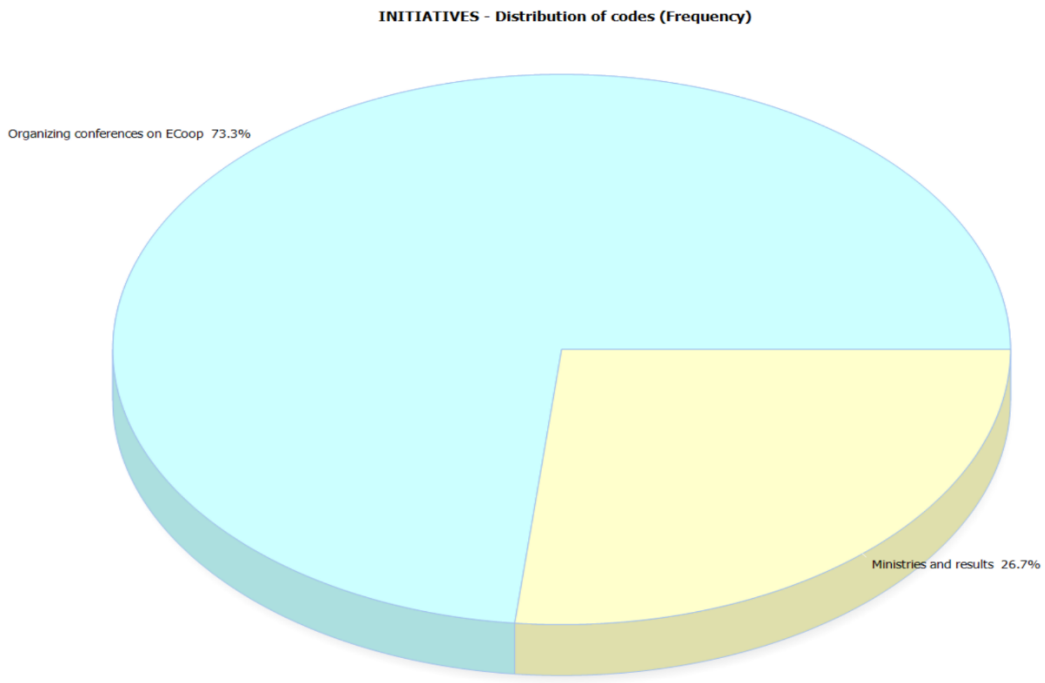


Figure 14: The distribution of quotations based on the codes in initiatives category (Author-generated via QDA Miner Lite)

4.3.1 Ministries and results

There are 4 quotes associated with the ministries and results code (see Figure 13); while one of them represents the first initiative taken by the research participants, the rest rely on the initiatives' results. In the section above (see section 4.2.2), as it is explained by research participants how they are first met with the concept of energy cooperative during the Erasmus project carried out in Belgium. Further, (RP1) continued with the statement below: *"After our arrival, we focused on the need for energy cooperatives to be in Turkey. We started negotiations with the Ministry of Commerce and the Ministry of Energy."* Several elements influence the emergence and success of energy communities, one of which is enabling energy policy argued by Ruggiero et al. (2019).

Regarding this matter (RP1) underlined that *"in Turkey, the concept of energy cooperatives was included in the unlicensed energy regulation for the first time in 2016, especially after the meetings we held with the ministries and the conference we held in 2014."* This quotation reflects the first result of the initiative taken by research participants in Turkish energy policy regarding the energy cooperatives. Reinforcing the above statement, another research participant (RP2) emphasized the importance of solidarity with other cooperatives in various topics, stating: *"We have published a booklet includes topics such as how to establish an energy cooperative, what to do, what the regulations are. Together with ourselves, we are trying to do all we can to help them develop, establish and start electricity production in other cooperatives."* In addition, one of the research participants not only supports the argument above but also further explains how their initiative has led to the development of energy cooperatives and their current situation in Turkey. Hence, (RP1) remarked: *"Then, after our initiative, ten energy cooperatives were established in 2016. We established our energy cooperative in 2017. Afterward, we continued to work on publications and information in this field and follow the updates. Currently, 50 energy cooperatives have been established throughout Turkey, and we are in contact with them and have collaborations with all of them."*

4.3.2 Organizing conferences on ECoop

The energy cooperative is currently conducting the most significant activity under the initiative category (see Figure 14), with 73.3% organizing annually held international conferences on energy communities. All the research participants in diverse perspectives mentioned the importance of organizing conferences. Thus, it is considered a crucial aspect of the analyzed case study to add in the research as it reveals insights to shed light on the development of the energy cooperative. he research's finding is in line with van der Schoor & Scholtens (2015) claimed that intense activities,

such as organizing an annual international conference in our case, are seen here as a symbol of members' dedication to the local energy initiative and its goals. In this regard, how this initiative has started is explained like (RP1): *"In 2016, we started to organize international conferences for the dissemination of energy cooperatives. We organized the first conference by inviting experts from 4 countries and we wanted to see how they established energy cooperatives, what they did."*

Furthermore, another research participant (RP4) expressed the opinions about the conferences: *"Although we did not actively produce energy, as a cooperative for about 5 years, we did a lot of things within the association to be encouraging or informative on these issues (energy transition, active participation in this process) with international participation."* In addition to the international characteristics of the conference, (RP2) also highlighted the local dimension of the conferences: *"Annually we have an international conference on the need to support energy cooperatives in Turkey, what the obstacles are in front of them, how it can be done and how it is done in the world. We do it together with various local environmental associations."* Sharing experiences, ideas and practices through formal and informal meetings lead to an increase from local people in engaging energy cooperatives as (RP3) stated its story how the participation decision was driven: *"At our annual conferences, many seminars are held open to 16 participants from 8 countries and, of course, citizens as well. I started by joining them, then I found myself in the cooperative."* As a result of the organized conferences on EC, what was aimed, how they were carried out, what were the outputs, and the contribution of the set of conferences to worldwide energy cooperatives diffusion was highlighted by (RP1): "*We invite all energy cooperatives from Turkey and energy cooperatives from abroad and try to ensure their experience sharing and interaction through these conferences. These conferences not only contribute to the members of our energy cooperative but also enable them to benefit from both national and international experiences generated in other cooperatives. I certainly believe that this set of conferences is excellent when it comes to the worldwide dissemination of energy cooperatives.*

Finally, the experiences, feelings, and thoughts attached to organizing conferences on EC are emphasized with several perspectives represented in Table 3 below.

Table 3: Excerpts on organizing conferences on EC

Participant	Excerpt
RP1	*"The interest in this conference surprised and delighted us because we realized that we were on the right track."* And *"One of the things we are most proud of is the Energy Cooperatives Conference, which we organize every year."*
RP4	*"We held the first conference in Çanakkale, and many people came from all over Turkey, which surprised us, and it means that people want to learn about energy cooperatives."*
RP3	*"I noticed that some environmental associations helped us with some problems through these conferences. Our souls were fed, and we learned a lot."*

Source: Author-generated

4.4 Members' energy community interpretation

The members' interpretation of what energy community/cooperative means to them, the research found several concepts attached to their understanding and learning. The research of (Pellicer-Sifres et al., 2018) revealed that energy cooperatives' actions hold transformative learning practices. The current study results also demonstrate through the research participants' attribution to the energy community meaning and understanding, which hold potential learning processes for various energy topics. Thus, the category of energy community interpretation added to the current research to reveal in-depth the research participants' understanding with 4 codes (see Figure 15) and the quotations' distribution is illustrated (see Figure 16).

	Count	% Codes	Cases	% Cases
Energy Community Interpretation				
Decision-making	3	1.8%	2	50.0%
Energy transition	1	0.6%	1	25.0%
Energy democracy	4	2.4%	3	75.0%
Energy efficiency	2	1.2%	2	50.0%

Figure 15: The category of energy community interpretation and codes flow (Author-generated via QDA Miner Lite).

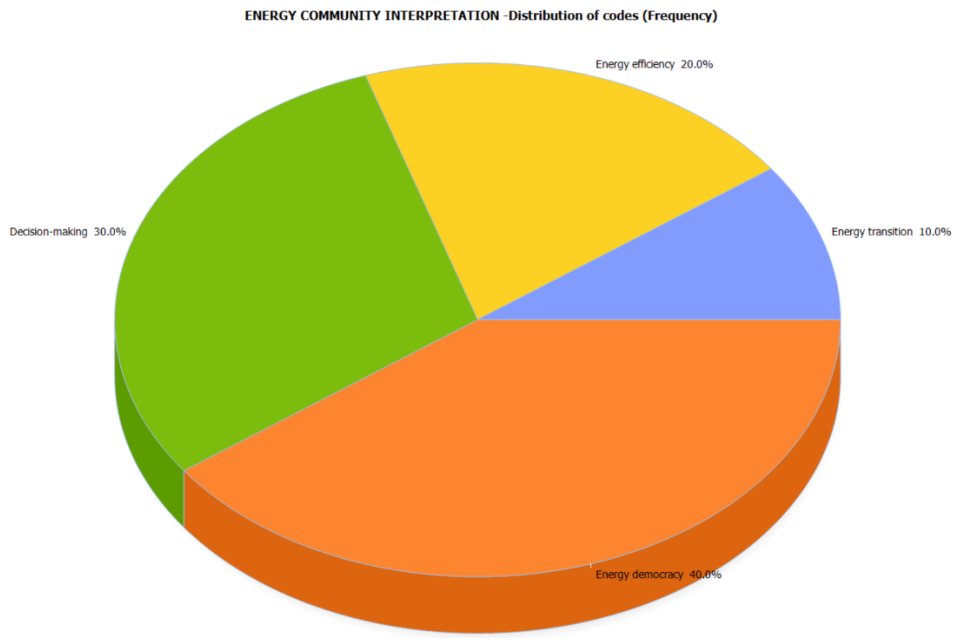


Figure 16: The distribution of quotations in energy community interpretation category (Author-generated via QDA Miner Lite)

4.4.1 Decision-making

Based on the research participants' answers, the decision-making code included 3 quotations in total (see Figure 15) and became the second most mentioned code (see Figure 16). The research conducted by Karunathhilake et al. (2019) showed that community members needed to be involved in energy planning processes for optimal outcomes. This current research discovered the same as one of the research participants (RP1) highlighted: "*The more effective use of renewable energy and the ability of local people to decide on their energy production indicate how much their own needs should be and how they can be organized."* The same research participant further (RP1) echoed: *"I think it is essential that citizens are at the decision-making point of all energy fields, not just in terms of renewables."* On the other hand, how diverse motives affect internal decision-making processes on energy cooperatives emergence and whether they are in line with international counterparts' experiences are stated by (RP4): *"Ours is not like the first energy cooperatives in Europe or U.S. Since the government did not transmit the electricity there, people came together and generated their electricity. It is based on real need. Instead, the idea of ours is being both clean and sustainable, a model in this sense."*

4.4.2 Energy transition

Only a quotation is attached to the energy transition code and placed as the least mentioned under the energy community interpretation category (see Figures 15 and 16). An essential component is

increasingly allocated for energy communities in the energy transition towards renewable-based energy production, argued by Moroni et al. (2019) and the findings of this research are in accordance with. The research participant's (RP1) perspective on the intersection of energy transition and energy cooperatives stated*: "I think that energy cooperatives are fundamental in terms of an energy transformation, moving away from fossil fuels and especially nuclear energy, together with the forms of renewable energy production suitable for the conditions of that region."*

4.4.3 Energy democracy

%75 of the research participants mentioned the energy democracy code when the interpretation of energy communities was questioned. 4 quotations were identified (see Figure 15), and the distribution of the codes is accounted for %40 (see Figure 16) for energy democracy code. Hence, it is the most noted code under the energy community interpretation category. 'While the extent to which society should be included in forming energy policy and its implementation is highly contested, there is broad agreement that energy policy can no longer be the exclusive concern of public institutions and utilities,' stated by Mullally et al. (2018) which leads to the arrival of the concept of *energy democracy.* Additionally, Diestelmeier, L., (2021) claimed that energy communities could potentially create a unit supporting sustainable energy democracy. In this respect, the abovementioned citations align with the following findings, such as (RP1) stated: *"We see the energy cooperative as an essential element in promoting and making the concept of energy democracy widespread."*

Moreover, one of the research participants (RP2) at the intersection of share purchase and consequent voting rights in the energy cooperatives model commented: *"First of all, the structure we call cooperative is democratic. Even if 90% of the shares are yours, you still have 1 vote. So, this is a good model for people who think like us. Therefore, this democratic structure in our cooperative is of value to us."* This was further supported by another respondent (RP3) who pointed out the feature of energy cooperative in reaching to the public for renewable energy generation: *"Therefore, the cooperative has an inherently democratic identity. This is like democracy in energy. I think it is an area where it can reach the public or where smaller production can be done with smaller groups."*

4.4.4 Energy efficiency

Two quotations are identified under the community member interpretation category (see Figure 15) for the energy efficiency; thus, it is placed as the third mentioned code (see Figure 16). One of

the aims of REScoop is defined to empower energy cooperatives in increasing energy efficiency (REScoop.eu). For instance, Ecopower, a Belgian renewable energy cooperative, is focused on energy efficiency, and its members have lowered their electricity consumption by an average of 50% over the past 10 years (Friends of the Earth Europe, 2018). Considering this, (RP2) declared: "*Energy cooperatives are a model that tries to encourage citizens for energy efficiency and savings by covering its members' consumption and selling the surplus to the grid."* Another research participant (RP4) further supported the statement above by referring to the possible economic generation via selling the energy surplus to the grid and expressed: *"If the energy cooperative wants to earn more, it should consume less energy to increase its profitability. Therefore, all energy cooperatives encourage energy-saving and raise awareness in energy efficiency. Because the energy you consume changes from the bulb used to the refrigerator. Therefore, I can say that our energy cooperative contributed in this sense."*

4.5 Barriers the energy cooperatives facing in Turkey

This study makes a novel contribution by not just categorizing the barriers according to the four areas suggested by Weber (1997) and also applied by Brummer (2018) institutional, obstacles conditioned by market, organizational, to behavioural barriers facing Troya renewable energy cooperative specifically, but also extending it to overall Turkish energy cooperatives' barriers with the light of the current study's findings. The figure below (see Figure 18) presents the category of barriers with 4 codes created based on the aforementioned classifications outlined by scholars. Furthermore, the distribution of all identified quotations within the scope of 4 codes is presented (see Figure 19).

	Count	% Codes	Cases	% Cases
Barriers				
Institutional barriers	21	12.7%	4	100.0%
Obstacles conditioned by market	7	4.2%	4	100.0%
Organizational barriers	5	3.0%	3	75.0%
Behavioural barriers	8	4.8%	4	100.0%

Figure 17: The category of barriers and codes flow (Author-generated via QDA Miner Lite).

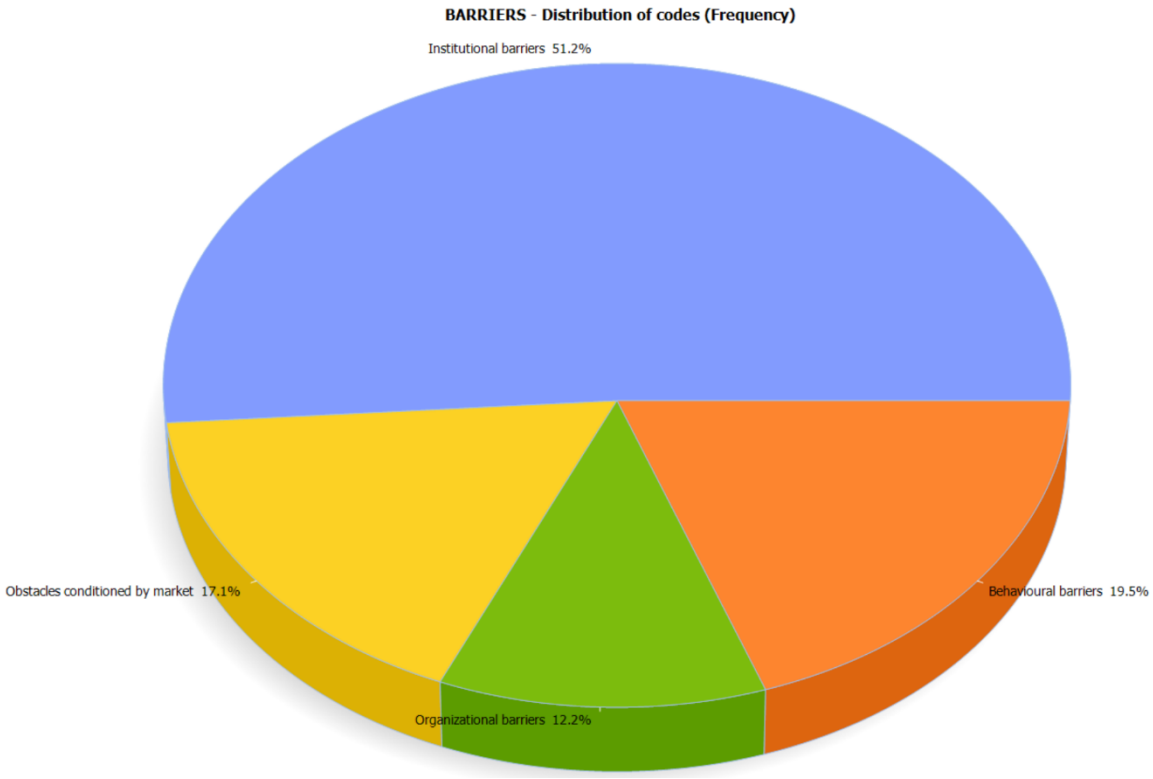


Figure 18: The distribution of quotations in barriers category (Author-generated via QDA Miner Lite)

4.5.1 Institutional barriers

All participants mentioned the institutional barrier code. Moreover, more than half of the quotations out of 41 in total are identified under this code (see Figure 17); hence it became the most mentioned code (see Figure 18) in the barriers category. Considering the overall regulatory framework, it was revealed by (RP1): "*Often regulatory framework changes in Turkey, and generally, these regulations are in favor of large energy producers.*" Additionally, the same research participant (RP1) is further emphasized regarding the initial phase of the energy cooperative and the unexistence of regulatory framework: *"The concept of energy cooperative was not included in the legal legislation in Turkey until 2016. Individual producers had the opportunity to produce electricity within the regulatory framework for unlicensed energy production, and the concept of energy cooperative is introduced into this regulatory framework."*

Consequently, the hampering regulatory barriers and uncertainties negatively influenced the process of renewable power plants installation mentioned by (RP4): *"In 2017, we established our cooperative. We are not an active producing cooperative at the moment. We found land for installation in 2019 and completed our application for complete installation in April. However, on May 9, the government changed the regulation again. This time, some regulations prevent*

cooperatives. Because they said that everyone should be at a common meter point for production and consumption, but this was not very possible. Because in the previous regulation, cooperatives can be established within the same distribution region with members and can build their power plants on land. The new regulation prevented this, and we could not rent the land that we were planning to buy then." Regarding the same challenges, this statement is further supported by another research participant (RP3): *"We encountered many bureaucratic obstacles during the establishment phase, the regulation was changed, and the feed-in-tariff was abolished. Then again, there was a change in the feed-in tariff, but this time we failed to get the land we found to install power plants, and this situation lasted for 1-2 years."* These four findings corroborated by Biresselioglu et al. (2021), who stated that the production of electricity for consumption purposes within their premises and selling any excess to the market is limited to a group of people for which consumption can be measured via the common meter and same tariff; thus, this framework practically only enables a few households and commercial entities to carry out the mentioned energy activities.

Another research participant (RP2) further focused on how inconsistent, quick-changing official announcements and regulation changes negatively affected the investment decision policies of energy cooperatives: *"Not being able to do business on the legally stable ground is a huge obstacle. For example, the government said that with a recent decision, the state will not take 75% of the distribution price for 10 years for energy cooperatives established until 31.12.2017. Until this decision, cooperatives and investors borrowed in foreign currency, took loans, went through very difficult processes, and raised their payments until this date. However, 5 years after this decision, the government announced that it abolished this decision. It is a serious problem that the state now gives such a guarantee and then suddenly removes it."* The feed-in-tariff incentive scheme is one of the most crucial aspects facilitating the dissemination of energy cooperatives. Finally, one of the research participants (RP1) elaborated on how this incentive scheme does not favor them and the price jump in electricity distribution cost: *"The existing energy regulations in Turkey can change very quickly, without mutual consultation with the relevant parties. For example, if energy cooperatives consumed 50 units of the 100 units of electricity they produced in 2016 by the cooperative members, they could sell the remaining 50 units for 0.12 cents per kWh. In 2019, this regulation changed, and the new regulation decided that the payment would be made in local currency (Turkish Lira), not in Euro. Due to the lack of a stable regulation, people were worried. Also, companies that carry out energy distribution activities in the Turkish energy markets have*

increased the transmission cost of the energy they have purchased from energy cooperatives by 370% as of January 1, 2021. Therefore, this change from energy distribution companies has caused significant economic damage to energy cooperatives. Currently, the most significant lobbying work is going on in this area." These two findings are consistent with Özgül et al. (2020), who argued that the "purchase guarantee" revocation before September 2020 had concerned many investors in RECs. Thus, it is identified as a significant barrier in RECs diffusion since many energy cooperatives were founded, considering the purchasing agreement and incentives from the Turkish government. In this fragile environment, the law of RECs is still inadequate. Furthermore, these findings also align with Boon & Dieperink (2014), who claimed that institutional barriers might emerge from lengthy legal processes and/or the lack of a long-term and consistent policy framework.

Finally, several viewpoints are expressed in Table 4 below regarding how a lack of enabling regulatory framework hinders Turkey's development of energy cooperatives.

Table 4: Excerpts on institutional barriers

Participant	Excerpt
RP4	*"The regulation changes demoralized us. They changed it again in May 2022. With the new regulation, it looks like we can install the power plant, although it is controversial."*
RP2	*"…nevertheless, when regulations come into play, we get stuck. There is not much we can do there.*
RP3	*"We constantly pay taxes, but we don't have panels."* and *"Our obstacles are not only bureaucratic obstacles but also serious policy obstacles. The nationwide implementation had a devastating effect on us."*
RP1	*"Within the framework of the unlicensed energy regulation published in 2014, the government has given a feed-in-tariff for the electricity you have produced for ten years. However, it does not give any information about what we will face after 2024 when the regulation is terminated. Thus, this is one of the most significant handicaps we face."*

Source: Author-generated

4.5.2 Obstacles conditioned by market

The obstacles conditioned by market code included 7 codes (see Figure 17) and with slightly more than 17% placed as the third-most mentioned one under the barriers category. The obstacles conditioned by market code included 7 codes (see Figure 18), with slightly more than 17%, it is placed as the third-most mentioned one under the barriers category. Considering the overall energy market characteristics, it was mentioned by (RP4): *"The energy sector is a vast industry all over the world. Even if this sector is not entirely monopolized, it is close to monopoly by very large groups." This statement is further echoed by (RP1): "Since 2018, energy cooperatives who benefited from the unlicensed energy regulation to produce their energy faced a severe disadvantage when selling surplus energy to the grid. The legal structure in Turkey has never been an incentive for energy cooperatives. The incentives applied were only for large licensed energy producers. For example, when you say that instead of 1 MW, I want to produce 40 MW of electricity, and I will install 100 windmills. All the procedures will be made more accessible for you. Even lands will be allocated free of charge for the construction of energy technologies."* These findings are consistent with B. Koirala et at., (2018), who argued that big, centralized companies dominate the electricity sector in many countries. Hence, decentralized energy cooperatives are challenged to overcome regulatory barriers in the energy market that usually favor large corporations. However, contrary to dominant perspectives on obstacles deriving from market conditions, one of the participants (RP4) expressed: *"The national electricity distribution company in our region offered sponsorship for one of our energy cooperatives conferences. They initiated new seminars. Their approach is more moderate right now."*

Ultimately, some perspectives are indicated in Table 5 below in terms of obstacles deriving from the energy market in Turkey.

Table 5: Excerpts on obstacles conditioned by market

Participant	Excerpt
RP4	*"The electricity distribution cost has also increased a lot, and it creates deterrents to small producers like energy cooperatives rather than incentives.*
RP1	*"Nevertheless, when it comes to small-scale individual energy producers, the answer we usually get is to produce as much energy as you can produce with your equity capital or bank loans. Currently, it is not*

	possible to talk about any incentive mechanism for post-energy production in the energy market.
RP2	*"The fact that this state does not have a policy and abandons the decisions it has committed are serious problems. Therefore, the biggest problem in Turkey is the state's lack of a stable policy and opinion on this issue."*

Source: Author-generated

4.5.3 Organizational barriers

The organizational barriers included 5 codes (see Figure 17) and became the least referred barrier code (see Figure 18). However, it should be considered that none of the findings in this code are referred to Troya Renewable Energy's organizational barriers for their organization itself. Instead, research participants' observations that the other energy cooperatives face. Hence, one of the research participants (RP1) indicated: *"Although we do not experience any organizational problems due to the 3-year research period I mentioned above, many energy cooperatives around us are experiencing such difficulties. As I said before, we are aware of the technology-intensive character of renewable energy and the difficulties related to it. Thus, we feel responsible for explaining these technical elements to our friends who decided to establish an energy cooperative with their members and partners. In this regard, we sometimes attend planning meetings to contribute to their processes and provide support on these technical issues, which is precisely one of the missions of the Troya Renewable Energy Cooperative."* Another research participant (RP3) highlighted the organizational barrier due to organizational incapability, indicated: *"We have not experienced any organizational barriers. However, when we gathered, we heard some stories from other cooperatives. For instance, one energy cooperative worked on electricity generation from bio-organic waste due to insufficient knowledge about technicalities of the type; they struggled to explain their energy* production to citizens." These findings are corroborated with Herbes et al. (2017), who argued that the lack of know-how or competencies represents one of the most mentioned constraints, especially when the business models require more know-how than the competencies of managers.

4.5.4 Behavioural barriers

The behavioural barriers with 8 codes (see Figure 17) were recognized as the second-most noted code (see Figure 18). One of the research participants (RP1) argued: "*One of Turkey's most critical*

barriers is the following; When the word cooperative is mentioned in Turkey, it has always caused a negative perception. Cooperatives' perception was characterized as a political element of communism and evaluated as an issue that should be avoided." This finding aligns with Huybrechts, B., & Mertens, S. (2014). They argued that understanding of the cooperative was a serious issue to the development of RE cooperatives, especially in Eastern Europe, due to moral legitimacy, with the attribution of this model as 'socialist' ideas.

Moreover, one of the other participants (RP2) declared: *"The word cooperative is already a word that is perceived as antipathetic in Turkey, because housing cooperatives scammed people and ran away, and people experienced inefficiently functioning agriculture cooperatives. Hence, due to these problems, cooperatives are not generally welcomed."* Moreover, the statement above is supported by another research participant (RP4) who stated: *"The country is not unfamiliar with the concept of cooperatives. Housing cooperatives were very popular in the 90s. Of course, there are good examples, moreover, if we think about rural areas, agricultural cooperatives are quite common, and there are good examples, but overall, they are less than negative examples."* These findings are corroborated with Özgül et al. (2020), who claimed that the bias with cooperatives is an essential explanation as people are mainly apathetic to the cooperative concept primarily due to the housing cooperatives failure in the 1990s; thus, it can be concluded as a social barrier.

On the other hand, socially-driven investment time horizon understanding thus its consequences as behavioural barriers in energy cooperatives is firstly mentioned by (RP1): *"People who plan to join the cooperative need to undertake long-term investments by the nature of energy cooperatives. Nevertheless, I do not think citizens in Turkey are good at making long-term plans. Usually, they are focused on short-term plans."* This is further stated by (RP4): *"Frankly, when we held a meeting in agricultural cooperatives in the villages, they were not very agreeable with energy cooperatives. Either this system was not suitable for them, or the investment costs were too high, but when you think carefully, the initial costs could be covered by the PV system itself in 6-7 years or 10 years at the latest. I do not know, and maybe we need to explain a little more."*

Finally, some of the views on behavioural barriers are represented in Table 6 below about the impediments to energy cooperatives deriving from socially-driven bias.

Table 6: Excerpts on behavioural barriers

Participant	Excerpt
RP2	*"When we say we have established a cooperative, we feel that people are startled from the first sentence. Unfortunately, cooperatives in Turkey have a psychological barrier."*
RP3	*"We encounter behavioral barriers when meeting new members, making offers, or receiving requests. For example, there are questions like "when will we start making money, I have a land, can we install it there?" When they see it as just a trade issue, you need to get off the table because economic ambitions are not our first premise."*

Source: Author-generated

4.6 Benefits deriving from the energy cooperatives in Turkey

This study constructs a novel contribution by applying Brummer's (2018) conceptual benefit categories in seven distinct aspects. Namely, economic, education and acceptance, climate protection and sustainability, community building and self-realization, RE generation targets, innovation additionally based on the research findings, women's empowerment and gender equality has been added to better shed light on the benefits generated from Troya Renewable Energy Cooperative but also overall the energy cooperatives in Turkey. The figure below (see Figure 19) illustrates the category of benefits with 7 codes suggested by Brummer and 1 code created by the author, reaching 8 codes in total. These codes distribution is with specified quotations are given below (see Figure 20).

	Count	% Codes	Cases	% Cases
Benefits				
Economic	8	4.8%	4	100.0%
Education and acceptance	7	4.2%	4	100.0%
Participation	9	5.5%	4	100.0%
Climate protection and sustainability	5	3.0%	4	100.0%
Community building and self-realization	12	7.3%	3	75.0%
RE generation targets	8	4.8%	4	100.0%
Innovation	10	6.1%	4	100.0%
Women's empowerment and gender equality	5	3.0%	3	75.0%

Figure 19: The category of benefits and codes flow (Author-generated via QDA Miner Lite).

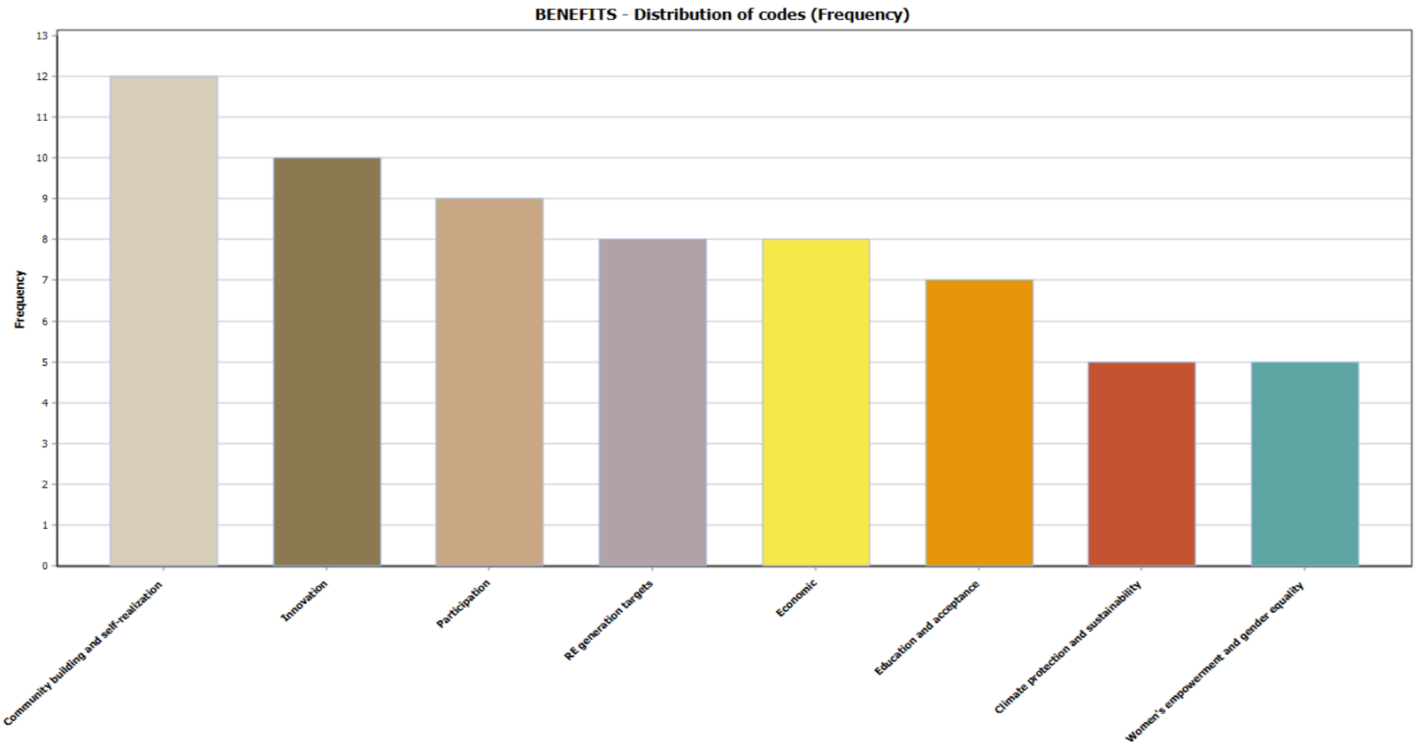


Figure 20: The distribution of quotations in benefits category (Author-generated via QDA Miner Lite)

4.6.1 Economic

By all the research participants' views, economic benefits included 8 codes (see Figure 19) and placed 4th most mentioned code (see Figure 20), sharing the ranking with RE generation code under the benefits category. One of the research participants (RP1) underlined: *"We have not yet realized electricity generation, and I cannot say that we distribute a certain number of dividends to our members or dedicate a part of our income to social responsibility projects in energy manners. However, our primary goal is to ensure that people have a cheaper and cleaner energy source and finally to provide economical income for people at the same time. Indeed, when we say economic income, we should not think of a significant number of dividends. We will reduce your electricity bill in direct proportion to your cooperative shares, and we will pay the remaining amount as a profit share."* The abovementioned quotation is further supported by another research participant (RP2), underlying the cooperatives' community-driven feature in comparison to market-driven enterprises: *"There are economic benefits such as a decrease in the amount of the electricity bill and dividend distribution. These are some of the factors that encourage people to participate in the cooperative. Nevertheless, our priority is not to earn much money here. We did not get into this cooperative business with the idea of making a lot of money."* Similar views are also shared by another research participant (RP4) by elaborating more on the economic benefits from the consumption, sale of electricity generated and community-first feelings: *"For example, we have a*

power of 5 kW for our house, but we do not consume all of this 5 kW. Of course, this will make a small economic contribution to the cooperative by selling the excess energy produced to the grid. Maybe new members will be included in the cooperative with these economic contributions, and new facilities will be established. Therefore, it will be a small-scale investment in this sense, but this spiritual pleasure is much more important for us." These findings are in line with the scholars, respectively such as Caramizaru et al. (2020), who argued that the most common economic benefit is seen as reduced energy bills, while Magnani&Osti, (2016) claimed that through the electricity sale to the grid, energy cooperatives generate economic profit. On the other hand, Walker et al. (2010) argued that the lack of trust appears when commercial interests prevail, which is also in line with the study's findings as many of the research participants referred to their priority as different than pure economic gain.

Finally, some views on economic benefits are described in Table 7 below.

Table 7: Excerpts on economic benefits

Participant	Excerpt
RP4	*"It will certainly create some local employment."*
RP3	*"It also provides economic benefits such as I consume what I produce, and when I sell the electricity surplus, I get dividends from what I sell."*

Source: Author-generated

4.6.2 Education and acceptance

All participants expressed their opinions on the education and acceptance code with 7 seven quotations in total (see Figure 19). It is one of the least mentioned benefits in comparison to other benefits (see Figure 20). One of the research participants (RP3) stated the benefits firstly within one's family and its iterative power on education and acceptance: *"First, through the household, these benefits will increase, and if you have student children, anything you say to them will spread five times faster because they are actively social. Secondly, it spreads through conversations and word of mouth in your unique environment."* Secondly, the same research participant (RP3) also underlined the importance of the conferences organized in EC in terms of increasing the knowledge: *"At these conferences, you can get opinions on new topics and have the chance to attend many other pieces of training/seminars. In fact, it is a kind of awareness method, and when the individual becomes conscious, the society also becomes conscious. When we go to the*

conferences, we learn about other projects. For example, after the energy crisis in Denmark, you can learn what the cooperatives were doing with the biowaste consisting of chicken manure." Another research participant (RP1) explicitly emphasized the role energy cooperatives are playing to overcome the challenges in misinformation about RE technologies: *"I believe that energy cooperatives provide many benefits to local communities in this sense. Because the RE cooperative performs very clearly in terms of raising this awareness to the people around it and the local community it is in by producing its energy and sharing this energy more effectively through its partners. One-on-one communication by energy cooperatives with local communities helps increase the level of support for RE technologies by eliminating false or incomplete information about RE technology and equipment."* Another research participant (RP2) focused on how people's opinion and awareness can be expanded in RE technologies manner with the contribution of energy cooperatives: *"Indeed, energy cooperatives generate benefits in terms of education and acceptance of energy technologies. The awareness will be increased about it. When you invite someone, even if they do not join the cooperative, at least they listen to you, and I can see that their perspective on this issue has expanded. Of course, some did not attend when we invited them. Generally, people who are sensitive about this issue listen to you, but regardless they agree or not, what is told has an effect."* These findings are aligned with Walker, B. et al. (2014) and Caramizaru et al. (2020), who argued that people's participation with ownership in energy cooperatives fosters acceptance of renewable energy technologies and further improves the level of education in energy topics.

Finally, some of the benefits under the education and acceptance code and how increased awareness in energy cooperatives generate benefits are underlined with the perspectives in Table 8 below.

Table 7: Excerpts on education and acceptance

Participant	Excerpt
RP4	*"We can talk about benefits such as awareness of energy saving and support for RE technologies."*
RP3	*"Exemplary models multiply when energy cooperatives produce clean energy and raise awareness."*

Source: Author-generated

4.6.3 Participation

All participants conveyed the importance of participation in energy cooperatives and how beneficial it can be the participation in energy cooperatives. Nine quotations are accounted for the participation code (see Figure 19), and it is placed as the third-most remarked code (see Figure 20). In this respect, one of the research participants (RP2) indicated: *"Ultimately, the people who decide to join the cooperative want to take part in the energy transition and want to contribute to it. Therefore, people who think about what can be done or what I can do are interested in this. You interact more with people who have a general mindset that there should be a transition from fossil fuel to renewable energy, which makes people more conscious."* Another research participant (RP4) expressed the benefits generated from the participation in energy cooperatives even though the energy is not produced yet: *"Although we have not been able to produce energy until now, as a cooperative for about 5 years, we have done much work with international collaboration within the association to encourage and inform people on these issues (energy transition, active participation in this process)."* While one of the research participants (RP1) emphasized the contribution to energy transition via participation and consequent individual feelings deriving from the engagement with the energy cooperative: *"Participating in a clean electricity generation process gives the consumer spiritual pleasure by contributing to the energy transition. Hence, this creates the pleasure for prosumers to fulfill their responsibilities on climate change mitigation and energy transition at an individual level via participation in energy cooperatives."* Finally, another research participant (RP3) underlined the importance of participation and potential benefits regarding the cooperative's capacity to overcome both legal and financial obstacles. Collaboratively investing in renewable energy technologies instead of individually production of renewable energy: *"In cooperatives, you have to use as much as the capacity of your own house and consume by yourself, and there are strict rules. Individuals will not be able to install the installation and produce energy because the costs are high on their own. Therefore, individuals understand that it will also benefit them. However, since they will encounter legal obstacles when trying to produce energy independently, participation in the cooperative is important as it facilitates legal procedures for production and distribution."* The research findings above are corroborated considering Turkey's high energy dependency and fossil-based energy generation (see Chapter 2, Section 2), and claims of Devine-Wright, (2005) that the energy cooperatives' participation is seen as an element facilitating the country's policy-making processes in energy

transition and consequently allowing to reach green energy targets and reduction in carbon emissions.

Finally, the intersection of benefits from participation in energy cooperatives and energy transition is underlined with the views of (RP3) in Table 8 below.

Table 8: Excerpts on participation in energy cooperative

Participant	Excerpt
RP3	*"I think energy cooperatives are the most important element in the energy transition because there is no other way to get the civilians involved. I also think that the greatest benefit will be through increased participation and awareness."*

Source: Author-generated

4.6.4 Climate protection and sustainability

The climate protection and sustainability code included only 5 quotations (see Figure 19) and was placed as the lowest mentioned code (see Figure 20). However, it should also be noted that while the drivers are revealed above for the emergence of the energy cooperative, some quotations may be placed in climate change and environmental commitment code (see Chapter 4, Section 4.1.1) since it was highly challenging to draw a clear-cut among both codes. One of the research participants (RP4) underlined the essence of producing clean and renewable energy and further focused on the consequent positive impact of this green energy production: *"The most important feature of energy cooperatives in combating climate change is that they produce renewable and sustainable energy, which does not have a carbon footprint. In this sense, I think that energy cooperatives provide great support."* This statement is further supported by explaining the features of members' characteristics in climate and sustainability manners: *"The fact that cooperative members are simultaneously sensitive to sustainability and climate issues conscious about recycling means that they can also generate benefits in this regard."* Finally, another research participant (RP1) further underlined the broad analysis of the relationship between fossil-fuel generation and climate change while also emphasizing the role energy cooperatives play as the bottom-up solution for the same problem in their community: *"One of the most important causes of climate change is fossil fuel dependence. Every time fossil fuel dependency is reduced, you fight against climate change. When you do this, especially with renewable energy sources, you already contribute to the fight against climate change. In this sense, energy cooperatives are one of the*

most important actors in combating climate change in terms of showing that renewable energy is a model and an energy transformation can be achieved with renewable energy. According to research by Rescoop, by 2050, 40% of the energy produced from renewable energy sources will be produced by energy communities and energy cooperatives. In fact, this is an indication of how we will proceed in terms of energy transformation for Turkey and the world and what role energy cooperatives will play at this point. Everyone needs to be involved in this energy transformation in some way. As an energy cooperative, our duty is to increase participation in this transformation and bring this process to the broader masses." These findings are aligned with Walker, G. (2011), who revealed that a substantial amount of carbon reduction could be accomplished with energy communities' local characteristics to combat climate change.

4.6.5 Community building and self-realization

The community building and self-realization code included 12 quotations (see Figure 19) and became the most mentioned code (see Figure 20). One of the research participants (RP2) underlined the profiles of members how these diverse profiles generate benefits in terms of overcoming barriers and creating social cohesion: *"We have a wide range of members from ship captains to hotel operators, from engineers to lawyers. While searching for land or doing any business, the various connections of the members or the fact that these members are from different occupational groups find a solution to any problem we encounter. It helps us overcome the problems we face. Each partner's background or skillset is different. This synergy and social cohesion are a huge advantage for us and other cooperatives similar to us."* Another research participant (RP1) also highlighted the feelings of control and behavioral changes in joining renewable energy production via cooperatives: *"When people start to produce their own energy needs, they become more energy-efficient, and this is one of the essential concepts. As a consequence of this, the most important characteristic that we have seen in all members in energy cooperatives is that they prefer products with energy-saving features."*

Furthermore, another research participant (RP3) stated the importance of enhanced social cohesion and its expansion among cooperatives nationwide. *"I am not sure how many energy cooperatives there are currently in Turkey, but some of them did not start energy production, some did. They also come together and look for solutions, so there is enhanced social cohesion because we can learn new models from those that have already started to generate electricity domestically."* These findings aligned with the scholars G. Walker (2008), who argued that participation in energy communities is significantly facilitative in enhancing social cohesion, and Middlemiss & Parrish

(2010) claimed that community energy practices contribute to creating cultural capacity for community building.

Finally, the views in Table 9 below underlined the benefits energy cooperatives generate and are indicated in terms of the self-realization and community building perspective.

Table 9: Excerpts on community building and self-realization

Participant	Excerpt
RP3	*"For example, I got the principles of a cooperative certificate from the University of Anadolu e-certification program to improve and realize myself."*
RP1	*"Energy cooperatives and cooperatives, in general, are obliged to serve their members, the region, and the community in which they live. It is essentially one of the primary concepts of cooperatives."*

Source: Author-generated

4.6.6 RE generation targets

With the 8 quotations identified in the RE generation targets (see Figure 19), the code is placed as the third-most cited one (see Figure 20). One of the research participants (RP2) underlined the importance of enabling energy policy for energy cooperatives in Turkey and consequent benefits to Turkey's overall carbon profile in an international domain: *"Of course, energy cooperatives will generate benefits in meeting RE targets. Many countries worldwide are very sensitive about climate change and renewable energy production. Our sensitivity on this issue shows that we are in harmony with them. We have the same values. If we can frame an enabling policy mechanism as a country, I think this will result in the appreciation of Turkey's efforts in achieving the RE targets in international environments.* In addition to supporting the statement above, another research participant (RP1) underlined the prosumer feature of energy cooperatives, took into consideration the international deals for RE generation targets and energy cooperatives' potential for speeding the energy transition: *"I think that energy cooperatives will provide significant benefits in reaching the climate targets set by international agreements, such as the European Green Deal, the transition from fossil fuels to renewable energy sources, and reducing carbon emissions. I believe energy cooperatives will be one of the most critical elements in the energy transition, primarily since energy cooperatives produce energy in the local region and ensure that it is consumed in that region. That is, they have an understanding of local production and consumption locally. If the generated electricity is consumed where it is produced, all distribution costs, transmission costs,*

and new investment costs will be saved. Also, if the practical storage possibilities of this locally produced energy can be expanded, energy cooperatives will increase their contribution to this energy transition process." One of the research participants (RP3) emphasized the significance of energy cooperatives in facilitating the energy transition and RE generation but also stated the inadequate power of energy cooperatives to promote RE generation targets and energy transition as stand-alone: *"Regarding the reduction of carbon emissions in Turkey, we seem to have no other choice than energy cooperatives. It is obvious that we cannot wholly shift from fossil fuels, but right now, we have no choice other than energy cooperatives. Nevertheless, we will not be able to fulfill those RE targets only with energy cooperatives."*

On the contrary to above stated perspectives one of the research participants (RP4) stated: *"I don't think energy cooperatives in Turkey have that much power."* Besides the last quotation from (RP4), these findings are affirmed with Hain et al. (2005), who claimed that the energy initiatives increase the speed of reaching specified energy targets and generate benefits with the bottom-up renewable energy generation approach.

Finally, (RP3) emphasized how beneficial and vital energy cooperatives are reaching the RE generation targets; the view is presented below in Table 10.

Table 10: Excerpts on RE generation targets

Participant	Excerpt
RP3	*"I do not see any way other than energy cooperatives."*

Source: Author-generated

4.6.7 Innovation

The innovation code contained 10 quotations (see Figure 19), and it is placed as the second-most mentioned code (see Figure 20). One of the research participants (RP4) focused on the organizational aspect of energy cooperatives while explaining the energy cooperatives' potential to create benefits in terms of innovation: *"I think that energy cooperatives are an innovative organization by nature, in the sense of being a prosumer, which is the main purpose of energy cooperatives."* The statement further supported by another research participant (RP3) underlying the energy cooperative conferences' contribution to innovation: *"At one of our conferences, a member of the energy cooperative, which was established with municipality initiative, made a statement to us about the solar panels installed in their cooperative, and what he said was entirely*

new for us, which we had never thought of before. When many people from different fields of the energy sector come together, they add very innovative things both commercially and mentally." The same research participant further detailed its argument by: *"When prosumers come together at our conferences or other events, there is participation from various audiences. I have heard of people offering jobs to each other or, for example, I witnessed a student-academician meeting, and the student said to the academician that I was working with a thesis on this subject (REC), but it had never occurred to my mind what you mentioned in your speech.*"

Additionally, one of the research participants (RP1) emphasized the innovative benefits generated through the energy cooperatives by mentioning several examples both from Turkey and Europe: "*I want to mention two examples in this regard. Firstly, there is an energy cooperative in Portugal that provides services on electric vehicles, and it provides services for the use of electric vehicles as a taxi in the field of transportation or the sharing of vehicles. This example is one of the best examples of innovative energy cooperatives. Secondly, I would like to talk about electric scooters, which have become extremely widespread in Turkey and Europe. The first adopter of these electric scooters is again an energy cooperative. Therefore, energy cooperatives are organizations that propose more radical methods, generate solutions, and implement them for people's energy consumption habits within the scope of the energy field because energy cooperatives are organizations that can produce effective and striking solutions in a small community."* The same research participant further continued to provide innovative benefits energy cooperatives generate: "*Some of the citizens in Europe innovatively use the batteries of their electric vehicles as storage units to meet their electricity needs for the home. In an environment where such opportunities are developed, the technology-friendly nature of energy cooperatives is an indication of how important it can play in the adaptation of such innovative ideas. Therefore, the innovative structure of energy cooperatives will be one of the essential triggers for accelerating energy transition."* These results corroborated with the scholars Hielscher et al. (2011), who claimed that the energy community projects are innovative in terms of transformational power in altering people's overall energy practices. Furthermore, Kalkbrenner & Roosen (2016) also argued that prosumers are innovative in providing affordable and clean energy for the citizens with a bottom-up approach.

4.6.8 Women's empowerment and gender equality in EC

The research provides novelty by adding the women's empowerment and gender equality in EC code to the category of benefits deriving from energy cooperatives in order to reveal additional uncoded benefits. The code included 5 quotations (see Figure 19) and it is positioned as the least

mentioned code with the climate protection and sustainability code (see Figure 20). One of the research participants (RP4) underlined the presence of women in the energy cooperative management: *"For example, since our cooperative was established, the majority of our management has consisted of women. In fact, we specifically wanted it to be like this."* The statement above further expanded by research participant (RP3) on how important it is for the cooperative existence of women in their organization analyzed: *"In essence, we are also a women's cooperative since we women came together and started thinking about what we could do."* Finally, one of the research participants (RP1) focused on the overall male-driven energy market characteristics and how the energy cooperative is further empowering the presence of women in the energy sector, particularly within the energy cooperative: *"I want to emphasize one thing that is very important to us in particular. The energy sector is very male-dominated, and we are working on methods that will enable women to take part more effectively in this field. In other words, we are trying to increase the number of women who take an active role in the field of renewable energy."* These findings are corroborated with Lazoroska et al. (2021), who argued that women are a crucial part of the energy transition, and their presence further accelerates the pace in reaching renewable energy generation targets. The energy communities risk reproducing the energy sector's inequalities with the lack of more prominent awareness of the gendered practices in working and volunteering in the energy sector.

4.7 Analysis of implemented business model

This section presents the analysis of the implemented cooperative business model with the business model canvas framework proposed by Osterwalder et al. (2005). The explanation of the building blocks of the applied model is presented above (see Chapter 1, Section 1.4). The business model representation of Troya Renewable Energy Cooperative is illustrated below based on the research findings (see Figure 21).

In regard to *value proposition* building block, all the research participants stated the values namely, environmental, social and economic values. For the *key activities* block, since the energy cooperative has not generated energy yet, one of the research participants (RP1) explained how they planned it: *"First of all, we want to establish a solar power plant quickly. One of our medium-term goals is implementing a hybrid energy system with solar panels and wind turbines. In the long term, one of our primary goals is to implement a cloud system in which our energy cooperative members are located and establish a micro-network that ensures energy efficiency more effectively, where cooperative members carry out their transactions on energy, thanks to this technological network. After we implement it, we plan to share this application model so that other energy cooperatives can apply it and support them in this sense. After achieving this, we now want the electricity distribution of our province to be realized by our cooperative."* In addition to this, one of the most significant key activity is conferences on energy cooperatives (see Chapter 4, Section 4.3.2), furthermore lobbying activities are also underlined by research participants (RP1): "*Currently, the most significant lobbying work is going on in this area on (the fluctuation of energy distribution cost)."* Lastly, one of the research participants (RP3) stated: *"We hold meetings for the participation of new members."* Referring to *key resources* section, capital provided by members' contribution and EU funds are identified and one of the research participants (RP2) explained: *"We started by relying on our own equity. At the moment, our cooperative is running entirely with its equity. Since we have not started production yet, a more substantial source will be needed later on. However, if the equity is not enough when we start production, we will apply for incentives, funds, etc., and more economically creative solutions will be found."* In addition to further supporting the statement above, the research participant (RP1) added: *"Our cooperative has made all its investments with its equity capital. We cover the costs of our projects with the financial resources provided by our members in equal amounts. In addition, we, as a cooperative, create various innovative projects and benefit from European Union funds. Thus, we partially cover some costs of our cooperative from these funds."* Since current regulatory framework does

not permit a mixed model, thus *customer segment* is identified as households by all research participants and one of the research participants (RP3) stated: *"This is a rule set before us when we were established. Household; by law."* Regarding the *key partners* all research participants mentioned cooperative members and their contribution as technical resource providers, and REScoop, one of the research participants (RP1) indicated: *"All of our cooperative members have diverse expertise, and we provide the technical information we need through them; for example, our chairman of the board of directors is a lawyer. Apart from this, we collaborate with every renewable sector actor. Also, we are the only partner of REScoop in Turkey."* This statement is supported by one of the research participants (RP4) mentioned: *"In this sense, it can be said that we have members from various age groups and disciplines, such as there are two electrical and electronics engineers, tourism professionals, shipmasters, freelancers, an accountant, and a lawyer."* In terms of *customer relationship* all the research participants mentioned personal and direct relationships, one of them (RP4) stated: *"We choose the most direct individual communication method."* When it comes to *channels* building block, all research participants stated digital channels and face to face meetings. Regarding the *costs structure* one of the research participants stated: *"Even if we have not produced energy yet, we pay a stamp tax every year. Then there are accounting expenses."* Furthermore, another research participant (RP1) added: *"The land (in search) for the energy technologies installation and the projects' feasibility planning studies can be defined as a cost structure."* Finally, for the *revenue streams* building block in business model canvas, all research participants mentioned the cooperative share purchase such as one of them (RP3) indicated: *"Cooperative share sale. We will be able to receive subsidies and grants once we are operational."* Additionally, there is also EU fund stream, as above mentioned by (RP1): "*as a cooperative, create various innovative projects and benefit from European Union funds."*

Business Canvas Model

Troya Renewable Energy Cooperative

<table>
<tr>
<td>Key Partners
Cooperative members
RE technology providers
Cooperative members as know-how providers (i.e lawyer, electrical engineer)
REScoop</td>
<td>Key Activities
Lobbying activities in dissemination of EC
Local generation with PV (planned)
New members recruitment
Organizing conferences
Key Resources
Members' equity capital
EU funding</td>
<td rowspan="2">Value Propositions
Energy Efficiency
Environmental value
Social value
Economic value (planned)</td>
<td>Customer Relationships
Personal and direct interactions
Channels
Digital channels
Face to face meetings</td>
<td rowspan="2">Customer Segments
Households</td>
</tr>
<tr>
<td colspan="2">Cost Structure
Feasibility analysis of projects
Staff & office costs
Land costs for building and installing RE equipment (in search)
Purchase of PV technologies (planned)</td>
<td colspan="2">Revenue Streams
Members' share purchase
Funds from accomplished EU projects</td>
</tr>
</table>

Figure 21: Troya Renewable Energy Cooperative Business Canvas Model, structure based on adopted from Osterwalder et al., (2005)

CHAPTER 5: Conclusions

This chapter outlines the key research results concerning the research aims, questions, and contributions. It also reviews the study's limitations and presents opportunities for future research. This study aimed to investigate the barriers surrounding the development of energy communities applying the conceptual barrier models proposed by Weber (1997). This research also aimed to explore the benefits deriving from the energy communities using the conceptual benefit categories suggested by Brummer (2018). The final aim of this research was to analyze the implemented business model for the selected energy cooperative case study in Çanakkale, Turkey, by applying the business model canvas framework proposed by Osterwalder et al. (2005).

In order to achieve the abovementioned research aims, this study applied an exploratory case study method using both primary and secondary data. The study deployed in-depth semi-structured interviews with Troya Renewable Energy Cooperative members for primary data collection and secondary data from relevant websites and academic literature in energy communities. The major findings from the research are listed below:

- The results indicate that the most significant barrier in disseminating energy communities in Turkey is institutional barriers. Further research findings present that frequently changing, unstable energy policy frameworks hinder the development of energy communities. The study's findings correspond to Brummer (2018), who argued that weak current institutions and politics cause a lack of support for energy communities because energy communities and their demands are often not included in countries' energy agendas.
- Another research finding highlighted considering the barriers is the behavioural barrier. Turkey's overall negative past experiences with the understanding of the cooperative model cause bias to the citizens in energy communities' participation. These findings are corroborated with Özgül et al. (2020), who claimed that the bias with cooperatives is an essential explanation as people are mainly apathetic to the cooperative concept primarily due to the housing cooperatives' failure in the 1990s in Turkey.
- On the other hand, the findings indicate that the most crucial benefit generated from EC is identified community building and self-realization. The findings herein corroborate with Middlemiss & Parrish (2010), who claimed that energy communities' environmentally-friendly motives build cultural capacity for the country's energy transition with the bottom-

up approach. In this regard, the empirical findings of this study led to the emergence of additional insights. While climate change, environmental commitment, green energy, and lifestyle arose some of the drivers and benefits of energy community practices. This finding is further in line with Caramizaru et al. (2020), who claimed that community energy's root is often linked with environmentalist movements and sentiments.

- Moreover, one of the most significant activities carried out by the investigated case study for the development of energy communities is the initiative taken to organize and lead annually held international conferences on the energy community for the first time in Turkey since 2016. This finding reflects on innovation, the second-most mentioned benefits of energy communities, as Hielscher et al. (2011) asserted that the energy community projects are innovative in terms of transformational power in altering people's overall energy practices.
- The research finding reveals the business model of the energy cooperatives: While the value proposition emerged environmental, social, and economical. The revenue streams appeared members' share purchase and funds from EU projects, and finally, the cost structure included feasibility analysis of projects, land, and RE equipment as in line with the features of the business model applied to energy cooperatives by Reis et al., (2021).

In addition to the abovementioned vital findings, this study also revealed a novel benefit result that in addition to supporting EU's climate-energy goals and positively contributing to the energy transition, energy communities might further sustain gender equality and strengthen the presence of women in the male-dominant energy sector. This finding corroborated with Lazoroska et al. (2021), who argued that women are a crucial part of the energy transition, and their presence further accelerates the pace in reaching renewable energy generation targets.

To the best of the author's knowledge, no such studies have been performed concerning the barriers to and benefits from energy communities by analyzing the implemented business model and particularly focusing on the energy cooperative members in Turkey. Hence, this is the first study exploring the abovementioned considerations of energy communities' development. Therefore, this research provided theoretical and practical contributions to further disseminating energy communities' academic field and implementation in practice. In this regard, this study attempts to narrow the gap noted by Caramizaru et al. (2020) that an in-depth investigation is recommended to

explore the barriers facing the development of energy communities in the different Member States (In Turkey's case, a candidate country) in addition to clarifying the potential benefits arising from them.

Acknowledging that, like any research, this study has some limitations. The study implemented a limited sample size. Even this is partially due to the nature of energy cooperatives with a small number of members; however, this limitation could be overcome if time and budget constraints are removed.

The suggestions for future research and practice are following:

- To comprehend the essence of these results better, future studies could apply mixed methods, including both qualitative and quantitative, to investigate the development of energy communities further in Turkey.
- Based on these conclusions, policy-making practitioners should consider the creation of a consistent, long-term enabling legal framework for energy communities complying with EU Directives, namely RED II and ED 2019, even though Turkey has accepted them; however, they are unspecified in Turkish national legislation.

Appendices

Appendix 1. English Version: Semi-structured interview script regarding barriers to, benefits from and business model of energy community/cooperative.

APPENDICES
APPENDIX 1
SEMI-STRUCTURED INTERVIEW SCRIPT
INTERVIEWS

This series of interviews, conducted with the board of directors of Troya Yenilenebilir Enerji Kooperatifi (Troya Renewable Energy Cooperative) in Canakkale / Turkey, aims to gather data on **feelings, thoughts, opinions, experiences, and practices** of the renewable energy community/cooperative sector in Turkey. The objectives that drive the interview questions are:

OBJECTIVE 1: To investigate the barriers surrounding the development of renewable energy cooperatives in the Turkish context.
OBJECTIVE 2: To examine the benefits generated for the local community deriving from the renewable energy cooperative in Canakkale / Turkey.
OBJECTIVE 3: To explore the business model contemplated by Troya Enerji Kooperatifi.

INTRODUCTION: My name is Ahmet Sahin. I am a master's degree student at the University of Padova, Italy. I am interested in researching the characteristics of the renewable energy community in Turkey. The research includes gathering feedback from the board of directors on how renewable energy cooperative functions, its purposes, benefits, barriers, and the business model it has applied. I am interested in **the feelings, thoughts, opinions, experiences, and practices of** Turkey's renewable energy community/cooperative sector.

This interview will last up to an hour – depending on how we proceed. It is divided into three main sections, covering several related themes relevant to renewable energy cooperatives and barriers to, benefits from their implementation, and the chosen business model. It is more of a conversation that we will be having. You can explain to me as an outsider through examples or stories, your experiences within this renewable energy cooperative, your views on the barriers surrounding, benefits generated by the cooperative, and the business model applied.

This interview will be treated with confidence. I will analyze the interview thematically, so your identity will not be revealed. I will be recording the interview, after which I will write a transcript. If at any time you are interested in the data collected in the research, you are welcome to If I feel that further clarification is needed on a particular subject, would you agree to me contacting you through video conference/phone (whichever convenient) at a later date to discuss? YES □ NO □. If you feel uncomfortable about answering any of the questions, you are not under any obligation to do so, and we can move on to other questions or terminate the interview.

So before we start, I would also like to clarify that we will be having this discussion because I am interested in understanding these themes from your perspective. There are no right or wrong answers, just your unique answers. Your answers can help me understand your unique worldview. Feel free to give me stories and examples as we go along that help you illustrate any points and help me understand.

INITIAL QUESTIONS: Introductions (so I have presented myself a little bit, it is the time for you…name, age, your background)

1. Can you first describe to me the story of how you started with your renewable energy community in Canakkale?

OWN DEFINITION OF RE COMMUNITY/COOPERATIVE AND BARRIERS - what does it mean energy cooperative according to you? What are the barriers your energy cooperative is facing?

2. How would you describe the energy cooperative with your own words?

3. What are the institutional barriers? (i.e., policy mechanisms, regulation, legal conditions, complicated bureaucratic processes)

4. What are the obstacles deriving from the energy market? (i.e., lack of tax breaks, allowances, and subsidies for RE communities.)

5. What are the organizational barriers? (i.e., lack of experienced managers, intense risk aversion.)

6. What are the behavioral barriers? (i.e., citizens' attitudes, values, social norms, and lifestyle patterns)

BENEFITS DERIVED FROM RENEWABLE ENERGY COOPERATIVES

7. What are the economic benefits generated from the RE cooperatives? (i.e., dividends, lower energy prices, and local jobs)

8. Is there any benefit in terms of education and acceptance related to RE technology? (i.e., awareness in energy savings, level of support.)

9. Do you think that citizens' participation in an energy cooperative is a benefit for energy transition matters? If so, may you elaborate more? (i.e., decision-making, contribution to the policy-making process.)

10. When it comes to climate protection and sustainability, do you think energy cooperatives can generate benefits? If so, how do they accomplish them? (i.e., boosting consciousness on climate change)

11. Do you think that energy cooperatives can create benefits in terms of community building and self-realization? (i.e., enhanced social cohesion, feelings of control, and self-sufficiency)

12. Regarding the energy transition targets, do you think energy cooperatives can help in reaching those targets and create benefits? (i.e., EU Green Deal's targets)

13. Do you think that energy cooperatives can generate socially innovative benefits? (i.e., changing people's usual energy-related practices, becoming prosumers)

ENERGY COOPERATIVES AS THE BUSINESS MODEL

14. What is the value proposition of your renewable energy cooperative? (i.e., economic, environmental, and social value.)

15. What are the key activities your RE cooperative perform? (i.e., local generation & supply, consumption, energy services.)

16. What are the key resources your RE cooperative has? (i.e., community members, public incentives, regulatory framework.)

17. What is the customer segment of your energy cooperative? (i.e., households, municipalities, and SMEs.)

18. What are your key partners? (i.e., community members, technology manufacturers, technical know-how providers such as engineers, lawyers, accountants.)

19. How does your RE cooperative pursue customer relationships, and what are the communication channels? (i.e., direct personal contact, face-to-face meetings, and online channels.)

20. How would you define your costs structure? (i.e., projects' feasibility, building, and licensing costs.)

21. What is your RE cooperative's revenue structure? (i.e., sale of community members' shares, sale of energy to other consumers, subsidies from the government.)

END

22. Any other comments/observations…? Do you think the interview has allowed you to get your point of view across? Is there anything else you would like to talk about that relates to these issues?

PROMPTING QUESTIONS (as backup)

Can you elaborate more on….? Do you have further examples of this…?

INTERPRETING QUESTIONS

You then mean that…/Is it correct that you say…?

Appendix 2. Turkish Version: Enerji topluluğu/kooperatifinin önündeki engeller, ondan kaynaklanan faydalar ve iş modeliyle ilgili yarı yapılandırılmış mülakat metni ve soruları.

EKLER
EK 1
MÜLAKAT SORULARI&METNİ
MÜLAKAT

Türkiye'nin Çanakkale ilinde yer alan Troya Yenilenebilir Enerji Kooperatifi (Troya Renewable Energy Cooperative) yönetim kurulu üyeleri ile gerçekleştirilen bu mülakat dizisi, yenilenebilir enerji topluluğu/kooperatifi sektörü hakkında **duygu, düşünce, görüş, deneyim ve uygulamaları** hakkında veri toplamayı amaçlamaktadır. Mülakat sorularını yönlendiren amaçlar şunlardır:

HEDEF 1: Yenilenebilir enerji kooperatiflerinin gelişiminin önündeki engelleri/barriyerleri Türkiye bağlamında araştırmak.
HEDEF 2: Çanakkale / Türkiye'deki yenilenebilir enerji kooperatifinin yerel halka sağladığı faydaları incelemek.
HEDEF 3: Troya Enerji Kooperatifi'nin öngördüğü iş modelini keşfetmek.

GİRİŞ: Benim adım Ahmet Şahin. İtalya'nın Padova Üniversitesi'nde İşletme bölümünde yüksek lisans öğrencisiyim. Türkiye'deki yenilenebilir enerji topluluğunun/kooperatiflerinin özelliklerini araştırmakla ilgileniyorum. Araştırma, yenilenebilir enerji kooperatifinin nasıl işlediği, amaçları, faydaları, karşılaştığı bariyerleri/engelleri ve uyguladığı iş modeli hakkında yönetim kurulu üyelerinden mülakat yöntemi ile geri bildirim toplamayı içeriyor. Türkiye'nin yenilenebilir enerji topluluğu/kooperatif sektörünü çevreleyen **duyguları, düşünceleri, görüşleri, deneyimleri ve uygulamaları** ile ilgileniyorum.

Bu röportaj, nasıl ilerlediğimize bağlı olarak yaklaşık bir saat kadar sürecek. Yenilenebilir enerji kooperatifleri, önündeki engeller ve kooperatiflerin hayata geçirilmesinden sağlanan faydalar ve uygulanan iş modeli ile ilgili birkaç temayı kapsayan üç ana bölüme ayrılmıştır. Bu daha çok yapacağımız bir görüşme şeklinde gerçekleşecek. Dışarıdan biri olarak bana örnekler veya hikayeler aracılığıyla bu yenilenebilir enerji kooperatifindeki deneyimlerinizi, kooperatifin karşılaştığı engeller hakkındaki görüşlerinizi, kooperatifin sağladığı faydaları ve uygulanan iş modelini açıklayabilirsiniz.

Bu mülakat güvenle ele alınacaktır. Röportajı tematik olarak analiz edeceğim, böylece kimliğiniz ortaya çıkmayacak. Röportajı kaydedeceğim, ardından bir transkript yazacağım. Araştırmada toplanan verilerle herhangi bir zamanda ilgilenirseniz size sağlayabilirim, belirli bir konuda daha fazla açıklamanın gerekli olduğunu düşünürsem, sizinle video konferans/telefon (hangisi uygunsa) aracılığıyla iletişime geçmemi kabul eder misiniz? EVET □ HAYIR □. Sorulardan herhangi birini yanıtlama konusunda kendinizi rahatsız hissediyorsanız, bunu yapmakla yükümlü değilsiniz ve diğer sorulara geçebilir veya görüşmeyi sonlandırabiliriz.

Başlamadan önce, bu mülakat konuları sizin bakış açınızdan ele almak üzere kurulmuştur. Ben sizin görüşlerinizi anlamakla ilgilendiğim için mülakatı bu şekilde yapacağımızı da açıklığa kavuşturmak istiyorum. Doğru ya da yanlış cevap yoktur, sadece size özel cevaplar vardır. Cevaplarınız, sizin kendinize ait dünya görüşünüzü anlamama yardımcı olabilir. Lütfen devam ederken bana önemli gördüğünüz noktaları ifade etmekten ve benim anlamama yardımcı olacak hikayeler ve örnekler vermekten çekinmeyin.

İLK SORULAR: Tanışma (ben kendimi biraz tanıttım, şimdi sizin sıranız… adınız, yaşınız, geçmişiniz)

1. Önce bana Çanakkale'deki yenilenebilir enerji topluluğunuza başlama hikayenizi anlatır mısınız?

SİZİN YE TOPLULUĞU/KOOPERATİFİ TANIMINIZ VE KARŞILAŞILAN BARİYERLER- size göre enerji kooperatifi ne anlama geliyor? Enerji kooperatifinizin karşılaştığı engeller/bariyerler nelerdir?

2. Enerji kooperatifini kendi kelimelerinizle nasıl tanımlarsınız?
3. Kurumsal engeller nelerdir? (ÖR: politika mekanizmaları, düzenleme, yasal koşullar, karmaşık bürokratik süreçler)
4. Enerji piyasasından kaynaklanan engeller nelerdir? (ÖR: YE kooperatifleri için vergi indirimleri, ödenekler ve sübvansiyonların olmaması.)
5. Organizasyonel engeller nelerdir? (ÖR: deneyimli yöneticilerin eksikliği, yüksek riskten kaçınma.)
6. Davranışsal engeller nelerdir? (ÖR: vatandaşların tutumları, değerleri, sosyal normları ve yaşam tarzı kalıpları.)

YENİLENEBİLİR ENERJİ KOOPERATİFLERİNDEN ELDE EDİLEN FAYDALAR

7. YE kooperatiflerinden elde edilen ekonomik faydalar nelerdir? (ÖR: temettüler, daha düşük enerji fiyatları ve yerel istihdam.)
8. YE kooperatiflerinin, yerel topluluğun YE teknolojilerinin kabulü ve bu teknolojilerle ilgili eğitim seviyesinin artması hususunda bir faydası var mı? (ÖR: enerji tasarrufu konusunda farkındalık, YE teknolojilerine destek seviyesi.)
9. Vatandaşların bir enerji kooperatifine katılımının enerji geçişi süreci konularında bir fayda sağladığını düşünüyor musunuz? Eğer öyleyse, daha fazla detaylandırabilir misiniz? (ÖR: karar verme süreçlerine katılım, politika oluşturma sürecine katkı.)
10. İklim değişikliği ile mücadele ve sürdürülebilirlik söz konusu olduğunda, enerji kooperatiflerinin fayda sağlayabileceğini düşünüyor musunuz? Eğer öyleyse, bunları nasıl başarıyorlar? (ÖR: İklim değişikliği konusunda bilinci artırmak.)
11. Enerji kooperatiflerinin, yerel topluluğun inşası ve bireylerin kendini gerçekleştirme açısından faydalar yaratabileceğini düşünüyor musunuz? (ÖR: Gelişmiş sosyal uyum, kontrol duyguları ve kendi kendine yeterlilik.)
12. Enerji geçiş hedefleri ile ilgili olarak, enerji kooperatiflerinin bu hedeflere ulaşmada yardımcı olabileceğini ve fayda yaratabileceğini düşünüyor musunuz? (ÖR: AB Yeşil Anlaşması'nın hedefleri.)
13. Enerji kooperatiflerinin sosyal olarak inovatif faydalar sağlayabileceğini düşünüyor musunuz? (ÖR: İnsanların enerjiyle ilgili olan pratiklerini değiştirmek, üreten tüketici olmak 'prosumer'.)

İŞ MODELİ OLARAK ENERJİ KOOPERATİFLERİ

14. Yenilenebilir enerji kooperatifinizin değer önerisi nedir? (ÖR: Ekonomik, çevresel ve sosyal değer.)
15. YE kooperatifinizin gerçekleştirdiği ana aktiviteler nelerdir? (ÖR: Yerel üretim ve tedarik, tüketim, enerji hizmetleri.)
16. YE kooperatifinizin sahip olduğu ana kaynaklar nelerdir? (ÖR: Topluluk üyeleri, kamu teşvikleri, elverişli yasal düzenlemeler.)
17. Enerji kooperatifinizin müşteri segmenti nedir? (ÖR: Hanehalkı, belediyeler ve KOBİ'ler.)
18. Ana ortaklarınız kimlerdir? (ÖR: Kooperatif üyeleri, teknoloji üreticileri, mühendisler, avukatlar, muhasebeciler gibi teknik bilgi sağlayıcılar.)
19. YE kooperatifiniz müşteri ilişkilerini nasıl yürütüyor ve iletişim kanalları nelerdir? (ÖR: Doğrudan kişisel iletişim, yüz yüze toplantılar ve çevrimiçi kanallar.)
20. Maliyet yapınızı nasıl tanımlarsınız? (ÖR: Projelerin fizibilitesi, inşası ve lisans maliyetleri.)

21. YE kooperatifinizin gelir yapısı nedir? (ÖR: Kooperatif hisselerinin satışı, diğer tüketicilere enerji satışı, devlet sübvansiyonları.)

SON

22. Eklemek istediğiniz yorum/gözlem var mı? Mülakatın bakış açınızı aktarmanıza izin verdiğini düşünüyor musunuz? Bu konularla ilgili konuşmak ya da eklemek istediğiniz başka bir şey var mı?

DESTEKLEYİCİ SORULAR (yedek olarak)

Daha fazla detaylı anlatabilir misiniz? Bununla ilgili başka örnekleriniz var mı?

YORUMLAMA SORULARI

Şunu mu demek istiyorsunuz…? / Söylediğinizi doğru mu anladım…?

References:

Allen, J., Sheate, W. R., & Diaz-Chavez, R. (2012). Community-based renewable energy in the Lake District National Park - local drivers, enablers, barriers and solutions. Local Environment, 17(3), 261–280. https://doi.org/10.1080/13549839.2012.665855

Anadolu Agency (AA) Energy, (2019). https://www.aa.com.tr/en/energy/renewable/turkey-set-to-be-among-europes-top-5-renewable-leaders/27069 (accessed on 18th January 2022).

Arto, I., Capellán-Pérez, I., Lago, R., Bueno, G., & Bermejo, R. (2016). The energy requirements of a developed world. Energy for Sustainable Development, 33, 1–13. https://doi.org/10.1016/j.esd.2016.04.001

Aslani, A., & Mohaghar, A. (2013). Business structure in renewable energy industry: Key areas. In Renewable and Sustainable Energy Reviews (Vol. 27, pp. 569–575). Elsevier Ltd. https://doi.org/10.1016/j.rser.2013.07.021

Bauwens, T. (2016). Explaining the diversity of motivations behind community renewable energy. Energy Policy, 93, 278–290. https://doi.org/10.1016/j.enpol.2016.03.017

Bauwens, T. (2019). Analyzing the determinants of the size of investments by community renewable energy members: Findings and policy implications from Flanders. Energy Policy, 129, 841–852. https://doi.org/10.1016/j.enpol.2019.02.067

Bauwens, T., Gotchev, B., & Holstenkamp, L. (2016). What drives the development of community energy in Europe? the case of wind power cooperatives. Energy Research and Social Science, 13, 136–147. https://doi.org/10.1016/j.erss.2015.12.016

Becker, S., & Kunze, C. (2014). Transcending community energy: collective and politically motivated projects in renewable energy (CPE) across Europe. People, Place and Policy Online, 8(3), 180–191. https://doi.org/10.3351/ppp.0008.0003.0004

Beckmann, V., Otto, I. M., & Rong, T. (2015). Overcoming the legacy of the past? Analyzing the modes of governance used by the Polish agricultural producer groups Conflicts and Collective Action on Common Village Pastures-Comparative Case Studies in Azerbaijan and Georgia (Co4) View project REBOOST: A BOOST FOR RURAL LIGNITE REGIONS View project. https://doi.org/10.17221/190/2014

Biresselioglu, M. E., Limoncuoglu, S. A., Demir, M. H., Reichl, J., Burgstaller, K., Sciullo, A., & Ferrero, E. (2021). Legal Provisions and Market Conditions for Energy Communities in Austria, Germany,

Greece, Italy, Spain, and Turkey: A Comparative Assessment. Sustainability, 13(20), 11212. https://doi.org/10.3390/su132011212

Bomberg, E., & McEwen, N. (2012). Mobilizing community energy. Energy Policy, 51, 435–444. https://doi.org/10.1016/j.enpol.2012.08.045

Boon, F. P., & Dieperink, C. (2014). Local civil society based renewable energy organisations in the Netherlands: Exploring the factors that stimulate their emergence and development. Energy Policy, 69, 297–307. https://doi.org/10.1016/j.enpol.2014.01.046

Bracken, L. J., Bulkeley, H. A., & Maynard, C. M. (2014). Micro-hydro power in the UK: The role of communities in an emerging energy resource. Energy Policy, 68, 92–101. https://doi.org/10.1016/J.ENPOL.2013.12.046

Bridge Horizon 2020 EU. (2019). Energy Communities in the EU Task Force Energy Communities.

Brown, D., Hall, S., & Davis, M. E. (2019). Prosumers in the post subsidy era: an exploration of new prosumer business models in the UK. Energy Policy, 135. https://doi.org/10.1016/j.enpol.2019.110984

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

Buke, 2018 Available online: https://sosyalekonomi.org/turkiyede-yenilenebilir-enerji-kooperatifleri/ (accessed on 20 January 2022). (In Turkish)

Butenko, A. (2016). USER-CENTERED INNOVATION AND REGULATORY FRAMEWORK: ENERGY PROSUMERS' MARKET ACCESS IN EU REGULATION.

Caramizaru, Aura., Uihlein, Andreas., & European Commission. Joint Research Centre. (2020). Energy communities : an overview of energy and social innovation.

Cass, N., Walker, G., & Devine-Wright, P. (2010). Good neighbours, public relations and bribes: The politics and perceptions of community benefit provision in renewable energy development in the UK. Journal of Environmental Policy and Planning, 12(3), 255–275. https://doi.org/10.1080/1523908X.2010.509558

Chmiel, Z., Energy, S. B.-R., & 2015. (2016). Analysis of off-grid electricity system at Isle of Eigg (Scotland): Lessons for developing countries. Elsevier. Retrieved January 30, 2022, from https://www.sciencedirect.com/science/article/pii/S0960148115002438

Coen, J.-M. (2010), "Energies citoyennes", in SAW-B (ed.), Initiatives citoyennes, l'économie sociale de demain, Bruxelles: SAW-B, pp. 80-117

Coşkun, (2019) M.Kooperatifler Hukuku; Seçkin Yayınevi: Ankara, Turkey (In Turkish).

Cumhurbaskanligi Mevzuat Bilgi Sistemi, Elektrik Piyasasi Kanunu. Available online: https://www.mevzuat.gov.tr/MevzuatMetin/1.5.6446.pdf (accessed on 20 January 2022). (In Turkish)

DECISION OF THE GRAND NATIONAL ASSEMBLY OF TURKEY Decision on the approval of the Eleventh Development Plan (2019-2023). (2019).

Devine-Wright, P. (2005). Local aspects of UK renewable energy development: Exploring public beliefs and policy implications. Local Environment, 10(1), 57–69. https://doi.org/10.1080/1354983042000309315

Diestelmeier, L. (2021). The Role of Energy Communities in Facilitating Sustainable Energy Democracy: Legal Challenges. In Sustainable Energy Democracy and the Law (pp. 124-143). Brill Nijhoff.

di Silvestre, M. L., Ippolito, M. G., Sanseverino, E. R., Sciumè, G., & Vasile, A. (2021). Energy self-consumers and renewable energy communities in Italy: New actors of the electric power systems. In Renewable and Sustainable Energy Reviews (Vol. 151). Elsevier Ltd. https://doi.org/10.1016/j.rser.2021.111565

Dilger, M. G., Jovanović, T., & Voigt, K. I. (2017). Upcrowding energy co-operatives – Evaluating the potential of crowdfunding for business model innovation of energy co-operatives. Journal of Environmental Management, 198, 50–62. https://doi.org/10.1016/j.jenvman.2017.04.025

Dilger, M. G., Konter, M., & Voigt, K. I. (2017). Introducing a co-operative-specific business model: The poles of profit and community and their impact on organizational models of energy co-operatives. Journal of Co-Operative Organization and Management, 5(1), 28–38. https://doi.org/10.1016/j.jcom.2017.03.002

Energy Policies of IEA Countries 2016 Review Turkey. (2016). www.iea.org

Engelken, M., Römer, B., Drescher, M., Welpe, I. M., & Picot, A. (2016). Comparing drivers, barriers, and opportunities of business models for renewable energies: A review. In Renewable and Sustainable Energy Reviews (Vol. 60, pp. 795–809). Elsevier Ltd. https://doi.org/10.1016/j.rser.2015.12.163

Erat, S., Telli, A., Ozkendir, O. M., & Demir, B. (2021). Turkey's energy transition from fossil-based to renewable up to 2030: milestones, challenges and opportunities. Clean Technologies and Environmental Policy, 23(2), 401–412. https://doi.org/10.1007/s10098-020-01949-1

European Commission. Clean Energy for All Europeans Package. Available online: https://ec.europa.eu/energy/topics/energystrategy/clean-energy-all-europeans_en (accessed on 5th November 2021).

European Commission. European Climate Pact. 2021. Available online: https://ec.europa.eu/clima/policies/eu-climate-action/pact_en (accessed on 5th November 2021).

Eur-Lex. Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the Promotion of the Use of Energy from Renewable Sources. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A3 2018L2001 (accessed on 5th November 2021).

Eur-Lex. Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on Common Rules for the Internal Market for Electricity and Amending Directive 2012/27/EU. Available online:https://eurlex.europa.eu/legalcontent/EN/TXT/?uri=CELEX%3A32019L0944 (accessed on 5th November 2021).

F.G. Reis, I., Gonçalves, I., A.R. Lopes, M., & Henggeler Antunes, C. (2021). Business models for energy communities: A review of key issues and trends. In Renewable and Sustainable Energy Reviews (Vol. 144). Elsevier Ltd. https://doi.org/10.1016/j.rser.2021.111013

Frantzis, L., Graham, S., Katofsky, R., & Sawyer, H. (2008). Photovoltaics Business Models. http://www.osti.gov/bridge

Friends of the Earth Europe, (2018). Unleashing the Power of Community Renewable Energy, Friends of the Earth Europe, Brussels.

Gabriel, C. A., & Kirkwood, J. (2016). Business models for model businesses: Lessons from renewable energy entrepreneurs in developing countries. Energy Policy, 95, 336–349. https://doi.org/10.1016/j.enpol.2016.05.006

Goedkoop, F., & Devine-Wright, P. (2016). Partnership or placation? the role of trust and justice in the shared ownership of renewable energy projects. Energy Research and Social Science, 17, 135–146. https://doi.org/10.1016/j.erss.2016.04.021

The World Bank (2015). Guidelines and procedures for publications by regional units. Turkey's Energy Transition Milestones and Challenges Energy & Extractives Global Practice Europe and Central Asia Region www.worldbank.org

Hain, J. J., Ault, G. W., Galloway, S. J., Cruden, A., & McDonald, J. R. (2005). Additional renewable energy growth through small-scale community orientated energy policies. Energy Policy, 33(9), 1199–1212. https://doi.org/10.1016/j.enpol.2003.11.017

Hall, S., & Roelich, K. (2016). Business model innovation in electricity supply markets: The role of complex value in the United Kingdom. Energy Policy, 92, 286–298. https://doi.org/10.1016/j.enpol.2016.02.019

Heinrich Böll Foundation. Available online: https://www.boell.de/en/who-we-are (Accessed on 20 January 2022).

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

Herbes, C., Rilling, B., & Holstenkamp, L. (2021). Ready for new business models? Human and social capital in the management of renewable energy cooperatives in Germany. Energy Policy, 156. https://doi.org/10.1016/j.enpol.2021.112417

Hielscher, S., Seyfang, G., & Smith, A. (2011). Community Innovation for Sustainable Energy. www.cserge.ac.uk

Hoppe, T., Graf, A., Warbroek, B., Lammers, I., & Lepping, I. (2015). Local governments supporting local energy initiatives: Lessons from the best practices of Saerbeck (Germany) and Lochem (The Netherlands). Sustainability (Switzerland), 7(2), 1900–1931. https://doi.org/10.3390/su7021900

Huybrechts, B., & Mertens, S. (2011). Renewable Energy Source Cooperatives (REScoops): assets, obstacles and diffusion strategies. https://orbi.uliege.be/handle/2268/118878

Huybrechts, B., & Mertens, S. (2014). The relevance of the cooperative model in the field of renewable energy. Annals of Public and Cooperative Economics, 85(2), 193-212.

IEEE Power & Energy Society., & Institute of Electrical and Electronics Engineers. (n.d.). 16th International Conference on the European Energy Market (EEM) : 18-20 September 2019, Ljubljana, Slovenia.

International Energy Agency. (2021). Turkey 2021 - Energy Policy Review. www.iea.org/t&c/

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

Karunathilake, H., Hewage, K., Mérida, W., & Sadiq, R. (2019). Renewable energy selection for net-zero energy communities: Life cycle based decision making under uncertainty. Renewable Energy, 130, 558–573. https://doi.org/10.1016/J.RENENE.2018.06.086

Kaya, (2017). Available online: https://www.yenkoop.com/wp-content/uploads/2020/01/enerji-kooperatifleri-el-kitabi.pdf (accessed on 15th December 2022). (In Turkish)

Koirala, B. P., Koliou, E., Friege, J., Hakvoort, R. A., & Herder, P. M. (2016). Energetic communities for community energy: A review of key issues and trends shaping integrated community energy systems. In Renewable and Sustainable Energy Reviews (Vol. 56, pp. 722–744). Elsevier Ltd. https://doi.org/10.1016/j.rser.2015.11.080

Koirala, B. P., Araghi, Y., Kroesen, M., Ghorbani, A., Hakvoort, R. A., & Herder, P. M. (2018). Trust, awareness, and independence: Insights from a socio-psychological factor analysis of citizen knowledge and participation in community energy systems. Energy research & social science, 38, 33-40.

Lazoroska, D., Palm, J., & Bergek, A. (2021). Perceptions of participation and the role of gender for the engagement in solar energy communities in Sweden. Energy, Sustainability and Society, 11(1), 1-12.

Magnani, N., & Osti, G. (2016). Does civil society matter? Challenges and strategies of grassroots initiatives in Italy's energy transition. Energy Research & Social Science, 13, 148–157. https://doi.org/10.1016/J.ERSS.2015.12.012

Middlemiss, L., & Parrish, B. D. (2010). Building capacity for low-carbon communities: The role of grassroots initiatives. Energy Policy, 38(12), 7559–7566. https://doi.org/10.1016/j.enpol.2009.07.003

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

Mullally, G., Dunphy, N., & O'Connor, P. (2018). Participative environmental policy integration in the Irish energy sector. Environmental Science & Policy, 83, 71-78.

Musall, F. D., & Kuik, O. (2011). Local acceptance of renewable energy-A case study from southeast Germany. Energy Policy, 39(6), 3252–3260. https://doi.org/10.1016/j.enpol.2011.03.017

Osterwalder, A., Pigneur, Y., Clark, T., & Smith, A. (Designer). (2005). Business model generation : a handbook for visionaries, game changers, and challengers.

Oteman, M., Wiering, M., & Helderman, J. K. (2014). The institutional space of community initiatives for renewable energy: a comparative case study of the Netherlands, Germany and Denmark. Energy, Sustainability and Society, 4(1), 1–17. https://doi.org/10.1186/2192-0567-4-11

Özgül, S., Koçar, G., & Eryaşar, A. (2020). The progress, challenges, and opportunities of renewable energy cooperatives in Turkey. Energy for Sustainable Development, 59, 107–119. https://doi.org/10.1016/j.esd.2020.09.005

Pellicer-Sifres, V., Belda-Miquel, S., Cuesta-Fernandez, I., & Boni, A. (2018). Learning, transformative action, and grassroots innovation: Insights from the Spanish energy cooperative Som Energia. Energy Research & Social Science, 42, 100–111. https://doi.org/10.1016/J.ERSS.2018.03.001

Republic of Turkey Ministry of Customs and Trade, 2012 Available online: https://www.ica.coop/en/media/library/turkish-cooperative-strategy-and-action-plan-2012-2016 (accessed on 20 January 2022). (In Turkish)

Republic of Turkey Ministry of Energy and Natural Resources (2014). National Renewable Energy Action Plan for Turkey.

REScoop.eu. Available online: https://rescoop.eu/ (accessed on 4 December 2021)

Resmi Gazete, Elektrik Piyasasında Lisanssız Elektrik Üretimi Yönetmeliği. Available online: https://www.resmigazete.gov.tr/eskiler/2019/05/20190512-1.htm (accessed on 20 January 2022). (In Turkish)

Richter, M. (2011). Utilities' Business Models for Renewable Energy: Evidence from Germany.

Ropenus, S., & Henrik Klinge Jacobsen, M. (2015). A Snapshot of the Danish Energy Transition. www.agora-energiewende.de.

Ruggiero, S., Isakovic, A., Busch, H., Auvinen, K., & Faller, F. (2019). Co2mmunity Co-producing and co-financing renewable community energy projects Developing a Joint Perspective on Community Energy: Best Practices and Challenges in the Baltic Sea Region.

Schweizer-Ries, P. (2008). Energy sustainable communities: Environmental psychological investigations. Energy Policy, 36(11), 4126–4135. https://doi.org/10.1016/j.enpol.2008.06.021

Seyfang, G. (2009). Low-carbon currencies: The potential of time banking and local money systems for community carbon-reduction (No. 09-04). CSERGE working paper EDM.

Seyfang, G., & Smith, A. (2007). Grassroots innovations for sustainable development: Towards a new research and policy agenda. Environmental Politics, 16(4), 584–603. https://doi.org/10.1080/09644010701419121

Smil, V. (2010). Energy transitions: history, requirements, prospects. ABC-CLIO.

Soeiro, S., & Ferreira Dias, M. (2020a). Renewable energy community and the European energy market: main motivations. Heliyon, 6(7). https://doi.org/10.1016/j.heliyon.2020.e04511

Soeiro, S., & Ferreira Dias, M. (2020b). Community renewable energy: Benefits and drivers. Energy Reports, 6, 134–140. https://doi.org/10.1016/j.egyr.2020.11.087

Sokołowski, M. M. (2020). Renewable and citizen energy communities in the European Union: how (not) to regulate community energy in national laws and policies. Journal of Energy and Natural Resources Law, 38(3), 289–304. https://doi.org/10.1080/02646811.2020.1759247

Strupeit, L., & Palm, A. (2016). Overcoming barriers to renewable energy diffusion: Business models for customer-sited solar photovoltaics in Japan, Germany and the United States. Journal of Cleaner Production, 123, 124–136. https://doi.org/10.1016/j.jclepro.2015.06.120

Tounquet, F., de Vos, L., Abada, I., Kielichowska, I., Klessmann, C., & Europäische Kommission Directorate for Internal Energy Market Unit C.1.: Renewables and CCS Policy. (2020). Asset study on energy communities in the European Union.

Transport sector transformation: Integrating electric vehicles into Turkey's distribution grids. (2019). www.shura.org.tr.

van der Horst, D. (2007). NIMBY or not? Exploring the relevance of location and the politics of voiced opinions in renewable energy siting controversies. Energy Policy, 35(5), 2705–2714. https://doi.org/10.1016/j.enpol.2006.12.012

van der Horst, D. (2008). Social enterprise and renewable energy: emerging initiatives and communities of practice. Social Enterprise Journal, 4(3), 171–185. https://doi.org/10.1108/17508610810922686

van der Schoor, T., & Scholtens, B. (2015). Power to the people: Local community initiatives and the transition to sustainable energy. Renewable and Sustainable Energy Reviews, 43, 666–675. https://doi.org/10.1016/J.RSER.2014.10.089

van der Schoor, T., van Lente, H., Scholtens, B., & Peine, A. (2016). Challenging obduracy: How local communities transform the energy system. Energy Research and Social Science, 13, 94–105. https://doi.org/10.1016/j.erss.2015.12.009

Walker, E. T., & McCarthy, J. D. (2010). Legitimacy, strategy, and resources in the survival of community-based organizations. Social Problems, 57(3), 315–340. https://doi.org/10.1525/sp.2010.57.3.315

Walker, G. (2008). What are the barriers and incentives for community-owned means of energy production and use? Energy Policy, 36(12), 4401–4405. https://doi.org/10.1016/j.enpol.2008.09.032

Walker, G. (2011). The role for 'community'in carbon governance. Wiley interdisciplinary reviews: climate change, 2(5), 777-782.

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

Walker, G., Hunter, S., Devine-Wright, P., Evans, B., Fay, H., & Gordon Walker, •. (2007). Harnessing Community Energies Harnessing Community Energies: Explaining and Evaluating Community-Based Localism in Renewable Energy Policy in the UK. http://www.sustainabletechnologies.ac.uk.

Weber, L. (1997). Viewpoint Some reflections on barriers to the efficient use of energy. In Energy Policy (Vol. 25, Issue 10).

Wierling, A., Schwanitz, V. J., Zeiß, J. P., Bout, C., Candelise, C., Gilcrease, W., & Gregg, J. S. (2018). Statistical evidence on the role of energy cooperatives for the energy transition in European countries. Sustainability (Switzerland), 10(9). https://doi.org/10.3390/su10093339

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

Zott, C., Amit, R., & Massa, L. (2011). The business model: Recent developments and future research. In Journal of Management (Vol. 37, Issue 4, pp. 1019–1042). https://doi.org/10.1177/0149206311406265