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A View of Energy Cooperatives from the Framework of Energy Justice

Enerji Adaleti Çerçevesinden Enerji Kooperatiflerine Bir Bakış

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ÖZ

Enerji adaleti, geleneksel enerji sisteminin yarattığı sorunlara karşı kavramsal bir çerçeve sunmaktadır. Geleneksel enerji sisteminin birçok adaletsizliğin temelinde olduğu düşünüldüğünde, yeni bir enerji üretim anlayışının oluşturulması kaçınılmaz görünmektedir. Bu kapsamda öncelikle enerji adaletinin usul, dağıtım ve tanınma ilkeleri incelenmiştir. Bu üç ilke bağlamında enerji kooperatifleri örnekleri enerji sistemine uygulanabilirlikleri açısından incelenmiş ve enerji kooperatiflerinin enerji adaletini gerçekleştirebilecek somut bir model olup olmadığı tartışılmıştır.

ABSTRACT

Energy justice offers a conceptual framework against the problems created by the traditional energy system. Considering that the traditional energy system is the basis of many injustices, it seems inevitable to establish a new energy production approach. In this context, first of all, the principles of procedural, distributional and recognition of energy justice were examined. In the context of these three principles, examples of energy cooperatives were examined in terms of their applicability to the energy system and it was discussed whether energy cooperatives are a concrete model that can realize energy justice.

1. Introduction

Energy is used in every aspect of our lives. Sufficient energy is needed to maintain even the lowest quality of life. The fact that energy is of vital importance for life and the disproportionate distribution of such a strategic input over the world brings along a series of inequalities. In particular, the use of fossil energy sources has led to environmental problems such as global warming and climate change and have caused human rights violations and military conflicts and created serious injustices. Discussions to understand

where and how injustices arise and who are most affected by injustices have revealed the concept of "energy justice".

Energy justice has had a widespread literature in recent years. Its origins come from environmental and climatic struggles. Scientists, who evaluate that the traditional energy system is the basis of many injustices, establish the basic principles for the adoption of a new energy production approach. For this purpose, this study wants to answer the following questions: (1) Does energy cooperatives offer a production approach that contributes to energy justice? (2)

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Are energy cooperatives a suitable model for achieving energy justice? (3) Can it play an active role in establishing a more equitable energy system?

In the first part of the study; the historical origin of energy justice, its conceptual framework and the basic principles of energy justice are explained. In the second part, examples of energy cooperatives in different countries are examined. Then, in the conclusion, energy cooperatives are discussed in the context of energy justice.

2. Origins of the Energy Justice

Energy justice is based on the concepts of environmental justice and climatic justice. Environmental justice emerged in the United States (USA) in the early 1980s following a debate that communities of color and the working class often faced disproportionate environmental burdens and that legislation did little to protect such communities. The scope of the environmental justice concept has also spawned the climate justice movement, which addresses acute climate change issues facing communities of color and low-income communities. This has led to the environmental justice movement, which focuses more on local issues, gaining a global character (Baker et al., 2019).

Both environmental justice and climate justice combine the procedural and substantive requirements of the definition of justice. Basic principles of environmental justice includes ensuring full participation in the development, implementation and enforcement of environmental laws, regulations and policies with the aim of equitably distributing the burdens and externalities in the development process. On the other hand, climate justice addresses the disproportionate burdens of vulnerable communities due to climate problems and develops methods for them to be at the forefront of climate-related debates (Heffron & McCauley, 2018). Energy justice reflects the procedural and substantive demands of environmental justice and climate justice movements and is based on these two concepts of justice (Baker et al., 2019).

The term energy justice was used for the first time in the literature in 2010 in the article "Energy Justice and Sustainable Development". But the article is about sustainable development rather than energy justice (Guruswamy, 2010: 659). In the book entitled "Energy Justice in a Changing Climate" published in 2013, energy justice was emphasized, but rather than the conceptual framework of energy justice, the term's relationship with climate changes and other issues was mentioned in the book (Bickerstaff et al., 2013). McCouley et al., in their article titled "Advancing Energy Justice: The Triumvirate Of Tenets" published in 2013, explained energy justice with three tenet framework: distributional, procedural, and recognition justice. Hall (2013), Jenkins et al. (2014), Fuller and McCouley (2015), Jenkins et al. (2016) and Savocool (2013) have discussed the concept of energy justice more broadly. The concept of energy justice has attracted more attention with the book "Energy Justice: Re-Balancing the

Trilemma of Security, Poverty and Climate Change" published by McCouley in 2018 and the book "The Energy Workbook" published by Baker et al. in 2019.

3. The Conceptual Framework of Energy Justice

The dependence on fossil fuel-based production systems to meet the increasing energy demands creates a significant injustice in energy. On the other hand, our high-carbon power generation systems are designed to meet the needs of industry, commerce and the global economy rather than securing people's basic energy needs. The existence of energy resources is a matter of values, morality and justice beyond meeting the increasing global energy demands. It is a must to secure the energy need by using sufficient resources (McCouley, 2018).

All societies suffer more or less from energy injustice. The causes and consequences of energy injustices are listed below:

Table -1: The causes and consequences of energy injustices

Causes of energy injustice	Consequences
Energy systems inefficiency	Waste generation, Reduction of easily accessible resources, Reduction of quality fuels
Negative Externalities	Pollution during oil extraction or transportation, Destruction of agricultural and forest areas to reach coal, Leaks that may occur during the nuclear fuel, Air pollution
Human rights violations, social instability and risks of military conflict	Accidents, explosions and health problems Global conflicts Damage to the habitats of indigenous people
Deprivation of the right to decide	Indigenous communities, low income people, tribes are the groups most affected by the negative effects of harmful facilities.
Subsidies that harm the market system	Subsidies to fossil industries increase fossil fuel consumption and use. There is a transfer of wealth from those who provide subsidies to those who receive them.
Lack of fair and affordable access to energy	In some regions, the people do not have access to electricity. Especially women have to carry water from distant areas. Health problems arise.
Climate change and global warming	The carrying capacity of the planet is starting to run out. Environmental pollution is increasing.

Source: Derived from the studies of Gerrard (2015), McCouley (2018) and (Savocool and Dworkin, (2014).

The search for solutions to energy injustices has encouraged scientists to work on energy justice. Energy justice, in its shortest definition, is defined as the enforcement of rights (both social and environmental) in each component part of

the energy system (Jenkins et al., 2016). Energy justice aims to achieve equality in both social and economic participation in the energy system. It aims to manage energy in a more accessible, affordable, clean and democratic way for all communities. At the same time, energy justice adopts a model that will remedy the injustices of the mining economy in various sectors, while fighting for the transition from fossil fuels to a low-carbon renewable economy (Baker et al., 2019).

Energy justice is based on three main principles. These are procedural justice, distributional justice and recognition justice.

3.1. Procedural Justice

Procedural justice refers to the establishment of mechanisms to achieve fair results through greater public awareness of energy and better institutional representation (Gibson-Wood & Wakefield, 2013). In other words, it is the involvement of people in decision-making processes regarding energy system infrastructures and technologies (Sari et al., 2017).

Every year, millions of people are forced to migrate involuntarily due to energy projects in violation of modern legal processes. In the last fifty years, 80 million people have been displaced by the construction of 300 large dams. In Brazil, Ghana, Indonesia and South Africa, 15,000 to 37,000 people are displaced each year due to mining activities. Between 1950 and 2009, 2.6 million people in India had to migrate as part of mining or energy projects. Such practices can be framed as violations of procedural justice (Sovacool et al., 2016).

Public access to local information is critical for procedural justice. For example, the Samis, the indigenous people of the region, were asked for help for wind farms to be built in the northern regions of Finland. The Sami people, who are engaged in fishing and reindeer husbandry, are heavily dependent on the ecosystem of the region. Wind farms to be built threatened to disrupt reindeer populations. The wind farm company asked Sami people for guidance on the location of the construction. In this way, the power plants were established without harming the lifestyle of the local people (McCouley et al., 2015).

Procedural justice requires the involvement of government and industry officials as well as meaningful public participation. In this context, government representatives may also require public consultation in environmental decision-making processes (Jenkins et al., 2016). Public sharing of policies and industrial plans can be an impetus to further encourage a society's choice of energy production (Schwanitz et al., 2014).

There is unequal representation in a wide range of institutions such as businesses and governmental institutions. This inequality has an impact on the decision-making. Gender and ethnic minority inequalities in governing bodies have been observed for a long time. As a result, hegemonic structures emerge in the governing bodies

and decisions are taken in favor of interest groups (Jenkins et al., 2016). White men make up 84% of those working on the boards and management teams of energy companies (RRA, 2013). In a study conducted in the oil and gas sector, it was revealed that 72% of the employees are male and white (BP, 2013). This and similar studies show that minorities and genders are not equally represented. It is necessary to ensure greater representation in institutions of women and non-white minorities most affected by energy injustice.

3.2. Distributional Justice

Distributional justice deals with how social benefit is shared across society. The study of Sovacool et al. (2019) on energy justice reveals that most of the energy transition injustices in countries are distributional inequalities. Distribution is geographically uneven in nature. The energy poverty of the household is primarily determined by the physical conditions of the settlements. For example, households in countries with cold climates spend a larger portion of their income on heating. In these countries, heating is usually 10% of income. However, in regions where energy is distributed unequally, the share of heating rises above 20%. Many spatial features such as energy inefficient buildings, inadequate insulation and lack of access to energy carriers create inadequate energy services and high costs (Bouzarovski and Simcock, 2017).

It is very important to understand where inequalities arise and how inequalities are distributed in a particular energy system (McCouley, 2018). In some cases, inequity relates not only to the location of infrastructure but also to access to energy services. From a consumption perspective, the transformation of energy services can cause unequal distribution of loads. Sometimes even well-intentioned energy conversion projects can lead to unequal distribution of costs. For example, the German government has guaranteed access priority and profitable prices for renewable electricity producers. The high investment costs were reflected in the electricity bills. Therefore, low-income communities had to pay a relatively higher share of their total income for energy costs. Energy transformations made in this way are worrisome in terms of distributive justice (Jenkins et. al., 2016).

Whether inequity is physical or financial, reorganizing the distribution of energy equitably on a global scale is a highly complex process. Therefore, local energy transformations are the more logical option, with the benefit of the communities most affected by inequality.

3.3. Recognition Justice

The process of determining where inequalities arise and which segment of society is affected is called recognition justice (Heffron and McCauley 2017; Jenkins et al., 2016; McCauley et al., 2013). Sometimes neglected segments of society can be overlooked in determining where injustices occur. This is known as misrecognition.

Environmental justice literature from the 1970s says we should call attention to socially deprived groups or ethnic minorities (Houston, 2013). Disadvantaged groups should also be taken into account, considering that there may be an energy injustice due to poverty or race. For example, the fuel poverty movement in the US and UK has focused on older people (Sovacool 2015; Liddell and Morris, 2010). The movement wants to draw the attention of national governments to inequalities in domestic energy systems based on heating. Recent research has highlighted the lack of access to affordable heating in the community for the disabled or less able groups (Lalvani 2013; Ball, 2000).

4. Energy Cooperatives in the framework of Energy Justice

Cooperative is defined as an autonomous association of persons who voluntarily come together to meet common economic, social and cultural needs, jointly and under democratic conditions. Cooperative refers to a form of business both owned and managed by members. The core values are the principles of self-sufficiency, self-responsibility, democracy, equality and solidarity (ICA, 2021). Cooperatives are mostly seen as agricultural production unions. Energy cooperatives, on the other hand, are defined as cooperatives established to produce, sell, consume or distribute energy or other services related to this field (ILO, 2013).

It is a process in which the public is included in the energy production chain and the form of energy production is radically changed (ILO, 2013). Integrating the public into sustainable economic processes, involving them in renewable power plants has a positive impact on transparency and democratic structures in society. In order to ensure a healthy energy transition, it must be accepted at all levels of society. Public energy projects have the ability to design and change society. Energy cooperatives have goals such as creating value chains on a regional basis. There is evidence that these value chains are getting stronger in regions that promote decentralized energy production (George, 2012; Aretz et al., 2010). Regional economic power can be increased through two effects. First, the use of renewable energy sources reduces dependence on fossil energy imports. Second, the transition to a sustainable power generation system can help mitigate the effects of demographic change, particularly in rural areas affected by job loss, infrastructure, migration to cities and aging populations (Staab, 2015). Energy cooperatives provide an opportunity to increase regional confidence by using regional value chains, direct visibility of investments and knowledge of local conditions (ILO, 2013).

Although there are regional differences, energy cooperatives generally consist of three organs. There is a general assembly, an executive committee and a supervisory board with a simple and functional organizational structure. While the board of directors carries out the responsibility of the cooperative, the supervisory board also supervises these

activities. The General Assembly is the highest legal body of the cooperative, which elects the supervisory board and decides on the bylaw changes and other fundamental issues. Every cooperative has a charter as an internal constitution that complements the legal provisions and defines the cooperative's structure, powers and objectives (Eichermüller et al., 2018).

Energy cooperatives are a viable model for planning, financing and implementing renewable energy projects and offer many advantages (Havet et.al., 2009; ILO,2012; Schreuer, 2010):

- Provides access to electricity in rural areas
- Offers affordable prices.
- Offers a sustainable investment opportunity
- Promotes renewable energy
- Improves energy production at local level and contributes to local development
- Improves innovation

5. Examples of Energy Cooperative

This section presents a number of cooperative examples that provide information on the diversity, scale and types of energy cooperatives. There are different types of energy cooperatives in the world, and different types of cooperatives can be seen according to the development level of the countries.

5.1. Rural Energy Cooperative Examples

Rural areas are areas where it is difficult to transport electrical energy. For-profit companies are often reluctant to deliver electricity to rural areas where they find the investment too costly or the venture unprofitable. However, these types of companies have been the only energy providers for rural areas for a long time. The lack of market incentives for for-profit enterprises in rural electrification has left most rural areas without electricity. For these reasons, the energy cooperative model with subsidized initial costs in rural areas was introduced. While mostly biomass materials are used as an energy source, there are also cooperatives that benefit from wind and hydro energy. Governments subsidize rural energy cooperatives directly through energy programs, through municipalities and private enterprises, or through partnerships (ILO, 2013).

Bangladesh's rural electrification program is one of the examples of rural energy cooperative implementation. It was inspired by the examples of rural electrification in the USA in the late 1970s. Activities have been carried out under the auspices of the Rural Electrification Board (REB) since 1977. There are 80 rural energy cooperatives in Bangladesh. These cooperatives are called Palli Bidyut Samities in Bangladesh as PBS for short. REBs and PBSs work with rural communities to create new PBSs (REB, 2021). In 2007, approximately 16,000 people were employed in PBSs.

More than 219,000 kilometers of distribution lines were established and electricity was delivered to 47,650 villages. Thanks to the electricity delivered, more than 170,000 water pumping stations have been activated. As a result of this initiative, approximately 30 million people have had electricity (NRECA, 2021).

Each PBS prepares a master plan within its operational area and implements it through elected representatives to the PBS governing body of the rural consumer members. REB sets retail prices for each cooperative's consumers, taking into account an amount to cover operating costs, maintenance and repair costs, depreciation and financing rates (UNDP, 2009). Thanks to rural energy cooperatives in Bangladesh; due to the decrease in the use of kerosene, the traditional fuel form, socio-economic developments such as annual savings of US\$ 3.74 million, an income increase of up to 64% in houses with electricity, and a decrease in infant mortality rates have occurred (REB, 2021).

Another example of a rural energy cooperative is located in Cambodia. The first rural energy cooperative in Cambodia was established in 2005 under the name "Community Energy Cooperative Small Business and Livelihood Development Project". Using biomass energy, the facility provided electricity to more than 290 households. Key factors in the project's success included the project's financial sustainability and its ability to provide cost-effective energy. It has expanded its cooperative membership to 160 new households, reducing greenhouse gas emissions and relieving pressure on local forests (UNDP, 2008).

Energy cooperatives in Costa Rica mainly focus on rural electrification. More than 98% of the country's population has access to electricity. This situation makes Costa Rica an exceptional country in terms of Central America. There are four cooperatives operating in rural areas in the country. The main objective of these cooperatives is to achieve rural electrification levels in accordance with the requirements of the law on the participation of rural electrification cooperatives (NRECA, 2021). Energy cooperatives in Costa Rica are responsible for a distribution network that spans over 7,000 kilometers and supplies approximately 150,000 customers. But they can meet 34% of the demand. The remaining demand is provided by public electricity providers. With the new projects, it is aimed to meet 80% of the demand from rural energy cooperatives (GTZ, 2007).

Located in the USA, the National Rural Electric Cooperative Association (NRECA) is the national service organization for more than 900 nonprofit rural electric cooperatives and public electric districts. Through its programs, Touchstone Energy, it collaborates with more than 700 local consumer-owned cooperatives in 46 states. More than 80% of energy cooperatives offer electricity from renewable sources (NRECA, 2021).

5.2. Wind and Solar Energy Cooperatives

It is a cooperative model consisting of wind and solar photovoltaic (PV) production facilities. These types of facilities are mostly located in developed countries as they require a high level of installation cost. When it comes to wind energy, it is important that local communities are part of the process to plan the deployment and operating model of wind turbines. The cooperative model is appropriate in this respect.

5.2.1. Danish Wind Cooperatives

Middelgrunden wind farms are the best-known examples. It is responsible for a total of twenty turbines, ten of which belong to it and ten of which belong to the Copenhagen municipality. In 1996, the Copenhagen Environment and Energy Office identified the wind energy potential in Middelgrunden. A study was conducted to investigate the feasibility of an offshore wind farm and a working group of citizens interested in wind energy was formed. This led to the establishment of the cooperative in 1997. A contract was signed between the cooperative and the utility company after two years of negotiations. After final approval in 1999, construction began in 2000. About 40,500 shares were sold to the more than 8,000 members of the cooperative. The only direct government support for the Middelgrunden cooperative project was in the form of a loan from the Danish Energy Authority to finance the comprehensive feasibility study (Middelgrunden.dk, 2021).

Lynetten is an energy cooperative with seven wind turbines of 600 kilowatts (kW) each. About 900 members own 3,600 shares. The cooperative in Hvidovre has three turbines of 3.6 MW each, 2,300 members and 10,700 shares at 570 euros each. Established in 2013, the Prøvestenen energy cooperative, which operates three turbines with a power of 2 MW each, has distributed 4,000 shares to more than 1,800 members at a price of 663 euros. Together with the Hvidovre cooperative, two out of every three turbines are organized as public property.

Danish wind energy cooperatives have a mixed membership structure. While all cooperatives are open to new members, member recruitment is only made by current shareholder decisions. In this way, a member can enter the cooperative by buying shares from another member. The reason for this practice is not to decrease the income per share by increasing the number of members excessively. Membership numbers are generally stable, as shares are rarely traded (Bohnerth, 2015).

The 2009 Danish Law on renewable energy obliges all new wind energy projects to provide at least 20 percent ownership to local residents to encourage local participation and ownership in new wind energy projects. Therefore, establishing a cooperative has become an attractive option. Local policies have also had a significant impact on the viability of community initiatives. In addition, it has become easier to obtain financing for the purchase of cooperative shares, with some local banks providing loans almost

automatically and taking the shares as collateral (Rebelgroup, 2011).

5.2.2. German Energy Cooperatives

Community-owned wind turbines are common in Germany. Buying a stake in a wind energy cooperative equates to financial support for local and environmentally friendly power generation (Toke, 2008). The motivation to be part of a cooperative is also to promote the energy transition towards renewable energies, which was the original idea behind the cooperative's establishment.

One of the important cooperatives in Germany is the Elektrizitätswerke Schönau (EWS), which has its origins in the anti-nuclear movement. It has more than 4,000 members, 155,000 to 160,000 customers. Its total capital is 34 million Euros. In order to become a member of the cooperative with the maximum contribution application, it is necessary to purchase five shares with a minimum of 100 and a maximum of 10,000 Euros. The cooperative also buys electricity generated from renewable sources such as wind and hydro produced in Norway, Germany and Austria.

Energiegenossenschaft Starkenburg was founded in 2010 by 13 people. It currently has 720 members. The cooperative operates two wind turbines and 12 solar panels. In a study conducted with cooperative members, it was determined that the main motivation of 40% of the members is interest in sustainable lifestyle, 30% of them aim to reach self-efficacy with collective consciousness, and 30% of them invest in a clean energy and ethical structure. The democratic and participatory organizational structure of the Starkenburg cooperative, which makes every member equal, ensures that a large number of people are involved in the projects. The need for large amounts of financing to establish cooperatives complicates the work, but raising awareness of more people on energy transformation and justice increases the interest in projects with democratic participation (Bohnerth, 2015).

Greenpeace Energy is the largest energy cooperative in Germany with 20,000 members and over 100,000 customers. It was established with the aim of meeting the demand of more than 10,000 citizens who want to consume electricity from renewable energy and that large providers are not willing to produce 100% renewable energy. For more than a decade, the cooperative has been producing and supplying green energy at affordable prices to its members and customers. Given the German Government's decision to phase out nuclear power generation, such initiatives are likely to see growth. Therefore, organizing a renewable energy supply will probably become more important (Toke, 2008).

5.2.3. UK Energy Cooperatives

Most wind farms in the UK are owned and managed by companies. However, in recent years energy cooperatives have grown by 24%, making them among the fastest growing cooperatives in the UK cooperatives sector. The Baywind energy cooperative is the first publicly owned

wind farm in the country. It was established in 1996 when community members had the opportunity to own part of a medium-sized wind farm in Cumbria. The cooperative has raised the capital required to purchase the turbines through share offers.

In January 2015, High Winds a Society for the Benefit of Community raised £3.9m to build two new high-power turbines at the Harlock Hill site near Cumbria. The turbines were built in early 2016 and started production in the summer of 2016. The cooperative, which gives priority to local investors, ensures that the local community benefits economically in this way. The cooperative currently has 1,217 shareholders. Owning a stake in a local wind power project has helped local people understand wind power generation in general (Baywind Coop., 2021).

In 2003, Wales' first community-owned wind turbine was installed in Machynlleth, Wales. Production started with a 75 kW wind turbine purchased second-hand from Denmark. In 2010, a 500 kW wind turbine was built. One third of the profits from the sale of electricity produced by the wind turbine goes to the community energy fund. This fund pays residents for consulting services on energy efficiency and insulation of homes (Kunze and Becker, 2014).

Another energy cooperative in the UK is the Gigha Heritage Trust on the island of Gigha, where 98 people live. Located in Scotland, the cooperative receives financial support from two public institutions. In 2004, it started production by connecting three wind turbines with a total of 225 kW to the grid. The profits are used to renovate buildings on the island and modernize the electrical infrastructure from the 1950s (Kunze and Becker, 2014).

5.2.4. Energy Cooperatives in Turkey

There are two basic regulations regarding the legal framework of renewable energy in Turkey. "Regulation on Unlicensed Electricity Production in the Electricity Market" dated October 2, 2013, and numbered 28783, and "Regulation Amending the Regulation on Unlicensed Electricity Generation in the Electricity Market" dated October 22, 2016 and numbered 29865 (EMRA, 2021). With the regulations, it has become possible to establish and operate renewable energy cooperatives in Turkey. Cooperatives can be established by at least seven subscribers of the same type, without the requirement of a common connection point, and can produce electricity up to a maximum of 5 MW, within the same distribution region, through consumption aggregation (T.R. Ministry of Commerce General Directorate of Cooperatives, 2021). With the regulation change in 2016, 100 members for 1 MW energy production, 500 members for 2 MW energy production, 1000 members for 3 MW energy production and more than 1000 members for maximum 5 MW generation must be registered to the cooperative.

The first renewable energy cooperative is the Aegean Electricity Energy Production Cooperative, established in Denizli. The cooperative, which was established with seven

founding partners, has found the necessary land for the enterprise and continues its preparations for the application. Karaman Craftsmen Electricity Production Cooperative is the second cooperative established. The aim of the cooperative, which was established with 7 people, is to meet the electricity needs of the local tradesmen. Çorum Renewable Energy Cooperative was established in 2016 with 7 founding partners. The facility plans to produce 600 kW of electricity using PV panels with an investment budget of 2 million 200 thousand TL (Solarist, 2021). Kayseri Furnituremakers Renewable Energy Cooperative has 240 members and was established in 2018. It is aimed to produce 7 GWh of electricity per year with a capacity of 5 MW installed on a roof area of 36.000 m² (T.R. Ministry of Commerce, 2018). Amasya Renewable Energy Cooperative was established in 2016 with 7 members. It has applied to the Middle Black Sea Development Agency for the financing of a 600-kW solar power plant. İzmir Renewable Energy Cooperative is the first cooperative established with 10 founding members. Nilüfer Renewable Energy Cooperative was established with 7 founding members in the first stage and increased the number of members rapidly. This initiative, which is generally established by the employees of the municipality, has also set wind energy as a target. Another local government supported initiative is Seferihisar Renewable Energy Cooperative. The main purpose of the cooperative, which was established with 7 founding partners, is to produce the energy needs of public areas from renewable resources (Seyeko, 2021). Çanakkale Troya Renewable Energy Cooperative was established in May 2017 with 8 members. There are currently 13 members within the cooperative. Troy Renewable Energy Cooperative has decided to use solar energy and intensified its work in this area, which can be less costly than wind energy and can be promoted more easily by the local people. The cooperative, which plans to establish a 250-kW solar power plant in the first place, plans to share the electricity produced with the local people (Yenkoop, 2021).

5. Conclusion

Energy justice enables to see where injustices arise, recognize negatively affected parts of society and provide policies to address problems.

Energy justice provides a conceptual framework. The energy cooperative model is suggested as the application of energy justice. We propose energy cooperatives as a viable method for the transition from fossil fuel to renewable energy. Thanks to rural energy cooperatives, millions of people have access to electricity. Especially in low-income countries, many cooperatives are established by using donation and support methods. Rural cooperatives, which are mostly seen in South Asia, are expected to be implemented in Africa over time.

Energy cooperatives are not only an economic institution, but also an example of a different ownership structure. It is the rebirth of the cooperative as an organizational form, at

least in Western Europe. The fact that each member has equal voting rights and a voice in cooperatives provides a different structure from traditional capital-based business management. Cooperatives provide a practice of democratization not only in the energy field but also in many other fields.

There is great interest in energy cooperatives in developed countries. In developing countries, however, legal barriers still exist. This situation hinders the realization of procedural justice. The energy cooperatives we examined contain economic differences between countries. In this respect, energy cooperatives are established with different legislation according to different priorities. In South Asian examples, the aim is to bring electricity to the poor masses, while in Europe it is to achieve a fair renewable energy conversion or to generate electricity with clean energy sources. This difference is quite natural. Since the installation costs of renewable energy systems are quite high, it is very difficult to establish a power plant with a membership system in low-income countries. In such cases, governments, local governments, donors and international supporters can finance energy cooperatives. Sometimes, as in the case of Middelgrunden, local governments can be direct supporters of cooperatives, or, as in Turkey, businesses belonging to a certain business sector can unite and establish an energy cooperative. We observe that energy cooperatives, established in many different purposes and ways, implement at least one principle of energy justice, consciously or unconsciously. We conclude that it is possible to establish a fairer energy system with energy cooperatives in an environment where legal barriers are completely removed, and international solidarity is ensured.

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