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Research Paper

The Renewable Energy Cooperatives in Turkey

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Objectives : The world is getting more polluted day by day and living conditions are getting harder and harder. The Covid 19 process explains this situation even better. Global warming will show its effect more heavily if measures are not taken. There is a close relationship between global warming and the type and method of energy used. The use of fossil fuels by people pollutes the environment too much, and the use of alternative energy sources is gaining importance instead. Here, the issue of use and management of renewable energy sources comes to the fore. Turkey is a country with rich renewable energy resources and experience in cooperatives. In this study, it is aimed to reveal the current situation and problems of renewable energy cooperatives, which can be a model for managing Turkey's renewable energy resources.

Methods : In the study, a literature review method was used by examining domestic and foreign resources related to renewable energy and renewable energy cooperatives. Some of the data obtained were arranged in tables and used in the study.

Results and Discussion : It is very important for Turkey to develop renewable energy resources and increase the share of renewable energy resources among other resources. Because Turkey is a developing country and its population is increasing day by day. It is essential to use renewable energy for the energy need of the increasing population and the least environmental pollution. Within the scope of 2023 targets in Turkey, it is planned to produce 34 thousand MW of hydroelectric, 20 thousand MW of wind energy, solar energy, 5 thousand MW, 1,000 MW of geothermal energy and 1,000 MW of geothermal energy and biomass energy. In order to achieve this goal, it is planned to invest approximately 60 billion dollars in renewable energy sources. Cooperatives are one of the most effective ways in which Turkey can use its renewable energy resources. Because cooperative is a method known to the Turkish society and it would be beneficial to transfer it to the renewable energy field.

Conclusion : Turkey is a developing country and its energy needs are increasing day by day. It is very important to use the renewable energy resources it has correctly and in a planned way. In this respect, it should be understood that renewable energy cooperatives are quite compatible with Turkey. Turkey should provide the necessary legal and administrative structure for the development of renewable energy cooperatives and develop it with financial support in order to make its increasing energy needs sustainable.

Keywords : A renewable energy cooperative, cooperative, energy, renewable energy

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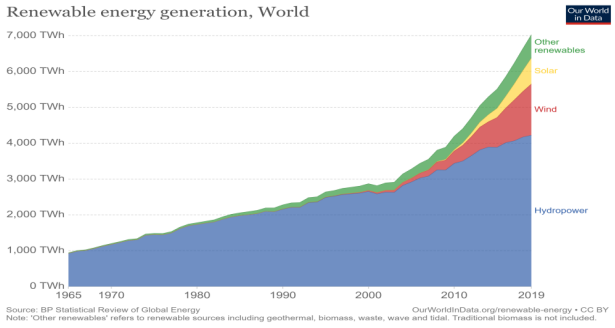
1. Introduction

Renewable energy encompasses all renewable resources, including bio-energy, geothermal, hydropower, ocean, solar, and wind energy. One hundred percent renewable energy means that all sources of energy to meet all end-use energy needs in a certain location, region, or country are derived from renewable energy resources 24 hours per day, every day of the year. Renewable energy can either be produced locally to meet all local end-use energy needs (power, heating and cooling, and transport) or can be imported from outside of the region using supportive technologies and installations such as electrical grids, hydrogen, or heated water. Any storage facilities to help balance the energy supply must also use energy derived only from renewable resources.[1-3] Since the Industrial Revolution, the energy mix of most countries across the world has become dominated by fossil fuels. This has major implications for the global climate, as well as for human health. Three-quarters of global greenhouse gas emissions result from the burning of fossil fuels for energy. And fossil fuels are responsible for large amounts of local air pollution, a health problem that leads to at least 5 million premature deaths each year.[4-6]

Hunting and gathering people to meet with agriculture, has brought it from the position of the nutrient food manufacturer. This situation is considered as the Agricultural Revolution and is considered an important stage in the history of civilization. It is accepted that the most important process in the development of humanity after the Agricultural Revolution and its transformation into modern society is the Industrial Revolution.[7] The industrialization and the use of the machine in mass production necessitate the existence of the energy that the machine can be used, and this requires the use of coal and other fossil fuels for that period. The relationship between the use of fossil fuels after the industrial revolution and the energy crises has led to new ideas, especially in the field of energy. The relationship between countries' desire to gain power and the ability to have and control energy has also constituted the infrastructure of new energy policies. The global environmental threats experienced in time with such energy policies have also been the basis for new policies.[8,9]

The Covid-19 crisis has slowed down deal-making in renewable in recent months, along with that in other sectors, and this will affect investment levels in 2020. However, governments now have the chance to tailor their economic recovery programs to accelerate the phase-out of polluting



https://ourworldindata.org/renewable-energy (2020).

Fig. 1. Renewable energy production in the world (1965-2019).

processes and the adoption of cost-competitive sustainable technologies. In 2019, the amount of new renewable power capacity added (excluding large hydro) was the highest ever, at 184 gig watts, 20 GW more than in 2018. This included 118 GW of new solar systems and 61 GW of wind turbines. Renewable energy 2030 targets already written into official policy by 87 governments around the world would mean the construction of an estimated 721 gig watts of new capacity in wind, solar, and other non-hydro renewable power technologies over the next decade, according to an analysis by BloombergNEF.[10] The amount of renewable energy production in the world is increasing every year. This upward trend can be seen in **Fig. 1**.

International Renewable Energy Agency (IRENA), total renewable energy production capacity in Turkey was 17 thousand 369 MW in 2010, this value in 2019 rose to 44 thousand 587 MW. According to the data capacity of 2019 MW of hydro capacity in Turkey, 28 thousand 503, 7 thousand 591 MW of wind energy, solar energy, 5 thousand 996 MW, 983 MW bio-energy, biogas 534 MW, and 1,515 MW of geothermal was. In particular, developing countries such as Turkey need intensive energy production. Thanks to the increase in energy production, industrial production and industrialization can also be supported. A large part of Turkey's energy needs is supplied by imports. This situation causes a current account deficit, economic dependency, and economic problems. Turkey 36° - 26° to 42° south parallels - is in a position located between the meridians 45° east. In this way, it experiences all four seasons. It has a high potential in terms of natural energy sources such as solar energy, hydraulic energy, geothermal energy, and wind energy. Thanks to the utilization of natural resources, new business lines are created and the national economy is supported.[11-14]

It is economically important for a country to have energy

resources, but it is not sufficient. Because of its usability is more important than the existence of that energy. Although there are many energy resources in many underdeveloped and developing countries, those countries are also dependent on foreign energy. This situation is quite dramatic. It is not a correct approach for a country like Turkey, which is rich in terms of renewable energy resources, to be externally dependent on energy. Turkey to make full use of renewable energy resources and should be able to effectively control this energy as you can manage it very well. Although there are various methods of this, the management of this energy will be more rational and permanent, especially through cooperatives. Due to the solidarity and solidarity phenomenon of Turks, cooperatives in Turks dates back to very old times. Turkey will be able to take great and lasting steps in the cooperative experience combining energy with renewable energy potential.[15)]

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2. Why Renewable Energy?

The economic and political events of the Industrial Revolution and its aftermath are largely the answer to the question of why renewable energy. Because the macro crises have deeply affected the world and this has caused the concerns to continue to increase. Within the framework of these considerations, a subject such as energy and especially renewable energy will inevitably come to the world agenda. Renewable energy can be defined as the energy that can be renewed faster than the amount consumed shortly. In general,

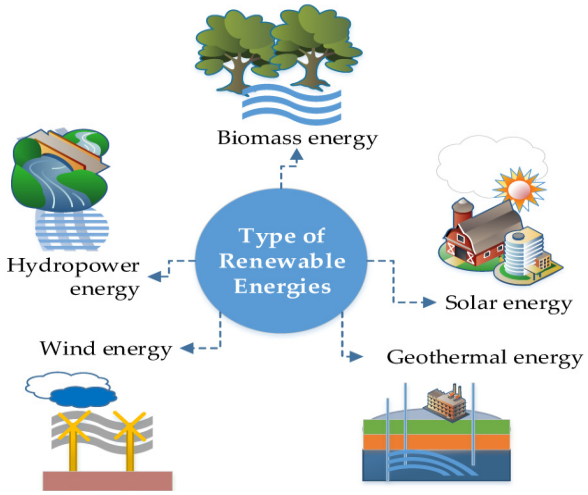

Fig. 2. Renewable energy sources.

renewable energy sources are considered renewable energy sources such as hydraulic, wind, solar, geothermal, biomass, wave, and non-fossil energy sources **Fig. 2**. One of the most important factors in defining renewable energy is that it is considered a clean energy source that is compatible with the environment. These features, which are expressed in renewable energy, briefly suggest that renewable energy has three distinct features such as being environmentally friendly, economical, and sustainable, not only the use of these types of energy resources but also their production. Renewable energy sources are the common values of all countries and are considered a global value. Besides these advantages of renewable energy, it can be said that renewable energy has also tolerable disadvantages. WWF (World Wide Fund) for Nature has a vision of a world that is powered by 100 per cent renewable energy sources by the middle of this century. Unless we make this transition, the world is most unlikely to avoid predicted escalating impacts of climate change.[17,18)] An example of this is the distance between the wind energy source and the consumption zone, distribution, and transmission problems (**Fig. 2**).

The use of renewable energy sources in the world and Turkey said it was about the three main reasons. These are increasing energy demands can be classified as the reduction of fossil fuels and environmental pollution. These reasons, in the coming years, the use of renewable energy and the legal, technical, and administrative steps to be taken in this regard also prepares the ground. In short, the use of renewable energy is considered as a sustainable, economic, ecological energy, and a strong expectation that the future will be used as the main source of energy rather than an alternative.[19,20)] Why

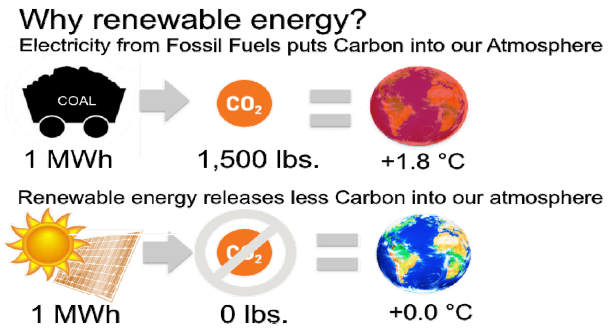

Fig. 3. Why renewable energy?

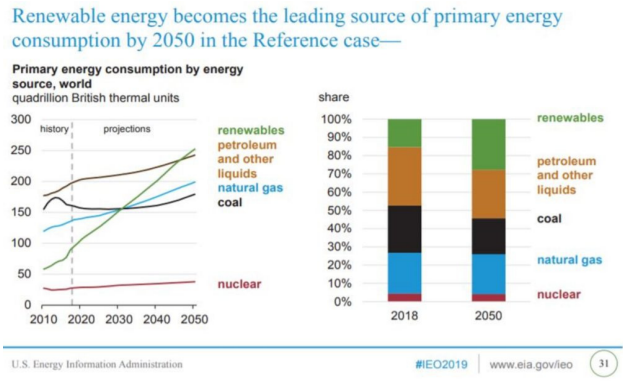

Fig. 4. The future of renewable energy in the world.

should renewable energy be used in the world? The economic reasons for this problem come to mind first. However, the main reason is that renewable energy is environmentally friendly and therefore human friendly (**Fig. 3**).

It is a fact that the use of renewable energy sources is caused by environmental pollution, increase population, and reduction of fossil fuel sources energy demand.[21,22] It is predicted that renewable energy will be used more in the coming years in the world. This situation can be seen in **Fig. 4**.

3. Renewable Energy Cooperatives in General

The use of renewable energy is made possible by state power or state-funded private entrepreneurs in many parts of the world. The most important reasons for this are the monopolization of the energy market, the large capital companies, and the fact that service in the delivery of this service, especially to the rural areas, lies at the same time. Also, the energy problem caused by the oil crisis in the 1970s and increasing environmental problems are among the reasons that increase public support for renewable energy. By 2050, Germany's energy systems are designed to be designed according to renewable energy systems.[23,24]

The idea of cooperatives in the production, distribution, and transmission of renewable energy is considered a very long-term practice. Especially in the US, an important role of the American Association of Rural Electricity Cooperatives NRECA in solving the energy crisis in the rural area after 1929 is an example of this.[25,26] In summary, the elements and requirements in the world to come to the forefront of renewable energy cooperatives can be listed as follows:

1. Monopolization energy coops de monopolize the system of energy investments by large capital companies, an absolute partnership, cooperation, and the idea of putting it at the local level.
2. Ensuring public support in this type of co-operative with the absolute process and making it sustainable through some advantages,
3. The generation process and the amount of energy of renewable energy are only suitable for small-scale investors and producers,
4. Renewable energy sources such as wind, biomass, solar, etc. are casual to use in rural areas,

The most fundamental principle in renewable energy cooperatives is the establishment of a system in the formation of state support or advantage. This system can be defined as the establishment of renewable energy cooperatives legal, administrative and financial support, and the provision of positive discrimination in the production, distribution, and transmission of energy by these cooperatives. In such a system, subsidizing the renewable energy co-operative to provide appropriate price support to the energy market is considered a special and important incentive. An example system that supports renewable energy cooperatives in this way is the application of (FIT) Feed-in Tariff.[27,28] There are many renewable energy cooperatives, mostly in Germany, the UK, and Denmark, including Canada, the USA, and Australia. The spread of renewable energy cooperatives has gained momentum in countries through the 'Feed-in Tariff', the Tariff Guarantee System.

Cooperatives may also provide services related to the provision of energy, such as advisory or training services. Some examples of renewable energy cooperatives in the world can be given in **Table 1**.

From the past to the present, it can be said that many countries have some experiences and achievements in renewable energy cooperatives. It is a fact that these countries are mainly in developed, industrialized, and urbanized countries such as the USA, Germany, Denmark, and England.[29]

Table 1. Some examples of renewable energy cooperatives in the World

Sequence No.	Country	Cooperative name	Activity
1	USA	Licking Rural Electrification Cooperative	Was established in 1936. It distributes electricity to 25.000 consumers. Its 32-mile transmission has a 3.072-mile distribution line
2	Germany	Friedrich-Wilhelm Raiffeisen FWR Energy Cooperatives GroBbardorf Solar Energy Roof Project	A solar panel with a capacity of 96 kW was installed in 2011, at a cost of € 190,000, on the roof of the facility, where the agricultural and animal wastes required for biogas were stored. The energy produced meets the electricity needs of the plant. In Germany, you could also refer to Bürgerwerke Heidelberg or Elektrizitätswerke Schönau, very innovative business models.
3	Denmark	Wind Energy Cooperatives Middelgrunden Energy Cooperatives	In 1997, 50/50 Municipal partnerships were established. The wind turbine with a capacity of 40,000 kW meets the electricity needs of nearly 50,000 houses.
		Samso Energy Cooperatives	Was established in 1997. There are 111,000 kW shore turbines and 102,300 kW marine turbines.
4	Britain	Baywing Energy Cooperative	Founded in Cambria, England in the early 1990s, the Baywind Energy Cooperative meets the energy needs of 1,100 homes today with 2,500 kW of electricity generated by the wind farm named Harlock Hill, which began operations in 1997 Willis & Willis, 2012. The shares of the cooperative, which has more than 1,300 partners, have reached the level of £ 1.2 million required to finance two wind turbine projects. Based on its experience in the renewable energy cooperative project, Baywind founded Energy4All in 2002 to promote wind farms. Energy4All supports cooperatives by bringing together people who are experienced in their fields to provide expert services to cooperatives in the field of renewable energy. Seven cooperatives are operating under the Energy4All umbrella and more than 7,000 cooperative partners.

(Baggio, et al., 2015)

Several factors play a significant role in the development and success of renewable energy cooperatives. These factors cannot only reveal the level of development of renewable energy cooperatives in that country but also the reasons and limitations. It can be said that these factors have various strengths or weaknesses in terms of restriction and opportunity generating.[30] They can be handled with analytical thinking as follows (**Table 2**).

Because of the above factors, to develop renewable energy cooperatives in a country, multi-faceted factor components need to come together and their strengths should be strengthened by eliminating their weaknesses. For example, it can be said that an important infrastructure was established in the development of this kind of cooperatives with the bank of cooperatives in England Davis, 1993.[31] There are some examples of renewable energy cooperatives in the world. These examples are generally more evident in Western European countries such as the USA, Germany, Denmark, and the United Kingdom. For example, the Licking Rural Electrification Cooperative, established in 1936 in the United States, now provides electricity services to around 25,000 people.[32] Some of these and other examples are shown in **Table 2**. The examples in **Table 2** can be further amplified, but in many countries, there is no complete relationship between the presence of renewable energy resources and the utilization of these through cooperatives. Especially rich in renewable energy resources such as Turkey, which has brought together the cooperative and savings is very important at this stage. The most important data that could reveal the renewable energy cooperatives in Turkey, Turkey's energy sources will be potential.[33-35]

Since the beginning of the 20th century, diminishing volume of energy resources and resulting the rise in energy prices gave rise to the notion of eliminating adverse effects of energy use, and thus necessitated research and placement into service of environmentally-friendly and renewable energy sources, and this trend has also opened the door for a new model: "energy cooperatives".[36-38] A cooperative can be defined as cooperation and economic activities based on cooperation. In this cooperation model, members voluntarily form an independent organization regulated by democratic rules in order to satisfy economic, social, and environmental needs. A cooperative can be defined as cooperation and economic activities based on cooperation. In this cooperation model, members voluntarily form an independent organization regulated by democratic rules in order to satisfy economic, social, and environmental needs. A cooperative can be defined as cooperation and economic activities based on cooperation.

Table 2. Strengths and weaknesses of renewable energy

Factor	Powerful direction	Weak side
Urbanization	Any kind of energy needs.	The use of fossil fuels and access to them may be easier for increasing needs.
Industrialization	Any kind of energy needs can improve the technology of rectifier and alternative energy source usage.	It can direct the energy needed by industry to large energy companies and this can lead to companies that are devoted to fossil fuels.
Technology level	Use of new technologies in renewable energy production	The development of technology can also develop new areas of use in energy based on fossil fuels.
Capital accumulation and structure	Create the necessary capital in the production of renewable energy.	Big energy can cause companies to monopolize.
Presence of renewable energy sources geographical and topographic structure of country and amount of sunshine etc.	It can provide maximum utilization of the sun, which is the main source of renewable energy.	Existing resources can be wasted and idle.
Knowledge and experience in cooperatives	This experience and knowledge can lead to the use of renewable energy through cooperatives.	This experience and accumulation can lead to co-operatives in capital-intensive areas.
The legal and administrative structure of the country on cooperatives	Renewable energy can lead to the easier and successful implementation of cooperatives	This legal and administrative disorder can make the installation of renewable energy cooperatives difficult.
Public supports and positive discrimination on cooperatives	Cooperatives with a relatively weak capital can benefit from this support and positive discrimination to be provided and become more powerful.	These supports and advantages can be exploited and public resources can be wasted.
Environmental pollution	The environmental aspect of renewable energy can increase the use of such energy.	Climate change caused by environmental pollution threatens to pollute renewable energy sources

https://academic.oup.com/jwelb/issue/13/2 (31.10.2020).

In this cooperation model, members voluntarily form an independent organization regulated by democratic rules in order to satisfy economic, social, and environmental needs.

Turkey, industrialized quickly after 1950, has taken a heavy migration from rural to urban parallel to this development and has entered the process of urbanization. In this case, when considered in conjunction with Turkey's growing population, it will be faced with an intense energy demand has also been revealed.[39,40] Turkey consumes over 6 exajoules of primary energy per year, over 20-megawatt hours (MW/h) per person. 88% of energy is fossil fuels and energy policy includes reducing fossil fuel imports, which were over 20% of import costs in 2019 and three-quarters of the current account deficit. Greenhouse gas emissions by Turkey are about 6 tons/ person in a year, which is more than the global average. Hydroelectricity in Turkey is the largest renewable source of electricity and in 2018 was 9% of primary energy with another renewable at 6% geothermal power in Turkey is used mainly for heating. By massively increasing the production of Turkey's solar power in the south and Turkey's wind power in the west the country's entire energy demand could be met from renewable sources. According to Turkey's Solar Energy Investors Association (GUYAD), Turkey generated around 44% of its electricity from renewable resources last year; detailed as 29.47% from hydropower, 7.13% from wind, 3.18% from solar energy, 2.74% from geothermal energy, and 1.34% from biomass and others. In addition this, Turkey's passionate 2023 vision, declares especially attractive goals for the renewable energy sector. For this reason, the Ministry of Energy and National Resources (MENR) encourages to increase the share of RES in electricity generation and it is striving to improve the whole capacity of renewables to 61,000 MW by 2023. 34,000 MW of this total installed generation will be composed of hydropower; 20,000 MW of wind power, 1,000 MW of geothermal, 5,000 MW of solar, and 1,000 MW of biomass energy. The total estimated cost of this object is almost 60 billion dollars.[41,42]

Table 3. The renewable potential of Turkey

Renewable energy source	Current state
Solar energy	The total established solar collector area within Turkey as of 2017 was calculated as being close to 20,000,000 m^2. As of the end of 2017, there were 3,616 solar power plants with a total installed capacity of 3,421 MW. This is the equivalent of 4% of the total potential. In 2017, electricity production based on solar energy realized 2,684 GWh, and 0.91% of our electricity production was obtained from solar energy
Wind energy	The land surface area of Turkey is nearly 800,000 km^2. There are many investments both in Turkey and the rest of the world, with increasing scales of wind energy, which is one of the most important renewable energy sources. The installed power of licensed wind power plants in Turkey was 6,353 MW by the end of October 2017. Turkey has 48,000 MW of wind energy potential and the total area corresponding to this potential is equivalent to 1.3% of Turkey's surface. These ratios represent a very advantageous geography for the efficient use of wind energy.
Geothermal energy	Turkey has approximately 1,000 geothermal springs that are located all over the country and have various temperatures. As of the end of 2017, there were 40 geothermal power plants with a total installed capacity of 1,064 MW. In 2017, electricity production based on geothermal energy realized 5,970 GWh, and 2.02% of our electricity production was obtained from geothermal energy.
Naturel gas	The import ratio of Turkey's natural gas, which is one of its most important sources of electricity production, is 99%. In natural gas, which seriously affects the dependency ratio of energy imports, 80 trillion cubic meters (43%) of total reserves are located in the Middle East; 54 trillion cubic meters (29%) of total reserves are located in the countries of Russia and the Commonwealth of Independent States, and 30 trillion cubic meters (16%) of total reserves are located in Africa/Asia-Pacific countries

https://www.mondaq.com/turkey/renewables/782900/energy-2019

4. RENEWABLE ENERGY POTENTIAL AND GIVE RISE TO THE USE OF RENEWABLE ENERGY IN TURKEY

In response to Turkey's growing energy demand, fossil fuel resources in terms of failure, these resources are also decreasing the threat and Turkey this fuel in general in the world to be importing a large proportion about 70% dependent on the outside should be considered a combination of such factors. Faced with this situation, Turkey is again the subject of alternative energy sources and the need to address seriously will be inevitable. Specifically, Turkey is drawing attention as potential renewable energy sources have a significant start that will be considered in solving the problem. As Turkey is dependent on oil and gas imports, it follows a development strategy that includes a nuclear and renewable energy agenda. As a result of Turkey's rapidly increasing energy demand, especially for oil and natural gas, the dependence on energy imports is increasing. Domestic sources can meet only about 26% of the country's total energy demand.[43,44] Turkey's potential to have related to renewable energy sources is presented by analyzing various reports and one of the Politics of the most important of these, Economic and Social Research Foundation SETA is the research that has been done.[45] Brief details of Turkey's renewable energy resources and potential are given in **Table 3**. As can be understood from **Table 3**, Turkey has good potential for renewable energy, is looking for ways to develop this potential.

According to reports in the press, and discovered 320 billion cubic meters of natural gas reserves in Turkey it is expected to be useful for many aspects of the economy in the Black Sea. Natural gas at a rate of 99 percent dependent on foreign countries, in Turkey, in 2019, 45 billion cubic meters of gas was imported and these imports about 12 billion payment, reveals the importance of Turkey's new natural gas reserves.

5. An Overview of Cooperatives in Turkey

In Turkey, a similar phenomenon *imece* (a kind of solidarity among the ancient Turks) and assistance to cooperatives are based on very old ideas. In the structure of Turkish society, the ideal of traditional cooperation and cooperation is not only an economic and social cohesion but also a political and sociological union, the nation, and the state.[42] The development of Turkish cooperatives is examined in two main periods, first in the Republic. Before the Republic established by Mithat Pasha is recorded as the first actual cooperative thinking and action in Turkey.[46]

Turkey in cooperatives, particularly in agricultural areas, including housing, artisans and artisans, marketing, insurance, education, and established a range of matters such as consumption has continued its activities. According to the National Cooperative Union of Turkey as of 2017 data, 30

659 units in total 5,788,239 people in Turkey cooperatives in various fields be common. It is a fact that this number is quite low when compared to the developed western countries and there are several reasons for this.[47)]

6. Renewable Energy Cooperative in Turkey

A cooperative can be defined as cooperation and economic activities based on cooperation. In this cooperation model, members voluntarily form an independent organization regulated by democratic rules in order to satisfy economic, social, and environmental needs. Some thoughts regarding cooperatives and the future development of renewable energy in Turkey are suggested. These general considerations and justifications can be classified as follows:

1. Turkey's increasing energy needs urbanization, industrialization, and population growth,
2. Almost 70% external dependence on energy fossil fuels,
3. The global scarcity of fossil fuels in the world and the expected global scarcity in energy failure,
4. Environmental pollution,
5. Turkey's renewable energy resources potential owners,
6. The experience and knowledge about Turkey's cooperative,
7. Turkey's economic and social structure,

Reasons expressed above regarding renewable energy cooperatives in Turkey, when taken as a whole, a necessity for Turkey and cooperatives of renewable energy is an inevitable fact that value comes to the fore. Briefly, renewable energy cooperatives are expected in Turkey, predictable and desirable, which would be a step in the direction of social as well as economic. Short of the steps taken in this regard, can meet Turkey's energy demand in the medium and long term, it can also be expected to eliminate the dependence on foreign energy in the medium and long term. Thus renewable energy cooperatives in Turkey, using the national power in the country's economy will have to start from the local and the country could be avoided providing sustainable development.[48,49)]

What is bearing the renewable energy cooperatives in Turkey can be collected in the following topics on the agenda.

1. Developments in the energy market in the world and Turkey,
2. The global public in Turkey and its reflections,

The first of the above-mentioned titles are closely related to the developments in the energy market in which the world can live or live from the past to the present and the future. This situation can be considered as a situation related to the global economic crisis that started in 1929, the similar energy crises, and the economic crises it created. It can be said that the developments in Turkey in an indirect relationship between predisposing and renewable energy cooperatives. However, developments in the second title can be described as developments that directly affect renewable energy cooperatives in Turkey. These developments, in particular, the global organization in which from Turkey, particularly the United Nations UN, International Labor Organization ILO, the International Cooperative feasibility ICE such structures, to make decisions that affect the international community, and which are reflected in countries like Turkey It can be considered.[50-52)] These are briefly;

6.1. The ILO's decision number 193 on the promotion of cooperatives in 2002

The ILO decision which requires the co-operatives to make contributions that are expected from them, on the other hand, to adopt the co-operation and solidarity with the key characteristics to compete with strong international companies by adapting to the developments in today's economic conditions at the international level. The ILO's decision was discussed on various platforms in Turkey and ILO 193 Recommendation No. Decisions Cooperative Policy and Legislation in the Light organized International Conference on 25-26 November 2004 in Ankara was discussed with reflections details of the issue in Turkey.

6.2. Adoption of 2012 by the UN as Y Year of Cooperatives Year 'and' Year of Sustainable Energy for All 2012

As is known, the issue of renewable energy and cooperatives was discussed in the 'Sustainable Development Conference' Rio +20 organized by the UN in 2012 and emphasized the importance of cooperatives in the energy initiative, which is a critical issue for sustainable development, poverty reduction and elimination of basic human needs. An effective public opinion has been created. The fact that cooperatives are a practical tool to develop the green economy, as well as the green economy, is one of the most important decisions to be approved in Rio + 20.

6.3. Post-2015 Development Agenda by the UN Secretary-General

In this context, the UN has announced 17 SDGs, one of which is to increase the share of renewable energy, to establish

international connections to modern energy services, to improve energy efficiency in different sectors, and to progressively remove the use of fossil fuels and to maintain sustainable energy.

6.4. Year of Cooperatives and Turkey Cooperative Strategy Action Plan 2012-2016

In this plan, some of the issues expressed as insufficiency in the Turkish cooperatives have been expressed, and specifically, the situation of energy cooperatives has been mentioned.[44)]

Today, our world is in a deep economic crisis; the growing need for food safety; the economic operation model of cooperatives is being taken into consideration while increasing environmental pollution and climate change. In the world, cooperatives have found their place in almost every area where social and economic needs are concerned. According to TURKSTAT data in our country, the cooperatives established for the last seven years are evaluated in terms of type and number; it is understood that most housing construction cooperatives, agricultural development cooperatives, and transport cooperatives were established. To ensure that the cooperatives are the actors that make greater contributions to the economy of our country, studies are being carried out to encourage them to take part in other sectors such as retail, credit, finance, insurance, energy production, education, and health. Compared to other country systems and practices, it is a known fact that the expected performance cannot be obtained from our country's cooperatives according to their potential. more housing construction in Turkey and focused in the field of agriculture cooperatives, retail applications, as in other countries, credit, and finance, insurance, energy production, education, did not take place in sectors such as health. On the other hand, Turkey Statistical Institute TSI for 2006-2009, Turkey Chambers, and Stock Exchanges Union (TOBB), established according to data from the year 2010 and closed when we look at the number of cooperatives; cooperatives, agricultural cooperatives, and transport cooperatives were the most established cooperatives.

Turkey in the international community's reflections expressed above for new renewable energy cooperatives formed an opinion on the subject in Turkey and has begun to take steps related to renewable energy cooperatives. In summary, a renewable energy cooperative in Turkey can be said that an attempt of three main factors compounds of this interference generally cooperative energy cooperative and that new and generally inaccessible for renewable energy cooperative within the scope caused the creation of a targeted model. Development of renewable energy cooperatives in Turkey, yet it is also true that the show but promising steps taken in this regard. Especially to overcome some problems in Turkey related questions will be the priority and urgency of cooperatives. These can be categorized under two headings: legal issues, regulations concerning the energy market, and regulations on cooperatives.

7. Steps Taken for Renewable Energy Cooperative in Turkey

Created the public about renewable energy cooperatives in Turkey, issues such as the need for energy and the environment, and has accelerated this kind of cooperative and effective way in a short time creation process in Turkey. As a first step, the legitimacy and legality of the issue have been tried to be solved by the legal regulations concerning the energy market and cooperatives.[53)]

These;

1. In Turkey, primarily to extend the use of photovoltaic systems, Renewable Energy Sources Act No. 5346, 2010 and revised legislative work on this issue was completed in 2013.
2. The first legal step for the establishment and dissemination of photovoltaic solar power generation and consumption cooperatives in our country is the co-operative constitution example, electrical energy generation for renewable energy cooperatives, and the main contract of the consumption cooperative.

In order to manage for renewable energy systems that can be created as well as these legal arrangements, an infrastructure study has been initiated on the applicability of the presumes, the model for renewable energy cooperatives, in which the Solar Energy Investors Association plans to combine the producer and the consumer on the same roof.

The basis of the legal steps for renewable energy cooperatives in Turkey, prepared in 2012, the National Cooperative Action Plan and by this plan, prepared in 2014, 'Turkey's National Renewable Energy Action Plan' form. These two fundamental texts published in Turkey in 2013 with 'unlicensed Regulation on Electricity Generation' with the emergence of individual meaning in Turkey obstacles for consumers combine to produce electrical energy has been removed. In this regulatory framework, the first renewable

energy cooperative Denizli/Tavas District was established in 2014 and so the first time renewable energy co-operatives in the changes in the Turkish legal system made in 2016 in Turkey took place in the legislation. The first cooperative establishment is Agea Electricity Energy Production and Consumption Cooperative. The first activity among the cooperatives that received establishment permission was the Kayseri Furnishers Renewable Energy Cooperative with 240 members. Founded in September 2017 and commissioned in August 2018, the cooperative aims to produce 7.5 million kWh of energy per year thanks to its first stage of electricity capacity of 5 MWp which is the maximum power of solar panels under test conditions established on a 36.000 m2 roof area. The cooperative solar power plant, Turkey has the distinction of being the largest rooftop plant (Damcı, 2018; Emre, 2014; Gozen, 2015). Turkey in the energy market, published in 2013 for the establishment of renewable energy cooperative Unlicensed Electricity Regulation Regarding Production Article 5 of the grounds, has been shown and these regulations with the addition made in 2016 have been introduced following regulations.[54-56)]

1. Up to 1 MW for the cooperatives which have a partner up to 100 persons,
2. Up to 2 MW to the cooperatives with 101 to 500 partners,
3. Cooperative with 501 to 1,000 partners up to 3 MW
4. Up to 5 MW of capacity was allocated to cooperatives with a capacity of 1,000 Mb.

As a rule, individual and more than one natural or legal person, the electricity consumed in their facilities for the consumption of electricity production facilities or facilities to install unlicensed electricity production facilities or facilities connected to the same connection point or electrical energy consumption can be measured with a single common meter is conditional. However, this requirement in the Unlicensed Electricity Generation Regulation is required to provide an advantage to the cooperatives by making it necessary for the consumption combinations made for the facilities established through renewable energy production cooperatives.

The above-mentioned regulations for renewable energy cooperatives are partly encouraged for these cooperatives and can make a breakthrough with the discrimination they provide. However, it is also very important in economic incentives regarding renewable energy cooperatives. These cooperatives need to operate in developed countries in similar mechanisms such as ‘Feed-in tariff’.

8. Economic Incentives for Renewable Energy Cooperatives in Turkey

A model article of association for electricity generation and consumption cooperatives was published in the Official Gazette on December 18th, 2013. Real persons and/or legal entities wishing to establish a renewable energy cooperative may make use of the said model articles of association.

By way of establishing renewable energy cooperatives, consumers embody a cooperative and combine their consumptions and jointly commission an unlicensed RES power plant. In principle, pursuant to the prevalent legislation, the energy consumption of the real persons/legal entities must be measured with a common counter or all energy consumption units registered in the name of relevant real persons/legal entities must be connected to the same point or transformer in the network. However, this rule does not apply to cooperatives as the Regulation sets forth an exemption for renewable energy cooperatives. Accordingly, the members of the cooperatives and the cooperatives themselves can satisfy their electricity needs and may receive revenue for the surplus energy within the scope of RES support mechanisms.[57,58)]

Moreover, renewable energy cooperatives are exempted from corporate income tax, pursuant to specific conditions set forth within Corporate Tax Law numbered 5520. According to these conditions, a renewable energy cooperative may be exempt from the said tax on the condition that its articles of association; (i) prohibits dividend distribution over the capital, (ii) prohibits the dividend share allocation to the chairman and members of the board, (iii) prohibits the distribution of reserves to partners, and (iv) obligates the cooperative to conduct business with its partners only. Furthermore, these provisions to be set forth within the articles of association must be abided in practice to be exempted from the said tax liability (Bilal and Bayrakçı, 2017).

9. Result and Discussion

Turkey on the renewable energy target of 30% of the national strategy is to take steps in line with WWF’s vision of 100% renewable energy and to reduce its dependence on fossil fuels. The fact that the current pricing in the Renewable Energy Law is far below the European and Northern Mediterranean countries strengthens the fossil fuel priority. Incentives for renewable energy, especially solar and wind

energy are very low compared to European countries. For incentives related to renewable energy projects, economic analyzes should be updated in the light of an increase in oil prices, and new studies should be carried out taking greenhouse gas emissions into account. Stronger and encouraging legislation for the effective use of renewable energy potential other than hydroelectric energy regulations should be implemented. With the still high investment cost of solar power plants, current legal regulations are not enough to encourage investors. In addition, the current law sets limits on the maximum allowable installed power potential. Turkey's solar and wind energy potential is reassessing the current targets should be increased. In terms of the diversity of renewable energy sources in Turkey, which has a favorable geographic location; It is imperative that decision-makers and the business world take urgent action to overcome this biggest problem of our age in order to reduce foreign dependency on energy resources such as oil, natural gas, and coal and to implement low-carbon development moves.

Develop renewable energy resources in terms of Turkey and increasing its share among other sources of renewable energy to diversify energy sources, reduce dependence on foreign sources, and thus needed energy supplies to ensure the security discarded or disposed of steps is very important. At this point, it is gratifying developments in the renewable energy sector in Turkey. When the already existing renewable energy capacity and the calculated total potential, given the opportunity to secure the future goals of Turkey it is very high. 34 thousand MW of hydropower within the scope of the 2023 targets in Turkey, 20 thousand MW of wind energy, solar energy, 5 thousand MW, 1,000 MW, and 1,000 MW of geothermal energy, biomass energy is planned to be produced. These objectives are in line with the year 2023 when Turkey's electrical energy demand of at least 30 percent of which including hydropower is planned to be provided by renewable energy sources. Approximately $ 60 billion is planned to be invested in renewable energy sources to achieve this goal. Turkey achieves its renewable energy targets in 2023 and proceeded to name all existing renewable energy investments that must make it active. Otherwise, these targets are merely numbers.

Currently, investors demonstrate a high demand for unlicensed electricity generation in Turkey; especially electricity generation from solar energy catches the most attention. Nevertheless, establishing such cooperatives and facilities have their own difficulties that lie in limited connection possibilities, coordination among relevant authorities, and the selection of plant locations. Furthermore, public awareness can be pursued to help people comprehend better the relevant regulation and applications in this sector.

The Covid 19 epidemic process has shown the whole world the importance of health and the environment. It has revealed the necessity of using the right energy with the right methods, especially on the environment. The world has been using fossil fuels for centuries and this situation threatens human life directly and indirectly. Therefore, the importance of the use of renewable energy in energy is increasing day by day. However, not only the use of renewable energy, but also its management is very important. Therefore, it is necessary for cooperatives to show themselves in this area.

Turkey is a country rich in cooperative experience and renewable energy resources. The combination of these two components will be a great gain for Turkey. For this, Turkey should remove all obstacles to renewable energy cooperatives.

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Declaration of Competing Interest

The authors declare that they have no know competing financial interests of personal relationships that could have appeared to influence the work reported in this paper.

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