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## RENEWABLE ENERGY POLICIES FOR SUSTAINABLE BUSINESS: COMPERATIVE STUDY BETWEEN EU AND TURKEY<sup>1</sup>

### SÜRDÜRÜLEBİLİR İŞ İÇİN YENİLENEBİLİR ENERJİ POLİTİKALARI: AB VE TÜRKİYE ARASINDA KARŞILAŞTIRMALI BİR ÇALIŞMA

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## ABSTRACT

Using energy effectively is important to achieve the goal of sustainable development. In the world today, energy consumption is increasing rapidly due to rapid increasing of world population. Therefore, energy demand is also increasing for urbanization, industrialization, widespread use of technology and electronic products, etc. Thus, the energy supply security become important. Countries has explored new renewable energy resources in order to reduce their dependence on fossil fuels imported from oil producing countries. On the other hand, the traditional energy sources are directly available on the nature. However, with the increasing of world's population, the natural resources are destroyed and the world is undergoing with climates changes. So it is important both individuals and institutions to learn the value of energy and have the knowledge how to use energy effectively. In order to achieve a better social and economic future, it is important to use energy more efficiently and to use new renewable energy sources. In this context, in this study, Turkey and the EU renewable energy policies and government supports provided to the enterprises in this field were examined and compared.

**Key Words:** Renewable Energy, Sustainable Business, Energy Policies in EU, Energy Policies in Turkey.

## ÖZET

Enerjiyi etkin kullanmak, sürdürülebilir kalkınma hedefine ulaşmak için önemlidir. Günümüz dünyasında nüfusun hızla artması nedeniyle enerji tüketimi hızla artmaktadır. Bu nedenle kentleşme, sanayileşme, teknoloji ve elektronik ürünlerin yaygın kullanımı vb. için enerji talebi de artmaktadır. Böylece enerji arzının güvenliği önemli hale gelmiştir. Ülkeler, petrol üreten ülkelere ithal edilen fosil yakıtlara bağımlılıklarını azaltmak için yeni yenilenebilir enerji kaynaklarını araştırmaktadırlar. Öte yandan, geleneksel enerji kaynakları doğrudan doğada mevcuttur. Ancak dünya nüfusunun artmasıyla birlikte doğal kaynaklar tahrip edilmekte ve iklim değişikliğe uğramaktadır. Bu nedenle hem bireylerin hem de kurumların enerjinin değerini öğrenmeleri ve enerjiyi daha etkili bir şekilde nasıl kullanabileceklerini bilmeleri önem arz etmektedir. Sosyal ve ekonomik anlamda daha iyi bir gelecek elde etmek için, enerjiyi daha etkin kullanmak ve yeni yenilenebilir enerji kaynaklarını kullanmak önemlidir. Bu bağlamda bu çalışmada, Türkiye ve AB'deki yenilenebilir enerji politikaları ve bu alandaki işletmelere sağlanan hükümet destekleri incelenmiş ve karşılaştırılmıştır.

**Anahtar Kelimeler:** Yenilenebilir Enerji, Sürdürülebilir İş, AB'de Enerji Politikaları, Türkiye'de Enerji Politikaları.

## 1. INTRODUCTION

Using energy effectively is important to achieve the goal of sustainable development. In the world today, energy consumption is increasing rapidly due to the rapid increase of world population. So energy demand is also increasing for urbanization, industrialization, widespread use of technology and electronic products, etc. Thus the energy supply security has become important. In addition, using

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energy is the main reason of the depletion of resources and the environmental pollution. Therefore countries have explored new renewable energy resources in order to reduce their dependence on fossil fuels imported from oil producing countries.

Many researches show that there is a relationship between the renewable energy and GDP per capita. Increasing the production of renewable energy will have positive effect on the economic growth for a short term and for a long term. Even there were several of wars for the energy sources throughout the history, especially in the Middle East. Particularly EU energy policies are important for renewable energy enterprises. Because, EU countries have mostly lack of energy resources and they have to depend on outside. So they have created technologies for renewable energy.

“The consequences of climate change, increasing dependence on fossil fuels, and rising energy prices make it even more pressing for the EU to put in place a comprehensive and ambitious policy on energy combining action at the European and Member States' level. In the framework of this energy policy, the renewable energy sector stands out for its ability to reduce greenhouse gas emissions and pollution, exploit local and decentralised energy sources, and stimulate world-class high-tech industries.” The strategic importance of renewables force States to use it. Because “Renewable energy sources are largely indigenous, they do not rely on the future availability of conventional sources of energy, and their predominantly decentralised nature makes our economies less vulnerable to volatile energy supply. Consequently they constitute a key element of a sustainable energy future” (Commission of the European Communities, 2008). Renewable resources are also key to sustainable growth. Sustainability; is to use natural resources without destroying nature and destroying ecological balance. Sustainable development is a concept that draws attention to the fact that economic development must be achieved without damaging the environment. It is an understanding against the consumption of non-renewable resources (Muslu, 2016).

To achieve a better future, it is important to use energy more effectively and to use new renewable energy sources. In this respect, the government energy policies and promotions provided to the renewable energy businesses in Turkey and EU are investigated and compared in this study.

## **2. ENERGY POLICIES AND INCENTIVE MECHANISM IN EU**

The EU, which supplies half of its total consumption from external sources, ranks second in the world energy consumption after the United States. Providing 81% of petroleum consumption, 54% of natural gas consumption and 38% of solid fuels from foreign sources, the Union is the first in the global energy market in imports. The European Commission estimates that consumption will double in the next twenty years, and in parallel, import dependence will reach 70% in 2030. Looking at the latest trends, total energy demand increases by 1-2% per year, while electrical energy is 2% - 3% in the new member states - and the demand for natural gas is growing faster than that (Yorkan, 2009). Therefore it is thought that using renewable energy resources will have an important role to reduce the external dependency (Belet, 2016).

### **2.1. Renewable Energy Policies in EU**

Providing consumers with cheaper energy, higher quality and uninterrupted/continuous service is the basis of EU energy policy. EU energy policy includes the following objectives (Yorkan, 2009) :

- The establishment of a competitive, transparent and fully integrated internal market in the electricity and natural gas sectors,
- Protecting the environment and combating global climate change and,
- Securing energy supply security. In addition to these, increasing the energy saving and efficiency, investing in clean energy technologies and developing a common foreign policy for energy, can be mentioned.

While creating a policy in the field of energy, the EU aims providing energy of continuous, safe, inexpensive, clean and non-hazardous for human health and the environment, at the same time developing the new energy systems and completing the internal energy market.

The legislation of EU for renewable energy is contained in “Renewable Energy Directive (2009/28/EC)”, “Revised Renewable Energy Directive (2018/2001/EU)” and “Directive to reduce

indirect land use change for biofuels and bioliquids ((EU) 2015/1513)". Accordingly, the EU's basic targets and principles regarding renewable energy are as follows (European Commission, 22.08.2019; European Commission, 26.08.2019) :

Renewable energy directive:

*The original renewable energy directive (2009/28/EC) establishes an overall policy for the production and promotion of energy from renewable sources in the EU. It requires the EU to fulfil at least 20% of its total energy needs with renewables by 2020 – to be achieved through the attainment of individual national targets. All EU countries must also ensure that at least 10% of their transport fuels come from renewable sources by 2020.*

National action plans and progress reports:

*The Directive 2009/28/EC specifies national renewable energy targets for 2020 for each country, taking into account its starting point and overall potential for renewables. These targets range from a low of 10% in Malta to a high of 49% in Sweden. EU countries set out how they plan to meet these 2020 targets and the general course of their renewable energy policy in national renewable energy action plans. Progress towards national targets is measured every two years when EU countries publish national renewable energy progress reports.*

Cooperation mechanisms:

All of the European Union countries have domestic renewables to exploit. However, the potential for renewable energy sources of some areas in Europe is greater than other regions. For example, while some countries have more yearly sunshine suitable for solar, others have more rivers suitable for hydroelectric power. European internal energy market provides important opportunities to countries for working together to exploit these renewables and reach the 2020 targets. Countries can achieve this by cooperating in line with the Renewable Energy Directive.

*The Directive 2009/28/EC promotes cooperation amongst EU countries (and with countries outside the EU) to help them meet their renewable energy targets. The cooperation mechanisms can take the form of:*

- *statistical transfers of renewable energy*
- *joint renewable energy projects*
- *joint renewable energy support schemes*

To ensure stable progress towards the targets of 2020, the EU Commission has proposed several intermediate targets. According to these targets, 25% of the national target of each EU member should be fulfilled until the end of 2012, 35% until the end of 2014, 45% until the end of 2016 and 65% until the end of 2018. To meet the 2020 aims, each EU member has its own national objectives. The fulfillment of these national objectives also ensures the fulfillment of the EU's objectives. The national objectives of the EU member countries consist of two parts. The first part is: each EU member is obliged to increase the share of renewable energy in ultimate energy consumption up to 5,5% according to 2005. The year 2005 is taken as a reference because of that it has the most reliable data related to the national renewable energy. The second one is calculated according to the GDP per capita (Bayraç & Çildir, 2017). "The Community has long recognised the need to further promote renewable energy given that its exploitation contributes to climate change mitigation through the reduction of greenhouse gas emissions, sustainable development, security of supply and the development of a knowledge based industry creating jobs, economic growth, competitiveness and regional and rural development." Therefore a proposal has been issued. "This Proposal for a Directive aims to establish an overall binding target of a 20% share of renewable energy sources in energy consumption and a 10% binding minimum target for biofuels in transport to be achieved by each Member State, as well as binding national targets by 2020 in line with the overall EU target of 20%" (Commission of the European Communities, 2008).

It is estimated that the targeted amount of renewable energy production to be reached in 2020 is 550-600 TWh. It is also expected that the potential benefits of these ambitious targets will be more. Beside the reduction of greenhouse gas emission, the EU diversifies energy portfolio with renewable energy resources at the same time. Decreasing the usage of primary energy will also increase EU's energy

security by reducing the EU's imported fossil fuels and will increase employment in the green business at the same time. Renewable energy is the source of green business. It is estimated that global renewable energy employment increased by 5% in 2015 to reach 8.1 million. Countries which have the most renewable energy jobs were China, Brazil, the U.S., India, Japan and Germany. Jobs continued to shift towards Asia. The continent's share in the global employment rose to 60% (IRENA, 2016).

The EU's sustainable development policies implemented in the 1990s with environmental priority transformed into a green growth model by reducing greenhouse gas emissions due to climate change, ensuring energy security due to instability in energy prices, and increasing technological innovation and competitiveness policies. In various policy documents of the EU, the elements related to green economics such as environmental protection, resource efficiency, social integration and creating new job opportunities, are seen integrated into EU policies at different levels (Yılmaz, 2014)

## **2.2. Renewable Energy Incentive Mechanism in EU**

In renewable energy production, the EU countries are seen among the successful countries. Until 2020, at least 20% of the total energy demand of each of EU member countries is necessary to be provided from renewable energy resources (European Commission, 22.08.2019). To reach these identified targets, many countries apply important incentive policies especially since the 2000s. Thus, as of 2016, the share of renewable energy sources in gross final energy consumption in EU reached 17%. These levels are higher than the indicative EU trajectory for these years set by the Renewable Energy Directive (European Environment Agency, 2019). Because of different resource potentials and differences renewable technology costs of EU members, a single support tool is not enough for developing renewable energy resources. Therefore, according to the need of market structure and the type of energy to be used, countries use the combination of the different incentive mechanisms. These incentives are explained below.

### **2.2.1. Incentives Given Over Public Expenditures**

These incentives consist of direct expenditures realized under the public legal entity. The main capital of these incentives given in cash is provided from the funds generated from the budget income opportunities or over the budget (Bayraç & Çildir, 2017). These incentives are divided into 3 groups:

- **Tariff guarantee**

Tariff guarantee application is the basic incentive policy of the EU and it differs from country to country. It is accepted as the most effective and minimum cost incentive mechanism by the Commission. The price is determined according to the kWh of the electricity produced and differs according to the type of technology used. In this respect, technologies with high investment and maintenance costs such as solar, benefit from guarantee at a much higher rate than wind. The price in the tariff guarantee model is determined at a level very close to the production cost. Thus the investors are provided high security against price fluctuations and appropriate purchase guarantee for the actual project costs. There are two different applications of tariff guarantee as "fixed price guarantee" which is not dependent on market price, and "premium guarantee" which is dependent on market price (Bayraç & Çildir, 2017). With the method of fixed price guarantee, governments guarantee to purchase energy from producers that produce their energy by using renewable energy sources, at a price above the market price. The amount of the energy to be purchased is depended on the type of resource and its economic applicability. Also, sales and price risks are eliminated in terms of investors by providing a long term price guarantee for a time from 10 years up to 30 years (Brown, 2013). In the application of the premium guarantee, which is different from the fixed price guarantee, the producer is paid a premium above the market price instead of a fixed price. The premium will not be paid if the market price exceeds the specified minimum price (Deloitte, 2011).

- **Investment credits**

These credits are provided for developing the investments of renewable energy. They are usually given as a certain percentage of total costs, or low interest rate and long term per installed kWh. Due to the advantages such as lightening the burden on public budget and spreading costs over time, together with a high political applicability, there are some problems in dealing with those who do not pay their credit debt (Bayraç & Çildir, 2017).

- The Subsidies

Government interventions in the energy sector have been common for many years. States have used subsidies to increase supply security, reduce air pollution and greenhouse gas emissions, strengthen competition, provide social benefits and increase employment (European Environment Agency, 2004). Subsidies express the grants of the government for persons or institutions in the form of goods, money or services. In this context, the government finances a certain percentage of the investment cost as a grant to support the production of renewable energy.

### 2.2.2. Incentives Given Over Public Revenues

Tax incentives take part among the commonly used incentive types. Tax incentives are defined as measures that lower or completely eliminate the tax burden in the sectors to be supported. Among the mainly used tax incentives tools, exemptions and exceptions, discounts, depreciation regime, forward and backward offset of losses, tax breaks and tax suspension, are included. Also, taxation of fossil fuels at a higher rate or with additional taxes such as carbon tax creates the tax measures (Aslanii, Naaranoja and Wong, 2013).

Renewable energy capital expenditures like machinery, equipment, land and inventory can be deducted from the income and corporate tax base. In some countries, there are minimum and maximum investment requirements to take the advantage of the deduction. For some countries, security and performance certificate is required to take the advantage of deduction (Artigues & Rio, 2014). Instead of deduction in investment or production, some countries apply direct income tax exception. The accelerated depreciation facility is possible in the investments of renewable energy. Energy power plants are usually depreciated over a long term, 20-30 years, but with accelerated depreciation, this period is lowered to 15 years. The Research and Development spendings made for renewable energy technologies can be reduced from the income tax base. Also there are three different property tax incentives for renewable energy as exception, deduction and return (Bayraç & Çildir, 2017).

### 2.2.3. Regulatory Incentives

Renewable energy is suggested to play a crucial role in the future of the electric power industry. Renewable energy technologies such as wind and solar have comparatively higher costs. Therefore it appears that there is a consensus on the requirement for regulatory intervention for promoting investment in renewable technologies (Garcia, Alzate and Barrera, 2012). The arrangements made by State in economics with the purpose of stabilizing the country's economics and eliminating imbalances in the markets are called regulation. Regulatory incentives are put into practice by State by watching -as a referee- the behaviours of markets and private sector inside the country's economics.

Renewable portfolio standard is a quantity based incentive tool. To be able to produce a certain percentage of energy from renewable energy resources, mandatory target or quota are put on the producers. For those, renewable energy certificates are produced. Renewable energy credit, green certificate, green label or renewable energy certificate, etc, these are possible to be traded at the same time. So it is possible to evaluate them as a kind of environmental credit. The value of green certificates are generally determined by the supply and demand conditions in the market (Brown, 2013). For the encouragement of renewable energy resources, technological R&D policies were focused on more in 1970s. But from the years of 2000s, it has started to replace with renewable portfolio standard. Today, with the implementation of the other incentive policies, it is considered that this standard will be especially effective in attracting the large pollutants to the renewable energy sector (Aguirre & Ibikunle, 2014).

### 2.2.4. Other Non-tax Incentives

In renewable energy incentives, the alternative policy options like public tender and net measurement are also used. The purpose of the tender system is to increase the competitive power of renewable energy. This method is used especially for large scale projects. In this method, the electricity company commits to purchase electricity at a price above the market price for a period of 10-25 years, in accordance with the agreement with the winning company of the tender. In this method, the lowest bidder will win the tender of renewable energy, so that the cost of investment to society will be theoretically minimum. However, the limited effectiveness of this system is a significant disadvantage.

In practice, the implementation of the projects become difficult as a result of very low price proposals of renewable energy producers to operate profitable power plants. One of the oldest policy tools is Net Measurement method. In this method, the consumers are offered the opportunity to produce their own electricity from renewable energy resources and sell the excess to national network with a high rate. This model provides to equip the homes, schools and commercial buildings with renewable energy and to take the extra credit from the network for later use upon the excess electricity produced. Due to the focus on small scale applications, it is stated that the effectiveness of this method is relatively low. In addition, the investment security is also at a very low level because of the fluctuation of the purchase price of the excess electricity generated (Bayraç & Çildir, 2017).

### 3. ENERGY POLICIES AND INCENTIVE MECHANISM IN TURKEY

Turkey has a great variety of renewable energy sources like hydraulic, solar, wind, biomass and geothermal. Nowadays in the World, Turkey is known as a rich country in terms of particularly wind energy, that has a significant role in all the other renewables related to electricity production. Turkey ranks first among the EU States regarding the potential of wind energy. Turkey also has a great technical wind energy potential of 88 GW. Thanks to this potential, Turkey can cope with its high energy dependency and use the renewable energy sources which contributes to a better air quality. In addition, Turkey has a large amount of solar energy compared to the other countries. In Turkey, the average sunshine duration is 7.2 h/day and the solar radiation is 309.6 cal/m<sup>2</sup> day. Furthermore, geothermal energy potential of Turkey is 31,500 MW. Current use covers only 3% of the geothermal energy potential (Uğurlu & Gokcol, 2017).

Turkey is a country which lies between Europe and Asia. That makes Turkey important not only as geographically, but also as world politically. Turkey is located in a significant region especially for transporting energy from Central Asia to Europe. The steps of a country for the energy reveals the vision related to the country's policy and economics. Therefore, the specific restrictions of the States are the most prominent elements for the implementation of energy policies.

Turkey has fairly abundance of renewable energy resources. But, it has not used them at the desired level. However, renewable energy utilization in Turkey was lower about a decade ago. The share of renewables was only 0.1% in the total electricity generation. It was 10.5% as of June 2017. The table below shows Turkey's electricity generation, export, import, and consumption volume and generation and consumption growth rate between 2002 and 2016. It is seen that although there are a few exception years, electricity generation and consumption rates in Turkey have been rising. Therefore, it is important Turkey to supply the electricity from domestic and renewable energy sources (Uğurlu & Gokcol, 2017).

**Table 1.** Electricity Power in Turkey

| Years | Generation (GWh) | Export (GWh) | Import (GWh) | Consumption (GWh) | Generation increase (%) | Consumption increase (%) |
|-------|------------------|--------------|--------------|-------------------|-------------------------|--------------------------|
| 2002  | 129,400          | 3,588        | 435          | 132,553           | 5.4                     | 4.5                      |
| 2003  | 140,581          | 1,158        | 588          | 141,151           | 8.6                     | 6.5                      |
| 2004  | 150,698          | 464          | 1,144        | 150,018           | 7.2                     | 6.3                      |
| 2005  | 161,956          | 636          | 1,798        | 160,794           | 7.5                     | 7.2                      |
| 2006  | 176,300          | 573          | 2,236        | 174,637           | 8.9                     | 8.6                      |
| 2007  | 191,558          | 864          | 2,422        | 190,000           | 8.7                     | 8.8                      |
| 2008  | 198,418          | 789          | 1,122        | 198,085           | 3.6                     | 4.3                      |
| 2009  | 194,813          | 812          | 1,546        | 194,079           | -1.8                    | -2.0                     |
| 2010  | 211,208          | 1,144        | 1,918        | 210,434           | 8.4                     | 8.4                      |
| 2011  | 229,395          | 4,556        | 3,645        | 230,306           | 8.6                     | 9.4                      |
| 2012  | 239,497          | 5,826        | 2,954        | 242,370           | 4.4                     | 5.2                      |
| 2013  | 240,154          | 7,429        | 1,227        | 246,357           | 0.3                     | 1.6                      |
| 2014  | 251,963          | 7,953        | 2,696        | 257,220           | 4.9                     | 4.4                      |
| 2015  | 261,783          | 7,135        | 3,194        | 265,724           | 3.9                     | 3.3                      |
| 2016  | 273,387          | 6,400        | 1,442        | 278,345           | 4.4                     | 4.7                      |

**Source:** Uğurlu & Gokcol, 2017.

Demand for energy is increasing in parallel with the growth of the country's population and economic growth. This increase in demand for energy is higher in developing countries than in developed

countries. In the energy policy of Turkey in recent years encourage to increase the use of the domestic, renewable and environmentally friendly energy sources and to assess these sources in electricity production. Turkey is dependent on foreign energy almost around 70%. Thus, in Turkey, domestic and renewable energy sources is expected to be preferred as much as fossil fuels (Yılmaz, 2015). Turkey owns domestic and environmental friendly natural resources. These resources can be used by taking the right steps and making necessary plans.

“Like EU, Turkey also lack in energy resources and has to depend on outside. Although Turkey is near to the Middle East, it doesn't have enough energy resources like fossils fuels. And the energy demand is increasing every year. So Turkey is needed to develop renewable energy”. Therefore Turkey is adopting certain national energy strategies to reduce its dependency on imports to meet growing energy demand. The application of these strategies aims to achieve the following objectives (Republic of Turkey Ministry of Foreign Affairs, 2019):

- ✓ Diversification of supply routes and resources for imported oil and natural gas,
- ✓ Increasing the proportion of renewable and local energy in Turkey's energy mixture,
- ✓ Increasing the efficiency of energy,
- ✓ Nuclear addition to Turkey's energy mixture.

The targets of Turkey's renewable energy policy are listed below (Yılmaz, 2015):

- ✓ Increasing the use of renewable resources to generate electricity
- ✓ Encouraging safe, economic and cost effective renewable energy production
- ✓ Increasing the diversity of energy resources
- ✓ Reducing greenhouse gas emissions
- ✓ Protecting the environment by using waste products.
- ✓ Developing the manufacturing sector of relevant mechanical and electro-mechanical.
- ✓ Using the hydroelectric potential in generating electricity.
- ✓ Increasing the installed capacity based on wind energy to 20.000 MW
- ✓ Operating 600 MW geothermal potential
- ✓ Making the necessary arrangements for using solar energy and other renewable energy resources.
- ✓ Reducing the share of the natural gas under 30% in generating electricity, as a result of the measures these will be taken for the use of domestic and renewable energy resources.

### 3.1. Renewable Energy Policies in Turkey

As of the 2000s years, with the development of Turkey's economic activities, energy demand was also increased. Therefore Turkey wanted to activate all energy resources to meet this energy demand. The first step to liberalize in the energy sector was the establishment of Energy Market Regulatory Authority in 2003. Following the establishment of this authority, public and private sector investments were started to be controlled in line with the growth targets. As of the 2004, with the supports of Ministry of Energy and Natural Resources, the State Planning Organization, Turkey became aware of its domestic and renewable energy potential In this context, the Law on the Use of Renewable Energy Resources was officially adopted in 2005 (Teke, 2013).

In 2005, Renewable Energy Law -No.5346- came into force for the purpose of producing electricity energy. That has accelerated the activities in renewable energy field. However, due to the absence of secondary legislation and relatively low fixed price guarantee, investment in renewable energy resources remained limited between 2005 and 2010. In December 2010, higher fixed price guarantee and monetary or non-monetary incentives for some resources were regulated. Therefore, it can be said that the renewable energy sector has revived significantly since 2010 compared to the period 2005-2010.

Especially after the revision of the fixed price guarantees, renewable energy investments attracted the attention of both domestic and international investors (T.C. Enerji ve Tabii Kaynaklar Bakanlığı, 2014).

### 3.2. Renewable Energy Incentive Mechanism in Turkey

New Investment Incentive Program in Turkey has been in effect since January 1, 2012 and offers four different types of plans. These incentive plans may be applied to renewable energy plants, R & D initiatives, equipment development activities and equipment production for renewable power plants. These types of plans are as follows (T.C. Enerji ve Tabii Kaynaklar Bakanlığı, 2014) :

- ✓ General Investment Incentive Plan
- ✓ Regional Investment Incentive Plan
- ✓ Large Scale Investment Incentive Plan
- ✓ Strategic Investments Incentive Plan

The mainly used incentives in the energy field in Turkey are fixed price guarantee, unlicensed production, and financial incentives (VAT exception, exemption from customs duty, etc.) (Yılmaz, 2015).

#### 3.2.1. Fixed Price Guarantee

Fixed price guarantee is the most widely used incentive mechanism in the world and Turkey. In this mechanism, a new fixed price guaranteed plan was introduced for each renewable energy source. Real and legal persons benefit from the prices in the following table for 10 years if they send the electricity they generate above their needs to the distribution system (Yılmaz, 2015).

Under Law No. 6094, the incentive is set in US \$ basis and electricity generation license holders with renewable energy source certificate can only benefit from these tariffs for the first 10 years for the plants before 31 December 2015. This fixed price guarantee has been extended until 2020. Investors have the opportunity to choose between involving renewable energy support mechanism or direct sales to the free electricity market every year with this fixed price guarantee plan (T.C. Enerji ve Tabii Kaynaklar Bakanlığı, 2014).

**Table 2.** Fixed Price Guarantee applied for Renewable Energy in Turkey

| Based on Renewable Energy Sources<br>Production Plant Type    | Prices to be applied<br>(US dollar cent/kWh) |
|---|--|
| a) Hydroelectric production facility                          | 7,3  |
| b) Wind Energy based production facility                      | 7,3  |
| c) Geothermal energy based production facility                | 10,5   |
| d) Biomass based production facility (including landfill gas) | 13,3   |
| e) Solar energy based production facility                     | 13,3   |

Source: Yılmaz, 2015.

#### 3.2.2. Other Incentives

Incentives other than fixed price guarantee and some regulations are as follows (Şen, 2017) :

- ✓ The Energy Market Regulatory Authority issue a certificate to the generation license holder for the determination of the type of resource and follow-up in the purchase and sale of electricity generated from renewable energy sources in domestic and international markets. Those who wish to get benefit from renewable energy incentives must apply with this document. Producers who receive this certificate do not pay the license fee for the first 8 years. In the following years, they pay 10% of the license fee.
- ✓ The Ministry of Environment and Forestry or the Ministry of Finance allow, lease, establish easement, give usage permission for a fee to which will be used as transportation roads and power transmission line for the purpose of generating electricity from renewable energy sources within the scope of this Law of these are forestly qualified or owned by the Treasury or under the provisions and dispositions of the State. Fifty percent discount is applied to the permission, rent, easement and usage permission. Electricity generation facilities based on renewable energy sources are allowed to be established in the national park, natural park, natural monument, nature protection areas, conservation

forests, wildlife development areas and special environmental protection zones provided that the relevant Ministry's, in the natural protected areas provided that the relevant conservation regional council's positive opinion is obtained.

- ✓ 85% discount is applied for investment and operation from generation facilities based on renewable energy sources, transportation roads and power transmission lines.
- ✓ Technical support is provided from relevant public institutions according to the type of resource.

#### 4. CONCLUSIONS

Today, energy demand is increasing throughout the World. Nonrenewable energy sources which are called fossil fuels are limited in the earth. The only way to solve this problem is developing renewable energy sources. Also, today everything is based on technology, and technology is based on electricity energy. It is possible to generate electricity with renewable energy sources. Energy + Environment + Economic, these three E are related to each other. So it is crucial to examine energy from the aspects of environmental and economic effects. Renewable energy sources are important for energy supply security. Investment in renewable energy also has higher potential for employment. In addition, the findings shows that renewable energy sources increase economic growth. Also using nonrenewable sources cause environmental pollution and depletion of sources. Countries within the European Union and Turkey lack of energy. Therefore producing and consuming renewable energy sources and supporting the use of these sources with incentives is important for the EU and for Turkey as well.

In order to enhance the external security, the EU has pursued certain objectives such as promoting transparency and improving governance in the energy sector through energy partnerships with third countries; improving production and export capacities in producer countries, and upgrading energy transportation infrastructure in producer and transit countries; improving the appropriate business environment for European companies' investments in third countries; diversifying energy imports by producer country.

Current energy production in Turkey hardly meets the rapid demand requirement of country. Annual average of Turkey's energy demand is estimated to increase by 4-6%. Therefore Turkey is the fastest growing energy market, that makes it much attractive to the global investors for energy investment. On the other hand, Turkey has wind, solar and geothermal energy potential since the hydroelectric is the main energy resource. However, it can be stated that Turkey can not use renewables enough since renewable energy incentives in Turkey are very low compared to the European countries such as Denmark, Norway, Finland, Germany and Sweden. This research put forward that the energy policy of EU and Turkey is important for both energy production/consumption and sustainable business. It is required that policy makers compose a strategy to stimulate the larger use of renewable resources. In addition, as a member of EU, it is important Turkey to consider the energy policy that the EU outline.

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