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TAXATION AND INCENTIVES IN RENEWABLE ENERGY INVESTMENTS

YENİLENEBİLİR ENERJİ YATIRIMLARINDA VERGİLENDİRME VE TEŞVİKLER

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Abstract

The aim of this research is to reveal the effects of taxation and incentives under a single roof, combined with a regularly adjusted subsidy, in the renewable energy sector. In terms of financial investment, the study looks at how tax incentives and other forms of support for renewable energy sources are evaluated. The essential features of renewable energy sources are that they help to protect the environment, and renewable energy investments are a hot topic on the agendas of many countries. The Turkish energy market has been exposed to the liberalization process. So, the government, investors, and the people of the country are the main owners of these projects. Each partner directly or indirectly affects these investments or is involved in them. These things should be managed in a way that keeps the whole system in balance. This method turns the problem into a multi-objective optimization problem, with the goal of maximizing the benefits for all stakeholders. This research investigates the items related to renewable energy investments to analyse the risk factors for system risk mitigation and tax approaches.

Keywords: Renewable Energy Projects, Wind Energy, Finance, Risk Mitigation, Taxes, Incentives

Öz

Bu araştırmanın amacı, düzenli olarak ayarlanan bir sübvansiyonla birleştirilmiş tek bir çatı altında vergilendirme ve teşvik yaklaşımının, yenilenebilir enerji sektöründeki etkilerini ortaya koymaktır. Finansal yatırım açısından, çalışma, vergi teşviklerinin ve yenilenebilir enerji kaynaklarına yönelik destek yapılarının nasıl değerlendirildiğini incelemektedir. Yenilenebilir enerji kaynaklarının temel özellikleri çevrenin korunmasına yardımcı olmalarıdır ve yenilenebilir enerji yatırımlarının birçok ülkenin gündeminde sıcak bir konu olduğu açık bir şekilde ortadır. Bu bakımdan Türkiye enerji piyasası serbestleşme sürecine maruz kalmıştır. Dolayısıyla konu olan projelerin ana hissedarları devlet, yatırımcılar ve ülke vatandaşlarıdır. Bütün taraflar, bu yatırımları doğrudan veya dolaylı olarak etkiler veya bunlara dahil olurlar. Bu faktörler sistemin dengesini koruyacak şekilde kontrol edilmelidir. Bu yaklaşım, sorunu her bir paydaşın faydasını maksimize etmeyi amaçlayan çok amaçlı optimizasyon haline getirilmelidir. Bu araştırma, sistem riskinin azaltılması ve vergi yaklaşımları için risk faktörlerini analiz etmek amacıyla yenilenebilir enerji yatırımlarıyla ilgili kalemleri incelemektedir.

Anahtar Kelimeler: Yenilenebilir Enerji Projeleri, Rüzgar Enerjisi, Finans, Risk Azaltma, Vergiler, Teşvikler

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1. Introduction

Energy has been used to be generated via conventional methods which has massive carbon emission. The developments in technology have been provided utilization of renewable sources to generate electricity, wind, hydro, solar, bio fuels etc. Financing of these projects has been main bottleneck in realization of these projects. Minimization of risk items for renewable energy financing would be handled by analysing the situation in Turkish wind energy market. The items in financial model would be investigated and it would be matched with concerns of main actors in the system.

Humans have turned to novel fuels rather than non-renewable or conventional fuels to meet their growing energy needs, taking into account environmental, social, and economic issues. Renewable energy sources are gradually displacing fossil fuels. The interest in renewable energy has grown further as a result of its environmental friendliness. It would be accurate to say that the Kyoto Protocol and other international environmental treaties influenced the growth of this interest. In addition to a rise in research into renewable energy sources like sun and wind during the 1970s, these sources are now widely used. The International Energy Agency estimates that 10 trillion dollars will be invested in renewable energy sources between 2001 and 2030. The OECD countries should have a 25% proportion of renewable energy sources in their energy production.

The fact that fossil fuels can run out in a predictable amount of time, plus the damage they do to the environment during production and use, has led to much research on renewable energy sources worldwide. The following definitions of renewable energy sources can be found in the literature, each with minor variations. In light of this, renewable energy is defined as "a collection of natural resources that, in contrast to fossil fuels and uranium, are limitless and constantly regenerate" (Teske, Zervos, & Schafer, 2007). "Energy coming from natural processes, including hydrogen acquired and constantly renewed; from solar, wind, biofuel, geothermal, hydropower, ocean resources, and renewable resources that are directly or indirectly generated by the sun or heat generated inside the earth (IEA, 2016)." As well as "energy derived from the flow of energy present in ongoing natural processes" (Doğan, Nilhun, 2015). Based on the definitions, renewable energy is energy that comes from the natural environment and can be used over and over again. Renewable energy sources are better than non-renewable ones because they are clean and cheap. This is because renewable energy sources are made from non-scarce natural resources. Countries that want to increase the energy they get from renewable sources are studying incentives and support for renewable energy to take advantage of these benefits.

Countries offer a variety of incentives and assistance of various levels for the production of energy from renewable sources in order to maintain the sustainability and security of energy policy. Following is a summary of these incentives and assistance (Steenblik, 2007; Çelebi and Uğur, 2015);

- Supporting products used in renewable energy production,
- Encouraging labour, capital and natural resources in terms of production factors,
- Supporting the manufactured products with tax deductions or tax exemptions,
- Supporting the products produced with the market price,
- Providing support within the scope of storage and distribution infrastructures for manufactured products,
- Supporting the consumption phase of the products,
- Providing incentives for the vehicles in which the products are used.

In this context, the mechanisms that indirectly affect the use and production of renewable energy; are tax credits and tax exemptions. Tax credits aim to reduce the effects of high-cost renewable energy technologies on the market and to make the renewable energy market more competitive and consist of two main tools: "investment tax credits" and "production tax credits." A tax credit for investments is a reduction of all or part of the taxes owed on investments in renewable energy made with taxable income. On the other hand, production tax credits are annual tax credits based on renewable energy production. Under this system, renewable energy producers get a tax deduction for each unit of electricity or heat they make. On the other hand, tax exemption can be used to prevent taxation policies, problems, and distortions in the market in energy production and consumption (Aydınlı, 2013; REN21, 2012).

If we use the Turkish wind energy industry as an excellent example of a renewable energy source, looking at the wind energy case in our country, the first wind power plant was established in 1998 in Çeşme, İzmir, with a capacity of 1.5 MW. From 1998 to 2005, there were no severe developments in the area of wind power plants (Enerji Atlası, 2022). According to Turkey's Wind Energy Statistics Report, which TÜREB published at the beginning of 2018, in 1998, we installed power of 8.7 MW to 7000 MW level reached at the end of 2018. As of the end of 2018, 192 wind power plants are under operation. According to the statement made by the Ministry of Energy and Natural Resources, in order to take place among the leading countries in the world in the field of renewable energy, 1 GW of wind capacity will be put into operation every year, and steps will be taken to make 10 GW wind investment in the next 10 years (TUREB, 2022).

Another important issue apart from taxation is that the life span of the wind turbines is 20 years according to IEC (International Electrotechnical Commission) 61400-11 international standard. However, the life span of these turbines can be increased with regulatory and preventive maintenance. It can be seen that the existing power plants, which have been operating for a long time, are quite high in terms of their availability. This, together with the increasing maintenance costs, shows that wind power plants can operate easily for 20 years (International Electrotechnical Commission, 2005). Recently, turbines have been highly developed due to the great competition among turbine manufacturers. Based on the first turbines that were built, both the tower height and the width of the blades have grown a lot. Thus, even with just one turbine, it is possible to produce powers equivalent to two or more turbines established in the past. With these developments, the electricity generated from the turbines increased. As the competition is expected to continue, we are curious about the repowering advantages of the old power plants.

Electricity production in Turkey is realized by natural gas, hydroelectric, hard coal and lignite, imported coal, liquid fuels such as wind, diesel, and fuel oil, geothermal, biogas, and solar energy, in order of their share in production. While the installed power of electricity in Turkey was 78,599 MW in 2016, the installed power was 82,312 MW as of October 31, 2017. As of the end of October 2017, the share of natural gas was 28 percent, the share of hydraulics was 33 percent, and the share of coal was 21 percent. According to TEIAŞ data, over 2321 power plants were generated in 2016 and 3822 power plants were generated this year. According to data from the end of October 2017, EÜAŞ had a 25.6 percent share of this production in 2016 and a 24.5 percent share in 2017.

Figure-1: Turkish electricity system Installed power shares by sources (as of end of October 2017)

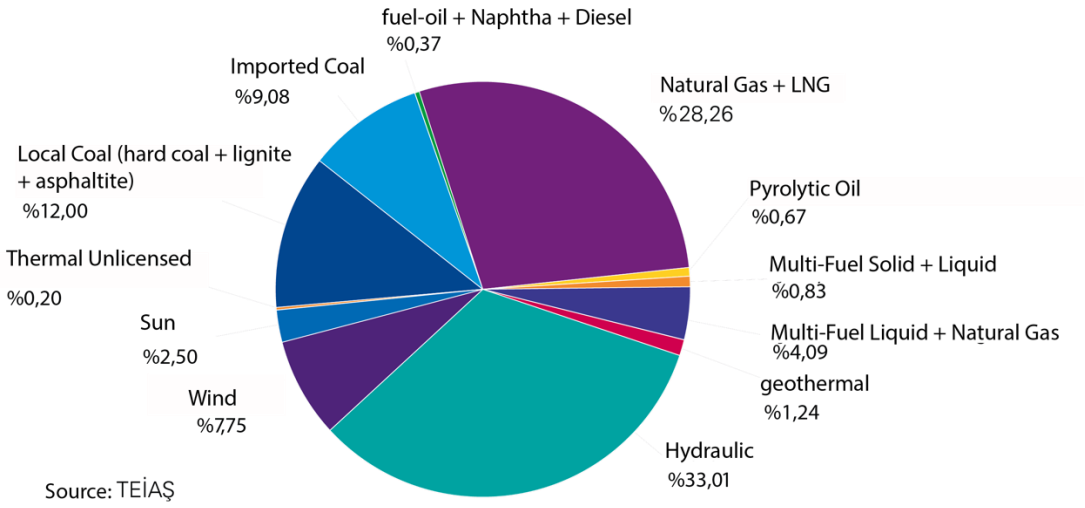


Figure-1 As a result, Turkey should be allowed to invest in evaluating the potential of wind energy. Turkey's wind energy target for 2023 of 20 thousand megawatts. In order to achieve this, approximately one thousand 950 megawatts per year, i.e., 2 billion dollars of wind investment, should be realized (EPDK, 2021).

Table-1: Some empirical studies regarding tax incentive policies.

Author	Subject	Result
Kahn and Goldman, 1987	Impact of tax reform on renewable and cogeneration project	Capital intensive projects such as wind turbines, small hydro, geothermal and wood-fired electricity were not financially viable with the expiration of energy tax credits. The avoided cost price is important to develop projects.
Walsh, 1989	Energy tax credit and housing improvement	Tax credits are not considered to be an effective solution to subsidize energy conservation activities. It could be due to the small discount rate, uncomfortable procedure to claim the credit or lack of knowledge about price impact.
Alfsen et al., 1995	Impacts of EC carbon tax and deregulating power supply on emissions	Emissions are reduced by European Community (EC) tax by 6–10 percent under both regimes (plan and cost-efficient) compared to the scenario without tax.
Hassett and Metcalf, 1995	Energy tax credits and residential conservation	They found that a 10-percentage point change in the rate of tax incentive for energy investment could increase the probability of investment by 24 percent
Kahn, 1996	Production tax credit for wind turbine power plants	Production tax credit is considered an ineffective incentive for wind turbine power plants, because it raises financing costs.

Brännlund and Nordström, 2004	Carbon tax simulation using a household model	Households living in populated areas are influenced more by CO2 tax. Petrol demand will decrease by almost 11 percent which affects carbon emissions.
Barradale, 2010	Wind power and the production tax credit	Wind power is not feasible in the lack of a production tax credit. An incentive instrument applied for enhancing renewable energy production may be changed to a disincentive form if it comes with uncertainty.
Galinato and Yodar, 2010	An integrated tax-subsidy policy for carbon emission reduction	Revenues made by carbon taxes could be used to fund subsidies for low-emitter fuels. Therefore, carbon tax and subsidy mechanism are revenue neutral within the energy industry
Pablo-Romero et al., 2013	Incentives to promote solar thermal energy in Spain	Tax incentives have not had sufficient impacts on solar thermal energy deployment due to regulatory change at the national level which caused confusion within the system.
Lehmann, 2013	Supplementing and emission tax by an FIT for renewable electricity	Optimal tax rate should be less than Pigouvian level, differentiated across the fossil fuels, and modified continuously based on technological change.

Sources: Abolhosseini, & Heshmati, 2014

This paper is structured into five sections. The introduction includes a brief introduction to the renewable energy resources concept and benchmark studies. The second part contains information about the regulatory framework. In the third part, the building blocks of the system are mentioned, and it contains information about renewable energy and wind power. The fourth part contains information about taxes and funds in the renewable energy sector. Finally, section five summarizes the main conclusions of this research.

2. Regulatory Framework

Natural resources are owned by the state under several state constitutions. T.R., according to Article 168 of the Constitution;

Natural resources and riches are at the control and disposal of the state. The State owns the right to explore and exploit them. The state may transfer this right to accurate and lawful individuals for a limited time. Exploration and operation of natural wealth and resources are carried out in collaboration with real and legal people of the state or directly by real and legal persons, depending on the specific approval of the legislation. In this scenario, the law explicitly specifies the conditions that actual and legal people must meet, as well as the procedures and principles of State surveillance, inspection, and sanctions.

2.1. Legal Definition

In the 3rd article, titled definitions of the law numbered 5346;

- **8. Renewable Energy Resources (RER):** Non-fossil energy resources such as hydraulic, wind, solar, geothermal, biomass, gas obtained from biomass (including landfill gas), wave, current energy and tides,

- **9. Biomass:** Resources obtained from agricultural and forest products and by-products resulting from the processing of these products, including vegetable oil wastes, agricultural harvest residues, as well as organic wastes,
- **10. Geothermal source:** Natural water, steam and gases that can contain molten matter and gas, whose temperature is constantly above the regional atmospheric average temperature due to the natural heat in the earth's crust, and water, steam and gases obtained from hot, dry rocks,
- **11. Renewable energy resources within the scope of this Law:** Wind, solar, geothermal, biomass, gas obtained from biomass (including landfill gas), wave, current energy and tidal and canal or river type or hydroelectric generation with a reservoir area of less than fifteen square kilometres electrical energy generation resources suitable for the establishment of a facility,
- **13. (Annex: 29/12/2010-6094/1 art.) Landfill gas:** Gas produced for the purpose of obtaining energy from other wastes, including garbage,

As determined by law.

2.1.1. Regulations Regarding the Energy Sector

In 2001, Energy Market Regulatory Authority (EMRA, 2021) was established as the regulatory body on the liberalization movement in the energy sector.

The service units of the Authority are as follows:

- Electricity Market Law No. 4628 (2001),
- Natural Gas Market Law No. 4646 (2001),
- Petroleum Market Law No. 5015 (2003),
- LPG Market Law No. 5307 (2005)

The laws mentioned above have entered into force.

In 2021, the following Law studies were carried out in the electricity market (EMRA, 2021);

- The phrase "**the electrical energy they produce beyond their needs**" has been added to the first sentence of the first paragraph of Article 6/A titled "**Unlicensed electricity generation activity**" and the phrase "**transmission, or**" has been added to the second sentence to come after the phrase in this context.
    - In the Law No. 7346, amending Certain Laws and the Law No. 5346 on the Use of Renewable Energy Resources for the Purpose of Generating Electrical Energy published in the Official Gazette, dated 25 December 2021 and numbered 31700,
    - In Article 10 titled “Sanctions” the phrase “4628” has been replaced with “6446” and the phrase “11th” has been replaced with “16th”.
- In the Law No. 7346 amending Certain Laws published in the Official Gazette dated 25.12.2021 and numbered 31700, and **the Law No. 6446 on Electricity Market**,
    - In order to encourage effective use without adversely affecting the convenience of using and charging electric vehicles, the definitions of the concepts related to electric vehicles and charging stations related to the

provision of charging service have been made with the amendment made in the first paragraph of Article 3 "Definitions and Abbreviations".

- In the third sentence of the fourth paragraph of Article 17 "Tariffs and supporting the consumers ", the phrase "the electrical energy for these subscriber groups is different.
- according to the amount of consumption" has been added after the phrase "subscriber groups".
- In Article 20 “Security of Supply, the sentences hereinbelow have been added after the first sentence of the first paragraph, the second sentence of the paragraph as well as the clause (a), (b), and (c) have been repealed, the third paragraph has been amended as follows and the following paragraph has been added to the article.

"In this context, all legal entities operating in the market are obliged to comply with the measures specified by the Ministry for the security of supply, to contribute to the transactions to be established, and to submit the information and documents to be needed within the specified periods. The long-term Türkiye National Energy Plan is prepared and published every five years, within one year from the effective date of this article by the Ministry, by taking the opinions of the Presidency of Strategy and Budget, the Ministry of Treasury and Finance and the Authority. The Ministry may organize capacity allocation auctions in order to ensure the security of supply in the medium term by taking the Türkiye National Energy Plan into account. The lowest price offer over the ceiling price, which shall be determined in Turkish Lira by the Ministry, for the generation plants to be established within the scope of capacity allocation auctions, shall be applied for the period to be determined in the auction conditions within the scope of RES Support Mechanism. The procedures and principles regarding the auctions to be held, such as the procedures and principles for the update of the price to be formed as a result of the auction within the period to be determined by the auction conditions, recording the received guarantee as revenue in case of not fulfilling the conditions of use of domestic goods and obligations, and other penalties and sanctions to be applied are determined by the Ministry in the relevant auctions specifications. Pre-license and license granting conditions, issues regarding the cancellation and amendment for generation plants to be established within the scope of this article shall be regulated in accordance with the regulation issued by the Energy Market Regulatory Authority."

“(3) TEİAŞ may hold a tender for the construction of a new generation plant or leasing the capacities of existing generation plants within the scope of ancillary services agreements, in order to maintain the system reliability and to meet the regional system needs that may arise due to insufficient capacity. The capacity leasing price to be paid by TEİAŞ within the framework of the tenders shall be reflected in the system operating price, and the energy price shall be met by the market participants within the framework of the balancing and settlement regulation depending on the purpose of use, or by reflecting on the system operating price within the scope of commercial ancillary services agreements. The procedures and principles regarding the tender to be hold by TEİAŞ for capacity leasing within the scope of ancillary services agreements are regulated by the regulation issued by the Authority."

“(4) The Authority shall be responsible for monitoring the realization of the licensed generation plants, taking the necessary measures for the commissioning of these plants in the projected time within the scope of the relevant legislation, and notifying the Ministry at regular intervals of the new licensed generation capacity amounts to be put into operation within five years.”

- The Annex 5 "Charging Service", added to the Law, in line with the goal of reducing greenhouse gas emissions for the protection of the environment, aims to establish an electric vehicle ecosystem for the dissemination of electric vehicle use and a free market with sufficient and sustainable electric vehicle charging infrastructure based on this system, to ensure the rights of electric vehicle users by determining the principles and procedures of regulation and supervision in the execution of market activities, the basic principles of the operation of the market, and to determine the parties in the market, and the duties, powers, responsibilities and rights of the Authority. The Authority is entitled to make arrangements in the issues specified in the article. In this context, apart from the exceptions determined by the Authority for non-commercial purposes, the following issues are regulated: The charging service may be carried out by the charging network operators with the charging network license granted by the Authority; the charging network operators may establish and operate a charging station or they can enable third parties to set up and operate a charging station with the certificates they will issue; the charging network operator is obliged to provide continuous and quality charging service in the charging stations connected to its charging network and to determine, announce and apply the charging service price in accordance with the procedures and principles determined by the Authority; the Authority is entitled to take the necessary measures with respect to the charging service pricing, to determine the base and/or ceiling price, and to apply the minimum and maximum limit if necessary; and the principles regarding the application of the provisions added to the Law as well as the issues regarding the rights and obligations of the vehicle owners who benefit from the charging service are regulated by the Authority.
- With the Provisional Article 30 added to the Law, an arrangement has been made regarding the provisions of the Annex 5 that the relevant legislations and regulations will be issued by the Authority within 3 months, and persons who are currently engaged in charging service activities will bring their status in compliance with the legislation within 4 months from the date of entry into force of the legislations and regulations to be issued by the Authority.

- In the Law no. 7346 amending Certain Laws, published in the Official Gazette dated 25.12.2021 and numbered 31700 and the Law on Revenues of **Turkish Radio and Television Corporation** numbered 3093

  - The phrase "shares to be allocated from electrical energy revenue" in the article 1 titled "Purpose and scope" has been removed from the article text and the said amendment has entered into force as of 01.01.2022.
  - Clause (b) of the first paragraph of Article 2 titled "Revenues" has been repealed.
  - Paragraph (c) of Article 4 is repealed.
  - Clause (c) of the first paragraph of Article 5 titled "Collection" has been repealed and the phrase "and energy share" in clause (f) has been removed from the article.
  - The following provisional article has been added:

PROVISIONAL ARTICLE 7 – As of 31/12/2021, the collection of accrued energy shares within the scope of the repealed paragraph (c) of Article 4 is conducted and

followed up in accordance with the repealed clause (c) of first paragraph of article 5."

In 2021, the following Regulation studies were carried out in the electricity market (EMRA, 2021);

- The clauses (b), (c), (e), (h), (i), (l), (n), (o), (z), (ff), (gg), (ıı), (lll), (mmm), (nnn), (ppp) and (rrr) of the first paragraph of Article 4 titled "Definitions and abbreviations" of the Amending Regulation and **Electricity Market Ancillary Services Regulation** published in the Official Gazette, dated 27.01.2021 and numbered 31377, have been amended as follows,
    - And clauses (bb), (kk) and (fff) of the same paragraph have been repealed and the following clauses have been added to the same paragraph.

b) Instant demand control reserve: *The amount of load that can be automatically disconnect by means of instant demand control relays in order to prevent the system frequency from falling to critical level within the scope of emergency measures defined in the Electricity Network Regulation published in the Official Gazette dated 28/5/2014 and numbered 29013 repetition and offered by consumption plants,*
c) Over-excited operation: *Increasing the excitation currents of synchronous condensers and/or generators in case the system voltage falls below the operating values determined in the Electricity Network Regulation or the voltage setting values determined by TEİAŞ,*
e) Regional capacity leasing: *In order to maintain the reliability of the system and to meet the regional system needs that may arise due to insufficient capacity, leasing the capacities of the new generation plants and/or the capacities of the existing generation plants through tenders held by TEİAŞ,*
h) Balancing unit: *A generation or consumption plant or a part of the generation or consumption plant that can participate in the balancing, as defined in the Electricity Market Balancing and Settlement Regulation published in the Official Gazette dated 14/4/2009 and numbered 27200,*
i) Balancing mechanism: *Activities consisting of day-ahead market, intraday market and real-time balancing that are complementary to the electricity futures market and bilateral agreements,*
l) Energy deficit: *The sum of the amount of electricity, which the market participants have made during the energy settlement within the scope of the futures electricity market, day-ahead market, intraday market and bilateral agreements, deloading offers, imports and the electrical energy they have given to the system on the basis of energy settlement, is less than the sales made within the scope of futures electricity market, day-ahead market, intraday market and bilateral agreements, loading offers, exports and the electrical energy they have drawn from the system on the basis of energy settlement,*
n) Electricity storage facility: *The plant that can store electrical energy and provide the stored energy to the system,*
o) Energy surplus: *The sum of the amount of electricity, which the market participants have made during the energy settlement within the scope of the futures electricity market, day-ahead market, intraday market and bilateral agreements, deloading offers, imports and the electrical energy they have given to the system on the basis of energy settlement, exceeds the sales made within the scope of futures electricity market, day-ahead market, intraday market and bilateral agreements, loading offers,*

exports and the electrical energy they have drawn from the system on the basis of energy settlement,

z) Relevant legislation: *Law on the electricity market, Presidential decree, Presidential decision, regulation, communiqué, circular and Board decisions,*

ff) National Load Dispatch Centre (NLDC): *The central unit within TEİAŞ responsible for real-time balancing of electricity supply and demand and operation of the interconnected electricity transmission system,*

gg) Organized wholesale electricity markets: *Futures electricity markets, where electricity energy, capacity or retail sales are made, organized and operated by a central intermediary legal entity which holds a market operating license, markets operated by Borsa İstanbul Anonim Şirketi, where standardized electricity contracts with day-ahead market, intraday market and capital market instruments, and derivatives with the basis of electricity energy and/or capacity are traded, and electricity markets such as balancing power market and ancillary services market organized and operated by TEİAŞ,*

ıı) Payment notifications: *The notifications made to the relevant legal entities and constituting the basis for the invoices to be prepared within this scope and containing detailed information regarding the payments to be made and the non-fulfilment fees to be applied to the legal entities which provide ancillary services,*

lll) Ancillary services: *As per this Regulation, the ancillary services, defined in detail in this Regulation hereby and Electricity Network Regulation, are provided by relevant legal entities which are connected to the transmission or distribution system in order to ensure the safe operation of the transmission or distribution system and providing the electricity under the required quality conditions,*

mmm) Ancillary service agreements: *Agreements that determine the ancillary services to be provided to TEİAŞ, ancillary service fees, conditions and provisions in accordance with the Electricity Network Regulation by generation companies, distribution companies, electricity storage facilities or consumers connected to the transmission and/or distribution system,*

nnn) Ancillary service unit: *A generation, consumption or electricity storage facility or a part of the generation, consumption or electricity storage facility to be registered in Ancillary Service Market Management System to provide ancillary services,*

ppp) Ancillary services market participant: *Legal entities holding generation or OIZ generation licenses that have completed their legal entity registration procedures to participate in the balancing power market and legal entities that own or operate electricity storage facilities and legal entities that own consumption plants, by applying to the system operator to take part in the supply process of the ancillary services defined within the scope of this Regulation.*

rrr) Ancillary Service Market Management System (ASMMS): *Internet-based applications used to carry out transactions related to ancillary services market,*

dddd) Emergency: *Situations that pose a danger for system stability and safety within the framework of the Electricity Network Regulation and other provisions of the relevant legislation,*

eeee) Minimum discharge unit: *The unit, which is specific to hydraulic power plants with reservoirs and regulators, established to obtain electrical energy from the minimum discharge that should be left in the stream bed, which has to work at a certain flow rate due to the installation purpose and which cannot change its output power due to its function,*

ffff) Available capacity: *The maximum amount of power that a settlement supply/draw unit can technically give to the system, including emergencies, under its current conditions,*
gggg) EÜAŞ: *Electricity Generation Corporation,*
ğğğğ) MAXC: *The upper limit value of the ancillary service units participating in the secondary frequency control service in the automatic generation control program,*
hhhh) MINC: *The lower limit value of the ancillary service units participating in the secondary frequency control service in the automatic generation control program,*
ııı) Minimum stable generation level (MSGL): *The minimum active power level at which a settlement supply/draw unit can operate continuously,*
iiii) Bid period: *The period specified in the tender, announced by the system operator in the procurement processes of ancillary services,*
jjj) Demand side reserve: *The amount of consumption that is supplied within the scope of demand side reserve service and can be changed in accordance with the instructions of the system operator,*
kkkk) Demand side reserve service: *The services that are supplied by changing the consumption amount for the consumption plants participating in the service in accordance with the instructions of the System Operator,*
llll) Demand side backup service compliance certificate: *The document issued by TEİAŞ for the consumption plants that want to participate in the supply process related to demand side reserve service by registering to ASMMS as an ancillary service unit, in case that the relevant plant is within the framework of the procedures to be determined by TEİAŞ that it has the necessary communication infrastructures to provide the required control, measurement, monitoring, verification and service providing,*
mmmm) Ancillary services market: *It refers to the organized electricity market in which the ancillary services, defined in this Regulation, are supplied and operated by the system operator,*
nnnn) Transfer of the obligation by means of special order: *Transfer of the reserve obligations undertaken by the ancillary service market participants, which are selected as a result of the procurement process of the frequency control services, defined within the scope of this Regulation, through a special agreement in the transfer platform between the parties of the transferor and the transferee,*
oooo) Liability transfer platform: *Internet-based interface operated by the system operator within the scope of ASMMS and enabling market participants, that participate in the frequency control service, to transfer their liabilities within the limits specified in this Regulation,*

- The second paragraph of Article 5 titled "Ancillary services and the procurement of ancillary services" has been amended as follows.

"(2) Procurement of ancillary services includes the submission of services needed by the system operator to TEİAŞ by legal entities that are capable of providing the service and having the qualifications of market participants, identification of the plant and/or legal entities, from which the service will be received, by TEİAŞ, the activities carried out by TEİAŞ regarding the signing of additional service agreements when necessary and the execution of receivables and debts arising from these transactions, and the necessary administrative proceedings for these activities."

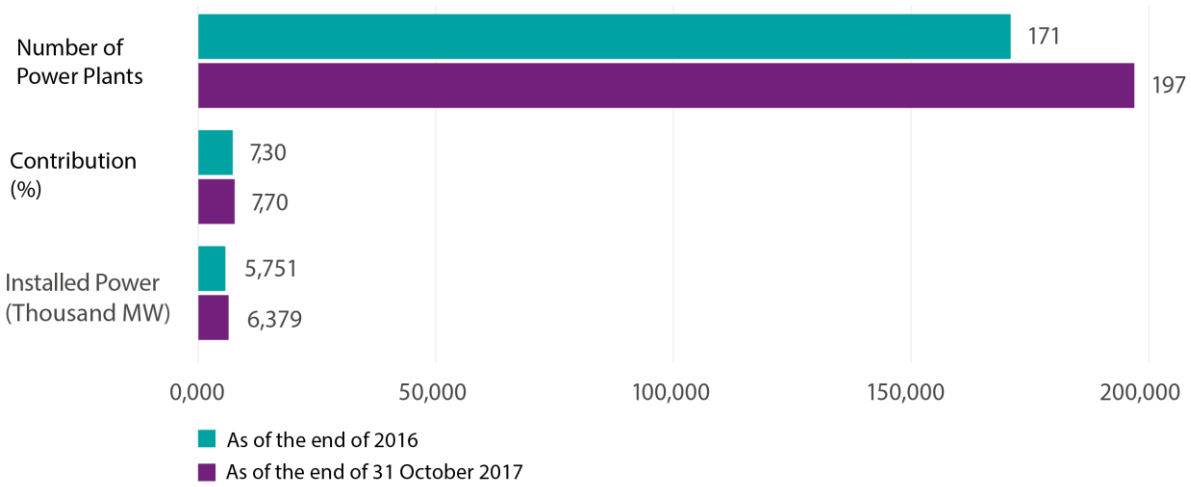
Within this framework, Turkey has made and is still making plans to encourage the use of energy sources that don't use up any natural resources. The Law No. 5346 on the Use of Renewable Energy Resources for the Purpose of Electricity Generation was the first legal

regulation on the subject in Turkey. Along with the rest of the world, Turkey uses different tax incentives and financial support tools to encourage the production of renewable energy sources and increase the amount of energy that comes from these sources. However, it can be stated that the tax incentives provided by Turkey for renewable energy sources are new in terms of historical processes and incentive types. In this context, it is said that the stamp tax exemption was the only type of tax incentive used in this area until 2012. This was because it was thought that Turkey couldn't differentiate the tax incentives for renewable energy sources enough.

3. System Structure

In wind energy, one of the most important sources of renewable energy, there are many investments of increasing scale both in the world and in Turkey. Wind energy generation increased from 17.4 GW in 2000 to 432.9 GW in 2015. In 2030, this figure is expected to reach 1,749.8 GW. Energy markets used to be controlled by state-owned companies. The developments in the markets resulted in a liberalization process that increased the number of participants through the involvement of private investors. The Turkish energy market has been exposed to these changes. As a result, there are three major stakeholders in a wind energy system: the state, the investor, and the consumer. Each of them participates in this system with their own motivation. Turkey's wind energy potential is 48,000 MW, and the total area corresponding to this potential corresponds to 1.3 percent of Turkey's surface area. These rates represent an extremely advantageous geography for the efficient use of wind energy (KPMC, 2018).

Figure-2: Change of wind energy in installed power (2016-2017)



Source: TEİAŞ

Looking at the studies in the literature, Agrawal states perception of renewable energy projects as high-risk is a challenge. The project selection depends on the creditworthiness of the project participant, future cash flows, and the legal and political structures of the host country (Agrawal, 2012). In another study, Abolhosseini and Heshmati identify feed-in tariffs, tax incentives, and tradable green certificates as the three primary support mechanisms for renewable energy development (Abolhosseini, & Heshmati, 2014). Finally, the report prepared for UNDP lists successful policy mechanisms as competitive bidding, renewable energy targets, tariff guarantees, capital subsidies and tax incentives (Muriel Watt, 2014).

The maturity of the market conditions determines the weight of concerns. The main structure is shaped according to progress in market conditions. In the infancy period, the government take the role of attracting investors by providing huge incentives by behaving as a risk taker. As the market grows up, other participants tend to take the risk to be able to take place in the market. This explanation has been exemplified in Turkey. The primary mechanism in Turkish Wind Power Systems is feed-in tariffs and competitive bidding. Feed in-tariff system is determined as a purchase guarantee with the price of 7.3 $cent/kWh for ten years after the start of operation for the plants established until 2020. Also, it may be increased for the first five years to 11 $cent/kWh, proportional to the local content amount in the plants' equipment types. Market prices were above the feed-in tariff prices before 2015. After that year, the price has been decreased to the level of 4.5 $cent/kWh. This structure has been transformed into competitive bidding in the form of small-sized capacities and large capacities such as YEKA (Renewable Energy Resource Areas), and renewable energy source region tenders, in which the state aims to increase the local production of equipment. This transformation shows the dynamism of market conditions.

3.1. Wind Power Plant Instalment and Operation

Wind power project development starts with measuring the sites having high wind potential with masts (Medimorec, & Tomsic, 2015). The measurements shape the project's generation capacity, which is one of the most essential items in wind power plant feasibility studies. On the other side, it is one of the riskiest parts since it depends on some hypothesis. Analysing the generation predictions with data from different sources and evaluating the correlation with those sources would provide testing for the foreseen generation amount.

3.2. Financial Modelling

Financial models are developed to check the rentability of the projects. The model is shaped according to the expectations of the investors as return on investment, internal rate of return, payback period, and needed business capital. The items are described as capital expenses, financial expenses, sales, operational expenses, and taxes. Summation of all these items results in net free cash for a given period. The main risk factors of a project are future cash flow, country profile, legal and political structure and market condition (Medimorec, & Tomsic, 2015). Since renewable energy investments have multiple risk factors, it is a multi-objective optimization problem with objectives for maximising profit and minimising risks. The sensitivity analysis is required for each element and the project value to understand the weight of the risks on the result.

3.2.1. Items in Financial Modelling for Renewable Energy Investment

3.2.1.1. Capital Expenditures and Finance

Renewable energy is an intense capital sector that promises high returns and risks (Bernabeu, Vitoria, & Verdu, 2015). The capital is needed for the Turbine, instalment, and establishment of the plant. The civil works, electrical works and governmental allowances are collected under the heading of the balance of plant (Miceli, 2012). Renewable energy investments require a high amount of capital. This capital could be supplied with traditional loans like in the European Example. The project finance approach is used in this process. This approach helps on reducing all types of project risks (Bernabeu, Vitoria, & Verdu, 2015). Two leading credit suppliers are traditional banks and export credit agencies (ECA). ECAs have the advantage of providing cheaper and long-term credit. Therefore, the equipment providers have the potential to reach this kind of enhancement and may step forward. The projects contain construction parts which it could not be able to generate money. This period

is covered as a grace period in project enhancement. Since the project has a long lifetime, the payment period is also structured as long-term debt. Concerning and financial Model, the main actors in the wind energy system are the state, investors and consumers. Each of them approaches renewable energy with their own motivation.

- Main concerns of states
    - **Low energy cost**: Providing cheaper energy to encourage the development of the country.
    - **Energy security**: Providing energy service with high quality.
    - **Energy sustainability**: Providing energy continuously without any interruption.
    - **Economic independence**: Financial policies focus on decreasing the budget deficit. Energy sources dependent on foreign countries may threaten these efforts. Therefore, renewable energy investments are instruments for that purpose.
    - **Clean environment**: Conventional technologies in energy generation result in massive carbon emissions. Renewable energy may be chosen for renewing the technology with environmentally friendly technologies.
- Main concerns of investors
    - **High return on investment**: The main objective of investors in their business is obtaining higher returns.
    - **Low payback period**: Higher returns in shorter times are more preferrable for investors.
    - **Market guarantee**: Market structure defines the risk of the investment. Investors aim to get a higher return in a lower period with minimum risk.
- Main concerns of consumers
    - **Low energy cost**: Consumers focus on lower costs in their bills. Renewable energy may be alternative for this aim because of the lower cost of the raw materials.
    - **Sustainable Energy**: Consumers are the state's constituents concerned with the environmental situation. They demand continuous energy generated without polluting the environment.

3.2.1.2. Generation

The amount of energy expected to be generated from the plant is calculated by using a statistical calculation based on long-term data. It has different categories depending on the probability of foreseen amount. For a wind power plant, the value with the probability of 90% (P90) means less than the amount resulting as 75% probability (P75). The lenders choose the P90 value to avoid risk.

3.2.1.3. Sales

Selling is based on the amount generated and the price for which energy is sold. Governments use different methods to attract investors to make renewable investments. The feed-in tariff and tender fee are the items related to this subject. The Turkish renewable sector has a feed-in tariff mechanism with two sheets as an incentive for investment and an incentive for local content in the investment. When the assets become familiar, a contribution margin is introduced into the system, requiring each amount of energy to be paid to the state. The common ground of these two systems is the guaranteed buying price of 7.3 $cent/kWh. After the interest from the investors increased, a new model was developed with no guarantee to

buy generated energy but a proposal to make a contribution margin for the system. This implies trust in market prices.

On the other side, the concern of the state has reshaped the licensing mechanism under the name of YEKA, in which the government expects to procure equipment with higher local content. The concerns of the central authority have launched renewable energy, and its financial support mechanism has been exposed to the transformation from fixed pricing to flowing market prices.

3.2.1.4. Operational Expenses

Generation plants face expenses depending on internal and external factors. The transmission fee is a sample for external factors which does not rely on the performance. Maintenance expenses may be high or low depending on outsourcing usage or providing in-house solutions. Insurance is a way of protecting project partners as investors and financial supporters from natural risks. Personnel expense is the cost for the personnel that take missions in field activities. Rent for the project area depends on the ownership structure of the land. Administrative expense covers overhead costs, security costs etc.

Support mechanism and tenders for capacity usage there are five policies used in supporting renewable energy investments (Muriel Watt, (2014);

- Competitive bidding: The winning bid for the capacity is the lowest one. It supports investments by providing a purchase guarantee.
- Renewable energy targets and portfolio standards: Targets determined by the state to encourage energy sector diversification and reduce carbon emissions.
- Feed-in tariffs: Buying guarantee with fixed cost during determined years.
- Capital subsidies: Incentives may be provided for the construction period.
- Tax incentives: Support for income taxes or VAT payments.

4. Taxes and Funds in the Renewable Energy Sector

Taxes and Funds Received from Consumption;

- Electricity Consumption Tax (BTV) Article 34 of the Law on Municipal Revenues No. 2664
- TRT Share
- Energy Fund
- VAT

Taxes on Income;

- Corporate Tax (and Provisional Tax)

Taxes on Transaction;

- Stamp duty
- Mortar

Electricity and Coal Gas Consumption Tax (Municipal Consumption Tax) entered into force with Article 35 of the Law on Municipal Revenues No. 2664 (1981). In this context;

Taxpayer;

- Those who consume electrical energy.

Tax responsible;

- Electricity Supply Companies are responsible for the collection of this tax together with the sales price and its deposit to the relevant Municipality.

Tax base;

- The tax base is the electrical energy sales price, excluding the costs related to the transmission, distribution and retail sales of electricity.
- Taxes, funds and shares cannot be included in the tax base.

4.1. Tax Discounts, Exceptions and Exemptions in the Turkish Investment Incentive System

Tax exemption is when a taxable event is not taxed, and tax exemption is when a taxed person is not taxed, either permanently or temporarily, in part or whole, if certain conditions in the law are met. In tax deduction, the person or people are still taxed, but if the law's requirements are met, a deduction is made from the tax base.

Tax exemptions, exemptions, and discounts are used for the widespread use of renewable energy worldwide. The government gives tax breaks to investment companies that invest money in renewable energy projects. In Sweden and Germany, for example, investments in wind energy projects can be taken out of a person's income tax. However, companies in Spain, Ireland, and the Netherlands can receive corporate tax reductions if they invest in renewable energy projects. In Greece, on the other hand, tax breaks and exemptions are given to households that use renewable energy (Abdmouleh, and Alammari, R., 2015).

Implementing zero or reduced VAT on installing and supplying renewable energy equipment and materials could increase the demand for renewable energy, especially for households and residences. For example, the reduced VAT rate of 5.5% in France applies to the production and use of renewable energy in homes (IEA, 2021). Motor Vehicles Tax (MTV) and Special Consumption Tax (SCT) make renewable energy consumption attractive compared to fossil fuels. By exempting fuels obtained from renewable energy sources such as biomass from other taxes such as SCT, Germany has enabled them to compete with highly taxed conventional diesel fuel. Germany did the same thing with electric cars, exempt from MTV for five years (IEA, 2021).

The Fifth Region incentives can be used to finance investments in wind energy and turbines for renewable energy generation, as well as the creation of blades for use in generator manufacturing. There is a lot of tax support in this situation.

We can list these supports as follows;

- VAT
- Customs Exemption
- Corporate Tax Deduction
- SGK Employer share Support
- Interest Support (5 Points in TL Loans / 2 Points in Foreign Currency Loans)
- Land - Investment Place Allocation

Investment Incentive Supports offer tax benefits to enterprises as part of the investment incentive certificate structure.

Article 13/d of Law No. 3065 says that taxpayers with Investment Incentive Certificates do not have to pay tax on machinery and equipment that falls within the scope of the certificate. Buyers who want to purchase goods within the scope of the exemption apply to the tax office to which they are affiliated, obtain an exemption document stating that they

have VAT liability and that they will use the machinery-equipment discount right and submit a copy of this document to the customs administrations or domestic sellers (Mutluer, 2017).

With the exception of investment subjects that will not be supported and investment subjects that do not meet the necessary conditions, all investments over the minimum fixed investment amount will receive VAT and customs tax exemptions without regard to area. If the investment is not realized as specified in the incentive certificate, the tax that was not timely collected would be collected from the buyer along with the default interest by imposing a tax loss penalty, according to paragraph 1 of Article 13 of the VAT law. According to the aforementioned article, the deadline for collecting unpaid taxes and tax penalties begins at the start of the calendar year after the tax collection date or the occurrence that led to the collection of the tax penalty. In the seventh article of the Council of Ministers Decision No. 2009/15199, which continues the law article, it is stated that the imports and domestic deliveries of machinery and equipment that are deemed appropriate within the scope of the incentive certificate will be exempt from the value-added tax within the meaning of the Value Added Tax Law (Mevzuat, 1984).

The most recent regulations have broadened the scope of government incentives for energy investments. Investments in solar energy- and wind power-based electricity generation facilities are included in the scope of regional support without providing interest/profit-sharing support, per the decision of the Presidency dated February 24, 2022, "within the scope of unlicensed activity and on condition that it is limited to the contract power in the connection agreement." A region must meet several requirements in order to get investment support (President's Decision, 2022). These conditions are as follows: If the investment is made in the first, second, and third areas, the fourth area will support it if it is made in the fourth, fifth, and sixth areas. It has been made known that it will get local support. So, suppose the investment is made in the provinces of the first, second, third, or fourth regions. In that case, the following types of support may be given: no VAT, no customs duty, help with the employer's share of insurance premiums for six years, a 70% tax cut, and a 30% contribution rate for the investment.

Table-2: Regional and provincial distribution showing the development level of the provinces in terms of incentive applications

1st Region	2nd Region	3rd Region	4th Region	5th Region	6th Region
Ankara	Aydın	Adana	Afyonkarahisar	Bayburt	Adıyaman
Antalya	Balıkesir	Burdur	Aksaray	Çankırı	Ağrı
Bursa	Bilecik	Düzce	Amasya	Erzurum	Ardahan
Eskişehir	Bolu	Gaziantep	Artvin	Giresun	Batman
İstanbul	Çanakkale	Karaman	Bartın	Gümüşhane	Bingöl
İzmir	Denizli	Kırıkkale	Çorum	Kahramanmaraş	Bitlis
Kocaeli	Edirne	Kütahya	Elâzığ	Kilis	Diyarbakır
Muğla	Isparta	Mersin	Erzincan	Niğde	Hakkâri
Tekirdağ	Karabük	Samsun	Hatay	Ordu	Iğdır
	Kayseri	Trabzon	Kastamonu	Osmaniye	Kars
	Kırklareli	Rize	Kırşehir	Sinop	Mardin
	Konya	Uşak	Malatya	Tokat	Muş
	Manisa	Zonguldak	Nevşehir	Tunceli	Siirt
	Sakarya		Sivas	Yozgat	Şanlıurfa
	Yalova				Şırnak

					Van
9 Province	**15 Province**	**13 Province**	**14 Province**	**14 Province**	**16 Province**

This kind of application aims to speed up and grow investments in the relevant region by figuring out what types of investments need more support and incentives based on the region. Turkey has evaluated energy investments, in particular, as a priority investment issue. No matter where they are made, energy investments will be counted as being in the 5th region and eligible for the incentives set for this region. Suppose the priority investment issues of the investors are in the 5th region. In that case, they will both be able to benefit from the support of this region. If they need to make their investments in the 6th region, the investments will be helped by the support factors in the 6th region. (Table-2)

The situations that are excluded from the investment support specified in the Presidential Decision are as follows (PWC, 2022);

- Solar energy investments, modernization investments, and investments with a capacity of less than 240 KW (including the roof) are not encouraged.
- Customs duty exemption does not apply when importing machinery and equipment from the Decision's Annex-8 list.
- Solar energy panels to be procured from abroad are not considered investment expenditures.

Incentive elements and applications in the context of tax types are as follows (Sanayi ve Teknoloji Bakanliği, 2021); The aim is to invest in all kinds of electricity generation;

- Providing support within the General Incentive System only during the investment period by the Ministry of Economy,
- Provide support through purchase guarantees and tariffs during operation periods. Supporting Hydraulic, Wind, Geothermal, Solar, Biomass, Thermal and Natural Gas Cycle Power Plant investments with an old license within the scope of General Incentive Systems, Supports;
- VAT Exemption,
- Customs Duty Exemption,
- Income Tax Withholding Support
- Stamp Duty exemption.

Table-3: Support Elements Provided for Priority Investments

Support Elements		**Support Rate and Duration***
VAT Exemption		**YES**
Customs Duty Exemption		**YES**
Tax Allowance	Investment Contribution Ratio (%)	**40****
	Tax Allowance (%)	**80****
Insurance Premium Employer Share Support		**7 years**
Investment Place Allocation		**YES**
Interest or	Internal Credit	**5 points**

Dividend Support* **	**Foreign Currency / Foreign Currency Indexed Loan**	**2 points**

***** 1-5. 5th Region support for investments in the regions, 6th Region support for the investments to be made in the 6th Region.

****** Within the scope of investment incentive certificates issued for the manufacturing industry (US-97 Code: 15-37), the investment contribution rate for investment expenditures to be made between 1/1/2017 and 31/12/2022 is added to the current rate by adding 15 points to the tax deduction rate. It is applied at the rate of 100%, and the rate of the investment contribution amount that can be used in the investment period as 100%.

******* In the case of using the CBRT-sourced Investment Committed Advance Loan, 5 points of interest support are applied.

Supports;

- **Value Added Tax Exemption**: You don't have to pay value-added tax on investment goods, machinery, and equipment that you buy from Turkey or another country if you have an Investment Incentive Certificate. This also applies to software and intangible rights you buy or rent if you have an Investment Incentive Certificate.
    - **VAT payers**: Licensed legal entities that sell electrical energy to end users.
    - **VAT rate**: 18% on electrical energy sales.
    - **VAT base**: It consists of the sum of the electrical energy consumption cost, transmission, distribution, and retail sales services, energy fund, and TRT share.
    - **Declaration Period**: VAT, which is calculated and shown separately on the invoice, is declared by the taxpayers monthly with VAT declaration.
- **Customs tax exemption**: It is applied in the form of non-payment of customs duty and RUSF for investment goods, machinery, and equipment to be procured from abroad within the scope of the Investment Incentive Certificate.
- **Tax reduction**: Tax reduction is the application of income or corporate tax at a discount until the contribution amount foreseen for the investment is reached. This support; is provided within the scope of incentive certificates issued within the framework of strategic investments, large-scale investments, and regional incentive practices.
- **Interest or dividend support**: Financial support is provided for loans with a maturity of at least one year used within the scope of the Investment Incentive Certificate. The Ministry of Economy covers a portion of the interest or dividend payable on the loan up to 70% of the fixed investment amount registered in the incentive certificate. This support; strategic investments, R&D and environmental investments, and investments to be made within the scope of regional incentive applications in the 3rd, 4th, 5th and 6th Regions.
- **Investment place support**: Investment sites can be allocated within the framework of the procedures and principles determined by the Ministry of Finance for large-scale investments for which an Investment Incentive Certificate has been issued, strategic investments, and investments that will benefit from regional support.
- **Insurance premium employer's share support**: It is the Ministry's coverage for a certain period of time, corresponding to the minimum wage, of the employer's share of the insurance premium required to be paid for additional employment provided by investment within the scope of the Investment Incentive Certificate. It is applied for

incentive certificates issued within the scope of large-scale investments, strategic investments and regional incentive applications.

- **Insurance Premium (Employee's Share) Support**: It is the Ministry's way of covering the worker's share of the minimum wage of the insurance premium, which must be paid if an investment creates more jobs within the scope of the incentive certificate. It is only stipulated in the incentive certificates issued for regional and strategic investments to be made in the 6th region and for strategic investments to be supported within the scope of TOSHP.
- **Income tax withdrawal support**: The part of the income tax withholding that is to be paid for additional employment provided by investment within the scope of the Investment Incentive Certificate, which corresponds to the minimum wage, is cancelled for 10 years. It has only been mentioned in the incentive certificates that are given out for investments in the 6th region.
- **Investment Site Allocation**: An investment site is given to an investment for which an Incentive Certificate has been issued based on the rules and procedures set by the Ministry of Environment, Urbanization, and Climate Change.
- **Value Added Tax Refund**: It is the refund of the VAT collected for the building-construction expenditures made within the scope of strategic investments with a fixed investment amount of more than 500 million Turkish Liras. Building-construction expenditures related to all investments with incentive certificates to be realized in the manufacturing sector in 2017–2018 can benefit from a VAT refund. Within the scope of Temporary Article 37 of the VAT Law No. 3065, the building-construction expenditures realized within the scope of the investment incentive certificate in the manufacturing and tourism sector can be benefited from VAT exemption until 31/12/2025.
- **Corporation Tax**: The Corporate Tax Law does not explicitly regulate companies that work in the electricity market. In this context, no Corporate Tax exemption is provided to legal entities operating in the sector or a special exemption regulation regarding earnings. The earnings of companies operating in the sector are subject to Corporate Tax at a general rate.

Support is provided for the above-mentioned issues.

4.2. TRT Share

According to article 4/c of the Turkish Radio-Television Corporation Revenues Law No. 3093 (1984); License holder legal entities that sell electrical energy to the final consumer, excluding the fees related to transmission, distribution and retail sales, on their invoices for a share of two percent of the electrical energy sales price (excluding Value Added Tax, other taxes, funds and shares and similar deductions). They also show it and transfer the costs within this scope to the Turkish Radio-Television Corporation."

- Organized industrial zones legal entities do not invest a separate share in the Turkish Radio-Television Corporation for the energy they obtain from suppliers as free consumers for their members.
- With the statement added to the Law No. 7033 on Amending Certain Laws and Decrees for the Development of Industry and Supporting Production, published in the Official Gazette dated 01.07.2017 and Article 4/2-C of the Law No. 3093 on TRT Revenues, TRT share in electricity subscribers with industry registration certificate has been removed.

4.2.1. Electric Energy Fund

With Provisional Article 4 of Law No. 3096, the Energy Fund came into effect.

- This fund was set up to pay for the Electric Energy Fund, which was set up before the Ministry of Energy and has a legal personality. The Electric Energy Fund helps pay for research, development, surveys, projects, audits, and new facilities in the electrical energy sector. It also helps keep the price of electrical energy stable.
- This fund is taken at the rate of 1% over the retail sale price of electrical energy and the cost of loss and leakage.

4.3. Taxes on Transaction

Stamp duty:

- With the brief article 4/1-b of Law No. 6446, in the investment period of the electricity generation facilities that will be put into operation for the first time until 31.12.2020, the transactions related to the generation facilities are exempt from the fee, and the issued papers are exempt from the stamp tax.
- According to the Stamp Duty Law General Communiqué (Serial No: 62), a stamp duty of 9.48 per thousand was collected from wholesale and retail sales contracts in the electricity and natural gas sector in 2018.

5. Conclusion

Environmentally friendly, less harmful, and sustainable alternative energy sources are becoming more and more popular in developed nations due to issues like air pollution and global warming brought on by the sharp decline in fossil fuel reserves, which are the source of the world's most fundamental energy supply. Globally, installed renewable and sustainable energy capacity expanded by 100% yearly, while the amount of power produced climbed by more than 70%. The Turkish government supports investments in renewable energy through a variety of means. In this situation, Turkey has created a priority investment incentive program and is using tax exemption, discount, and exception methods. The scope of incentives has been broadened to promote investors in renewable energies, as can be seen in the 2022 Presidential decision. The state's tax incentives are the most critical policy tool for renewable energy types and increasing energy capacity. Because for institutional investors with high tax burdens, tax incentives and support are very important for realising the investment.

In general, for renewable energy systems to become widespread in the context of countries, tax policies, government incentives, and a legal basis for trade are required. In this respect, if we examine our work;

The cross marks in Table-4 shows the relation between the points related with investment and stakeholders. The strategy of the system should be established by considering the affected parts. There may be conflicts in providing satisfying solution for all parts. Therefore, the problem for system design should be considered as multi objective optimization problem. Table-2 is given as an example and can be considered a road map for what to pay attention to.

Different ways to protect the environment are put in place through economics (incentives) or rules (non-incentives). The economy could encourage people to use renewable energy or tax emissions or the use of fossil fuels. There are three common support mechanisms: feed-in tariffs (FIT), (ii) tax incentives, and (iii) tradable green certificates. Tax

credits could be used for investments in, production of, or consumption of electricity derived from renewable energy sources. This instrument is attractive primarily because it makes cash available. Because of this, it could be a significant financial incentive for private investors and a chance for them to make small investments right away since it increases their liquidity. Couture and Gagnon (Couture, & Gagnon, 2010) say that for FIT policies to work, three things must be in place: guaranteed access to the grid, stable and long-term power purchase agreements, and prices that are based on the unit costs of power from renewable sources.

With this trend, the cost of energy production from renewable sources can be high in the first place due to the newness of the technologies in this field. Depending on how the costs are set up, renewable energy should be given some incentives to help it compete with energy from sources that do not regenerate. Countries try to reach their goals by making sure they have enough energy and encouraging energy production from renewable sources. In this context, they offer various incentives and support in various dimensions with various applications. In summary, these incentives and supports include supporting products used in renewable energy production; promoting labour, capital, and natural resources; supporting manufactured products with tax deductions or tax exemptions; supporting products within the scope of storage and distribution infrastructures; and supporting products during consumption. Turkey is seen as a country that has a national renewable energy target and is revising this target. In this situation, it's clear that different studies that will be discussed with statistical methods about each type of energy and the effectiveness of the incentives used for renewable energy and tax incentives will add to the field.

Consequently, capital subsidies and discounts, public investments, and grant loans are implemented at the national level as part of financial incentives and public financing. Other financial incentives (investment and production tax incentives, reductions in sales, energy, CO2, VAT, and other taxes, and rewards for energy output) appear to be planned components of the system. However, despite the fact that such financial assistance instruments are explicitly applied in the sector of renewable energy in Turkey, as indicated previously, VAT and customs tax exemptions are applied as part of general incentives.

Table-4: Relationship between concerns of actors and financial structure

RELATIONSHIP BETWEEN CONCERNS of ACTORS and FINANCIAL STRUCTURE

	STATE					INVESTOR			CONSUMER	
	Low Energy Cost	Energy Security	Energy Sustainability	Economic Indepence	Clean Environment	High Return on Investment	Low payback period	Market Guarantee	Low Energy Cost	Sustainable Energy
Items in Financial Modelling										
Capital Expenditures	X	X		X		X	X		X	
Domestic	X	X	X	X		X	X		X	X
Import	X	X		X		X	X		X	
Finance						X	X			
EUR				X		X	X			
USD				X		X	X			
Local Currency				X		X	X			
Generation		X				X	X			
Production Forecast		X				X	X			
Sales	X					X	X	X	X	
EUR				X		X	X	X	X	
USD				X		X	X	X	X	
Local Currency				X		X	X	X	X	
Operational Expenses						X	X		X	
EUR				X		X	X		X	
USD				X		X	X		X	
Local Currency				X		X	X		X	
Incentives						X	X			
Taxes	X					X	X			
Export/Import	X					X	X			
Employment						X	X			
Operational Expenses	X					X	X			
Environmental			X		X	X	X			X
Contribution Margin	X					X	X	X		
EUR	X			X		X	X	X		
USD	X			X		X	X	X		
Local Currency	X			X		X	X	X		

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