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Effect of renewable energy on energy security

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Abstract

There are plenty of studies assume that renewable energy sources diminish the number of security problems and relevant energy threats. Many approaches support the idea that renewable energy sources provide long-term energy security, activate sustainable growth, and mitigate the negative impacts of climate change. It could be said that increasing percentage of renewable energy within energy generation is likely to be antidote to some concerns on security, but allocating that it can eliminate all the security problems will not reflect truth. Besides, there are new possible threats produced by renewable energy systems. This study attempts to make an analysis of energy security with regard to renewable energy affection. Today, the usage rates of renewable energy is still low and it has not been realized its anticipated leap yet. In years to come, however, it expected that the rates in question will rise, and the positive impact of renewable energy systems on a decrease in the number of struggles about fossil fuels could be possible. Even so, the new conflict areas due to renewable energy systems need to be taken into account. The conventional disadvantages of non-renewable energy sources such as price instability and natural disasters is reflected upon renewable energy systems in various and different ways. In this sense, the concept of energy security (securitization) needs to be evaluated in a twofold approach: Firstly, what are the responses of renewable energy systems to the non-renewable energy sources? Secondly, whether the technological, geographical and sustainable advantages embedded in renewable energy systems are likely to cause new possible security threats or not in the future?

Keywords: Renewable energy; Security; Sustainable growth.

1. Introduction

One of the top topics of both national and international agenda is energy issue. Energy has been identified with civilizations, development, strong economy, and modern society in the years, and it has been at the heart of a country's policies to have a source of energy or access to energy. The increasing value of coal with the industrial revolution and the inclusion of

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natural gas in the energy production before the end of the 19th century and the beginning of the 20th century brought the result of the evaluation of energy and energy politics within the framework of energy resources.

To date, the so-called "traditional" fossil resources have met the large proportion of energy needs. However, there is a need for new resources in energy production because these resources are not available in some countries that they require high cost of accessing and communicating, decreasing reserves and causing environmental damage. The type of energy, called renewable energy, is thus an alternative to fossil fuels in energy production. It always meets the enthusiasm that all states are able to produce a certain part of their energy needs with their own resources, but renewable energy production has not spread throughout the world and has not reached the desired size. Nevertheless, it will not be wrong to say that the role of renewable energy will increase significantly in the near and medium term.

The use of renewable energy sources instead of traditional energy sources has a significant impact on every aspect of energy policies. From energy supply to pricing, from access and transportation costs to inter-country relations, many areas are affected by the chosen source of energy production. Undoubtedly, the area where this effect most clearly visible is energy security. As will be discussed during this article, it will be very useful to evaluate the energy security examined with various sub-headings together with the developments in the field of renewable energy. Renewable energy will bring about fundamental changes in traditional energy security understanding and, on the other hand, raise new risks.

In this study, it is expected to contribute to energy debates, which have an important role in both country policies and international relations. Increasing the share of renewable resources in energy production, that is mostly based on the traditional resources, brings new dimensions to energy policies. Energy security in particular is directly affected by developments in renewable energy. The relationship between renewable energy and energy security will be conducted throughout the study. In addition to the impact of renewable energy on the solution of traditional energy' security problems, this article can be important in the literature in terms of addressing new problems and threats that may arise. The extent to which renewable energy systems can be implemented and expanded in the future, how the concept of traditional energy security can be transformed, the extent to which renewable energy can contribute to the solution of energy security problems and whether renewable energy will bring about new security problems, will be the main points to be examined. Firstly, a conceptual examination of renewable energy and energy security will be made and then the effect of renewable energy on energy security, and then, the future of renewable energy will be discussed.

2. Analysis

2.1. The concept of renewable energy and energy safety

2.1.1. Renewable energy

In all areas of daily life, the need for energy is not important. The energy agenda is undoubtedly the sources for which energy can be obtained. It is possible to talk about a wide range of energy sources, from coal to nuclear,

from wind to sun. Primary energy sources with a general definition; traditional and non-traditional energy sources; or renewable and non-renewable energy sources are extracted or obtained directly from nature.

The primary sources of energy, traditionally called coal, oil, natural gas and nuclear fuel, constitute the second group of waterpower, solar energy, wind, biomass energy and geothermal (Demirel, 2012). The natural gas started to be used for the production of energy needed in every stage of the daily life and production process. In the energy process, the fact that modernity is seen as an important provider of development, social development and state power have increased the value of natural gas and oil. However, the fact that these resources are not found anywhere in the world, cannot be renewed by the nature and cannot be recycled by people constitutes a big problem (Bradley, 1973). The necessity of a continuous research to identify the reserves, the difficulty in carrying the source to the distant places and the environmental concerns a negative outlook for fuels. However, the share of fossil fuels in energy production does not decrease. Today, the proportion of fossil fuels in primary energy needs is expressed as 80%, which is almost the same as the 25 years ago (Van der Hoeven, 2013). In the course of the Cold War, nuclear technology has been adopted by many states as a source that has made great progress. According to the International Atomic Energy Agency data, 438 jobs in the world and 70 in the construction phase of the reactor reveal the interest in this type of energy (IAEA, 2015). However, the share of nuclear energy in the total energy production will vary in the range of 6-8% at a low rate, which is not comparable to the fossil resources in the coming period (Energy Information Administration and Energy, 2015).

Coal, oil, natural gas and nuclear energy; the opposite attitude of countries that do not have the resources and sufficient technology to be the basic elements of energy production has become more severe after the oil crisis in the 1970s. The high dependence of economies on oil caused a great concern. In addition, the environmental problems caused by an oil spill or nuclear explosion are clearly understood. In addition, the fact that fossil fuel reserves will be depleted over time is also stated more frequently. Thus, new sources have emerged in order to find new sources of energy produced outside of these resources and renewable energy has come to the agenda. The new energy vision put forward based on the use of resources defined as alternative or renewable energy in energy production. The idea of integrating non-consumable sources into energy production, not based on fossil fuels or nuclear energy and not lead to crises in the international arena was initially met with enthusiasm. However, a strong excitement has been experienced due to the need for developing a new technology for renewable energy, and the pressure of the state and companies that have benefited greatly from the traditional sources (Yergin, 2011).

The non-traditional definition of renewable energy is based on an important fact. Fundamentally, the world's first energy sources have been renewable energy sources. Until the use of coal and oil as an energy source, sun, water and wind power are used for various purposes, from transportation to feeding. Therefore, it is possible to say that these energy sources are more traditional than fossil energy sources. However, coal, oil, natural gas and nuclear power production were used so

intensively for several centuries, and the solar, wind, water, and geothermal energies were ignored until the need for new energy sources is on the agenda.

In the traditional sense, energy production relies on fossil resources. However, especially in economically developed societies, the rise of views on the sustainable use of the world's resources and biosphere brought renewable energy into the agenda. (Van Santen, 2007).

It is becoming increasingly important that renewable energy is primarily an alternative to nuclear energy, which may lead to serious problems in fossil resources and in any negative situation, and then be able to take its place. Although, the desired points have not been reached, the share of renewable energy in energy production and the awareness in this context are increasing with time. For example, according to the World Energy Council data, the share of renewable energy in primary energy supply was 12% in 1993, compared to 13% in 2011, and estimates are expected to increase to 18% by 2020 (World Energy Council, 2013). Renewable energy, which is dealt within the framework of hydropower and its other sources are gathered under a single title, is discussed in a broad scope. Therefore, it would be useful to introduce the renewable energy sources briefly. The sun, which provides heat and light to the earth for millennia, is known as an endless energy source. Solar energy is a resource that can be utilized directly and can be consumed in the most abundant for energy production. The fact that only a small part of the rays reaching the earth from the sun converted into energy will be able to respond to the humanity's energy needs largely. There are some observations that the energy value of the sun's rays that are born in one year is more than that of all the proven and unproven fossil sources on earth and the energy available from the nuclear. Transforming the sun's rays into energy is considered not to be difficult: the establishment of platforms to convert the rays into energy and the storage and transmission of the energy obtained is an activity that can be done by any country that can benefit from the sufficient time of sunbathing.

The wind, which is another renewable energy source, involves the use of the energy produced by taking advantage of the air currents in various ways. Undoubtedly, winds are effective in every part of the world; however, the wind must be in certain intensity as an important and consistently sustained source of energy. With the wind turbines built at such facilities, it is possible to produce energy in a cheap way. Many states have started to produce a significant portion of their energy needs from winds in recent years especially the steps taken by European countries such as Germany, Spain, and Denmark on wind energy closely monitored by other countries (Marcovitz, 2011).

Waterpower is the most common type of renewable energy. Under waterpower, it is possible to examine such headings as hydraulic energy, wave-tidal energy and ocean (heat) energy. Although many countries produce energy from water, particularly in hydraulic energy, the amount of energy obtained from rivers, seas, and oceans should be higher than the existing one, considering that 3/4 of the world is covered with water. The technology required for more efficient use of water, which will not be exhausted, should be developed and damaging the environment in the energy production process should be minimized.

Another type of renewable energy is geothermal, which contains water, steam and

gases heated by the temperature of the core in which there are various minerals and chemicals. The reasons such as; not being affected by the weather conditions, being used directly, finding many usage areas, being quite sustainable, are put into a different position in geothermal renewable energy. The existing technology allows the production of geothermal energy where geothermal resources can reach the ground; however, with the development of geothermal technology in the future, it is planned to provide a large part of the world energy requirements from geothermal. Another issue that needs to be addressed within the scope of renewable energy is biomass energy. Biological materials and wastes, that store solar energy in any way, can be used for biomass energy production. Biomass energy is the most widely distributed type of renewable energy in the world and it is expected that there will be a wide range of utilization areas from heating to electricity generation, from vehicle fuel to the production of existing petrochemical products. The rapid growth of the world population and the country's development are increasing the needs for energy. Countries are developing their policies to reduce their dependence on fossil fuels and nuclear energy to meet their growing energy requests. Not only the fossil resource importers and nuclear-tech countries, but also those with oil and natural gas and nuclear reactors are in a positive trend towards the renewable energy. Therefore, it is not difficult to argue that the share of renewable energy in energy production will gradually increase. Although solar and wind energy is dependent on weather conditions, geothermal energy cannot be reached all over the world, water power is largely confined to hydroelectricity and biomass energy cannot be reached at the desired levels. However, developments in energy technology are expected to overcome such disadvantages in the coming years. For example; in order to be able to benefit from the sun continuously, important projects such as developing solar vehicles that can monitor the wind instead of constant wind turbines to obtain solar energy from space or to benefit more from the wind are still continuing. As the projects are carried out, it is unlikely to argue that countries can abandon fossil sources and nuclear energy because of both economic reasons and environmental concerns, and that many struggles over traditional energy sources will finish in the international arena.

2.1.2. Energy Security

Energy security continues to exist on national and international grounds from the 1900s to the present, but there is no common consensus based on the concept. In fact, energy security is dynamic and affected by the conditions over time but it has a quality that can change without losing any of its basic points. Innovations in energy technology increase the awareness based on the climate change, and the enhancement in sustainable energy resources are just a few of the developments that can lead to the reshaping the energy security. As stated by Yergin, energy security has more than one dimension. First dimension is physical security to protect the assets, infrastructure, supply chains, and trade routes and to change and renew them as necessary. The second dimension is critical accessing to the energy. Third dimension of the energy security is a system consisting of national policies and international institutions to ensure that supply is maintained in a coordinated manner, in response to disruptions, loss of

space and extraordinary situations. The fourth dimension of energy security is investment issue. In order to secure adequate supply and infrastructure in the future and where needed, policies and working environment that enable investment and development are very important (Yergin, 2011).

When we say energy security, it is understood that individuals, consumers' energy needs are safeguarded and the economic interests of the society and the state are protected against internal and external threats. In the scientific literature, although the concept of energy security still does not have a clear definition. Energy security needs to be a system that can not only resist energy cuts due to technological, natural, economic, socio-political and geopolitical reasons but also by providing energy to the consumers with favorable conditions and reasonable prices (Augutis *et al.*, 2015).

The concept defined by the International Energy Agency (IEA) is providing energy in an uninterrupted, sufficient, acceptable price, an environmentally friendly way, to ensure the continuity of economic growth (IEA, 2015a). The IEA defines energy security as long-term energy security policies aim to provide energy supply investments that will support economic development and environmental factors, and to have the energy systems that can respond most quickly to short-term energy security sudden supply/demand imbalance (IEA, 2015a). The World Energy Council's energy security definition is based on the energy sustainability and three main components: energy security, energy equality, and environmental sustainability. These three objectives form a trilogy (the equation with three unknowns), which involves complex and interconnected relations, from public and private sectors, governments and regulators, economic and social factors, national resources, environmental concerns, and individual behaviors (Wyman, 2015).

The International Strategic Research Organization (USAK) has defined the concept of energy security on four main pillars: availability, accessibility, affordability, and sustainability. Presence is related to the existence of energy resources and this title is important in the context of supply/demand security. Accessibility is the need of those who reach these resources easily. The accountability dimension is divided into two, the ability of the demander to obtain energy resources in a competitive market mechanism, and to meet the price level that will enable economic development and new investments for the supplier of energy resources. Sustainability

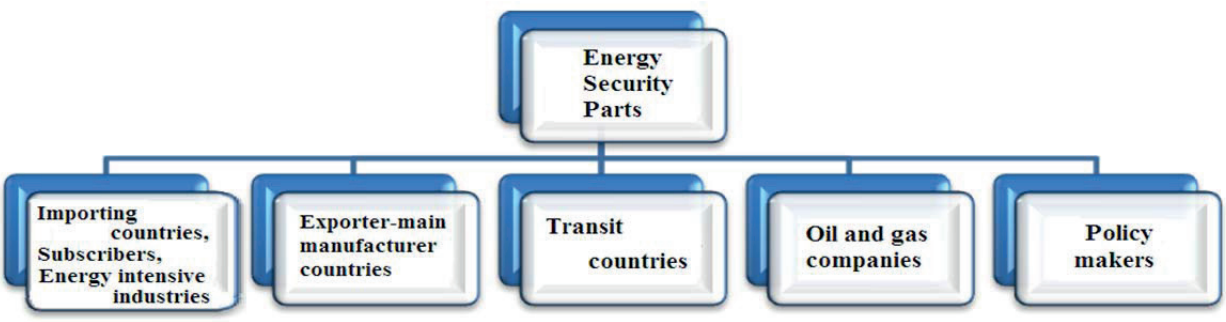

Figure 1. Parties to Energy Security

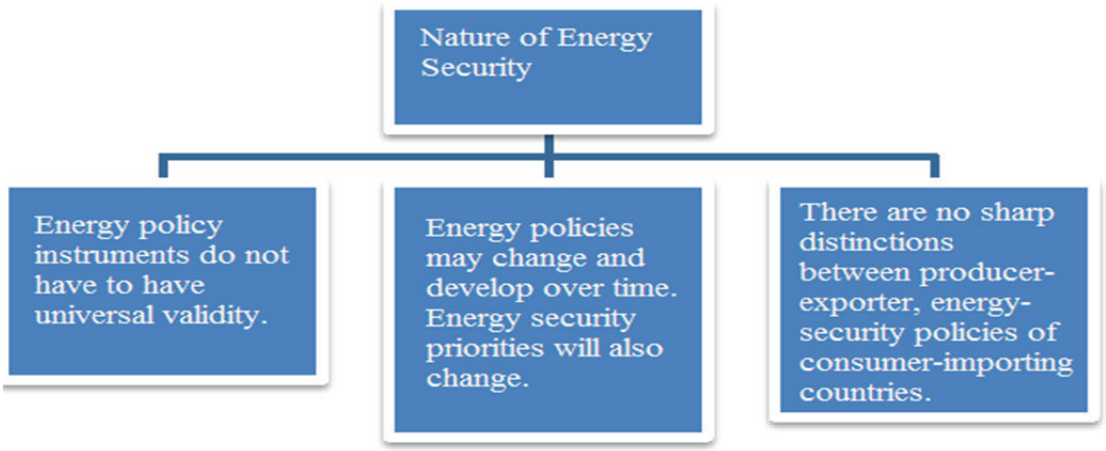

Figure 2. The Nature of Energy Security by Energy Charter Secretariat (ECS, 2015)

means that the requested energy can be reached as long as necessary and without any disruption (USAK, 2011). Energy security in a broad sense; energy types, economic growth, geo-economics and geopolitical power balances, security threats, energy infrastructure systems, and energy accessibility, price, energy infrastructure, environment and energy efficiency are the elements of classical energy security. On the other hand, energy security becomes a multifaceted concept with the effect of importing countries, consumers, energy intensive industry, exporters and main producing countries, transit countries, oil and gas companies and policy makers (Figure 1).

At this point, it can be said that energy security has different meanings for different countries and parties. Energy sources that depend on imports from Turkey and the European Union countries 'security of supply' critical nature when moving; in countries such as Russia whose economy is dependent on energy exports, demand security is gaining importance. As Winzer says; the purpose of energy security for some is to protect the low-income from energy fluctuations. Other researchers emphasize the importance of protecting the economy from supply cuts in energy services, despite the rise in energy prices during crisis periods. For some, the goal of energy security is to ensure reliable fuel supply, as compared to the increased safety risk of nuclear energy. Furthermore, others relate energy security to the reduction of hazards caused by accidents and nuclear proliferation, and perceive the spread of nuclear industry as a potential threat to energy security (Winzer, 2012). Another issue that needs to be addressed in terms of energy security involves two distinct elements. The first one is energy and another is security. While the security part includes the protection measures to be taken against all security threats to the facilities in the energy exploration, development, production, communication, cycle, distribution, marketing and consumption network, the energy-weighted definitions, the above mentioned energy availability, accessibility and acceptability (quality and environment friendly) (Ediger, 2007; Dedeoglu, 2015).

2.2. The effect of renewable energy on energy safety

It is thought that the world population will need 45% more energy than it consumes today in 2030; however, concerns are raised that new energy production can meet increasing demand (Luft and Korin, 2009).

The countries' energy policies and risk control mechanisms vary, and even within their own territory, their energy policies may vary. Some of the diversified risk management policies are diversification of supplies, resources and demand, improvement in stockpile security, energy efficiency (demand control), price setting, and vertical integration of energy production tools and distribution (ECS, 2015). From this perspective, the approaches based on the safety of renewable energy also show diversity. The nature of energy security has three characteristics (Figure 2).

According to International Energy Security report, energy policy instruments do not have to have universal validity for each column of energy policies (ECS, 2015). The operation of some vehicles is for one pillar of energy security; however, they may not always have positive or negative effects to others. For example; in order to ensure the security of energy supply, the opening of new maritime routes in the Artik Region (at the North Pole) meets the global warming and environmentalist approaches from the pillars of ensuring energy security. Another aspect of renewable energy sources is that they help to protect the environment by reducing carbon dioxide emissions and contributing to the reduction of foreign dependency in energy because they are domestic resources. However, it may not be economically possible, for example, to obtain electrical energy from solar energy, the inability to calculate the amount of production, the inability to use it in winter, and the problems in storing the energy were obtained. Technological developments, diversification of energy resources, increasing energy demand can lead to changes in energy policies. Accordingly, energy security policies will be established according to the changing risks and threats. For example, increased interest in renewable energy sources can be associated with a number of changing factors. The recent fluctuations in oil prices, the dependence on foreign energy sources and the environmental consequences of carbon emissions are all factors contributing to the interest in renewable energy sources today (Apergis and Payne, 2009). Finally, in energy policies, countries are dependent on each other, and therefore there are no sharp distinctions between energy security policies. At this point, it is thought that the use of renewable energies will decrease the interdependence of energy between countries and thus change the nature of energy security policies. Actually, renewable energy as one of the basic solutions in energy supply, security and climate change, has a strong place in the nature of energy security. According to Hinrichs-Rahlwes, for example, he considered renewable energy as the best solution for the problems of today's world and summarized its contributions in three articles (Hinrichs-Rahlwes, 2013):

1. Provides long-term energy security for developed and developing countries
2. Provides a sustainable growth with a high level of future business opportunities
3. Helps to mitigate the effects of climate change with the development of new technologies

However, rather than the contribution of renewable energy to energy security, it is

necessary to evaluate the security dimension of renewable energy sources and to examine the threats and advantages that they have. In this respect, classical energy security elements, energy availability, infrastructure, energy prices, societal effects, and environmental aspects of renewable energy in the sub-headings of the study of the security elements will distinguish us from the classical evaluations.

First, energy supply and demand security of renewable energies will be evaluated under the heading of energy accessibility. The energy accessibility and energy diversity are the important policy guiding factors for renewable energy. According to the first assessment, the growth in renewable energy contributes to the diversity of the technology portfolio, as well as the energy diversity in terms of geographic resources. The use of renewable energies can reduce fuel imports and to some extent protect the economy from fossil fuel wage increases and fluctuations (IEA, 2015b). As long as renewable energy sources are utilized in a sustainable way, it is possible to sustain energy supply in the long term with renewable energy sources. However, information based on what results for a feasible spread of renewable energy may emerge is yet very evident. Renewable energy sources are directly related to climatic conditions, and climate change is likely to affect renewable energy sources more intensively than fossil fuels. For example, some factors that may affect renewable energy include temperature, wind speed distribution, cloudiness, and changes in the hydrological cycle (Johansson, 2013).

In addition, the impact of renewable energy on diversity is controversial. With a rapid pace of development, renewable energy is still far away from being a major energy source. Diversity is expected to increase during the renewable energy investment period, where the cost of entry into the market is low. However, as the renewable energy becomes widespread in energy systems, the diversity advantages will be reduced. In this respect, a balance between various renewable energy sources will be important. Finally, security of supply does not depend solely on the balance between supply and demand. The political instabilities in which the countries that are the energy provider, the social movements, the rising terror threats on the energy paths, the security and continuity of the energy transportation routes can be disrupted. As Johansson stated; the current oil and gas markets are determined by several sovereign suppliers and are expected to increase further in the future. This situation causes these markets to be seriously affected by the incidents and transportation lines in these countries (caused by natural or conflict). With the increase of renewable energy investments, this sovereignty and the decrease in dependence on these countries is another possible result (Johansson, 2013).

Price is another element included in the most traditional definitions of energy security. There are multiple approaches to energy prices based on the impact of renewable energy. First, the rise in renewable energy investments is expected fluctuating in the oil and natural gas prices in international markets (Apergis and Payne, 2009). Another approach is because the rise in energy prices in the 2000s led to the rapid growth and support of the renewable energy sector. In this process, the cost gap between renewable energy and classical energy has narrowed and the investment rates have increased (Yergin, 2011). According to Bolinger and Winzer reports, the project cost of wind

energy in the USA decreased by approximately 40% per kilowatt electric energy between 1985 and 2005 (Valentine, 2011).

A different approach examines the role of energy in economic growth and the impact of renewable energy. According to the biophysical and ecological view, energy plays an important role in determining income, and economies that are heavily dependent on energy use are also significantly affected by changes in energy consumption (Yuan *et al.*, 2008). For the safety of renewable energy, the investments undertaken must support economic prosperity and provide affordability together. At this point, the incentives of states based on renewable energy sources are gaining importance. The applications launched under the tariff guarantee laws constitute the economic basis for the creation of a modern renewable energy industry (Yergin, 2011).

One of the energy security perspectives, resilience, is the main discipline of economics (Cherp and Jewell, 2011). According to research, renewable energy strengthens the energy elasticity in two ways. The first expected result is the reduction of the negative impact of renewable energy technology, the disruptions in the technological infrastructures of consumable energy sources and the terrorist attacks on the electricity networks of nations.

For example, there is some estimation because any explosion or disruption in any wind energy tribune will be less harmful than the explosion that may occur in the coal power plant. Second, renewable energy is expected to change the course of oil revenues. According to the researches, the wind energy will provide a much higher standard of job opportunity compared to the job opportunity created by consumable fuel technology (Valentine, 2011).

Before proceeding with the examination of the diversity-price relationship of renewable energy, diversity is important in reducing the system's vulnerability to price changes. How the prices of various energy sources are related to the market is related to how vulnerable working area (country, industry, household) and fluctuating prices. Renewable energy prices are likely to follow global fossil fuel prices, and its impact on a given national economy (Johansson, 2013). At this point, a renewable energy system requires a two-sided review in order to cope with or adapt to price changes. The first relies on the prices and income distribution of renewable energy sources, while the other covers the effects on the global fossil fuel market.

On the other hand, infrastructure security of renewable energy can be examined in two parts. According to a study examining the relationship between renewable energy and technical efficiency in developed and emerging economies, it has been suggested that the increase in renewable energy consumption also increases the technical efficiency. Compared to developed economies, the fastest increase in energy demand is in emerging economies. Increasing the use of renewable energy is expected to be more important for emerging economies as the largest increase in energy demand and carbon dioxide emissions will occur in these countries (Sadorsky, 2009). The renewable energy infrastructure is considered one of the most suitable options by overcoming the limits of existing approaches to energy production and consumption and contributing more to the modernization of the energy sector (Kaygusuz *et al.*, 2007). As a result, the risk of tension that may arise from the use of increased renewable energy; having new technologies

will increase due to local groupings and income distribution. It is expected that the smaller scale renewable technologies will enable the wider local investor groups to enter the market and thus a better state than the existing fossil fuel systems. Increasing demand for materials found in basic systems for the use of renewable energy from new areas of increasing interest and the fact that most of these resources are gathered in several countries and considered as one of the possible causes of conflict (Johansson, 2013).

In the social dimension of energy security, every part of the society is able to reach the energy at a healthy and reasonable price. Sustainability and the environment are generally considered together in energy security. The efforts to increase global warming and use of renewable energy resources have increased due to the fact that environmental factor is more involved in energy security planning. Renewable energy sources are as extremely important in terms of overcoming the climate change problem. Renewable energy sources can increase energy efficiency and are as a reliable, cost-effective technology with positive effects on reducing CO_2 emissions (Kaygusuz *et al.*, 2007). On the other hand, hydroelectric power plants are one of the major problems of dam safety from renewable energy sources with the greatest environmental risk. Hydrogen has explosive properties. Therefore, it is at risk of accidents and has a potential target for enemy attacks. Environmentalism and renewable energy have established itself as a political power especially in the 2000s. In particular, it is noteworthy that, as in the case of solar energy, wide geographical ones have the advantage of being spread, clean, easy to carry and install. However, it is not suitable for storage materials. On the other hand, wind energy is not suitable for sound activities of the turbines, in the immediate vicinity of settlements and in sensitive wildlife areas. Finally, geothermal energy, ocean energy and water energy can cause ecological changes, which can affect the natural habitats of living things.

3. Results

3.1. The future of renewable energy and energy security

The world population continues to grow rapidly. The world population, which was 6.1 billion in 2000, will reach 9.6 billion in 2050, according to the United Nations (UN) average estimates (United Nations, 2013). Such an increase would lead to an unbalanced demand for energy as well as major problems. According to British Petroleum (BP) Energy Outlook 2035, primary energy consumption by 2035 will increase by 37% (British Petroleum, 2015). Such an increase will undoubtedly require more energy sources to be consumed. Considering the population growth and the unrelenting struggles of the countries to develop, it is a point to consider how many years the fossil fuels will be enough for the world. Moreover, it is not difficult to predict that the decrease in oil and natural gas reserves will cause price increases due to the economic logic. More energy needs and decreasing resources will trigger international energy conflicts and domestic problems. Moreover, the increase in the budget allocated to fossil fuel imports by non-fossilized countries will be a factor that will deeply affect the economies of the country in the future. Besides, it is a major source of concern for the states, which are already fossil resource exporters and whose

economies are big and dependent on this income, after their resources are reduced first. Nuclear power, which is seen as a traditional energy source, was put on the agenda of the Fukushima Nuclear Power Plant, which was affected by the 9.0 magnitude earthquake that happened in Japan in 2011, with the help of electricity cuts, flooding, radiation leakage, partial explosions and melting. Damage caused by natural disasters, war and terrorist attacks, or any nuclear explosion that may be caused by technical reasons, in human and nature life; It is important to note that the nuclear that is very useful in energy production is in fact a great danger. For these reasons, responding to the energy needs of the future will only be possible if the resources outside traditional energy sources more effectively entered into the game and new resources are available. Energy security, which is often covered by fossil fuels and nuclear energy, will undoubtedly require a new definition based on new sources.

t is not right to expect renewable energy to replace fossil fuels in the short term. Estimates that the share of fossil fuels in primary energy consumption down to 80% by 2035 (British Petroleum, 2015) suggest that energy assessments based on fossil fuels will be more effective in the upcoming period. There is a large economy that returns from traditional energy sources and interests in this direction. There are many governments and companies, which benefit from activities such as researching, extracting, delivering, marketing, making suitable infrastructure and facilities. Not only the source countries on the fossil resources and nuclear energy sector, but also many developed countries with technology. In addition to states, the multinational corporation that is active in the energy sector has a serious say on energy policies. In the first 50 ranks of the Forbes (2015) Biggest Companies list, 8 companies are in the fossil energy sector (World Ranking, 2015).

In light of these facts, renewable energy will dominate energy production and the popularity of fossil resources will not be a painless process. There is also already developed technology for every stage of fossil and nuclear energy. Although many countries produce energy from renewable sources today, renewable technology has a long way to go and great investments have to be made in this direction. These and similar reasons will continue to be the first choice of fossil resources and nuclear energy. However, the fact that this situation is not sustainable suggests that in the coming period, searches outside of traditional sources in energy production should be more comprehensive and that renewable energy will be more involved in human life. Thus, the energy policies of the future will be formed in parallel with this situation. Energy security, which constitutes an important title in energy policies, needs to deal with in a new way beyond its traditional boundaries.

Increasing the share of renewable energy in energy production is undoubtedly the most important impact on energy security in the future, so the international struggle, regional tensions and domestic power wars will be reduced. The regions, which are rich in oil and natural gas like the Middle East, are witnessing the struggles up to wars in order to have resources or to take part in energy projects, the interventions of the great powers from outside and the competitions of international companies that want to take a share from the cake. For this reason, renewable energy will be more prominent, and will reduce both these

negative conditions and may give a new option to the state and companies affected by the energy struggle.

In terms of new security concept, economy security has an important place. While considering the security of countries' economies, the energy relationship is a factor to be taken into account. Fossil energy sources; it is an important cost for the importing countries, but it is important to maintain the flow of these resources for the continuation of economic development. Today, the continuity of energy supply is seen as an indispensable title of energy security by both supplier and importer countries. However, in an environment where renewable energy dominates energy markets, it is possible to foresee that energy supply problems will decrease. In the current situation, supply security is more important than the countries that import energy sources for economic developments, but it will be more important for export countries to transmit energy resources with the decrease in the need of these countries for fossil fuels in the future.

Another issue that needs to be discussed within the scope of energy security and renewable energy relationship is how environmental safety will be affected. The damage to the environment and the actual and potential environmental threats of nuclear facilities are a very important problem at every stage of fossil fuel extraction. It is possible to define renewable energy as environmentally friendly compared to traditional energy. Placing energy from sources that are part of nature, such as wind, sun and water, as a clean energy before traditional sources, will further increase the overall acceptance of renewable energy. A world in which nuclear accidents such as the one in Chernobyl, the oil spill occurring in the Gulf of Mexico in 2010, pollution of groundwater in shale gas exploration and air pollution caused by the explosion of natural gas pipelines will not be experienced will be more clean and livable. Therefore, the environmental factor within the scope of energy security will no longer be a topic for which concerns are collected. However, it would also be misleading to argue that renewable energy is completely harmless on environmental issues. There are some negative consequences for the environment in energy production from renewable energy sources. For example, during the construction of hydroelectric power plants, serious damages can be caused to the rivers' beds and surrounding forests. Or, as seen in the Icelandic example, geothermal energy can be consumed if the groundwater is exhausted, or if there is not enough filtration, toxic gases can be mixed into the atmosphere. In addition, attempts to open space for the production of biomass energy resources constitute a significant problem. An important example is the discontinuation of the Amazon forests for the production of sugarcane, an important biomass source (Marcovitz, 2011). In addition, it is known that wind turbines cause death of birds flying in the region and may pose a threat to their lives. More waterpower will be utilized, more biomass energy sources will be required, and more geothermal wells will be excavated in the future, the environmental dimension of energy security should be considered more comprehensively.

With the dominance of renewable energy in energy production, the most important risks of traditional energy security are market instability, technical problems, and the wide range of physical threats from terrorist attacks to natural disasters (IEA, 2007). The structure on which

it is installed will deeply affect its structure. It is possible to argue that the risks, threats, and security problems associated with energy will be greatly reduced or redefined as fossil and nuclear resources and are largely replaced by renewable energy; however, it would be misleading to wait for energy-related security issues to end. It is obvious that the dispute over the energy sector, in which the large margin of profit returns and the development of the countries, will not end. The question is whether renewable energy will pose new security risks in the future.

Using the rights of waterpower in the seas and oceans around where the rivers traveling among the countries, surrounded by the riparian states, can be started to be voiced from a higher level. The regions where the sunshine duration is long and the wind is at the desired power can become places of interest and even the clashes on these places in the same way. Furthermore, on the oil and natural gas fields, energy companies will try to reach the center of the world with money-based policies by leaving aside environmental concerns. In order to reach the geothermal energy, biomasses start a big race for the sake of producing fuels. In such possibilities, it is probable to make an inference that renewable energy will reduce the traditional energy security problems but may bring new risks together.

Conclusion

The need for energy is indispensable and continuous, and the first question is how to produce energy from which source. To have a wide range of energy sources, from coal to sun, from wood to oil, or to reach them in the most reasonable ways, ranks high on policies for all countries. Fossil fuels and nuclear energy, which are considered as traditional energy sources, together with a number of economic, political, military, and environmental and social security problems, have created a close interest in renewable energy and this trend is quite natural in the future. However, it would be extreme optimism to argue that renewable energy can be the main actor of energy production in the near or medium term, and that it can take the throne of fossil fuels. Nevertheless, the increasing share of renewable energy in energy production will deeply affect all areas of energy, from energy sociology to energy law, from energy trade to energy security.

As mentioned in the article, the impact of renewable energy on energy security is noteworthy. Today's understanding of energy security mainly based on the access to fossil resources, the development of technology, the avoidance of technical problems due to any reason, and the impact of traditional energy resources on the environment. However, with the increasing share of renewable energy in energy production, many issues that are considered important in traditional energy security understanding become insignificant, while some of the issues that are ignored and do not exist today will enter the agenda. Undoubtedly, the reduction of the security problems, threats, and risks defined by fossil resources and nuclear energy is very important in terms of ensuring international peace and the importance of renewable energy in this context can be important. However, the measures need to be taken for security issues that may arise from the use of renewable energy more widely and in different ways.

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