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Renewable energy perspectives in the frame of Turkey's and the EU's energy policies

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ABSTRACT

Renewable energy as one of the current and substantial issue needs to be investigated in terms of political outlook. So the researches on renewable energy policies under the energy policies of different countries are necessary. The emergence of renewable energy policy was the 20th century but it gained momentum in 21st century. The realization of the polluting nature of the petroleum products, their negative environment effects and the assumptions about the future of non-renewable energy sources were the driving forces behind these politics. The European Union in these conditions tries to play pioneer role. Turkey on the other hand as a candidate country has to harmonize its policies with the Union's. In this context, objective of this work is to examine the EU and Turkey's renewable energy policies, make a comparison and as a sustainability of Turkish renewable energy policy construct a future projection in short, medium and long terms.

1. Introduction

Although Turkey has a wide range of energy resources such as coal, lignite asphaltite, bituminous shale, natural gas, hydropower, and biomass, as well as geothermal, wind, solar, and nuclear energy, Turkey has been imported more than half of its energy requirement. Biggest share in total primary energy consumption is oil and natural gas. Especially coal and lignite reserves are large. However Turkish hard coal is low grade and lignite has low calorific value, high sulfur, dust and ash content [1]. And also hard coal and lignite usage responsible for air pollution in urban centers during the 1970s and 1980s. Therefore Turkish coal and lignite are largely inappropriate for the purposes of sustainable development and environmental effects. Two-thirds of the Turkey's current account deficit, which is seen as the biggest problem of our country, is caused by the energy import [2]. Therefore, it gains more importance to supply its energy demand by using domestic resources [3,4]. But this demand should be provided with clean energy sources as much as possible [5]. Within this respect, Turkey's renewable energy sources are promising. In 2010, primary energy production and consumption has reached 39.94 and 152.93 million tonnes oil equivalents (Mtoe) respectively [6]. Although there are most significant developments in hydropower, geothermal, solar energy and coal production also it increased consumption of oil and gas. Turkey has recently been decided that its nuclear program would be reopened in order to provide to the growing energy demand especially electricity [7]. Besides renewable energy is more efficient and effective solutions for clean and sustainable energy development which accounted for 12.7% of the world's total primary energy supply in 2007 and it is expected to be 14.3% of the world's total primary energy supply in 2020 [6].

Energy is one of the important and determinant policy areas for the whole countries. The nature of the energy policies have been changing for years. But interestingly the effects of global warming and its environmental outcomes paved the way for change in policies' direction. Therefore studying on the EU's and Turkey's energy policy from the renewable energy perspective gains importance. The researches on energy policies have to have a renewable energy perspective. But also especially for Turkey the case of nuclear energy is also another important asset for the future perspective of the energy policies beginning from 1960s.

The existing literature on the renewable energy in Turkey mostly depends on the potentials and the roles of the renewable energy. From this perspective there are several studies. Turkey's renewable energy sources focus on, the historical process and the future perspectives for developments in energy sector have examined by Hepbasli and Ozgener [8]; Kaygusuz [9]; Ozturk et al. [10] and Toklu et al. [11] in details. Especially for the support mechanisms in the EU the articles has written by Ragwitz et al. [12] and Cansino et al. [13] are very inspiring.

This article mainly aims to build a broad perspective on the EU and Turkey's renewable energy policies and make a background with its historical assessment. Especially the emphasis on the support mechanisms and harmonization of the policies can be seen as the main outputs of this work.

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2. Renewable energy policies of the EU and Turkey

Even though significant differences in support scheme design exist, feed-in systems are the most common renewable energy sources (RES-E) support scheme through Europe. Most of the EU Member States have performed feed-in schemes as main support mechanism. One objective of energy policy should be to afford motivations for technology improvements and more effective solutions in order to decrease the electricity generation costs of RES-E technologies. Especially for technologies that do not need any costs for fuel, such as wind power, PV, geothermal energy or hydropower, the largest portion of costs are the investment costs of the power plant and the connection costs. One best practice portion of feed-in systems is the regular tax relief of tariffs: The tariff level depends on the year in which the RES-E plant starts to operate. Each year the level for new plants is reduced by a certain percentage. Consequently the later a plant is installed, the lower the return received. The tariff tax relief can be used to provide inducements for technology improvements and cost reductions. Ideally the rate of tax relief is based on the empirically derived growth ratios for the different technologies [14].

From a broader perspective Renewable energy policies of the EU and Turkey can be evaluated under the energy policies. Especially for the 21st century the effect of environmental policies, the increasing importance of energy security supply and of having a well-designed energy policy has gained importance. In the context of this energy policy the role of the renewable energy sources, energy efficiency and environment friendly technologies constitute the main elements. For this purpose in this section under the two subsections the EU and Turkey's policies will be studied with the sustainability principle.

2.1. Renewable energy policy of the EU

In the first stages the agreements established the European Coal and Steel Community (ECSC) in 1951 and European Atomic Energy Community in 1957 were 'adopted primarily to ensure regular and equitable supplies of coal and nuclear energy in the Community' as underlined by the European Commission (EC) [15]. In the coming years the Oil Crises and increasing level of imported energy brought a need to act together. Interestingly the energy dependency increased from 45% to 53.1% in the years 1997 to 2007 [16]. In the 1990s EC prepared some White and Green Papers on the energy issue. But the Green Paper 'A European Strategy for Sustainable, Competitive and Secure Energy' determined three objectives of the European Energy Policy which had approved by the European Council in the March 2007 Presidency Conclusions. These are Security of Supply, Sustainability, and Competitiveness [17,18]. These three objectives are the basis of all the activities. For the 2008 rates 54% of the energy needs meet by the imports [19]. Increasing trend of energy imports made the decision makers to have a common policy in the energy security. Moreover for the sustainability perspective creation of the competitive technologies, meeting energy demand and altering environment concerns play the major role. To build a common energy policy needs a sustainability perspective. That is to say competitiveness and sustainability fosters each other. On the other hand the necessity to decrease energy dependence has constituted the third leg of the system.

The period before 2000, attempts for solving the energy problematic were too limited. The first attempts for constructing nuclear energy power plants after the 1979 Oil Crisis were the sole attempts that made commonly [20]. The challenges of the European Commission during the 1990s could only beared fruit after 2000s. There was a failure for Maastricht and Amsterdam Treaties which do not have an energy chapter. The only reference to the energy was the preamble of Amsterdam Treaty [21].

After 2000 the policy construction process gained momentum. Directives 2001/77/EC, 2009/28/EC and Renewable Energy Road map were landmarks within the 11 yrs period. Hanreich states about Directive 2001/77/EC that it 'sets a legal framework for the future development of the renewable electricity (RES-E) markets in the EU' [22]. On the other side Renewable Energy Road Map criticized the national policies that have not been effective in order to reach % 12 objectives (offered in 1997 White Paper) and it was necessary to create a mandatory target for the EU. Afterward Directive 2009/28/EC prepared by the EU to regulate a mandatory 20% renewable share target which has to be reached until 2020. Additionally Directive 2009/548/EC constitutes templates of National Action Plans for the member countries. Finally with the Lisbon Treaty, three aims of the energy policy took part in a European level Agreement.

In this context policy instruments play a determinant role in development of renewable energy technologies. Feed in Tariff (FiT) and Tradable Green Certificates (TGC) are argued in the EU context. Generally, in FiT the government guarantees its purchasing from the producer in a determined price and time conditions. But in the TGC system certificates determined by the government in the free market conditions and are sold to the consumers, generators and suppliers [12,23,24]. From this perspective the European Union supports TGC system while assessing FiT as not competitive policy in the EU level [23].

2.2. Renewable Energy Policy of Turkey

In the first years of Republic there were challenges to build power plants. But the electrification process has been continued until 1988. According to 6th Development program in the year 1988 all the villages have electricity and telephone connection [25]. The first step of Turkey in energy planning was Law No. 2819 which was established in 1935 and followed by the establishment of Ministry of Energy and Natural Resources(ETKB) in 1963 [8]. From the historical perspective Development Programs were the main sources for the energy planning cover the years between 1963 and 2013. There were nine plans and the 9th program is in effect now. In this process the establishment of Turkish Electricity Enterprise (TEK) paved the way that 'Turkey could have a central public authority in the energy sector' even though this enterprise will divide into two different enterprises as production and distribution. Then these enterprises also divided into different ones regarding the development process [10].

In order to encourage energy investments with Law No. 3096 Built- Operate- Transfer (BOT), Transfer of the Operational Rights (TOR), and with Law No. 4283 Build- Operate (BO) was created [10]. But these systems were criticized and found problematic in 2000's. The developments of the investments were too low and a new necessity was aroused for having a more effective investment plans. On the other hand Electricity Market Law (Law No. 4628) established the independent institution Energy Market Regulatory Authority (EPDK) which can be assessed as an important step [26]. The following arrangements Law No. 5784 (Electricity Market Law), Law No. 5627 (Energy Efficiency Law), Law No. 6094 (The Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy) were all additional challenges for constituting an energy policy. Importantly Law No. 6094 needs special attention because it regulates the support mechanism of the ETKB.

According to the Law No. 6094, the applicable sale tariffs within the scope of the RES Support Mechanism are shown as Table 1:

Apart from the regulations there are some strategic papers which are 2009–2011 Middle Term National Program, 2009–2013 Electric Energy Market and Supply Security Strategy Paper, Turkish Electrical Energy 10 Year Generation Capacity Projection