

The Energy Policies for a Sustainable Economic Growth in Turkey

Hasmet Gokirmak*

Business Administration Department, İstanbul Sabahattin Zaim University, Turkey. *Email: gokirmak@gmail.com

ABSTRACT

This study deliberates on the main energy policies and their implications for Turkey in recent years. Turkey has been implementing some major policy changes in its energy strategy, including comprehensive liberalization and competitive market initiatives. There have been also same efforts to attract investors into energy sector. Energy efficiency is also attracting attention from the policy makers since it is an important element of the energy supply security. Diversification of the suppliers of natural gas and oil, and an increase in the use of alternative renewable energy sources, such as wind and solar energy, reduce energy costs and contribute to the energy supply security. There has been an ongoing effort to modify laws and regulations to confirm with European Union (EU) legislations for Turkey's advancement toward accession to EU. Turkey may also serve as a Transportation Corridor and an Energy Hub between the East and the West.

Keywords: Turkish Energy Policy, Renewables, Energy Liberalization

JEL Classification: Q4

1. INTRODUCTION AND COUNTRY OVERVIEW

Turkey lies between east and west, connecting the very western tip of Asia to Eastern Europe. In addition to serving a strategic bridge between Europe and Asia, it also connects the World to the Middle East, Northern Africa and Continental Africa. Turkey is one of upper middle-income countries, and is a member of the Organization for Economic Co-operation and Development and the Group of Twenty (G20).

Turkey and some of her neighboring countries, Russia, Iraq and Iran, hold the key for the energy future of Europe and the World as a whole. The neighbors of Turkey both have the richest oil and gas reserves and are major producers in the world. The Caspian Basin, the Middle East, the Russian Federation accounts to about 65% of world oil reserves, and 71% of natural gas reserves¹. According to the estimations of the International Energy Agency, the global energy consumption is expected to increase up to 55% by the year 2040 compared to consumption levels in 2013².

Turkey's economy has been one of the fastest growing economies in the world. The country experienced a steady growth between 2002 and 2015 with a single party government, averaging a growth rate of 4.9% per year. Turkey's gross domestic product (GDP) was 717 billion USD for 2015 with a per capita income of 9,221 USD. Turkey had a total population of 77.7 million in 2015³.

An accelerated economic growth has led to a rapid growth in energy demands in the last 15 years in Turkey. The demand for energy, however, increased at a higher rate than GDP growth averaging 5.7% per year for the 2002 and 2015 period. Hydropower plants, coal and natural gas turbines largely meet the energy requirements. The increase in natural gas imports, however, has been causing Turkey's current account to deteriorate and has had adverse effects on the national economy. Turkey spent \$60 billion in 2012 on energy imports. Turkey's external energy shortfall is about 6-9% of its GDP and significantly contributes to balance of accounts deficit, which accounts for 58% of the trade deficit.

Both oil and natural gas play important roles in meeting Turkey's growing energy demand. By the end of 2015, crude oil consumption

1 ETKB. (2015), "Dünya ve Ülkemiz Enerji."

2 International Energy Agency. (2013), "Energy Policy Highlights."

3 Focus Economics. (2016), "Turkey Economic Outlook."

reached to 27.2 million tons and natural gas consumption to 48 million cubic meters. Crude oil consumption has increased slightly (4%) compared to 2002 while natural gas consumption has increased 2.8 times for the same period.

The rapid economic growth stimulated the electricity consumption in the last 14 years, averaging about 5.4% per year. The increase in the demand for electricity was about 99.3% in this period⁴. The installed electricity generation capacity increased as the demand for energy increased. In 2015, the electricity generation was about 260 TWh and consumption was about 264.2 TWh.

The fast pace of economic growth, however, initially caught the policy makers off guard in meeting the demand for electricity. The easiest solution was to rely on natural gas turbines. Natural gas turbines can be constructed rather quickly and relatively inexpensively and they are more profitable than other alternatives. These turbines are very flexible; the amount of electricity generation can be easily adjusted or switched on and off, depending on the demand at the time, without causing problems with the electricity distribution grid. Natural gas is also environmentally cleaner than some of the other fuels used in electricity generation.

The installed capacity was about 31.8 MW in 2002 but it has more than doubled to reach 74 MW in 2015⁵. In 2002, hydroelectric power was the number one in total installed electricity generation capacity with a 38.4% share. Natural gas had a 26.5% share and coal had a 21.9% share. Wind and geothermal had a 0.1% share in total installed capacity. By the end of 2015, thermal power plants provided 68.5% of electricity production; natural gas and liquefied natural gas (LNG) generated 37.8%, coal generated 28.5%, and liquid fuels 1.9% of the electricity. Hydroelectric power accounted to 25.8% of the total electricity generation. Geothermal (1.3%), wind power (4.4%) and solar power (0.3%) generated 6.3% of the total electricity generation in 2015⁶.

Starting in 2007, the private investments in solar systems to convert sunlight to electricity have been increasing steadily.

Energy policy for Turkey has been an across-the-board liberalization, creation and maintenance of competitive and environmentally sustainable markets and creation of an investor-friendly business environment in recent years. Energy efficiency is also attracting attention from the policy makers since it is an important element of the energy supply security. Increasing the energy efficiency of motor vehicles, buildings and appliances and increasing the public awareness tops the energy initiatives of the government. Using new technologies to minimize losses during production, transmission, distribution and utilization of electricity is also encouraged to save energy. Using more of the domestic resources, such coal and anthracite, may help reduce external dependency to foreign sources in energy supply. Reduction of energy costs may be possible with diversification of the suppliers of natural gas and oil, and with the increase in the use of alternative renewable energy sources, such as wind and solar energy. The

government also encourages domestic investment into the energy sector.

There has been an ongoing effort to modify laws and regulations to match European Union (EU) legislations in Turkey's advancement toward accession to EU. Turkey may also play a potentially important role serving as a bridge between producers of oil and natural gas in the Central Asia, the Middle East and Caucasus and major consumers in Europe. There are several pipelines project proposals that might give Turkey an important role in natural gas transit⁷.

2. LIBERALIZATION OF THE ENERGY SECTOR

The Turkish Government's primary policy in energy is to gradually liberalize and deregulate the electricity, oil and gas sectors. Increasing private companies' involvement is very important to create competition in the energy market. The government aims to encourage private sector investments to create sustainable growth rates in the electricity, oil and natural gas sectors. The measures were taken to restructure government-owned enterprises, and new laws and regulations initiated the implementation of the rules on liberalization to increase private sector participation. The share of the private investments in electricity generation increased from 40.2% in 2002 to 78.7% in 2015. The private sector investments were made mostly for thermal plant electricity generation. The private investments in hydropower generation also increased significantly.

The first attempt in liberalization in the energy sector of Turkey was in 1984 with a law creating a framework for private participation (No. 3096). The Constitutional Court, however, intervened in the case of Aliğa Power Plant due to environmental concerns, blocking the law to take effect. The Build-Own-Operate law passed in 1994 and the Build-Own-Transfer (BOT) law passed in 1997. However, the Constitutional Court ruled against initiatives in electricity generation again, halting any other liberalization attempts until 2001.

In Turkey, the liberalization efforts of the energy sector restarted in 2001 with the Natural Gas Market Law and the Electricity Market Law. These laws intended to reorganize the electricity and natural gas markets by restructuring the state-owned enterprises into a corporate form operating in a competitive market environment.

2.1. Electricity

One of the leading institutions in the energy market, The Turkish Electricity Authority (TEK), was founded, as a state-owned enterprise in 1970, for generation, transmission, distribution and trade of electricity services needed in Turkey.

In 1993, TEK was divided into two separate state economic enterprises: Turkish Electricity Generation Transmission Co. (TEAŞ) and Turkish Electricity Distribution Co. (TEDAŞ). The Turkish Power Sector Liberalization Plan introduced a time frame

4 ETKB. (2016), "Dünya ve Ülkemiz Enerji."

5 TEİAŞ. (2013), "Electricity Generation."

6 ETKB. (2016), "Dünya ve Ülkemiz Enerji."

7 Secretariat of the Higher Board of Planning (DPT). (2009), "Energy."

for liberalization of the electricity market. Electricity generation, transmission, and wholesale operations were separated from each other. TEAŞ split into three separate state economic enterprises as joint-stock companies: Turkish Electricity Transmission Co. (TEİAŞ) Electricity Generation Co. (EÜAŞ) and Turkish Electricity Contracting and Trading Co. (TETAŞ). The Energy Market Regulatory Authority (EPDK) was also created in 2001.

Privatization of electricity production and distribution was important to reduce the dominance of the public sector. Privatization of the Turkish Electricity Distribution Corporation (TEDAŞ) was initiated with the Electricity Sector Reform and Privatization Strategy Paper, published in early 2004. The paper suggested privatizing TEDAŞ operations under 21 different distribution companies for different regions of the country.

The privatization of electricity generation and distribution companies, however, experienced some difficulties and delays. The supply-demand imbalance in electricity in 2006, however, made the need for the involvement of private companies more apparent and led to additional liberalization steps that included the Balancing Settlement Regulation in 2006. Afterwards, privatization of the energy plants and electricity distribution companies gained a momentum.

2.2. Natural Gas

Petroleum Pipeline Corporation (BOTAŞ), a state-owned company, was established in 1974 for construction and operation of the Kirkuk-Ceyhan Oil Pipeline. BOTAŞ had been solely responsible for distribution, import, storage, marketing, trade and export of natural gas in addition to crude oil transportation until 2001.

The Natural Gas Market Law (No. 4646) was intended to secure new supplies, reduce supply costs, and attract private infrastructure investment into the natural gas market. In addition, this law made entrance to the market by private companies free, eliminated BOTAS' monopoly on natural gas, provided competitive market prices for end-users of natural gas, provided market efficiency for all kinds of market activities, regulated market share limits, and initiated liberalization of distribution grids.

In 2008, spot LNG imports were liberalized with an amendment to the Natural Gas Market Law. A more recent law was proposed in 2012 for BOTAŞ to be divided into three independent companies: A company for gas transmission, a company running gas liquefaction plants and a company for the storage of energy resources.

Shell Enerji, A.S., the first private importer and wholesaler of natural gas, started operation in 2005. In 2012, four private suppliers received import licenses from the EPDK after signing supply contracts with Gazprom. Today, Bosphorus Gaz, Enerco Enerji, Bati Hatti, Kibar Enerji, Avrasya Gaz, and Shell Enerji are some of the major private companies that import natural gas into Turkey.

The energy stock exchange (EPIAŞ) was established in the second quarter of 2014. The main objective of EPIAŞ is to participate

in foreign energy stock exchanges and to increase liquidity, efficiency and transparency in the energy market⁸. Although the establishment of EPIAŞ was the most important step in the liberalization of the energy, there is a long way before a fully functioning market for natural gas in Turkey.

2.3. Petroleum

The liberalization of the petroleum sector has also been in progress. The Turkish Petroleum Company (TPAO) had been in a dominant role in the oil exploration process in Turkey. The Petroleum Market Law, accepted in 2013, encourages private companies for oil exploration, distribution and retail. The new law limits TPAO's involvement in especially for upstream activities by opening room for private initiatives. The objective of this law to provide a transparent, non-discriminatory and stable performance of market activities related to the delivery of petroleum to consumers, directly or after processing, within a competitive environment⁹. Preliminary work is in progress for the privatization of TPAO.

Currently, six companies hold petroleum refinery licenses in Turkey, but only four refineries, operated by Türkiye Petrol Rafinerileri A.S. (TÜPRAŞ), are in operation (located in İzmir, İzmit, Kırıkkale and Batman). TÜPRAŞ was privatized in 2005. Two other privately owned refineries, Doğu Akdeniz Petrokimya ve Rafineri San. ve Tic. A.Ş. and Star Rafineri A.Ş., are expected to be completed in 2018.

3. DIVERSIFICATION OF ENERGY SUPPLY AND ENERGY SECURITY

Energy supply security is becoming a priority for Turkish foreign policy. The government has been conducting bilateral and multilateral negotiations with its neighbors and other countries in the region to ensure uninterrupted flow of oil and natural gas. The Ministry of Natural Resources and Energy has made great strides in energy supply diversification in recent years.

Gas imports are contracted with long term with Russia, Iran, Azerbaijan, Algeria, and Nigeria. Turkey's dependency on Russian natural gas is being reduced gradually. However, Turkey is still importing a significant portion, 57.7% in 2015, of its natural gas from Russia.

The government has recently focused on the Trans Anatolian Natural Gas Pipeline Project (TANAP), which is being jointly conducted with Azerbaijan. TANAP will bring natural gas produced from Azerbaijan's Shah Deniz-II gas field, and other areas of the Caspian Sea, to Turkey and Europe. TANAP is scheduled for completion by 2018 and the initial capacity will be 16 billion cubic meters per year (bcm/y) (10 bcm/y for Europe and 6 bcm/y for Turkey). The capacity will be gradually increased first to 24 bcm/y and later to 31 bcm/y¹⁰.

Iran is ready to supply a lot more oil and natural gas once economic sanctions are removed. National Iranian Gas Transmission

8 Herdem. (2014), "2103 Turkey Energy Report."

9 ETKB Petrol İşleri Genel Müdürlüğü. (2016), "Turkish Petroleum Law."

10 tanap.com. (2016), "Major Shareholder."

Company stated that Iranian gas exports to Turkey have been increasing and Iran is committed to supply Turkey 30 million cubic meters per day of natural gas until the year 2026. More than nine bcm Iranian natural gas were exported to Turkey in 2014¹¹.

In 2013, Turkey renewed its LNG contract with Algeria for 10 more years accounting about 9% of natural gas imports. Turkey has also recently signed a gas contract with Qatar, where the LNG purchases have transformed from the spot to long-term contracts, similar to the LNG contracts with Algeria and Nigeria.

Furthermore, natural gas from Israel and Northern Iraq might reduce dependence on Russia. Using Turkey route for transporting East Mediterranean natural gas finds to Europe is also promising in terms of the diversification of resources to both Turkey and European countries. The Leviathan gas field is a large natural gas field located in the Mediterranean Sea off the coast of Israel and the Gaza Strip. The production expected to start in 2017. According to the estimations of the Israel Ministry of Energy, the Leviathan gas field has about 470 bcm of natural gas¹². The Aphrodite gas field in the south of Cyprus is estimated to have about 200 bcm of natural gas¹³.

The Kurdistan Regional Government (KRG) will start building their first natural gas pipeline in February 2016 to export the fuel to Turkey. The link will transport gas from the Khor Mor and Chamchamal fields in Northern Iraq, first to Turkey and later to Europe. Turkey will help finance the 831-kilometer network, which will run parallel to the existing oil pipeline. The 181-kilometer section will be in the Kurdish territory and will cost an estimated \$750 million¹⁴. The KRG will start shipping 10 bcm/y by the end of 2016 and double the volume to 20 bcm/y by 2020¹⁵. The gas pipeline will generate income for the KRG and to help Turkey providing some level of natural gas supply security.

4. ENERGY EFFICIENCY

Energy efficiency became an important issue for the Turkish government because of energy supply security and environmental pollution concerns. The Turkish government is keenly aware of the importance of energy efficiency and is making advances toward establishing a legal and institutional framework.

Turkey has enacted a wide-ranging strategic and legislative framework to promote energy efficiency, including mandatory appointment of energy managers by large energy users, and an annual energy efficiency week to raise public awareness of the issues. The Energy Efficiency Law (2007) is considered an important milestone for the promotion of energy management.

Energy Efficiency Strategy Paper (2012) details an energy management plan and encourages public, private, and non-governmental organizations jointly undertake initiatives for energy efficiency.

11 Mehr News Agency. (2015), "Export of Iran's gas."

12 Globes. (2016), "New Report."

13 Dünya. (2016), "Türk Akımı."

14 Financial Tribune. (2016), "KRG Gas."

15 Bloomberg. (2016), "Cash-Strapped Iraqi Kurds."

According to IEA Study (2014) the Energy Efficiency Law and associated regulations have extensive coverage, including:

- Increasing and supporting energy efficiency;
- Setting up energy efficiency consulting companies;
- Forming energy management systems;
- Promoting energy efficiency investments;
- Increasing energy efficiency in transportation and buildings;
- Discouraging the sale of inefficient appliances and increasing awareness.

Under the energy efficiency law, energy management became mandatory for large residential buildings and industrial plants. Large industrial, commercial and public sectors establishments must hire or contract an energy manager to ensure the adoption of energy management activities. However, a single energy management unit may be established to serve for small manufacturing establishments at organized industrial zones. An Energy Efficiency Coordination Board has been established to carry out energy efficiency studies within all relevant organizations all over the country, monitor its results and coordinate efforts.

5. THE USE OF DOMESTIC AND ALTERNATIVE ENERGY SOURCES

Turkey needs to concentrate more on the exploration activities of the domestic resources, and find ways to utilize domestic renewable energy sources. Nuclear energy looks like an economically viable option for Turkey's energy supply security.

Turkey is planning to use coal and other domestic resources in order to reduce its dependency on energy import and reduce the energy import bill.

Domestically mined anthracite and lignite are very low quality (low calorific value) and contain high levels of sulfur. The state owned lignite reserves were about 12.8 billion ton and anthracite reserves were about 1.3 billion tons as of March 2015¹⁶. The annual lignite production is about 63.3 million tons and anthracite production about 2.8 million tons. Domestic anthracite and lignite accounts about 13% of the total coal used for electricity generation.

There are 26 coal-based electricity generation thermal plants in Turkey with an installed capacity of 15,508 MW. According to the estimations of the 2015-2019 Strategic Plan of Energy and Natural Resources Ministry, coal-based thermal plants meet about 29% of electricity demand. While trying to reduce the share of natural gas in power generation, coal is expected fill the void by reaching to 42% by the end of the planning period.

The government has a target electricity generation level of 60 billion KWh from coal-based thermal plants. In order to reach these levels in electricity generation from coal, existing terminals should be rehabilitated and modernized, coal production in existing coal mines should be increased and new coal fields should be brought into production. Afyonkarahisar-Dinar, Eskişehir-Alpu,

16 ETKB. (2016), "Dünya ve Ülkemiz Enerji."

Karapınar-Ayrancı, Tekirdağ-Çerkezköy and Istanbul-Çatalca fields will be opened to investors in 2019 after some additional surveys.

Renewable energy can expand power generation possibilities and diversify the energy supply mix while lowering the costs and environmental pollution caused by fossil fuels. The share of the renewables in the energy generation is growing; however, it is still very small compared with the fossil fuel use.

According to the Energy and Natural Resources Ministry, target electricity generation per year from renewable resources by the year 2023 are:

- Hydro: 34,000 MW
- Solar: 5,000 MW
- Wind: 20,000 MW
- Geothermal: 1,000 MW
- Biomass: 1,000 MW¹⁷.

5.1. Hydropower

Turkey has a significant hydropower capacity, estimated at some 433 TWh a year in total, of which some 140 TWh a year is thought economically viable. According to the IEA, Turkey has 478 installed hydropower plants located in 69 provinces throughout the country, with a total installed capacity of 15.1 GW. Hydro plants and dams account 12.6 GW and run-of-river projects 2.5 GW capacity. There are 160 new plants under construction with around 15 GW capacity. There are also about 280 plants under study¹⁸.

5.2. Solar Energy

Solar energy can be used for water heating, space heating, space cooling, process heat generation, and electricity generation. Turkish government encourages investments in solar energy for electricity generation to reduce the dependency in energy to oil and natural gas imports. Solar energy has the highest potential among renewable energy sources. Sunlight is a very clean source of energy and is abundantly available in Turkey. There are some encouraging developments in solar energy generation as investors started to see the economic viability of this energy source. The installed electricity generation capacity reached to 63.9 MW in 2014, which is about 1% of the total installed capacity.

5.3. Wind Energy

Turkey has an outstanding potential to produce electricity from wind due to its geographic location and topography. Installed capacity for wind power in Turkey has been expanding rapidly. In 2006, installed capacity for wind power was 51 MW, and capacity increased to almost 800 MW in 2009 and it had risen to 4,728 MW at the end of 2015. The Aegean, Marmara and Mediterranean regions contain about 90% of the existing installed wind power capacity.

5.4. Geothermal Energy

Geothermal energy is thermal energy generated and stored in the Earth. Turkey is very rich in terms of geothermal energy

resources. The government recognized geothermal energy's economic potential as an environmentally sustainable source of energy to generate electricity, that can be used for a range of industrial and domestic applications. The geothermal potential of the country is estimated as 31,500 MW¹⁹.

5.5. Biomass Energy

Biomass, a renewable energy source derived from organic matter such as scrap lumber, forest debris, certain crops, manure, and waste residues. Biomass energy has a low penetration rate in Turkey. Biomass potentially is an important renewable and sustainable source of energy to generate electricity, heat homes, fuel vehicles and provide process heat for industrial facilities. Biomass potential is around 8.6 million tons of petroleum equivalent (TEP) of which 6 million TEP are used for heating purposes. Biomass sources are dispersed throughout country. Total amount of wastes estimated to be 4.8 million tons of forest products and 15 million tons of agricultural products²⁰.

5.6. Nuclear Energy

Nuclear power plants have been one of the most discussed issues in the energy sector in recent years. The government is planning to complete the construction of two power plants and start the construction of the third nuclear power plant by 2030. Nuclear plants are estimated to meet about 10% of Turkey's energy demand.

The first nuclear power plant will be constructed in Akkuyu, Mersin, on the Mediterranean coast. Turkish government signed an agreement with Russian Federation on 12 May 2010 to construct and operate this nuclear plant. The second nuclear power plant will be built in Sinop, on the Black Sea coast. Turkish government signed an agreement with the Japanese Government on 3 May 2013 to construct and operate four unit nuclear plant with an installed capacity of 4.480 MW. The first unit will be in operation in 2023, followed by the other units in 2024, 2027, and 2028. EÜAŞ, American Westinghouse, and the SNPTC of the People's Republic of China signed a Memorandum of Understanding on November 24, 2014 to develop the third nuclear power plant projects in Turkey.

6. ACCESSION TO EU

In 1995, Turkey has signed a Customs Union agreement with the EU. Turkey is also a candidate for full membership since 12 December 1999. There has been an ongoing effort to modify laws and regulations to match EU legislations in Turkey's advancement toward accession to EU. Energy is one of the most critical chapters in the EU accession process.

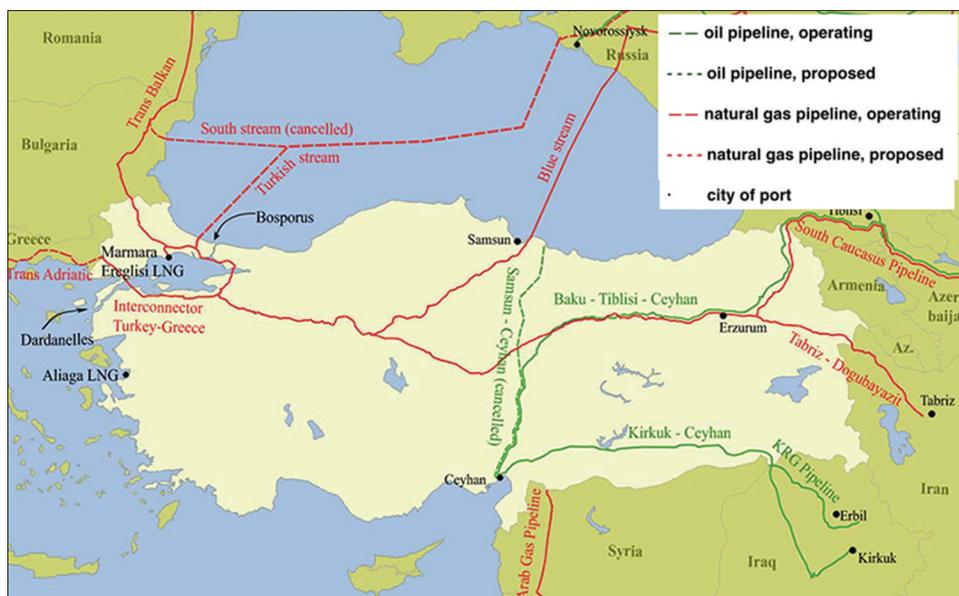
As part of the accession process, the EU and Turkey have been negotiating on various energy-related issues in recent years. The main issues are related to integrating the Turkish energy market with the EU, energy efficiency and renewable energy, climate change, gas markets and interconnections, the development of the Southern

17 Akçin (2016), "Renewable Energy."

18 Appleyard. (2016), "Powering Up Turkey."

19 Department of Strategic Development. (2013), "2014 Budget."

20 Akçin. (2016), Renewable Energy."

Figure 1: Turkey's major oil and natural gas transit pipelines

Source: U.S. Energy Information Agency, (2015), "Country Analysis: Turkey."

Gas Corridor, and the Trans-Anatolian gas pipeline (TANAP). The other issues include electricity markets and interconnections, nuclear safety, and regional cooperation and integration in the Energy Community and Euro-Mediterranean cooperation on energy²¹.

In this respect, Turkey has been amending its laws and adding new legislation in recent years. Energy market liberalization, the new natural gas law package, and changes in the role distribution of public vs. private actors in the energy sector are examples of this on-going effort.

The European Commission has stated that Turkey is considered to be a crucial partner to ensure that the European energy sector is well supplied and free from dominance. "Energy is a topic of key interest in EU-Turkey relations," the commission argued. "Turkey stands out as a crucial partner for EU's energy security and energy diversification²²."

7. TURKEY AS AN ENERGY TRANSPORTATION CORRIDOR AND AN ENERGY HUB

Turkey is in a position to serve as an economically and environmentally compatible energy hub and a reliable, stable connecting bridge between vast energy resources of the Caspian region, the Middle East and Central Asia and largest consumers of these energy sources in European and other regions in the world.

Oil pipelines from Northern Iraq and natural gas pipelines from Azerbaijan merge at the southeastern port of Ceyhan. Tankers, then, are used to export the crude oil and natural gas. There are

several pipeline project proposals that might give Turkey an important role in natural gas transit.

There are several pipeline projects on the government's agenda. These projects are being evaluated in cooperation with the governments of these countries, which are either producers or consumers of these resources. The parties are in various stages of the plans to develop and carry out the installation of pipelines, storage facilities, and oil and natural gas-based plants.

8. CONCLUSIONS

The main energy policies of Turkish government revolve around market liberalization, energy efficiency, the diversification of its long term energy supply contract portfolio, increasing the share of domestic and alternative fuels in power generations. Turkish government also focuses on increasing energy infrastructure and natural gas storage facilities, reducing dependency on imported fuel, while taking advantage of Turkey's own resources in an environmentally responsible way. The government has also been keen on being compatible with EU energy-related legislation by taking measures and coming up with reform packages on issues related to energy. There has been some recent effort to become an energy transportation corridor and energy hub to connect the Central Asia, the Middle East and Caucasus to Central and Western Europe.

Turkey needs to concentrate more on the exploration activities of the domestic resources, finding ways to utilize domestic renewable energy sources. Nuclear energy also looks like an economically viable option for Turkey's energy supply security, since there are not enough proven domestic hydrocarbon resources. Wind and Solar energy made it into the list of major

21 European Commission. (2016), "EU and Turkey."

22 UPI. (2016), "Turkey."

sources of energy sources since 2007. However, installed capacity for the renewable energy is still very low to meet energy demand. Depending on imported fuel constitutes a considerable risk due to increasing energy demand and toll on the current account balance.

Turkish government has been successful meeting the ever growing energy demand in the last 14 years. The government, however, should continue with reforms in energy sector to create a more competitive market, to reduce payments for energy imports and to become more in line with EU practices.

REFERENCES

- Akçın, M. (2016), Renewable Energy Policy & Biomass Energy Potential in Turkey, General Directorate of Renewable Energy. Available from: http://www.irena.org/DocumentDownloads/events/2015/Bioenergy%20Statistics%20Presentations/Administrative%20and%20other%20data%20sources/Turkey_Energy%20Policy%20and%20Biomass%20Energy%20Potential.pdf. [Last accessed on 2016 June 06].
- Appleyard, D. (2016), Powering Up Turkey with Hydropower. Renewable Energy World. Available from: <http://www.renewableenergyworld.com/articles/print/volume-17/issue-6/hydropower/powering-up-turkey-with-hydropower.html>. [Last accessed on 2016 Jul 09].
- Bloomberg News. (2016), Cash-Strapped Iraqi Kurds to Start Gas Exports to Turkey in 2016 January 13, 2016. Available from: <http://www.bloomberg.com/news/articles/2016-01-13/cash-strapped-iraqi-kurds-to-start-gas-exports-to-turkey-in-2016>. [Last accessed on 2016 Jun 08].
- Department of Strategic Development. (2013), 2014 Budget Presentation, Republic of Turkey, Ministry of Energy and Natural Resources. Ankara, Turkey: Department of Strategic Development.
- Dünya Gazetesi. (2016), Türk Akımı'nın Ertelemesi ile Enerjide Kaynak Çeşitliliği Hedefleniyor. Focus, No: 8, September 3, 2016.
- ETKB Petrol İşleri Genel Müdürlüğü. (2016), Turkish Petroleum Law."T.C. Enerji ve Tabii Kaynaklar Bakanlığı. Available from: <http://www.pigm.gov.tr/index.php/english/turkish-petroleum-law>. [Last accessed on 2016 June 11].
- European Commission. (2016), EU and Turkey Strengthen Energy Ties. Available from: <http://www.ec.europa.eu/energy/en/news/eu-and-turkey-strengthen-energy-ties>. [Last accessed on 2016 Jun 18].
- Financial Tribune. (2016), KRG Gas Export to Turkey in 2016. January 17, 2016. Available from: <http://www.financialtribune.com/articles/energy/34341/kr-g-gas-export-turkey-2016>. [Last accessed on 2016 Jun 08].
- Focus Economics. (2016), Turkey Economic Outlook. Available from: <http://www.focus-economics.com/countries/turkey>. [Last accessed on 2016 Jun 15].
- Globes, Israel's Business Area. (2016), New Report Sees 20% Less Gas Reserves in Leviathan, 3 June 2015. Available from: <http://www.globes.co.il/en/article-new-report-sees-20-less-gas-reserves-in-leviathan-1001041847>. [Last accessed on 2016 Apr 14].
- Herdem, Attorneys at Law. (2014), 2013 Turkey Energy Report. Available from: <http://www.herdem.av.tr/energy-sector-turkey-central-importance-epias>. [Last accessed on 2015 Sep 22].
- International Energy Agency. (2013), Energy Policy Highlights, 1974-2014. Available from: http://www.iea.org/publications/freepublications/publication/Energy_Policy_Highlights_2013.pdf. [Last accessed on 2015 Jun 23].
- Mehr News Agency. (2015), Export of Iran's gas to Turkey soars, 7 December 2015. Available from: <http://www.en.mehrnews.com/news/112622/Export-of-Iran-s-gas-to-Turkey-soars>. [Last accessed on 2016 May 13].
- Secretariat of the Higher Board of Planning (DPT). (2009), Electricity Energy Market and Supply Security Strategy Paper, Under Secretariat of State Planning Organization, Republic of Turkey, Prime Ministry. Resolution No. 2009/11 Dated 18/5/2009 of the Higher Board of Planning.
- T.C. Enerji ve Tabii Kaynaklar Bakanlığı (ETKB). (2016), Dünya ve Ülkemiz Enerji ve Tabii Kaynaklar Görünümü. Strateji Geliştirme Başkanlığı. Sayı: 12. Available from: http://www.enerji.gov.tr/File/?path=ROOT%2f1%2fDocuments%2fEnerji+ve+Tabii+Kaynaklar+Görünümü%2fSayi_12.pdf. [Last accessed on 2016 May 12].
- Tanap.com. (2016), Major Shareholder in the Project of the Century. Available from: <http://www.tanap.com/media/press-releases/major-shareholder-in-the-project-of-the-century>. [Last accessed on 2016 Jun 12].
- Türkiye Elektrik İletim A.Ş. Genel Müdürlüğü (TEİAŞ). (2013), Electricity Generation & Transmission Statistics of Turkey, 2013. Available from: <http://www.teias.gov.tr/TürkiyeElektrikİstatistikleri/istatistik2013/istatistik2013.htm>. [Last accessed on 2016 Jan 08].
- U.S. Energy Information Administration. (2015), Country Analysis: Turkey. July 7, 2015.
- UPI. (2016), Turkey a Vital Energy Partner, EU Says. Available from: http://www.upi.com/Business_News/Energy-Industry/2016/01/25/Turkey-a-vital-energy-partner-EU-says/2771453722112/. [Last accessed on 2016 June 12].