

energy  
fact sheets



# Turkey

Version 1.0 / February 2014

Maria Kottari



To cite the present document, please use the following information:

**Author:** Maria Kottari

**Title:** Turkey

**Publication:** Energy Brains – Energy Fact Sheet

**Date:** February 2015

**Hyperlink:** [http://www.energybrains.org/docs/EFS/EnergyBrains\\_EFS\\_Turkey\\_MK\\_2015.pdf](http://www.energybrains.org/docs/EFS/EnergyBrains_EFS_Turkey_MK_2015.pdf)

### Disclaimer

Energy Brains is a web platform formed of experts, academics and practitioners who study energy with a comprehensive approach. Multidisciplinarity is at the very core of our philosophy and analytical focus on energy matters. We emphasize the need not only to identify the actors at play, but also the necessity to examine their mutual interactions, influence and dynamics. The complexity of the global energy sector demands a specific and yet inclusive investigation.

Energy Brains, therefore, applies this innovative methodology to high-quality, multifaceted studies that can thus help students and researchers in their academic endeavors, and also members of the international energy community, policy-makers, public and private stakeholders in deepening their knowledge and understanding of this field. The published documents are fully reviewed and checked for editorial mistakes. The content, however, is the sole responsibility of the author.

### Follow us:



<https://www.facebook.com/EnergyBrains>

<https://www.twitter.com/EnergyBrains>

<http://www.linkedin.com/company/energy-brains>



**Energy Fact Sheet  
Turkey**

Maria Kottari

February 2015

**Table of Contents**

<b>1. INTRODUCTION.....</b>	<b>4</b>
<b>2. LEGISLATIVE BACKGROUND.....</b>	<b>6</b>
<b>3. HYDROCARBONS MARKETS AND INDUSTRY: KEY FEATURES AND ISSUES.....</b>	<b>7</b>
<b>3.1. OIL SECTOR.....</b>	<b>7</b>
3.1.1. <i>REFINING.....</i>	7
3.1.2. <i>PETROLEUM PRODUCTS AND POWER GENERATION.....</i>	7
3.1.3. <i>MINING AND OIL EXPLORATION.....</i>	7
3.1.4. <i>PORTS AND PIPELINES.....</i>	8
3.1.5. <i>TAXATION.....</i>	9
<b>3.2. GAS SECTOR.....</b>	<b>9</b>
3.2.1. <i>ARTICULATION AND OPERATORS.....</i>	9
3.2.2. <i>PORTS AND PIPELINES.....</i>	10
<b>4. RENEWABLE ENERGY AND ENERGY EFFICIENCY.....</b>	<b>11</b>
<b>5. ENERGY POLICY.....</b>	<b>14</b>
<b>6. BIBLIOGRAPHY.....</b>	<b>16</b>
<b>6.1. PRIMARY SOURCES AND STATISTICS.....</b>	<b>16</b>
<b>6.2. SECONDARY SOURCES.....</b>	<b>16</b>
<b>6.3. OTHER WEB RESOURCES.....</b>	<b>17</b>

## 1. Introduction

### Key Economic Indicators

Population	74.9 million
Gross Domestic Product per capita (GDP)	627.75 (2000 USD)
Energy Production	30.56 MTOE (total) / 0.41 TOE (per capita)
Energy Consumption	116.8 MTOE (total) / 1.56 TOE (per capita)
Electricity Consumption	206.71 TWh
CO2 Emissions (per capita)	4.04 t

Source: EIA (2012)

Turkey is a growing energy consumer and one of the fastest growing economies in the world. The energy consumption rate is currently rather low but, it is growing at a fast pace<sup>1</sup>. The domestic sources cover only the 26% of the total energy demand<sup>2</sup> and the rest is provided by imports. According to IEA<sup>3</sup>, the energy demand in Turkey is expected to double over the next decade. The increasing energy demand and the high dependence on fossil fuels imports make Turkey an important market for foreign energy suppliers. As it is shown in Table 1, fossil fuels are country's main energy source. Turkey has to import nearly all of its oil and oil products supplies due to the very low indigenous production rates and reserves.

The natural gas share is growing steadily over oil and coal. Turkey produces a very small amount of natural gas. The estimated 218 billion cubic feet (Bcf) reserves is a rather small volume capable to cover the growing domestic demand without the need of imports.

Turkey aims to increase further the share of renewable energy sources in its energy mix through investments in domestic infrastructures. Hydro and geothermal powers have, already, a substantive contribution. In terms of geothermal energy, Turkey ranks first in Europe and seventh in a global scale<sup>4</sup>. Finally, aiming at the fossil fuels imports reduction, Turkey envisages the gradual development of nuclear power production.

As results from Table 2, industry is the most energy-consuming sector of Turkey's economy, followed by the residential and the transports sectors. "Industrial energy consumption

<sup>1</sup> U.S. Energy Information Administration, "Turkey: Country Analysis", 2014

<http://www.eia.gov/countries/analysisbriefs/Turkey/turkey.pdf>

<sup>2</sup> Republic of Turkey, Ministry of Foreign Affairs, "Turkey's Energy Strategy",

<http://www.mfa.gov.tr/turkeys-energy-strategy.en.mfa>

<sup>3</sup> IEA, "Energy policies of IEA countries: Turkey", 2009,

<http://www.iea.org/publications/freepublications/publication/turkey2009.pdf>

<sup>4</sup> Republic of Turkey, Ministry of Foreign Affairs, "Turkey's Energy Strategy",

<http://www.mfa.gov.tr/turkeys-energy-strategy.en.mfa>

grows by an average of 4.2% per year between 1990 and 2007 more rapidly than the country's overall energy consumption"<sup>5</sup>. The transport sector is the largest oil user. The volume of oil use in the residential sector is very low compared to gas reflecting the country's swift to gasification. Natural gas is mainly used in power generation and space heating.

**Table 1 – The Turkish Energy Mix (supply and consumption)<sup>6</sup>**

(ktoe)	Production	Imports	Exports
Coal and Peat	15,589	19,462	-5
Crude oil	2,310	19,421	-376
Oil products	-	20,291	-7,418
Gas	521	37,801	-507
Nuclear	-	-	-
Hydro	4,976	-	-
Geothermal, solar	3,508	-	-
Other renewables	3,652	-51	-
Electricity	-	51	-254
Heat	0.74	-	-
<b>TOTAL</b>	<b>30,556</b>	<b>97,528</b>	<b>-8,560</b>

**Table 2: The Turkish Energy Mix (use)<sup>7</sup>**

(ktoe)	Industry	Transport	Residential	Commercial & Public Services	Agriculture & Forestry	Fishing	Non-energy	Other
Coal and Peat	6,831	0	4,834	4,088	68	0	0	8,989
Crude Oil	0	0	0	0	0	0	0	0
Oil Products	1,682	16,880	884	0	3,542	0	6,833	4,426
Gas	7,994	199	7,283	2,241	86	48	264	9,658
Nuclear	0	0	0	0	0	0	0	0
Hydro	0	0	0	0	0	0	0	0
Geothermal, solar	268	0	1,581	0	382	0	0	1,963
Biofuels & Waste	0	72	2,405	0	0	0	0	3,452
Electricity	7,764	73	3,902	4,347	493	10	0	8,753
Heat	1,225	0	0	0	0	0	0	0
<b>Total</b>	<b>25,765</b>	<b>17,224</b>	<b>20,888</b>	<b>10,676</b>	<b>4,571</b>	<b>58</b>	<b>7,097</b>	<b>37,240</b>

<sup>5</sup> ABB, "Turkey: Energy Efficiency Report", March 2013

[http://www05.abb.com/global/scot/scot380.nsf/veritydisplay/a2c92d1d4f7f2405c1257be9002c5060/\\$file/Turkey.pdf](http://www05.abb.com/global/scot/scot380.nsf/veritydisplay/a2c92d1d4f7f2405c1257be9002c5060/$file/Turkey.pdf)

<sup>6</sup> IEA, 2009.

<sup>7</sup> IEA, 2009.

## 2. Legislative background

The Turkish Ministry of Energy and Natural Resources<sup>8</sup> (MENR) was established in 1963 in order to define targets and policies related to energy and natural resources. These policies should be exercised in a way that guarantees the defense and the security of the country and strengthens the national economy and welfare. The General Directorate of Energy Affairs (EIGM) is the main policymaking body<sup>9</sup>. It executes the national energy policy and it carries out studies on general energy policies, energy markets, renewable energy, fossil fuels, energy efficiency, and environment. The EIGM is responsible for the co-ordination of the electricity and natural gas reform programs. The MENR has a number of attached, related and affiliated institutions<sup>10</sup> that deal with the different sectors of the energy and natural resources system.

The Energy Market Regulatory Authority (EMRA)<sup>11</sup>, established in 2001, is an important entity, tasked with performing the regulatory and supervisory functions in the Turkish energy market. The EMRA is a member of Energy Regulators Regional Association (ERRA) and Association of Mediterranean Energy Regulators (MEDREG). It is a public corporation with administrative and financial autonomy. The main responsibilities<sup>12</sup> of the EMRA are:

- a) To regulate and monitor the electricity, natural gas, petroleum, and liquid petroleum gas (LPG) markets;
- b) To establish a financially viable, stable, and transparent energy market within a competitive environment;

The EMRA is an independent regulator endowed with a series of regulatory functions:

- Giving licenses in order to transcribe the entries and exits to the market
- Ensure non-discriminatory third party access to the monopolistic infrastructures such as grids
- Ratemaking to inhibit monopoly rents
- Supervision and imposition of penalties (if necessary) to assure that the energy market participants are in compliance with rules and regulations

In addition, the Turkish Competition Authority (CA)<sup>13</sup> is the governmental organization responsible for the establishment, the protection and the development of a competitive energy market.

---

<sup>8</sup> Republic of Turkey, Ministry of Energy and Natural Resources, <http://www.enerji.gov.tr/en-US/Mainpage>

<sup>9</sup> EU Committee of the Regions, "Turkey: Energy" <http://extranet.cor.europa.eu/divisionpowers/countries/Candidates/Turkey/Policy-Areas-Obligatory/Pages/Energy.aspx#>

<sup>10</sup> Republic of Turkey, Ministry of Energy and Natural Resources, <http://www.enerji.gov.tr/en-US/Mainpage>

<sup>11</sup> Turkish Energy Market Regulatory Authority, <http://www.emra.org.tr/>

<sup>12</sup> Republic of Turkey Prime Ministry Investment Support and Promotion Agency "Invest in Turkey", <http://www.invest.gov.tr/en-US/investmentguide/investorsguide/Pages/BusinessEnvironment.aspx>

<sup>13</sup> Turkish Competition Authority, <http://www.rekabet.gov.tr/en-US/Mainpage>

### 3. Hydrocarbons markets and industry: key features and issues

#### 3.1. Oil sector

After the mid 1990s, oil consumption started to decline gradually because of the rapid expansion of natural gas. In 2008, natural gas use has surpassed that of oil for the first time<sup>14</sup>. In 2011, the domestic oil production provided 2.3 Mtoe (see Table 1) while, imports were at a level of 17.9 Mtoe. The majority of Turkey's imports come from Iran (51% in 2011 and 35% in 2012<sup>15</sup>) followed by Iraq, Saudi Arabia, Russia, and Kazakhstan. Apart from crude oil, Turkey is also a net importer of oil products. In 2011 imports amounted to 18.5 Mtoe, the majority of which was diesel fuel.

The oil production is located in the south-east and the north-west parts of the country and it has reached its peak in 1991. The majority of proven oil reserves (around 270 million barrels, hereafter bbl) are located in Hakkari Bassin, in the south-east region. The area of the Black Sea pertinent to Turkey has a significant potential for oil exploration with estimated reserves between 7 and 10 barrels of oil.

The Turkish Petroleum Corporation, TPAO<sup>16</sup>, has preferential rights in oil exploration and exploitation on 151 licenses, i.e. 36% of the total. TPAO is a state-owned company which collaborates with many foreign oil corporations. Specifically, any foreign involvement in Turkish oil exploration activities is subject to joint venture with TPAO. In general, there are several oil firms operating in Turkey and the government offers a variety of favorable tax measures in order to encourage further exploration and exploitation activities. According to the Competition Authority, there are many structural barriers in the liquid fuel sector.

Gasoline, diesel, and heating oil prices are high in Turkey. According to the IEA, "in comparison to disposable income, oil products are far more expensive in Turkey than any other IEA member country"<sup>17</sup>. This is one of the reasons for the low car ownership in the country.

#### 3.1.1 Refining sector & storage facilities

Turkey has six refineries with a total refining capacity of 714,275 bbl/day. TUPRAS<sup>18</sup>, a former government monopoly, operates more than 85% of the total refining capacity. TUPRAS was fully privatized in January 2006. The existing storage facilities are located in urban areas close to the refineries (Marmara, Central Anatolia Region, and Mediterranean region, close to Ceyhan oil terminal). The total storage capacity in Turkey in 2011 was estimated, by the IEA<sup>19</sup>,

---

<sup>14</sup> IEA, 2009.

<sup>15</sup> Sanctions had a large impact in the fall of imports from Iran. U.S. Energy Information Administration, "Turkey: Country Analysis", 2014, <http://www.eia.gov/countries/analysisbriefs/Turkey/turkey.pdf>

<sup>16</sup> Turkish Petroleum Corporation (TPAO), <http://www.tpa.gov.tr/eng/index.php?tp=m&id=4>

<sup>17</sup> IEA, 2009.

<sup>18</sup> Turkish Petroleum Refineries Co., <http://www.tupras.com.tr/masterpage.en.php>

<sup>19</sup> IEA, "Oil & Gas Security. Emergence Response of IEA countries: Turkey", 2013, [http://www.iea.org/publications/freepublications/publication/2013\\_Turkey\\_Country\\_Chapterfinal\\_with](http://www.iea.org/publications/freepublications/publication/2013_Turkey_Country_Chapterfinal_with)

at 12.5 million cubic meters (mcm). TUPRAS has the largest storage facilities (44% of the total storage capacity in 2011).

The construction of new refineries, led by Star Refining and Eastern Mediterranean (Dogu Akdeniz) will add 18.9 million bbl (3 mcm) of storage capacity. With the realization of the Samsun-Ceyhan oil pipeline project the total storage capacity of the country will be expanded to over 110 million bbl (17.5 mcm).

#### ◆ *Oil emergencies stockholding*

The National Oil Stock Commission (NOSC) is responsible for energy security in case of oil supply disruption. The EMRA and the General Directorate of Petroleum Affairs<sup>20</sup> (GDPA) coordinate and form the core body of the Turkish National Emergency Strategic Organization (NESO).

According to the Turkish Petroleum Law, the country should hold oil stocks equivalent to at least 90 days of its net imports. Refineries and fuel distributors are also obliged to hold at least 20 days of produced stocks based on the average daily sales of previous year. However, the Turkish government does not provide any financial support for the building of compulsory stocks. All refineries and distributors cover these expenses on their own. As a result, these costs are implicitly passed to the final consumers.

The majority of the Turkish emergency oil stocks are mainly held by TUPRAS, which owns the majority of the refineries in operation as well.

### 3.1.2 Pipelines and Ports

#### ◆ *Domestic crude oil pipelines*

Turkey has two domestic crude oil pipelines, both owned and operated by BOTAS. The Ceyhan-Kirikkale pipeline has capacity of 135,000 bbl/day. This 448 km long pipeline delivers crude oil from Ceyhan to the Kirikkale refinery near to Ankara. The 511 km Batman-Dortyol pipeline, with a capacity of 86,400 bbl/day, transports the domestically produced crude oil from the Batman area to the adjacent refinery and to the Dortyol terminal near Ceyhan.

#### ◆ *International crude oil pipelines*

Turkey plays a very important role in the international oil transit, given its key geographic position. The country is strategically located at crossroads between oil rich regions: Russia, Caspian region, Middle East and the EU. Besides, Bosphorus is one of the busiest chokepoints worldwide. Turkey is deriving significant revenues from the transit fees.

#### Kirkuk – Ceyhan pipeline

The, 600 miles long, Kirkuk-Ceyhan pipeline transports Iraqi oil and it is the biggest Turkish pipeline in terms of capacity (maximum available capacity 600 thousand bbl/day). The pipeline has been attacked at least 5 times between April and September 2012. The frequent terrorist attacks result in frequent supply disruptions.

---

[\\_last\\_page.pdf](#)

<sup>20</sup> Republic of Turkey, Turkish Petroleum Law, Law n. 6491, approved 30 May 2013, <http://www.pigm.gov.tr/index.php/english/turkish-petroleum-law>

### Baku – Tbilisi – Ceyhan (BTC) pipeline<sup>21</sup>

The Baku-Tbilisi-Ceyhan (BTC) pipeline is Turkey's longest pipeline, running approximately 1,768 km. The BTC pipeline was the first pipeline that bypassed both Russian territory and the Turkish straits. The main driver for the construction of the pipeline was to relieve transport congestion in the Bosphorus and Dardanelles Straits. The first oil was loaded at the Ceyhan marine Terminal (Haydar Aliyev Terminal) onto the oil tanker *British Hawthorn* in May 2006. The project was backed politically and financially by the US and the EU, even though the construction was ultimately delayed and more costly than other options. The geopolitical significance of the pipeline has overshadowed the drawbacks related to its construction as well as its commercial competitiveness. This route provided a compromise between the West and Azerbaijan-Turkey. Another alternative route through Armenia was politically impossible due to the unresolved Nagorno-Karabakh conflict between Armenia and Azerbaijan.

#### ◆ *Proposed pipeline projects and bypass routes*

### Samsun – Ceyhan pipeline project

The proposed Samsun-Ceyhan oil pipeline is projected to carry 1.5 million bbl/day of Russian oil from the Black Sea Turkish port of Samsun to the Mediterranean port of Ceyhan. The project includes the construction of a 550 km oil pipeline, a new oil terminal receiving Russian oil in Samsun, a terminal for exporting oil and a storage plant at Ceyhan. It would be operated by the Trans-Anatolian Pipeline Company, a joint venture of Italian ENI and Turkish Calik Enerji. The pipeline was promoted as an alternative to oil exports by tanker through the Turkish straits, but there has been no progress on this project during 2011-2012, due to Chalik Enerji's participation in natural gas exploration off the coasts of Cyprus. The project was ultimately shelved in April 2013.

### Canal Istanbul

Turkish Prime Minister Recep Tayyip Erdogan announced in 2011 an ambitious plan for the construction of a new canal to bypass the Bosphorus, to be named "Canal Istanbul", in order to diminish tanker traffic and environmental risks. The canal would be in service in 2023, for the occasion of the centennial of the modern Turkish Republic. The project would have geopolitical implications as it raises international law issues, such as the legal jurisdiction of Turkey to bypass the Montreux Convention for the regime of the Turkish Straits. According to the Turkish newspaper *Today's Zaman*<sup>22</sup>, Turkey intends to re-open the debate regarding the Convention's provisions. The Montreux Convention awards Turkey the right to control the passage of commercial vessels and warships in the Dardanelles and Bosphorus Straits. Turkey cannot close the traffic for tankers (innocent passage) through the Straits but, it can negotiate an international

---

<sup>21</sup> Maria Kottari *et al.*, "Energy politics, pipelines and the Black Sea Basin: On the route of diversification of EU energy sources", *European Centre for Energy and Resource Security (EUCERS)*, King's College, London, 2013 <http://www.kcl.ac.uk/sspp/departments/warstudies/research/groups/eucers/strategy-paper-young-researchers-Vol-1.pdf>

<sup>22</sup> VV.AA., "Istanbul Canal project to open debate on Montreux Convention", *Today's Zaman*, 8 October 2010, <http://www.todayszaman.com/news-223806-istanbul-canal-project-to-open-debate-on-montreux-convention.html>

accord so as to be designated to regulate the secure passage through the new canal, possibly levying transit fees. Even if the issue of revising the Convention will not arise directly, Turkey could still claim that the tankers and the new Canal are excluded from the Convention's provisions and they are covered by the Turkish legislation. Ankara would thus be able to control indirectly the passage of the commercial ships and tankers, through the Canal.

### Kiyikoy – Ibrikbaba Pipeline<sup>23</sup>

The Kiyikov-Ibrikbaba pipeline is a proposed 1.2million bbl/d, \$400-\$900 million infrastructure, running from Kiyikoy on Turkey's Black Sea coast to Ibrikbaba on the country's Aegean Sea coast, near the border with Greece. Russia's Transneft had the lead on this project, but pulled out in March 2005. The Kiyikoy-Ibrikbaba line is opposed by environmentalists, since Ibrikbaba lies in a national park and the pipeline would pass near coral reefs.

#### ◆ Ports

The port of Ceyhan is a marine transport terminal facilitating the transportation of oil and natural gas reserves coming from Middle East, Caspian region and Russia to US and EU markets. It is located in the Adana province, in the south Mediterranean coast of Turkey and it has four crude oil loading berths. The two outer berths can accommodate tankers up to 300 thousand deadweight tons, the two inner berths can accommodate ships up to 150 thousand deadweight tons.

### **3.2. Gas sector**

Between 2000 and 2009, natural gas supplies in Turkey rose by 127%. This sharp increase made Turkey one of the fastest-growing gas markets in Europe. To meet this growing demand, Turkey's supplies come mostly from abroad, since the indigenous total production in 2011 amounted to only to 758 bcm. The largest gas field is Marmara Kuzey, an offshore field in the Sea of Marmara. Lately, TPAO has intensified its gas exploration activities. Apart from TPAO, BP and Shell are also operating in exploration activities. A number of natural gas fields have been brought on-stream in the Black Sea.

Russia is Turkey's largest gas supplier (52% of the total imported gas), followed by Azerbaijan, Algeria, Iran, and Nigeria. Turkey also imports Liquefied Natural Gas (LNG) from five countries: Algeria, Nigeria, Qatar, Egypt, and Norway. These LNG imports accounted approximately to 15 % of the total gas supply in 2011. Turkey seeks to diversify its gas suppliers as the constantly increasing consumption intensifies the dependence on natural gas imports. Demand is expected to grow in all sectors, but the power generation sector will remain the dominant gas consuming sector.

Turkish imports are bound by long-term contracts with supplier countries. Russia and Turkey's contract on supplies sent via the Blue Stream pipeline is set for renewal in the first quar-

<sup>23</sup> "Turkey's oil pipelines, Western Route", *Oil and Gas Articles*, 9 January 2006 <http://www.oilgasarticles.com/articles/414/1/Turkeys-Oil-Pipelines-Western-Route/Page1.html>

ter of 2015, though the contract on Russian supplies that transit Bulgaria has many years left<sup>24</sup>. Algeria and Turkey's LNG supplies contract was extended in November 2014<sup>25</sup>.

Reform and liberalization are on-going procedures in the Turkish natural gas market. The 2001 Natural Gas Market Law (no. 4646) aimed at establishing a competitive gas market through the reduction of the role of the state and the harmonization with EU legal standards. This law meets the requirements of the 2003 EU Gas Directive (2003/55/EC). It was amended in 2008, allowing the Petroleum Pipeline Corporation BOTAS to make new LNG contracts and private companies to make their own contracts with countries already having contracts with BOTAS. The key objective of the new law was to break BOTAS's monopoly on imports, distribution, storage, and sale of natural gas. After the full implementation of these legal provisions, BOTAS could maintain its monopoly only on pipeline transmission. Prices and tariffs policy followed the liberalization path, moving to a fully cost-reflective tariff structure<sup>26</sup>.

In September 2012, the Ministry of Energy and Natural Resources has proposed a new liberalization phase<sup>27</sup> requiring BOTAS to be unbundled in three distinct entities: an LNG trading group, a gas transmission system, and a storage facility operator. Gas import and export rights would be transferred to private companies.

### 3.2.1. Transmission Network and Storage

Turkey imports the majority of its gas resources via pipelines, including those from Russia, Iran and Azerbaijan. Turkey imports also liquefied natural gas (LNG).

The Turkish transmission grid is owned and operated by BOTAS, the Transmission System Operator (TSO). It includes 11,294 Km of high –pressure grid, seven compressor stations (capacity 200 MW in total) and more than 200 pressure –reducing and metering stations<sup>28</sup>. The country has 9 entry points: 4 points through international pipelines, 2 LNG terminals, 2 domestic production areas and a storage facility.

The current storage capacities of the country are around 3 bcm in total. This amount is not sufficient for the growing demands and the Ministry of Energy and Natural Resources set a target of 4 bcm storage capacities till 2014. BOTAS and Ege Gaz operate, also, LNG storage tanks (total capacity: 535 cubic meters of LNG or 329 mcm of natural gas).

Increasing the natural gas storage facilities is a key element of Turkey's overall gas security policy. According to the Natural Gas Market Law no 4646 (2001), the gas importers are obliged to hold gas storage capacities that correspond to the 10% of their annual gas imports.

<sup>24</sup> Faruk Akkan, "Putin's Turkey visit: cooperation in trade, discord in foreign policy", *Today's Zaman*, 23 November 2014, [http://www.todayszaman.com/national\\_putins-turkey-visit-cooperation-in-trade-discord-in-foreign-policy\\_365077.html](http://www.todayszaman.com/national_putins-turkey-visit-cooperation-in-trade-discord-in-foreign-policy_365077.html) and "Russia's energy plans for Turkey, Eurodialogue", *Stratfor*, 2 April 2012 (hosted at: <http://www.eurodialogue.org/Russia-Energy-Plans-for-Turkey>)

<sup>25</sup> "Turkey Extends LNG Deal With Algeria", *LNG World News*, 20 November 2014, <http://www.lngworld-news.com/turkey-extends-lng-deal-with-algeria/>

<sup>26</sup> IEA, 2009.

<sup>27</sup> U.S. Energy Information Administration, "Turkey: Country Analysis", 2014 <http://www.eia.gov/countries/analysisbriefs/Turkey/turkey.pdf>

<sup>28</sup> IEA, 2009.

### 3.2.2. Available gas import pipelines

#### Blue Stream pipeline<sup>29</sup>

The Blue Stream gas pipeline has a nominal capacity of 16 bcm/year. The first gas flowed during the last days of 2002, although volumes and prices were not yet defined. A dispute ensued and the supplies were halted. It was finally commissioned in November 2005 and now runs from the Izobil'nyi gas plant in southern Russia across the Black Sea to the Turkish port of Samsun. Once in Turkey, the pipeline continues from Samsun to Ankara for about 501 kilometers<sup>30</sup>. At the time of its construction, it became the deepest undersea pipeline in the world.

#### Baku – Tbilisi – Erzurum (BTE) pipeline

Baku-Tbilisi-Erzurum pipeline exports Azeri natural gas since September 2006<sup>31</sup>. The gas is sourced from the first stage of development of the Shah Deniz field in the Caspian Sea. It is also known as the South Caucasus Pipeline (SCP). The pipeline closely follows the route of the BTC oil pipeline (see above). The length of SCP is 691 km and the pipeline is capable of carrying up to 25 bcm of gas per year, although historically it has been utilized at one-fourth of its capacity<sup>32</sup>. The shareholders of the SCP consortium are: BP (technical operator, 25.5%), Statoil (commercial operator, 25.5%), Azerbaijan SCP Ltd. (10%), LUKOIL (10%), NICO (10%), Total (10%), and TPAO (9%).

#### Tabriz – Ankara pipeline

The Tabriz-Ankara gas pipeline is 1,491 km long<sup>33</sup>. It was commissioned in July 2001 to carry natural gas from the Iranian city of Tabriz to Turkey's capital Ankara<sup>34</sup>. The pipeline's capacity is 10 bcm per year. This pipeline crosses the Kurdish-populated region in Iran and Turkey. Media accounts have reported repeatedly attacks and damages to the pipeline by Kurdish insurgents on both the Iranian and Turkish side<sup>35</sup>.

---

<sup>29</sup> Maria Kottari *et al.*, 2013,

<sup>30</sup> Economic Brief: the Blue Stream Gas Pipeline, *Power and Interest News Report* (PINR), 25/11/2005, available at : [http://web.archive.org/web/20070702221045/http://www.pnr.com/report.php?ac=view\\_report&report\\_id=403&language\\_id=1](http://web.archive.org/web/20070702221045/http://www.pnr.com/report.php?ac=view_report&report_id=403&language_id=1)

<sup>31</sup> Maria Kottari *et al.*, 2013.

<sup>32</sup> BP, "South Caucasus Pipeline: Supplying gas to meet the needs of regional consumers", (no date) [http://www.bp.com/en\\_ge/bp-georgia/about-bp/bp-in-georgia/south-caucasus-pipeline--scp-.html](http://www.bp.com/en_ge/bp-georgia/about-bp/bp-in-georgia/south-caucasus-pipeline--scp-.html)

<sup>33</sup> Maria Kottari *et al.*, 2013.

<sup>34</sup> John Daly, "Iran, Turkey and Azerbaijan: a pragmatic marriage of common interests", *OilPrice*, 15 August 2011, <http://oilprice.com/Energy/Energy-General/Iran-Turkey-And-Azerbaijan-A-Pragmatic-Marriage-Of-Common-Interests.html>

<sup>35</sup> "Bombed Iran-Turkey gas pipeline back in use", *Radio Zamaneh*, 30 July 2011, <http://www.payvand.com/news/11/jul/1298.html> and Meric Ali Berat, "Turkey Says Iran Gas Flow Disrupted Due to Leakage in Pipeline", *Bloomberg*, 28 June 2012: <http://www.bloomberg.com/news/2012-06-28/turkey-says-iran-gas-flow-disrupted-due-to-leakage-in-pipeline.html>

## 4. Electricity Sector

The electricity sector in Turkey has undergone a restructuring with the establishment of the EMRA. In 2001, the Turkish government enacted an Electricity Market Law, setting the stage for liberalization of power generation and distribution activities. Under this law, the state-owned Turkish Electricity Generation and Transmission Corporation (TEIAS)<sup>36</sup> was split into separate generation, transmission, distribution, and trade companies, with the objective of privatizing generation and trade companies. In May 2002, the EMRA issued drafts of the Energy Market Licensing Regulation and the Electricity Market Tariffs Regulation, and these regulations went into effect in August 2002. The Electricity Market Implementation Manual was issued by the EMRA in April 2003<sup>37</sup>.

Following this restructuring initiatives, both electricity generation and consumption have expanded. More precisely, in 2011 Turkey's net electricity generation amounted to 217 billion kWh. Between 2001 and 2010, electricity demand has experienced a 70% increase.

The conventional thermal sources have been, traditionally, the main power generation source. The natural gas-fired power plants occupy the second largest power generation source. Turkey, in an effort to diversify its electricity production portfolio, has advocated the construction of nuclear power plants. The state-owned Electricity Generation Company (EUAS)<sup>38</sup> control almost the half of all electricity generation in the country.

---

<sup>36</sup> Turkish Electricity Transmission Company, <http://www.teias.gov.tr/eng/>

<sup>37</sup> Arif Hepbasli, "Development and restructuring of Turkey's electricity sector: a review", *Renewable and Sustainable Energy Reviews*, Volume 9, Issue 4, 2005, pp. 311-343, <http://www.sciencedirect.com/science/article/pii/S1364032104000620>

<sup>38</sup> Turkish Electricity Generation Company, <http://www.euas.gov.tr/Sayfalar/Eng/AnaSayfa.aspx>

## 5. Renewable energy and energy efficiency

Because of an increasing electricity demand, the expansion of renewable energy sources for the Turkish power generation sector is a necessity. The high reliance on imported natural gas resources for power generation raises concerns over the security of supply. The support of the domestic energy sources, such as renewables, can contribute substantially to the expansion of an environmentally sustainable power generation.

The Renewable Energy Law no. 5436<sup>39</sup>, which came into force in 2005, aims to spread renewable energy use for electricity production. The Turkish government launched a new renewable energy support mechanism (YEK) in December 2011. This mechanism is operated in order to support the renewable energy production providing purchase guarantees to the renewable energy producers<sup>40</sup>. The mechanism contains terms and prices that companies owning production license and operating in renewable energy resources energy production may obtain. Sale prices in renewable energy-based plants are determined in accordance with the law.

### Hydropower

Turkey has a total gross hydropower potential 433 Twh/year. Currently, only 32% (or 140 TWh/year) of the economic hydro potential of the country is utilized<sup>41</sup>. In this light, the country has a great potential in hydropower development.

Hydroelectric power plants receive the lion's share of the investments in renewable energy in Turkey. In 2012 the EMRA had assigned 832 licenses, with a total capacity of 29,570 MW. Approximately, 15,275 MW of this capacity is operative and 14,295 MW is under construction. Of the installed capacity, 11,629 MW belongs to the Turkish Electricity Production Company and some of these power plants (including Karakaya 1,800 MW, Ataturk 2,405 MW and Keban 1,330 MW) are not included in the government's privatization plan<sup>42</sup>.

### Wind power

Several regions, such as the Marmara and Aegean Sea coasts, the East-Mediterranean, and South East Anatolia, have a promising and gradually expanding capacity of wind power production. The Turkish government set a goal of a 20-fold increase in wind capacity by 2020 to be in line with the 20-20-20 energy policy goals of the European Union.

At the end of July 2012, the installed wind power capacity reached 2,041.35 MW, which representing 14% of Turkey's total economic wind potential<sup>43</sup>. Private companies have indicated

<sup>39</sup> Turkey Electricity, <http://www.turkey-electricity.com/page15.html>

<sup>40</sup> Zuhail Uysal, "New regulations in Renewable Energy: Regulation on support and certification of renewable energy sources – Turkey", Herdem Attorneys at Law, (no date) <http://www.hg.org/article.asp?id=31297>

<sup>41</sup> Erkan Erdogdu, "An analysis of Turkish hydropower policy", MPRA paper, n. 26791, 2011, [http://mpra.ub.uni-muenchen.de/26791/1/MPRA\\_paper\\_26791.pdf](http://mpra.ub.uni-muenchen.de/26791/1/MPRA_paper_26791.pdf)

<sup>42</sup> "Turkey's renewable energy sector from a global perspective", PWC report, 2012, [http://www.pwc.-com.tr/tr\\_TR/tr/publications/industrial/energy/assets/Renewable-report-11-April-2012.pdf](http://www.pwc.-com.tr/tr_TR/tr/publications/industrial/energy/assets/Renewable-report-11-April-2012.pdf)

<sup>43</sup> Rasit Ata, "The current situation of wind energy in Turkey", *Journal of Energy*, 2013, <http://www.hindawi.com/journals/jen/2013/794095/>

interest in investing in the construction of wind farms. Among the main obstacles are a rather slow licensing process<sup>44</sup> and the limited transmission capacity<sup>45</sup>.

### **Solar power**

Turkey has one of the most advantageous geographical positions for solar power generation. The yearly average solar radiation is 1,311 kWh/sq.m (3.6 kWh/sq.m per day). The total yearly insolation period is approximately 2,460 hours (6.7 hours per day).

However, despite Turkey's abundant solar energy potential, these resources are not being fully utilized. Despite a potential investment volume projected at around \$60 billion, there are currently no electricity generation licensees to generate electricity using solar resources, presumably because the incentives provided under the Renewable Energy Law (no. 5436) were insignificant.

The main solar energy uses in Turkey are the flat-plate collectors for domestic hot water systems. Turkey is one of the leading countries in the world with a total installed capacity of 10 GWh as of 2011 (129 kWth/1,000 inhabitants).

In 2013, EMRA was expected to begin distributing photovoltaic production licenses for projects larger than 1 MW. A total of 600 MW worth of licenses were planned to be awarded by the end of the year. A recent study found that this had not been the case, mainly due to regulatory complications and delays<sup>46</sup>. Hope remains that cumulative capacity surpasses 4 GW by 2017<sup>47</sup>.

### **Geothermal**

Turkey has attracted significant additions to its power generation capacity from geothermal resources since 2005<sup>48</sup> following the implementation of a new feed-in structure that provides a \$0.105/kWh tariff for geothermal power plants<sup>49</sup>. Turkey has one-eighth of the world's geothermal potential and is ranked 7th in the world, given its location on the Mediterranean volcanic belt which is one of the most promising geothermal fields<sup>50</sup>.

---

<sup>44</sup> Jane Burgermeister, "Turkey looks to exploit wind energy potential", *Renewable Energy World*, 14 September 2007, <http://www.renewableenergyworld.com/rea/news/article/2007/09/turkey-looks-to-exploit-wind-energy-potential-49947>

<sup>45</sup> PWC report, 2012.

<sup>46</sup> Burcu Ersin and Hazal Tunçay, "A Snapshot Of The Turkish Solar Energy Market", 3 November 2014, <http://www.mondaq.com/x/344042/Renewables/A+Snapshot+Of+The+Turkish+Solar+Energy+Sector>

<sup>47</sup> Shahriyar Nasirov, "Turkey: a critical year for solar energy development", *PV magazine*, 11 April 2013, [http://www.pv-magazine.com/news/details/beitrag/turkey--2013-a-critical-year-for-solar-energy-development\\_100010867/#axzz2mWRzFkPC](http://www.pv-magazine.com/news/details/beitrag/turkey--2013-a-critical-year-for-solar-energy-development_100010867/#axzz2mWRzFkPC)

<sup>48</sup> PWC report, 2012

<sup>49</sup> *ibid.*

<sup>50</sup> Turkey Electricity: <http://www.turkey-electricity.com/page6.html>

Six other geothermal fields<sup>51</sup> have been identified, all in southwest Turkey. Most of them are suitable for geothermal power production: the Germencik-Aydin field in the Aydin Province, the Aydin-Salvatli field in the Aydin Province, the Çanakkale-Tuzla field in the Çanakkale Province, the Izmir-Sefirihiser field in the Izmir Province, the Dikili-Bergama field in the Izmir Province, and the Kutahya-Simav field in the Kutahya Province.

The Germencik-Aydin field may be the most promising of these as it has a power potential of at least 100 MWe; a new 25 MWe power plant, to be located near the city of Germencik, is in the planning stages. Turkey planned to generate 1,000 MWe by the year 2020.

### **Biomass**

Turkey's geographical structure is suitable for biomass generation. A large part of Turkish society lives close to areas with abundant agricultural activities placing biomass energy demand in a prominent position<sup>52</sup>.

In Turkey, biomass is used generally as non-commercial fuel and covers around one-fourth of domestic energy production. According to the Ministry of Energy, biomass energy production (wood, plant, and animal waste) will reach 7,530 Btoe as of 2020<sup>53</sup>.

Despite a great potential, the biomass sector in Turkey lacks the adequate regulatory framework for further investments<sup>54</sup>.

---

<sup>51</sup> *ibid.*

<sup>52</sup> "Biomass energy in Turkey", *Invest in Izmir*, (no date), <http://www.investinizmir.com/en/html/634/Biomass+Energy+in+Turkey>

<sup>53</sup> *ibid.*

<sup>54</sup> *PWC report*, 2012.

## 6. Energy policy

The rapidly growing economy of Turkey has become one of the fastest growing market. The limited indigenous resources, given its growing energy demand, resulted to dependency on imported sources, primarily fossil fuels. "Turkey, which imports majority of its oil, natural gas and hard coal supplies, is expected to double energy demand over the next decade"<sup>55</sup>. The diversification of imports, in both type and origin, is a priority for the Turkish energy policy.

Turkey is geographically located in close proximity to 71.8% of the world's proven gas and 72.7% of oil reserves, in particular those in the Middle East and the Caspian basin. "It thus, forms a natural energy bridge between the source countries and consumer markets and stands as a key country in ensuring energy security through diversification of supply sources and routes, considerations that have gained increased significance"<sup>56</sup> in EU energy policy as well. Turkey is a key component of both East-West and South-North energy corridors. As a reliable energy partner, Turkey plays a key role for EU's energy supply security.

The 2023 vision is a set of goals, defined by the government of Recep Tayyip Erdogan, for the year 2023, which marks the 100th anniversary of the establishment of the Turkish Republic. This vision set a number of goals in a variety of sectors, including energy<sup>57</sup>. On the road to 2023, the Turkish government aims to reduce its natural gas demands by \$12 billion, replacing gas with domestic resources. Turkey aims to increase the portion of renewable energy sources in the energy mix to 30%, having already an installed capacity of 20,000 MW from wind energy, 3,000 MW from solar energy, and 600 MW from geothermal energy. Finally, by 2023, the Turkish government foresees the operation of at least 3 nuclear power stations.

As an EU candidate country, Turkey makes concerted efforts to align its energy policy with the EU "*acquis communautaire*". However, according to the latest Commission Staff Working Document<sup>58</sup> on Turkey's progress regarding the enlargement procedure, Turkey is at a moderately advanced stage of alignment. Progress has been recorded in both renewable energy and energy efficiency sectors. According to the Commission's document, progress was recorded regarding the security of supply with reference to the intergovernmental agreement and the Memorandum of Understanding between Turkey and Azerbaijan, in 2011, on the sale and transit of Azeri natural gas to EU through Turkey (Trans Anatolian Pipeline-TANAP).

Energy issues have been part of the Positive Agenda<sup>59</sup>, launched by Commissioner for Enlargement and European Neighbourhood Policy Štefan Füle and the Turkish Minister for European Affairs and Chief EU negotiator Egemen Bağış in Ankara in 2012, with a view to bring fresh dynamics and a new momentum for EU-Turkish relations. A working group has been established to complete the preparation of a roadmap which will contribute positively to the enhancement of EU-Turkey energy relations.

<sup>55</sup> "Energy dependence to grow in Turkey", *Hurriyet Daily News*, 5 February 2013, <http://www.hurriyet-dailynews.com/energy-dependence-to-grow-in-turkey.aspx?pageID=238&nid=40585>

<sup>56</sup> European Commission, Turkey's energy strategy, [http://ec.europa.eu/enlargement/pdf/european\\_energy\\_policy/turkeys\\_energy\\_strategy\\_en.pdf](http://ec.europa.eu/enlargement/pdf/european_energy_policy/turkeys_energy_strategy_en.pdf)

<sup>57</sup> "Turkey: A landmark decade: Vision 2023", *Foreign Affairs*, September-October 2013, <http://www.foreignaffairs.com/files/attachments/Turkey%20pdf.pdf>

<sup>58</sup> European Commission Communication 336, 2012: Enlargement Strategy and Main Challenges 2012-2013: [http://ec.europa.eu/enlargement/pdf/key\\_documents/2012/package/tr\\_rapport\\_2012\\_en.pdf](http://ec.europa.eu/enlargement/pdf/key_documents/2012/package/tr_rapport_2012_en.pdf)

<sup>59</sup> European Commission Press Release, "Positive EU-Turkey agenda launched in Ankara", MEMO/12/359, 17 May 2012: [http://europa.eu/rapid/press-release\\_MEMO-12-359\\_en.htm](http://europa.eu/rapid/press-release_MEMO-12-359_en.htm)

## 7. Bibliography

### 7.1. Primary sources and statistics

ABB, "Turkey: Energy Efficiency Report", March 2013

[http://www05.abb.com/global/scot/scot380.nsf/veritydisplay/a2c92d1d4f7f2405c1257be9002c5060/\\$file/Turkey.pdf](http://www05.abb.com/global/scot/scot380.nsf/veritydisplay/a2c92d1d4f7f2405c1257be9002c5060/$file/Turkey.pdf)

Arab Republic of Egypt, Ministry of Petroleum, Arab Gas Pipeline: <http://www.petroleum.gov.eg/en/ProjectsandActivities/StrategicProjects/Pages/GasPipeline.aspx>

BP, "South Caucasus Pipeline: Supplying gas to meet the needs of regional consumers", (no date) [http://www.bp.com/en\\_ge/bp-georgia/about-bp/bp-in-georgia/south-caucasus-pipeline--scp-.html](http://www.bp.com/en_ge/bp-georgia/about-bp/bp-in-georgia/south-caucasus-pipeline--scp-.html)

EU Committee of the Regions, "Turkey: Energy"

<http://extranet.cor.europa.eu/divisionpowers/countries/Candidates/Turkey/Policy-Areas-Obligatory/Pages/Energy.aspx#>

EU Press Release, "Commissioner Oettinger welcomes TANAP gas pipeline agreements", 27 June 2012 <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/12/721&type=HTML>

European Commission, Turkey's energy strategy, [http://ec.europa.eu/enlargement/pdf/european\\_energy\\_policy/turkeys\\_energy\\_strategy\\_en.pdf](http://ec.europa.eu/enlargement/pdf/european_energy_policy/turkeys_energy_strategy_en.pdf)

European Commission Communication 336, 2012: Enlargement Strategy and Main Challenges 2012-2013: [http://ec.europa.eu/enlargement/pdf/key\\_documents/2012/package/tr\\_report\\_2012\\_en.pdf](http://ec.europa.eu/enlargement/pdf/key_documents/2012/package/tr_report_2012_en.pdf)

European Commission Press Release, "Positive EU-Turkey agenda launched in Ankara", MEMO/12/359, 17 May 2012: [http://europa.eu/rapid/press-release\\_MEMO-12-359\\_en.htm](http://europa.eu/rapid/press-release_MEMO-12-359_en.htm)

IEA, "Energy policies of IEA countries: Turkey", 2009, <http://www.iea.org/publications/freepublications/publication/turkey2009.pdf>

IEA, "Turkey, indicators", 2012, <http://www.iea.org/statistics/statisticssearch/report/?country=TURKEY&product=indicators&year=2012>

IEA, "Turkey, balances", 2012, <http://www.iea.org/statistics/statisticssearch/report/?year=2012&country=TURKEY&product=Balances>

IEA, "Oil & Gas Security. Emergence Response of IEA countries: Turkey", 2013, [http://www.iea.org/publications/freepublications/publication/2013\\_Turkey\\_Country\\_Chapterfinal\\_with\\_last\\_page.pdf](http://www.iea.org/publications/freepublications/publication/2013_Turkey_Country_Chapterfinal_with_last_page.pdf)

- Republic of Turkey, Ministry of Energy and Natural Resources: <http://www.enerji.gov.tr/en-US/Mainpage>
- Republic of Turkey, Ministry of Foreign Affairs, "Turkey's Energy Strategy", <http://www.mfa.gov.tr/turkeys-energy-strategy.en.mfa>
- Republic of Turkey, Prime Ministry Investment Support and Promotion Agency "Invest in Turkey", <http://www.invest.gov.tr/en-US/investmentguide/investorsguide/Pages/BusinessEnvironment.aspx>
- Republic of Turkey, Turkish Petroleum Law, Law n. 6491, approved 30 May 2013, <http://www.pigm.gov.tr/index.php/english/turkish-petroleum-law>
- U.S. Energy Information Administration, "Turkey: Country Analysis", 2014 <http://www.eia.gov/countries/analysisbriefs/Turkey/turkey.pdf>

## 7.2. Secondary sources

- Faruk Akkan, "Putin's Turkey visit: cooperation in trade, discord in foreign policy", *Today's Zaman*, 23 November 2014, [http://www.todayszaman.com/national\\_putins-turkey-visit-cooperation-in-trade-discord-in-foreign-policy\\_365077.html](http://www.todayszaman.com/national_putins-turkey-visit-cooperation-in-trade-discord-in-foreign-policy_365077.html)
- Rasit Ata, "The current situation of wind energy in Turkey", *Journal of Energy*, 2013, <http://www.hindawi.com/journals/jen/2013/794095/>
- Dimitar Bechev, "Sofia view: Oil pipeline cancellation questions", *European Council on Foreign Relations*, February 2011, [http://ecfr.eu/blog/entry/sofia\\_view\\_oil\\_pipeline\\_cancellation\\_questions](http://ecfr.eu/blog/entry/sofia_view_oil_pipeline_cancellation_questions)
- Meric Ali Berat, "Turkey Says Iran Gas Flow Disrupted Due to Leakage in Pipeline", *Bloomberg*, 28 June 2012: <http://www.bloomberg.com/news/2012-06-28/turkey-says-iran-gas-flow-disrupted-due-to-leakage-in-pipeline.html>
- "Biomass energy in Turkey", *Invest in Izmir*, (no date) <http://www.investinizmir.com/en/html/634/Biomass+Energy+in+Turkey>
- "Bombed Iran-Turkey gas pipeline back in use", *Radio Zamaneh*, 30 July 2011, <http://www.payvand.com/news/11/jul/1298.html>
- "BP wants to join TANAP oil pipeline", *Hurriyet Daily News*, 18 August 2012, <http://www.hurriyetdailynews.com/bp-wants-to-join-tanap-oil-pipeline.aspx?pageID=238&nID=27989&NewsCatID=348>
- Jane Burgermeister, "Turkey looks to exploit wind energy potential", *Renewable Energy World*, 14 September 2007, <http://www.renewableenergyworld.com/rea/news/article/2007/09/turkey-looks-to-exploit-wind-energy-potential-49947>

- John Daly, "Iran, Turkey and Azerbaijan: a pragmatic marriage of common interests", *OilPrice*, 15 August 2011, <http://oilprice.com/Energy/Energy-General/Iran-Turkey-And-Azerbaijan-A-Pragmatic-Marriage-Of-Common-Interests.html>
- "Economic Brief: the Blue Stream Gas Pipeline", *Power and Interest News Report (PINR)*, 25 November 2005: [http://web.archive.org/web/20070702221045/http://www.pinr.com/report.php?ac=view\\_report&report\\_id=403&language\\_id=1](http://web.archive.org/web/20070702221045/http://www.pinr.com/report.php?ac=view_report&report_id=403&language_id=1)
- "Energy dependence to grow in Turkey", *Hurriyet Daily News*, 5 February 2013, <http://www.hurriyetdailynews.com/energy-dependence-to-grow-in-turkey.aspx?pageID=238&nid=40585>
- Erkan Erdogdu, "An analysis of Turkish hydropower policy", *MPRA paper*, n. 26791, 2011, [http://mpa.ub.uni-muenchen.de/26791/1/MPRA\\_paper\\_26791.pdf](http://mpa.ub.uni-muenchen.de/26791/1/MPRA_paper_26791.pdf)
- Burcu Ersin and Hazal Tunçay, "A Snapshot Of The Turkish Solar Energy Market", 3 November 2014, <http://www.mondaq.com/x/344042/Renewables/A+Snapshot+Of+The+Turkish+Solar+Energy+Sector>
- Arif Hepbasli, "Development and restructuring of Turkey's electricity sector: a review", *Renewable and Sustainable Energy Reviews*, Volume 9, Issue 4, 2005, pp. 311-343, <http://www.sciencedirect.com/science/article/pii/S1364032104000620>
- Maria Kottari et al., "Energy politics, pipelines and the Black Sea Basin: On the route of diversification of EU energy sources", *European Centre for Energy and Resource Security (EU-CERS)*, King's College, London, 2013 <http://www.kcl.ac.uk/sspp/departments/warstudies/research/groups/eucers/strategy-paper-young-researchers-Vol-1.pdf>
- Shahriyar Nasirov, "Turkey: a critical year for solar energy development", *PV magazine*, 11 April 2013, [http://www.pv-magazine.com/news/details/beitrag/turkey--2013-a-critical-year-for-solar-energy-development\\_100010867/#axzz2mWRzFkPC](http://www.pv-magazine.com/news/details/beitrag/turkey--2013-a-critical-year-for-solar-energy-development_100010867/#axzz2mWRzFkPC)
- "Trans-Anatolian Will Put Greater Emphasis on Other Pipelines", *Natural Gas Europe*, 18 November 2011, <http://www.naturalgaseurope.com/trans-anatolian-will-put-greater-emphasis-on-other-pipelines-3590>
- "Turkey Extends LNG Deal With Algeria", *LNG World News*, 20 November 2014, <http://www.lng-worldnews.com/turkey-extends-lng-deal-with-algeria/>
- "Turkey: A landmark decade: Vision 2023", *Foreign Affairs*, September-October 2013, <http://www.foreignaffairs.com/files/attachments/Turkey%20pdf.pdf>
- "Turkey's renewable energy sector from a global perspective", *PWC report*, 2012, [http://www.pwc.com/tr/tr\\_TR/tr/publications/industrial/energy/assets/Renewable-report-11-April-2012.pdf](http://www.pwc.com/tr/tr_TR/tr/publications/industrial/energy/assets/Renewable-report-11-April-2012.pdf)
- "Turkey's oil pipelines, Western Route", *Oil and Gas Articles*, 9 January 2006, <http://www.oil-gasarticles.com/articles/414/1/Turkeys-Oil-Pipelines-Western-Route/Page1.html>

"Russia's energy plans for Turkey, Eurodialogue", *Stratfor*, 2 April 2012, (hosted at: <http://www.eurodialogue.org/Russia-Energy-Plans-for-Turkey>)

Zuhal Uysal, "New regulations in Renewable Energy: Regulation on support and certification of renewable energy sources – Turkey", Herdem Attorneys at Law, (no date), <http://www.hg.org/article.asp?id=31297>

VV.AA., "Istanbul Canal project to open debate on Montreux Convention", *Today's Zaman*, 8 October 2010, <http://www.todayszaman.com/news-223806-istanbul-canal-project-to-open-debate-on-montreux-convention.html>

### **7.3. Other web resources**

BOTAS, Petroleum Pipeline Corporation, <http://www.botas.gov.tr/defaultEN.asp>

Centre for Renewable Energy Sources, <http://www.cres.gr>

ITGI pipeline, Edison: <http://www.edison.it/en/itgi-pipeline>

Turkish Competition Authority, <http://www.rekabet.gov.tr/en-US/Mainpage>

Turkey Electricity, <http://www.turkey-electricity.com/>

Turkish Electricity Generation Company, <http://www.euas.gov.tr/Sayfalar/Eng/AnaSayfa.aspx>

Turkish Electricity Transmission Company, <http://www.teias.gov.tr/eng/>

Turkish Energy Market Regulatory Authority, <http://www.emra.org.tr/>

Turkish Petroleum Corporation (TPAO), <http://www.tpao.gov.tr/eng/>

Turkish Petroleum Refineries Co., <http://www.tupras.com.tr/masterpage.en.php>