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Energy and Climate Strategies, Interests and Priorities of the EU and Turkey

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Abstract

Energy is one of the sectors in which EU–Turkey cooperation could be most fruitful, possibly leading overall convergence through the common achievement of mutual interests in key areas – in particular, natural gas imports and diversification. Yet, this collaboration is undermined by the uncertainty over Turkey's position vis-à-vis these policies and its undefined commitment to others, such as renewables and nuclear power; by doubts over the ability of the EU to balance security of supply, sustainability and competitiveness; and by the unclear growth trends of both regions. This situation is partially balanced by Turkey's and the EU's participation in several – sometimes successful – platforms for energy cooperation on the bilateral and multilateral levels (i.e. ENTSO-E, the European Network of Transmission System Operators for Electricity and Med-TSO, the Association of the Mediterranean Transmission System Operators), which are aimed at the integration of the two polities' energy markets. Nonetheless, the overall energy framework still needs a strong policy boost to set it on a common path towards convergence.

Enerji sektörü, AB-Türkiye işbirliğinin en verimli olabileceği, kilit alanlarda – özellikle doğal gaz ithalatı ve çeşitlendirilmesi hususlarında - ortak çıkarları yine ortak başarılara dönüştürerek muhtemelen en kapsamlı yakınlaşmayı sağlayabilecek unsurlardandır.
Fakat Türkiye'nin enerji politikaları, yenilenebilir ve nükleer enerji konularındaki yükümlülüklerinin
belirsizliği, AB'nin arz güvenliği, sürdürebilirlik ve rekabet meselelerinde dengeyi sağlayabileceğine
dair şüpheler ve her iki bölgenin de belirsiz büyüme eğilimleri nedenleriyle bu işbirliği alanına tereddütle yaklaşılmaktadır.Bu durum kısmen hem Türkiye'nin hem de AB'nin çeşitli – ve kimi zaman başarılı – ikili ve çok taraflı, enerji piyasalarını yakınlaştırmayı amaçlayan, işbirliği platformlarına (bkz:. ENTSO-E, the European Network of Transmission System Operators for Electricity and Med-TSO, the Association of the Mediterranean Transmission System Operators) iştirak etmeleriyle dengelenmektedir. Bunlara rağmen, Türkiye ve AB'nin yakınlaşma sürecinde, ortak bir yol izlenilebilmesi açısından, enerji hususunda güçlü bir politikaya ihtiyaç duyulmaktadır

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Introduction

The mutual relevance of the EU and Turkish energy sectors is well known, and it has been reaffirmed at the institutional level on several occasions. These include the EU Energy Union strategy, as expressed in the 2015 February Communication establishing the initiative (European Commission, 2015b), and the last "Turkey–EU High Level Energy Dialogue" meeting of January 2016 (Albayrak & Cañete, 2016). Indeed, Turkey's geographical position makes the country a fundamental partner for European energy security, particularly in order to grant access to Caspian and Middle Eastern hydrocarbon resources. Conversely, Turkey can significantly benefit from the size of the EU gas market and its technological and regulatory advancement, especially in the field of renewable energy. Yet, despite this, the narratives proposed by the two sides often differ. The EU is indeed primarily interested in Turkey as an "energy bridge", thus focusing on its role as a transit country.[1] Turkey's main narrative, on the contrary, encompasses a wider level of ambition for the country, which aspires to become a regional energy hub. Not by chance, the joint press statement of the 2016 High Level Energy Dialogue between European Commissioner Miguel Arias Cañete and the Turkish Minister of Energy, Berat Albayrak, summarizes the two positions, stating that "Both sides underlined the importance of Turkey as a key country for EU's energy security and as a regional energy hub" (Albayrak & Cañete, 2016). Thus, despite different energy features, both the EU and Turkey have designed their energy strategies around the same three key objectives of competitiveness, security of supply and sustainable development. However, due to varying priorities regarding time and differing levels of ambition, energy cooperation between the two partners is still partial and the integration of their energy markets remains an incomplete process.

On the one hand, energy demand in Europe has flattened out, as a result of both an economy that is still struggling to recover from the 2008/9 financial crisis and of ambitious decarbonization (and, particularly, efficiency) policies that are now producing their first outcomes. In the aftermath of the economic crisis, EU primary-energy consumption dropped dramatically from its 2006 peak, reaching levels not seen since the 1980s (Eurostat, 2016). In this context, the European Commission expects continental energy demand to decline steadily until 2040, at which time it will reach a plateau (European Commission, 2016e).

On the other hand, in the past decade Turkey has been one of the fastest-growing economies in the world, displaying an economic dynamism that resulted in a 90% increase in electricity demand whilst gas consumption grew from 22 billion cubic metres (bcm) to 49 bcm. Despite the

[1] Indeed, the Energy Union February 2015 Communication states that: "the EU will use all its foreign policy instruments to establish strategic energy partnerships with increasingly important producing and transit countries or regions such as Algeria and Turkey" (European Commission, 2015b: 6).

slowdown in economic performance that has been experienced over the last few years, access to secure, sufficient and affordable energy sources remains a key priority for the Turkish authorities. In fact, energy demand is, in any event, expected to expand to satisfy both economic activities and the increasing living standards of Turkish citizens. Security continues to occupy a prime place in Turkey's energy-policy agenda as the country remains extremely dependent on external hydrocarbon supplies, with imports accounting for 91% of total oil demand and 99% of domestic gas consumption.

This paper analyses the energy profiles, priorities and strategies of the EU and Turkey in order to evaluate whether or not in recent years the two partners have undertaken policy trajectories leading towards convergence. In conclusion, it explores energy relations between Brussels and Ankara, paying specific attention to both bilateral and multilateral institutional initiatives to strengthen cooperation in the energy and climate domain.

1 The composition and future trends of European and Turkish energy mixes

A significant degree of uncertainty on both sides undermines the possibility of convergence between the European and the Turkish energy frameworks. Yet, similarities on core points of their energy requirements, in particular the need to diversify imports, as well as complementarities in others, such as a possible cooperation in the renewable energies sector, could rectify the situation.

Indeed, while the EU is marked by a clearly declining consumption, Turkey's is rapidly growing. The need for increased generation capacity could be largely addressed by Ankara through Russian-managed nuclear power, with the risk of neglecting renewable energies, which the EU strongly supports. The uncertainty over the future of the Turkish nuclear programme could, however, push towards an increasing share of renewable energy sources (RES) – and thus convergence with EU interests. As the two lack domestic resources, and will continue to do so into the future, their shared need for the diversification of natural gas suppliers could be the key to draw them closer to each other.

Thus, the answer probably lies in the resolution of key uncertainties for future EU and Turkish energy and economic trends. These comprise the issues of when and if the EU's gross domestic product (GDP) completely recovers from the financial crisis, and whether Turkish GDP (with its associated energy demands) keeps growing and by how much; how Turkey will shape its generation mix, choosing between gas, nuclear, coal and renewables; and whether economic factors will prevail over political determinants in this process.

1.1 The EU energy framework

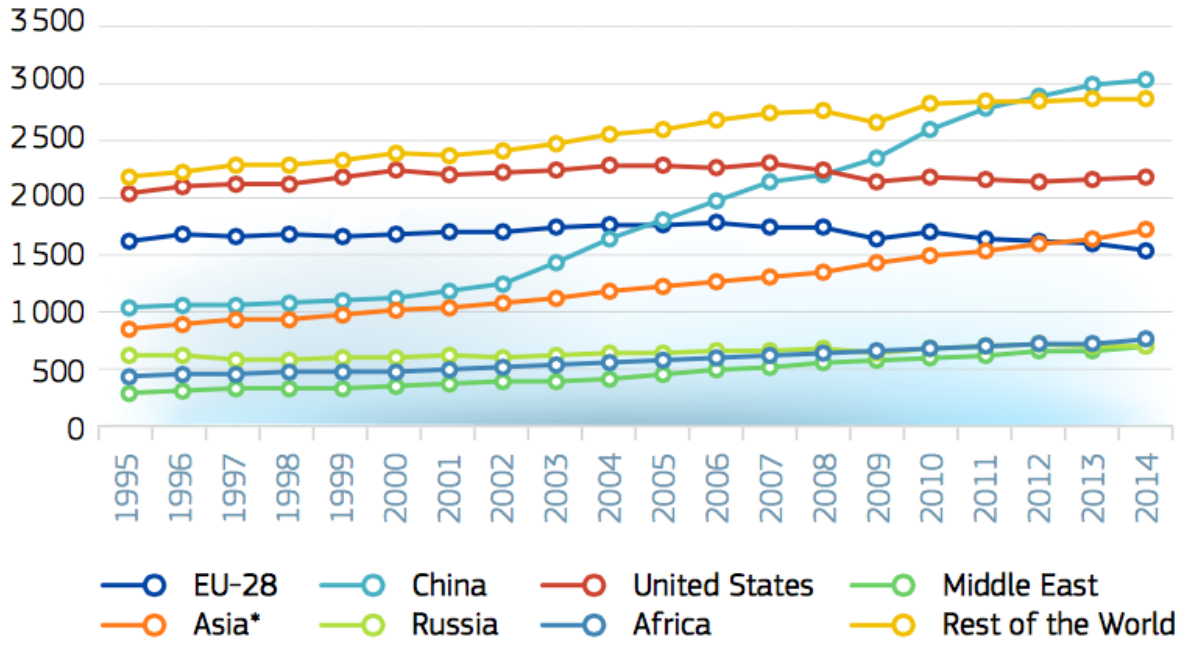
1.1.1 The present and past composition of EU energy mixes

The EU is the world's third largest energy consumer behind China and the US (see Figure 1.1), and more than half (53.5%) of the EU-28's gross inland energy consumption in 2014 came from imported sources. The Union's consumption patterns show its dependence on fossil fuels. Indeed, until the early 1950s coal dominated, contributing almost 90% of the primary energy supply of the six founding members of the European Coal and Steel Community (ECSC). By 1967, coal accounted for only 35% of total primary-energy supply, and was replaced by oil in 1969 as the most important energy source. Today, despite the long-term downward trend since the 1990s, oil continues to be the most important energy source for the European economy, natural gas being the second. Although consumption of solid fuels (coal and lignite) has declined, consumption of coal has increased in recent years and only started declining again in 2014.

The energy mix in the EU mainly involves five different sources. As of 2014, these were: petroleum products (including crude oil) (34%), natural gas (21%), solid fuels (lignite and hard coal) (17%), nuclear energy (14%) and renewable energies (13%)[2] (see Figure 1.1). In 2015, these shares remained roughly at the same level, natural gas accounting for 22% while solid fuels decreased to 16% (see Figure 1.1).

[2] All data, if not indicated otherwise, are based on European Commission, 2016c.

Figure 1.1 - World Gross Inland Consumption by Region, 1995–2014 (Million toe) [3]



* Excluding China.

Source: European Commission, 2016c: 12.

Each EU member state has sovereignty over its own national energy mix, which leads to the fact that the shares of the different energy sources in the total energy available vary considerably between states. For example, in 2015 oil accounted for a significant share of the total energy available in Cyprus (93%), Malta (85%) and Luxembourg (63%), while natural gas made up around a third in the Netherlands, Italy and the United Kingdom. Over half of the energy available in Estonia (62%) and Poland (51%) came from solid fuels (mainly coal). In France and Sweden nuclear energy accounted for 45% and 32% respectively. Renewable energy made up over a third in Latvia (35%) and Sweden (42%).

With regard to long-term trends of the overall EU-28 energy mix during the period 1990–2015, there was an overall gradual decline in the share of petroleum products. The combined share of petroleum products and solid fuels fell from 65.0% of total consumption in 1990 to 50.7% in 2010 and 50.6% by 2015, reflecting a move away from the most polluting fossil fuels. The share of nuclear energy rose to a peak of 14.5% in 2002 but dropped back, before increasing somewhat to reach 13.6%. By contrast, the share of EU-28 gross inland consumption accounted for by renewable energy sources was 13% in 2015, three times its share (4.3%) of the energy mix in 1990. The share of natural gas also increased relatively quickly during the 1990s and more

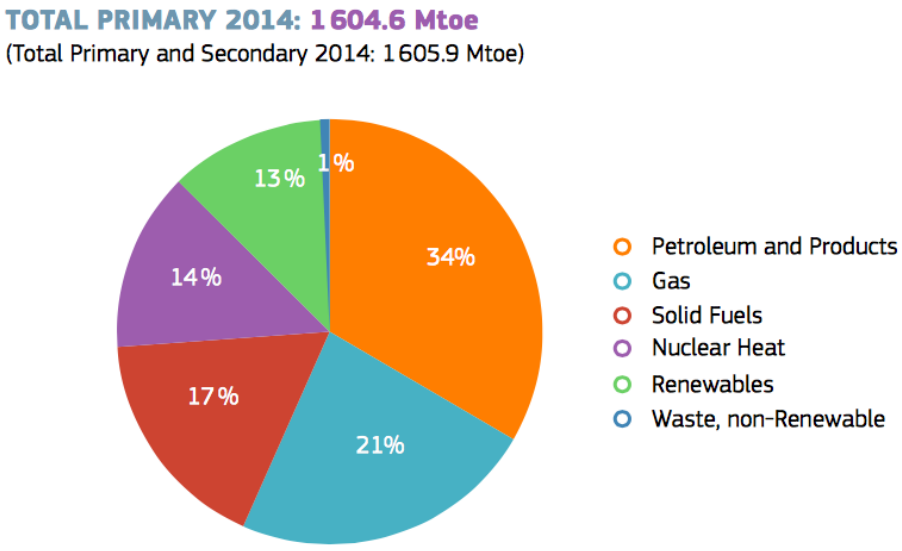
[3] The tonne of oil equivalent (toe) is a conventional standardized unit for measuring energy.

slowly thereafter, to peak at 25.4% in 2010. Its share fell during the next four years to reach 22% in 2015, partly due to the low coal price of recent years, which made it cheaper to generate electricity with coal than with gas (see Section 2.1.4).[4]

1.1.2 Trends in energy demand and their relationship with GDP and other factors

The European Union is one of the largest economies in the world, with a GDP of about €14,632 billion in 2015, and 508.4 million consumers, or 6.9% of the world's population. The value of the energy sector in the EU (excluding energy-intensive industries) was around 2.5% of its total GDP. The gross inland energy consumption[5] in the Union in 2015 was 1,626.4 Mtoe, slightly higher than in 2014 (1,604.6 Mtoe). It was relatively stable during the period 1990–2015, with a strong decline in 2009 as a result of the financial and economic crisis, falling by around 8% from its peak in 2005–6 with 1,831 Mtoe. The crisis strongly impacted on industrial production and energy demand as well as investment. At the same time, many energy-efficiency policies started to have a visible impact on curbing the demand. Thus, after two decades of sustained growth in energy demand and supply, the slow economic recovery and energy-efficiency policies resulted in returning the EU bloc to its energy consumption levels of 1990 in 2012.

Figure 1.2 - Share of energy primary resources in EU total energy mix (% of total, based on Mtoe)



Source: European Commission, 2016c: 22.

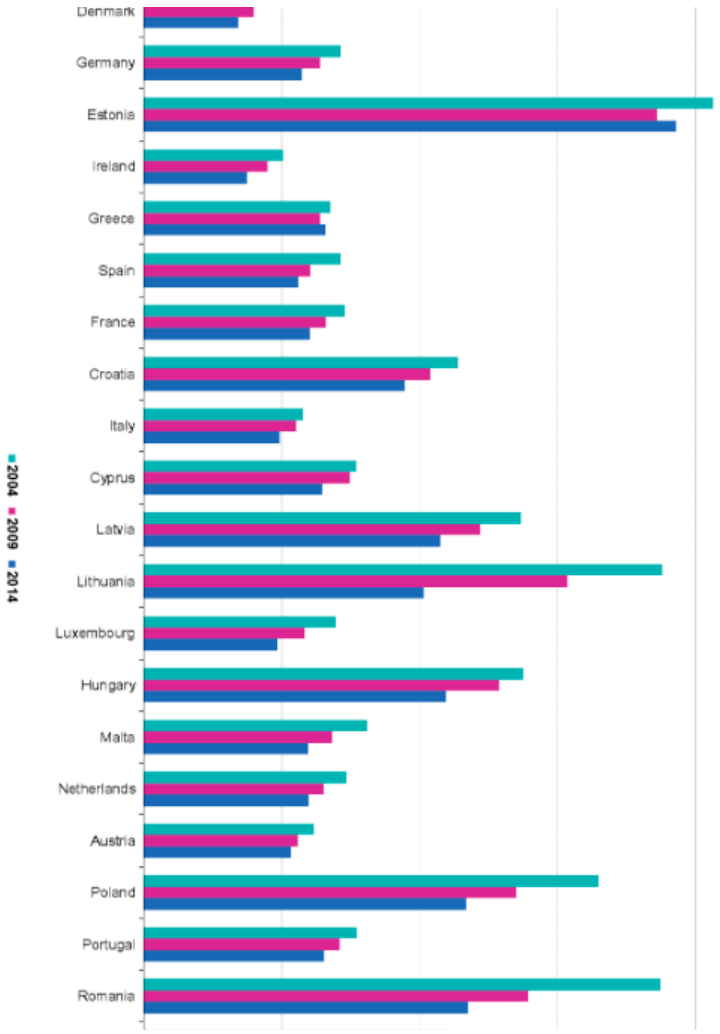
Energy intensity can be considered as an approximation of the energy efficiency of a nation's economy. It indicates how much energy is needed to produce a unit of GDP. A comparison of the

[4] For the Section, see Eurostat, *Statistics Explained: Consumtion of Energy*, http://ec.europa.eu/eurostat/statistics-explained/index.php/Consumption_of_energy.
[5] Gross inland consumption describes the total energy demand of a country.

historical trends in each country shows that, with the exception of Estonia and Greece, energy intensity decreased in all EU countries over the last decade. The reasons for this development are manifold: a faster growth in GDP than in energy demand and a general shift from an industrial towards a service-based economy can be observed. In addition, there has been a shift within industry to less energy-intensive production methods, including the closure of inefficient units.

This follows a general trend, as shown by the International Energy Agency (IEA). In countries and blocs with a high GDP per capita, such as the US, Japan or the EU, the energy consumption per capita decreases, while for China, India and other emerging economies the opposite trend can be observed. The growth in GDP per capita, electrification and similar development programmes in the latter have led to an increase in the energy consumption per capita.

Figure 1.3 – Energy intensity of the economy, 2004-2009–14 (in kilograms of oil equivalent - kgoe per €1,000 GDP)

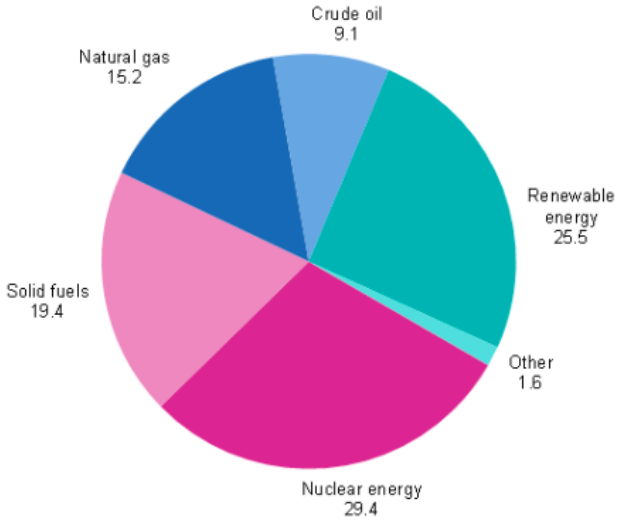


Source: Eurostat, *Statistics Explained: Energy Trends*, http://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_trends.

1.1.3 Energy-mix dynamics: production, imports and vulnerability

Europe has experienced a decline in the primary production of hard coal; lignite; crude oil; natural gas; and, more recently, nuclear energy. In 2014, nuclear energy (29.4% of total EU energy production) was the largest source contributing to energy production in the EU. Renewable energy (25.5%) – such as hydro, wind and solar energy – was the second largest source, followed by 19.4% solid fuels – mainly hard coal, natural gas (15.2%) and crude oil (9.1%) (see Figure 1.4).

Figure 1.4 – The EU's share of domestic production by source (%)



Source: Eurostat website: *Statistics Explain: Energy Production and Imports*, http://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_production_and_imports.

The highest level of primary-energy production among the EU member states was in France, with a 17.86% share (deriving mainly from nuclear energy, with 82.8% of total national energy production and as shown by Table 1.1), followed by Germany (15.65%) and the UK (15.45%).

Table 1.1 – Energy production by country, 2004 and 2014 (Mtoe)

	Total production of primary energy		Share of total production, 2014 (%)				
	2004	2014	Nuclear energy	Solid fuels	Natural gas	Crude oil	Renewable energy
EU-28	931.7	770.7	29.3	19.4	15.2	9.1	25.4
Belgium	13.5	12.2	71.2	0.0	0.0	0.0	23.4
Bulgaria	10.2	11.3	36.5	45.3	1.4	0.2	16.4
Czech Republic	33.1	29.1	27.0	58.0	0.7	0.9	12.6
Denmark	30.9	15.8	0.0	0.0	26.3	51.2	19.9
Germany	136.8	119.9	20.9	36.8	5.7	2.9	30.0
Estonia	3.7	5.8	0.0	78.5	0.0	0.0	20.3
Ireland	1.9	2.0	0.0	48.3	6.1	0.0	42.5
Greece	10.3	8.8	0.0	72.5	0.1	0.7	26.5
Spain	32.4	34.9	42.3	4.7	0.1	0.9	51.5
France	135.4	135.9	82.8	0.0	0.0	0.8	15.5
Croatia	4.7	4.4	0.0	0.0	33.2	13.9	52.7
Italy	29.2	36.8	0.0	0.1	15.9	16.6	64.2
Cyprus	0.1	0.1	0.0	0.0	0	0.0	94.2
Latvia	1.8	2.4	0.0	0.1	0.0	0.0	99.6
Lithuania	5.1	1.5	0.0	1.9	0.0	5.6	91.3
Luxembourg	0.1	0.2	0.0	0.0	0.0	0.0	78.8
Hungary	10.2	10.0	40.3	15.8	14.3	8.2	20.4
Malta	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Netherlands	68.2	58.4	1.8	0.0	85.8	3.4	7.8
Austria	9.9	12.1	0.0	0.0	9.0	7.6	77.6
Poland	78.1	66.9	0.0	80.2	5.6	1.4	12.0
Portugal	3.9	6.0	0.0	0.0	0.0	0.0	97.6
Romania	28.6	26.6	11.3	16.7	33.0	15.8	22.9
Slovenia	3.4	3.7	44.6	22.2	0.1	0.0	32.0
Slovakia	6.2	6.3	64.1	9.2	1.3	0.2	22.8
Finland	15.7	18.1	33.7	8.9	0.0	0.4	55.8
Sweden	33.8	34.1	49.0	0.4	0.0	0.0	48.8
United Kingdom	224.3	107.6	15.3	6.3	30.6	38.1	9.0
Iceland	2.3	5.2	0.0	0.0	0.0	0.0	100.0
Norway	228.8	196.3	0.0	0.6	48.4	44.3	6.6
Montenegro	0.0	0.7	0.0	52.6	0.0	0.0	47.5
FYR of Macedonia	1.6	1.3	0.0	78.0	0.0	0.0	22.0
Albania	1.1	1.9	0.0	0.0	1.3	65.6	33.1
Serbia	12.0	9.4	0.0	60.8	4.7	12.4	22.0
Turkey	24.1	31.2	0.0	52.0	1.3	8.1	38.5
Bosnia and Herzegovina	3.6	6.0	0.0	62.3	0.0	0.0	37.7
Kosovo (under UNSCR 1244/99)	1.3	1.6	0.0	83.6	0.0	0.0	16.4

Source: Eurostat website: *Statistics Explain: Energy Production and Imports*, http://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_production_and_imports.

The overall decline in EU domestic production has led to an increased reliance on primary-energy imports in order to satisfy demand. Moreover, as this trend will continue in the foreseeable future, gas imports are expected to increase between 2020 and 2030 while oil imports are projected to remain stable, even in a decarbonization scenario (IEA, 2014).

Energy-import dependence is thus a fact of life for the EU. Since 2004, its net imports of energy have been greater than the Union's primary production. The EU's imports of primary energy exceeded exports by some 881 Mtoe in 2014. Relative to population size, the largest net importers in 2014 were Luxembourg, Malta and Belgium. The dependency on energy imports increased to around 40% of gross energy consumption in the 1990s, reaching 53.5% by 2014 (see Table 1.2). In 2014, nearly 88% of the EU's crude oil, 67% of its natural gas, 68% of its hard coal and 95% of the uranium needed for its nuclear fuel were imported. The lowest energy-dependency rates in 2014 were recorded for Estonia, Denmark, Romania and Poland (dependency rates below 30.0%), while Malta, Luxembourg and Cyprus were (almost) entirely reliant on primary-energy imports, with dependency rates of over 90%.

Table 1.2 – EU-28 Energy Import Dependency by Fuel (%)

	1995	2000	2005	2010	2013	2014
Total	43.1	46.7	52.2	52.6	53.1	53.5
Solid Fuels	21.5	30.6	39.4	39.5	44.1	45.6
of which Hard Coal	29.7	42.6	55.7	57.9	64.5	67.9
Petroleum and Products	74.1	75.7	82.1	84.5	87.4	87.4
of which Crude and NGL	73.0	74.4	81.3	84.6	88.0	87.9
Natural Gas	43.4	48.9	57.1	62.2	65.2	67.4

Source: European Commission, 2016c: 24.

Russia has remained the EU's main supplier of crude oil (30.4%) and natural gas (37.9%) over the years. Norway is the second largest supplier of EU imports of crude oil (13.1%) and natural gas (31.8%). Algeria delivers 11.9% of natural gas imports. With regard to crude oil imports, Russia and Norway were followed by Nigeria (9.1%) and Saudi Arabia (8.9%).[6] Almost three quarters of solid fuel (mostly coal) imports came from Russia (29.0%), Colombia (21.2%) and the United States (20.5%).

The security of the EU's primary-energy supplies may be threatened if a high proportion of imports are concentrated among relatively few partners, and this is a specific concern in the gas sector. Despite investment made in liquefied natural gas (LNG) terminals, more than two thirds (69.1%) of the EU's imports of natural gas in 2014 came from Russia or Norway – a share that in 2010 accounted for 59.6% of total gas imports. Member states such as Finland, Slovakia, Bulgaria and the Baltic nations are the most vulnerable vis-à-vis this situation, since they are nearly 100% dependent on Russian pipeline gas. Even though the Union reformed its gas emergency policies in the aftermath of the 2009 crisis, several shortcomings remain. Reverse flows are not available at all interconnection points between market areas, and access across borders to storage and LNG is then hampered. As the recently published "Second Report on the State of the Energy Union" by the European Commission (2017) points out, through lack of pipelines vast areas of the EU remain physically disconnected from each other.

In addition, a rapid decline in the bloc's indigenous gas production, notably in the Netherlands and Denmark, can be observed. As a result of declining domestic production, from 2004 to 2014 the EU's dependency on non-member countries for supplies of natural gas grew 13.8 percentage points faster than the growth in dependency for crude oil (7.5%) and solid fuels (7.4%).

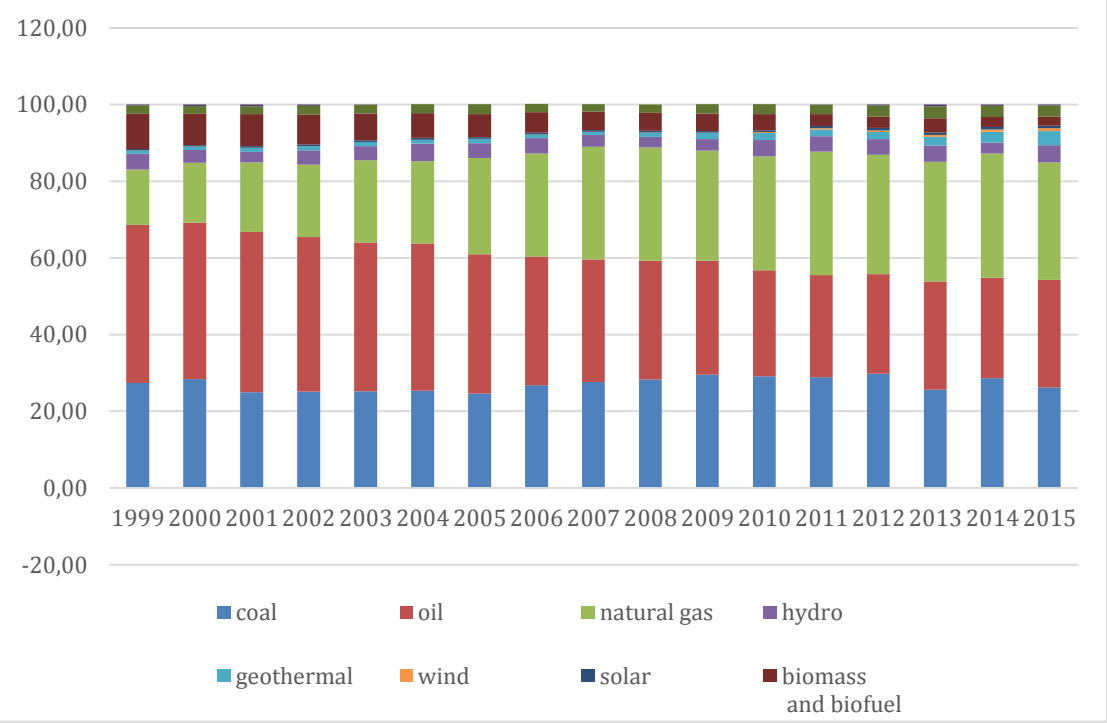
[6] Kazakhstan (6.4%), Iraq (4.6%), Azerbaijan (4.4%) and Algeria (4.2%) contributed with smaller amounts.

1.2 The Turkish energy framework

1.2.1 The present and past composition of Turkey's energy mixes

Fossil fuels dominate Turkey's energy mix. Figure 1.5 allows us to compare the country's annual energy mixes since 1999. The share of oil in the primary-energy supply[7] has been decreasing steadily since 1999, when it reached a peak of 41.2%. The lowest share (26%) occurred in 2015. Oil represented the largest share of Turkey's energy mix until 2007, when natural gas overtook it. In contrast to the decreasing share of oil, the value of natural gas in the country's total primary-energy supply has been increasing. From a 14.48% share in 1999, it grew steadily to the level of 31% in 2015. Although coal's share slightly decreased in 2001, it ranged between 23.98% (in 2005) and 28.90% (in 2011), which was its peak point. There was a decrease in the share of biofuels and biomass, whereas the share of hydro ranges between 2.6 and 4.77%. In addition, it is possible to witness a steady increase in wind and geothermal energy, although the overall share of renewable energy (including hydro) in total primary-energy supply is still relatively low, accounting for only 12% in 2015 (General Directorate of Energy Affairs of the Republic of Turkey, 2016).

Figure 1.5 – Share of energy resources in Turkey's total energy mix (%)

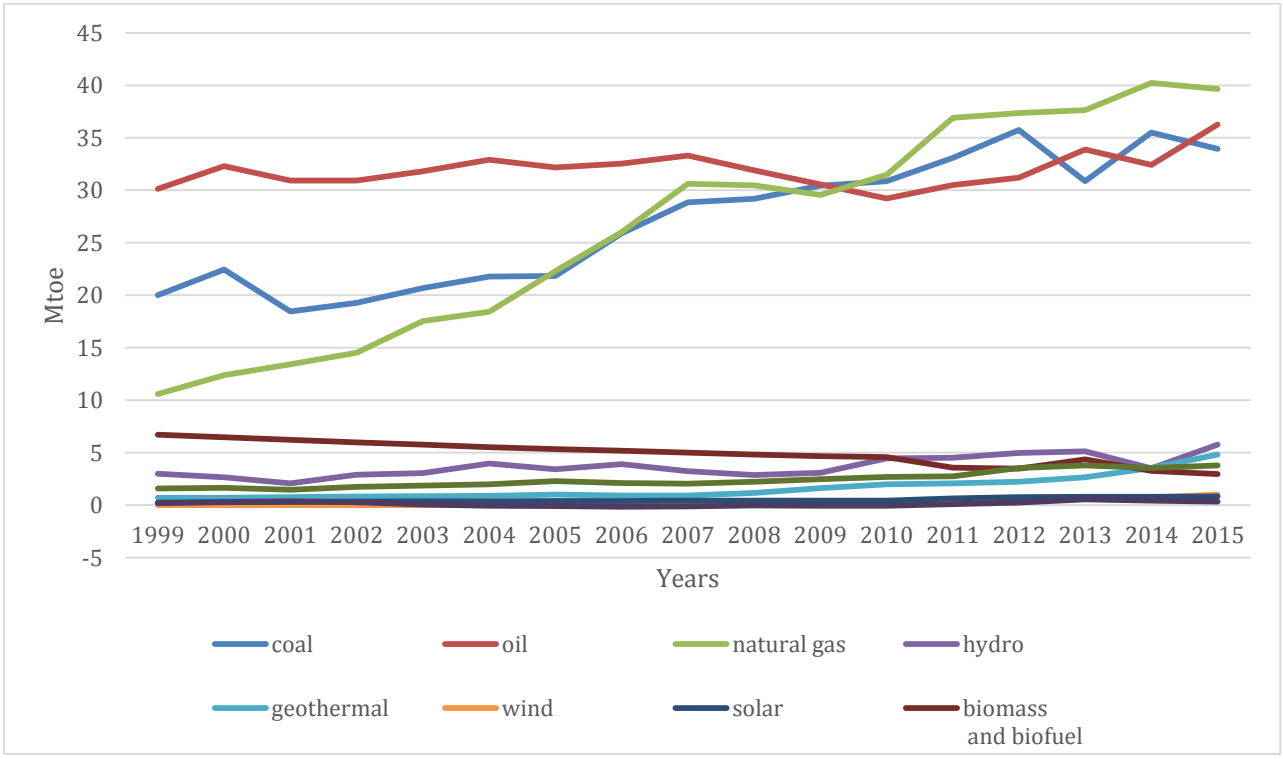


[7] Primary energy supply refers to domestic energy production plus energy imports, minus energy exports, minus international bunkers, plus or minus stock changes, plus or minus statistical differences.

Source: Data from General Directorate of Energy Affairs of the Republic of Turkey, *Energy Balance Tables*, various years. Compiled, calculated and graphed by Dicle Korkmaz Temel.

Figure 1.6 shows the changes in Turkey's primary-energy supply for each energy source since 1999, highlighting the contrast between fossil fuels and renewable energy sources. The decrease in biomass and biofuel is obvious. Oil stayed more stable compared with coal and natural gas, as the amount ranged between 29 and 36 Mtoe. In contrast, primary natural gas supply increased steadily since 1999, with only a slight decrease in 2009 as compared with 2007 and 2008. However, the increase continued until 2015, when there was again a slight decrease compared with 2014. Coal supply follows a similar path, despite a trough in 2001. From that year, a steady increase occurred until 2012, in which year the peak point was reached. After a decrease in 2013, the coal supply started to increase again and slightly decreased in 2015. While the share of coal in primary-energy supply was 26.24% in 2015, it is expected to reach 37% in 2023 (Ministry of Energy of the Republic of Turkey, 2016a: 13). By exploiting significant amounts of domestic lignite and hard-coal reserves, Turkey expects to increase the electricity produced from domestic coal from 33,500 gigawatt hours (GWh) in 2015 to 60,000 GWh in 2019 (Ministry of Energy of the Republic of Turkey, 2015: 35).

Figure 1.6 – Primary Energy Supply in Turkey (Mtoe)

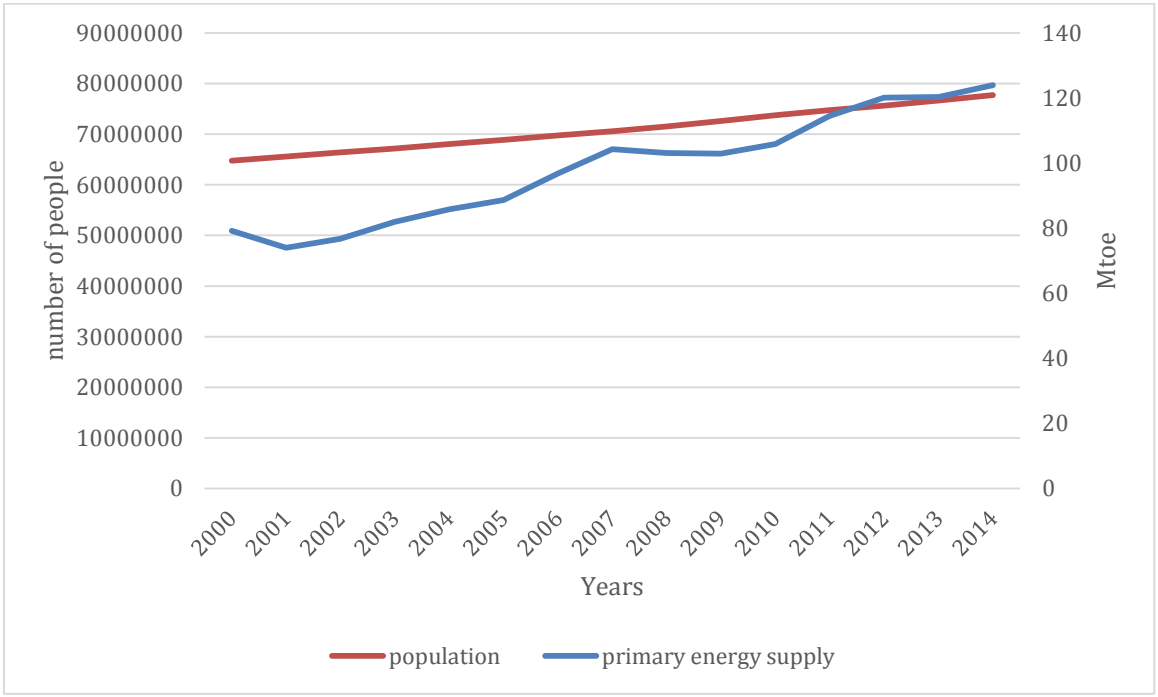


Source: Data from General Directorate of Energy Affairs of the Republic of Turkey, *Energy Balance Tables*, various years. Compiled and graphed by Dicle Korkmaz Temel.

1.2.2 Trends in energy demand and their relationship with GDP and other factors

As Figure 1.7 shows, Turkey's primary-energy supply and its population have both been steadily increasing. There are slight decreases in the primary-energy supply in 2001, 2008 and 2009, which could be related to the economic crisis. However, there is not to a direct relationship between primary-energy supply and population trends during these years. Despite a drop in Turkey's energy supply in 2001, the steady growth in population continued. Thus, drivers other than population (such as GDP) clearly influence primary-energy supply.

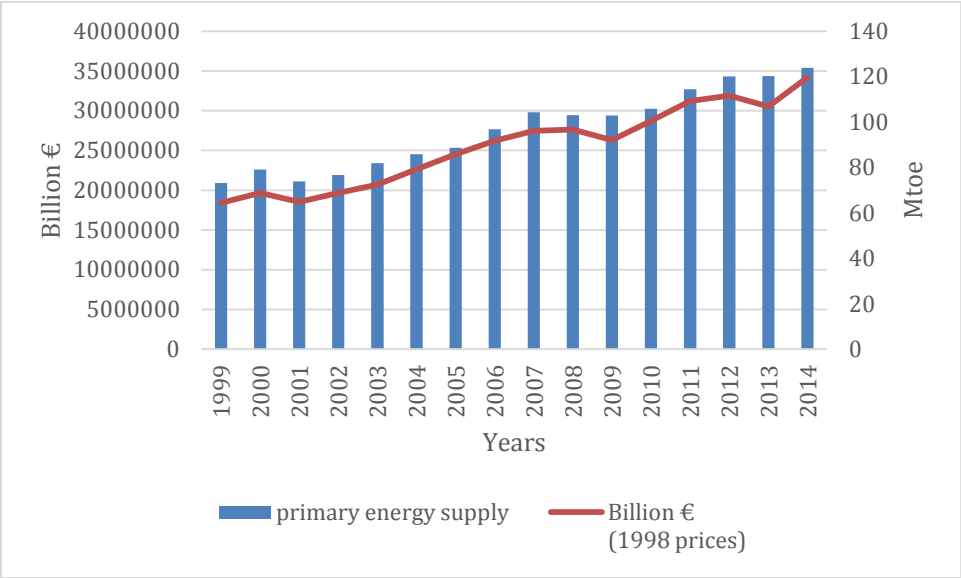
Figure 1.7 – Primary-energy supply and population in Turkey



Source: Data from the General Directorate of Energy Affairs of the Republic of Turkey, *Energy Balance Tables*, various years; Turkish Statistical Institute, 2017b. Compiled and graphed by Dicle Korkmaz Temel.

By contrast, there is a direct relationship between primary-energy supply and GDP. As Figure 1.8 shows, the two follow almost the same path. Both of them show drops in 2001 and 2009, and both increased steadily afterwards. There are two exceptions to this similar trajectory, in 2008 and 2013, though they are insignificant. Whereas there was a minor decrease in the primary energy supply in 2008, compared to 2007, there was an insignificant increase in GDP in the same year. Furthermore, there was a slight increase in primary-energy supply in 2013 while a drop occurred in GDP.

Figure 1.8 – Primary-energy supply and GDP in Turkey



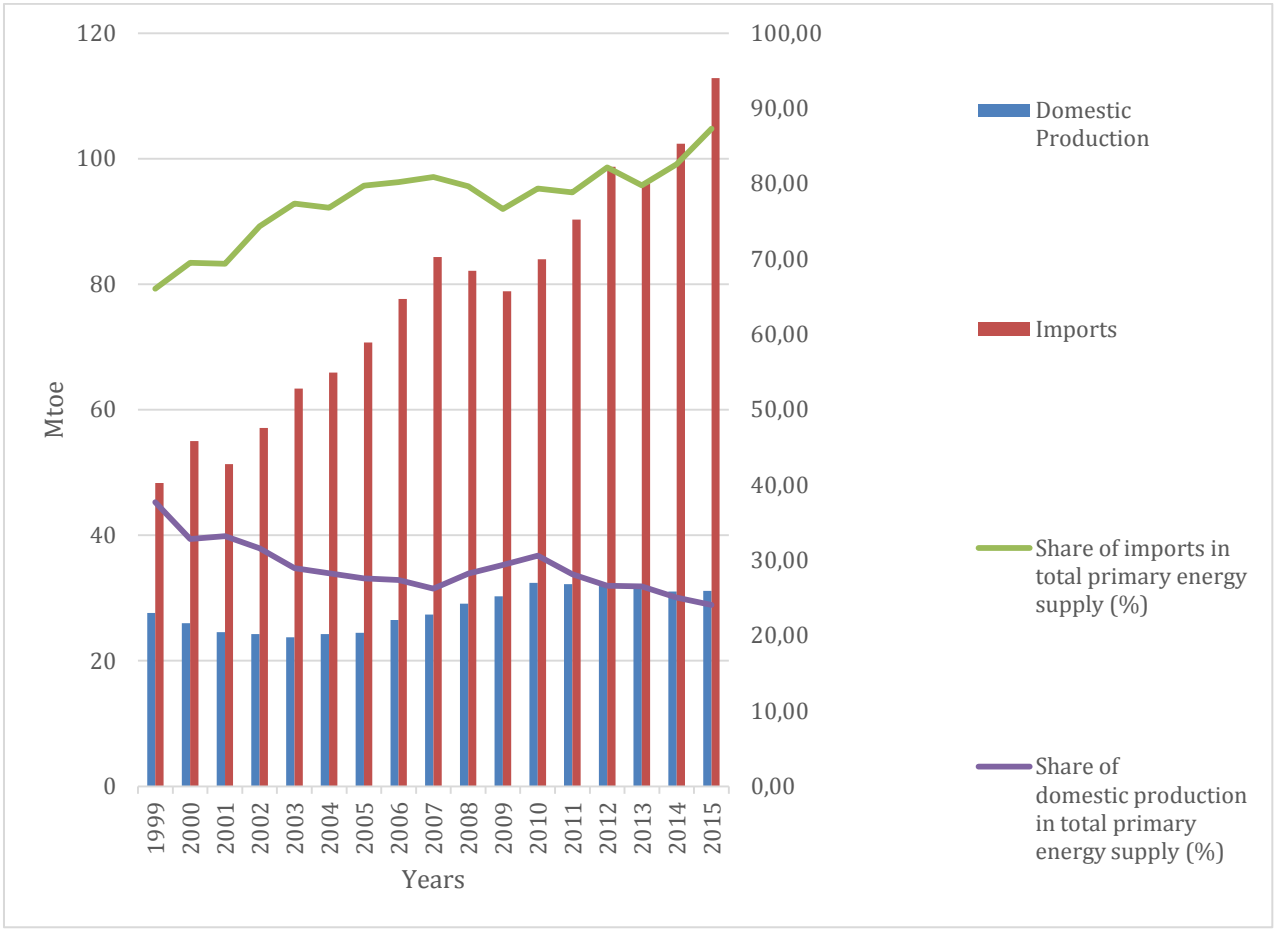
Source: Data from General Directorate of Energy Affairs of the Republic of Turkey, *Energy Balance Tables*; Turkish Ministry of Development, 2015: 9. (Converted to €, 1€ = Turkish lira - TRY 3.6862). Compiled and graphed by Dicle Korkmaz Temel.

1.2.3 The dynamics of energy mixes: production, imports and vulnerability

Being unable to meet its energy demand by means of indigenous production, Turkey has a high external dependency. Its share of import dependency was 75% in 2014 (Turkish Petroleum, 2016: 26). This outcome is mainly due to the dominance of oil, natural gas and imported coal in Turkey's primary-energy supply. However, it is also important to stress that demand growth is higher than the speed of resource development in Turkey. Indeed, the country has indigenous coal reserves and a large potential for renewable energy sources, a fact that will be elaborated upon in further subsections. Turkey's potential for the development of unconventional energy resources is a controversial topic due to uncertainties about reserves, the cost of drilling and environmental concerns (Gürbüz, 2015).

As shown by Figure 1.9, the share of domestic production in total primary-energy supply dropped from almost 38% in 1999 to 24% in 2015. In contrast, the share of energy imports increased from 66% in 1999 to 87% in 2015, which was the peak point, despite slight decreases in 2008, 2009, 2011 and 2013 (General Directorate of Energy Affairs of the Republic of Turkey, various years).

Figure 1.9 – Domestic production and imports in total primary-energy supply (Mtoe)

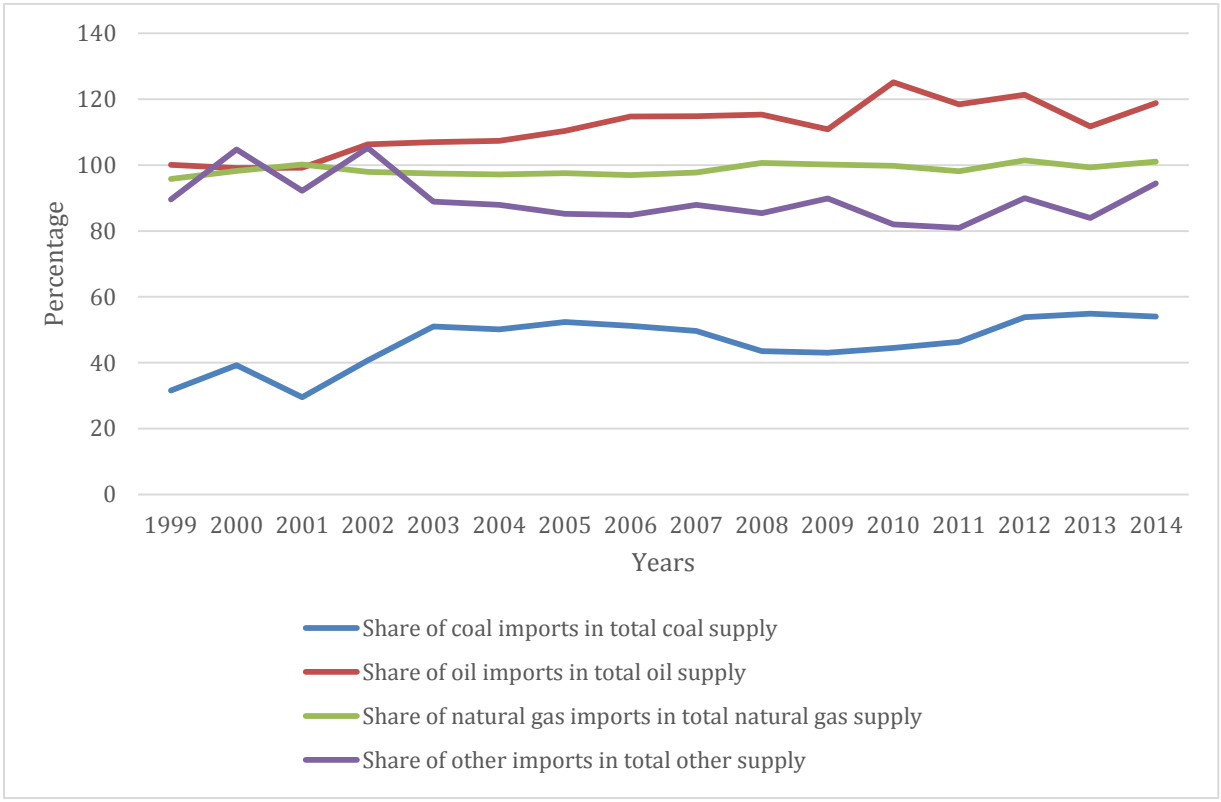


Source: Data from the General Directorate of Energy Affairs of Turkey, *Energy Balance Tables*, various years. Compiled, calculated and graphed by Dicle Korkmaz Temel.

Figure 1.10 shows import dependency for each energy resource. The share of imported coal in the total coal supply has risen from 31.55% in 1999 to 54.07% in 2014. Despite the lowest point in 2001 and slight decreases during 2008–11, there has been a steady increase in the amount of imported coal. The share of imports in total natural gas supply is, by contrast, constant and it covers almost all Turkish gas consumption. The share of asphaltite, petroleum coke and coke, classed as "other" in the figure, was also high, ranging between 81 and 105%[8] (General Directorate of Energy Affairs of Turkey, various years).

[8] Figures more than 100% show re-exports, stock change and international bunkers.

Figure 1.10 – Turkey's share of imports by source (%)

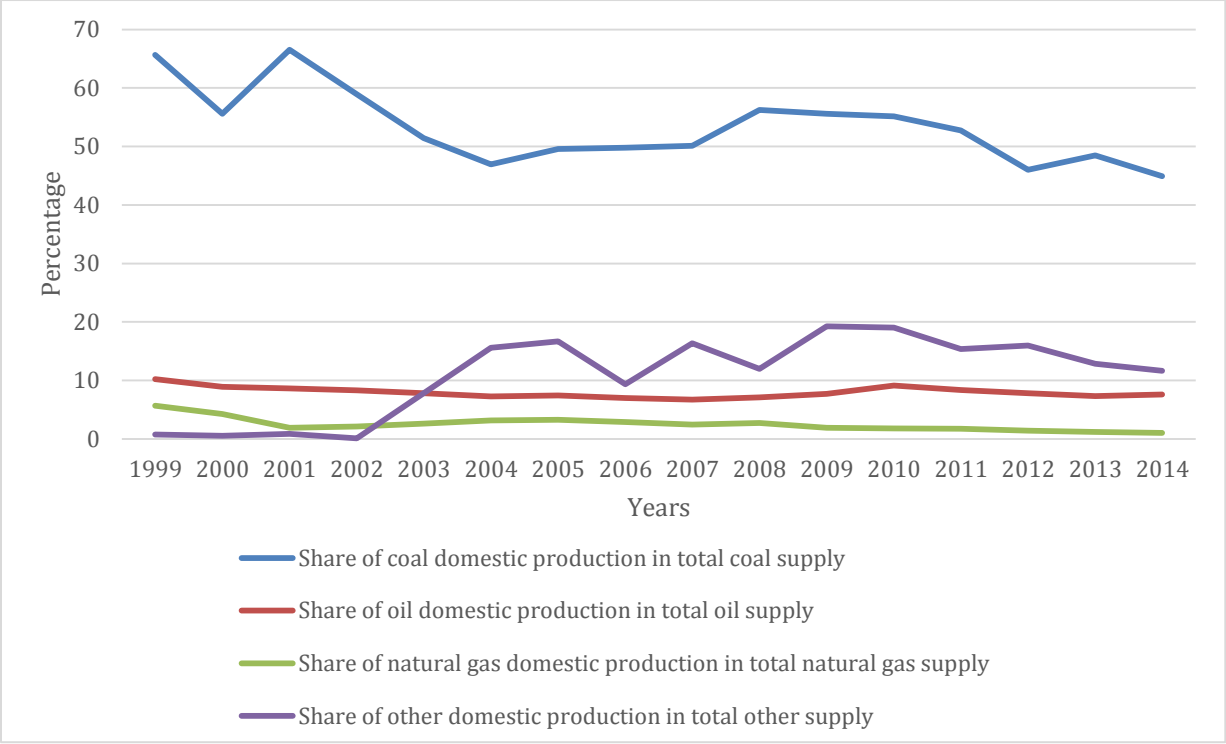


Source: Data from the General Directorate of Energy Affairs of the Republic of Turkey, *Energy Balance Tables*, various years. Compiled, calculated and graphed by Dicle Korkmaz Temel.

Figure 1.12 explains why import dependency is high in Turkey. The steady increase in imported coal shown in Figure 1.10 is due to a decrease in domestic production, as shown in the intervening Figure 1.11. The peak point in the domestic share of coal production was in 2001 with a proportion of 67%, and the lowest point was in 2014 with 45% (General Directorate of Energy Affairs of the Republic of Turkey, 2016). This decline was compensated for by imported coal. As of September 2016, lignite reserves amount to 12,716 million tonnes, of which 0.15% was produced in 2016. The figure for hard coal was 1,299 million tonnes, of which 0.05% was produced as of September 2016 (Ministry of Energy and Natural Resources of the Republic of Turkey, 2016b: 48). The framework is worse for natural gas, as domestic-production share accounted to 5.6% of total natural gas consumption in 1999, decreasing to 1% in 2014 (General Directorate of Energy Affairs of the Republic of Turkey, 2016). Turkey's estimated natural gas reserves are completely inadequate to meet the country's current demand. Indeed, as of August 2015, natural gas reserves amounted to approximately 19 bcm (Ministry of Energy and Natural Resources of the Republic of Turkey, n.d.) whereas consumption in 2015 was 48 bcm (EMRA, 2016b). The share of oil production in total oil supply has been quite steady, though the peak point was reached in 1999 with 10%. The only increase compared to 1999 has been in the domestic production of asphaltite, coke and petroleum coke in 2009 and 2010, which account

for a still limited 19% of total consumption (General Directorate of Energy Affairs of the Republic of Turkey, various years).

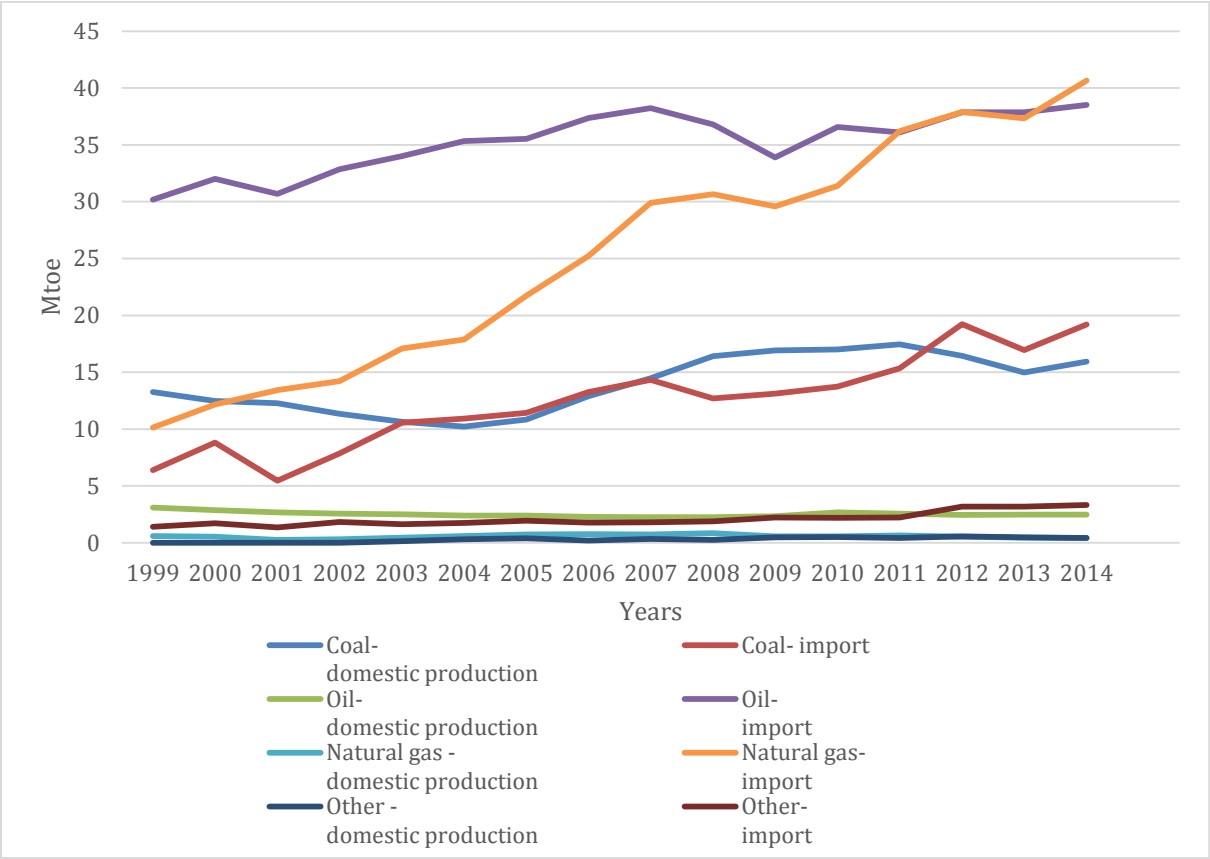
Figure 1.11 – Turkey's share of domestic production by source (%)



Source: Data from the General Directorate of Energy Affairs of the Republic of Turkey, *Energy Balance Tables*, various years. Compiled, calculated and graphed by Dicle Korkmaz Temel.

The striking point regarding coal is the fact that domestic production exceeded coal imports during 1999–2003 and 2007–11 (Figure 1.12). Starting from 2012, coal imports have surpassed domestic coal. As for natural gas, Figure 1.12 demonstrates that despite a slight decrease in 2009 there has been a steady growth in natural gas imports. Bearing in mind that Turkey imports almost all of its natural gas, as is shown in Figure 1.10, Figure 1.12 shows that the country's import dependency in natural gas has been constantly increasing. Similarly, there is a large gap between domestic oil production and oil imports.

Figure 1.12 – Turkey's domestic production and imports (Mtoe)



Source: Data from the General Directorate of Energy Affairs of the Republic of Turkey, *Energy Balance Tables*, various years. Compiled and graphed by Dicle Korkmaz Temel.

2 The EU and Turkey: mid- and long-term strategies

Common points between EU and Turkish energy strategies are limited, and convergence can be achieved only if key problems are solved. Indeed, despite natural gas being the most important sector in energy cooperation between the two, it is hampered by a lack of determination in the liberalization process on the Turkish side, and by a still unclear balance between EU policies on fossil fuels and its environmental commitments. In addition, the two polities are clearly diverging on climate policies, as the EU is likely to retain its global climate leadership while Turkey's involvement in the 2016 Paris Agreement is still significantly limited. Furthermore, even if the electricity sector presents an opportunity for positive cooperation between the two sides, unclear Turkish policies determining the future of its energy mix, mostly on nuclear and renewables, impact on the possibility of reaching a sustained cooperation with the EU in building generation capacity. This lack of clarity might be due, for instance, to the dominant role of Russia if Turkey were to develop nuclear energy to its declared level of ambition. The EU itself is not immune to uncertainty, as its climate commitments clash not only with natural gas-related ambitions but also with the still cumbersome presence of coal generation, hampering the reliability of its policies. Determining factors for convergence might be the success of the EU Energy Union, which would strengthen the overall solidity and the external dimension of the EU's energy policy, and a clear turn by Turkey towards a more sustainability-focused energy mix and a liberalised energy market.

2.1 The EU's mid- and long-term strategies

Since the 1990s, the EU has been actively promoting the integration of climate and energy policies in order to tackle environmental and energy-security challenges. The "triangle" of EU energy and climate policy goals – namely (1) energy security, (2) affordability and competitiveness, and (3) emission reduction – describes the guiding framework for the Union's long-term strategies and actions. Methods to achieve these three objectives include: building a European infrastructure of interconnectors and diversifying energy supply; enhancing competitiveness through a functioning internal market; and reducing CO_2 emissions and increasing energy efficiency. The "Energy Security Strategy" summarized its goals thus: "In the long term, the Union's energy security is inseparable from and significantly fostered by its need to move to a competitive, low-carbon economy which reduces the use of imported fossil fuels" (European Commission, 2014a: 3).

However, keeping the triangle of energy and climate policy in balance has proved to be difficult. In 2008–9, when the policy goals for 2020 were set, the emphasis was on emission reduction. However, with the increasing costs of renewables subsidies and worries about high energy costs, the issue of competitiveness came to dominate the debate (Buchan, 2014). Finally, the Russia–Ukraine crises in 2006, 2009 and 2014, and an increasing energy-dependency trend (see section

1.1.3), brought the issue of security of supply back to the top of the agenda, as roughly 15% of EU gas imports arrive through Ukraine.

In February 2015, partly in response to the Russian threat to EU gas supplies, the European Commission published a communication on the Energy Union Package entitled "A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy" (European Commission, 2015b), in order to promote a more collaborative approach to European energy and climate policy and thereby to coordinate the transformation of European energy supply. The Energy Union's approach is based on the three aforementioned, long-established objectives: security of supply, competitiveness and sustainability. In order to achieve these goals, five mutually reinforcing and closely interrelated dimensions were set out: energy security, the integrated internal energy market, energy efficiency, climate action, and research and development. Since its launch two years ago, views and national interests regarding the Energy Union's goal have often diverged. While some member states – particularly in the east of the EU, where countries are almost fully dependent on Russian gas supplies – emphasize its energy-security dimension, others highlight the energy transition towards a low-carbon economy. This is hardly surprising, as the EU has always been split over long-standing questions such as those about its huge dependence on external suppliers for natural gas, and the role of nuclear power. These debates manifest themselves in national energy mixes, which sometimes lead to contradictory results. For instance, when Germany decided to phase out nuclear power it experienced a rise in coal consumption and in its dependence on Russian gas supplies. As a consequence, Germany has been struggling to keep its greenhouse gas (GHG) emissions in check (Appunn, 2017).[9]

Nevertheless, the Commission has started to translate its vision into initiatives – both legislative and non-legislative. The February 2016 "Security of Supply Regulation" (European Commission 2016f) proposed a shift from a national approach in guaranteeing security of supply to a more regional approach by introducing a solidarity principle, according to which, as a last resort, neighbouring countries would help to ensure gas supplies in severe crises. Following this, on 30 November 2016, the Commission proposed a new legislative package entitled "Clean Energy for All Europeans" (European Commission 2016a), the so-called second "winter package", which is now up for negotiation. This proposal goes well beyond the previous three energy legislative packages by amending and extending to 2030 legislation on energy efficiency and renewable energy. The package deals mainly with electricity, tackling the design of the electricity market and proposing new governance rules for the Energy Union.

[9] Germany had achieved a reduction of 27.2% in 2015, which needs to be confronted to its national GHG reduction target of 40% by 2020 (compared to 1990 levels). Latest projections even estimated that energy-related CO_2 emissions rose in 2016 by 0.9% compared to 2015 (AG Energiebilanzen, 2016).

2.1.1 Energy-market liberalization processes in the EU

In order to achieve competitiveness through a functioning internal market, the liberalization of electricity and gas markets has constituted "a core element of the EU's agenda" (Schubert et al., 2016: 149), and consists of three legislative packages (known as Energy Packages).

As early as 1988, the European Commission suggested concrete measures to liberalize electricity and natural gas markets. In February 1997 and August 1998, two directives came into force that laid the groundwork for a gradual liberalization of both sectors: Directive 96/92/EC on electricity and Directive 98/30/EC on natural gas, respectively. This legislation focused on grid inter-operability, unbundling and transparency of accounting, third-party access and the establishment of an independent conciliation board. It was replaced by a second legislative package in 2003, which set common rules for internal markets in electricity and natural gas (Directive 2003/54/EC and 2003/55/EC). This enabled new gas and electricity suppliers to enter member states' markets, and consumers to choose their own suppliers. In April 2009, a third legislative package, aiming at further liberalizing the internal electricity (2009/72/EC) and natural gas (2009/73/EC) markets, was adopted by amending the second package. It intended to:

- regulate transmission-network ownership by ensuring a clear separation of supply and production activities from network operation;
- ensure more effective regulatory oversight by independent national energy regulators;
- reinforce consumer protection and ensure the safeguarding of vulnerable consumers;
- regulate third-party access to gas storage and LNG facilities, and lay down rules concerning transparency and regular reporting about gas reserves;
- promote regional solidarity by requiring member states to cooperate in the event of severe disruptions of gas supply, by coordinating national emergency measures and developing gas interconnections.

There is still a long way to go to achieve a fully integrated market. Domestic-market characteristics and prices vary between states. For instance, in the electricity sector the EU operates 28 grids instead of one Union-wide grid linking suppliers and consumers. In contrast to what was expected by the European Commission, electricity prices have increased over the last 20 years. With a view to the gas market, the Ukraine–Russia crisis especially drew public and political attention to the urgent need for modernizing and investing in cross-border infrastructure.

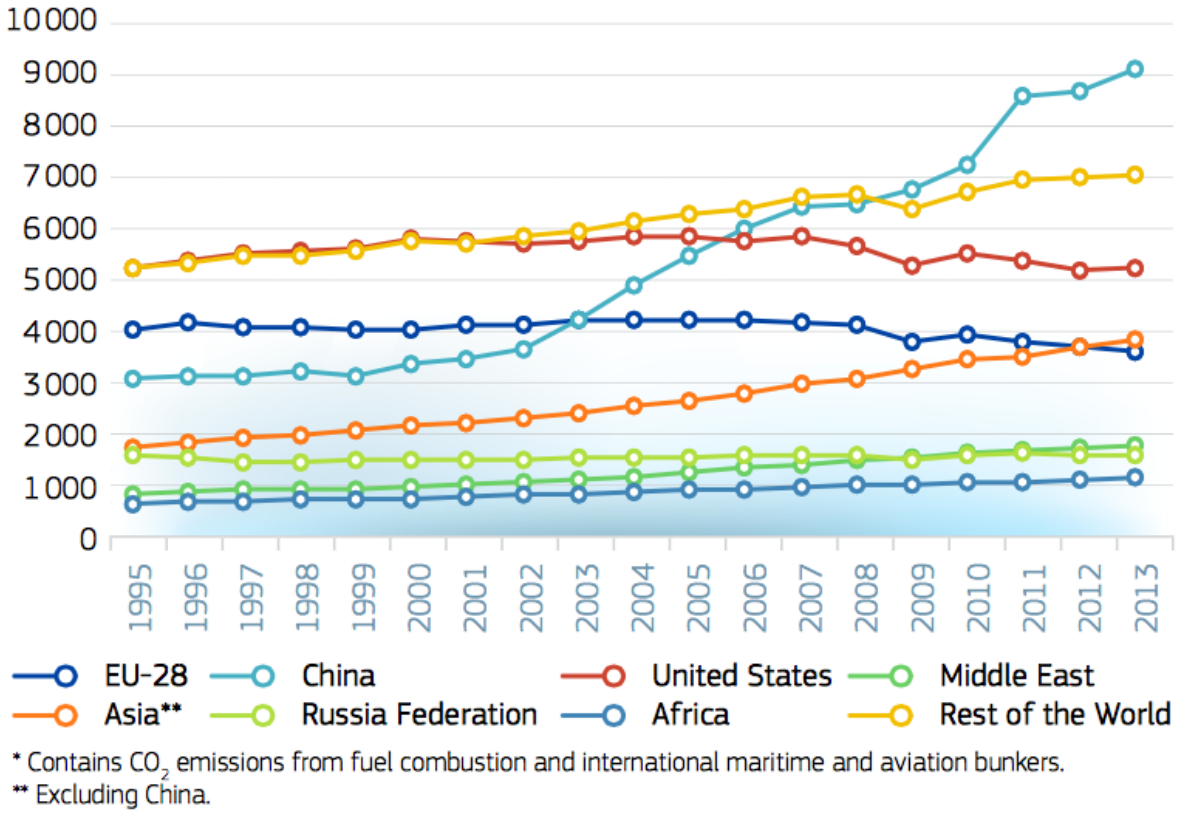
2.1.2 Decarbonization policies and the path after the Paris Agreement

Parallel to its approach on competitiveness, the European Commission uses environmental legislation to drive its energy policy. Since adopting the United Nations Framework Convention

on Climate Change (UNFCCC) in the late 1990s, the EU has struggled to achieve emission-reduction goals whilst maintaining industrial growth. Today, the European Union perceives itself as a leader on international climate policy. According to the Directorate-General for Climate Action, the EU has been a driving force in international negotiations on climate change, which contributed significantly to the new global climate agreement. In this context, at the 2015 Climate Change Conference in Paris, Europe committed itself to contributing to limiting the global rise in temperature to only 1.5 degrees Celsius. To achieve its decarbonization objectives, the EU has formulated legally binding targets for 2020 and 2030 and supplementary goals for 2050 – designed, however, on the basis of a 2-degree reduction target.

Following its downward trend, Europe accounted for 3,607 million metric tonnes of carbon dioxide, representing a 10.8% share of the world's emissions in 2013, which totalled 33,398 million tonnes of CO_2 (including CO_2 emissions from fuel combustion and international maritime and aviation bunker fuels). For comparison, the US totalled 5,234 million metric tonnes (15.7%) while China produced 9,114 million metric tonnes (27.4%) (see Figure 2.1).

Figure 2.1 – World CO_2 Emissions by Region, 1995–2013 (in million metric tonne CO_2)



Source: European Commission, 2016c: 18.

The "Trends and projections in Europe 2016" report (EEA, 2016) reveals that GHG emissions in Europe decreased by 23% between 1990 and 2014, and reached the lowest levels on record. The

report projects that, on current trends, EU emissions cuts will slow to 24% in 2020 and 27% in 2030.

Despite extensive EU regulations and proclamations, Europe's carbon emissions actually increased in 2014–15. In 2015, GHG emissions in the European Union were 22% below their 1990 level. The official report by the European Commission (2017: 4) tends to treat this as a slight backward trend in 2015, by looking at the overall emissions decline since the 1990s. But if one removes the impact of the decline of industrial and power sectors in Eastern Europe following the fall of the Communist regimes (so-called "wall-fall profits"), which meant automatic CO_2 reductions, it is questionable whether the EU's renewable energy and climate policy has been effective in cutting GHG emissions.

The actual impact of EU targets, such as the reduction goal of at least 20% in GHG emissions compared with 1990 levels by 2020 (see below), remains open for debate. The European Environment Agency (EEA) attributes the overall emissions drop to a combination of factors – economic cycles, the downsizing of the global economy, climate policies, measures to tackle fluorinated gases, and mild winters that have reduced demand for energy and heat. These findings have led the European Parliament to debate the utility of the EU Emissions Trading System (EU-ETS), which has attempted to use market mechanisms to lower carbon emissions.

Set up in 2005, with the objective of supporting the Union's obligations under the Kyoto Protocol, the EU Emission Trading Scheme is the EU's key tool for reducing GHG emissions cost-effectively. It remains the largest multi-sector example of emissions trading in operation today, encompassing more than 11,000 installations (power stations and industrial plants) across 31 countries[10] and covering approximately 45% of total EU GHG emissions. The system works by putting a limit on overall emissions from covered installations, which is then reduced each year. Within this limit, companies can buy and sell emission allowances as needed.[11] While this "cap-and-trade" approach was inaugurated as an innovative tool that gives companies the flexibility they need to cut their emissions in the most cost-effective way, it faced serious obstacles – the most important of which was a lack of harmonized standards across the member states. This led to miscalculations, price volatility and a market collapse (Schubert et al., 2016: 192). Over-allocation of allowances led to inevitable price crashes and large windfall profits from generous free allocation. Because annual allocations were determined before the economic crisis, which reduced emissions more than anticipated, this, together with high imports of international credits, resulted in a large surplus of allowances. This situation has led to lower carbon prices, and thus weakened incentives to reduce emissions. The Commission is optimistic that from January 2019 onwards, a market-stability reserve will improve the system's resilience to major shocks by adjusting the supply of allowances to be auctioned. Still, the real impact of the ETS in

[10] All 28 EU member states plus Iceland, Liechtenstein and Norway.
[11] For a detailed overview, see European Commission (2016b).

reducing GHG emissions is subject to debate. For example, only a few of the EU's member states are on course to meet their own national targets (Schubert et al., 2016: 21).

2.1.3 The integration and development of renewables in the EU

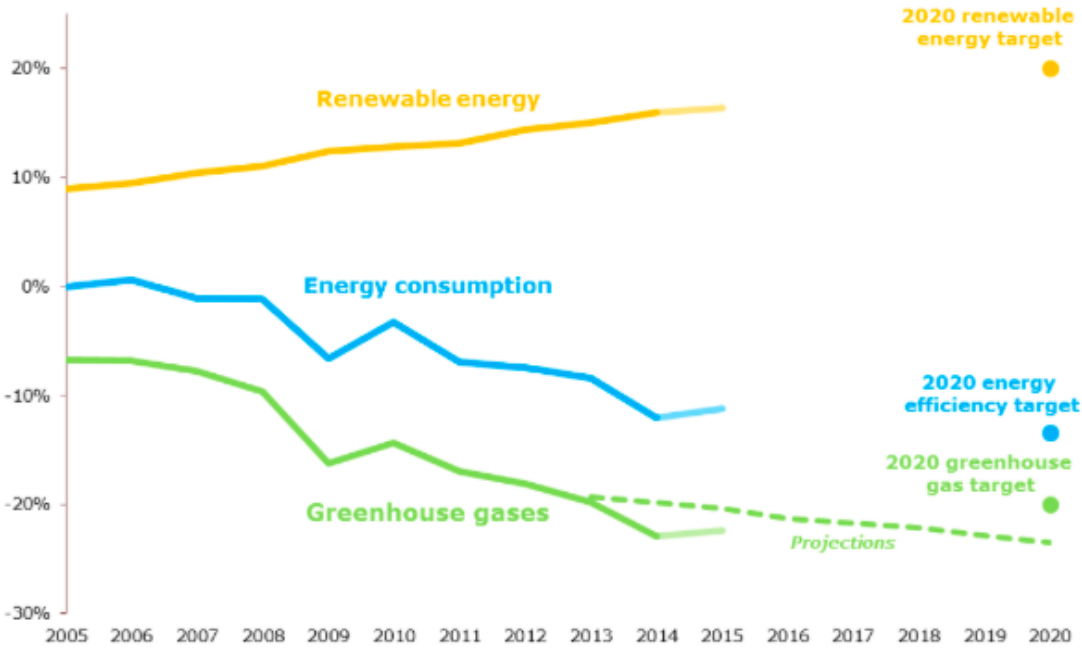
One of the first EU initiatives in the renewables domain was the 1997 White Paper (European Commission, 1997), by which Brussels set itself a non-binding target of generating 12% of gross inland energy consumption from renewable sources by 2010. By doing so, the Commission laid the basis for a cause–effect policy model that led to multiple rounds of increasing renewable targets. The current policy agenda is driven by the integrated "2020 climate and energy package", enacted in legislation in 2009,[12] which sets out binding legislation to achieve the following "20-20-20" targets by 2020 (see also Figure 2.2):

- a reduction of at least 20% in GHG emissions compared with 1990 levels;
- an increase to 20% of the share of renewable energies in energy consumption, and the share of biofuels in transport to a binding minimum target of 10%;
- an improvement of 20% in energy efficiency.

The Directive has changed the legal framework for promoting renewable electricity. It sets two mandatory goals: renewable energy should supply 20% of the EU's gross final consumption by 2020, and each member state is required to significantly increase renewables in its energy mix.

[12] Directive 2009/29/EC, Directive 2009/28/EC, Directive 2009/31/EC and Decision No. 406/2009/EC of the Parliament and the Council.

Figure 2.2 – EU progress towards 2020 climate and energy targets



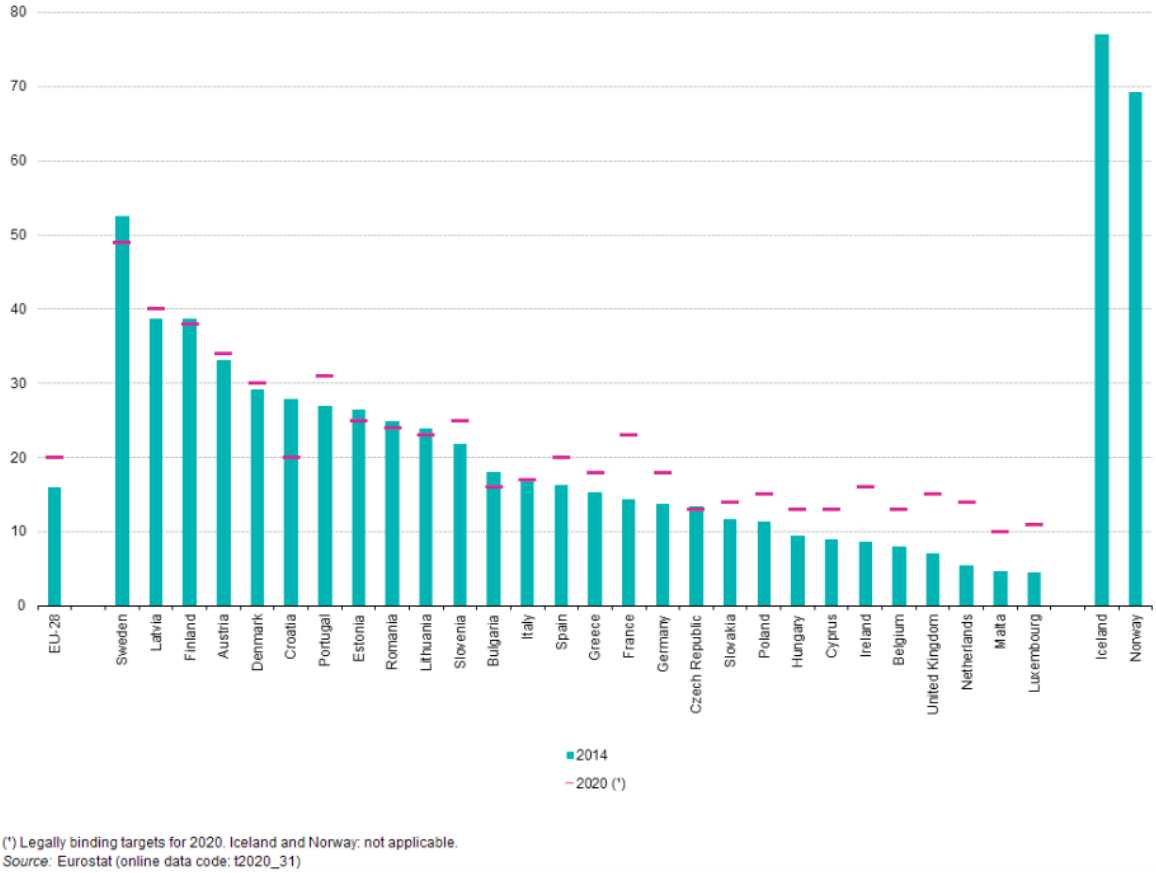
Source: EEA, 2016: 9.

Therefore, the EU member states have committed themselves to adopting national action plans indicating the measures intended to realize these goals. The national targets will enable the EU as a whole to reach its 20% renewable-energy target for 2020. In 2014, the share of renewables stood at 16%.

Even though the majority of member states are expected to meet or exceed their 2020 renewable-energy targets[13] (see Figure 2.3), most of the emission savings up to 2020 will not come from an increased use of renewables, given the current state of technology, the efficiency of conversion processes and the limited availability of reliable renewable options. As long as member states retain sovereignty over their energy mixes, it is usually the market that drives decisions over national energy mixes.

[13] According to the Commission's (2015c) *Renewable Energy Progress Report 2015*, France, Luxembourg, Malta, the Netherlands and the UK probably will not meet their renewable energy objectives. Achievement of the 2020 renewable energy targets is also not certain in the case of Belgium, Spain, Hungary and Poland: it is only under optimistic assumptions related to the future development of energy demand and country-specific financing conditions that the 2020 renewable energy targets appear achievable.

Figure 2.3 – Share of renewables in gross final energy consumption, 2014 and 2020 (%)



(*) Legally binding targets for 2020. Iceland and Norway: not applicable.
Source: Eurostat (online data code: t2020_31)

Source: Eurostat, *Statistics Explained: Renewable Energy Statistics*, http://ec.europa.eu/eurostat/statistics-explained/index.php/Renewable_energy_statistics.

Among renewable energies, the most important source was solid biofuels and renewable waste, with 63.1% of primary renewables production, followed by hydropower (16.5%) and wind energy (11.1%). Even though their shares are relatively small, both solar (6.1%) and geothermal energy (3.2%) experienced a rapid expansion. However, wind and solar power face challenges that have made their deployment slower than initially expected. Hence, despite progress in some areas, the overall trends in the renewable sector must be assessed cautiously because of economic crises, administrative and infrastructural barriers, policy shifts and the huge scale of investment needed (Schubert et al., 2016: 178).

Already in 2011, different long-term scenarios were described in the Commission's (2011) communication *Energy Roadmap 2050*. In order to achieve a transition to a low-carbon economy by 2050, the Commission suggested that, without further intervention, growth in renewable energy might fall after 2020 due to higher costs and other barriers facing renewable energies as compared with fossil fuels. "To achieve our longer-term goals for 2030 and 2050, a fundamental

change is needed in the way we produce and use energy in Europe", said the EEA's director, Hans Bruyninckx (European Commission 2015a).

For the period up to 2030, the European Council in October 2014 adopted the 2030 Framework for European climate and energy policies (European Commission, 2014b), a new structure based on the 2020 framework. This foresees a binding target for an internal EU reduction in GHG emissions of at least 40% by 2030[14] as compared with 1990 levels, a share of renewable energies (at the EU level) of at least 27% of energy consumption by 2030 and an indicative energy-efficiency target of at least 27% in energy savings by 2030. The Commission's second "winter package" (European Commission 2016a) now proposes a 30% energy-savings target by 2030, instead of the original 27%, in order to step up its efforts to limit GHG emissions in line with the Paris Agreement. While the EEA recognizes the ambition of this objective, it also points out that it will already be challenging to achieve the new 2030 goals. In any case, even if these targets are achieved European countries will still have to double or even triple their emissions-cutting efforts after 2030 in order to get onto a path that could limit global warming to 2 degrees Celsius by mid-century.

2.1.4 The role of coal and gas generation

According to the IEA's "Coal Information", world coal production fell in 2015 by 221 million tonnes, which is the largest decline in absolute terms since the beginning of IEA records in 1971. Coal, by far the most CO_2-intensive of all the primary-energy sources, continues to be primarily used for the generation of electricity and commercial heat, with 65.5% of primary coal being used for this purpose globally in 2014, and 83.2% in Organization for Economic Co-operation and Development (OECD) countries (IEA, 2016b).

Within the EU, the production of derived heat from coal continued its long-term decreasing trend, diminishing by 56% since 1990. Nevertheless, a continued concentration of carbon-rich fuels in the EU's energy mix can be still observed today. Indeed, some member states, such as Germany – among the largest coal producers along with Poland and the UK, but also one of the most pro-environmental countries – continue to rely heavily on coal. Overall, coal-fired power stations account for 17% of GHG emissions in the EU. Reducing reliance on coal and oil, and switching to natural gas for electricity and heat generation, needs to be a key element of its approach if the EU wants to meet its long-term climate policy objectives for 2050.

However, while in 2010 gas and coal accounted for an equal share of electricity generation –

[14] The GHG reduction target of 40% in 2030 originates from the Commission's 2050 low carbon roadmap that aims at 80% GHG reduction in 2050. In the UN Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report it was showed that in order to keep temperature rise between 2-2.4 degrees Celsius, industrialized countries will need to reduce emissions by 80-95% (IPCC 2007).

24% each – due to the relatively low coal price, conventional coal-fired power stations (of which three quarters belong to a generation of plant more than 30 years old) had at that time been running at full capacity. By 2014, gas had decreased to a 17% share, while coal increased to 27%. Even though a recovery in gas demand is projected, and a slight upturn has already been observed for 2015, it is unlikely that a fuel switch from coal to gas will happen without a strong carbon-pricing programme or policies targeting the phasing-out of coal (Genoese et al., 2016).

2.2 The Turkish mid- and long-term strategies

Similar to the EU, Turkey's energy security is based on the principles of security of supply, competitiveness and sustainability. Turkey met 25% of its energy demand by domestic resources in 2014 (Turkish Petroleum, 2016: 25). Due to high import dependency, the primary aim in energy policy is to secure supplies. Within this context, diversification of energy resources, establishing a competitive market, exploiting indigenous resources, increasing share of renewables, ensuring sustainability, increasing energy efficiency are considered priorities. Furthermore, maintaining electricity interconnections with neighboring countries, including nuclear energy to Turkey's energy mix, establishing an energy hub by using geopolitical location and reducing current deficit by decreasing energy imports are also mentioned (Ministry of Energy and Natural Resources of the Republic of Turkey, 2016b: 2017 yili bütçe sunumu, Ankara).

Turkey aims to increase the share of coal from 26% to 37% while it foresees decreases in the shares of oil from 28% to 26% and natural gas from 31% to 23 % in 2023 (Ministry of Energy and Natural Resources of the Republic of Turkey, 2016a: 13). This shows that coal is expected to be the dominant energy resource in the primary energy supply and replace natural gas in 2023. Although this target is in harmony with the aim to exploit domestic resources, it is in contradiction with the goal to ensure sustainability.

The shares of hydro in primary energy supply is expected to reach 4% in 2023, and other renewables 6% (Ministry of Energy and Natural Resources of the Republic of Turkey, 2016a: 13). Bearing in mind that the shares of hydro and non-hydro renewables in 2015 were 4 % and 7%, it seems that even a decrease in the share of non-hydro renewables is foreseen whereas the share of hydro is expected to remain the same. This shows that ongoing investments on renewable energy are not sufficient to increase the share of renewables in total primary energy supply and consolidates the continuation of dominance of fossil fuels.

The next sections not only examine the extents of which Turkey liberalizes its natural gas and electricity markets and pursues decarbonization policies, but also elaborates the situations in hydro, non-hydro renewables, nuclear energy and role of coal and gas in electricity generation.

2.2.1 Energy-market liberalization processes in Turkey

Natural Gas

The liberalization of Turkish natural gas markets started in 2001. This was a precondition of Turkey obtaining International Monetary Fund (IMF) credits, which were needed to overcome the effects of the economic crisis then afflicting the country. The Natural Gas Law terminated the monopoly of state-owned provider BOTAŞ, and authorized the country's Energy Market Regulatory Authority (EMRA) to grant licences for market activities. Although a draft law amending the Natural Gas Law was sent to the country's Grand National Assembly in August 2014, it has not been discussed as of the beginning of 2017.

The pace of liberalization in the Turkish natural gas market has been slow, as the current situation regarding unbundling, concentration in the market, market opening and pricing mechanisms show. Transmission and trade are not separated in Turkey despite the provisions in the Natural Gas Law, while BOTAŞ – as of the beginning of 2017 – still has to address unbundling requirements. The company operates the gas network and one LNG terminal, and has investments in gas-storage facilities and the Trans Anatolian Natural Gas Pipeline (TANAP), which aims to transport 16 bcm of Azeri gas to Turkey and Europe. BOTAŞ has a market share of 84% in natural gas supplies, and dominates wholesale trade and supplies to distribution companies (EMRA, 2016b: 9, 20). The Natural Gas Law foresees import restrictions on BOTAŞ and private companies, which hamper the establishment of a competitive market. Although market opening has been in place for all non-household customers since 2013, the number of eligible consumers in 2015 stood at only around 484,000 out of approximately 11,640,000 Turkish customers (EMRA, 2016b: 35) due to the large number of households among those consumers.

Despite formal market opening, the pricing mechanism managed by BOTAŞ creates a barrier to establishing a competitive market. Although the wholesale gas price is determined by the seller and the buyer, BOTAŞ' prices are considered a benchmark by other wholesale companies (Soysal et al., 2012: 116; PwC, 2014: 8, World Bank, 2015: 141). BOTAŞ maintains cross-subsidization, as it sells cheaper gas to distribution companies, eligible consumers and non-state power plants, and expensive gas to both state-owned power plants and to build-operate-transfer power plants (World Bank, 2015: 142).[15] The provision for distribution companies to purchase at the lowest price thus forces them to buy from BOTAŞ, which supplies the cheapest gas. Through this practice, the state policy of supplying subsidized gas to households is successfully achieved. This pricing mechanism has a negative impact on BOTAŞ' financial position, hampers LNG access and dissuades potential investors due to uncertainties and low profit prospects (Soysal et al., 2012: 126). Turkey does not have day-ahead or secondary gas markets; nor does it operate a full entry–exit system, which necessitates different prices at each entry and exit point. In addition, its balancing regime is insufficient, as the balancing gas price is determined *ex ante*.

Infrastructural problems remain regarding the Electronic Bulletin Board, which is the tool for managing capacity allocation and balancing, and SCADA (Supervisory Control and Data Acquisition).[16] Such difficulties also occur with regard to physical capacity. Maximum capacity for the entry point is 196.5 million cubic metres per day (mcm/d), whereas in cold winters the demand can reach up to 230 mcm/d (IEA, 2016a: 11). Furthermore, east–west transportation capacity experiences shortages due to a lack of compressor stations. Moreover, the annual

[15] Build–operate–transfer is a form of project financing, wherein a private entity receives a concession from the private or public sector to finance, design, construct, and operate a facility stated in the concession contract.

[16] SCADA helps to monitor the pipelines. "SCADA systems provide monitoring staff the ability to direct and control pipeline flows, maintaining pipeline integrity and pressures as natural gas is received and delivered along numerous points on the system, including flows into and out of storage facilities" (Itteilag, 2012:46).

storage capacity in 2015 was 2.661 bcm whereas consumption in the same year was 48 bcm (EMRA, 2016b: 51).

One of the main differences between the EU's and Turkey's legislation is that whereas the EU considers transit pipelines as equal to transmission, thus enabling third-party access, Turkey does not perceive transit as a market activity under the Natural Gas Law or the Draft Law. Rather, the country's Transit Law aims to regulate the rules and procedures concerning the transit of oil and natural gas through pipelines. The Transit Law does not establish a transit regime, and thus does not enable third-party access. The transit issue is decided afresh in each intergovernmental agreement. The country's Ministry of Energy and the Ministry of Customs and Trade, the latter in case of emergency and necessity for the country's interests, are the competent authorities to execute agreements related to transit-pipeline projects. The approach of the Justice and Development Party (AKP), which has been in power since 2002, shows that not only the state company but also private firms can be responsible for transit-pipeline projects as long as the government retains the power to decide on the company; no tender was published in the case of either Samsun–Ceyhan Oil Pipeline project or the Iran–Turkey–Europe Gas Pipeline project (Korkmaz-Temel, 2016: 199-200).

Bearing all these factors in mind, we are far from being able to claim that Turkey has a liberal natural gas market. The Competition Authority argues that the Natural Gas Law, dated 2001, is not an efficient tool for establishing a competitive market since the law foresees regulations for "developed" or "mature" markets while the Turkish natural gas market is still at the stage of growth, due to increasing gas demand from power plants. Within this context, the Authority claims that the main problem in the liberalization process is the lack of a competition culture within the state company, BOTAŞ (Soysal et al., 2012: 24, 49, 140).

Domestic discussions on the liberalization of the country's natural gas market revolves around the question of to what extent Turkey needs to liberalize. Within this context, discussions are dominated by key issues such as the scope of the public service, the extent to which the state should be a player in the natural gas market, the necessity of having a vertically integrated body in the market and how to restructure the state company (Korkmaz-Temel, 2016: 179).

Electricity

Liberalization in electricity has progressed much further than in the case of natural gas, bearing in mind the levels of unbundling, market openness and wholesale-market provisions required. Competitive and regulated market activities are unbundled. The transmission operator is the Turkish Electricity Transmission Company (TEIAŞ), a state-owned company which owns and operates all transmission assets. In the generation segment, Turkey's Electricity Generation

Company (EÜAŞ) operates along with private generators[17] and auto-producers.[18] EÜAŞ is controlled by the government and holds state-owned assets, mainly hydro and thermal power plants. Finally, in the distribution segment, the operations of the Turkish Electricity Distribution Company (TEDAŞ) have been divided between 21 regions: the privatization process is complete, with distribution companies now legally unbundled. The eligibility threshold has been decreasing since 2003. While this was 9,000 megawatt hours (MWh) per year in 2003, it was reduced to 3.6 MWh per year in 2016. This means that all consumers with a consumption above this threshold have the right to choose their own supplier. Although the ultimate aim is to reduce the threshold to zero in order to increase customers' mobility, the proportion of consumers changing their suppliers was below 5% in 2016 (European Commission, 2016g: 55).

A formal electricity wholesale market has been in operation since 2015. Energy Exchange Istanbul (EPIAŞ) is the new operator of this concern, which includes a day-ahead market and an intraday market. Both TEIAŞ and the Istanbul Stock Exchange hold 30% of EPIAŞ, while the remaining 40% is shared among market participants. The expectation was that EPIAŞ would increase liquidity and the availability of derivative instruments, which would be traded on the Istanbul Stock Exchange. However, only approximately 30% of the electricity is traded in this market. The remaining trade occurs via bilateral legacy contracts, which are handled by the state company, Turkish Electricity Trading and Contracting Corporation (TETAŞ) (World Bank, 2015). TETAŞ purchases electricity generated by EÜAŞ and private wholesale companies with which the state has a purchasing-guarantee contract.

Despite the actual progress in the sector, further challenges remain. For instance, there is no cost-based pricing mechanism in the electricity market, while cross-subsidies still exist between regions as there is a single national tariff. The March 2015 blackout,[19] which lasted ten hours, exemplified the shortcomings of an electricity-transmission network in which imbalances between hydro power plants in the east and consumers in the west of the country need to be better managed. Transmission and distribution losses are among the infrastructural problems that have a negative impact on energy efficiency in Turkey. Furthermore, the high share of natural gas in electricity generation causes problems in cases of gas-supply interruptions and shortages, bearing in mind the country's insufficient storage facilities.

The liberalization of Turkey's electricity market has been criticized by some stakeholders. Domestic discussions question to what extent the Energy Market Regulatory Authority's

[17] Private generators are independent private producers and private companies with build-operate-transfer (BOT), build-own-operate (BOO) and transfer of operating rights (TOOR) contracts. The second group occurred as a result of the privatization policy during 1980 s and 1990s. While the state continued to own the power plant in a TOOR contract, it was transferred to the state at the end of the contract in BOT contract. BOO contract refers to full privatization but with a power purchasing guarantee by the state (IEA, 2016a: 136-137).

[18] Auto-producers produce electiricty for their own needs.

[19] March 2015 blackout was a national power outage, except the city of Van, which supplies its gas from Iran. The blackout did not have any effect on neighbours.

licensing policy contributes to securing electricity supplies and whether the liberalization policy has allowed the dominance of some private groups in the electricity market, as their market shares in distribution, production and wholesale segments have increased (TMMOB, 2016).

2.2.2 Decarbonization policies and the path after the Paris Agreement

Turkey has been a party to the UNFCCC since 2004, and to the Kyoto Protocol since 2009. In 2015, the country set its first GHG emission-reduction target for 2030. Accordingly, Turkey aims at a 21% reduction in GHG emissions from the "business as usual" scenario by 2030 (Ministry of Energy and Natural Resources of the Republic of Turkey, 2012b), and energy represents the largest share of any factor in total GHG emissions (72.5% in 2014) (IEA, 2016a: 11, 16). The GHG emission-reduction policies in the context of Turkey's energy policy would include increasing capacity in the production of electricity from solar power to 10 GWh and from wind power to 16 GWh until 2030. It would also mean utilizing the country's full hydroelectric potential, commissioning at least one nuclear power plant, reducing electricity transmission losses to 15% of their current total, rehabilitating public electricity-generation power plants, and establishing on-site micro-generation and co-generation systems and production capabilities. Bearing in mind that Turkish policies on climate change were previously based on denying the country's climate responsibilities during the 1990s and 2000s and refusing to declare a target after the year 2009, the goal of a 21% reduction is a significant achievement. However, this target has been considered "inadequate" as it does not enable Turkey to make a fair contribution towards keeping global warming below 2 degrees Celsius (Climate Transparency, 2015: 99). It is argued that the reduction target is based on an unrealistic "business-as-usual" scenario, into which Turkey has already factored a significant increase in its emissions. The target appears thus as a reduction from such a high increase, as considered in a mitigation scenario. Bearing in mind that emissions increased by 110% in the 23 years between 1990 and 2013, Turkey's target foresees an increase by 102%, compared to 2013 levels, in 2030 (Şahin, 2015: 13).

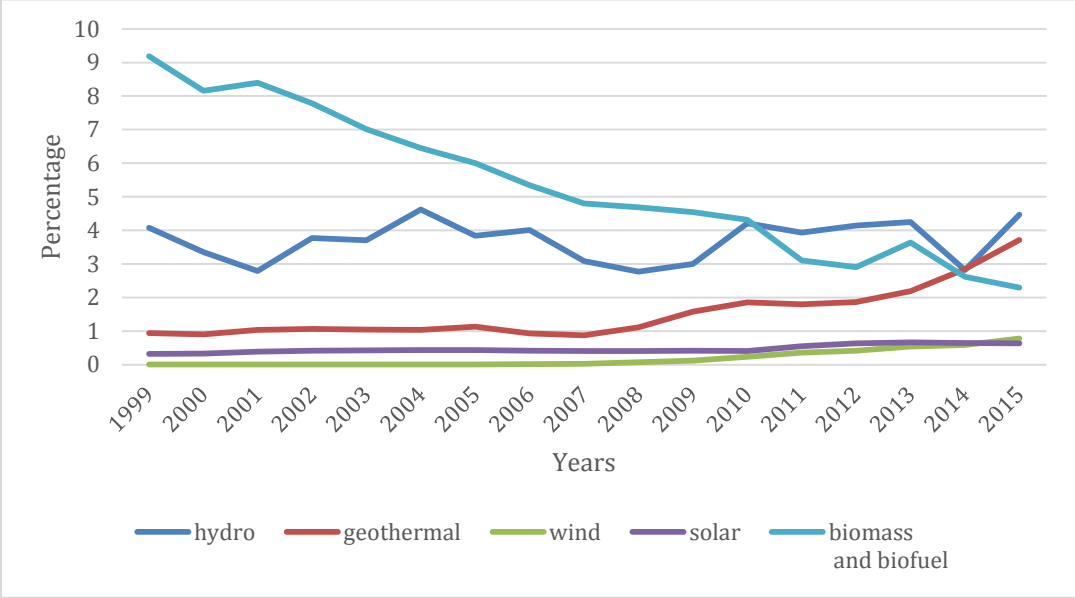
In this context, Turkey aims to reduce its energy intensity by at least 20% by 2023, a move that would contribute to its emission-reduction target. Turkey's energy intensity increased by 7.1% during 2005–15, while the average result among IEA countries overall was a 16.3% reduction. Energy demand-side measures remain crucial for achieving energy efficiency – as do the rehabilitation of energy infrastructure to prevent distribution and transmission losses, and measures to prevent electricity theft (IEA, 2016a: 47).

2.2.3 The integration and development of renewables in Turkey

Turkey has the potential for a high level of solar, wind and geothermal energy resources. Investments in non-hydro renewables have accelerated, especially in recent years: the total share of non-hydro renewables in installed capacity was 0.09% in 2005 and 7.35% in 2015. Investments in renewables have mainly focused on wind and geothermal, while those in solar remain minimal. Although the share of renewables in the total installed capacity has been increasing and the percentage of renewable energy (including hydro) in the total primary-energy supply has ranged between 8.77% and 14.53%, this latter peak was registered in 1999 – since when, the contribution of renewables has declined due to an increasing consumption of fossil fuels and a decline in the share of biofuels and biogas (General Directorate of Energy Affairs of the Republic of Turkey, various years). Furthermore, Turkey is still far from realizing its potential in renewable energy, especially in the case of wind, despite the increasing share of renewables in its installed capacity. For example, the country's installed capacity for wind meets less than 10% of its wind potential. In the case of geothermal energy, the figure is even lower: 2% (TMMOB, 2012: 160, 172; Usta, 2015).

Figure 2.4 shows the increase in the shares of geothermal, wind and solar in contrast to the decrease in biomass and biofuel. While the share of biofuels and biogas in 1999 was 9.18%, it decreased steadily to 2.45% in 2015. The share of geothermal in total primary-energy supply was around 1% until 2007. Afterwards, it increased progressively to 3.97% in 2015. Since 2010, the shares of wind and solar have been increasing, although they both remain at less than 1%.

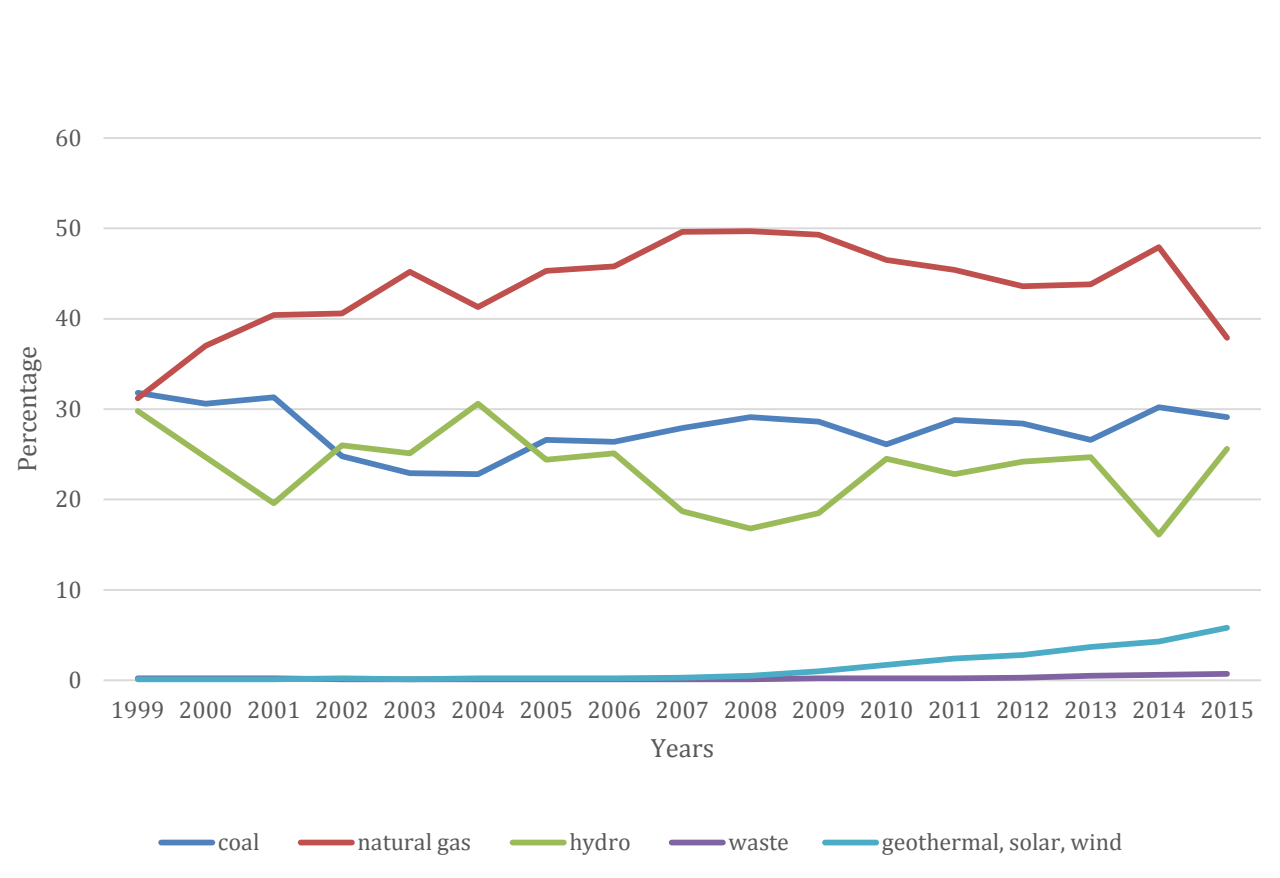
Figure 2.4 – Share of renewable energy in total primary energy supply (%)



Source: Data from the General Directorate of Energy Affairs of the Republic of Turkey, *Energy Balance Tables*. Compiled, calculated and graphed by Dicle Korkmaz Temel.

The share of renewable energy in electricity production is shown in Figure 2.5. Although there has been an increase in the share of geothermal, solar and wind, fossil fuels still dominate electricity generation in Turkey. The share of geothermal, solar and wind in producing electricity in 2015 was 5.8%, whereas coal amounted to 29.1% and natural gas to 37.9%. Together with hydro, the share of renewables was 30%, which the Turkish Government mentioned as a target for the year 2023 (EMRA, 2016a: 5).

Figure 2.5 – Share of energy resources in electricity production (%)



Source: Data from TEIAŞ, 2017. Compiled, calculated and graphed by Dicle Korkmaz Temel.

Despite the fact that Turkey aims to increase its solar-generating capacity to 10 GW and its wind capacity to 16 GW by 2030, many challenges prevent the country from fulfilling its potential. Key concerns of investors related to the development of renewable energy include problems regarding governance, such as long bureaucratic processes, rapid changes in legislation, a lack of clear standards and rules, a lack of accountability, the division of labour and cooperation among governmental organizations and a lack of long-term planning. Investors also mention risks related to their cash flow; inadequate demand; the number of competitors, which would reduce their profit; public acceptance; and connectivity to transmission and distribution networks (Özbuğday, 2016: 7, 11; Erden-Topal, 2016: 72-82). Furthermore, the IEA (2016a: 179) considers

"the high licence and connection fees for renewable projects, delays in grid connection and expansion, regulatory uncertainty over the regime for distributed generation and the costs blocking the expansion of notably solar power" as relevant challenges to investments in renewable energy within the country. Finally, insufficient funding for research and development, low feed-in-tariffs compared with those in other countries and contradictions between targets of renewable energy and protection of the environment are mentioned as discouraging factors (WWF, 2011: 9-11).

2.2.4 The role of coal and gas in electricity generation

Turkey is largely dependent on fossil fuels in its electricity production. As Figure 2.5 shows, the share of natural gas in electricity production increased until 2007, when – for three years – natural gas accounted for almost half of the electricity produced. It then started to decrease slightly, although it experienced another increase in 2014. Bearing in mind that Turkey imports almost all of its natural gas, the country is highly dependent on imported natural gas in electricity production, which means that any problem in securing natural gas supplies would have a direct impact on its electricity sector. The share of coal in electricity production typically ranges between approximately 23% and 32%. Since 2005, this share has increased, reaching a level of 30% again in 2014 (TEIAŞ, 2017). Bearing in mind the share of imported coal in 2015 (64.27%) in the total coal supply, high import dependency in electricity production increases concerns about energy security. Moreover, Turkey is highly dependent on Russia both for imported coal and natural gas. While natural gas imports from Russia accounted for 55.31% of the total in 2015, coal imports from Russia amounted to 32.79% (Turkish Petroleum, 2016: 28).[20]

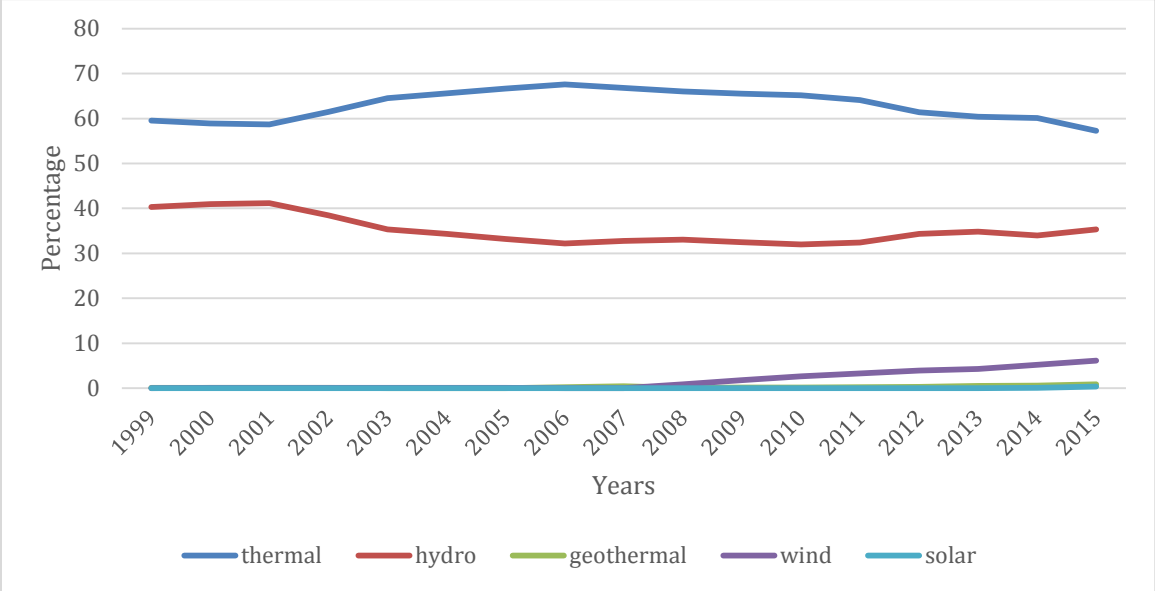
2.2.5 Turkey's strategy for hydroelectricity

The share of hydro in Turkey's installed capacity was around 40% at the beginning of the 2000s and then decreased steadily until 2010, when the share amounted to 31.97%, and then started to increase slightly again (see Figure 2.6). This reduction in the share of hydro coincides with an increase in the installed capacity of thermal power plants, to meet growing domestic demand. The share of hydro in electricity production changes according to weather conditions, and thus ranges between 16% and 30%. Figure 2.5 shows that while natural gas dominates electricity production, the consumption of coal and hydro for electricity generation occur interchangeably: when the share of coal increases the share of hydro decreases, and vice versa. In 2015, the share of hydro in electricity production was 25.6%. Nevertheless, the government has the target of utilizing Turkey's full hydroelectric potential by 2030. The main challenges to this goal are grid connection; the process of project selection; environmental concerns about run-of-river plants; the control of construction and the lack of development plans for river basins, which cause insufficient usage; operational problems; and disagreements among project holders (World

[20] See also the International Clean Coal Summit website: *Coal Market*, http://cleancoalsummit.org/turkish-coal-market.

Bank, 2015: 160-163). Furthermore, Turkey is expected to be affected negatively by climate change. Indeed, the country is likely to face challenges due to this phenomenon such as a decrease in rainfall and an increase in average temperature, which would limit its capacity to exploit hydro resources for generation (Turkish State Meteorological Service, 2015: 61-95, 130).

Figure 2.6 – Share of energy resources in installed capacity (%)



Source: Data from TEIAŞ, 2017. Compiled, calculated and graphed by Dicle Korkmaz Temel.

2.2.6 Turkey's strategy for nuclear power

Turkey's nuclear power strategy is closely linked to the pressing issue of energy-supply security, and nuclear energy is seen by the Turkish authorities as a critical aspect of the country's diversification strategy. The "Strategic Plan 2015–2019" sets the target of diversifying electricity production via the integration of nuclear energy. The installation of nuclear power plants is planned to ensure the base-load electricity supply domestically (Turkish Ministry of Energy, 2015: 40, 17). Moreover, given Turkey's desire to mitigate its vulnerability vis-à-vis its reliance on imported gas for electricity (Erdurmaz, 2012: 238), nuclear energy is considered one of the most important alternatives in the diversification of the country's energy mix (Kibaroğlu, 1997 ; Kılıç, 2008; Uslu, 2010).

While efforts towards the construction of nuclear power plants have intensified from the 2000s onwards, due to Turkey's increasing energy need (Ülgen, 2012), the country's engagement with civilian usages of nuclear power dates back to 1956 when the Atomic Energy Commission was

established.[21] Turkey's attempts to construct its first nuclear power plant were finalized with an agreement concerning the cooperation between the Republic of Turkey and the Russian Federation upon facilitating and operation of a nuclear power plant.[22] Within this context, in July 2010, the Turkish Parliament approved the intergovernmental agreement between Russia and Turkey for the construction of Turkey's first nuclear power plant in Akkuyu, a town in Mersin province along the shores of the Mediterranean. According to this agreement, the Russian state-owned atomic power company ROSATOM will construct and operate the Akkuyu nuclear power plant (Öniş & Yılmaz, 2016: 86). In late 2015, increasing tensions in bilateral relations and the impact of this resulted in delays in the implementation of the project, and have led to the questioning of Akkuyu's future. Although this tension highlighted the vulnerability of the Akkuyu power plant project to Russia's technical, economic and political variables, now that the political climate between Ankara and Moscow has improved (BBC, 2016) both sides have taken steps to ensure that the nuclear deal is a commercial project based on an international agreement, and not to be affected by any possible future tension. The Turkish Minister of Energy, Berat Albayrak, has anticipated that the first reactor will start generating electricity in 2023, coinciding with the 100th anniversary of the foundation of the Turkish Republic (Sputnik, 2017). The Akkuyu deal has a dual impact on Turkish–Russian relations. On the one hand, it will enhance mutual economic ties with approximately $20 billion of Russian investment in Turkey and enable some limited technology transfer. On the other hand, it will render Turkey even more dependent on Moscow in meeting its rising energy demand (Yilmaz and Sever, 2016).

At a time when a number of countries have been revisiting their nuclear energy plans in the aftermath of the Fukushima disaster, the Turkish Government is persistent about carrying out its nuclear energy agenda. On 2013, it announced its decision to construct a second power plant in Sinop with a consortium led by Mitsubishi Heavy Industries (MHI) and Areva, with Itochu (World Nuclear Association, 2017). Most recently, in August 2016, the agreement previously concluded on 9 April 2012 between China and Turkey on the "Cooperation in Peaceful Uses of Nuclear Energy" (Turkish Government, 2012a) was ratified, leading to discussions regarding a third nuclear power plant in the country. Speculations over İğneada as the third nuclear power plant site ignited reactions by environmentalists and strict opposition from the region's residents (Çelikkan, 2015). So far, the Ministry has refrained from officially naming İğneada and has highlighted the fact that the final decision would be based on the strategic evaluation of several criteria (Bloomberg, 2016). While discussions on İğneada continue, the Minister of Energy and Natural Resources affirmed that by 2030, 10% of Turkey's installed power capacity will be produced by three nuclear power plants (Daily Sabah, 2016).

[21] Currently, Turkey's nuclear developments are under the authority of Turkish Atomic Energy Authority (TAEK). See the TAEK website: *History*, http://www.taek.gov.tr/en/institutional/history.html.

[22] Agreement between the Government of the Republic of Turkey and the Government of Russian Federation on Cooperation in Relation to the Construction and Operation of a Nuclear Power Plant at the Akkuyu Site in the Republic of Turkey, signed in Ankara on 12 May 2012.

The Turkish Government justifies its push for nuclear power on the grounds of enhanced energy security, lower cost, reductions in carbon emissions, and the benefits of potential nuclear-technology training and transfer. However, there are also some critical areas regarding nuclear energy that might lead to challenging problems in the future (Global Relations Forum, 2014). Some of the key challenges are seismic risks, radioactive waste and storage problems, the possibility of radiation leakages, environmental risks to marine life, the security challenge of protecting the nuclear power plant and its highly strategic materials against terrorist attacks, and the risk of accidents and a potential proliferation crisis.[23] Hence, it is essential to have an effective oversight mechanism in place, with the necessary technological and scientific expertise to aptly monitor every stage of the process (Ülgen, 2012).

As a newcomer to the nuclear energy field, developing its technical and administrative capacity, investing in its human capital, addressing the potential security threats and strengthening its security culture are important tasks for Turkey. The build-own-operate model agreed with Russia for Akkuyu is unique, and requires prudent arrangements for security and waste management (Ülgen, 2016). Moreover, Turkey still needs to align its legislative and administrative capacity with international and EU standards. In the context of the latter, progress reports indeed highlight the necessity of further requirements concerning legislation on reporting, monitoring, and judicial and administrative capacity. Nuclear safety, the necessity of an independent authority,[24] security and the level of public consultations (European Commission, 2015d: 48) emerge as potential areas for further progress.[25]

While nuclear energy emerges as a critical aspect of Turkey's plans for enhancing its energy security, it should also develop within a framework that proceeds cautiously concerning issues related to human and environmental security. In this respect, there is a significant need for policy alignment, as well as potential opportunities for collaboration with the EU.

[23] For a comprehensive assessment of the strategic effects of nuclear energy development, see Stulberg & Fuhrmann (2013).
[24] Available in the Progress Reports for 2005, 2006, 2007, 2008, 2009, 2014, 2016. See European Commission (1998-2016).
[25] For an extended analysis and comparison of the EU and Turkey's nuclear energy policies with reference to Turkey's alignment process with the EU, see Sever (2017).

3 The framework of energy cooperation between Turkey and the EU

Energy represents a strategic issue in relations between Brussels and Ankara. For more than a decade, Turkey and the EU have regarded energy not only as a matter of mutual interest but also as a key tool with which to strengthen their bilateral political dialogue. The two have therefore been building or participating in platforms supporting convergence in the sector, some of which have already reached positive outcomes.

Cooperation has mainly focused on energy security, and specifically the diversification of gas supplies, as a result of the need of both parties to access new, secure sources of gas and to open transit routes. In this context, since 2003 Turkey has been at the centre of the most ambitious external-energy policy initiative ever established by the EU, the realization of the Southern Gas Corridor. In parallel with this initiative, the authorities in Ankara have placed "contribution to Europe's energy security" among the four key priorities of their country's own national energy strategy (Koranyi & Sartori, 2013: 3), repeatedly stressing the link between Turkey's indispensable role for European energy security and the EU accession process. From the Turkish point of view, the country's "membership perspective and the […] accession negotiations with the EU will be a driving force for the realization of joint projects which will enhance the supply security of Turkey and the EU" (Korany & Sartori, 2013: 4).

Given the high political value attached by Ankara to energy cooperation with the EU, the freezing of negotiations and the uncertain status of the accession process could negatively impact on the evolution of the bilateral energy dialogue, at least in strategic and very sensitive domains such as that of natural gas.

While this could lead to a divergent path in the most relevant sector, EU–Turkey energy cooperation, both at the bilateral and at the multilateral level, covers a wide range of increasingly complex issues that go beyond security concerns in the gas sector and would lead, if pursued wholeheartedly, to overall convergence. These issues include the integration of energy markets together with their adaptation to ambitious decarbonization and sustainable-development objectives being undertaken at European and global levels.

3.1 EU–Turkey: the status of bilateral energy cooperation

As mentioned above, bilateral energy cooperation is closely interlinked with Turkey's EU accession process. Energy is indeed among 35 policy areas of the *acquis communautaire*, the so-called "chapters", covered by the negotiation process that has been in place between the EU and Turkey since October 2005. The Energy chapter covers EU legislation related to the functioning of the internal electricity and natural gas markets, the implementation of energy-efficiency

measures, the integration of renewable-energy resources in the energy mix, the strengthening of the security of energy-supply policies and the improvement of nuclear safety.

Turkey's desire to become a member of the European Union has been a driving factor in the country's ongoing energy-sector restructuring. Despite a diminished ambition towards gaining EU accession by the government of President Erdoğan, the country's interest in liberalization has also been promoted by the desire to attract investors.

In terms of moving forward in the accession process, Ankara has made some headway in aligning its energy legislation and policy with the European *acquis*. Since 2001, Turkey has been taking important steps by enacting numerous regulations in order to ensure its compliance with EU rules and to establish a liberal and competitive market structure with an investor-friendly environment.

However, despite evident mutual interests, the positive results achieved in certain sectors and the periodic calls from both Brussels' and Ankara's authorities for the opening of the Energy chapter, negotiations are still blocked. Furthermore, the Screening Report[26] adopted in 2007 remains vetoed by Cyprus in the Council of the EU. More generally, in recent years the whole accession negotiation process has experienced significant delays due to a stagnation in political relations between the EU and Turkey, culminating in the freezing of negotiations in 2016, to the extent that one cannot be optimistic about future prospects for formal EU–Turkey energy dialogue in such an institutional framework.

Of course, failing to open the Energy chapter weakens a proactive and cooperative stand on this issue by Ankara. The political and institutional stalemate places limits on the scope and timing of EU–Turkey energy-policy coordination as well as market integration – particularly in the sensitive gas sector, where convergence lags behind due to missing cross-border infrastructure and the lack of a stable, transparent, common legal and regulatory framework in Turkey. In order to bypass the political bottlenecks slowing down the transfer and implementation of EU energy legislation in Turkey, Brussels and Ankara have tried to adopt alternative institutional initiatives in order to promote energy cooperation outside the accession negotiations. Apart from failed attempts by Brussels to persuade the Turkish Government to join the Energy Community (see Section 3.3), the most relevant bilateral energy-cooperation initiatives include the "Positive EU-Turkey Agenda" and the "Turkey–EU High Level Energy Dialogue and Strategic Energy Cooperation".

[26] The Screening Report results from the screening analysis, through which EU legislation in the relevant chapters and Turkish legislation are compared, with the report identifying those areas where compliance is high and those where further policy and legal harmonization is expected. The Screening Report forms the very basis of the Commission's Draft Common Position for the chapters to be negotiated.

Launched in May 2012, the "Positive EU-Turkey Agenda" aimed to complement and enhance accession talks by fostering cooperation and practical activities in a number of sectors of joint interest as well as advancing economic integration. Energy was an integral part of this process, as confirmed by EU commissioners Günther Oettinger and Štefan Füle together with Turkish Ministers Egemen Bağış and Taner Yıldız in their June 2012 joint statement on "Enhanced EU-Turkey energy cooperation".[27] The initiative – not officially intended to replace Turkey's accession process, but rather an attempt at supporting the country towards integration into the EU energy system – expected to deepen EU–Turkey energy relations in six broad areas of mutual concern: long-term perspectives on energy scenarios and energy mix, market integration and the development of infrastructures of common interest, global and regional energy cooperation, the promotion of renewable energy, energy efficiency and clean-energy technologies, and nuclear safety and radiation protection. In practice, the "Positive Agenda"' introduced regular exchanges and technical meetings between EU and Turkish officials, on these specific subjects, at working-group level.

Despite official statements clarifying the nature of the initiative (as a non-alternative to the accession negotiations), the launch of the Positive Agenda was perceived by many in Turkey as a further European attempt to dissociate energy cooperation from the stalled issue of Turkey's accession to the EU, as previous attempts to accelerate EU–Turkish cooperation on energy had proved.

In this context of growing political and strategic uncertainty, the launch of the "Turkey–EU High Level Energy Dialogue and Strategic Energy Cooperation" represents efforts by the newly installed Juncker Commission to revive institutional cooperation in the energy domain. Agreed in March 2015 by EU Vice President Maroš Šefčovič and the former Turkish Minister for energy and natural resources, Taner Yıldız, the Dialogue sets out to complement and support Turkey's accession process rather than substitute for or bypass it. Turkey is among the five strategic partners with whom the Commission has established such a cooperation framework (the others are Algeria, Canada, Norway and the US). The initiative aims to increase bilateral exchanges at ministerial level, and it is accompanied by preparation activities carried out through regular meetings at the council, committee and subcommittee levels. So far two "High-Level Dialogue" meetings have been held between the end of 2015 (in the context of the Paris Climate Conference, or "COP21") and 2016, while a third one is scheduled for the beginning of March 2017. Particularly relevant are the results of the 2016 meeting, for which the Turkish Minister for energy and natural resources, Berat Albayrak, and the EU Commissioner for climate action and energy, Miguel Arias Cañete, convened in Istanbul: on that occasion, the Commissioner stressed the EU's commitment to evaluating the alignment of Turkish energy legislation, specifically

[27] Other areas of cooperation addressed by the Positive Agenda include: political reforms, alignment with the *acquis*, dialogue on foreign policy, visas, mobility and migration, trade, counter-terrorism and participation in EU programs. See European Commission (2012a; 2012b).

through the resumption of the revision process for the Screening Report on the Energy chapter (European Commission, 2015).

3.2 The integration of European and Turkish energy markets

The different levels of integration between the electricity and the gas markets, as well as the status of the interconnections, reflect the overall discrepancies in the two main sectors of EU–Turkey energy cooperation.

Indeed, electricity has witnessed a significant improvement while gas has been lagging behind. While Turkey also has working interconnections with Iran, Iraq, Georgia, Syria and Armenia, only its European connections are synchronous – the others being used only to supply isolated areas (despite an export–import potential similar to that which it has with Europe) (Karbuz, 2014). Following an application made in 2000 by Turkish grid operator TEIAŞ to ENTSO-E's predecessor, the Union for the Co-ordination of Transmission of Electricity (UCTE), and a trial period from September 2010 to April 2014 (ENTSO-E, 2010), a long-term agreement on permanent synchronous operation between the Turkish power system and Continental Europe was signed in April 2015 (ENTSO-E, 2015a). Thus, Turkey has become able to use interconnections with Bulgaria and Greece on a regular basis, and to export a maximum of 400 MW of electricity and import up to 500 MW. Cooperation with Europe was also strengthened by the accession of TEIAŞ to ENTSO-E as the first observer member allowed into the organization in January 2016 (ENTSO-E, 2016). Overall, the observership and the synchronization highlight Turkey's compliance with the transmission-related components of the *acquis communautaire* – in particular, third-party access rules and the liberalization of the energy market.

Turkey is, in fact, already well advanced in the latter case. Its privatization of power generation and distribution in the past ten years has greatly expanded private investments in the country's electricity sector, doubling capacity from 2007 to 2014 (IEA, 2016a). The process was further enhanced by the 2013 Electricity Market Law, which contributed to reaching an almost 86% opening of the electricity market by the end of 2015 (IEA, 2016a). The law is also mostly compliant with the EU Third Energy Package,[28] thus strengthening the potential for EU–Turkey cooperation. Despite this, the direct effect of this last stage of liberalization has been to reduce energy exchange with Europe – most likely due to increased generation capacity, which resulted in electricity imports in the first half of 2016 being down 46% compared with the same period of 2015 (Turkish Statistical Institute, 2017a).

[28] The Third Energy Package is the latest round of EU energy market legislation, enacted to improve the functioning of the internal energy market and resolve structural problems.

Further electricity interconnections with Turkey are therefore possible, but actually far from certain. One major project – an undersea cable with Romania – will probably be dropped, following Romanian state secretary Corina Popescu's declarations of last August. On that occasion, she pointed out the instability in the area and Turkey's alleged focus on alternating-current connections (the cable will be direct-current instead) (Bendre, 2016). Moreover, no other similar projects are being discussed or developed – either at member-state or at Commission level. Yet, extending the European grid to neighbouring countries is often part of the Commission's and the Energy Union's discourse. For instance, the newly EU-funded electricity lines in Bulgaria fell under the "Black Sea Corridor" framework, a series of electric interconnections that also envisages the involvement of Turkey (European Commission, 2016d).

Beyond the European level, further integration in the sector is guaranteed by the Coordination Auction Office in South East Europe (SEE CAO), which Turkey contributed to founding in 2012. This organization allocates available transmission capacities among its ten participating countries, which include two EU member states (Greece and Croatia), and works in compliance with Regulation (EC) 714/2009.

The situation for gas is significantly different, offering a more positive picture regarding the development of infrastructures but underdeveloped integration in terms of market structure and the regulatory framework.

Connections between the EU and Turkey are through Bulgaria, with a capacity of 478 GWh per day, and via the Turkey–Greece interconnector (ITG), with a capacity of 49 GWh per day (GIE). The expansion of those facilities is likely, particularly considering the latest developments over the TANAP pipeline. After the approval of two $400 million loans from the World Bank, one to Azerbaijan and one to Turkey, and $600 million from the Asian Infrastructure Investment Bank to Azerbaijan's Southern Gas Corridor Company (Mustafayeva, 2016), it is reasonable to expect that the infrastructure will be completed by the expected date (2018). The TANAP will provide 6 bcm of gas to Turkey and 10 to Europe, when the Trans Adriatic Pipeline (TAP) is completed, likely in 2020, thus boosting the still limited integration of the European and Turkish gas markets.

In fact, even if the Natural Gas Market Law of 2001 and other pieces of Turkish legislation are already aligned on Third Package rules – in particular, those requesting the unbundling of all gas-market activities – implementation has been largely inadequate. The state company BOTAŞ owns a majority share in Turkish imports, distribution and the sale of gas in the country; despite holding 12 out of the 307 available licences for import, export, wholesale and other activities, the company controls 84% of all the gas imported to Turkey, including one of the two LNG facilities in the country. The Natural Gas Market Law has only received a small update, in summer 2016 (Yegin, 2016), while a new version has not been discussed in parliament since 2014.

The stalling in the liberalization of the Turkish gas market has thus limited integration with the European market, but it could be unblocked by further cooperation with the European Network of Transmission System Operators for Gas (ENTSO-G). In the last meeting between the Network, BOTAŞ and the Energy Community Secretariat in May 2015, the two European institutions offered support in the implementation of the new law and of gas-network codes, and opened up the possibility of BOTAŞ joining ENTSO-G as an observer member (Energy Community, 2015). Yet, no further action followed the meeting.

Nevertheless, integration between the European and the Turkish transmission systems is a feature of the priority sectors for which the €4,453.9 million of pre-accession assistance provided to Turkey are destined. This budget is valid for the period 2014–20 and also covers the adjustment of Turkish gas and electricity network codes against their European counterparts; however, while TEIAŞ is expected to apply European codes soon, progress in the gas sector has been limited. As the Commission wrote in its Energy Action Document in 2015:

> The institutional capacity of BOTAŞ has to be improved in terms of reliability, efficiency and operational performance of the natural gas infrastructure as well as smooth operation of network in line with EU network codes (European Commission, 2015e: 5)

In addition to this, Commission Energy Action Document identified a series of other issues undermining the integration of the European and Turkish gas systems (European Commission, 2015e: 5). Specifically:

- inefficiencies regarding "demand forecasting, system optimization, network and geographical simulation, which will ensure the effective operation of a liberalized gas market in line with EU acquis".
- Inadequate availability of data, which are however required to "enhance reliability and transparency of gas trade with third parties, including the market participants from EU."
- Deficiencies in "short-term and long-term decision making processes which pose a threat for an effective functioning of gas market".

3.3 The role of multilateral cooperation platforms

Along with enduring bilateral cooperation initiatives, the energy dialogue between the EU and Turkey takes place in several different multilateral fora.

As mentioned above, the Energy Community is the most relevant institutional setting through which the EU engages with its neighbours, who – as contracting parties – commit themselves to implementing the relevant EU *acquis* on energy, environment and competition. Turkey has

repeatedly refused to join the Energy Community or to unilaterally align with EU energy legislation, clearly preferring to link this process to deeper political dialogue with Brussels aimed at reaching full EU-membership status. In this context, the Turkish Government has made it clear that such an option is adequate for countries not eligible for EU membership but not for an accession candidate such as Turkey.[29] From a more practical perspective, Ankara's position is driven by the fact that, in the framework of the negotiations, Turkey has the right to decide on the timing of its alignment with some specific legislation (i.e. transit), whereas it does not have such a right in the Energy Community.

Despite the intransigency of Ankara's position vis-à-vis full membership, Turkey has been active in the Energy Community since its creation. Today, thanks to its observer status, officials from Ankara's Energy Ministry and the Energy Market Regulatory Authority (EMRA) take part in its institutional activities, regularly attending meetings of the Ministerial Council; of the Regulatory Board; and of the Permanent High-Level Group (PHLG) as well as of the various fora, task forces and groups established by the Energy Community. Although its representatives cannot propose actions and do not have voting rights, regular exchanges within the Community allow Turkey's officials to gain experience, interact with their European peers and bring back to Ankara lessons learned and expertise to be applied into their national institutional settings.

As already mentioned, ENTSO-E also represents an important framework for Turkey to integrate into the European energy market. As stated by the organization,

> The observer member status will give TEIAS the possibility to attend groups and task forces within the association. This will facilitate cooperation between ENTSO-E and TEIAS whenever this adds value for the operators and the customers they serve (ENTSO-E, 2016).

The observership will facilitate Turkey's ingress into the European market, easing the electricity trade between the two polities. Furthermore, it will support ENTSO-E in evaluating the standards applied by TEIAŞ in its service towards the European grid.

In detail, cooperation with Turkey under the ENTSO-E umbrella operates through the participation of the Turkish transmission system operator (TSO), TEIAŞ, on some of the bodies of the organization; the status of observer grants accession only to a part of these and not to the Assembly, the highest body of the organization. TEIAŞ representatives can participate, then, in the Regional Group Continental South East, an entity operating under the wider System Operations Committee of ENTSO-E, which is responsible for technical and operational standards

[29] As underlined by Ali Babacan and Hilmi Güler during the conference "Turkey and the EU: Together for a European Energy Policy" (held in Istanbul on 5 June 2007), candidate countries expect to align with the EU energy *acquis* through accession negotiations progressively and not in the framework of parallel cooperation processes such as participation in the Energy Community.

and the development of operational network codes. TEIAŞ has been also invited to send representatives to meetings of some of the groups under the Market Committee and the Research, Development and Innovation Committee of the organization. In addition to this, after synchronization Turkey has become part of the ENTSO-E Regional Group Continental Europe (RG CE), which comprises all TSOs of the synchronous European area and whose purpose is "to pursue the reliable and efficient operation of the Continental Europe Synchronous Area. The RG CE provides a framework for the regional activities of the member TSOs in the Continental Europe Synchronous Area within ENTSO-E" (ENTSO-E, 2015b)

The presence of Turkey in the above structure allows greater transparency and promotes cooperation; indeed, as part of the RG CE, Turkey has to notify to the Group about the development of further interconnections. This already happened in the case of the undersea cable between Turkey and the Turkish Republic of Northern Cyprus, agreed in October 2016 during the World Energy Congress (Sengul, 2016). It is also interesting to remark that the EU's interest in cooperation in the electricity sector with Turkey does not lie just in electricity exchanges but also, and perhaps more importantly, in the facilitating of European technology exports. The collateral effect of the use of EU network codes in third countries is indeed to increase exports of EU-developed software, IT technology and standards associated with these codes. Turkey could thus represent a "proxy country" for this process, looking towards its possible extension to Middle Eastern and African countries.

Interaction with ENTSO-G, on the other hand, is very limited. Before the creation of the organization, BOTAŞ was among the founding members of, and an active participant within, the Gas Infrastructure Europe (GIE) association. However, with the establishment of ENTSO-G, the Turkish company distanced itself from the group of European gas companies. In May 2015, ENTSO-G and BOTAŞ resumed a certain degree of dialogue, anticipating the potential engagement of the Turkish company as an observer, but since then the only the only exchanges in place between the parties have been those related to the data provided by Ankara to ENTSO-G's "Ten Year Network Development Plan" (TYNDP), in which the TANAP project is included (ENTSO-G, 2015).

Technical cooperation takes also place in the context of MedReg and Med-TSO – respectively, the associations of the Mediterranean regulatory agencies and of the Mediterranean transmission system operators. Both organizations are supported by the EU and aim to foster energy cooperation in the Mediterranean region, promoting a transparent, stable and harmonized regulatory framework as well as an integrated, secure and sustainable energy market across the region.

Turkey is among the founding members of MedReg, and EMRA's representative holds the vice-presidency of the association. Although MedReg was not established to promote the adoption of the *acquis communautaire* by Mediterranean non-EU countries, it represents an important

forum for fostering regulatory coordination and encouraging energy convergence between the EU and its Mediterranean neighbours. Turkey regularly holds institutional positions within the organization: today, EMRA chairs MedReg's Working Group on Gas and acts as vice-chair of the Institutional Working Group. In addition to this, a representative from the Turkish regulatory agency presides over the task force on the Union for the Mediterranean's (UfM) energy platforms. This appointment is particularly relevant, as the three energy platforms – promoted by the European Commission in 2014 and launched within the framework of the UfM – represent the most important institutional, multilateral tool for reinforcing energy cooperation in the Mediterranean region.[30]

Turkey is also extremely active within Med-TSO, of which it is one of the founding members, holding its vice-presidency since its establishment in 2012. This association has as its main objective the fostering of interoperability of the national/regional electricity markets across the Mediterranean, by establishing shared technical frameworks, defining common network planning and management procedures, and promoting the development of interconnections and joint projects. Turkey, through an official from TEIAŞ, chairs Med-TSO's Regional Working Group East, and represents the pivotal enabler of any initiative of the association in the Eastern Mediterranean region, whose countries are generally less active compared with its North African members.

[30] These are the Regional Electricity Market Platform (REM Platform), the Renewable Energy and Energy Efficiency Platform (REEE Platform), and the Gas Platform.

Conclusions

At first sight, interests and priorities – mainly determined by the common "energy and climate triangle" mantra – seem to be leading the EU and Turkey towards a converging path. Indeed, security, affordability and sustainability are still – in one way or another – the key factors shaping the energy and climate policies of Brussels and Ankara.

However, despite manifest similarities between the parties (i.e. their extreme dependence on external resources) in their hypothetical strategic convergence, this paper shows that the parties are still quite different in terms of energy and climate profiles, and far from fully aligned when it comes to key interests and policy priorities.

In the EU, energy consumption is basically flat, due to a combination of economic stagnation and improving energy-efficiency practices, and it is not expected to dramatically recover. In Turkey, on the contrary, energy-demand growth is expected to continue, although not at the same pace as in the past decade. This situation puts the EU and Turkey in different positions: while Brussels, still the global leader in the fight against climate change, can work more intensively on qualitative aspects (i.e. the progressive decarbonization of its energy sector), Ankara continues to struggle to provide adequate and secure supplies in order to enhance its socio-economic development. This is reflected, on the one hand, by the different levels of ambition of their respective decarbonization policies and rates of penetration of the renewables in their energy mix, and on the other, by their diverse levels of reliance on cheap and abundant (but polluting) energy sources such as coal.

Decarbonization
- Climate change/sustainability driver more for the EU than for Turkey, which does not seem to be able to reduce its hydrocarbon imports from abroad.
- Decarbonization does not seem an actual priority for Turkey, thereby limiting the extent of its cooperation with the EU in this domain.

Security of energy supplies and diversification of sources certainly constitute a domain in which the interests of the EU and Turkey appear more aligned, as Brussels and Ankara are among the world's largest (in percentage terms) importers of energy, and for different reasons (declining domestic production in the EU, growing demand in Turkey) are both expected to increase their reliance on foreign supplies. A certain degree of convergence of interests is in place in the gas sector, in which the shared objective to access new gas resources in landlocked areas such as the Caspian Basin has encouraged ambitious joint initiatives, such as the Southern Gas Corridor. However, over the past few years, Ankara's aspiration to play a strategic role for Europe's energy security and diversification strategy has been mitigated by the impasse in the access

negotiations and, more generally, in the political dialogue. The EU's attempts to increase energy-security cooperation with Turkey regardless of the latter's inaction over the opening of chapter 15 (the proposal for Ankara to join the Energy Community) appear rather unsuccessful. As a result, Turkey has developed its own agenda on the Southern Gas Corridor (partnership with Azerbaijan on TANAP) and on relations with Russia, not necessarily fully in line with EU priorities.

Security of supply

- Gas remains important in the EU's energy mix (as a key transition fuel), reinforcing Brussels' need to cooperate with Turkey in this domain. However, uncertain progress over the Southern Gas Corridor (i.e. the availability of Azerbaijani gas, the destiny of TAP) may reduce the centrality of Turkey in this scheme.
- Turkey needs to increase its imports of gas to meet growing demand, but not as much as previously expected due to economic slowdown. In this context, competition with the EU over additional supplies is not likely, and this outcome could generate a more cooperative approach from Ankara towards Brussels.

Without a clear political incentive (i.e. EU accession), Turkey seems oriented towards intensifying cooperation where its energy priorities and interests are clearly safeguarded. This is, for instance, the case for electricity, where integration between European and Turkish markets is proceeding smoothly, and the liberalization of the market – through the implementation of legislative measures promoted by the EU – offers significant benefits to Turkish citizens and companies. In this domain, cooperation is successfully projected both at the bilateral and (in the Mediterranean region) at the multilateral level, demonstrating that if shared interests are in place the energy strategies and policies of Turkey and the EU can still converge.

Market integration

- Affordability of energy resources and better services to citizens and industry incentivize deeper cooperation between Turkey and the EU – as can be seen in the case of the electricity market. However, internal dynamics on both sides (i.e. the role of former energy monopolists or strong political incumbents) and strategic considerations (particularly in the gas sector) still limit full alignment.
- In terms of initiatives and cooperation mechanisms, without clear political commitment it is difficult to imagine the EU and Turkey successfully converging on broad and ambitious cooperation schemes. However, ad hoc collaborations, and a positive role for Turkey in multilateral fora, offer the possibility of deepening the relationship – particularly to both parties' mutual benefit for a more robust integration process.

References

Accenture (2013): *Developing a Natural Gas Trading Hub / Exchange in Turkey*. Final Report, December, http://docs.petform.org.tr/docs/turkish_natural_gas_market_report_15012014.pdf

AG Energiebilanzen (2016): *Energy Consumption Increases in 2016*, 20 December (Press Releases 5/2016), http://www.ag-energiebilanzen.de/index.php?article_id=29&fileName=ageb_pressedienst_05_2016_eng.pdf

Albayrak, Berat & Cañete, Miguel Arias (2016): *Joint Press Statement: 'Turkey-EU High Level Energy Dialogue' Meeting*, Istanbul, 28 January, http://europa.eu/!RC66kD

Appunn, Kerstine (2017): "Germany's Greenhouse Gas Emissions and Climate Targets", in *Clean Energy Wire Factsheets*, 1 February, https://www.cleanenergywire.org/node/251

Bavbek, Gökşin (2015): *Turkish Position in the UNFCCC Climate Change Negotiations*, Istanbul: EDAM, November, http://www.edam.org.tr/en/File?id=3182

BBC (2016): "Putin Mends Broken Relations with Turkey's Erdogan", in *BBC News*, 9 August, http://www.bbc.com/news/world-europe-37018562

Bendre, Georgiana (2016): "Romania Might Abandon Undersea Power Cable Project with Turkey", in *Business Review*, 25 August, http://www.business-review.eu/?p=116825

Bloomberg (2016) "Türkiye ve Çin arasında enerji ağırlıklı 3 imza atıldı" (Turkey and China signed 3 Agreements on Energy), 4 September, http://www.bloomberght.com/haberler/haber/1915513-turkiye-ve-cin-arasinda-enerji-agirlikli-3-imza-atildi

Buchan, David (2014): "Europe's Energy Security - Caught between Short-term Needs and Long-term Goals", in *Oxford Energy Comments*, July, https://www.oxfordenergy.org/?p=27411

Çelikkan, Erdinç (2015): "Locals, Environmentalists Protest Turkey's Third Nuclear Plant in İğneada", in *Hürriyet Daily News*, 16 October, http://www.hurriyetdailynews.com/Default.aspx?pageID=238&nID=89992

Climate Transparency (2015): *G20 Climate Action – A Turning Point? An Overview of Climate Mitigation Action by the G20 Countries*, https://www.climate-transparency.org/?p=358

Daily Sabah (2016): "Turkey, China Sign Energy, Nuclear Security Agreements at G20", in *Daily Sabah*, 3 September, http://sabahdai.ly/dnnuLy

EEA (2016): *Trends and Projections in Europe 2016. Tracking Progress towards Europe's Climate and Energy Targets*, Brussels, EEA, December (EEA Reports 29/2016), http://www.sipotra.it/wp-content/uploads/2016/12/Trends-and-projections-in-Europe-2016-Tracking-progress-towards-Europes-climate-and-energy-targets.pdf

EMRA (2016a): *Elektrik Piyasasi 2015 Piyasa Gelisim Raporu* [Electricity Market 2015 Sector Report], http://www.epdk.org.tr/TR/Dokumanlar/Elektrik/YayinlarRaporlar/ElektrikPiyasasiGelisimRaporu

EMRA (2016b): *Natural Gas Market 2015 Sector Report*, http://www.emra.org.tr/EN/Documents/naturalgasmarket/publishmentsreports

Energy Community (2015): *Turkey's Transmission System Operator Botas to Increase Cooperation with EU's ENTSOG and Secretariat*, 13 May, https://www.energy-community.org/portal/page/portal/ENC_HOME/NEWS/News_Details?p_new_id=11042

ENTSO-E (2010): *Trial Parallel Operation of Turkish TSO TEIAS Planned to Start in September 2010*, 7 June, https://www.entsoe.eu/news-events/announcements/announcements-archive/Pages/News/trial-parallel-operation-of-turkish-tso-teias-planned-to-start-in-september-2010.aspx

ENTSO-E (2015a): *Expanding the European Electricity Market*, 16 April, https://www.entsoe.eu/news-events/announcements/announcements-archive/Pages/News/Expanding-the-European-Electricity-Market-.aspx

ENTSO-E (2015b): *Regional Group Continental Europe*, updated December, https://www.entsoe.eu/about-entso-e/system-operations/regional-groups/continental-europe/Pages/default.aspx

ENTSO-E (2016): *Turkish Grid Operator, TEIAS, Joins ENTSO-E as Observer Member*, 14 January, https://www.entsoe.eu/news-events/announcements/announcements-archive/Pages/News/turkish-grid-operator-TEIAS-joins-ENTSO-E-as-observer-member.aspx

ENTSO-G (2015): *Ten Year Network Development Plan 2015*, April, http://www.entsog.eu/publications/tyndp

ENTSO-G & GIE (2016): *System Development Map 2015/2016*, September, http://www.gie.eu/index.php/maps-data/system-development-map

Erden-Topal, Yelda (2016): *A Policy Design Model for Market Formation of Solar and Wind Electricity Generation in Turkey*, unpublished PhD thesis, Middle East Technical University, Ankara

Erdurmaz, Serdar (2012): "Nuclear Energy in Turkey, Do We Need it Indeed?", in *Asian Economic and Financial Review*, Vol. 2, No. 1, March, p. 233-243, http://www.aessweb.com/pdf-files/AEFR,2(1),%20PP.233-243.pdf

European Commission (1997): *Energy for the Future: Renewable Sources of Energy. White Paper for a Community Strategy and Action Plan* (COM/1997/599), 26 November, http://europa.eu/documents/comm/white_papers/pdf/com97_599_en.pdf

European Commission (1998-2016): *Progress Reports for Turkey*, https://ec.europa.eu/neighbourhood-enlargement/countries/package_en

European Commission (2008): *20 20 by 2020 – Europe's Climate Change Opportunity* (COM/2008/30), 23 January, http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52008DC0030

European Commission (2010): *Energy 2020. A Strategy for Competitive, Sustainable and Secure Energy* (COM/2010/639), 10 November, http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52010DC0639

European Commission (2011): *Energy Roadmap 2050* (COM/2011/885), 15 December, http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52011DC0885

European Commission (2012a): *Enhanced EU-Turkey Energy Cooperation*, Stuttgart, 14 June, http://europa.eu/rapid/press-release_MEMO-12-434_en.htm

European Commission (2012b): *Turkey-EU Positive Agenda, Enhanced EU-Turkey Energy Cooperation*, Outcome of the meeting of Commissioners Oettinger and Füle and Ministers Yildiz and Bağis, Stuttgart, 14 June, http://ec.europa.eu/energy/international/bilateral_cooperation/doc/turkey/20120622_outline_of_enhanced_cooperation.pdf

European Commission (2014a): *European Energy Security Strategy* (COM/2014/330), 28 May, http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52014DC0330

European Commission (2014b): *A Policy Framework for Climate and Energy in the Period from 2020 to 2030* (COM/2014/15), 22 January, http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52014DC0015

European Commission (2015a): *Climate Change: EU Shows Leadership Ahead of Paris with 23% Emissions Cut*, 20 October, http://europa.eu/rapid/press-release_IP-15-5868_en.htm

European Commission (2015b): *A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy* (COM/2015/80), 25 February, http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52015DC0080

Europan Commission (2015c): *Renewable Energy Progress Report* (COM/2015/293), 15 June, http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52015DC0293

European Commission (2015d): *Turkey 2015 Report* (SWD/2015/216), 10 November, http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52015SC0216

European Commission (2015e): *Turkey Energy Action Document 2015. Instrument for Pre-accession Assistance (IPA II) 2014-2020*, December, https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/pdf/turkey/ipa/2015/ipa2015-038-405.7-energy.pdf

European Commission (2016a): *Clean Energy for All Europeans* (COM/2016/860), 30 November, http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52016DC0860

European Commission (2016b): *The EU Emissions Trading System (EU ETS)*, October, https://ec.europa.eu/clima/sites/clima/files/factsheet_ets_en.pdf

European Commission (2016c): *EU Energy in Figures. Statistical Pocketbook 2016*, https://bookshop.europa.eu/en/eu-energy-in-figures-pbMJAB16001/

European Commission (2016d): "EU Funds a New 140 km Electricity Line in Bulgaria", 10 August, http://europa.eu/!jc69uC

European Commission (2016e): *EU Reference Scenario 2016. Energy, Ttransport and GHG Emissions – Trends to 2050*, Luxembourg: Publications Office of the European Union, https://bookshop.europa.eu/en/eu-reference-scenario-2016-pbMJ0115793

European Commission (2016f): *Proposal for a Regulation Concerning Measures to Safeguard the Security of Gas Supply and Repealing Regulation (EU) No 994/2010* (COM/2016/52), 16 February, http://eur-lex.europa.eu/legal-content/en/TXT/?uri=COM:2016:0052:FIN

European Commission (2016g): *Turkey 2016 Report* (SWD/2016/366), 9 November, http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52016SC0366

European Commission (2017): *Second Report on the State of the Energy Union* (COM/2017/53), 1 February, http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52017DC0053

European Union (1996): *Directive 96/92/EC of 19 December 1996 Concerning Common Rules for the Internal Market in Electricity*, http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:31996L0092

European Union (1998): *Directive 98/30/EC of 22 June 1998 concerning common rules for the internal market in natural gas*, http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:31998L0030

European Union (2003a): *Directive 2003/54/EC of 26 June 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC - Statements made with regard to decommissioning and waste management activities*, http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:32003L0054

European Union (2003b): *Directive 2003/55/EC of 26 June 2003 concerning common rules for the internal market in natural gas and repealing Directive 98/30/EC*, http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:32003L0055

European Union (2009a): *Directive 2009/72/EC of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC*, http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0072

European Union (2009b): *Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC*, http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:32009L0073

Eurostat (2016): *Statistics Explained: EU-28 Energy Consumption 2014*, updated 3 February, http://ec.europa.eu/eurostat/statistics-explained/index.php/File:EU28EnergyConsumption2014.PNG

General Directorate of Energy Affairs of the Republic of Turkey (various years): *Energy Balance Tables*, http://www.eigm.gov.tr/en-US/Balance-Sheets

General Directorate of Energy Affairs of the Republic of Turkey (2016): *Denge Tablosu 2015* [Energy Balance Table 2015], 15 November, http://www.eigm.gov.tr/tr-TR/Denge-Tablolari/Denge-Tablolari

Genoese, Fabio et al. (2016): *Gas Demand for Power Generation Peaked as Early as 2010*, Brussels: Centre for European Policy Studies, 12 February (CEPS Commentary), https://www.ceps.eu/node/11323

Global Relations Forum (2014): *Turkish Energy Strategy in the 21st Century: Weathering Uncertainties and Discontinuities. Task Force Report*, Istanbul: Global Relations Forum, http://www.gif.org.tr/Images/ReportFiles/1033/16.PDF

Government of the Republic of Turkey (2012a): *Agreement between the Government of the Republic of Turkey and the Government of the People's Republic of China for Cooperation in the Peaceful Uses of Nuclear Energy*, 9 April, http://www2.tbmm.gov.tr/d26/1/1-0475.pdf

Government of the Republic of Turkey (2012b): *Energy Efficiency Strategy Paper 2012-2023*, 25 February, http://www.eie.gov.tr/verimlilik/document/Energy_Efficiency_Strategy_Paper.pdf

Government of the Republic of Turkey (2015): *Intended Nationally Determined Contribution*, 30 September, http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx

Gürbüz, Özgür (2015): *Shale Gas in Turkey: An Equation with Multiple Variables*, Istanbul, Heinrich Böll Stiftung Turkish office, 26 March, https://tr.boell.org/en/node/2221

IEA (2014): *Energy Policies of IEA Countries - The European Union 2014 Review*, https://www.iea.org/publications/freepublications/publication/energy-policies-of-iea-countries---the-european-union-2014-review.html

IEA (2016a): *Energy Policies of IEA Countries – Turkey 2016 Review*, https://www.iea.org/publications/freepublications/publication/energy-policies-of-iea-countries---turkey-2016-review.html

IEA (2016b): *Key Coal Trends. Excerpt from: Coal Information*, https://www.iea.org/publications/freepublications/publication/coal-information---2016-edition---excerpt---key-coal-trends.html

IPCC (2007): *Climate Change 2007: Mitigation of Climate Change*, https://www.ipcc.ch/report/ar4/wg3

Itteilag, Richard L. (2012): *Natural Gas Future. A World without Oil*, Bloomington: AutorHouse

Karbuz, Sohbet (2014): *EU-Turkey Energy Cooperation: Challenges and Opportunities*, Rome: Istituto Affari Internazionali, November (IAI Working Papers 1412), http://www.iai.it/en/node/2362

Kibaroğlu, Mustafa (1997): "Turkey's Quest for Peaceful Nuclear Power", in *The Nonproliferation Review*, Vol. 4, No. 3, Spring-Summer, p. 33-34

Kılıç, Ahmet M. (2008): "Importance and Necessity for the Utilization of Nuclear Energy in Turkey", in *Energy Sources,* Vol. 30, No. 12, p. 1074-1084

Koranyi, David & Sartori, Nicolò (2013): *EU-Turkish Energy Relations in the Context of EU Accession Negotiations: Focus on Natural Gas*, Rome, Istituto Affari Internazionali, December (Global Turkey in Europe Working Papers 5), http://www.iai.it/en/node/596

Korkmaz-Temel, Dicle (2016): Turkey's Energy Security vis-à-vis Integration with the EU: A Narrative Policy Analysis from the English School Perspective, University of Tampere, unpublished PhD thesis

Ministry of Development of the Republic of Turkey (2015): *Economic and Social Indicators 1950-2014*, http://www.mod.gov.tr/Pages/content.aspx?List=da71bf51-cd71-420a-bfc8-9dfba104e918&ID=84

Ministry of Energy and Natural Resources of the Republic of Turkey (n.d.): *Natural Gas*, http://www.enerji.gov.tr/en-US/Pages/Natural-Gas

Ministry of Energy and Natural Resources of the Republic of Turkey (2012): *Energy Efficiency Strategy Paper (2012-2013)*, 25 February, http://www.eie.gov.tr/verimlilik/document/Energy_Efficiency_Strategy_Paper.pdf

Ministry of Energy and Natural Resources of the Republic of Turkey (2015): *Strategic Plan 2015-2019*, http://www.enerji.gov.tr/File/?path=ROOT/1/Documents/Strategic+Plan/StrategicPlan2015-2019.pdf

Ministry of Energy and Natural Resources of the Republic of Turkey, (2016a): *2016 YILI bütçe sunumu* [2016 Budget Presentation], 9 February, http://www.enerji.gov.tr/tr-TR/Butce-Konusmalari/Sn-Bakanin-Butce-Sunus-Konusmalari

Ministry of Energy and Natural Resources of the Republic of Turkey (2016b): *Dünya ve Ülkemiz Enerji Ve Tabii Kaynaklar Görünümü* [Energy and Natural Resources Oulook], 1 October, http://www.enerji.gov.tr/tr-TR/Enerji-ve-Tabii-Kaynaklar-Gorunumleri

Mustafayeva, Kama (2016): "WB, AIIB Approve $1.4BN Loans for Tanap", in *Natural Gas World*, 22 December, http://www.naturalgasworld.com/wb-approved-800-loan-for-trans-anatolian-gas-pipeline-35040

Öniş, Ziya & Yılmaz, Şuhnaz (2016): "Turkey and Russia in a Shifting Global Order: Cooperation, Conflict and Asymmetric Interdependence in a Turbulent Region", in *Third World Quarterly*, Vol. 37, No. 1, January, p. 71-95

Özbuğday, Fatih Cemil (2016): *Türkiye'de Yenilenebilir Enerji Yatırımları İçin Risk Algısı* [Risk Perceptions for Renewable Energy Investments in Turkey], Ankara: Turkey Energy Foundation (TENVA), http://www.tenva.org/en/?p=7335

Piebalgs, Andris (2007): *EU and Turkey Together for a European Energy Policy*. Speech at the Conference on "Turkey and the EU Together for a European Energy Policy", Istanbul, 5 June, http://europa.eu/rapid/press-release_SPEECH-07-368_en.htm

PwC (2014): *Liberalising Natural Gas in Turkey*, February, http://www.pwc.com.tr/en/sektorler/enerji-altyapi-madencilik/yayinlar/dogal-gaz-piyasasi-raporu.html

Rehn, Olli (2007): *Why Turkey and the EU Need Each Other: Co-operating on Energy and Other Strategic Issues*. Speech at the Conference on "Turkey and the EU Together for a European Energy Policy", Istanbul, 5 June, http://europa.eu/rapid/press-release_SPEECH-07-362_en.htm

Şahin, Ümit (2015): "Türkiye'nin İklim Hedefi Ne Olmalı? (2) – Resmi INDC'nin Değerlendirilmesi" [What Should Be Turkey's Climate Target? (2) – Assessment of Official INDC], in *Yeşil Gazete*, 19 October, https://yesilgazete.org/?p=115661

Schubert, Samuel R. et al. (2016): *Energy Policy of the European Union*, London/New York: Palgrave Macmillan

Sengul, Ebru (2016): "Turkey-North Cyprus Elect. Cable to be Linked in 2017", in *Anadolu Agency*, 13 October, http://v.aa.com.tr/664030

Sever-Mehmetoğlu, Duygu (2017): *Turkey's Nuclear Energy Policy in the Context of Environment: A Case of Europeanization?*, forthcoming

Soysal, Cengiz et al. (2012): *Doğal Gaz Sektör Araştirmasi*, Ankara: Competition Authority, July, http://www.rekabet.gov.tr/File/?path=ROOT/1/Documents/Güncel/sektorarastirma.pdf

Sputnik (2017): "Ankara Hopes Construction of Akkuyu NPP to Begin in 2017 - Energy Minister", in *Sputnik News*, 3 February, https://sptnkne.ws/dXBM

Stulberg, Adam N. & Fuhrmann, Matthew, eds. (2013): *The Nuclear Renaissance and International Security*, Stanford: Stanford University Press

TEIAŞ (2017): *Türkiye Elektrik Istatistikleri* [Turkish Electricity Statistics], http://www.teias.gov.tr/TurkiyeElektrikIstatistikleri.aspx

TMMOB/Turkiye Makina Mühendisleri Odası (2012): *Türkiye`Nin Enerji Görünümü 2012* [Turkey's Energy Outlook 2012], April, https://www.mmo.org.tr/kitaplar/turkiyenin-enerji-gorunumu

TMMOB/Turkiye Makina Mühendisleri Odası (2016): *Türkiye`Nin Enerji Görünümü 2016* [Turkey's Energy Outlook 2016], April, https://www.mmo.org.tr/kitaplar/turkiyenin-enerji-gorunumu-2016

Turkish Petroleum (2016): *2015 Ham Petrol ve Doğal Gaz Sektör Raporu* [Oil and Natural Gas Sector Report 2015], May, http://www.tpao.gov.tr/tp5/?tp=m&id=57

Turkish State Meteorological Service (2015): *Yeni senaryolar ile Türkiye iklim projeksiyonlari ve iklim degisikligi* [Climate Projections and Scenarios for Turkey], 26 February, http://www.mgm.gov.tr/FILES/iklim/iklim-degisikligi-projeksiyon2015.pdf

Turkish Statistical Institute (2017a): *Energy Statistics*, http://www.turkstat.gov.tr/PreTablo.do?alt_id=1029

Turkish Statistical Institute (2017b): *Population of Provinces by Years, 2000-2016*, http://www.turkstat.gov.tr/PreIstatistikTablo.do?istab_id=1590

Ülgen, Sinan, ed. (2012): *The Turkish Model in Transition to Nuclear Energy II*, Istanbul: EDAM, http://www.edam.org.tr/Media/Files/225/edamreport2012big.pdf

Ülgen, Sinan, ed. (2016): *Managing the Risks of Nuclear Energy: The Turkish Case*, Istanbul: EDAM

Uslu, Tuncay (2010): "The Necessity of Nuclear-Based Energy Production for Turkey", in *Energy Sources, Part B: Economics, Planning, and Policy*, Vol. 5, No. 2, p. 155-164

Usta, Ramazan (2015): *Türkiye'nin Yenilenebilir Enerji Stratejisi ve Politikalari* [Turkey's Renewable Energy Strategy and Policy], 27 March, http://www.tepav.org.tr/upload/files/haber/14274761750.Ramazan_Ustanin_Sunumu.pdf

World Bank (2015): *Turkey's Energy Transition Milestones and Challenges*, Washington: World Bank, July (ESMAP Reports ACS14951), http://hdl.handle.net/10986/22913

World Nuclear Association (2017): *Nuclear Power in Turkey*, updated March, http://www.world-nuclear.org/information-library/country-profiles/countries-t-z/turkey.aspx

Yegin, Mete (2016): "Recent Changes to the Turkish Energy Market Legislation", in *Clifford Chance Briefings*, 22 June, https://www.cliffordchance.com/briefings/2016/06/recent_changes_totheturkishenergymarke.html

Yilmaz, Şuhnaz & Sever-Mehmetoğlu, Duygu (2016): "Linking Foreign Policy and Energy Security: An Asset or a Liability for Turkey?", in *Uluslararası Ilişkiler/International Relations*, Vol. 13, No. 52, p. 105-128

WWF (2011): *Yenilenebilir Enerji Geleceği ve Türkiye* [Renewable Energy Future and Turkey], 27 January, http://www.wwf.org.tr/?1411