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2017

Online at <https://mpa.ub.uni-muenchen.de/83862/>

MPRA Paper No. 83862, posted 11 Jan 2018 15:20 UTC

The role of Greece and Turkey as energy hubs in the region.

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Abstract

The Greek-Turkish relations have been complex in different aspects for a long time. However, neighborhood makes these countries close to each other in political, military and economic terms. Geopolitical location of Turkey makes it strategically important for Greece. Despite of the economic crisis in Greece bilateral trade between these two countries almost doubled for the last five years. Energy and minerals are significant part of this trade and it is expected that natural gas will be one of the most important determinants of the bilateral trade. The energy products trade is two sided and creates strategic meaning for both countries. This chapter analyzes energy markets in Greece and Turkey separately and the Greek-Turkish relations in terms of energy. Completed natural gas pipeline of 296 km connects Turkey and Greece and delivers natural gas of Azerbaijan to Europe. There are several planned or under construction projects that connect Turkey and Greece. Impact of Turkey and Greece as energy hubs on the Greek-Turkish relations and various possibilities for the future cooperation at the energy market are discussed in this chapter.

Energy – economic growth relationships

The Energy Union is the European Union's (EU) long-term project, which consists of five targeting dimensions. First target is to diversify sources of energy of the EU members, second is to develop the barrier free infrastructure for unrestricted flows of energy to reach all members of the EU. Next target is to increase and to sustain economic growth through decreased dependence on energy imports, next goal is to reduced carbon dioxide emissions to improve the environmental quality of its members, and final aim is to motivate research in creation of new clean technologies (DG Energy).

The importance of energy is widely discussed in the literature for developing as well as for developed countries. The reason for its importance is connection to economic growth. There are four hypotheses that consider relations between energy and economic growth (Ozturk, 2010; Omri, 2014). First is the growth hypothesis, which describes the relationships between growth and energy as unidirectional, from energy to economic growth. Any decline in energy consumption will deteriorate economic growth (Apergis and Payne, 2009; Shahbaz et al., 2013; Alshehry and Belloumi, 2015; Tang et al., 2016). Second is the conservation hypothesis, where growth and energy relations are unidirectional as well, however opposite to the growth hypothesis, from growth to energy. This hypothesis supposes that changes in energy consumption do not affect economic growth and energy saving policies may be applied by governments without fear of negative effect on growth. (Ocal and Aslan, 2013; Al-mulali et al., 2013; Omri et al., 2015; Fang and Chang, 2016). Next one is the feedback hypothesis, which suggests bidirectional relations between energy consumption and economic growth, imposing that both of them have a mutual effect. (Shahbaz et al., 2012; Tugcu et al., 2012; Raza et al., 2015; Menegaki and Tugcu, 2016). Finally, the neutrality hypothesis assumes that economic growth and energy consumption are independent from each other and energy saving policies do not affect economic growth or growth does not stimulate demand

for energy. Only a few studies found support for the neutrality hypothesis (Adjaye, 2000; Akinlo, 2008; Yildirim et al., 2014; Menegaki and Tugcu, 2016).

There are various studies on the analysis of energy consumption and economic growth relationships for Greece and Turkey. For example Fuinhas and Margues (2012) found support for the feedback hypothesis in Greece and for conservation hypothesis in Turkey. Results for Turkey indicate that energy conservation policies in Turkey would not damage its economic growth. However, there are different results in the literature, which are biased to econometric techniques, and time period applied by researchers. For example, Erdal et al. (2008) and Shahbaz et al., (2015) found evidence to conclude that bidirectional relationships exist between energy consumption and growth of Turkey, supporting the feedback hypothesis. Dogan (2015) studied electricity consumption from renewable and non-renewable sources and found results supporting feedback hypothesis for non-renewable sources and growth hypothesis for relations between electricity consumption from renewable sources and economic growth. The author specifies importance of electricity consumption policies from both renewable and non-renewable source, arguing that the rising efficiency in electricity generation from non-renewable sources stimulates higher growth. Nazlioglu et al. (2014) revealed non-linearity in series for Turkey. The authors discovered that the linear Granger causality test provides evidence for the feedback hypothesis illustrating bi-directional relations between energy consumption and economic growth. However, when authors applied nonlinear Granger causality test due to the nonlinearity of series, empirical results exposed independence of energy consumption and growth supporting the neutrality hypothesis.

In case of Greece, empirical results of Dergiades et al. (2013) reveal strong unidirectional linear and non-linear relations from energy to growth supporting the growth hypothesis. Katrakilidis et al. (2014) discovered strong bi-directional relationships in short-run and long-run supporting the feedback hypothesis. Tsani (2010) studied disaggregated

levels of energy consumption and found support for feedback hypothesis as well, however only in the case of relationship between industrial and residential energy consumption and economic growth. Though causal relationships were not found in any direction for transport energy consumption and economic growth. Kocak and Sarkgunesi (2017) examined nexus for renewable energy and economic growth in Black Sea and Balkan countries. Analyzing countries by employing the heterogeneous panel causality approach, the authors found support for the growth hypothesis in Greece indicating the importance of the renewable energy consumption in economic growth. However, the panel data estimations pointed to the feedback hypothesis in all included countries.

In case of Turkey evidence of all possible four hypotheses were found in the literature, where results vary with the employed technique and period of estimations. Therefore it is difficult to conclude on relations of energy consumption and economic growth in Turkey. For Greece most of studies found evidence for growth or feedback hypothesis, where common conclusion is the high importance of energy consumption in economic growth. There is not enough evidence in empirical literature for making links between energy-growth development in Greece and Turkey. It cannot be concluded that energy and economic growth have similar or different effects in these two countries.

The aim of this study is to examine energy markets and their relations to economic growth of Greece and Turkey and to study these countries' relations at the energy market level. This chapter examines bilateral external links between these countries and what are advantages of these relations even though empirical literature does not provide common conclusion for the similarity of their internal energy markets. This chapter is organized as follows. Parts 2 and 3 analyze energy markets of Greece and Turkey respectively. Part 4 explores relationship between Greece and Turkey on the energy market and finally last part concludes.

Greek Energy Market

In order to be an adequate part of the Energy Union and for improvement of the country's energy efficiency the Government of Greece prepared the National Action Plan 20-20-20 which reports to the European Commission. Renewable sources are planned to reach 20% of all energy sources in Greece by 2020 (Law 3851/2010). The share of renewable sources in total energy consumption consisted 15.3% in 2014 that progressively increased from 6.9% in 2004 (Eurostat). However Greece today still is highly dependent on fossil fuels such as petroleum, coal and natural gas and more than half of which is imported. Figure 1 illustrates consumption tendencies of main energy products in Greece. For the last decade consumption of renewable energy in Greece follows the increasing tendency except the last year which may be temporary. Main parts of renewable energy in Greece are wind and solar energies, thus wind energy generated about 49% of electricity from renewable sources and about 8% of total electricity. Solar energy accounted for about 41% and 7% of electricity generated by renewable energy sources and by total sources, respectively. Greece has the highest capacity in wind energy and second capacity in solar energy in Europe after Germany. Therefore Greece is one of a few countries in Europe that easily can meet National Plan's requirements for 2020 by increasing renewables consumption to 20% of total energy sources.

Since 2011-2012 there is a significant decline in natural gas and solid fuels consumption, however this period seems like a break point for crude oil products consumption where significant rise is observed. In Greece lignite contains 99% of solid fuels consumption. Therefore continuous decline in lignite consumption reflects the country's target for the cleaner environment. Decline in natural gas consumption is associated to significant fall in imports. Natural gas consumption in Greece depends only on its import where Russia is the major supplier since Greece started to import natural gas in 1996. However after suspension of natural gas by Russia through Ukraine in 2006-2007 and 2009

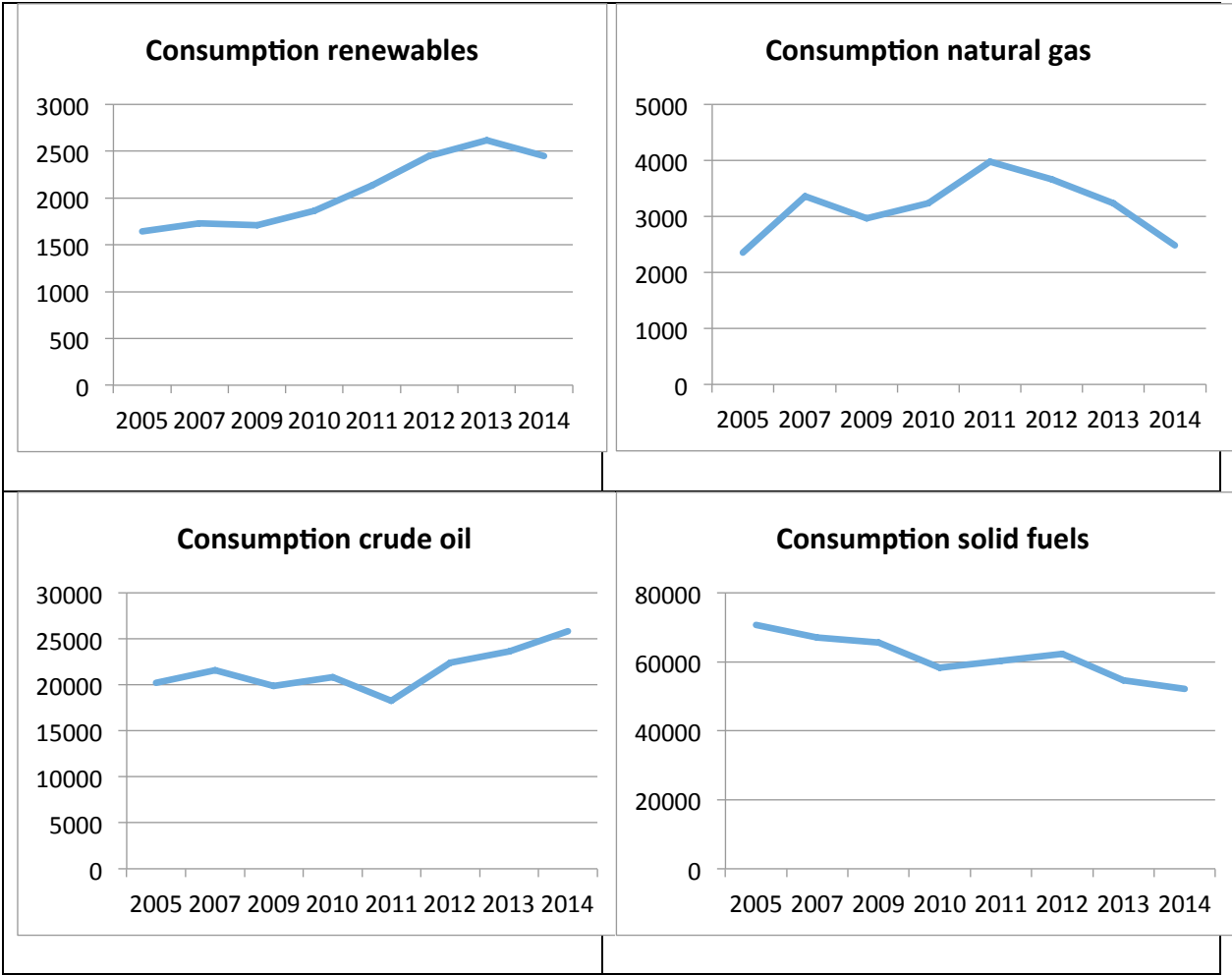
winters, the European Union and particularly Greece accepted the policy of energy suppliers' diversification. Consequently share of Russian imports of natural gas decreased from 85% in 2005 to 58% in 2014 (Eurostat). Greece started to import natural gas from Turkey and increased its imports from Algeria. Thus share of gas imports consisted 17% and 31% from Turkey and Algeria, respectively in 2010, however by 2014 share of Turkish imports consisted 21, while Algerian imports contained 16%. Despite of diversification of gas suppliers, imports decreased significantly. Total natural gas imports fell by 38% in 2014 since 2011, out of which Russian imports declined by 39% and Algerian by 41%. Growing cooperation with Turkey increases its share on the energy market of Greece.

Only crude oil market has expanded, thus Figure 1 illustrates continuous increase in oil consumption since 2011, which is reflection of increasing imports in 2014 by 26% since 2011. Significant increase in oil imports is observed from Kazakhstan and Iraq. Thus share of Kazakhstan's imports in 2014 increased from 3% to 14% since 2011, while share of Iraq's imports rose from 10% to 38% for the same period. Russia was the largest supplier of crude oil, however its share in imports decreased from 36% in 2010 to 25% in 2014.

Figure 2 presents trend lines for energy production and trade. Slight decline in energy production is observed while export and import of energy products follow the upward tendency indicating on the growing import dependency of energy in Greece. Growth in energy imports is observed due to increase in the crude oil imports, while natural gas import had dramatically fallen. Despite of the falling Gross Domestic Product (GDP) energy exports of Greece have continuously increasing since 2011. Energy products of Greek exports consist of solid fuel, electrical energy and oil refinery products, where the prevalent share belongs to the latest. Exports of solid fuel and electrical energy do not follow the stable tendency, whereas exports of oil refinery products continuously grow, making a 168% increase in 2014

since 2005. Decreasing GDP of Greece causes decline in domestic energy demand, creating an opportunity for the export extension.

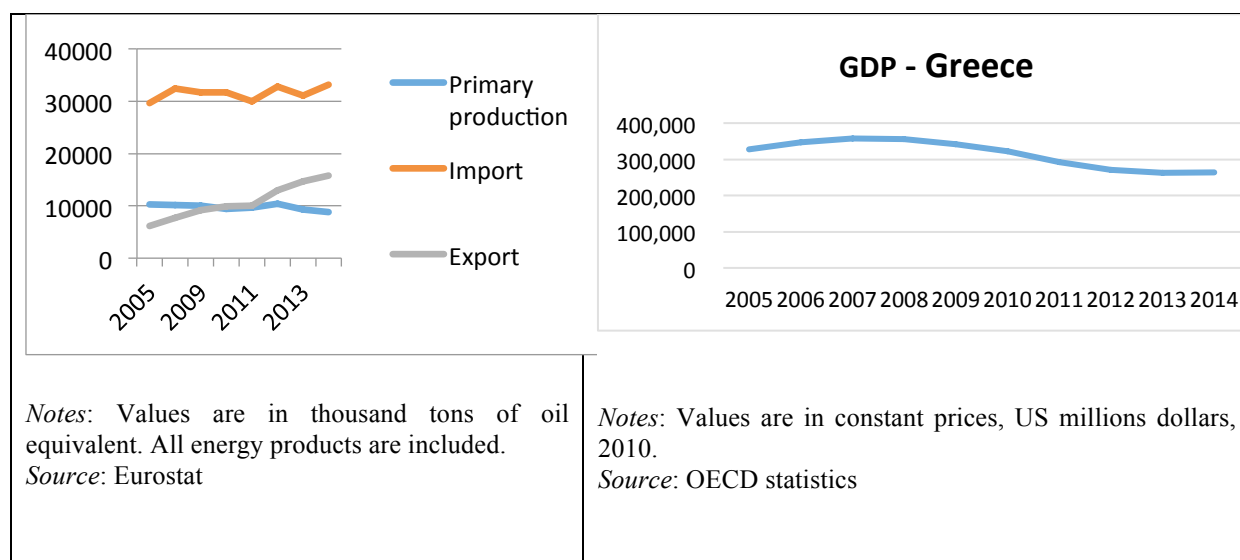
Figure 1. Consumption of main energy products - Greece



Notes: Consumption of renewables and natural gas are in thousand tones of oil equivalent, consumption of crude oil and solid fuels are in thousand tones.

Source: Eurostat

Figure 2. Production and trade of energy products



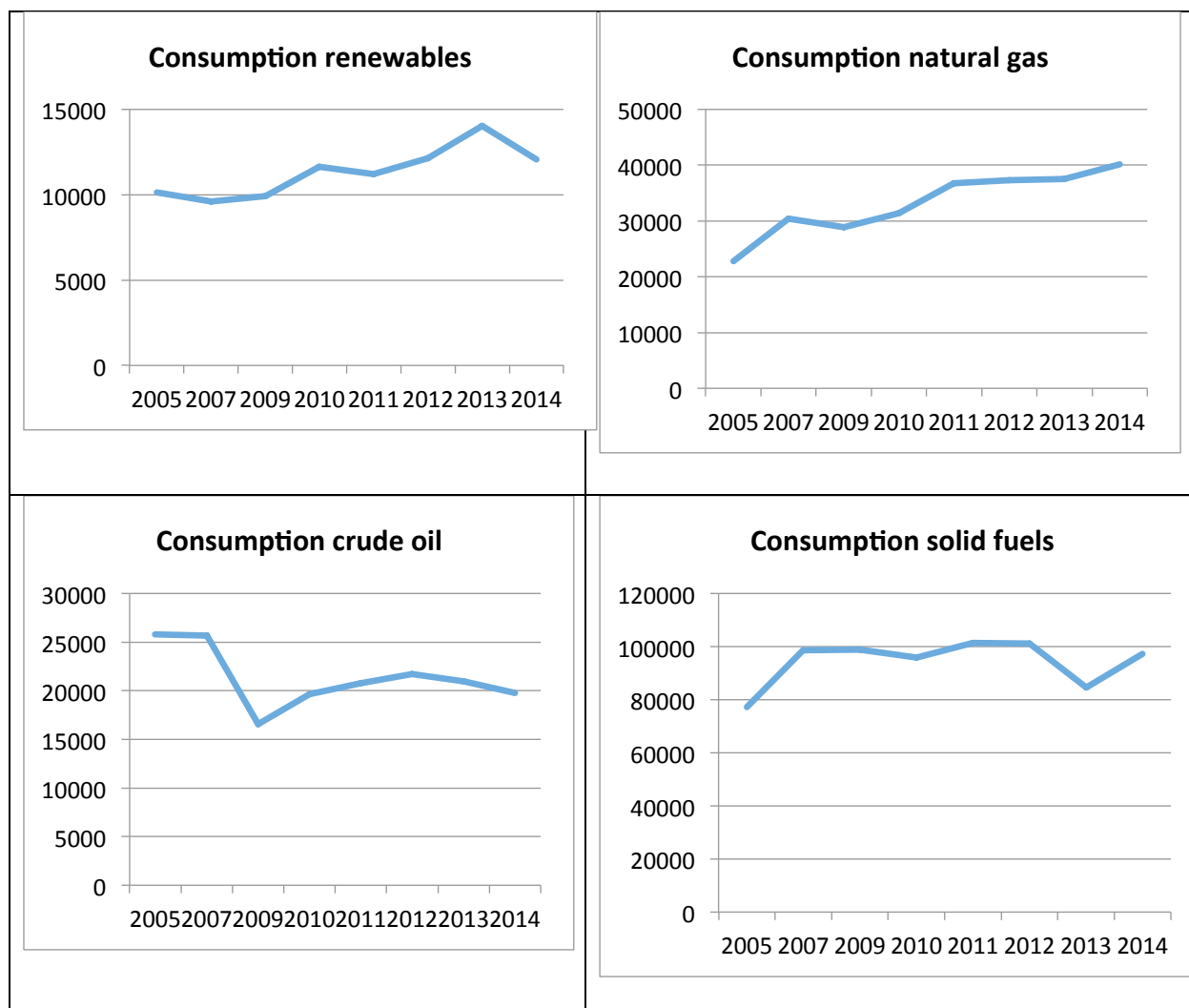
Turkish Energy Market

Major advantage of Turkey on the energy market is its geographical location. The lack of energy resources is easily supplemented by neighboring countries. Figure 3 illustrates consumption of main energy products in Turkey. Unlike Greece consumption of natural gas and solid fuels have opposite tendencies and experience increase. Thus in 2014 consumption of natural gas in Turkey increased by almost 40% since 2009. Many countries similar to Turkey increase share of natural gas in their energy consumption due to its less damaging effect on environment. Therefore energy security is becoming a strategic question worldwide, where countries struggle to diversify import countries. Major supplier of natural gas in Turkey is Russia, however recently the share of Russian imports decreased with an increased share of Azerbaijan. Thus in 2014 Turkey increased natural gas imports from Azerbaijan by 60% since 2011, and by 43% since 2013. Increase in solid fuel consumption of Turkey corresponds to renewed increased interest to coal use in domestic production, where coal consists about 47% of total primary energy production of Turkey. Coal is the second largest source for electricity production.

Consumption of crude oil products in Turkey had deep collapse in 2009, following two years of recovery with latest slight decrease. Main crude oil suppliers of Turkey were Russia, Iran and Saudi Arabia, however share of Russia extremely fell last five years, while Iraq steadily raised its share. Hence crude oil imports from Iraq increased almost six times since 2005 and more than doubled since 2010. Consumption of renewable energy in Turkey about five times exceeds consumption in Greece, however the increasing trend is similar to Greece. Both countries experienced decline in renewables consumption in 2014. Consumption of renewable energy mostly depends on domestic production due to its specific production type. Due to its high capacity for renewable energy, Turkey has 7th rank in the world. At the end of 2014 year Ministry of energy and Natural Resources released the National Renewable Energy Action Plan, where it is planned to increase the share of renewable energy sources to 30% in electricity generation by 2023 (MFA, 2016). In 2011 the share of renewables in the production of electric power contained 10% with following increase to 19% in 2015.

Figure 4 demonstrates production and trade of energy products in Turkey. Export and production of energy products in Turkey followed slight growing trend for the last decade, while import of energy products increased substantially. Increase in energy imports consisted 12% for the last decade in Greece, while Turkey increased its energy imports by 50% for the same period. Increase in total energy imports occurs due to significant increase in natural gas imports, which consisted 83% since 2005. In contrast to Greece growing economy of Turkey stimulates energy demand, thus in 2014 GDP of Greece has decreased by almost 20% since 2015, while GDP of Turkey increased by 45%.

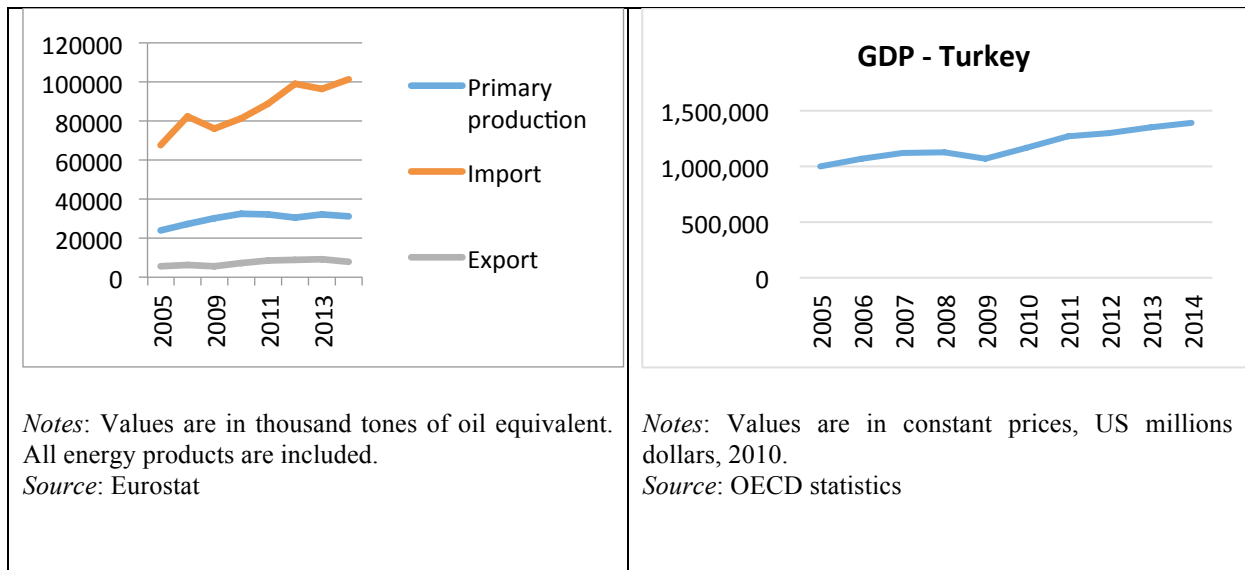
Figure 3. Consumption of main energy products - Greece



Notes: Consumption of renewables and natural gas are in thousand tones of oil equivalent, consumption of crude oil and solid fuels are in thousand tones.

Source: Eurostat

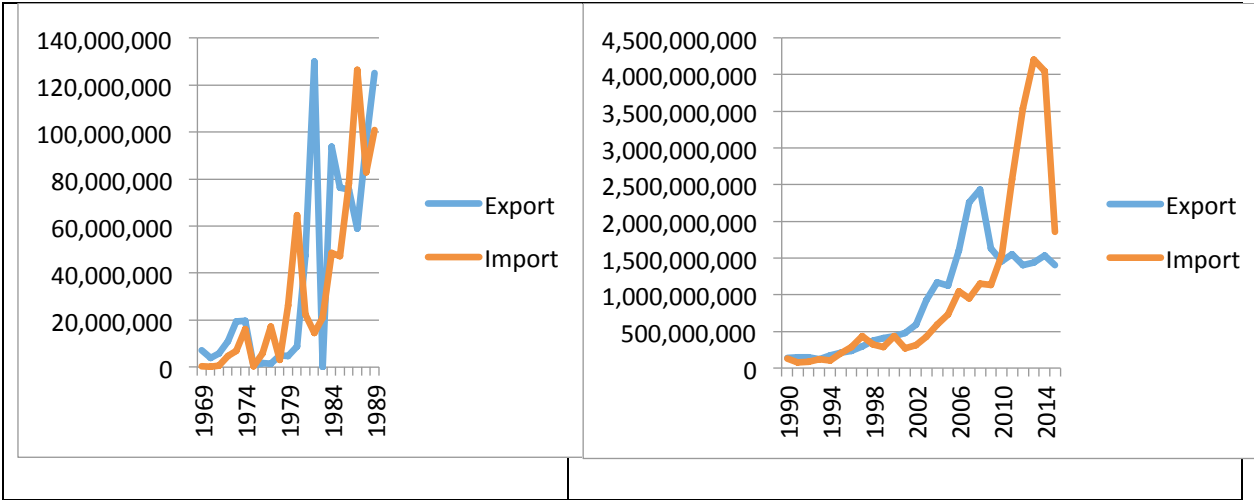
Figure 4. Production and trade of energy products



Energy Links between Greece and Turkey

Trade relations between Greece and Turkey have passed through unstable periods, Figure 5, where bilateral trade several times was reaching its picks and bottoms. However, since 1990 trade relations relatively stabilized. In 2003 since 1999, imports from Turkey increased by 126%. However it does not seem that political relations have significantly influenced bilateral trade, because in 1998 imports from Turkey increased by 213% since 1993. Despite of recent crisis in Greece, imports from Greece significantly have increased since 2010 and substantially exceeded Turkish exports. Nevertheless, year 2015 is characterized by weighty drop in imports from Greece, and 8% decline in imports from Turkey. In 2015 total Turkish exports experienced about 8% decline after long-term continuous growth. According to Turkish Economy Minister Mustafa Elitas, decline of Turkish exports to the European Union is justified by the fall of euro against the US dollar in 2015 by 19.7%, which indicates on exports growth in value but decline in value of the euro against the US dollar (Anadolu Agency, 2015).

Figure 5 Foreign trade, Turkey- Greece, US Dollars



Source: Eurostat

Major part of bilateral trade is related to mineral fuels and oils, where in 2014 Turkey exported 288 million US dollars worth products, while Greece exported to Turkey about 3 billion US dollars worth mineral fuels and oils. One of important portions of Turkish exports to Greece is natural gas. Major suppliers of natural gas to Greece are Russia, Algeria and Turkey. Since 1999 supply from Russia and Algeria significantly dropped, while Turkey almost did not change their supply. Due to the substantial fall in natural gas import from major suppliers, share of Turkey increased from 15% in 2011, to 21% in 2014.

Greece has three ports for natural gas transmission. The first port is located on the Bulgarian border, which is connected to a pipeline connecting Greece with Russia through Ukraine, Moldova, Romania and Bulgaria. The second port of a lower capacity is located on the Turkish border and receives natural gas from Turkey. The third port is located in Megara, northern part of Greece, Revithoussa Island, which is the liquefied natural gas (LNG) terminal. According to energy security the European Union including Greece are working on lowering the dependency on imported gas from particular sources. Thus, Greece managed to decrease its dependency on Russian gas from 100% in 1996 to 58% in 2014 (Eurostat).

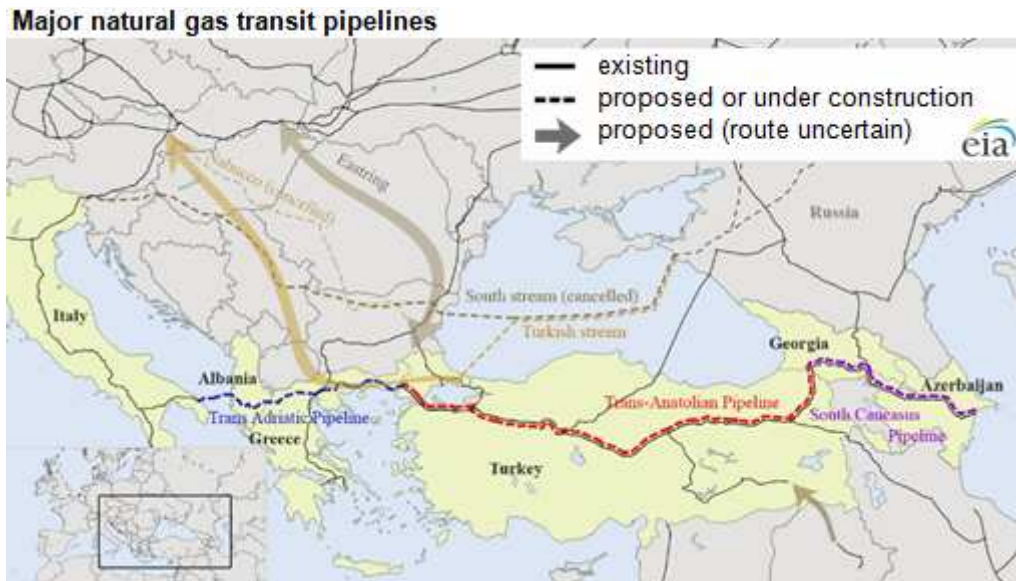
Therefore Greece is involved in new and planned projects for natural gas imports that will not only diversify import sources but increase capacity of natural gas receiving.

Greece was involved in the South Stream Pipeline project as a Greek branch to transmit natural gas from Russia, Caspian Region and Middle Eastern region to Europe. However in December of 2014 the project was cancelled by Russia due to political reasons. This project was replaced by Turkish Stream project, which will connect Southern Russian region under the Black Sea to Turkish Thrace. It is proposed that a part of natural gas passed through this pipeline will transmit gas to Europe through Greece.

Trans Adriatic Pipeline project is under construction and is supposed to supply natural gas from Azerbaijan's Shah Deniz gas field to Albania and Italy through Turkey and Greece. It is expected to start operations in 2017-2018 (Energia, 2016). At the same time Greece is planning to extend terminal of LNG in Revithoussa to increase its capacity and to include this terminal into a diversification plan. Another possible project is proposed by Israel. Israel is planning to exploit its extensive natural gas reserves to be connected to a suggested pipeline that will transmit natural gas to Turkey and to Greece through Turkey. Israel officials suggested that in the case of discovery of significant natural gas reserves in either of countries Israel or Egypt, the proposed pipeline has to be considered (Daily News, 2016).

Most of proposed or existing routes that supply energy to Greece and further to the European Union are passing through Turkey. Routes that are passing or are projected to pass through Turkey are safer in political, security and diversification terms. At the same time due to location of Turkey these routes are cheaper for their relatively shorter distance from energy sources, Figure 6.

Figure 6.



Source: U.S. Energy Information Administration and IHS EDIN

Both Turkey and Greece have strategic locations in natural gas transmission. However the geopolitical location of Turkey is of high importance for the European Union in terms of energy transmission. Turkey has a close proximity to more than 75% of proven oil and gas reserves of the world. In order to expand its role beyond energy hub to a regional energy trade hub, Energy Exchange Istanbul (EXIST) was established in 2015. The EXIST is expected to be main part on the regional level in trade and pricing of energy sources such as oil, natural gas and electricity. At the end of 2016 EXIST was covering only electricity with the plan of further expansion to oil and natural gas (MFA, 2016).

With the development of Turkish infrastructure to strengthen its position as energy hub for Greece, Greece itself is becoming energy hub for the European Union. Improvements in Greek-Turkish relations allow the European Union to get closer to its long-term project targets of energy resources diversification, as Turkey transmit natural gas from various countries. The second target of the EU's long-term projects of developing the barrier free infrastructure for unrestricted flows of energy to reach all members of the EU is making

Greece responsible for developing domestic infrastructure to connect Turkish lines to European countries.

Conclusion

This chapter analyzed the role of Greece and Turkey on the energy market and their energy relations on the international level. In Greece consumption of natural gas and solid fuels has been decreasing since 2011, while crude oil consumption was steadily and significantly increasing for the same period, which is the principal source of energy in Greece. Significant part of crude oil is used by transport and by transformation sectors. Greece is a net exporter of refined products to the EU and to countries outside of the EU, where Turkey is one of important importers of refined products from Greece. For more than five years Greece experiences contraction of production, which in turn gave opportunity to Greek refineries to expand their exports. Thus rate of growth of energy products exports exceeded the rate of growth of energy imports for last five years.

Turkey has different trend on the energy market, where imports of crude oil were decreasing for last several years, while natural gas and solid fuels consumption were growing. In contrast to Greece, Turkey has been experiencing continuous growth in production, except year 2009. Rise in energy demand corresponds to growing economy. Turkey has similar tendency to the world of increasing demand for natural gas for its less damaging effect on the environment. However, in order to diversify energy sources for energy security reasons, recently Turkey renewed its interest to solid fuels productions, such as lignite, which is not environment friendly as natural gas however it is of domestic production and relatively cheap source. Unlike to Greece growth rate of energy imports in Turkey substantially exceeds the growth rate of export. Therefore increasing trade deficit in energy products motivate domestic producers to expand domestically existent products.

Empirical literature does not provide evidence for making a conclusion on similarity of relationships between energy consumption and economic growth in Greece and Turkey. However, the analysis of domestic energy markets illustrated importance of these countries to each other. Neighborhood with Turkey gives opportunity to Greece to develop energy transmission infrastructure and to diversify sources of energy supply. With existing and planned projects Greece is becoming energy hub for Europe. At the same time geopolitical location of Turkey is of high importance for the EU. Due to its geographical location Turkey is able to connect to different suppliers of energy, like Caspian region countries, Iran, Iraq, and Syria. On the other side Turkey has a location opportunity directly to transmit energy to consumers in European countries through Greece and Bulgaria. Therefore it is advantageous for the EU to use Turkey as energy hub for the reason of diversification of energy sources.

Due to their geopolitical location both Turkey and Greece have the strategic importance in energy suppliers and energy consumers decisions on partners. Greece, being part of the EU is of high importance in energy transmission for European countries, in terms of security and distance. Turkey is a special country, which has proximity to 75% to all proven oil and gas reserves of the world, therefore it is difficult to avoid Turkey in energy transmission infrastructure in the region. In existing and proposed projects, both Greece and Turkey are playing role of energy hubs, therefore it is important for both countries to maintain and improve political and economic relations. Advanced political and economic relations between Greece and Turkey are important not only for these countries, but for countries of the region as well, which are energy suppliers from one side and energy consumers from another side.

Bibliography

- Adjaye, J.A. 2000. The relationship between energy consumption, energy price and economic growth: time series evidence from Asian developing countries. *Energy Economics*, 22(6), 615-625.
- Akinlo, A.E. 2008. Energy consumption and economic growth: Evidence from 11 Sub-Sahara African countries. *Energy Economics*, 30(5), 2391-2400.
- Al-mulali, U., Fereidouni, H. G., Lee, J.Y., Sab, C.N.B.C.S. 2013. Examining the bi-directional long run relationship between renewable energy consumption and GDP growth. *Renewable and Sustainable Energy Reviews*, 22, 209-222.
- Alshehry, A.S. and Belloumi, M. 2015. Energy consumption, carbon dioxide emissions and economic growth: The case of Saudi Arabia. *Renewable and Sustainable Energy Reviews*, 41, 237-247.
- Anadolu Agency, 2015. <http://aa.com.tr/en/economy/turkey-exports-decline-by-86-percent-in-2015/500275>
- Apergis, N. and Payne, J.E. 2009. Energy consumption and economic growth in Central America: Evidence from a panel cointegration and error correction model. *Energy Economics*, 31(2), 211-216.
- Daily News, 2016. Israel mulling twin gas pipelines to Turkey, Greece: Energy minister. December, <http://www.hurriyetdailynews.com/israel-mulling-twin-gas-pipelines-to-turkey-greece-energy-minister-.aspx?pageID=238&nID=94875&NewsCatID=348>
- Dergiades, T., Martinopoulos, G., Tsoulfidis, L. 2013. Energy consumption and economic growth: Parametric and non-parametric causality testing for the case of Greece. *Energy Economics*, 36, 686-697.
- DG Energy - http://ec.europa.eu/priorities/energy-union-and-climate_en

- Dogan, E. 2015. The relationship between economic growth and electricity consumption from renewable and non-renewable sources: A study of Turkey. *Renewable and Sustainable Energy Reviews*, 52, 534-546.
- Law 3851/2010 – “Accelerating the development of Renewable Energy Sources to deal with climate change and other regulations addressing issues under the authority of the Ministry of Environment, Energy and Climate Change”.
- <http://www.ypeka.gr/LinkClick.aspx?fileticket=qtiW90JJLYs%3d&tabid=37>
- Energia, 2016. Trans Adriatic Pipeline submits Third Party Access Exemptions in Albania, Greece and Italy. http://www.energia.gr/article_en.asp?art_id=24869
- Erdal, G., Erdal, H., Esengun, K. 2008. The causality between energy consumption and economic growth in Turkey. *Energy Policy*, 36(10), 3838-3842.
- Eurostat –Statistical office of the European Union, online website, <http://ec.europa.eu/eurostat/web/main/home>
- Fang, Z. and Chang, Y. 2016. Energy, human capital and economic growth in Asia Pacific countries – Evidence from a panel cointegration and causality analysis. *Energy Economics*, 56, 177-184.
- Fuinhas, J.A. and Marques, A.C. 2012. Energy consumption and economic growth nexus in Portugal, Italy, Greece, Spain and Turkey: An ARDL bounds test approach (1965-2009). *Energy Economics*, 34, 511-517.
- Katrakilidis, C., Kyritsis, I., Patsika, V. 2014. On the dynamic linkages between CO₂ emissions, energy consumption and growth in Greece. *European Research Studies*, 17(3), 79-90.
- Kocak, E. and Sarkgunesi, A. 2017. The renewable energy and economic growth nexus in black sea and Balkan countries. *Energy Policy*, 100, 51-57.

- Menegaki, A.N. and Tugcu, C.T. 2016. Rethinking the energy-growth nexus: Proposing an index of sustainable economic welfare for Sub-Saharan Africa. *Energy Research and Social Science*, 17, 147-159.
- MFA (2016) – Republic of Turkey Ministry of Foreign Affairs, Turkey’s Energy Profile and Strategy. <http://www.mfa.gov.tr/turkeys-energy-strategy.en.mfa>
- Nazlioglu, S., Kayhan, S., Adiguzel, U. 2014. Electricity consumption and economic growth in Turkey: Cointegration, linear and nonlinear Granger causality. *Energy Sources, Part B: Economics, Planning, and Policy*, 9(4), 315-324.
- Ocal, O. and Aslan, A. 2013. Renewable energy consumption-economic growth nexus in Turkey. *Renewable and Sustainable Energy Reviews*, 28, 494-499.
- OECD statistics - Statistical website for OECD countries, <http://stats.oecd.org>
- Omri, A. 2014. An international literature survey on energy-economic growth nexus: Evidence from country-specific studies. *Renewable and Sustainable Energy Reviews*, 38, 951-959.
- Omri, A., Mabrouk, N.B., Timar, A.S. 2015. Modeling the causal linkages between nuclear energy, renewable energy and economic growth in developed and developing countries. *Renewable and Sustainable Energy Reviews*, 42, 1012-1022.
- Ozturk, I. 2010. A literature survey on energy-growth nexus. *Energy Policy*, 38(1), 340-349.
- Raza, S.A., Shahbaz, M., Nguyen, D. K. 2015. Energy conservation policies, growth and trade performance: Evidence of feedback hypothesis in Pakistan. *Energy Policy*, 80, 1-10.
- Shahbaz, M., Zeshan, M., Afza, T. 2012. Is energy consumption effective to spur economic growth in Pakistan? New evidence from bounds test to level relationships and Granger causality tests. *Economic Modelling*, 29(6), 2310-2319.

- Shahbaz, M., Khan, S., Tahir, M.I. 2013. The dynamic links between energy consumption, economic growth, financial development and trade in China: Fresh evidence from multivariate framework analysis. *Energy Economics*, 40, 8-21.
- Shahbaz, M., Ozturk, I., Ali, A. 2015. Electricity consumption and economic growth causality revisited: Evidence from Turkey. *Bulletin of Energy Economics*, 3(4), 176-193.
- Tang, C.F., Tan, B.W., Ozturk, I. 2016. Energy consumption and economic growth in Vietnam. *Renewable and Sustainable Energy Reviews*, 54, 1506-1514.
- Tsani, S.Z. 2010. Energy consumption and economic growth: A causality analysis for Greece. *Energy Economics*, 32(3), 582-590.
- Tugcu, C.T., Ozturk, I., Aslan, A. 2012. Renewable and non-renewable energy consumption and economic growth relationship revisited: Evidence from G7 countries. *Energy Economics*, 34(6), 1942-1950.
- Yildirim, E., Sukuroglu, D., Aslan, A. 2014. Energy consumption and economic growth in the next 11 countries: The bootstrapped autoregressive metric causality approach. *Energy Economics*, 44, 14-21.