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Omer Ilker Poyraz
Old Dominion University

Omer Keskin
Old Dominion University

Resit Unal
Old Dominion University

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ENERGY SUSTAINABILITY OF TURKEY IN THE CASE OF LNG

Omer Ilker Poyraz*
Omer Keskin
Resit Unal, Ph.D.
Old Dominion University

iegri001@odu.edu

Abstract

Energy is both vital and strategic element for a nation to sustain its fundamental activities like security, logistics, heating, etc. Countries sustain their energy demands through internal or external sources. In the case of not being able to maintain energy demands from their internal sources, they would need to import their requirements. Whenever they need to buy raw materials, they have to build terminals to process the raw material into the required form. The dependency on the imports may cause the importing country to weaken its advantage in international conflicts, unemployment, and welfare. Therefore, countries aim to mitigate dependence to one country and seek for alternate countries. To keep the energy sustainable, they should not be dependent on a sole supplier country. A state chooses to increase its number of providers; it might cause economic advantages or disadvantages regarding the type of material. Besides, particular type of resources requires specific terminals, facilities, and technology to process the material to be ready to consume. Consequently, decision-makers should employ a holistic approach that should comprehend all of the aspects of the situation. We study the case of importing and building a terminal of Liquefied Natural Gas (LNG) to define criteria in maintaining the energy sustainability and profitability of Turkey.

Keywords

Natural Gas, LNG, Turkey, LNG Terminal Extension, Natural Gas Supply

Introduction

Arab Spring has changed the maps, governments, and social and business dynamics in the Middle East and North Africa. Local militias or terrorist groups have taken over the control in some part of Iraq, Syria and still have been struggling to take control in some North African countries like Libya. The turmoil in Syria has caused extra political conflicts between countries. Turkey's political position is opposed to Iran and Russia, which are leading natural gas suppliers of the country. The political tension between Turkey and Russia had increased when Turkey downed a Russian jet near Syria border. Russia immediately imposed an economic sanction to Turkey such as cutting imports. Experience with Russia and Iran force Turkey to diversify its natural gas suppliers to secure its energy demand and have a political advantage against those countries. Therefore, Turkey has sought out to find new suppliers. The country has already made agreements with Algeria and Nigeria to import LNG. Turkey also purchases from Qatar but in a small amount. Qatar and Turkey have been discussing the details of long-term LNG trade agreement.

In the last 25 years, Turkey's consumption of natural gas has increased. Turkey imports almost 99% of its demand from Russia, Iran, Azerbaijan, Algeria, Nigeria, Qatar and spot market. Turkey has long-term contracts with those countries except Qatar, which is in-progress. According to British Petrol (BP) Statistical Review of Energy, countries that has the most reserves respectively are Iran, Russian Federation, Qatar, Turkmenistan, U.S., Saudi Arabia, and so on (British Petrol [BP], 2015). Turkey purchases natural gas from Russia, Iran, and Azerbaijan through pipelines. Turkey also buys natural gas in liquid form from Algeria, Nigeria, Trinidad & Tobago, and Qatar. LNG Trade of Turkey in 2014 is displayed in Exhibit 1.

Exhibit 1. Turkey LNG Imports (EPDK, 2015; BP, 2015).

Turkey LNG Imports (billion cubic meter)	Algeria	Nigeria	Qatar	Spot Market	Total
2014	4.1	1.5	1.1	0.6	7.3
2015	3.7	1.4	1.7	0.6	7.4

Although import of natural gas fell in 2015, import of LNG increased in the same year. The share of LNG in 2014 was 14.8% but in 2015, it increased to 15.4%. The long-term LNG contract with Qatar and not extending the natural gas contract with Russia would encourage Turkey to buy more LNG.

The countries that Turkey import natural gas, and the end date of the contract are displayed in Exhibit 2.

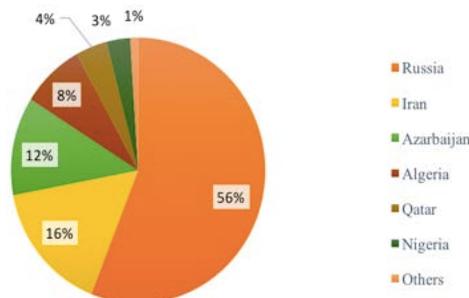
Exhibit 2. Turkey Gas contracts (BOTAS, 2015).

Agreement	Type	Amount (billion cubic meter)	Agreement Date	Start of Delivery	Duration	End Date	Status
Russia (Western Line)	Pipeline	8	2/18/1998	1998	23	2021	Active
Russia (Blue Stream)	Pipeline	16	12/15/1997	2003	25	2028	Active
Algeria	LNG	4	4/14/1988	1994	20+10	2023	Active
Nigeria	LNG	1.2	11/9/1995	1999	22	2020	Active
Iran	Pipeline	10	8/8/1996	2001	25	2026	Active
Azerbaijan (Shah Deniz - I)	Pipeline	6.6	3/12/2001	2007	15	2021	Active
Azerbaijan (Shah Deniz - II)	Pipeline	6	10/25/2011	2018	15	2033	Inactive

Natural Gas Imports

Turkey imported nearly 49 billion cubic meter (bcm) in 2014. In 2015 the number was 47 bcm. Peak demand for the natural gas was in winter. Turkey utilizes 50 % of gas import to generate electricity. The role of natural gas to generate electricity is important for Turkey. However, the country tries to decrease dependency to natural gas suppliers. The country also plans to invest in renewable energy. Also, by increasing the capacity of the existing LNG terminal and planning to construct a new LNG terminal in the south of Turkey will make the country more powerful in the case of an energy crisis. Especially in winter, the country must have enough storage and multiple gas suppliers to prevent its people from the shortage. The shares of imported natural gas is presented in Exhibit 3.

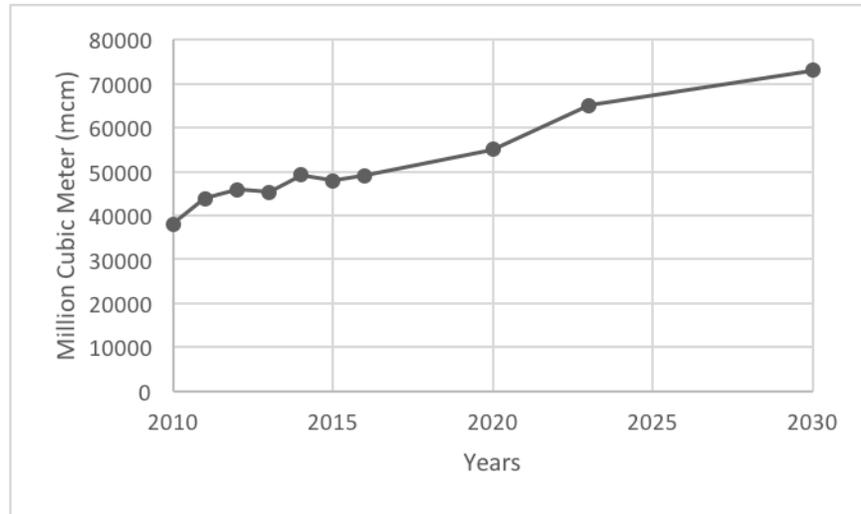
Exhibit 3. Turkey Natural Gas Import, 2015 (EPDK, 2015).



Turkey is highly dependent on Russia to import natural gas and generate electricity as well. Regarding increasing natural gas demand in next 20 years, supplier diversification is a must for Turkey. By 2030, Turkey’s natural gas demand will be expected to reach about 70 bcm. Exhibit 4 displays the forecast of gas demand of Turkey till 2030. Turkey will need more than 20 bcm of gas. In the Exhibit 2, you can see the end date of the contracts. Western Line and Shah Deniz-I contract will end in 2021. Turkey will either extend the contracts or make new agreements from different suppliers such as importing LNG from Qatar on a long-term contract.

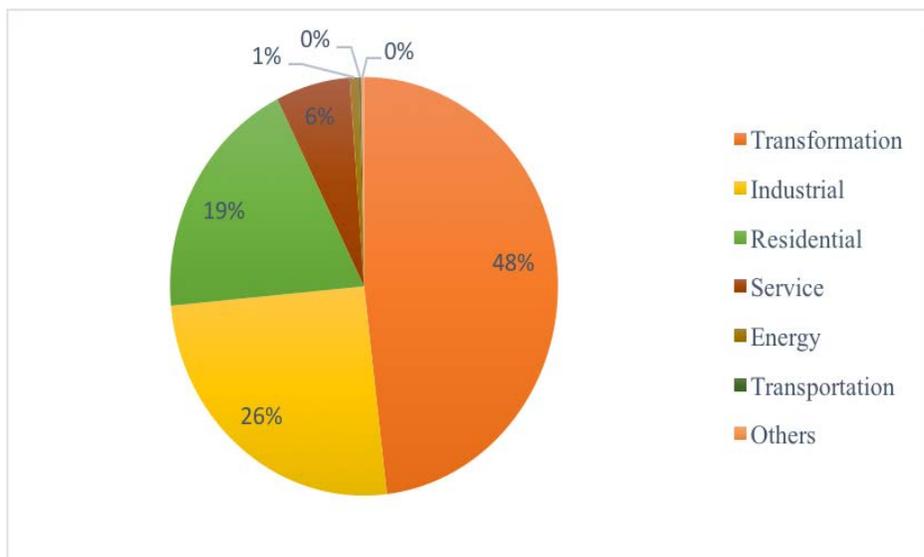
Turkey natural gas demand is expected to grow 3% yearly. If the country does not increase its renewable energy capacity or gain energy from nuclear, the demand projection shows that the demand will be 55 bcm in 2020, and it will be about 70 bcm in 2030.

Exhibit 4. Turkey Natural Gas Demand Projection (Rzayeva, 2014).



Major natural gas import is utilized to generate electricity. The rest of the areas are industrial, residential, service, transportation, energy. Distribution of the natural gas consumption based on the sectors is given in Exhibit 5.

Exhibit 5. Turkey Natural Gas Consumption (EPDK, 2014).



LNG Terminal Capacity and Utilization in Turkey

As of 2014, Japan is the most LNG importing country and Qatar is the most LNG exporting country in the world (BP, 2015). LNG demand is expected to have 15% share of energy demand in the world in 2035 (BP, 2016). The demand in Pacific-Asia is also significantly rising.

Turkey currently has two LNG receiving terminals; Aliaga LNG Terminal, and Marmara Eregli LNG Terminal. As of 2014, utilization of LNG terminals in Turkey is 51%. Details of the terminals and expansion capacity is presented in Exhibit 6.

Exhibit 6. Capacity of the Current LNG Terminals.

Terminal/ Capacity	Regasification& Daily send-out (million cubic meter[mcm] / year) with expansion	Planned Expansion by 2020 (mcm)	Regasification & send-out capacity per year (mcm/year) with expansion	LNG Tanks (cubic meter)	Additional capacity (cubic meter)
Aliaga	16.5	0	6 000	2 * 140 000	0
Marmara Eregli	18	9	8 200	3 * 85 000	160 000
Total	34.5 / (43.50)	9	14 200/ 17 200	505 000	160 000

By 2020, Turkey plans to have LNG terminals that can send out regasified LNG daily 44.5 million cubic meter (mcm), which will be equal 16.2 bcm/year. Turkey imported 27 bcm natural gas from Russia in 2014 (BP, 2015). 16 bcm of the import was Blue Stream. Turkey has to buy natural gas from Russia 16 bcm per year till 2028 due to this agreement between the countries. The deal is “take or pay”. Therefore, Turkey cannot cancel the import come through Blue Stream. However, the rest of the amount can be imported from a different source, which is 10 -12 bcm.

Why Turkey Need a 3rd LNG Terminal?

Turkey only has long-term LNG contracts with Algeria and Nigeria. It purchases LNG from Qatar on a spot market price, which is more expensive than long-term agreement price. Therefore, the country should make a long –term agreement to import LNG from Qatar in a large amount. The import amount of Nigeria and Algeria is 5.6 bcm for 2014, and 5.1 for 2015 in total. If the utilization of the existing terminals is be raised up to 100%, LNG import would be increased about seven bcm. However, there is still a gap to fill four bcm. With the expansion of Marmara LNG Terminal will provide to reserve additional three bcm in 2020 (TRT, 2016). Regarding increasing demand of natural gas in Turkey in 2021, 55 bcm, there is still need to purchase and store natural gas. Supposing ending contract with Russia and extending with Azerbaijan will also require additional 10- 12 bcm natural gas. Therefore, even with the full utilization of the terminals, Turkey will still need to import at least two bcm natural gas. By 2030. Turkey natural gas demand is expected to be more than 70 bcm /y. Therefore, a new LNG receiving terminal with a capacity of six bcm or more would help Turkey to secure its energy demand. Another issue related to import from Russia is that Russian deal of Western pipeline will end in 2021. Russia or Turkey might not extend the contract due to political or economic reasons. The pipeline provides about ten bcm/y natural gas to Turkey.

Scenario

The scenario reflects the projection for the year of 2021 and 2025. LNG contract with Nigeria will end in 2020. Western Line contract with Russia and Shah Deniz –I contract with Azerbaijan will end in 2021. Turkey is supposed to renew its contract with Azerbaijan and Nigeria. However, it will not renew the contract with Russia to decrease the dependency to one country. Turkey LNG contract with Algeria is supposed to be extended again in 2023. According to the scenario, Turkey will not change its energy policy, and also it will not invest more in renewable energy. The need for new LNG terminal capacity is displayed in Exhibit 7. In 2025, if Turkey makes long-term LNG contracts with major LNG suppliers like Qatar, the country will need to import 21 bcm LNG. If the utilization of existing terminals is at least 100%, the country will need a 3rd LNG terminal to regasify.

Exhibit 7. Projection of natural gas demand and need of LNG terminal.

Year	Demand	Gas from existing contracts/ LNG import	Available LNG Capacity	Need to import/ new contract	Need of LNG terminal capacity	Need of LNG terminal
2021	55	43.8 / 7.3	10	11.2	1.2	Possible
2025	65	43.8 / 7.4	10	21.2	11.2	Necessary

Why not Pipeline?

The route of proposed pipeline to deliver Qatar’s natural gas to Turkey and Europe was through Qatar- Saudi Arabia- Syria and Turkey. However, the civil war in Syria and Iraq prohibits building a pipeline from Qatar to Turkey. Therefore, the only option remains is shipping the LNG through vessels as it is shown in Exhibit 8. Turkey can be a hub to deliver Qatar natural gas to Europe with its existing pipeline substructure to deliver the regasified gas to Europe.

Exhibit 8. LNG Route from Qatar to Turkey.



Conclusion

The first reason to build an LNG receiving terminal is fall in the price. LNG price trend follows oil price trend. If oil prices tend to decrease, then, LNG prices seem to decrease in four months. LNG prices were increasing until 2014, however, fall in the price of oil also lowered LNG prices (International Gas Union, 2015). LNG prices of Henry Hub, Europe, and Japan has significantly decreased for the last two years (Natural Gas Intel, 2016). Therefore, the overall LNG demand in the world has been increasing, particularly in Pacific Asia. Lower LNG prices might encourage countries to choose gas instead of coal, and oil products to generate power. Also, entering of the U.S. and Australia to LNG market as a supplier will force competitors to decrease price more.

Next reason is increasing gas demand of Turkey in the next 15 years. In 2021, natural gas demand is expected to be 55 bcm, and in 2025, 65 bcm, in 2030, more than 70 bcm. Regarding some contracts will be expired during the next 15 years, either Turkey should find new suppliers or extend the contracts with them with an increase in the import amount as well.

Another reason is the need of Turkey to diversify its energy suppliers. Depending on one or two countries to meet its energy demand might force Turkey to be vulnerable in both politic conflict and energy crisis. Turkey already

had energy crisis with Russia and Iran in the last ten years. Therefore, Turkey needs to find different suppliers and decrease the dependency to Russia to import natural gas. One way to diversify supplier is building LNG terminal and make a long-term contract with Qatar.

The final reason is to have an LNG terminal is that since there is a war in Syria, which makes pipeline transport impossible from Qatar to Turkey. Turkey might sell Qatar's LNG through its already built pipeline structure to Europe by regasifying LNG (See Exhibit 8).

Limitation/Concerns

Since Turkey uses half of the imported natural gas to generate electricity, the country might use other options to generate power. Investing in renewable, solar, and nuclear energy might make building LNG terminal unnecessary. The other uncertainty would be the civil war in Syria. If the war ends soon, the pipeline would be the best option to transport Qatar gas to Turkey. That would also make LNG terminal unnecessary. The last concern might be fragile prices in LNG market such as fluctuating prices during the last ten years. In 2005, it was about \$4 but in 2014 it is more than \$16 in Japan (BP, 2015).

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About the Authors

Omer Ilker Poyraz is a Ph.D. student in the Engineering Management and Systems Engineering Department at Old Dominion University in Norfolk, Virginia. He has B.A. in Business and Administration. He received his MBA degree from Old Dominion University in 2015. His research interests include middle management, knowledge management, cyber warfare, and military leadership.

Omer Keskin is a Ph.D. student in the Engineering Management and Systems Engineering Department at Old Dominion University in Norfolk, Virginia. He has B.S. in Systems Engineering. He received his M.S in Engineering Management from Old Dominion University in 2015. His research interests include reliability engineering, quality, robust design, cyber physical systems, and decision making techniques.

Dr. Resit Unal is a Professor in the Department of Engineering Management and Systems Engineering at Old Dominion University. He has B.S. in Electrical Engineering and received his M.S. and Ph.D. in Engineering Management from the University of Missouri, Rolla in 1983 and 1987 respectively. Dr.Unal's research interests include Multidisciplinary Design Optimization, Robust Design, Quality Engineering, Response Surface Methods, and Parametric Cost Estimating.

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