



## COMMENTS ON THE ROLE OF TURKEY AS AN ENERGY CENTER

by *Oğuzhan Akyener and Mehmet Apaydın*



"Despite the failures in meeting local energy needs with national resources, abundance of supply is fortunately not far away since geopolitical location of Turkey is able to create some opportunities for its energy supplies."

### ABSTRACT

Turkey, due to growing population and economy, faces increasing consumption of energy, and day by day, becomes naturally a center of demand for energy sources in a strategic geography with abundant sources, but unfortunately, all the valuable sources are discovered outside the country borders. Even though public related institutions and private sector do their best to accelerate the exploration projects lately, the outcomes are dissatisfactory and the increase in the production is always far from compensating the increase in energy demand.

The increasing demand and unsatisfactory exploration results lead to more energy shortage, which means higher overdependence of external suppliers. Despite the failures in meeting local energy needs with national resources, abundance of supply is fortunately not far away since geopolitical location of Turkey is able to create some opportunities for its energy supplies. As clearly seen in the world map, Turkey has a position as a bridge between the energy-rich area (covering the Caspian Region, the Middle East and the East Mediterranean Sea) and the demand center, Europe. This leads Turkey to become an important energy corridor in the region.

It is obvious that there will be enormous strategic and economic benefits of becoming an energy corridor between energy producing and consuming giants. However, if Turkey wants to get a bigger share from global energy pie, studies shall focus on forming a real energy center as opposed to being a transit country in this location.

In this paper, the strategic and economic benefits for the situation of Turkey as an energy corridor today and in the future (2035) will be analyzed. Moreover, after defining an energy transit corridor, energy hub, and energy center, the difference between becoming an energy corridor, energy hub, and a real en-

ergy center will be mentioned. As a result, opinions on some necessary steps that Turkey shall take to become an energy center will be elaborated and consistencies of Turkey being an energy transit corridor and a real energy center will be analyzed.

### INTRODUCTION

Many researchers analyzed the energy strategy of Turkey in the last two – three decades over different aspects. In general, all the studies declared that Turkey has advantages and disadvantages related to energy policy when global dynamics and regional politics are considered. It is clear to see that Turkey is not an energy center or an energy hub in recent conjuncture because Turkey is not an energy exporter country, or not even a price maker in energy sector. At this point, a relevant question might appear; "If Turkey is dependent on Russia and other countries in the means of energy, how will it be possible to shift from being the transit corridor to the energy hub or to the energy center? To find a sincere answer to the question, analysis presented in this study concentrates on future projects, the year 2035 forecasts, regional politics, and global dynamics in energy sector.

Today, Turkey can be regarded as an energy transit corridor (actually a crude oil corridor only) between Asia and Europe. Turkey's natural position can be defined as a bridge between energy-rich territories such as the North-East Caspian, the East and South-East Middle East, and Caucasia. With further political developments, Turkey wishes to become an energy hub or even an energy center but it is not easy to become an energy hub with current energy strategies and since Turkey requires brand new energy policies.

In reality, Turkey hosts huge oil and gas pipelines such as Baku – Tbilisi - Ceyhan (BTC), Kirkuk – Ceyhan Oil Pipeline or Baku – Tbilisi – Erzurum Gas Pipeline (BTE), and



is a secure transit way for hydrocarbon transport. However, this fact does not mean Turkey owns nor has a choice to sell or re-sell the oil and gas inside its borders. Moreover, for being an energy center all types of energy resources have to be evaluated i.e. oil and gas are not the only items. As a result, Turkey has to produce, buy, store, sell & trade and transport all types of energy resources to be an energy center. This means a difficult and long term planning and can be followed as a mission that has to be detailed and divided into the applicable steps. Otherwise, undetailed and uncoherent plans will never make Turkey establish successful strategies. Moreover, Turkey's hopeful dreams may not turn in to reality.

A new developing Turkey has the background, vision and capacity to follow successful energy politics. That is why; the first step is to make accurate definitions and evaluations. The second step will include the effective planning to shape the future.

From this point of view, Turkey's current popular theory of being an energy center will be evaluated and analyzed within this study by giving the conceptual definitions.

## **BEING AN ENERGY TRANSIT CORRIDOR**

Being an energy transit corridor technically means the transition of all energy sources via associated systems from one side to other, or in other words, transition of all energy sources such as oil, gas, and electricity from the suppliers' side to the buyers' side via transportation systems.

Turkey is partially an energy transit corridor with its recent features (current pipelines). It consists of a variety of hydrocarbon pipelines, flowing hydrocarbons from Russia, the Middle East, and the Caspian Region, and conveys them to the European market via the Mediterranean Sea<sup>4</sup>. In current conjuncture, Turkey plays a receiver - transmitter role in oil and gas transportation system.

However, in the concept of her current sit-

uation, she is not a gas or electricity transit country but in the new future (expected in 2019) with the start of Shah Deniz Gas Project of Azerbaijan, Turkey will gain the statue of being a gas transit country, too.

## **BEING AN ENERGY HUB**

Technically, being an energy hub is a more complex system than being an energy transit corridor. Energy hub comprises the control mechanism of energy distribution through oil and gas pipelines, nuclear power plants, hydro plants, and other energy resources. Moreover, it provides the exportation or sale options in addition to domestic needs. Therefore, Turkey as a current importer shall have the diversity of resources to be an energy hub and to rise to the exporter level. The diversity shall include huge storage capacities and trade centers built in the national and international territories.

It is available to find some examples for hubs, but they partially include hub properties, such as Henry gas hub or Baumgarten gas hub. Under current circumstances, Turkey is not an energy hub due to lack of oil and gas resources, limited store facilities and restraints on current energy agreements.

## **BEING AN ENERGY CENTER**

In a simple way, being an energy center can be defined as the advance level of energy hub activities. In detail, an energy center needs high level of investment in energy, such as building nuclear power plants, comprehensive oil and gas pipeline infrastructure, increasing number of refineries, LNG terminals, natural gas storage facilities, and so on. In addition, an energy center must provide a sustainable energy system and sufficient energy intensity. An energy center has the authority and power to lead regional or global energy sector via pricing the energy market and regulatory actions.

Some experts use "energy center" term for Turkey's future energy disclosure so often, but it seems impossible for the near future

"Turkey is partially an energy transit corridor with its recent features (current pipelines). It consists of a variety of hydrocarbon pipelines, flowing hydrocarbons from Russia, the Middle East, and the Caspian Region, and conveys them to the European market via the Mediterranean Sea."

"An energy center has the authority and power to lead regional or global energy sector via pricing the energy market and regulatory actions."



due to lack of investments, strategic plans, nonbearing huge oil and gas reserves and having no suitable storage facilities.

### TURKEY AS AN ENERGY TRANSIT CORRIDOR: TODAY

Initially, it has to be mentioned that Turkey with its current properties, is not an energy transit country. Turkey is considered as an oil transit corridor because as mentioned previously, energy transit zone region must include all the transit options for energy sources such as oil, gas, and electricity (generated from nuclear, renewable, biomass and other due resources).

First, to assess Turkey's current situation as whether or not an energy center, existing infrastructures must be determined. Demand and supply potentials exist but infrastructural facilities are inadequate, which means this equation will not be valuable. Second, potentials of new supply and demand options must be considered together. At last, average transit

transport Azeri crude oil to Supsa, Novorossiysk (Russia), Ceyhan and Batumi (Georgia) terminals. (BTC's daily average transport volume is around 600 000 bbl.)

- CPC carries Kazakh crude oil to Novorossiysk terminal. (Daily average transport volume is around 400 000 bbl.)
- Kirkuk (Iraq) – Ceyhan transports the Iraqi oil to Ceyhan terminal. (Daily average transport volume is around 450 000 bbl.)
- By the way of related terminals, oil is shipped to the global market.
- Bosphorus is another strategic point of Turkey as a transit zone, in which all Black Sea oil is transported to the global market.

After briefing the infrastructure, the current oil and gas production – consumption (supply / demand) volumes of the related countries (an importer or exporter) in the region are listed in Table 1. Negative values in the supply / demand columns point if the associated country is an oil or gas importer.



Figure 1: Infrastructural facilities that make Turkey an oil transit corridor.<sup>4</sup>

volumes will show the importance of Turkey to be a transit country.

As it can be seen from the Figure 1:

- Turkey hosts 5 major pipelines and 1 railway in the region that are important for being an oil transit center.
- BTC, WREP, NREP and the railway

As it can be observed from Figure 2 that shows the supply & demand volumes on map view:

- EU is an important importer and there is a huge supply potential in Russia, Kazakhstan, Azerbaijan and Iraq in the region.

From where Turkey stands;



	CURRENT SITUATION (AVR)					
	OIL (1000 bbl/d)			GAS (bcm/a)		
	PRODUCTION	CONSUMPTION	SUPPLY/DEMAND	PRODUCTION	CONSUMPTION	SUPPLY/DEMAND
EU	1500	19000	-17500	146	438	-292
RUSSIA	10800	3200	7600	578	409	169
TURKMENISTAN	239	139	100	69	27	42
AZERBAIJAN	800	100	700	17	9	8
KAZAKHSTAN	1700	276	1424	19	5,6	13,4
UZBEKISTAN	67	65	2	57	48	9
IRAN	3600	2000	1600	172	170	2
IRAQ	3200	1000	2200	1,3	1,2	0,1
ISRAEL	0,5	223	-222,5	7	7,6	-0,6
TURKEY	50	724	-674	0,5	49	-48,5

Table 1: Current oil and gas supply – demand rates in the region.<sup>4,5,6,7</sup>

- Through the Bosphorus around 3 million bbl oil is transported per day.
- From the Ceyhan terminal 1 million bbl oil is transported per day.

Figure 1 and 2 prove that Turkey is an oil transit country that currently transits 4 million barrel of oil per day, and reaches the regional oil to the global market.

If Turkey’s gas options and the oil transit situations are evaluated, following assumptions can be deducted from Figure 3:

- The European Union is an important demander for gas and the Caspian Region is the main supplier.
- However, due to the lack of infrastructure (such as pipelines or LNG terminals) transporting gas abroad is currently not very economical to trade through Turkey.

It will be better to transfer it by using the Russian system.

- That is why, Turkey is not a gas transit country for today, but future conditions and the increase in gas demand might turn Turkey in to a new transit way.

To sum up, lack of infrastructure and lack of investment are the barriers of Turkey to become a gas transit corridor. With current economical inputs, it is not feasible to transit Iranian and Turkmen gas to Europe via Turkey because of the high costs. For such reason, Turkey can be considered as an oil transit corridor from a global perspective.

### TURKEY AS AN ENERGY TRANSIT CENTER: 2035

After the assessment of Turkey’s current situa-

"Turkey is an oil transit country that currently transits 4 million barrel of oil per day, and reaches the regional oil to the global market."

"Lack of infrastructure and lack of investment are the barriers of Turkey to become a gas transit corridor."



Figure 2: Oil supply & demand volumes in the region.<sup>4</sup>





Figure 3: Current situation of Turkey as a gas transit country.<sup>4</sup>

"Pipeline infrastructure for crude oil transportation will be the same in 2035 because the demand will not grow substantially in 20 years."

tion as an energy transit center in the region, the year of 2035's situation is selected for the analysis. Analyzing the year 2035's conditions, some important assumptions are taken under consideration:

- Best scenario case considers the acceptance of production – supply potentials.
- Oil prices are taken over 100 USD.
- No sanctions on Iran are noted.
- The political stability in the Middle East and Caspian region is provided.
- Massive investment option is available in related countries.
- Terrorism is solved.
- Conflicts between Northern Iraq and Central Iraq governments are solved.

Pipeline infrastructure for crude oil transportation will be the same in 2035 because the demand will not grow substantially in 20 years. For the gas transportation system, new stand-alone pipelines will be constructed with massive investments. Figure 4 gives the new gas pipeline options that will be constructed through Turkey:

- SCP transports Azeri gas to Georgia and Turkey.
- Extended SCP (SCPX), TANAP, and TAP projects were constructed and transports Azeri gas to the European Union via Turkey.
- Turkish Stream is planned for transporting Russian gas to Turkey and EU. (However, it will be too early to estimate

SCP	SCPX*	TANAP*	TAP*	TURKISH STREAM
42°	48°	56°	42°	48° (Four lines)
2006	2018	2018	2019	7
8,5 bcm	16 bcm	16 bcm	10 bcm	63 bcm
692 km	692 km	1700 km	870 km	1090 km



Figure 4: Major pipeline systems that transfer gas via Turkey to Europe in 2035.<sup>4</sup>



	2035 ESTIMATIONS (AVR)	
	OIL EXPORT POTENTIALS (1000 bbl/d)	GAS EXPORT POTENTIALS (1000 bcma)
RUSSIA	6000	350
TURKMENISTAN	250	140
AZERBAIJAN	250	40
KAZAKHSTAN	2100	60
UZBEKISTAN	0	80
IRAN*	1500	100
IRAQ	6000	8
ISRAEL	0	5

Table 2: 2035 Estimations for oil & gas export potentials in the region.<sup>1,2,3</sup>

the success of the capability of this pipeline project.)

After defining the infrastructures, Table 2 above gives the possible export volume estimations of the supplier countries in the region.

The potential daily oil supply that is shown in Figure 5 can be evaluated as follows:

- Supply potential from the Caspian region will decrease in 2030s. This will result in a decrease in the transit volumes through Bosphorus.
- Supply potential from Iraq will increase. Moreover, with additional transportation routes, partial Iranian crude might also reach to Ceyhan terminal. Therefore, estimated transit volumes via Ceyhan terminal will be higher than 1 million barrels per day.

As a result, from the point of view to be an oil transit country, the current situation will not make a considerable change in 2035.

As seen from the Figure 4, new gas pipelines will be constructed up to 2035. This will result in an active gas trading between suppliers and buyers. Figure 6 below displays the supply and demand potentials for the year 2035.

In order to determine the transit volumes through Turkey, assumptions that are given below must be considered, also they can be seen in Figure 7:

- 3 bcma portion of 5 bcma Israeli gas reaches to Turkey.
- 5 bcma portion of 8 bcma Iraqi gas reaches to Turkey.
- SCPX and TANAP capacities are extended, but due to capacity limits, 31 bcma of 40 bcma Azeri gas comes to Turkey.
- As a result of economic assessments, transportation of Iranian gas through Turkey to the European Union via stand-alone pipeline is not feasible (due to high tariffs and market conditions). On the other hand, Iran can send gas to Turkey for utilizing in the Turkish gas market.

"New stand-alone pipelines will be constructed with massive investments for the gas transportation system."

"New gas pipelines will be constructed up to 2035. This will result in an active gas trading between suppliers and buyers."



Figure 5: 2035 oil transit volumes via Turkey.<sup>1, 2, 3</sup>

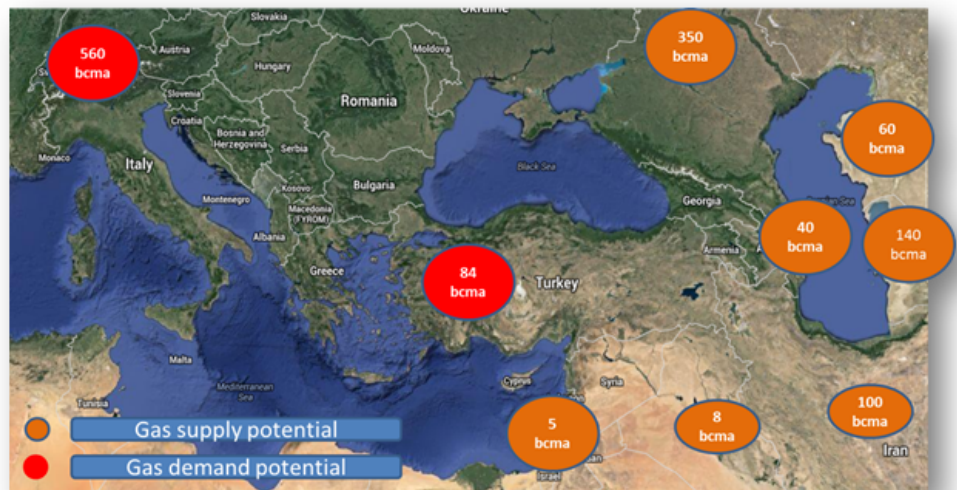


Figure 6: Gas supply & demand potential of 2035 in the region.<sup>1,2,3</sup>

"In 2035, Turkey will become an energy transit country for both crude oil and gas markets (and actually a gas transit hub). Turkey will provide 4 million barrels of oil per day for the global oil market, and gas supply rate through Turkey will be around 65 bcma with the best scenario case."

- This option will be economical.
- If the construction of the Turkish Stream is successfully completed, then more than 60 bcma gas will be transportable to EU through.
- Turkmen and Uzbek gas transport options are not taken into consideration due to lack of facility, economic conditions, and market limitations. Gas transportation will only be economic, if they transport it to EU through Russia and the Turkish Stream.
- 33% of gas will be used in Turkish Market, and the remaining portion will directly be transferred to EU considering the economic conditions and insufficient facility properties.

As a result of the assumptions made above, the estimated cumulative gas transit volume via Turkey will reach 65 bcma in 2035.

To sum up, in 2035, Turkey will become an energy transit country for both crude oil and gas markets (and actually a gas transit hub). Turkey will provide 4 million barrels of oil per day for the global oil market, and gas supply rate through Turkey will be around 65 bcma with the best scenario case.

### COMMENTS

This study focused on positioning of Turkey in global energy sector and examined the im-

portance by comparing recent and future energy policies. As mentioned in the previous sections, Turkey is an energy importer country, mainly gets oil and gas from its neighbors. As an advantage of having neighbors with considerable amount of world reserves, Turkey is headed to become a transit center year by year.

On the other hand, it is extremely hard to see the future of Turkey as an energy hub or an energy center with current energy agreements and developments. Lack of lobby activities, not being able to develop effective international energy politics, having only a little support from the private companies, universities and civil organizations, diverts Turkey from using her strong geographic position in regional energy dynamics.

Another issue is regarded as investments. Turkey cannot step up in the region without creating massive investments and implementing development plans. Beside these issues, non-governmental organizations have to take a position to support energy investments with feasible solutions. Unfortunately, most of these organizations are against to energy investments like nuclear power programs without creating an effective solution to generate energy from substitution sources.

### CONCLUSION

Technically, oil, gas, and electricity sectors





Figure 7: Gas supply to Turkey in 2035.

require separate assessments because each of them has different properties, market conditions that require distinctive developments.

If the year 2015 and the year 2035 rates and policies are compared, there will be no significant changes observed in oil sector in Turkey. Turkey will remain as an oil transit country with the supply of 4 million barrels of oil per day to the global market. However, a potentiality option will emerge, if Iraq (Northern Iraq) and Iran supplies more oil via pipeline systems by using Ceyhan terminal to the Europe and other markets.

In reality, using the Persian Gulf is a more economical way for Iran, but new foreign policies might change the balances. For the central Iraq, Iraq to Jordan pipeline, which is under construction, demonstrates that only northern Iraq oil resources will choose the Turkish root to reach the world market.

At this point, Turkey will absolutely need enhancements in oil storage capacity to provide more trade options via Ceyhan Terminal. It is clear to note that changing the balances in regional pipeline strategies and due investment programs will increase the importance of Turkey in oil transfer. Moreover, making Ceyhan a huge refinery and storage complex will make more crude be handled and be traded inside (by) Turkey. This will result in Turkey being a more important oil trading hub in the future.

As far as future gas policies are concerned,

Turkey should increase her storage capacity. This is vital for her to be a gas trader in the future. Hence, in the new future, Turkey will be a gas transit country and the volume of Azeri gas supply will increase. In addition to Azeri gas, Eastern Mediterranean, some small portions of Northern Iraq and with a new route through Russia (through new popular pipeline idea: Turkish Stream) Turkmen gas and more Russian gas will be able to be taken into the boundaries of Turkey for utilization, transition and trade. These options can only be handled with coherent, long term gas strategies, investments, building new storage facilities (inside or outside Turkey), legislations and agreements.

As the nature of geography, Turkey is the connector between Asia and Europe, and in many conditions, using this way for energy transfer is much safer and economical when compared to other options. Transition of Iranian and Turkmen gas to EU is also considered in this analysis, but it is not economic with assumed circumstances. Due to enhancement planning's, increase in gas transfer is highly required. Therefore, if Turkey wants to improve its great importance in the region, limited gas storage capacity will appear as a crucial concern. Due to enhancements in gas transit volume, Turkey might even rent places in other countries to store surplus gas.

In 20 years, electricity generation might accelerate upward associated with possible projects. For instance, Azerbaijan can generate

"Turkey will remain as an oil transit country with the supply of 4 million barrels of oil per day to the global market. However, a potentiality option will emerge, if Iraq (Northern Iraq) and Iran supplies more oil via pipeline systems by using Ceyhan terminal to the Europe and other markets."





electricity from natural gas and transfer it to Europe through Turkey via power plants. Similarly, Iran, Eastern Mediterranean or Iraq can apply the same strategy, too. In regards to these projects, Turkey will need massive investment in power plant construction inside or outside the country. In addition, Turkey needs a new policy to provide diversity in electricity generation from a variety of sources other than oil and gas such as nuclear, biomass, hydroelectric etc.. Domestic production can offset a slight ratio of oil and gas demand from external suppliers, which is extremely important for Turkey.

To summarize, from where we stand, it is not coherent to see Turkey's position as an energy center or energy hub for the next 20 years. Hence initially to be an energy center, Turkey must produce, store, sale/trade, transit all types of energy resources. Secondly, massive investments and long term energy politics are important.

On global scale, Turkey's energy transfer volume is not as important as expected. Due to economic and political reasons today, neighboring countries slightly use Turkey as an energy transit route. The change in Turkey's destiny can be related to unstable political conditions and problems in the Middle East and the Caucasia. Because of increasing terrorism and potential conflicts in our region, Turkey will emerge as a new option for supply security.

## ABBREVIATIONS

AVR: average  
BTC: Baku – Tbilisi – Ceyhan Pipeline  
SCP: South Caucasus Pipeline  
NREP: Northern Root Export Pipeline  
WREP: Western Root Export Pipeline  
CPC: Caspian Pipeline Consortium

## REFERENCES

<sup>1</sup> Oguzhan Akyener, "Azerbaijan Gas Export Potential & Related Infrastructures for EU & TR Energy Security Issues (up to 2050)", IP-

ETGAS, 2015.

<sup>2</sup> Oguzhan Akyener, "Southern Gas Corridor, Milestones and Other Turkmen Gas Export Options (via Turkish Stream)", Insight Turkey, 2015.

<sup>3</sup> Oguzhan Akyener, "Energy Security Struggle in Caspian Region From the View of Important Pipeline Projects", TESPAM – Energy Policy Turkey (This Issue), 2016.

<sup>4</sup> Oguzhan Akyener, "Azerbaijan's Role for Turkey Being an Energy Transit Hub", Azerbaijan Oil & Gas Week, 2013.

<sup>5</sup> SOMO Oil Marketing Company; accessible from <http://somoil.gov.iq/>

<sup>6</sup> BP, "Energy Outlook", 2035.

<sup>7</sup> CIA Fact book.

<sup>8</sup> Bilgin M., "Turkey's Energy Strategy: What Difference Does it Make to Become an Energy Transit Corridor, Hub or Center", UNISCI Discussion Papers, May 2010, ISSN 1696-2206.

"If Turkey wants to improve its great importance in the region, limited gas storage capacity will appear as a crucial concern. Due to enhancements in gas transit volume, Turkey might even rent places in other countries to store surplus gas."