Energy-hungry Turkey[1]

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Growing domestic energy demand and the objective of being an energy transit hub have shaped Turkey's energy sector in the last decade. To meet the growing demand while managing its effects on national budget deficits, Ankara has liberalized the energy market and diversified its energy sources and suppliers. Both of these measures boosted success for the objective of being an energy center, alongside the Bosporus straits' strategic role for Russian oil. Moreover, Turkish territories also welcomed the Baku-Tbilisi-Ceyhan oil pipeline and the Trans-Anatolian and Trans-Adriatic gas pipelines to deliver Caspian sources to Europe. Meanwhile, lower electricity pricing and growing carbon emissions pose a new challenge to the Turkish energy sector.

GROWING ENERGY DEMAND VERSUS LIMITED RESERVES

Concurrent with its economic expansion, Turkey's energy demand has increased rapidly over the last few years. As Turkey has limited domestic reserves, it imports nearly all of its energy supply, and as a consequence has budget deficit problems.

According to the International Energy Agency (IEA), Turkey's total primary energy consumption has risen considerably, from 24.4 million tons of oil equivalent (Mtoe) in 1973 to 114.1 Mtoe in 2011. The compound annual growth rate is approximately 4%. The share of Turkey's energy consumption in global consumption moved from 2.5% in 1973 to 5.2% in 2011. The IEA forecasts Turkey's energy consumption to continue to grow at a compound annual growth rate of around 4.5% from 2015 to 2030 and to rise to over 237Mtoe by 2030.

This growth rate makes the country attractive for energy investors, but from the Turkish state's perspective, a challenge is clear. Turkey's energy balance is not equilibrated and the market is highly dependent on imports.

The IEA 2011 data accounted for Turkey's energy balance as follows: natural gas supply takes some 32% of the total primary energy supply, oil takes 28% and coal 30%. Renewable energy, including hydro power, provides only 10% of the total primary energy supply. This balance constitutes a threat for the Turkish economy because Turkey has limited domestic hydrocarbon resources. For example, the country's total natural gas imports in 2011 amounted to some 44 billion cubic meters (bcm), corresponding to 98% of its total gas demand.

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For the oil, the balance is even worse; Turkey's proven oil reserves were 270 million barrels in 2012 while total consumption was 670.2 thousands barrels per day. This gap between domestic sources and consumption had a direct impact on the consolidated budget. With the increase of oil and gas prices in international markets, Turkey's energy imports have increased from 4.8% of gross domestic production in 2003 to 7.5% in 2012, accounting for 60% of the widening in the current account deficit.

Due to this rapid energy demand growth, the government's inability to meet that demand with existing infrastructures, international finance institutions' pressure to respond to the economic deficit, and the EU's adhesion criteria of liberalization of energy markets, Turkey began a comprehensive liberalization of the energy sector.

ENERGY SECTOR LIBERALIZATION

Turkey launched the energy market's liberalization in the 1980s. In 1982, the government abolished the public sector electricity monopoly and allowed the private sector to build power plants and sell their electricity to the state. The second step was privatization of the natural gas sector. This began in 2001, with the natural gas market law, which restructured BOTAS' monopoly rights on the importation, distribution, storage, and sale of natural gas. The 2001 law also designates the energy market regulatory authority (EMRA) as the sole regulatory authority and describes the procedures for regulations in the market. The reform enlarged its scale with the petroleum market law in 2003, the liquefied petroleum gas market law in 2005, and the overall petroleum law in 2013, all of which opened the way for liberalization in oil and LNG market investments.

Within the privatization process, new Turkish energy companies emerged and international energy companies penetrated the market via mergers and acquisitions. Private energy companies' power grew when they acquired local gas and electricity distribution networks. They were strengthened further with global energy firms' integration. Finally, they began getting gas import licenses from public companies' unbundling process.

In thirty years, liberalization became a political success indicator and a main catalyzer of the energy sector. The energy market's liberalization opened the way for the success of energy security strategies, which consist of diversifying energy sources and suppliers. Turkey's Minister of Energy and Natural Resources, Taner Yildiz, during a speech at the Trans-Anatolian gas pipeline project's (TANAP) announcement ceremony, confirmed this correlation in September 2012, saying "The agreement on the TANAP project is a prime example of the liberalization of the Turkish energy market."

DIVERSIFYING SOURCES FOR SUSTAINABLE ENERGY BALANCE

In the 1980s, the second strategic decision of the Turkish energy sector was switching from oil to gas in the electricity production industry. The share of natural gas increased from 5% in 1990 to 32% in 2011.In the 2000s, this overdependence on natural gas created a new energy balance challenge. To adjust this balance, Ankara developed a new strategy to diversify energy sources with two main actions: to increase the share of renewables and to introduce nuclear power plants. Over

the next ten years, Turkey wants to be able to generate 30% of its own electricity by 2023, in part by installing 20 GW of wind capacity as well as 600 MW of geothermal capacity. To achieve these objectives, the law on the use of renewable energy resources for electrical power production purposes in 2010 brought significant incentives to renewable energy investments. The state accepted to pay significant incentives for 10 years to renewable energy investments put into operation prior to the end of 2015, at rates of 7.3 per cent/kWh for power plants based on hydroelectricity and wind power, 10.5 per cent/kWh for power plants based on geothermal sources, and 13.3 per cent/kWh for power plants based on biomass (including landfill gas) and solar energy. Additionally, investors will receive extra incentives when they use locally manufactured products.

While pushing forward renewable investments, the country will also introduce two nuclear power plants in order to make nuclear energy responsible at least for 5% of its electricity generation by 2023. In May 2010, Russian and Turkish heads of state signed an intergovernmental agreement for Rosatom to build, own and operate the Akkuyu nuclear power plant at Mediterranean port--a $20 billion project. The decision of the second nuclear power plant came in May 2013, when Ankara accepted the offer of the Japanese-French consortium, led by Mitsubishi Heavy Industries and Areva, with Itochu, for four Atmea1 reactors with total capacity of about 4600 MWe at a cost of some $22 billion. The construction is planned to start in 2017 and the plant is expected to be operational by 2023.

But even if these objectives are reached in nuclear and renewable sources, for oil and gas Turkey will remain an energy import dependent country. Consequently, a strategic plan has emerged to diversify energy suppliers and supply roads.

DIVERSIFYING SUPPLIERS AND BEING AN ENERGY CENTER

The key elements of Turkey's energy security plan are diversifying a long-term supply contract portfolio and also forming an energy hub from Central Europe and the Middle East to Europe. This plan is more challenging for natural gas then oil, because of Turkey's geopolitical situation and the implications of the southern energy corridor project.

At the crossroads of Middle Eastern and Caspian energy transit, Turkey's oil and natural gas supply nevertheless remains limited to a small group of countries. Around 39% of total crude oil imports came from Iran, while Iraq provides 19%, Saudi Arabia 15% and Russia 11%. Russia also provides 58% of total gas imports. The southern energy corridor project, which aims to build a fourth energy corridor for Europe through Turkey and southern European territories to transport oil and gas from the Caspian and Middle Eastern regions to Europe, matched with Turkey's need to multiply its own supply destinations. In this framework, Turkey announced its objective to be an energy center in Eurasia as a top priority of its energy policy strategy and brought its full support to the southern energy corridor. This project brought also a solution to the problem of shipping crude oil through the Turkish Straits, which currently creates congestion, safety, and environmental hazards. An estimated 2.9 million barrels per day flowed through Turkey's Bosporus and Dardanelles straits in 2011, almost all of which was crude oil.

The diversification of oil supply goes alongside the construction of refineries. Pipelines and tankers mainly undertake imports of crude oil and petroleum products. While refineries in Izmit and Izmir import crude oil by tankers, crude oil is delivered to the Kırıkkale and Batman refineries by pipelines. Two cross-border oil pipelines penetrate the country--one built in 1977 comes from Kirkuk, Iraq, while the other one (built in 2009) comes from Baku, Azerbaijan via Tbilisi, Georgia, and runs through Turkey to the Mediterranean Ceyhan port. The Turkish pipeline corporation company (BOTAS) is responsible for the operation of those oil pipelines.

When Turkey invested in the Baku-Tbilisi–Ceyhan pipeline, it also began widening the scale of its oil suppliers while supporting Azerbaijan's first southern (and by definition not Russian) export roads. Furthermore, Turkey has a plan to construct a pipeline from Samsun on the Black Sea to Ceyhan, which will reduce increasing tanker traffic in Turkish Straits. The project is still in negotiation with Russia, which hopes to export crude oil through the pipeline.

Because the natural gas market is regional while the oil one is global, the diversification of natural gas supply roads is more challenging. Turkey has nine natural gas entry points: four points consist of international pipelines, two are liquefied natural gas (LNG) terminals, and the others are domestic production areas and storage facilities.

The four cross-border gas pipelines in operation have total import capacity of some 46.6 billion cubic meters (bcm). West Gas (16bcm capacity) and Blue Stream (14bcm) pipelines transfer Russian gas that constitutes the largest share of the gas, at 58 %. Iran's Tbilisi- Erzurum (10bcm) and Azerbaijan's Baku-Tbilisi-Erzurum (6.6bcm) gas pipelines provide the other 19% and 8%, respectively. The rest is imported in the form of LNG from Algeria and Nigeria.

To diversify natural gas import roads by increasing the share of LNG over the total gas supply could not be a reliable strategy for Turkey in short term because of its limited LNG regasification terminal and storage capacities. Turkey has two LNG regasification terminals with a total maximum annual capacity of 14bcm. BOTAS owns the Marmara Ereglisi LNG Terminal, which has a maximum send-out capacity of some 22 million cubic meters (mcm) per day. Ege Gaz operates the Aliaga Terminal, with a capacity of 16.4 mcm per day. In 2011, around 6.5bcm of natural gas was imported in the form of LNG. But the country's storage is around 3bcm in total, with a sending out capacity of some 58.5mcm per day. As such, it is not sufficient to meet its increasing gas demand.

To multiply its energy sources, Turkey developed the objective of being an energy center and supported the southern energy corridor project. Early this year, after an agreement with Azerbaijan for the right to resell Azeri gas and the inauguration of the natural gas pipeline to Greece, Turkey made its first step towards becoming an energy center between East and West.

When in July the Shah Deniz Consortium announced that the Azeri-Turkish joint Trans-Anatolian pipeline would deliver Azeri gas to Europe, Turkey moved one step closer to its aim. However, to ensure a sustainable Turkish economy, the energy sector has to overcome two main challenges: lowered energy pricing and carbon emission.

LOWERED ELECTRICITY PRICING

In 2011, Turkey's electricity pricing for the industry was 0.076 Euro per kilowatt hour (kWh) and for households it was 0.115 Euro per kWh, while the average in the EU-27 area was 0.112 Euro for industry and 0.184 Euro for households, according to Eurostat's energy price statistics. This pricing includes value added taxes (VAT) for households and excludes VAT for professionals, which is an excludible tax.

Indeed, Turkey's electricity pricing is among the lowest in Europe-27, and liberalization prospects would not change this trend. Eurostat's research mentions that the price of energy depends on a range of different supply and demand conditions, including the geopolitical situation, import diversification, network costs, environmental protection costs, severe weather conditions, and levels of excise and taxation. Turkish government kept energy prices unchanged for five years and only applied a slight raise last year to gas and electricity pricings. This price control strategy provides an outright subsidy to the rest of the economy.

Although the cost of electricity production is a state secret, one can estimate how much pricing is subsidized by calculating the breakdown of generation methods. For example, the average price Turkey paid for imported crude oil increased by 180% in the last decade, the price of natural gas increased by 65% in the domestic market, and fossil fuels accounted for 75% of total electricity production. However, no parallel increases occurred in Turkey's electricity price. Additionally, Turkey's electricity transmission loss ratio is also very high. Despite recent improvements, transmission loss is 17.8% in Turkey (and as much as 62% in some parts of the country), compared to an average of 6.5% in other OECD and EU countries.

The cost of keeping electricity prices artificially low has become an enormous burden on public finances and even on the current account. Turkey needs a comprehensive energy strategy to ensure sustainable growth.

CARBON EMISSIONS

Turkey has recently signed the Kyoto Protocols and is in the process of preparation for the post-Kyoto period. In this regard, increasing energy efficiency should be the key policy priority. According to Turkish statistical institute data, inventory results revealed that the overall greenhouse gas emissions (as a CO_2 equivalent) for the year 2011 was 422.4 million tones--124% more than 1990's emission. The energy sector had the largest portion of these emissions, with 71%. The energy intensity of Turkish industry is two times higher than the OECD average and four times higher than Japan's average.

To overcome the challenge of low electricity pricing and high carbon emission rate, the Turkish industry has to increase energy efficiency in production and the share of renewable energy in its energy mix. Despite all these challenges, energy diversification will create new investment opportunities, attract foreign investment and give a boost to economic growth.

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