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CAN TURKEY BECOME A GAS HUB?

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Abstract. Since 1990s, Turkey has been committed to become an energy hub or center, which is, so far, one of the main pillars of contemporary national energy policy. Official documents do not directly mention the creation of a “gas hub” in Turkey as a main task, however all existing strategic plans focus on the development of Turkish gas market through creation of a predictable market and diversification of energy sources and suppliers. The latest requires the development of gas storage infrastructure, gas pipeline network, LNG and floating storage and regasification units (FSRU), and reorganization of energy enterprises. Approaches of various actors of Turkish energy policy regarding the ways of creating a gas hub still differ from each other: when liberals support the policy of reducing the share and role of state-owned companies in the market, others give priority to creating the necessary legislation and administrative conditions to ensure the transparent operation of state-owned companies while maintaining their vertically integrated structure. This study aims to identify the beneficial and unfavorable conditions in Turkey to achieve the mentioned goal. It is made up of four sections: the first section briefly examines the concept and criteria of a “gas hub”, the next one outlines the goals set in Turkey’s energy strategy and the last two sections put the strong and weak sides of the gas infrastructure and the market. Given the current state of the gas infrastructure and gas market, and also domestic and foreign political circumstances, it is still difficult to characterize Turkey as an “energy trading center/gas hub”, simultaneously, it is impossible to ignore its great potential and based on the criteria of the EU Agency for the Cooperation of Energy Regulators (ACER), it can be concluded that Turkey belongs to the category of “emerging gas hubs”.

Keywords: gas hub, gas market, energy center, BOTAŞ, gas, LNG, gas pipelines, gas trade, Turkey.

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МОЖЕТ ЛИ ТУРЦИЯ СТАТЬ ГАЗОВЫМ ХАБОМ?

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Аннотация. Рассматриваются возможности Турции стать газовым хабом, к чему страна стремится уже более 30 лет. Описаны цели официальной государственной энергетической стратегии, выявлены сильные и слабые стороны национальной газовой инфраструктуры и системы регулирования торговли газом. Подчеркнут большой потенциал Турции в этой сфере и сделан вывод, что сейчас сложно назвать Турцию “газовым хабом”. Исходя из критериев Агентства Европейского союза по взаимодействию энергетических регуляторов (ACER), на текущий момент страну можно отнести к категории “возникающих” (emerging) газовых хабов.

Ключевые слова: газовый хаб, газовый рынок, энергетический центр, BOTAŞ, газ, СПГ, газопроводы, торговля газом, Турция.

Since the late 1990s, following the international approval of the Baku-Tbilisi-Ceyhan oil pipeline, Turkey has sought to become an energy hub/center. Today it is the basis of the national energy policy. As the British expert Winrow notes, the terms “energy transit state” and “energy hub” are sometimes even

interchangeable in Turkey, although they should still be distinguished [1, p. 145]. In fact, given the existing energy infrastructure and the state of the energy market, as well as domestic and foreign political circumstances, it is now difficult to call Turkey an “energy trading hub.” Rather, Turkey

can be considered one of the most important transit countries in the region due to its location between the European market and the so-called strategic energy ellipse [2], which covers the Middle East, Central Asia, and Russia, and where about 70% of the world's hydrocarbon reserves are concentrated. At the same time, according to some experts, Turkey has the potential to become a gas hub along with other countries seeking to take on this mission, such as Bulgaria, Greece, or Italy [3, p. 134].

Numerous materials have been studied on this issue, including a number of academic articles, reports of research institutes and international agencies such as *ACER* and *EFET*, as well as reports and regulations of relevant Turkish authorities such as the Ministry of Energy and Natural Resources, the energy market regulator *EPDK*, and the Competition Authority. Almost everywhere, the great potential of Turkey is emphasized, but depending on the ideological positions of the authors, there are different approaches regarding the ways to create a gas hub in Turkey. Some have more liberal views on market regulation, supporting the policy of reducing the role of state companies [1, 3, 4, 5, 6, 7], while others give priority to creating the necessary legal and administrative conditions to ensure the transparent operation of state companies, while maintaining their vertically integrated structure [8, 9, source 1].

THE CONCEPT AND CRITERIA OF A GAS HUB

The classic definition describes a hub as a trading point where buyers and sellers exchange rights to goods, which occurs in either risk management or physical transactions [10, p. 22]. Heather points out that there is some confusion as to whether a hub should be considered an actual geographic entity or a virtual entity, often but not always even located within a country's gas grid [11, pp. 21-22]. A virtual gas hub assumes that the entire network has a single point at which gas is traded. The British *NBP* and the Dutch *TTF* are prime examples of such gas hubs in Europe. A physical gas hub is a large gas storage facility at a specific location in the gas network, connected to suppliers and consumers, which makes it possible to enter into contracts for the sale and purchase of natural gas with the center serving as the point of distribution or purchase [6, p. 15].

ACER has developed a special methodology for evaluating the maturity of gas hubs. It provides for four degrees of development: established hubs have

very high liquidity, a large-scale derivatives market providing hedging, gas-to-gas competition, and stable price indication for other market participants; advanced hubs have high liquidity of short-term energy products, hedging opportunities and relatively low liquidity of longer-term products; "emerging" hubs have relatively low liquidity and a limited set of traded products, while retaining a high share of long-term contracts; illiquid-incipient hubs rely on long-term contracts, their organized trading is in its infancy, and there are no entry-exit market zones in a number of countries.

This classification is used to determine the level of market development, maturity, liquidity, and transparency of hubs. The number of active participants, traded products, trading volume, trading index, and *churn rate* are the main criteria for distinguishing them. The last of these is considered the main one for determining the commercial efficiency of hubs in terms of liquidity. For example, a developed market corresponds to a *churn rate* of about 10 [source 2, p. 8; 12, pp. 88-89].

The European Federation of Energy Traders (*EFET*) is another institution that evaluates competition, transparency, open access to energy markets, and the entry-exit system; ability to solve problems on market structure and concentration (a certain role of historical player if flexibility/liquidity is not enough); withdrawal rules, licensing and reporting obligations, and price agencies that produce daily prices in the hub; voluntary market makers operating in the hub; brokers, reliability of hub prices and their ability, etc. [source 3].

Based on the *ACER* and *EFET* criteria, one can conclude that the level of development in four main areas determines the level of maturity of a gas hub: gas transmission system (GTS) infrastructure issues, commercial issues, regulatory issues, and network operations issues.

TURNING TURKEY INTO AN ENERGY TRADING HUB

The Strategic Plan of the Turkish Ministry of Energy for the period of 2019–2023 (hereinafter referred to as the Energy Strategy) outlines the goal of turning Turkey into an *energy trading hub*. In this regard, in recent years, especially in the electricity and gas sectors, decisions have been actively taken to create the necessary regulatory mechanisms and infrastructure. It should be noted that the document does not specifically mention the creation of a gas

hub in Turkey, although the emphasis is placed on the development of the gas market. For example, it is expected: to transform Turkey into a center of liquefied natural gas (LNG) supply in the Mediterranean; to develop opportunities for the creation of gas connectors (interconnectors) and common trade mechanisms between Turkey and Eastern European countries; to negotiate cooperation with neighboring countries and conclude relevant agreements with them; and to work on primary and/or secondary legislation as needed [source 4, p. 57].

The national energy policy in this direction defines two main tasks: the creation of a predictable market and the diversification of energy sources and suppliers. This, according to strategic documents, requires the development of underground gas storage (UGS) infrastructure, main gas pipelines, LNG, floating storage and regasification units (*FSRU*), and the reorganization of energy companies such as the energy distribution company *TEİAŞ*, gas company *BOTAŞ*, oil company *TPAO*, and mining company *ETİMADEN*. It is also necessary to improve the functionality of energy exchange; it is necessary to promote the development of the mining industry through cooperation between the public and private sectors [13, p. 10].

QUESTIONS ON TURKEY'S GTS INFRASTRUCTURE

A physical gas hub requires a powerful gas infrastructure, i.e., long pipelines and large LNG terminals with high daily maximum throughput capacity at the entry/exit points of the GTS, compressor stations, and UGS. The current daily throughput capacity of Turkey's GTS is approximately 325 million m³. Given that the highest daily demand in 2021 was 276.55 million m³, it can be assumed that Turkey's GTS has no technical limitations to meet domestic demand. In 2021, approximately 61.77 billion m³ of gas was injected into the transportation network from 13 entry points and about 61.78 billion m³ of gas was released [source 5, pp. 39-40]. Currently, the annual throughput capacity of the Turkish GTS exceeds 118 billion m³.

Russian gas is supplied to the Turkish market through the Blue Stream and Turkish Stream pipelines, while Azerbaijani gas is supplied through the Baku-Tbilisi-Erzurum (BTE) and Trans-Anatolian Gas Pipeline (*TANAP*), and Iranian gas is supplied through the East-Anatolian Gas Pipeline [source 6].

In March 2021, the Turkish-Azerbaijani agreement on the purchase of 6.6 billion m³ of gas per year expired, which stopped the transfer of gas through the BTE. According to media reports, in September 2021, the two sides extended the gas supply contract, but no details were officially disclosed [source 7]. According to the press, under the new contract, Azerbaijan will supply about 11 billion m³ of gas to Turkey during 2022–2024, and the gas price is based on the spot price of the Italian hub *PSV* less the cost of gas transit to Italy and with an additional discount of 5–8% [source 8].

The gas contracts to supply 8 billion m³ per year through the Trans-Balkan pipeline expired at the end of 2021. Half of these contracts came from *BOTAŞ*, and the other half from private companies. Turkish *Avrasya Gaz* (0.5 billion m³), *Shell* (0.25 billion m³), *Bosphorus Gaz* (0.75 billion m³), and *Enerco* (2.5 billion m³) signed these contracts in 2009 during the so-called first gas release. According to media reports, at the end of 2021, three companies (*Akfel Gaz*, *Enerco Enerji*, and *Avrasya Gaz*), members of the *Akfel Commodities Turkey* group, extended their contracts with Gazprom for two years. Calculation of the cost of gas supplied is carried out according to a hybrid scheme: 70% of the price depends on the indexation of the price of the Dutch *TTF* hub and 30% – on the price of petroleum products with a nine-month lag [source 9].

BOTAŞ also renegotiated a four-year, 5.75 billion m³ contract with Gazprom. Under the new contracts, all deliveries are made through the first string of the Turkish Stream, which has a total capacity of 15.75 billion m³ per year [source 10]. Since the summer of 2021, the price of gas in the spot market has been breaking records time after time, and after the start of Russia's "special military operation in Ukraine", the price per thousand m³ of gas rose to \$3,000 in March 2022. The average price for *TTF* in February was at \$935/m³ [source 11].

The second branch of the Turkish Stream, with a capacity of 15.75 billion m³ per year, will supply Russian gas to the markets of South-Eastern and Central Europe via Bulgaria, Serbia, and Hungary. This European expansion, called Turkish Stream 2 and Balkan Stream, includes both new and existing infrastructure. In January 2020, Gazprom began deliveries via the Turkish Stream to Turkey, Bulgaria, Greece, and Northern Macedonia, using partially completed and pre-existing infrastructure. Since then, Gazprom has also supplied Serbia, Bosnia and Herzegovina, and Romania via the Turkish

Stream. Later, the role of the Trans-Balkan pipeline in supplying gas to Southeast Europe and Turkey declined significantly: according to Ukrainian authorities, as of the end of 2020, it was operating at less than 5% of its design capacity [14].

It is assumed that by 2026, the annual capacity of *TANAP* will be increased to 31 billion m³, which will allow Azerbaijan to deliver 25 billion m³ of gas to Europe annually. *BOTAŞ* owns 38% of *TANAP*, and *TPAO* owns 19% of the Shahdeniz-2 field, which will supply the line with gas.

However, as noted by the Turkish expert Ozdemir, the *TANAP* agreement contains provisions that are contrary to the economic interests of *BOTAŞ* and Turkey as a whole. In particular, instead of building a costly new pipeline, Turkey could have insisted at the talks on supplying Azerbaijani gas through existing *BOTAŞ* lines, whose throughput capacity could have been increased by installing new compressor stations and looping, thus significantly reducing *BOTAŞ* costs.

TANAP became a competitor to *BOTAŞ* in terms of revenues for gas transit, because with the construction of *TANAP*, the Turkish company not only had to invest large sums for its construction but also had to pay for the transit of gas delivered through this line. In addition, because it was built under an international agreement, it is not under the jurisdiction of the *EPDK* regulator, which relieves the other owners of the pipeline, i.e., the Azerbaijani *SGC CJSC*¹ and the British *BP*, from legal obligations, such as providing access to the pipes to a third party [8, pp. 444-446].

In 2020, the Trans Adriatic Pipeline (*TAP*) was commissioned and linked to *TANAP*. Azerbaijani gas enters Italy via this line, passing through Greece and Albania. Turkey has no stake in *TAP*, so in the future, it will not be able to actively participate in the development of projects to distribute Azerbaijani gas to other European countries.

Turkey's LNG infrastructure and the efforts made to strengthen it offer hopes for a favorable future for the market in terms of supply flexibility. The country now has four LNG terminals. Two of them are located on land, and the other two consist of a floating storage unit and a re-gasification unit (*FSRU*). Also, the procurement process for a third *FSRU* has already begun. The regasification capacity of LNG terminals becomes a critical factor for supply diversification: this figure has been increased to

¹ *SGC CJSC* was founded on March 31, 2014 by the Ministry of Economy of the Republic of Azerbaijan (51%) and *SOCAR* (49%).

117 million m³/day in Turkey (over 42 billion m³/year, which is almost 70% of current import volumes) [15].

It is true that the Turkish GTS has certain shortcomings. *TANAP* and the Turkish Stream are implemented on a one-way flow basis, i.e., they have no possibility of reverse. The technical capacity should be increased where the Bulgarian and Greek networks and the *BOTAŞ* network are connected, and an agreement should be concluded that would ensure a two-way flow of gas at these points [9, p. 157]. Moreover, in case the technical capabilities of the Trans-Balkan pipeline develop and the necessary equipment is installed to switch to reverse, the LNG coming to Turkey and Greece can be pumped into the Trans-Balkan pipeline. Of course, such a plan would require a consensus among the countries of Southeast Europe to overcome the main problems, which, according to experts, are not technical, but rather political [16].

The capacity of Turkey's GTS between the eastern and western regions of the country is limited by the lack of compressors, with only 9 at the moment [7, p. 53]. The number and capacity of UGS is limited compared to other countries. For example, up to 28% of the gas supplied to Germany can be stored in gas storages, while in Turkey, the figure is only 8% [5, pp. 264-265].

REGULATION OF THE TURKISH GAS MARKET

Creating a liberal and predictable energy market has become one of the priorities of Turkey's energy strategy. However, its progress is behind schedule. The legal basis for liberalization of the Turkish gas market has been established since 2001 as part of the reforms for accession to the European Union, when Law No. 4646 was adopted, which requires the gas market to be regulated by market rules.

Since then, official institutions such as the Competition Authority and leading business circles such as *TUSİAD* [source 12] have expressed the view that the law needs to be modified. Their main demand is to create the legal mechanisms necessary to ensure a more competitive environment in the local gas market. In the opinion of the Competition Authority, the practice of transferring import contracts since 2007 should be abolished, instead of which the practice of transferring the volume of imported gas can be applied. Thus, it would be possible not only to increase the number of participants but also to

condition an increase in the volume of gas entering the market.

As for the restructuring of the state-owned company *BOTAŞ*, the Competition Authority opposes its unbundling by transferring its ownership to three separate legal entities responsible for transportation, operation of LNG and gas storage facilities and trading. Instead, the agency recommends that all conditions be created for the company to be able to operate in the market as an independent full-fledged commercial organization [source 1, p. 130]. In 2017, *BOTAŞ* together with *TPAO* was taken under the control of the Wealth Fund, which is managed by the president of the country [source 13]. In the author's view, this led to the company losing its formerly relatively autonomous status. The transparency of its financial activities is also criticized.

The Turkish gas market clearly lacks an effective competitive environment free from government interference. The *BOTAŞ* state company dominates the entire gas market. According to Law No. 4646, it was necessary to reduce its share of the imported gas market to 20% by the end of 2009 and overcome its monopoly status in all sectors of the gas business. The transfer of contracts signed by *BOTAŞ* with other gas companies, including Turkish and foreign companies, has begun. Contracts to import 10 billion m³ of gas per year have already been awarded, bringing the share of private business in current total imports to 20%.

This process is hampered by opposition from the Ministry of Energy and *BOTAŞ* itself. In 2007, the latter insisted on maintaining its right to 75% of the total volume of gas imports [source 14, pp. 38-39]. In 2021, *BOTAŞ* sold 93.50% of its gas imports, which was due to the company's increased volume of LNG purchased, as well as its price subsidy.

The executive power has no desire to lose control of *BOTAŞ* because it gives it some advantages. In particular, the company subsidizes the price of gas in the context of a constant decline in the purchasing power of the population. The growing number of subscribers and the decreasing demand for natural gas in power generation suggest that natural gas consumption for heating will come to the forefront in Turkey. This increases the likelihood that a sudden increase in natural gas prices could cause great social tension.

BOTAŞ interference in market processes often causes discontent among private companies, which point out that the damage to their budgets due to cross-subsidization is compensated by taxpayers,

even those who are not gas consumers [source 15]. It should be emphasized that *BOTAŞ* subsidies are extremely unsustainable and in recent years, the cost of gas for the end consumer in the domestic market has increased by several times [source 16]. Moreover, while *BOTAŞ* subsidies make gas more available in the domestic market, the company itself suffers losses. For example, in the first six months of 2021, they totaled \$376 million [source 17].

All gas pipelines of the Turkish GTS belong to *BOTAŞ*. In 2007, other companies were given permission to access the network. The number of vendors serving clients over the years has been around 30. In 2021, the physical supply of natural gas to the market was about 61.77 billion m³, of which 93.5% went to *BOTAŞ* and only 6.5% went to private sector operators [source 5, p. 39].

The *EPDK* regulation on "Procedures and Principles for Pipeline Gas Imports in the Spot Market" came into force at the end of September 2019. According to it, part of the capacity of cross-border pipelines is allocated for gas imports under short-term spot contracts in order to buy cheaper gas from neighboring regions. *EPDK* has launched a new licensing activity that aims to allow companies licensed to import gas by pipeline to enter into monthly, quarterly, and annual contracts. In 2020, *Bosphorus Gaz* and *Engie Enerji* were entitled to reserve capacity on the pipelines. At the "Malkochlar" point of entry, more than 12 million m³ were imported on spot transactions for the first time [source 18, pp. iv, 10].

To increase the ability of gas-to-gas competition in the gas transaction market, there must be a surplus supply of gas, which allows the exchange of goods in significant volumes, since the availability of different sources creates favorable conditions to avoid supplier dominance. In recent years, the number of suppliers has increased due to growing LNG and Azerbaijani gas supplies, but the volume coming to the Turkish market satisfies only domestic demand.

After the start of Russia's military operation in Ukraine in February 2022, Europe's intention to reduce the share of Russian energy in the region is increasing, leading to a return to the agenda of long-standing scenarios about transporting gas to Europe from Iraq, Iran, Turkmenistan, and the Eastern Mediterranean region via the Turkish GTS. However, their implementation in the near future is not possible.

As for its own resources, the exploration work of the state oil company *TPAO* has borne its first

fruit, and gas reserves totaling 540 billion m³ were discovered on the shelf of the Western Black Sea. Officials claim that this gas will be available by 2023 [source 19, p. 39; source 20]. However, expert circles are skeptical about these claims for the following reasons: the discovered resources have not yet received the status of proven reserves, and extensive additional labor-intensive and costly engineering and planning work is required to confirm their existence. It is also necessary to determine the cost-effectiveness of extracting this gas and transporting it to land, as well as the possible risks of damage to the environment. In addition, the announced volumes can meet only part of the domestic demand [source 21, pp. 58-60].

Another obstacle to this is the fact that all the gas contracts mentioned above are signed for a long period with a “take or pay” obligation. Gas prices are indexed in line with oil prices, which limits Turkey’s ability to influence pricing in the European market. Turkey basically has no right to re-export gas from all these pipelines. There are only limited exports (approximately 750 million m³ per year) through the *INOGATE* gas pipeline between Turkey and Greece.

The launch of the Organized Wholesale Natural Gas Market (*OTSP*) on September 1, 2018 was one of the most important milestones in the gas hub process. In 2015, the joint-stock company for cooperation with energy markets (*EPIAŞ*) was formed, and then the *OTSP* gas exchange was founded under its roof, which, according to its leaders, aims to create a free and sustainable market for gas trading, conducting operations in the spot market and determining the reference price. In 2021, 1.23 billion m³ of gas was sold on the *OTSP*, a total of 52 license holders participated in the trade, the total volume of transactions was about 2.7 billion Turkish Liras, and the base price was in the range of 1204–6924 Turkish Liras per thousand m³ [source 22]. Having studied the first year of *OTSP* activity, the Turkish expert Ozen noted that the share of *BOTAŞ* in the market was about 30%, and the shares of other participants varied from 3 to 8% [9, p. 144], which also leaves questions about the degree of competitiveness of the domestic gas market of the country.

In June 2021, the Turkish Electricity Futures Market (*VEP*) began operating, and on October 1, the Turkish Natural Gas Futures Market (*VGP*) opened [source 23]. With their appearance in the future gas prices are expected to decrease, but experts point out that the bulk of gas imports to

Turkey is carried out under bilateral long-term government contracts, which determine the gas price with reference to the oil price, while gas futures sales can reduce prices only for free contracts concluded with private companies and occupying 10% of gas exports to Turkey. It is also noted that *VGP* can work effectively if the physical infrastructure of the market is strengthened by increasing the capacity of the UGS and installing the necessary equipment to create reverse flow [17].

RESULTS AND CONCLUSIONS

Taking into account *ACER* criteria, one can conclude that so far Turkey can be considered only as an “*emerging gas hub*”, due to low liquidity, a limited set of traded products, and a high share of long-term contracts. At the same time, Turkey has a good chance of becoming an established gas hub, as evidenced by the fact that in reports published by the *EFET* agency, its rating is gradually increasing [source 24]. The development of LNG infrastructure, an increase in the share and number of LNG suppliers, as well as the establishment of the country’s own gas exchange should be considered positive factors in terms of the prospects for creating a full-fledged hub in the country. The negative aspects include the insufficient amount of gas volumes coming to the market, the lack of the right to re-export, the limited capacity of UGS and compressor stations, the lack of a reverse flow mechanism at the entry-exit points of the Turkish GTS, the long-term nature of the current gas contracts, which mainly determine the gas price tied to the oil price, and the lack of transparency of the activities of the *BOTAŞ* state company in the market.

As for the restructuring of *BOTAŞ*, it seems that before breaking up a state-owned company by privatizing its ownership, it is important to create conditions that allow it to act more transparently and autonomously from the executive power in the market. It should be borne in mind that in recent years, the country has been actively searching for its own deposits, which requires huge investments. The vertically integrated structure allows the company to redirect funds earned in other sectors of the energy industry to investments in prospecting and exploration. In the current situation, it might be logical to temporarily merge all national energy companies, including *BOTAŞ*, and return to the position of the 1980s, when they were all under the auspices of *ТРАО* and its jurisdiction. This will not mean the removal of private companies from the energy business, but

it will strengthen the competitiveness of the Turkish energy market and, most importantly, the country's energy security in the long term. The result will depend on how effectively the national supervisory and regulatory mechanisms in the energy sector created in recent years will work.

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