April 2022

Turkey's supply-demand balance and renewal of its LTCs

Introduction

In 2021 Turkey faced an unprecedented demand hike, with gas use soaring from 48.3 bcm in 2020 to all time high 59.6 bcm in 2021,[1] driven mainly by power generation and industry. The power sector is the country's biggest gas user with gas consumption dictated by hydropower generation as well as the relative costs of coal and gas. Hydropower is highly variable as it relies on hydrological conditions such as the annual pattern of snowmelt and high precipitation in spring. In 2021, low hydropower generation, especially during the spring months due to poor rainfall and low water reservoir levels, led to a strong uptick in gas demand. Additionally, the high price of imported coal also favoured a switch to imported pipeline gas.

Turkey significantly increased pipeline imports in 2021, notably from Russia as well as from Iran during the summer. The situation was accelerated by the expiration of legacy long-term contracts with Gazprom at the end of December, which totalled 8 bcm, in light of uncertainty over contract extension and concerns over the supply security of natural gas in the summer when demand surged due to extremely hot weather and a harsh winter in 2021/2022.

The strong increase in Turkish demand and the call on Russian pipeline flows, in the context of tight European markets in late 2021 and the high price environment in 2022, raises questions about the outlook for 2022. Following the Russian invasion of Ukraine and Europe's anticipated need for higher LNG imports, markets are eyeing with concern competing demands for LNG this year.

This paper will discuss the strong increase in Turkish demand in 2021 and the outlook for 2022. It argues that 2022 is unlikely to see another record year for gas demand due to a combination of demand- and supply-side factors. It further reviews pipeline and LNG supplies in 2021 as well as gas supply projections for 2022, and also examines the price sensitivity of the Turkish market.

The paper also looks at contract renewals, as the expiry of a number of long-term contracts (LTCs) in 2021 came at a challenging time for Turkey, coinciding with strong demand and reduced supplies of hydro and imported coal. The paper reviews the recently extended LTCs between BOTAŞ and Gazprom and BOTAŞ and Azerbaijan Gas Supply Company (AGSC) in December and August 2021, respectively, as well as the failure of contract renewal for private companies. The Turkish government

[1] EPDK monthly natural gas sector reports, https://www.epdk.gov.tr/Detay/Icerik/3-0-95/dogal-gazaylik-sektor-raporu

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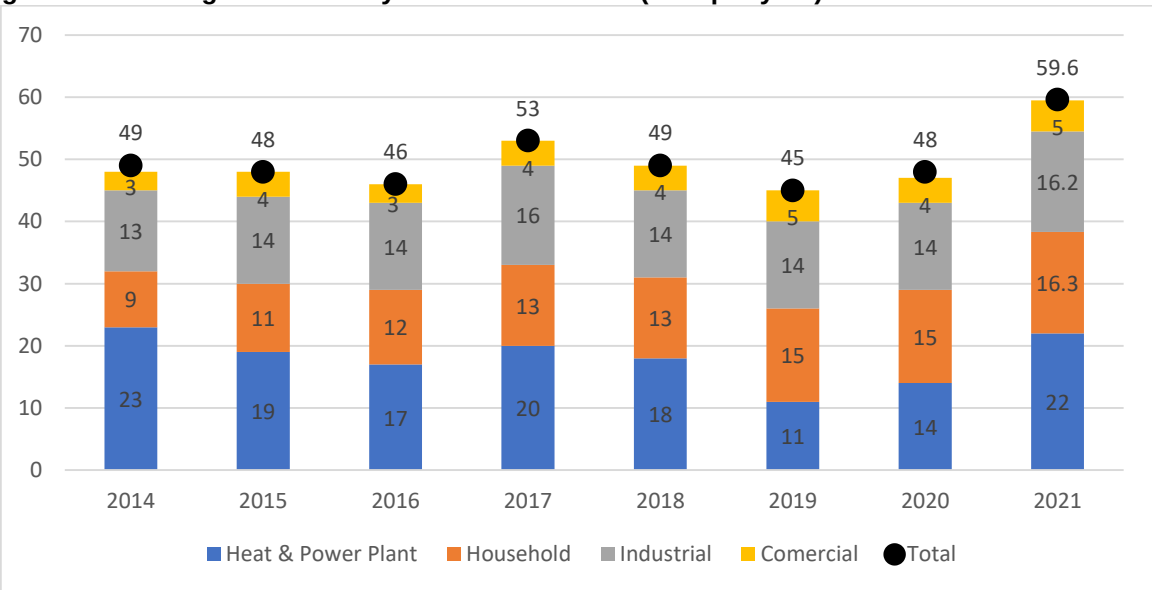
prepared the ground for contract renewals, aiming for more flexible contractual terms and less oil indexation, but it has achieved these desired changes at a short-term cost to the economy.

1. Turkey's gas demand in 2021/2022

In 2021 gas consumption in Turkey increased to an all-time high of 59.6 bcm from 48.2 bcm in 2020, exceeding its previous record in 2017 when demand surged to 53 bcm because of a dry spring season and lower than normal temperatures (Figure 1). Turkey's natural gas demand is largely affected by three major factors: temperature, hydrological conditions, and the price of imported coal and natural gas. In the power sector, imported gas is required if hydro reservoir levels are low or if the cost of imported coal is higher than gas.

While power generation and the residential sector are Turkey's largest gas consumers, in 2021 big surge in growth was seen in the industrial sector due to a surge in the production and export of consumer goods. Gas consumption increased from 15 bcm in 2021 to 16.3 bcm due to the lira depreciation and consequent profitability of goods which resulted in increased exports to garner foreign currency (Figure 1).

Figure 1: Turkish gas demand by sector and in total (bcm per year)



Source: Data from EPDK

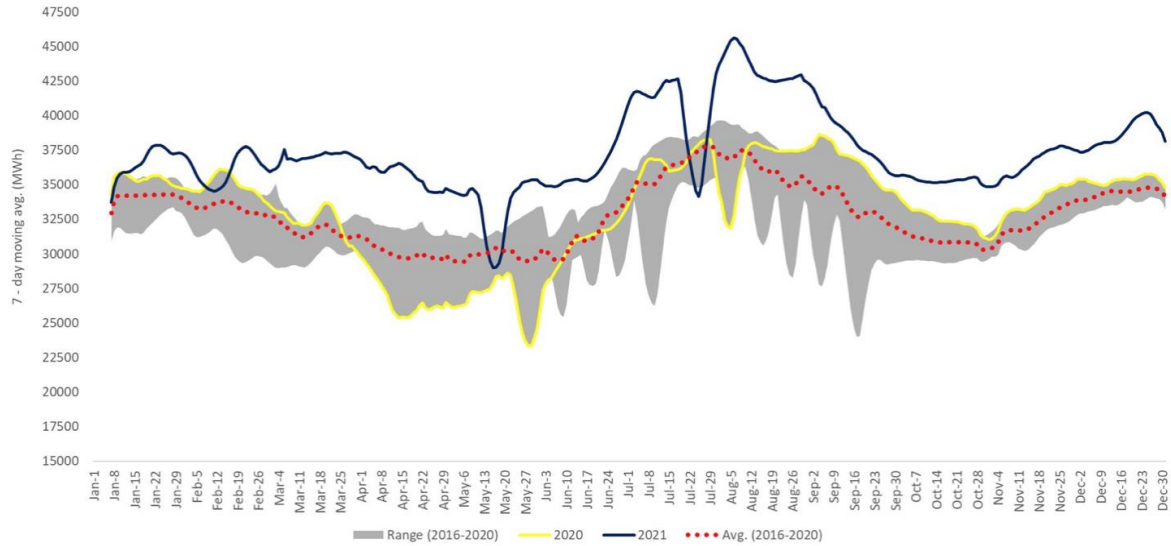
In 2021, Turkey's electricity consumption reached an all-time high of 330TWh, from 291TWh in 2020, around 11 per cent growth y-o-y.[2] With the exception of May and July, demand growth was strong throughout the year due to the extremely hot summer, which saw robust demand in August, as well as cold weather in the winters of 2020/2021 and 2021/2022 (Figure 2). Between 28 July - 6 August 2021, the most intense phase of the heatwave, the maximum temperatures in Istanbul averaged 35.3°C, 3.8°C above seasonal norms, and in the popular holiday destination Antalya, temperatures reached 42.5°C, 7.4°C above seasonal norms. But while gas demand in power surged last year, hydro power generation declined because of the dry season and low water reservoir levels, while high coal prices made imports uncompetitive with gas. As a result, in March, April and May, typically the peak months for hydropower generation, the increase in gas consumption in power generation was unprecedented, rising by 250 per cent, 273 per cent and 334 per cent respectively year on year.[3] Peak electricity

[2] EPIAŞ Transparency Platform, https://seffaflik.epias.com.tr/transparency/tuketim/gerceklesen-tuketim/gercek-zamanli-tuketim.xhtml

[3] EPDK monthly electricity reports, https://www.epdk.gov.tr/Detay/Icerik/3-0-23/elektrikaylik-sektor-raporlar

demand in Turkey is during the cooling season in the summer, boosted by the irrigation of agricultural lands, whereas peak gas consumption is seen during the heating season in winter. As electricity is also widely used in winter, the summer peak is only 5-7 per cent higher (Figure).

Figure 2: Electricity consumption in Turkey



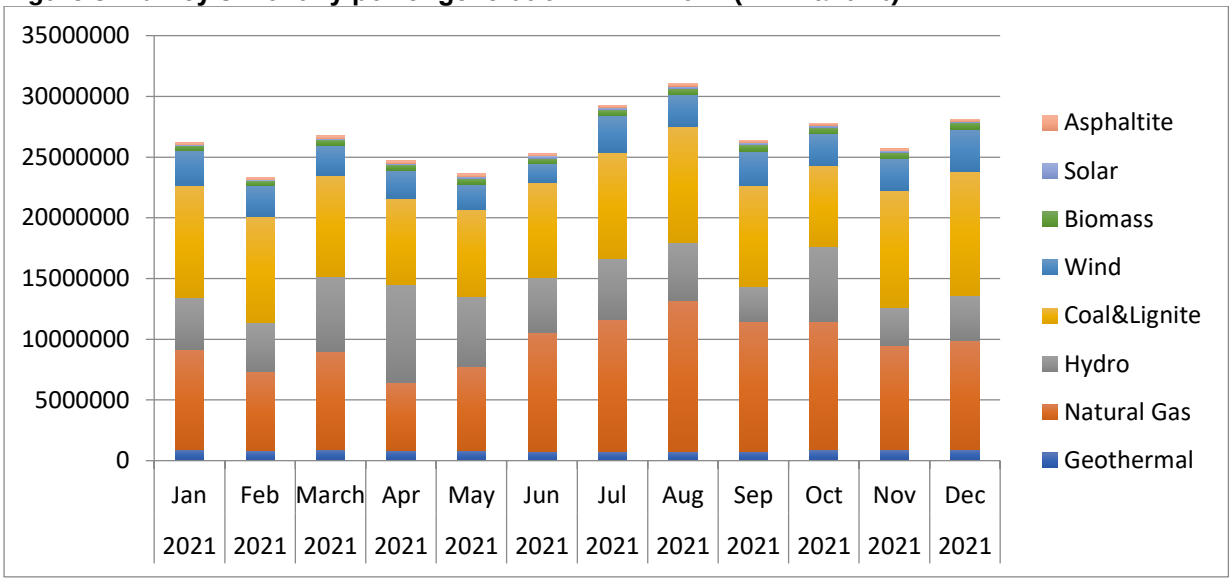
Source: EPIAS Transparency Platform, created by Hasanali Atalay

There are two types of hydro power generation – run of river and hydraulic with dams. In Turkey, peak run of river (snow melting and high precipitation) generation is in spring, between mid-April and mid-June; in May, levels are consistently higher than 80 per cent of the maximum capacity, while they drop to 20-40 per cent during the period from September to January.[4] Dam-type power plants operating regimes are effective for reservoir management and supply security for the winter-summer period. Although there was not a large decrease in generation from river-type power plants in 2021, there was a drought effect compared to an increase in installed power from dam-type power plants. Power plants with dams have output in the band of 40-60+ TWh, while river type hydropower is in the 20-10 TWh range.[5]

The most flexible power generation type which has the flexibility to offset low hydro, coal and renewable energy are natural gas plants. The switching largely depends on the hydro regime. Our estimation is that a wet year generates 30 billion kWh hydro which converts to 6 bcm of switching away from natural gas. Figure 3 shows the months where gas takes a larger share of the power mix as hydropower generation plummets.

[4] B. Sanlı, Türkiye'nin Uzun Dönemli Elektrik Üretim Eğilimleri, http://barissanli.com/calismalar/2021/20210621-uzundonemli.pdf
[5] B. Sanlı, Türkiye'nin Uzun Dönemli Elektrik Üretim Eğilimleri, http://barissanli.com/calismalar/2021/20210621-uzundonemli.pdf

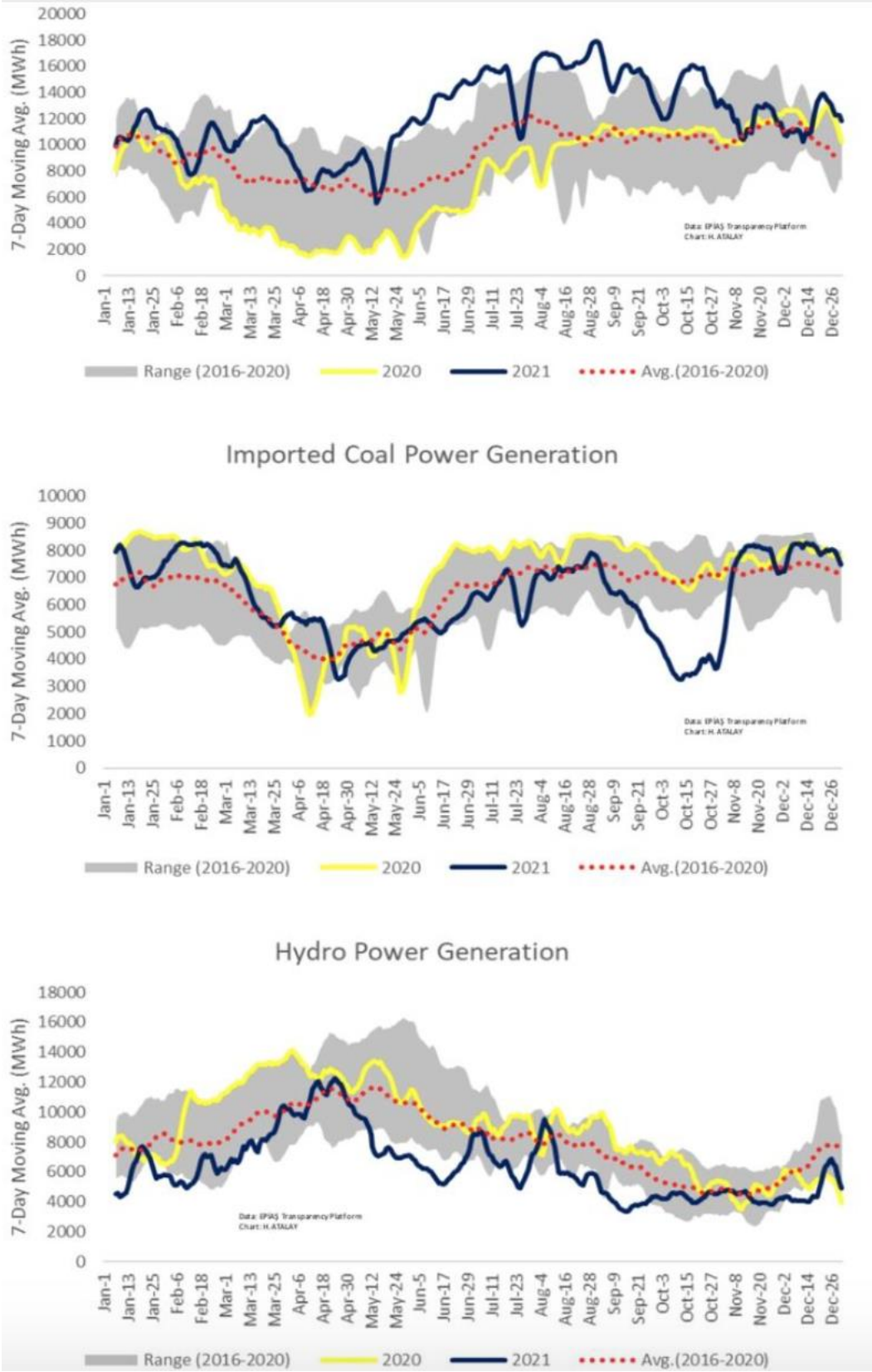
Figure 3: Turkey's monthly power generation mix in 2021 (MWh and %)



Source: EPIAŞ

Turkey's main sources of power generation are hydro, imported coal and gas, typically accounting, for a total of 200 TWh. These sources of generation are strongly correlated, and the correlation has remained stable for many years. In other words, changes in hydroelectric production or reservoir water levels impacts the share of imported energy (Figure 4). Run-of-river hydropower plants have a very limited capability for storing water or changing operations in response to market price fluctuations.

Figure 4: Natural gas, imported coal and hydro power generation



Source: EPIAS Transparency Platform, created by Hasanali Atalay

Correlation of gas, hydro, and coal in power generation in 2021 and price competitiveness

There was a strong correlation between hydro power and gas-fired generation and a weak correlation between coal and natural gas as well as between coal and hydro power in 2021. In Turkey, natural gas is a swing fuel which offsets hydro in the dry season and imported coal when spark spreads are positive (Figure 5). As far as renewables are concerned, solar is a particularly interesting resource as it seasonally has more power load than coal and is correlated with demand. The fact that wind energy cannot be stored and is intermittent means that there is no strong correlation between wind power and shifts in demand. Interestingly, solar has a negative correlation with wind, which means that they can complement each other.[6]

In Q2 2021 the depreciation of the Turkish Lira kept front-month spark spreads for gas-fired plants running at 55 per cent efficiency at relatively high levels, averaging $7.56/MWh compared with negative spark spreads seen in the previous two years. These spark spreads far outpaced the price-hike from BOTAŞ in May 2021. Gas tariffs for utilities were increased to TL 1,631.67/tcm in May 2021, a 12 per cent increase relative to the previous month, following consecutive 1 per cent increases in January-April 2021. But spark spreads in May averaged $9.62/MWh,[7] the highest since June 2019 for pipeline gas.

Coal-fired generation has lagged behind gas, mainly due to seasonal maintenance, but coal-fired units have maintained their relative cost advantage compared to gas-fired utilities. Coal-fired units have generated 4.6GW on average in Q1 2021, accounting for 14.2 per cent of the generation mix, a reduction compared to the 15 per cent (4GW) seen in April-May 2020, but up from 13 per cent (4.15GW) in April-May 2019 (Figure 2,Figure 4).[8]

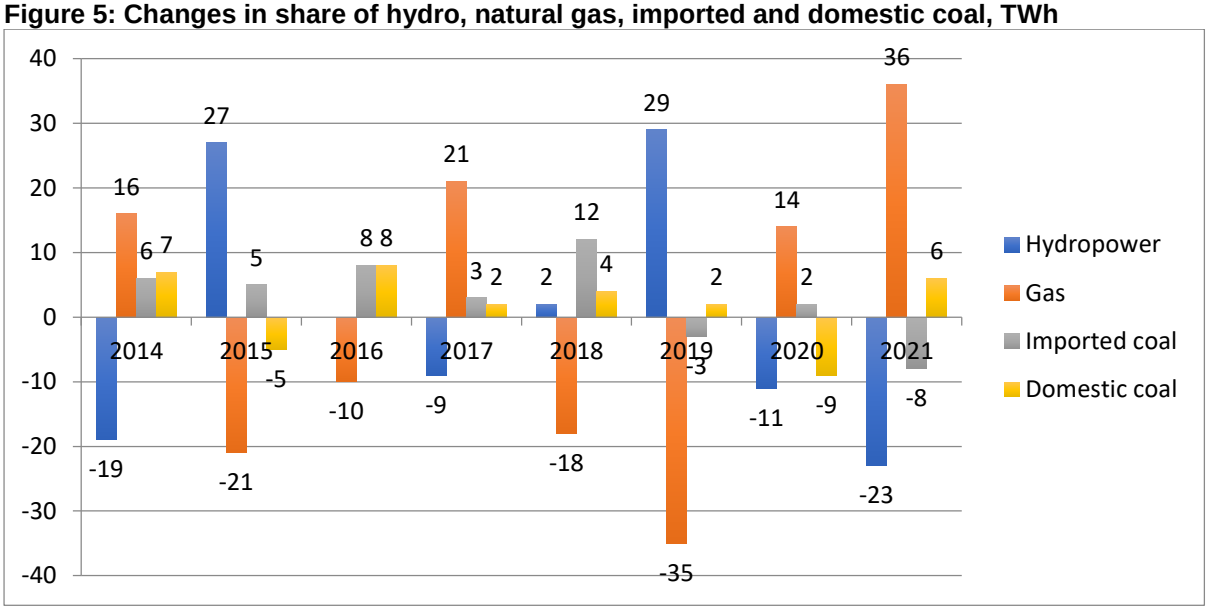
Coal-fired plants usually undergo maintenance in the April-May period, when hydropower output tends to peak. In 2021, more comprehensive maintenance was expected at some plants as the 2020 programmes had been disrupted by Covid-19-related staff and equipment shortages.

Rising fuel costs for gas-fired plants would normally decrease the competitiveness of gas-fired utilities, but the price hike in 2021 was offset by a depreciating lira, combined with historically high coal prices, lower hydro stocks than in previous years and high demand. These factors pushed up power prices to record highs in lira terms month by month throughout the year.

In Q3 2021, especially during July and August, Turkish gas burn in power generation reached a new high, and remained elevated in Q4. July averaged the highest monthly output owing to record demand levels and spark spreads in the regulated market reaching at least a four-year high. Turkish gas burn averaged 16.5GW in August, up from 14.7GW in July,[9] which was the highest level ever recorded. (Gas-fired output in August 2020 averaged 9.8GW and in 2019, 7.1GW.[10]) Utilities with gas-fired capacity have benefited from record high spark spreads for gas procured from the regulated market. The competitiveness of gas as a fuel has also enabled older, less-efficient power plants to enter the day-ahead market after having been idle for several years in some cases. The front-month spark spread for a 38 per cent-efficient gas-fired plant - inefficient by modern standards - reached positive territory on 15 June 2021 and closed at $6.09/MWh. This was also the first time that these older units had achieved positive margins for a prolonged period since the end of 2017.[11] Old units entering the market allowed the Turkish gas-fired fleet to generate more than 12GW on average in a month, the highest they had averaged before last summer 2020.

[6] B. Sanlı, Turkey Electricity Generation, http://barissanli.com/calismalar/2022/20220124-TurkeyElectricityGeneration.pdf
[7] Argus (subscription is required)
[8] Argus (subscription is required)
[9] EPIAŞ
[10] Argus (subscription is required)
[11] Argus (subscription is required)

Figure 5: Changes in share of hydro, natural gas, imported and domestic coal, TWh



Source: EPİAŞ, TEİAŞ

With above-average temperatures in September, October, and November throughout the country, electricity consumption fell, making these months relatively calm in terms of fuel supply.

In December 2021**,** demand increased due to the cold weather, especially after 15 December, when temperature fell below the norm. However, gas use in power generation was only slightly higher than in November as wind generation reached its highest for the year and satisfied much of the increase in demand, while imports of hard coal as well as production of lignite rose to their highest for the year (Figure). On 28 November, wind power became the largest source of electricity generation for the first time in the country's history with a 22.6 per cent share, generating 78,964 MW/h out of total of 791,794 MW/h of daily electricity output.[12]

Electricity demand and supply outlook for 2022

There are several important factors that will affect electricity demand and natural gas consumption in this sector in 2022.

Weather

The country was hit with extremely cold weather in Q1 2022, including the Trakya region of Istanbul, with temperatures falling below 0°C which is 5-6°C below the seasonal norm. With heavy snow and cold weather, electricity and natural gas demand reached record highs, leading the government to impose electricity cuts and ration use for some industry segments. In the third week of January[13], natural gas supplies to gas-fired power plants were cut due to the overall increase in demand just as supplies from Iran stopped,[14] and only fully resumed in early February. The country's electricity production in January alone was more than 27 TWh, almost 6 per cent higher y-o-y, while consumption was more than 28 TWh, 6 per cent higher than in January 2021. The cold snap in January and February will add significantly to the overall natural gas consumption for the year of 2022. Going forward, weather conditions will play an important role in gas use this year, with demand depending on the relative heat

[12] Wind becomes largest source of electricity for first time in Turkey's history, https://www.aa.com.tr/en/economy/wind-becomes-largest-source-of-electricity-for-1st-time-in-turkeys-history-/2433501, accessed 25 January

[13] Some Turkish manufacturers pause production after Iran gas supplies disrupted, Reuters, https://www.reuters.com/world/middle-east/some-turkish-manufacturers-pause-production-after-iran-gas-supplies-disrupted-2022-01-24/

[14] BOTAŞ üç kritik sektörde kesinti uygulamasını kaldırdı, https://www.bloomberght.com/botas-uc-kritik-sektorde-kesinti-uygulamasini-kaldirdi-2297183, accessed 25 January

of the summer and chill of the 2022/23 winter. In hot years, more electricity is consumed by electric pumps, exacerbated by the limited availability of water at the required depth which restricts hydropower output, combined with demand for air conditioning usage, especially in tourist regions during the peak summer season.

Rainfall

The second important factor for gas demand in power generation is the ***wet/dry season and seasonal precipitation*** given that gas plays a swing role and offsets hydro when water reservoir levels are low. The drought the country faced in 2021 was a relatively rare event, the sort only seen every 7-20 years. This year, the heavy rain and snow experienced earlier in the year - not only in the mountainous regions but also in the Trakya region in January - could allow hydro resources to recover, with run of rivers also contributing to hydro generation. As a result, it is quite realistic to assume that hydro power could produce around 70 TWh of electricity during 2022.

Industrial demand

The third factor affecting gas demand in power is ***industrial activity***, mainly manufacturing and trade. The country's gas demand increased last year in part due to high manufacturing output and high demand for Turkish exported manufactured goods. Gas consumption by Turkish industry increased by almost 16 per cent y/y in 2021, especially after COVID restrictions were eased in the spring for major industrial zones and other production sites, such as car manufacturers. Output from the most gas-intensive sectors in particular was significantly stronger than in 2020. Exports also benefited from the US dollar strengthening to TL 13 by the year end, up from around TL 7 the previous December, making Turkish goods increasingly competitive. Given the lira's continuing depreciation, Turkish exports are likely to grow in 2022 adding to overall gas demand. Moreover, in 2021, the Turkish industry benefited from input costs (gas) that were lower-priced than EU-input costs because of the oil-indexation in importers' long-term contracts (LTCs), whereas EU prices where gas hub-indexed. This gave Turkish industries a competitive advantage against European companies in addition to the lira devaluation.

The price

The fourth factor is the comparative costs of imported gas and coal. While domestic gas prices are regulated, BOTAŞ introduced a mechanism for increasing gas prices for power generation and industry when imported natural gas prices are high and the lira depreciates against US dollar. In 2021, BOTAŞ increased gas prices for power generation and industrial consumers by 48 per cent and 47 per cent[15] respectively to adjust for the depreciation of the lira. BOTAŞ is also set to further increase gas prices for its customers as imported gas prices rose again in Q1 2022. Further hikes are likely due to a combination of factors including: the new pricing mechanism in the renewed contract with Gazprom (this will be discussed below); BOTAŞ record financial losses in 2021; treasury balances; the changing exchange rate regime; and monetary policy. Meanwhile, the supply risks following an extremely cold winter also suggest higher prices for power generation and industry participants. At the same time, BOTAŞ will continue to subsidise residential gas prices. BOTAŞ increased tariffs in 2022 by 15 per cent for power plants and 50 per cent for industrial consumers in January (Figure 6). The residential tariff, which most recently increased by 12 per cent in July 2021, has risen again by 25 per cent. The tariff increase was initiated by BOTAŞ in order to limit gas consumption, with industrial users being subject to a tiered tariffs structure: their tariff will be 50 per cent higher if in January 2022 they exceed 60 per cent of their monthly consumption compared to January 2021. This increase is being applied to industrial users with annual consumption above 300,000m^3.

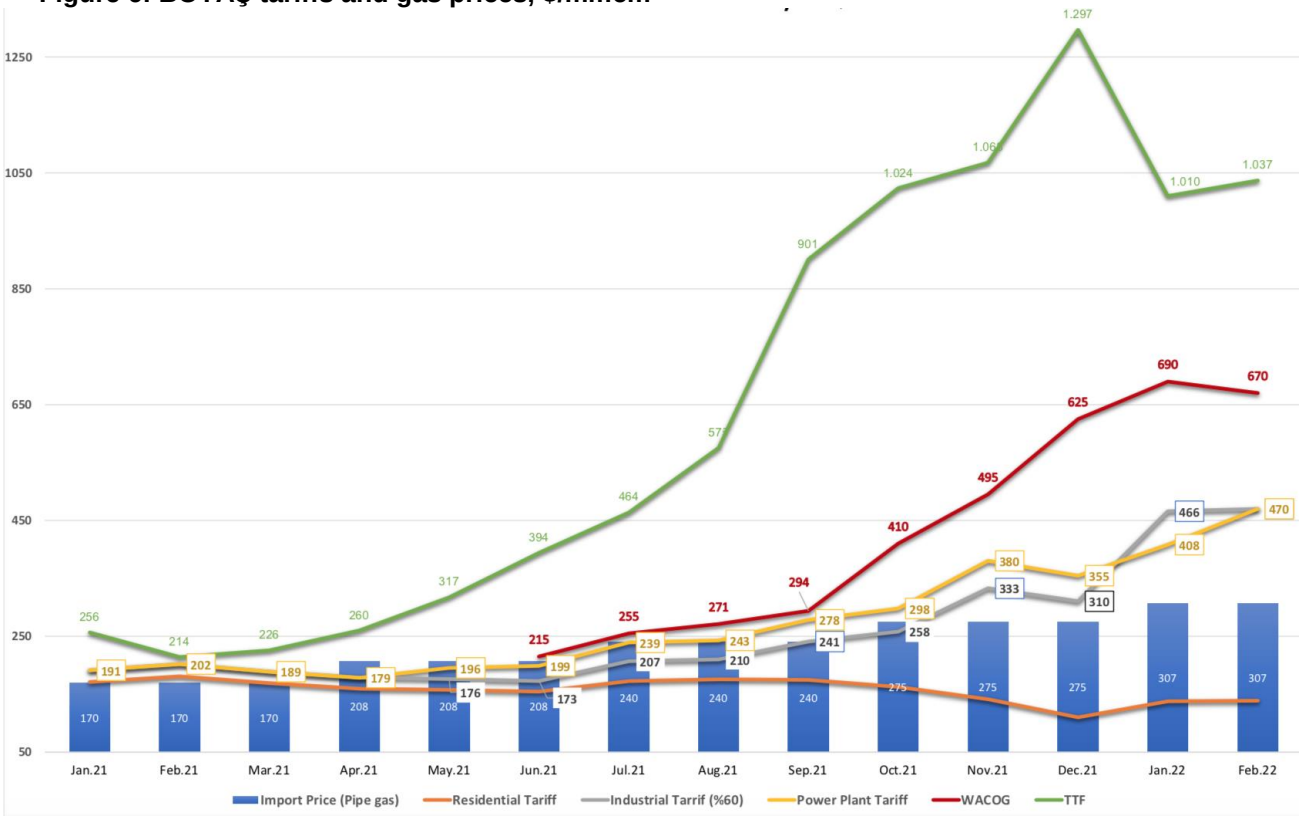
As a result, the price of 1,000m^3 of natural gas will be TL1.860 ($139.6) for households, TL6.300 ($472.9) for large industrial facilities and TL5.520 ($414.3) for power stations.[16] BOTAŞ also increased the price of LNG delivered to wholesale companies from the M.Ereglisi terminal to TL9,000/tcm, an

[15] https://www.dailysabah.com/business/energy/turkey-hikes-natural-gas-prices-for-industry-by-48-as-costs-rise

[16] Gradual tariff in gas, electricity consumption introduced, https://www.hurriyetdailynews.com/gradual-tariff-in-electricity-consumption-introduced-170499, accessed on 27 January

increase of 50 per cent on a monthly basis. Thus, LNG prices have increased by a staggering 562.5 per cent since January 2021.[17]

Figure 6: BOTAŞ tariffs and gas prices, $/mmcm



Source: Energy IQ

The correlation between imported gas prices and gas demand in Turkey has always been strong as the government has been trying to offset expensive gas in power generation with mainly imported coal and vice versa when the dark spread is negative. As shown in Figure 6, the imported gas price remained low throughout the year, especially in the second half of 2021, at $240 and $275 in 3Q and 4Q respectively, even as the prices in major European hubs reached above $1000/mmcm. This is because Turkey imported all its pipeline gas under oil-indexed contracts until the end of 2021, supporting high gas demand in 2021. However, given the inevitable price rise in 2022 due to a new spot contract concluded with Gazprom at the end of December 2021, as well as high European hub prices, it is most likely that EPDK, BOTAŞ, and the Ministry of Energy will continue imposing various capacity, price, and volume restrictions to gas users with consumption above 50 mcm/year.

The price correlation between the BOTAŞ tariff increases and demand is different and much more complicated. Put simply, it does not dramatically affect domestic demand for a number of reasons. Firstly, because the government subsidises gas tariffs for households meaning that gas prices for residential users always remain below the average imported gas prices (Figure 6). This is not the case, however, for the industry and power sectors. In 2021, the manufacturing sector dramatically increased production and exports, taking advantage of the lira depreciation against the USD and the Euro, thus boosting gas consumption in the sector. Gas demand in this sector also depends on the Turkish economy and GDP growth. The GDP growth rate in 2021 was the highest for ten years – almost 9 per cent (this translated into 7-8 per cent electricity growth) and it is projected that in 2022 the growth rate

[17] Energy IQ (subscription is required)

will drop to 3.29 per cent[18] which could translate into up to 3 per cent electricity demand growth, albeit from a high base.

In power generation, the gas tariff increase and gas demand show a weak correlation as power generators bid in accordance with their short-run marginal cost. When BOTAŞ increases its tariffs, the cost of gas-fired power generation and their bids will increase respectively. As currently power demand is high and hydro generation is low, power generators are operating and consuming gas at full capacity. As a result, when BOTAŞ increases gas tariffs for power generators, the price of electricity rises accordingly.

Summary

Based on the evidence, 2022 is likely to be less dry than 2021 and hydro power could add an additional 10-20 TWh of electricity supply. The GDP growth forecast of 3.3 per cent suggests slower gas demand growth, given that electricity demand could rise by 3 per cent (compared to a 9 per cent rise last year). The fiscal policy experiment in Turkey aims to lower the value of the Turkish lira to increase manufacturing and exports. However, if energy prices are subsidised by BOTAŞ and the Treasury, energy intensive industries are set for faster growth this year, given their relative competitiveness. But it looks as though the government is trying to pursue a policy of production and employment at all costs. Gas demand will also be affected by the number of tourists that will travel to Turkey in 2022. The government also aims to gasify all towns with population above 10,000,[19] which may add around 1 bcm/year of demand. Yet a policy of gasification during a global energy crisis could stress the country's fiscal balances.

Furthermore, in 2022 alone, Turkey is planning to add 1000 MWh of solar energy and installed wind farms with a record capacity of 1,750 MWh[20] substituting natural gas in electricity production where possible. Given all these factors, we estimate that Turkey's gas demand in 2022 may stand at 54-55 bcm, around 10 per cent below 2021 levels.

2. Pipeline and LNG supplies

Against the backdrop of the natural gas demand surge in Turkey in 2021, gas supplies into the country from various sources were vital. In 2021, Turkey imported 58.7 bcm, withdrawing an additional 0.9 bcm from storage.[21] But supply pressures rose in the summer of 2021, as demand surged in both power and industry during the summer heat wave. This coincided with a price surge in global gas markets, particularly in the major European hubs, a halt in gas exports by Gazprom to private importers on 16 July, as well as the expiry of 16 bcma of legacy gas import contracts.

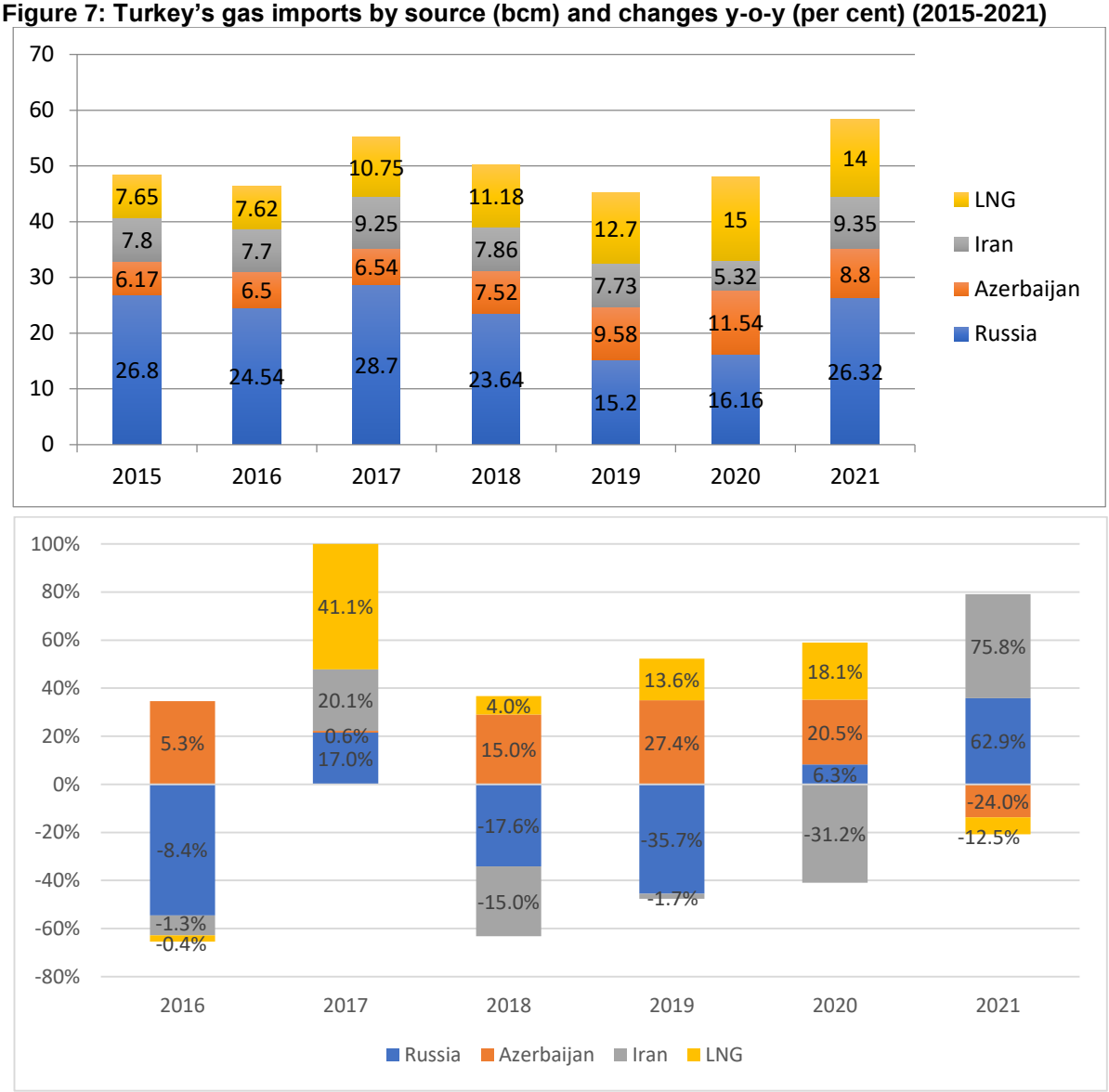
[18] https://www.statista.com/statistics/263612/gross-domestic-product-gdp-growth-in-turkey/

[19] Bakan Dönmez, nüfusu 10 binin üzerindeki tüm ilçelere doğal gaz götürmeyi amaçladıklarını bildirdi, https://www.aa.com.tr/tr/ekonomi/bakan-donmez-nufusu-10-binin-uzerindeki-tum-ilcelere-dogal-gaz-goturmeyi-amacladiklarini-bildirdi/2257392

[20] 2021 was record year for annual wind installations in Turkey, https://balkangreenenergynews.com/2021-was-record-year-for-annual-wind-installations-in-turkey/

[21] EPDK natural gas sector monthly reports.

Figure 7: Turkey's gas imports by source (bcm) and changes y-o-y (per cent) (2015-2021)



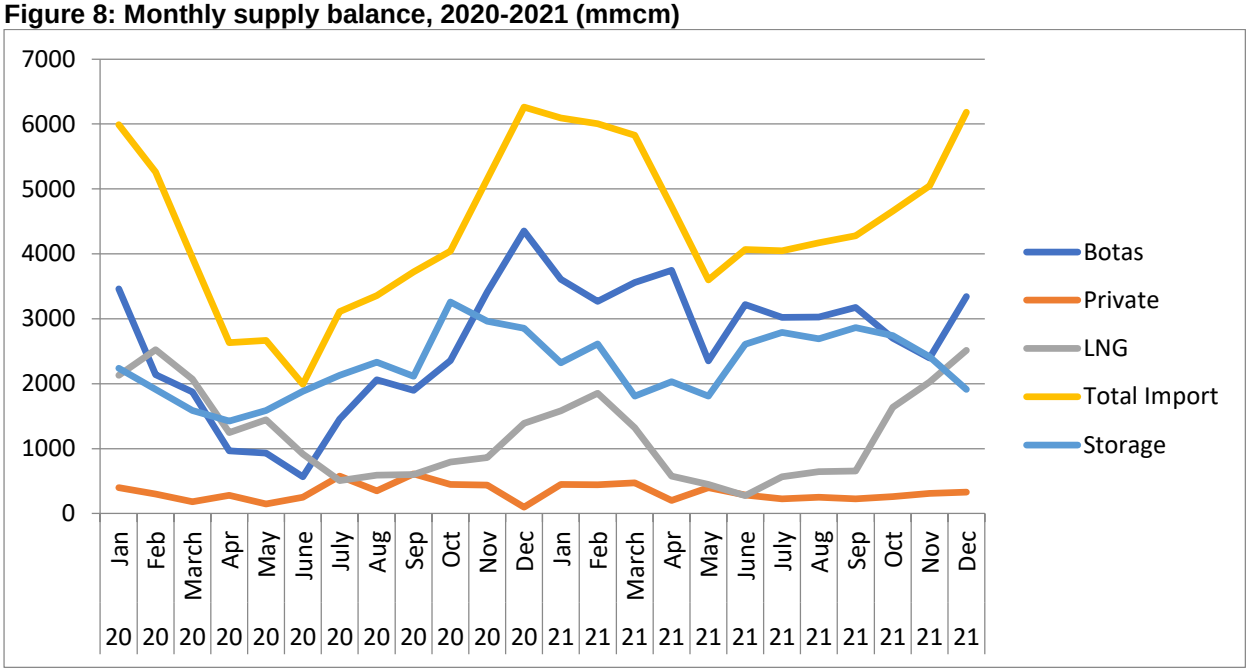
Source: EPDK

During the winter of 2020/2021, BOTAŞ increased its pipeline imports to meet the seasonal demand peaks, however between mid-January and February 2021, pipeline imports fell from 4.3 bcm to 3.2 bcm and LNG imports rose instead, from 862 mmcm in November 2020 to 1.8 bcm in February 2021 (Figure 8). With oil-linked pipeline contract prices coming in cheaper than spot LNG, Turkey increased imports of pipeline gas from Russia (by 62 per cent y-o-y) and Iran (by almost 76 per cent y-o-y) while arrivals from Azerbaijan were lower by 24 per cent y-o-y (Figure 7), owing to the expiration of the Shah Deniz Phase 1 (SD1) LTC and a short-term contract with Azerbaijan Gas Supply Company (AGSC), which contracted less gas for 2022.[22] The country moderately reduced its LNG imports for 2021 as a whole, but arrivals still came in at the second highest annual level following a sharp increase in Q4 (Figure 8, Figure 11). In Q3 2021, to meet the strong summer demand, Turkey favoured cheaper pipeline gas from Russia over expensive spot LNG. But imports from Azerbaijan decreased from 3.7 bcm in April to

[22] According to Azerbaijan's energy minister Parviz Shahbazov, 2.5 bcm will be supplied in 2022 and 3.5 bcm in 2023, leaving 5 bcm to be supplied in 2024. See https://www.reuters.com/article/azerbaijan-turkey-gas-idUSKBN2H418P

2.3 bcm in May due to the expiration of the 6.6 bcm/year SD1 long-term contract in the end of April. A new 3-year contract was signed in August 2021.

Figure 8: Monthly supply balance, 2020-2021 (mmcm)



Source: EMRA monthly natural gas market report.

Average pipeline gas prices for Turkey remained low throughout the year, hitting their lowest point of $170/mmcm in Q1, and ending the year at their highest, $275/mmcm in Q4 (Figure 6).

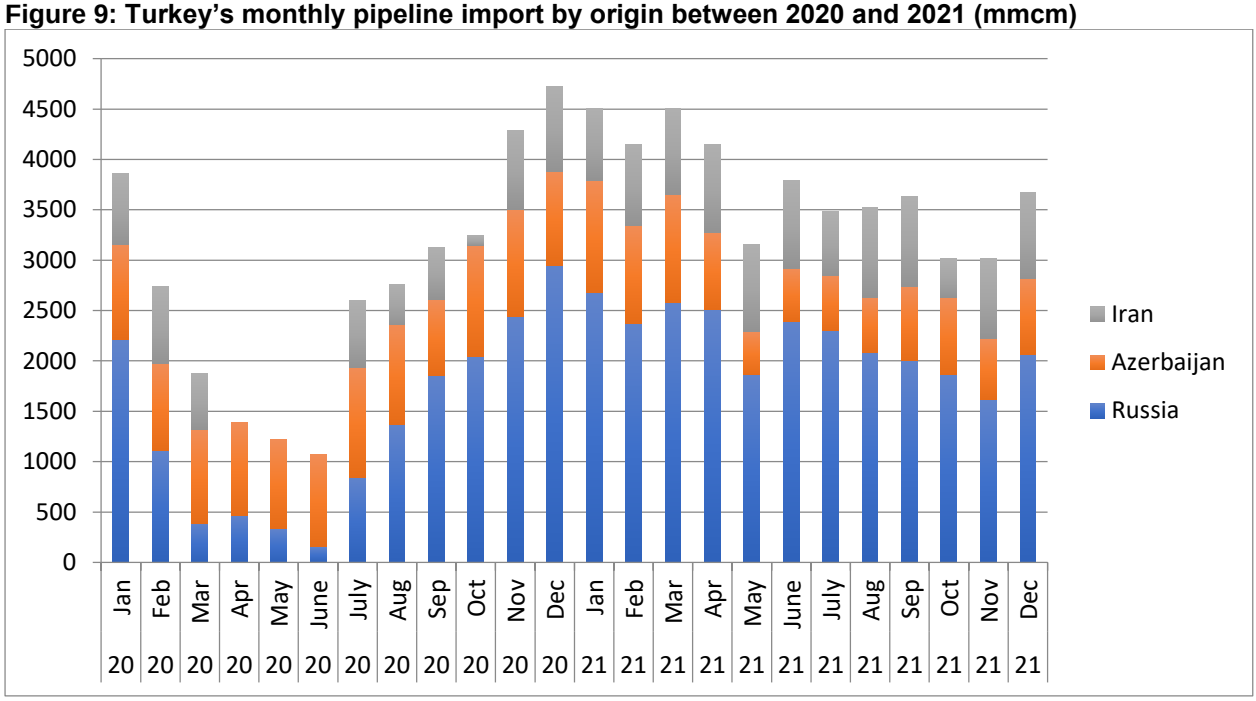
Despite the demand surge starting in October 2021, BOTAŞ decreased pipeline imports from Russia due to the end of the Annual Contract Quantity (ACQ) with Gazprom Export. As shown in Figure 9, pipeline gas imports, especially from Russia and Iran, reached record highs in the summer months but arrivals from Russia subsequently fell. Russian gas supplies to Europe also declined in October year-on-year,[23] but the data below highlights that this was not because Turkey was drawing Russian supplies away from the continent. This was, however, the case in first eight months of the year, given high import volumes from Russia (Figure 9).

BOTAŞ's 4 bcma LTC with Gazprom for pipeline arrivals at the Kıyıköy entry point via Turk Stream (this is in addition to the 4 bcma imported at the same entry point by private importers),[24] expired on 31 December 2021 and was extended as a short-term contract. This is discussed in the next section. BOTAŞ slightly increased gas imports from Russia in December to 2 bcm, from 1.6 bcm in November, most likely off-taking make up volumes, but this was still 40 per cent less y-o-y (Figure 9). Imports from Russia in December 2019 were only slightly below 2021 levels at 1.9 bcm. To compensate, BOTAŞ significantly increased LNG imports from various sources despite the fact that LNG prices were higher than imported pipeline gas. Table 1 illustrates gas deliveries to Turkey at various entry points from three pipeline suppliers as well as LNG deliveries and storage offtakes. It shows that BOTAŞ favoured LNG in December to meet high demand and utilised almost all its LNG facilities over cheaper pipeline gas.

[23] For detailed analysis on Russian and other suppliers' gas deliveries to Europe in 2021 see J. Sharples, "Supply Side Factors in European gas prices" https://www.oxfordenergy.org/wpcms/wp-content/uploads/2021/12/Insight-108-Supply-Side-Factors-in-European-Gas-Prices.pdf

[24] These include: Akfel Gaz Sanayi Ticaret A.Ş., Avrasiya Gaz A.Ş., Batı Hattı Doğal Gaz Ticaret A.Ş., Bosphorus Gaz Corporation A.Ş., Enerco Enerji, Kibar Enerji A.Ş., The Shell Company of Turkey Ltd.

Figure 9: Turkey's monthly pipeline import by origin between 2020 and 2021 (mmcm)



Source: EPDK

Table 1: Gas flows to Turkey in December 2021

Entry Point	Source/Line	Physical capacity, mcm/d	Operational Status	Predicted realisation
Malkoçlar	Western Line	41	41	0
Türkgözü	Azerbaijan 1 (spot)	19.1	11.6	9
Durusu	Blue Stream (Russia)	47.3	47.3	46
TANAP	Azerbaijan 2	17.3	17.3	17
Gürbulak	İran	28.5	28.5	25
Kıyıköy	TürkStream (Russia)	46.9	46.9	20
Egegaz	LNG	40	40	38
Etki FSRU	LNG	28	28	25
Ertuğrul G.FSRU	LNG	28	28	20
M. Ereğlisi	LNG	37	37	35
Silivri	UGS	25	25	20
Tuz Gölü	UGS	40	40	15
Total (mcm/d)		**398.1**	**349.60**	**270**
Operational Capacity Ratio, %			**87.82**	**67.82**

Source: EPDK, Energy IQ

It needs to be mentioned that there is no correlation between daily gas demand and the amount of gas supplied to the system from underground storage (UGS). The gas from the UGS is not used for peak shaving and is considered as a relatively low-cost source. Regular withdrawals are made in order to reduce BOTAŞ's purchase costs, using gas purchased during low price periods and selling into the domestic market when gas prices are peaking. The flexibility of the system is limited by the number of cold days in winter.

Imports by private companies

Private companies have been suffering losses, importing from Gazprom at LTC prices and selling into the domestic market at subsidised gas prices for households. It has been extremely difficult for them to compete with BOTAŞ but the seven main private companies have managed to survive for ten years by selling mainly to long-term clients from the industry and power generation sectors. Pricing terms are similar to Gazprom's contracts with BOTAŞ, but BOTAŞ subsidises its competing sales, a major obstacle to the development of a true market, meaning that private sellers must take both the price and volume risks. The private sector buyers take all the price risks because of a) oil price volatility in the international markets, b) exposure to the national currency's depreciation and volatility, and c) the fact that domestic prices are lower than imported gas prices. With the depreciation of the Lira against the US dollar over the past two years, import costs have soared above the price at which the gas can be sold. Private companies have not been able to accept selling the gas on the domestic market on this basis because, unlike BOTAŞ, they are not public companies and their gas prices are not subsidised.[25]

For the reasons described above, private importers managed to get a 10.25 per cent price discount from Gazprom back in 2015-2016. The importers considered the discount to be ongoing and did not pay the increased bill for January 2016. In response, Gazprom cut their bids for gas supply by the amount of the non-payment. Consequently, five private[26] Turkish importers have been in arbitration with Gazprom since February 2017 over gas prices for that year. Eventually Gazprom extended the 10.25 per cent discount to 2016, but the arbitration courts ruled that this should not continue into 2017, leaving the private sector importers with a $400 million bill.[27] New developments occurred after the Swedish court dismissed Akfel, Kibar, and Enerco's appeals in June and September 2021 respectively against a Stockholm arbitration ruling on a price revision in their long-term Russian gas contract which caused new problems for the importers.[28] In July 2021 Gazprom cut its supplies to Akfel, Kibar, and Enerco leaving these companies in a difficult situation regarding their customers. Additionally, the cut-off came at the worst possible time when demand started surging owing to low hydro power generation and above-average temperatures. The problem was that private sector importers were selling gas to wholesale marketers at prices that anticipated a 10.25 per cent price reduction from Gazprom. The importers held back-to-back long-term sale contracts with wholesalers covering the period January 2017 to September 2018, which would result in retroactive payments of $160 million, including clauses that the marketers would pay more if the importers did not receive the discount.[29] When the appeal was dismissed by the Swedish court, private importers were left in debt to Gazprom and private importers' customers, wholesalers, owing importers tens of millions of dollar in return.

The government decided to step in and save the situation to allow gas flows to resume. The Ministry of Energy suggested a scheme whereby it would buy gas from the private companies for around $475/mmcm,[30] allowing these companies to make a profit on imports which averaged around $277/mmcm in Q3 2021, instead of buying expensive spot LNG at a price of around $1200/mcmm in the same period. With the difference in price, Akfel Gaz, Enerco Enerji[31], Avrasiya Gaz, and Kibar could

[25] For detailed discussion on private sector importers' gas imports see Rzayeva "The Renewal of Turkey's Long-term Contracts", pp.21-25, https://www.oxfordenergy.org/publications/the-renewal-of-turkeys-long-term-contracts-natural-gas-market-transition-or-business-as-usual/#:~:text=Energy%20Transition%20Research-,The%20Renewal%20of%20Turkey's%20Long%20Term%20Contracts%3A%20Natural%20gas%20market,or%20'business%20as%20usual'%3F&text=Consequently%2C%20the%20year%202021%20is,as%20has%20long%20been%20anticipated.

[26] Shell and Bosphorus Gaz did not go to arbitration

[27] "The Renewal of Turkey's Long-term Contracts", pp. 23

[28] Gazprom cuts supply to some Turkish private importers, Accessed on 2 February https://www.argusmedia.com/en/news/2235225-gazprom-cuts-supply-to-some-turkish-private-importers

[29] "The Renewal of Turkey's Long-term Contracts", pp. 23

[30] This information has been obtained from market participants.

[31] Akfel, Enerco, and Avrasiya Gaz are being put up for sale by the Savings Deposit Insurance Fund of Turkey (TMSF), the state caretaker. Akfel Group, which also includes Akfel Gaz whose LTC with Gazprom will expire in 2043, has been managed by the TMSF since the beginning of 2016 within the scope of FETO/PDY terrorist organization investigations (although it has not been properly nationalised). The TMSF had further explained their plan of investigating the Akfel group's assets and liabilities, so as to put profitable assets up for sale. Controlled by the TMSF, Akfel Gaz is the owner of the second largest

take loans from a bank and repay their debt to Gazprom who would then resume supplies. The scheme started working in Q3 2021 – Akfel and Kibar Enerji paid their debts with loans from the state banks and resumed gas imports in October and November respectively (Figure). They sold the imported gas to BOTAŞ at a premium and paid the premium to the banks to repay their loans. Bosphorus Gaz did not have any dispute with Gazprom and continued importing gas as usual in 2021.

Table 2: Turkey's private sector importers contract terms and imported volume

Supplier	Importer	ACQ, bcm/year	Contract base	Contract End	Current status
Gazprom, TS	Enerco Enerji	2.5	Oil products	Dec 2021	Not renewed, make-up gas
Gazprom, TS	Shell	0.25	Oil products	Dec 2021	Not renewed, make-up gas
Gazprom, TS	Avrasiya Gaz	0.5	Oil products	Dec 2021	Not renewed, make-up gas
Gazprom, TS	Bosphorus Gaz1	0.75	Oil products	Dec 2021	Renewal is not announced
Gazprom, TS	Bati Hatti	1	Oil products	2036	Ongoing
Gazprom, TS	Akfel	2.25	Oil products	2043	Ongoing
Gazprom, TS	Bosphorus Gaz2	1.75	Oil products	2043	Ongoing
Gazprom, TS	Kibar	1.00	Oil products	2043	Ongoing
Total		10			

Source: EPDK

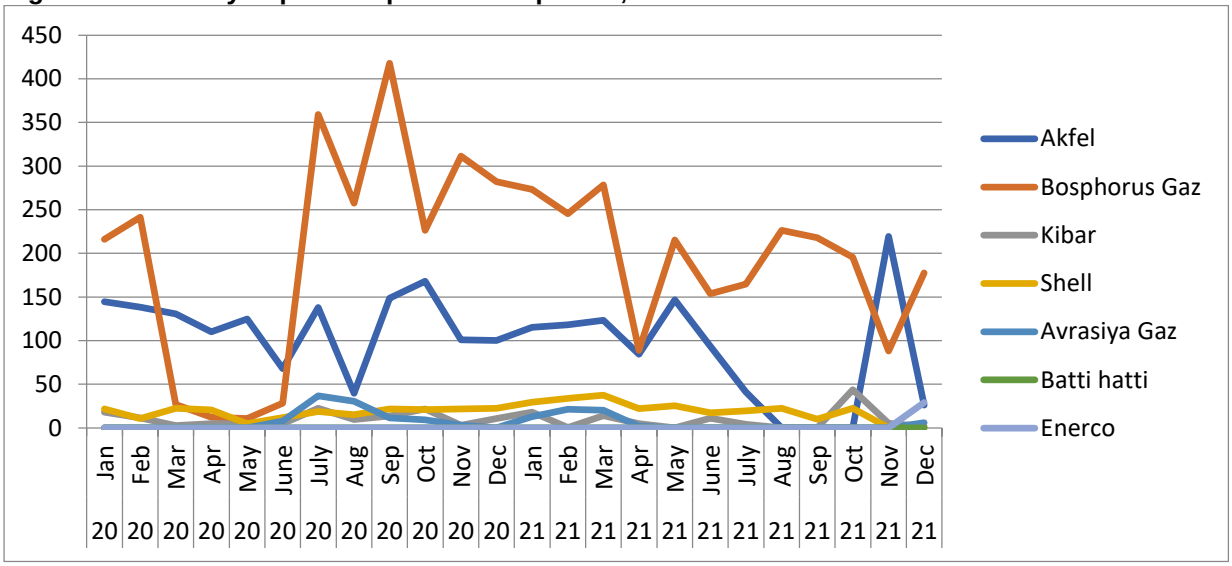
Although it was not announced officially, Shell and Bosphorus Gaz said they renewed their contracts at the end of 2021 or would continue importing make-up gas, if not renewed. The companies have agreed on a flexible two year contract with a hybrid import price formula which includes 70 per cent TTF indexation and 30 per cent oil linkage with a nine-month lag.[32] It seems that all other private importers who still hold operational contracts have had a price review with Gazprom Export and have also included a 70 per cent TTF and 30 per cent oil price indexation to the price formula. However, the information about the contract renewals by Enerco Enerji and Avrasiya Gaz has not been publicised. It is most likely they did not renew their LTCs given that these companies have been put up for sale by the TMSF and it will be up to the new owners to decide on any contract extension. Enerco Enerji stopped importing gas from Gazprom in January 2019 due to problems with paying its ToP fines and to date has not resumed its imports. Avrasiya Gaz did not import any gas throughout 2019 and imported negligible

volume of contracts held by the private sector in Turkey, with an annual contracted amount of 2.25 bcm. This sale does not mean the nationalization of Akfel. Rather, the TMSF has created a commercial and financial collectivity for the shares of the entire Akfel gas group. This group includes Enerco Enerji Sanayi ve Ticaret A.Ş., and Avrasya Gaz A.Ş., as well as Akfel Gaz Sanayi Ticaret A.Ş.. On 19 January 2022, the TMSF put up this group of companies up for sale, freed of any incumbrances such as pledges or attachments. The estimated value of this group is TL 230 million. Enerco Energy has the joint highest contractual amount among the private importers with 2.5 bcm/year, with Bosphorus Gaz achieving the same volume as Enerco Energy with its two contracts of 1.75 bcm/year and 0.75 bcm/year. Both the Enerco and Avroasiya Gaz contracts expired last year. Interestingly, Akfel Commodity Group (ACG), the parent company of Akfel Gaz, has shares in all three companies. It owns 60 per cent of Enerco Energy with the remaining 40 per cent owned by OMV Refining & Marketing GmbH. ACG also owns 60 per cent of shares in Avrasiya Gaz.. In total, all three companies have a 5.25 bcm/year import portfolio, accounting for more than 50 per cent of total private importers gas import portfolio. Whether there will be any change in the import strategy of these companies or whether they will renew their import sales and purchase contracts with Gazprom after the change in ownership structure is not known at this stage. Information about the announcement of the sale can be found at TMSF website: https://www.tmsf.org.tr/tr/SatisIlan/List/akfel-gaz-grubu-hisseleri-ticari-ve-iktisadi-butunluk-satıs-ve-uzatma-ilanı

[32] Three private Turkish gas suppliers face restructuring amid Russian long-term contract talks, ICIS, https://www.icis.com/explore/resources/news/2022/01/04/10721634/three-private-turkish-gas-suppliers-face-restructuring-amid-russian-long-term-contract-talks/

volumes in 3Q 2020 and 1Q 2021, these most likely being make-up gas (Figure). Clearly, these two private importers have had ToP issues and this problem has been accelerated after the arbitration decision in favour of Gazprom. Nevertheless, Enerco Enerji has held negotiations with Gazprom Export in the hope that there could be some concessions and a review of the contractual terms aiming for a flexible contract based on market fundamentals. However, it looks as though these companies have not extended their contracts but they want to offtake their make-up gas within the two year period during which EPDK has extended their licences. This requires them to pay Gazprom an amount upfront for this gas.

Figure 10: Monthly imports of private companies, mmcm



Source: EPDK

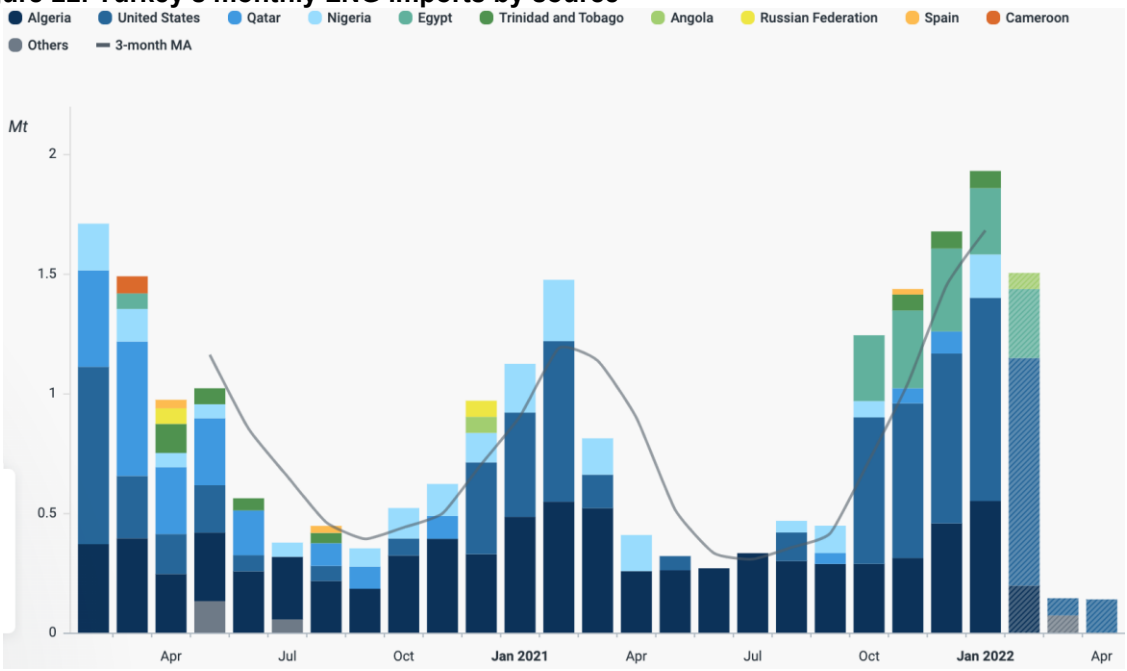
Uncertainty in the area of gas prices and the supply structure for 2022 is negatively affecting the purchasing decisions of power plants and consumers. The aggressive style of gas sales by BOTAŞ, the dominant player in the market, narrows the trade opportunities for private sector suppliers and their survival in the market. Lira depreciation and price subsidisation makes the situation even more challenging.

LNG imports

In 2021 Turkey imported 10 Mt of LNG, or 14.1 bcm.[33] Turkey moderately reduced its LNG imports throughout 1Q, 2Q and 3Q 2021 and instead significantly increased imports of pipeline gas especially during the summer months. The difference in LNG and pipeline gas prices for Turkey was significant throughout 2021, with LNG prices usually at a $0.90-$1/Mmbtu[34] discount to TTF or at a premium of around $0.80-$1/MmBtu[35] (Figure 6). BOTAŞ significantly increased LNG imports in November and December to their second highest annual level, after record high imports in 2020 of 10.64 Mt, when spot LNG prices fell to record lows (Figure 11, Figure 12).

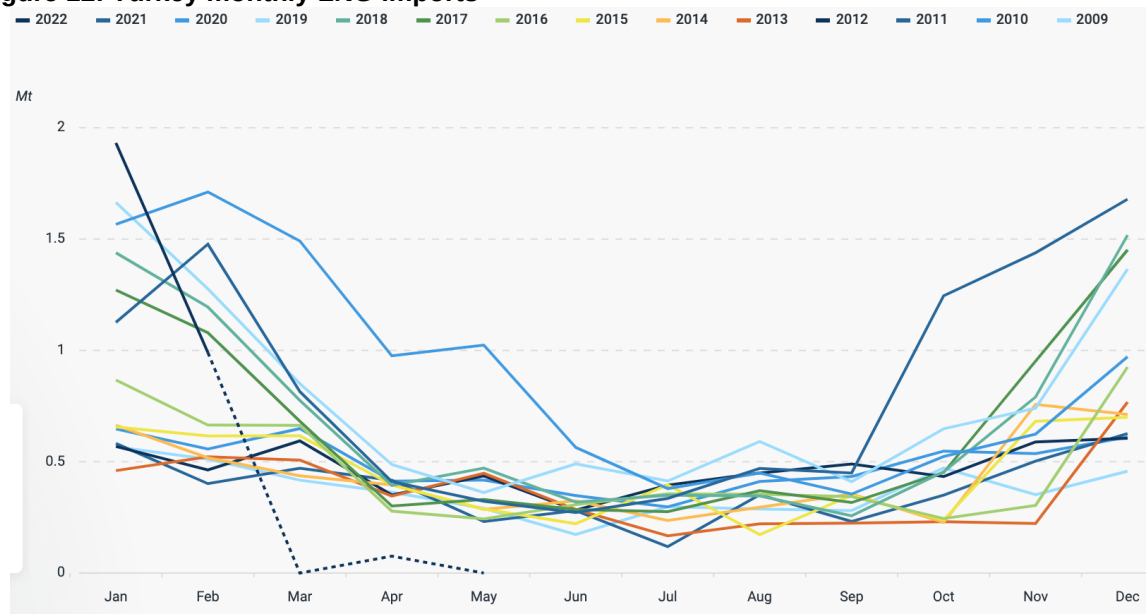
[33] EPDK
[34] For example, the front-month TTF futures contract settled at $32.85/mmBtu on October 4, $24.83/mmBtu on November 4, Kpler, https://research-terminal-frontend.kpler.com/news/turkey-s-botas-seeks-five-january-february-lng-cargoes, https://lng.kpler.com/research-news?page=%2Fnews%2Fturkey-s-botas-partially-awards-october-february-lng-tender, (subscription required)
[35] LNG Monthly Report (January 2022), Kpler (subscription required)

Figure 11: Turkey's monthly LNG imports by source



Source: Kpler

Figure 12: Turkey monthly LNG imports



Source: Kpler

An additional long-term contract with Nigeria of 0.91 Mt (with a price mechanism fixed to oil product prices) expired in October 2021, and was not renewed at the end of the year. Qatar stopped LNG deliveries to Turkey in December 2020 due to the expiration of its short-term contract, but resumed flows in September, November, and December 2021. Increased deliveries from Algeria, the US, and Egypt did not offset reduced shipments from Nigeria, Qatar, and Trinidad and Tobago, leaving LNG imports below 2020 levels (Figure 11, Figure 12).

BOTAŞ renewed its expired 6.6 bcm/year LTC with AGSC for gas deliveries from Shah Deniz Phase 1, changing it to a short-term contract with the gas price formula linked to oil prices. BOTAŞ also

renewed a 4 bcm/year LTC with Gazprom, with the price formula linked to TTF hub indexation. On top of this, LTCs amounting to 4 bcm with private importers expired last year and these contracts have not yet been renewed. The terms of the new contracts mean that imported LNG prices will be able to compete with Gazprom's new contract prices. The new contract between AGSC and Gazprom leaves the country short of contracted gas versus last year and the new contracts allow for the shortfall to be offset with LNG in 2022 and partly with domestic gas production after 2023. Turkey imports more LNG during the peak demand periods which are mainly in the winter, starting from October and by the winter of 2022, the share of LNG may increase in Turkey's energy mix by around 20 per cent y-o-y depending on prices and reservoir refill rates winter of 2022.

LNG imports play a role of import price balancing. Turkey's 133 mcm/d-gasification capacity enables it to maximize the cost advantage during periods when LNG offers price advantages. In 2020, Turkey saved around US$1 billion by reducing oil-indexed pipeline-gas imports and replacing them with cheaper LNG.

Summary

In 2021 due to the surging demand, Turkey was faced with the challenge of ensuring supply security in an escalating price environment to avoid any possible cut offs or even blackouts which could occurred during the winter months. This task was not easy as BOTAŞ had to juggle between sources with relatively lower prices and at the same time ensure supply security during peak demand times. Nonetheless, some cut offs did occur, mainly in the industry sector and also to some of the power generation fleet. Turkey increased gas supplies from Russia by 62 per cent in 2021 compared to 2020 which, especially in the summer of 2021 and the winter of 2020/21, could have drawn supplies away from Europe. LNG will remain an important swing supply source for Turkey in 2022 and its share of the total energy mix will largely depend on pipeline LTC gas prices and spot LNG price competition, as well as domestic energy production levels, mainly hydro power.

3. Renewal of LTCs – a game changer for Turkey?

The government has been undertaking necessary market preparations for the impending renegotiation of long-term gas sale contracts with its current suppliers for the last several years. It has discussed market conditions, as gas prices fell below $2/Mmbtu, as well as structural changes in the market, including Turkey's long-awaited liberalisation and move away from LTCs, oil-linked prices, Take or Pay (ToP) obligations, and destination clauses.[36] However, in just one year, market conditions have changed dramatically and Turkey's desired contractual terms and conditions have become less tenable. Government efforts have been focused on supply security against a backdrop of concurrent events: high demand in the post-pandemic recovery, high spot gas prices, demand pressure, and the expiration of 16 bcm of LTCs with Russia, Azerbaijan, and Nigeria in just one year. With the gas price rising to US$1200/mcm in major European liquid hubs and a shortage of both LNG and pipeline gas in Europe in 2021, Turkey has had to ensure security of supply through its contract renewals.

Over the last few years, Ankara has been making the necessary market preparations by investing financially and politically in strengthening its hand in negotiations with Gazprom and other suppliers upon contract expiration. It has done so by doubling the daily entry-point gas send-out capacity, which has included increasing LNG import capacity but also decreasing import demand (until 2020) by significantly increasing the share of domestically produced energy such as coal, lignite, wind, solar, and hydro. Turkey has long been unhappy with the high prices it pays for gas, relative to the rest of Europe, and wants to move away from the linkage to oil and oil products. It has traditionally purchased gas on long-term, oil-price-related contracts and the government has taken all the price-related risk by subsidizing the BOTAŞ gas price for the population, justifying it for security of supply reasons. Last

[36] "The Renewal of Turkey's Long-term Contracts", 2020;
G. Rzayeva "Gas supply changes in Turkey", 2018, OIES, https://www.oxfordenergy.org/publications/gas-supply-changes-turkey/;

year, our paper on contract renewals highlighted that "2021 will be a turning point for the Turkish natural gas market with expiration of 16 bcm of LTCs and their renewal on more flexible contractual terms away from old-fashioned, oil-indexation formulae and the inclusion of hub indexation".[37] This is exactly what happened in 2021 albeit in the context of a demand surge and global price hike.

BOTAŞ's LTC renewal with Gazprom

BOTAŞ's LTCs with AGSC for the gas deliveries from the SD1 field and with Gazprom expired in April and at the end of December 2021 respectively. The SD1 contract was renewed in August 2021 and the contract with Gazprom was renewed in December 2021 (Table 3). Almost all the contractual terms that BOTAŞ had wanted, including short- and mid-term contracts, gas-to-gas indexation, and flexibility in contractual terms were amended. Turkey has observed natural gas market developments in Europe for a long time and has reached the conclusion that natural gas prices in Turkey do not reflect pure economic market fundamentals and that there must be a move towards hub-indexed, ToP free, destination clause-free contracts, and away from traditional LTCs linked to oil product prices. However, the timing of these decisions and contract renegotiations could not have been worse, given current events in the international gas markets. Ankara chose short-term loss for long-term benefits, and it is confident that the current high gas prices are temporary.

Table 3: BOTAŞ contract terms and imported volumes

Supplier	Importer	ACQ, bcm/year	Contract base	End year	Current status
AGSC1, BTE, AZE	BOTAŞ	6.6	Oil products	2021	Renewed as short-term contract in Aug, '21
NLNG, LNG, Nigeria	BOTAŞ	1.338	Oil products	2021	Was not renewed
Gazprom, TS	BOTAŞ	4.00	Oil products	2021	Renewed as short-term contract in the end of Dec '21
Sonatrach, Algeria	BOTAŞ	4.444	Arab crude basket	2024	Ongoing
Gazprom BS	BOTAŞ	16.00	Oil products	End 2024	Ongoing
NIGC, Iran	BOTAŞ	9.60	Oil products	2026	Ongoing
AGSC2, TANAP	BOTAŞ	6.000	Oil products	2033	Ongoing
Total		48			

Source: EPDK, various sources

The new short-term contract with Gazprom spans four years[38] and is based on both hub indexation (70 per cent) and an oil product linkage (30 per cent) with a total volume of 5.75 bcm/year instead of the expired 4 bcm/year. Given that there is an extra 1.75 bcm/year capacity in TurkStream, the new contract with Gazprom means that Turkey has the flexibility to withdraw more gas volumes if and when needed. This condition was not reflected in the old, expired contract. With a total capacity of 31.5 bcm/year for the two lines of TurkStream, one is dedicated to the domestic Turkish market and second delivers gas to Bulgaria, Greece, North Macedonia, and Serbia. The contract makes clear that the first line will be fully utilized based on the contracted volumes by BOTAŞ (5.75 bcm/year), 4 bcm/year make-up gas from four private importers and the ongoing LTCs of three private importers who have contracted volumes of 6 bcm/year, giving a total of 15.75 bcm/year.

Last December, BOTAŞ was entitled to book spot pipe gas capacity at the Kıyıköy entry point on TurkStream for 2022. EPDK announced on December 29 that BOTAŞ was entitled to make annual,

[37] Ibid.

[38] Russia's Gazprom signs four-year gas deal with Turkey's BOTAŞ, https://www.reuters.com/business/energy/russias-gazprom-signs-four-year-gas-deal-with-turkeys-botas-2022-01-06/, accessed on 7 February

quarterly (Q1), and monthly (January) capacity reservations. The total daily capacity reserved by BOTAŞ for annual and quarterly spot gas imports was 11.841 mcm/d, which corresponds to the daily contract quantity (DCQ) of its 4-bcm/y contract that had phased out with 1.75 bcm being a flexible volume to be imported if extra volumes are needed.[39]

Private importers LTCs renewal with Gazprom

There is no public information about the renewal of the expired contracts of four private importers (Enerco, Avrasiya Gaz, Shell, and Bosphorus Gaz) with Gazprom Export. However, according to EPDK's license data, the long-term import license of Avrasya Gas expired on February 26 2021 and was then extended by EPDK for two years, Bosphorus Gas' license expired on October 18 2021, and was also extended for two years. Shell Energy's license expires on July 12 2022 and Enerco Energy's license expires on December 31 2022.[40] There is no information about the extension of these licenses. It is expected that EPDK will renew them in the short-term, to give them a chance to import their remaining make-up gas. These four companies can import their gas in the short-term, for the next two years, to ensure supply security until Turkey's first gas from the Sakarya field come online and the Akkuyu nuclear power station is commissioned in 2023.

Like BOTAŞ, these companies were keen to change their inflexible contractual terms with hub price indexation, lowering of ToP volumes from 80 per cent to around 50 per cent and eliminating the destination clauses. They were also unhappy with the absence of any hedging in the contracts to secure them against price fluctuations and lira depreciation and for that hub price indexation to both European hubs as well as Turkey's Gas Reference price (GRP) is required.

Contract renewal with AGSC

On expiration of the Shah Deniz Phase 1 contract in April 2021, BOTAŞ and the marketing arm of the Shah Deniz Consortium, AGSC renewed the contract in August 2021 as a short-term contract with the price formula linked to the oil price, like Shah Deniz 2 pricing. The sides contracted deliveries of 2.5 bcm to Turkey in 2022 and 3.5 bcm in 2023. Given that volumes at SD1 are expected to start to decline naturally in 2023-2024, it is most likely that there will not be enough gas to renew this contract with AGSC after 2023. Should Turkey need additional volumes of gas from Azerbaijan, gas may come from other fields currently under development, i.e. Absheron Phase 2 or Umid-Babek.

New law on spot imports

To create a competitive market, ensure supply security, and to reduce the role of the state in the gas sector, the Energy Market Regulation Authority first presented the Natural Gas Market Law (NGML) No. 4646 in 2001.[41] This was a fundamental step on the way to establishing a liberalised natural gas market in Turkey.[42] Since then, the transition to an open market has, however, been extremely slow. Ankara postponed the unbundling of BOTAŞ for an uncertain time and reduced the share of imports by private companies. Yet it opened up send-out capacity at all the entry points for third-party access for import and export. To legally support the function of a free and open spot market in Turkey, the EMRA promulgated a law on "Procedures and principles regarding the determination of spot pipe gas import volume and application method"[43] in 2019. The law on spot market regulation created a good opportunity for private companies to trade with gas sourced elsewhere, including Russian pipeline gas, to profit when and if the prices are suitable. Companies also have an opportunity to import spot LNG and re-export it to Europe, in accordance with the Natural Gas Market Law 4646 provisions, although BOTAŞ restricts private company access to LNG receiving terminals and facilities. BOTAŞ utilise the whole capacity, and the subsidized tariffs do not allow other importers to bring and sell LNG in Turkey.

[39] EPDK, Energy IQ
[40] EPDK
[41] In the paper on "Natural gas in the Turkish domestic energy market: policies and challenges" (2014), this author analyses NGML provisions in detail. See pp 46-50, https://www.oxfordenergy.org/wpcms/wp-content/uploads/2014/02/NG-82.pdf
[42] See discussion on market liberalisation in "The Renewal of Turkey's Long-term Contracts", 2020
[43] Law is available in Turkish: https://www.resmigazete.gov.tr/eskiler/2019/09/20190919-13.pdf

The storage and gasification service fee is determined by the parties and not subject to EPDK's tariff regulations. BOTAŞ's position on this is that private sector could import LNG depending on market conditions, when and if an extra amount of gas is needed and if the LNG prices are reasonable and competitive vis-a-vis pipeline gas prices. BOTAŞ is expected to launch its gasification capacity auctions on a monthly or quarterly basis depending on the gasification and storage service fees.

Turkey's daily entry capacity is 360 mcm/d as of today (Table) and will rise to 450 mcm/d in 2023, excluding the Western Line (Malkoclar). Malkoclar is ready for bi-directional flow, to be booked by private Turkish companies in accordance with the spot pipeline import law. This development may create a long-awaited opportunity for private sector companies to utilize surplus pipeline capacity via various trading structures such as physical cross-border swaps. The first spot pipe gas import in Turkey was made by Bosphorus Gaz in September 2020, an average of 403,000 m3/day throughout the month.

Along with adopting the spot pipeline gas import law on 1 October 2021, Turkey also launched an energy exchange called EPIAŞ (Enerji Piyasaları İşletme A.Ş.) EXIST (Energy Exchange İstanbul) Gas Future Trading, a platform for private companies importing spot pipeline gas to trade based on future contracts. Market participants will be able to manage their portfolios more flexibly and benefit from greater price visibility. There are monthly, quarterly, and annual contracts[44] with future consideration to introduce seasonal and semi-annual products at a later stage.[45] Turkish companies that are registered with the EXIST gas trading companies (registration with EPDK and the BOTAŞ gas transmission system is also required), will be able to trade imported as well as domestic gas, notably from the Sakarya field once the gas comes online after 2023. It is most likely that the price formation for the domestic gas will be linked to the EXIST platform and be competitive with other gas suppliers prices. Given the old-fashioned oil-linked price formation which will account for Turkey's 57 per cent imported gas in 2022 (assuming 4 bcm/year of make-up gas by private importers that can be imported as spot gas in a flexible manner as their LTCs are not renewed, BOTAŞ's 5.75 bcm of spot contract with Gazprom through to 2024 and the new SD1 oil-linked price contract), there is not much correlation between the EXIST gas reference price and European gas hub prices. However this situation may change in the near future, especially by 2026, when 32 bcm/year of oil-linked LTCs with Gazprom (16 bcm/year gas via Blue Stream), Sonatrach (5.4 bcm/year LNG), and Iranian NIGC (9.6 bcm/year) will run out (Table 3, 4) on top of the SD1 recently renewed spot contract. If Turkey can manage to turn this platform into a liquid one, it can convince its pipeline gas suppliers to link the price formula to Exist in the future. However, as we discussed in detail in the paper on "Renewal of Turkey's long-term contracts"[46], this will not be possible if the natural gas market is fully liberalised.

Summary

Table 4 below summarises Turkey's current natural gas supply based on the long-, mid-, and short-term contracts and spot LNG with its suppliers as it stands in 2022. 2021 indeed was a game changer for the Turkish natural gas market. With the renewal of an expired 16 bcm of gas contracts, Turkey managed to switch 43 per cent of its total contracted gas supplies to hub (TTF and HH) indexation in 2022 vs. 19.6 per cent in 2021, including spot LNG contracts. This translates to some 18.75 bcm of hub-indexed gas out of total of 62.25 bcm including spot LNG. This however does not include the non-operational volumes of the private sector importers which are assumed not to have renewed their contracts due to financial issues with Gazprom Export, but who will continue importing make-up gas into the country in the short term. The renewed contracts leave Turkey short of around 3-4 bcm of gas

[44] The daily spot pipe gas capacity of 4.91 mcm/day, announced by EPDK for the first quarter of 2022, corresponds to a capacity of 441.9 mcm for 90 days. For all data on traded volumes, average maximum and average minimum prices, booked capacities, and obligations of the participants see https://www.epias.com.tr/tum-duyurular/seffaflik-platformu-verileri-guncellendi/

[45] Q&A: Turkey's Epias (Exist) eyes gas futures trade launch, Argus, https://www.argusmedia.com/en/blog/2021/june/29/q-and-a-turkeys-epias-exist-eyes-gas-futures-trade-launch

[46] "The Renewal of Turkey's Long-term Contracts", 2020

in 2022 vs. 2021, which presumably will be substituted with spot supplies from Russia, out of the flexible 1.75 bcm/year, or with spot LNG based on flexible contractual terms and hub indexation.

Table 4: Turkey's long-, mid- and short-term contracts and share of hub and oil price indexation as of 2022

					Index (%)		Index Volume (bcm/y)			
Importer	**Type**	**Exporter**	**Entry Point/Line**	**ACQ, bcm/y**	**Oil**	**TTF/HH**	**Oil**	**TTF/HH**	**Expiry date**	**Current Status**
BOTAŞ	Pipeline/spot	Gazprom Export	TurkStream/Kıyıköy	4	30%	70%	1.2	2.8	31.12.25	Operational
BOTAŞ	Pipeline/spot	Gazprom Export	TurkStream/Kıyıköy	1.75	30%	70%	0.53	1.23	31.12.25	Operational
Avrasiya Gaz*	Pipeline	Gazprom Export	TurkStream /Kıyıköy	0.5	100%	0%	0.5	0	31.12.21	Expired (make-up gas)
Bosphorus Gaz*	Pipeline	Gazprom Export	TurkStream/ Kıyıköy	0.75	100%	0%	0.75	0	31.12.21	Expired (make-up gas)
Enerco Enerji*	Pipeline	Gazprom Export	TurkStream/ Kıyıköy	2.5	100%	0%	2.5	0	31.12.21	Expired (make-up gas)
Shell Enerji	Pipeline	Gazprom Export	TurkStream/ Kıyıköy	0.25	100%	0%	0.25	0	31.12.21	Expired (make-up gas)
BOTAŞ	LNG	Sonatrach, Algeria	M.Ereğlisi	5.4	100%	0%	5.4	0	1.12.24	Operational
BOTAŞ	Pipeline	Gazprom Export	Blue Stream/ Durusu	16	100%	0%	16	0	Dec. 2025	Operational
BOTAŞ	Pipeline	NIGC, Iran	Gürbulak	9.6	100%	0%	9.6	0	29.07.26	Operational/ Not at full capacity
BOTAŞ	Pipeline	AGSC/SD1, Azerbaijan	BTE/Türkgözü	2.5+3.5+5.5	100%	0%	2.5	0	31.12.24	Renewed as spot in Aug.'21/Operational
BOTAŞ	Pipeline	AGSC/SD2, Azerbaijan	TANAP	6	100%	0%	6	0	Jul 2033	Operational
Akfel Gaz	Pipeline	Gazprom Export	TurkStream/ Kıyıköy	2.25	30%	70%	0.68	1.58	2043	Operational
Batı Hattı*	Pipeline	Gazprom Export	TurkStream/ Kıyıköy	1	100%	0%	1	0	2035	Non-operational/ Stopped imports
Bosphorus Gaz	Pipeline	Gazprom Export	TurkStream/ Kıyıköy	1.75	30%	70%	0.53	1.22	2043	Operational
Kibar Enerji	Pipeline	Gazprom Export	TurkStream/ Kıyıköy	1	30%	70%	0.3	0.7	2043	Operational
BOTAŞ	LNG/spot**	Various	5 regas facilities***	12****	0%	100%*****	0	12	Various	Operational
Total operational				**62.25**	**57%**	**43%**	**43.5**	**18.75**		

Total non-operational	**5**	**100%**	**0%**	**5**	**0**
Total	**67.25**	**61.3%**	**38.7%**	**48.5**	**18.75**
Total operational vs. 2021 (before SD1 renewal, including 13.8 of LNG and all private importers ACQ except for 1 bcm/y Batı Hattı)	**70.4**	**80.4%**	**19.6%**	**56.6**	**13.8**

Source: Ministry of Energy and Natural Resources, EPDK, author's calculations

*As there is no publicly available information about the renewal of expired LTCs of Avrasiya Gaz, Basphorus Gaz, Enerco Enerji and Shell with Gazprom Export, we assume that their contracts have not been extended, however they continue importing make-up gas during this and next year. Batı Hattı stopped imports and will not resume make-up gas imports.

**Includes only spot LNG and does not include LTC of 1.33 bcm/year LNG with Nigerian NLNG which expired in 2021. This contract was not extended.

***M.Eriğlisi LNG (37 mcm/d), Aliağa LNG (39 mcm/d), Etki FSRU (15 mcm/d), Dörtyol FSRU (28 mcm/d) and Saros FSRU (20 mcm/d) (is not operationla yet).

****Assuming 12 bcm in 2022. (LNG import volumes largely depends on LNG prices in 2022 vs. imported pipeline prices).

*****80% TTF, 20% Henry Hub (HH) indexation

4. Conclusion

In 2021 Turkey faced an unprecedented demand surge. Despite Turkey's well developed natural gas import capacity and diverse supply sources, security of supply became a major issue for the country during the summer of 2021 and the winter of 2021/2022. In January-August 2021, demand hit record highs owing to an uptick in industrial use, the cold winter, a dry season and low water levels in hydro reservoirs, while the cost of imported coal surged. These weather events were followed by the extreme heat wave in August and another cold snap in December 2021-January 2022. At the same time, imports from Russia increased by 62 per cent year-on-year drawing away some supplies from Europe. However, starting from September, imports from Russia started falling, dropping by 9 per cent y/y in October, 33.7 y/y in November and 31 per cent y/y in December. Turkey therefore did not draw supplies away from Europe in Q4 2021. Instead Turkey significantly increased spot LNG imports in October-December despite high LNG prices vis-à-vis imported pipeline gas prices owing to exhaustion of the Annual Contract Quantity. As Turkey was left short of contracted gas after the renewal of the expired 16 bcm/year contracts, it is most likely that it will substitute LTC gas with spot LNG, subject to LNG prices.

It seems that Ankara got what it fought for during the last few years, namely demanding flexible contractual terms based on hub price indexation and short-term contract. Yet the contract expiry coincided with dramatic market changes, making the new contractual terms a short-term burden. Demand pressure throughout the year, shortage of gas, historic surging prices soar in the European gas hubs, expiration of legacy gas LTCs caused an increase in average imported gas prices of 45 per cent in 1Q 2022 relative to 1Q 2021, from $175/tcm to $307/tcm. As in 2022 the share of hub indexation of Turkey's total contracted gas price is around 43 per cent compared to 19.6 per cent in 2021, the average imported gas price can only increase in the remaining quarters of 2022 and in subsequent years given high hub prices. Ankara chose a short-term loss over long-term benefits, believing that current abnormally high hub prices cannot last long. By 2026 another 32 bcm/year oil-linked LTCs with Gazprom Export (Blue Stream), Algerian Sonatrach, and Iranian NIGC will run out, leaving Turkey potentially with 90 per cent of hub indexation contracts, if renewed based on hub indexation (only 6 bcm/year gas from Shah Deniz phase 2 remains as an oil-indexed LTC and this expires in 2033).

The situation with private importers remains uncertain, with the LTCs that were not renewed at the end of last year - with an ACQ of 4 bcm/year - now likely be delivered as make-up or spot gas. With import

licenses these companies can book capacity in the TurkStream pipeline and any other entry points to import spot gas and sell this gas on the EPIAŞ platform if the prices are competitive. Perhaps this is the reason why Turkey contracted for less gas for 2022 vis-à-vis 2021 to leave some opportunity for private companies to import spot pipeline gas from all the suppliers when and if needed which gives more flexibility in import volumes and contractual terms than old-fashioned LTCs, being a strategic decision. This is in accordance with the provisions of the Law on spot pipeline imports and exports.

2022 will be particularly challenging for Ankara to deal with high natural gas prices in the domestic market. In January alone the energy price was increased by 67.6-184.4 per cent for the power generation and industry sectors. Currency risk, high inflation, and rising electricity costs have already revealed the need for new hikes in electricity tariffs in Q2. This will inevitably raise social discontent which will be bad timing ahead of the presidential elections in 2023. This would force Ankara to search for non-tariff solutions to ensure that the distribution sector stays within financially sustainable limits. It is likely that Ankara may reduce VAT rate on electricity bills as a solution to the problem.

All in all, we project that Turkey's gas demand in 2022 will be much less than in 2021, around 54-55 bcm, given a wet winter and wet March and April with high precipitation level and high water reservoir levels. It is most likely that the biggest share in electricity mix will be hydro power, followed by coal and natural gas. Given that the cost of imported gas for Turkey is higher this year vis-à-vis 2021, Ankara will make every effort to reduce the share of imported gas, specifically from Russia and replace it with domestically produced energy sources such as hydro, wind, and solar. The share of wind and solar will grow y-o-y owing to the various government incentives and support mechanism schemes suggested to producers in line with its policy of reducing dependence on imports and also climate change policy. Turkey's preferred source of gas at the moment is the Shah Deniz gas from both phases because the cost of this gas is the lowest owing to the oil price indexation. LNG remains the most expensive source of gas at the moment due to the high hub indexed prices. This is why BOTAŞ significantly reduced LNG imports in March and April. LNG plays a price-balancing role for Turkey, as does the storage gas and, depending on the imported LNG price, Turkey will balance LNG and pipeline gas imports. Nevertheless, regardless of imported energy prices, supply security will remain the number one priority for the country and BOTAŞ may increase both LNG and gas imports from Russia when demand is high.

However, given Turkey's energy security priority, there is no reluctance for Ankara to import gas from Russia aftermath of Russia's invasion of Ukraine and pipeline flows to Turkey will be continuing as business as usual until Gazprom contract expiration in 2026-2027.