ENERGY OUTLOOK 2023



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Abbreviations

BCM: Billion Cubic Meters **BOTAS:** Petroleum Pipeline Corporation **BPP:** Biomass Power Plant **CO**₂: Carbon Dioxide **COP:** Conference of the Parties **EBP:** Efficiency-Boosting Project EGD: European Green Deal **EIA**: U.S. Energy Information Administration **EPC:** Engineering, Procurement and Construction **EPİAŞ:** Energy Exchange İstanbul **EPDK:** Energy Market Regulatory Authority **ESCO:** Energy Service Company **ETKB:** Ministry of Energy and Natural Resources **ETS:** Emissions Trading System **EU:** European Union **EÜAŞ:** Electricity Generation Company FSRU: Floating Storage and Regasification Unit **GST:** Global Stocktake **GW:** Gigawatt **GWh:** Gigawatthour HEPP: Hydroelectric Power Plant ktoe: Kilogram Tons of Oil Equivalent LNG: Liquefied Natural Gas m³: Cubic Meters MAPEG: Directorate General of Mining and **Petroleum Affairs** mcm: Million Cubic Meters MCP: Market Clearing Price **MSP:** Maximum Settlement Price mtoe: Million Tons of Oil Equivalent

MTP: Medium Term Programme **MVT:** Motor Vehicle Tax **MW:** Megawatt **MWh:** Megawatthour NDC: Nationally Determined Contribution **NEEAP:** National Energy Efficiency Action Plan NPP: Nuclear Power Plant NZEB: Nearly Zero Energy Buildings **OIZ:** Organized Industrial Zone **RES:** Renewable Energy Source **SCT:** Special Consumption Tax **SMP:** System Marginal Price SMR: Small Modular Reactor SPP: Solar Power Plant TANAP: Trans-Anatolian Natural Gas Pipeline **TEİAŞ:** Turkish Electricity Transmission Company **TPAO:** Turkish Petroleum Corporation TSKB: Industrial Development Bank of Türkiye **TTF:** Title Transfer Facility **TÜNAŞ:** Tuskish Nuclear Energy Company **TÜPRAŞ:** Turkish Petroleum Refineries Corporation TWh: Terawatthour **UNFCCC:** United Nations Framework Convention on Climate Change **USA:** United States of America WPP: Wind Power Plant YEKA: Renewable Energy Resource Area YEKDEM: Renewable Energy Resources Support Mechanism

Energy Outlook 2023



Introduction

The year 2022 has been marked by significant consequences both on a global scale and in Türkiye, influenced by geopolitical and local developments. In 2020, the ongoing impact of the Covid-19 pandemic on energy demand and prices, coupled with Russia's declaration of war on Ukraine at the beginning of 2022, prompted discussions on ensuring energy supply security for all nations. Especially notable were the supply shortages faced by European countries due to Russia's reduction in natural gas supply, leading to a surge in demand for liquefied natural gas (LNG) and causing unforeseen spikes in global natural gas and coal prices. The surge in global commodity prices triggered substantial hikes in electricity, natural gas, and coal prices in Türkiye, impacting the entire supply chain.

By the end of 2022, 46% of Türkiye's total electricity capacity and 58% of its gross electricity generation were derived from fossil fuels. Türkiye's reliance on fossil fuels, such as oil and natural gas, leaves the country vulnerable to direct impacts from fluctuations and price increases in the global markets for these resources. Hence, it is crucial for Türkiye to undergo a low-carbon energy transition to diminish its reliance on foreign energy sources and mitigate vulnerability in its current account deficit.

Türkiye's renewable energy potential serves as a key catalyst for the country's transition to a low-carbon energy system. The application of models to harness solar and wind energy resources, especially in the last two decades, along with strategic measures taken by policymakers to address climate change, has propelled Türkiye to advance more rapidly than anticipated in its transition towards low-carbon energy. Enhancing this aspect has become a goal aligned with the target of achieving net-zero emissions by 2053.

In the context of integrating renewable energy sources into the electricity system, recent legislative arrangements in the last two years, emphasizing storage and the electricity potential offered by nuclear uninterrupted energy for electricity supply, will drive Türkiye to take faster strides in low-carbon energy transformation.

The earthquake and flood disasters in the first six months of 2023 have once again underscored the crucial significance of energy supply. These disasters have reiterated the importance of robust electricity transmission and distribution lines, emphasizing necessity for planning the with a focus on highly resilient infrastructures.

In response to these unfolding events, Industrial Development Bank of Türkiye (TSKB) has compiled this report to offer an evaluation of the dynamics, advancements, and prospects within the energy sector. The report encompasses an analysis of the Turkish energy sector across diverse sub-components, electricity, including natural gas, oil and oil products, nuclear energy, renewable energy, energy efficiency, energy investments and financing, and climate developments.





Electricity Market

Türkiye's electricity sector has evolved in alignment with an approach emphasizing supply security and contributing to growth and prosperity. Additionally, the electricity sector is progressing in accordance with decarbonization targets, influenced by both national and international driving forces. The state has maintained a vertically integrated structure for many years, overseeing electricity generation, transmission, and distribution activities.

In the 1990s, there was a significant transformation in the electricity sector, involving the unbundling of electricity generation and distribution activities. Initiatives were introduced to encourage private firms to participate in the investment and operation processes, aiming to involve private capital and investors in the system. In the early 2000s, legislative changes and decisive steps towards liberalization transformed the electricity sector into today's multi-actor and unbundled competitive model.

1.1. Development of Electricity Demand

Türkiye's total electricity demand exhibited an upward trend between 2000 and 2022, with the exception of the years 2001, 2009, 2019, and 2022. In 2020, the total electricity demand stood at 306.1 terawatthours (TWh). By the end of 2021, a year of recovery following the Covid-19 pandemic, the demand increased to 329.6 TWh. In 2022, electricity demand decreased by 0.3% to 328.7 TWh due to both geopolitical developments and macroeconomic factors.



After the pandemic in 2020, 2021 was hailed as the year of recovery. While 2022 was expected to continue on an upward trend, electricity demand experienced a slight decrease due to geopolitical developments and a slowdown in industrial production. The downward trend observed, especially in the second half of 2022, continued in the first 4 months of 2023, influenced by the earthquake that occurred in February 2023, impacting 11 cities. While there was an increase in electricity demand in May, the contraction in demand deepened in June, surpassing the previous increase. In the third quarter, the rise in electricity demand had a limiting effect on the contraction, resulting in a decline of only 0.6% in electricity demand for the first 9 months. The cumulative electricity demand amounted to 249.7 TWh.

Chart 2: Monthly Total Gross Electricity Demand



1.2. Capacity Development

Türkiye's total installed capacity, which stood at approximately 27.3 gigawatts (GW) in 2000, has reached 105.7 GW by the end of September 2023. Until 2022, incentives for power plants generating electricity from renewable energy sources and domestic resources have played a significant role in this increase. Türkiye's total installed capacity continues to increase. In the period from 2012 to 2022, the average annual net increase in installed capacity was 4.6 GW. The increase in installed capacity in this period exceeded the growth in total electricity demand, with one of the main drivers being the incentives provided to renewable power plants. The average annual installed capacity of renewable power plants commissioned between 2012 and 2022 was approximately 3.3 GW.

During the first 9 months of 2023, 80% of the net increase in installed capacity, amounting to 1,891 megawatts (MW), originated from power plants generating electricity from renewable sources. Out of the overall increase in installed capacity, 1,473 MW were contributed by solar power plants (SPP), 213 MW by wind power plants (WPP), and 23 MW by hydroelectric power plants (HEPP).





The "Türkiye National Energy Plan" published by the Ministry of Energy and Natural Resources (ETKB) in December 2022 delineates Türkiye's future electricity demand targets⁻¹ In this framework, electricity demand is forecasted to increase by an average of 3.5% until 2025, reaching 510.5 TWh. The share of electricity in final energy consumption is anticipated to rise from 21.8% in 2020 to 24.9% in 2035

According to Türkiye National Energy Plan, the country's installed capacity is projected to reach 189.7 GW by the year 2035. The goal is to increase the share of renewable energy sources from the current 53% to 64.7% by 2035. As per the projection, the installed capacity of HEPPs is expected to reach 35.1 GW, while WPPs and SPPs will see an increase to 29.6 GW and 52.9 GW, respectively.

¹ ETKB, "Türkiye National Energy Plan," 2022. Source: https://enerji.gov.tr/Media/Dizin/EIGM/tr/Raporlar/TUEP/T%C3%BCrkiye_Ulusal_Enerji_Plan%C4%B1.pdf



1.3. Development of Electricity Supply

As import and export volumes in the electricity sector were very low, the total electricity supply followed a course parallel to electricity demand. Since the early 1980s, substantial investments have been undertaken to address the rapidly rising electricity demand, leading to a significant surge in Türkiye's total gross electricity supply.

Gross electricity supply surged to 331.5 TWh in 2021, marking an 8.5% growth compared to the previous year, which was a recovery period after the pandemic. In 2022, gross electricity supply declined by 1.7%, aligning with the limited decrease in electricity demand, totaling 326.0 TWh.



Chart 4: Gross Electricity Supply by Source

According to data for the first 9 months of 2023, gross electricity supply totaled 246.7 TWh, reflecting a decrease of 1.8% compared to the same period in 2022. Compared to the average of 2018-2022, the

annualized gross electricity supply in 2023 indicates an increase of 4.7% compared to the average of the same period over the last 5 years. In the first 9 months, the collective contribution of both imported and domestic coal-fired power plants to the overall gross electricity supply stood at 35.1%, with natural gas power plants making up 22.2%. Following natural gas power plants, HEPPs held a share of 19.9%, while geothermal, solar, and wind power plants collectively contributed 19.7%.

Compared to the distribution in the first 9 months of 2022, the share of electricity generated from coal power plants increased by 3.1 percentage points, while the share of electricity generated from natural gas power plants decreased by 1.0 percentage point. The significant decline in the share of electricity generated from natural gas power plants is widely attributed to geopolitical developments. The share of electricity generated from HEPPs decreased by 2.9 percentage points in 2023 due to drought conditions. The decrease in generation from natural gas and hydroelectric power plants was compensated by an increase in generation from both coal-fired and other renewable energy plants.

Türkiye National Energy Plan predicts that the country's electricity supply will reach 507.7 TWh by 2035. The plan aims to raise the share of renewable energy sources in electricity supply to 54.8% by 2035. An analysis of the breakdown of electricity supply indicates that it is anticipated that in the year 2035, approximately 90.1 TWh of electricity will be supplied from WPPs, and an additional 84.0 TWh will be generated by SPPs.

1.4. Development of Electricity Imports/Exports

Türkiye's electricity exports and imports are at negligible levels. In 2022, Türkiye's total electricity imports constituted approximately 1.9% of the total electricity demand, while total electricity exports accounted for around 1.1% of the gross electricity supply. All electricity imports and exports are conducted with five countries: Bulgaria, Greece, Georgia, Iran and Syria.

Based on Turkish Electricity Transmission Company (TEİAŞ) data for the first 9 months of 2023, the total electricity imports represented approximately 1.8% of the total electricity demand, and the total exports accounted for about 0.6% of the total electricity supply.

1.5. Development of Electricity Prices

The electricity price in Türkiye is determined by a supply curve for each hour, where price-quantity pairs are arranged in ascending order and consolidated into a single offer. Following the formulation of the demand curve in a similar manner, the market clearing price (MCP) for the relevant hour is determined at the intersection point of the supply and demand curves. The pricing in the balancing market is contingent on whether there is an energy deficit or surplus in the system. In the event of an energy deficit in the system, the system marginal price (SMP) is set at the maximum hourly bidding price in the system. In the case of an energy surplus, the SMP is determined by the minimum accepted bidding price. Electricity prices are influenced by factors such as power plant availability, climatic conditions, economic considerations, and geopolitical factors. Additionally, they exhibit a rapid response to fluctuations in commodity prices.

The cost formation in the Turkish electricity market is closely tied to fluctuations in natural gas and imported coal prices. This connection arises from the significant impact of natural gas and imported coal power plants on electricity prices. In 2022, global geopolitical developments and the volatility of natural gas prices in international markets had a notable impact on electricity prices. According to data from Energy Exchange Istanbul (EPIAŞ), the monthly average MCP in December 2021 was recorded as TL 1,008.6 /MWh. By June 2022, it exceeded TL 2,000.0 /MWh, reaching TL 2,230.7 /MWh. The monthly average MCP reached its highest value at TL 3,850.6 /MWh in September, closing the year 2022 with an average of TL 3,724.4 /MWh.

Beginning in 2021 and extending into 2022, certain natural gas and imported coal-fired power plants faced restrictions on commissioning, adhering to maximum limits, owing to the surge in global commodity prices. The Energy Market Regulatory Authority (EPDK) has implemented regulations to establish maximum limits for the MCP and SMP in order for these power plants to continue operating within the system. On October 14, 2021, EPDK decided to update the maximum price limits.² In 2022, the maximum limit was increased multiple times, reaching up to TL 4,800.0 /MWh. However, due to the excessive increase in commodity prices, EPDK introduced the Maximum Settlement Price

- ³ Official Gazette. Source: https://www.Resmîgazete.gov.tr/eskiler/2022/03/20220330-7.pdf
- ⁴ Official Gazette. Source: https://www.Resmîgazete.gov.tr/eskiler/2022/09/20220930-7.pdf

(MSP) mechanism in 2022. Launched on April 1, 2022, the MSP mechanism is designed to safeguard consumers and ensure the security of energy supply. Initially, the MSP was established at TL 2,500.0 /MWh for natural gas and imported coal-fired power plants and TL 1,200.0 /MWh for other power plants.³ Within this framework, the disparities between MCP and MSP were consolidated as resource-based support revenues, providing protection for consumers against price hikes. The continuation of the MSP mechanism for an additional 6 months with revised prices was announced in the Official Gazette No. 31969 of September 30, 2022.4 As per the Board Decision, the MSP for domestic coal-fired power plants was determined to be TL 2,050.0 /MWh, and the MSP for imported coal-fired power plants and natural gas power plants was adjusted to TL 2,750.0 /MWh and TL 4,500.0 /MWh, respectively. The initial MSP value for other resources was set at TL 1,540.0 /MWh. The MSP mechanism was extended once again in March 2023, considering the developments in global commodity prices. According to EMRA's announcement, the MSP was set at TL 2,550.0 /MWh for natural gas power plants, TL 1,800.0 /MWh for coal-fired power plants, and TL 1,700.0 /MWh for other resources, including renewable energy power plants.⁵



Starting at TL 3,400.0 /MWh in 2023, the monthly average MCP gradually decreased with favorable climatic conditions, reaching TL 1,623.9 /MWh in June. Despite a slight increase after June, the October average remained below TL 2,250.0 /MWh. In September, a decision was announced to terminate the MSP mechanism, considering the low level of electricity prices and the reduction of potential vulnerabilities.

² Official Gazette. Source: https://www.Resmîgazete.gov.tr/eskiler/2021/10/20211015.pdf

⁵ Official Gazette. Source: https://www.Resmîgazete.gov.tr/eskiler/2023/03/20230331-7.pdf

1.6. Development of Electricity Storage Systems

Electricity storage systems play a crucial role in integrating renewable energy sources more effectively into the system and enhancing the flexibility and performance of the grid. Storage systems, allowing the storage of electricity generated intermittently by renewable energy sources, represent a significant stride towards developing alternatives to fossil fuel-based power generation. Recently, Türkiye has incentivized the establishment of storage facilities to encourage their development.

The regulations on electricity storage facilities in Türkiye began with the publication of the Regulation on Acceptance of Electricity Generation and Electricity Storage Facilities in the Official Gazette of February 19, 2020.⁶ Over the past 3 years, the matter has gained prominence in the electricity sector, marked by advancements in both the regulatory authority and the investor community.

With a decision published in the Official Gazette of

July 6, 2022, it was determined that the EPDK would issue prelicenses for the establishment of electricity generation facilities utilizing wind and/ or solar energy to companies committing to establish electricity storage facilities, up to the installed capacity of the storage facility they pledge to construct.7 Additionally, these facilities were granted the opportunity to benefit from the Renewable Energy Resources Support Mechanism (YEKDEM) and domestic contribution support.

The regulations regarding YEKDEM were published in the Official Gazette of November 19, 2022.⁸ Accordingly, energy generated in a generation facility with storage, and subsequently fed into the grid after being stored, is considered to fall under the scope of YEKDEM. EPDK received more than 5,800 prelicense applications for wind and solar storage facilities between November 2022 and October 2023. Approximately 400 of these applications were granted pre-licenses. It has been stated that the review process for around 250 applications is currently in progress. The cumulative capacity of the issued pre-licenses is approximately 22 GW, with an additional 13 GW under evaluation for potential projects. According to industry stakeholders, the construction phase for these projects is anticipated to commence in 2025 at the earliest. Due to a higher-than-expected number of applications, EPDK announced in the Official Gazette of October 14, 2023, that it would no longer accept applications for electricity storage facilities.9

Türkiye National Energy Plan has also set a target for battery storage capacity in the system. Accordingly, the battery storage capacity in the system is projected to reach 7.5 GW by the year 2035.



⁶ Official Gazette. Source: https://www.resmigazete.gov.tr/eskiler/2020/02/20200219-1.htm

⁷ Official Gazette. Source: https://www.resmigazete.gov.tr/eskiler/2022/07/20220706-3.htm

⁸ Official Gazette. Source: https://www.resmigazete.gov.tr/eskiler/2022/11/20221119-6.htm



Natural Gas Market

Türkiye's natural gas consumption has increased proportionally with population growth, industrialization, and urbanization, while showing an inverse correlation with air temperature. Türkiye has been a net importer of natural gas, as well as oil, primarily due to its limited domestic underground resources. Throughout the years, natural gas generation has consistently remained below 1% of overall consumption. Türkiye's natural gas import dependency ratio remained above 99% in both 2022 and the first 8 months of 2023, with natural gas imports playing a substantial role in the country's foreign trade deficit.

In the early 2000s, natural gas distribution was limited to only 6 provinces, but by 2019, it had

expanded to cover all provinces in Türkiye. As of August 2023, the total number of natural gas subscribers has exceeded 19.43 million.

Natural gas ranks second after oil in Türkiye's total final energy consumption. In line with global energy consumption projections, natural gas is anticipated to be the only fossil fuel experiencing a growth in consumption in the short to medium term in Türkiye. Despite the anticipated increase in natural gas consumption in the short to medium term, Türkiye National Energy Plan outlines a decrease in the share of natural gas in primary energy consumption. The expected decline is from 27.0% in 2020 to 24.2% in 2025, further decreasing to 23.9% in 2030 and 22.5% in 2035.

The 12th Development Plan outlines the following targets concerning natural gas:

- Continue efforts to explore and enhance the production capacity of the natural gas reserve discovered in the Sakarya Gas Field in the Black Sea,
- Increase the capacity of Tuz Gölü Underground Natural Gas Storage Facility to 8.8 billion cubic meters (bcm) and the withdrawal capacity to 80 million cubic meters (m³) per day,
- Enhance the current infrastructure for natural gas transmission and distribution,
- Increase the capacity of the Trans-Anatolian Natural Gas Pipeline (TANAP) to 32 bcm/year and reinforce the infrastructure for transporting gas from the Caspian Basin to Europe,
- Decrease the contribution of natural gas in electricity generation from 22.9% in 2022 to 15% by 2028,
- Increase the underground natural gas storage capacity from 5.8 bcm in 2022 to 13 bcm by 2028.

2.1. Development of Natural Gas Consumption

An analysis of the recent natural gas consumption figures in Türkiye indicates that the highest consumption was recorded in 2021, reaching 59.8 bcm. In 2022, natural gas consumption in Türkiye decreased by 10.6% compared to 2021, following an annual increase of 23.3% in 2021. Examining the monthly data published by EPDK, it is observed that natural gas consumption in the first 8 months of 2023 decreased by 7.8% compared to the same period in 2022. Fluctuations in natural gas consumption are influenced by the climatic conditions experienced throughout the year.

Chart 6: Development of and Fluctuations in Natural Gas Consumption

2.2. Development of Natural Gas Production

Excluding the reserves from announced discoveries and potential sources in the Mediterranean and Black Sea, Türkiye's producible natural gas reserves stand at around 543.4 bcm. However, given the current low production volumes, this reserve is insufficient to meet even 1% of the country's annual consumption. Natural gas production in subsequent years fell short of the 1.01 bcm level achieved in 2008 and gradually declined to 400 million cubic meters (mcm). In 2022, Türkiye's natural gas production experienced a 1.7% year-on-year decrease, reaching 408.0 mcm. According to monthly data from EPDK, natural gas production reached 305.0 mcm in the first 8 months of 2023, marking a year-on-year increase of 27.3%. Natural gas production in Türkiye occurs in the provinces of Adana, Adıyaman, Çanakkale, Düzce, Edirne, Hatay, İstanbul, Kırıkkale, Kırklareli, and Tekirdağ. In 2021, 41.0% of the natural gas production was realized in Tekirdağ, and this share increased to 47.9% in 2022. In 2021, Kırklareli and İstanbul accounted for 31.7% and 23.9% shares, respectively, contributing to 33.7% and 13.5% of the total natural gas production in 2022. In this context, it is noteworthy that the Marmara Region plays a crucial role in Türkiye's natural gas production. Data for the first 8 months of 2023 indicate that the significance of Tekirdağ and Kırklareli in natural gas production continues to grow.

The discovery of natural gas in the Black Sea in 2020 was a significant development that had the potential to alter Türkiye's reliance on foreign natural gas. The natural gas discovery, initially announced in 2020 August as 320 bcm¹⁰, was expanded with additional reserves of approximately 85 bcm in October¹¹ and another 135 bcm in 2021.¹² Consequently, the total amount of natural gas reserves discovered in the Black Sea reached 540 bcm. In addition, in December 2022, it was reported that the estimated reserves of 540 bcm were updated to 652 bcm, and an additional natural gas reserve of 58 bcm was discovered.¹³ As a result of extensive research and studies, the natural gas reserve discovered in the Black Sea was confirmed to be 710 bcm.

¹⁰ Anadolu Agency. Source: https://www.aa.com.tr/tr/turkiye/cumhurbaskani-erdogan-320-milyar-metrekup-dogal-gaz-rezervi-kesfettik/1949014
¹¹ NTV. Source: https://www.ntv.com.tr/ekonomi/cumhurbaskani-erdogan-dogalgaz-rezervini-acikladi-toplam-dogalgaz-rezervi-405-milyar-metrekup,lLYaw_

- uBqECoPI1UKDNapQ
- ¹² TRT Haber. Source: https://www.trthaber.com/haber/gundem/cumhurbaskani-erdogan-amasra-1-kuyusunda-135-milyar-metrekup-dogal-gaz-kesfettik-586234. html

¹³ BBC News Türkçe. Source: https://www.bbc.com/turkce/articles/clkx07prld4o

2.3. Development of Natural Gas Trade

Türkiye meets nearly all of its natural gas demand through imports. In 2022, a total of 54.7 bcm of natural gas were imported, covering the entire natural gas consumption through imports. In 2022, imports decreased by 6.9% compared to the previous year. In the first 8 months of 2023, imports amounted to 33.3 bcm, marking a 12.5% decrease compared to the same period in the previous year.

Türkiye imports natural gas through both pipelines and LNG. The share of pipelines in natural gas supply decreased from 76.0% in 2021 to 72.2% in 2022. EPDK data suggest that the share of pipelines decreased to 63.5% in the first 8 months of 2023, influenced by factors such as a preference for non-renewal of long-term contracts and geopolitical developments. The increase in the share of LNG imports, rising by 3.6 percentage points compared to the same period in 2022, is attributed to Petroleum Pipeline Corporation's (BOTAŞ) decision not to renew certain long-term contracts in 2021 and the growing number of countries importing LNG to enhance security of supply in natural gas. Furthermore, the surge in global natural gas prices in 2022 widened Türkiye's current account deficit as it increased procurement from the spot market. Nevertheless, its growing share over the years clearly indicates that LNG will play a significant role in Türkiye's trade in the near future.

Chart 7: Development of LNG and Pipeline Shares in Natural Gas Imports

Russia's share in natural gas imports, which averaged 54% between 2010-2018, declined to 33.6% in 2019 and 2020. However, due to rising demand, the share of natural gas imported from Russia increased to 44.9% in 2021.

In 2022, Russia's share decreased to 39.5%. In the first 8 months of 2023, the share of natural gas imported from Russia was 39.1%, marking a 3.7 percentage points decrease compared to the same period of the previous year. In 2022, Azerbaijan, the secondlargest importer, accounted for 15.9% of the total imports. In the first 8 months of 2023, the amount of natural gas imported from Azerbaijan was 7.0 bcm, constituting 21.0% of the total imports. In the same period of 2022, the amount of natural gas imported from Azerbaijan was 5.7 bcm. The thirdlargest natural gas importing country is Algeria, contributing 11.8% to imports in the first 8 months of 2023. In the first 8 months of 2023, the amount of natural gas imported from Iran, which held the fourth position with a 17.2% share in total imports in 2022, amounted to 3.8 bcm, representing 11.4%. The share of the USA, another source of natural gas imports, increased from 6.2% in 2020 to 8.1% in 2021 and further to 10.3% in 2022. In the first 8 months of 2023, the USA's share was 7.9%, accounting for 2.6 bcm of the total natural gas imports.

Chart 8: Breakdown of Natural Gas Imports by Country for the First 8 Months of 2022 and 2023

2.4. Development of Natural Gas Storage

Investments in natural gas storage in Türkiye have resulted in substantial expansions of both underground storage and LNG terminal capacities. As a result, the volume of stored natural gas has witnessed significant growth over the years. Despite these expansions, the ratio of storage capacities to annual consumption in Europe averages around 20%, whereas in Türkiye, this ratio stands at approximately 5-10%. As of the end of 2022, the total capacity of natural gas underground storage in Türkiye reached 5.6 bcm. The LNG storage capacity of LNG terminals in Türkiye is 0.96 bcm. Considering these figures, Türkiye's total natural gas storage capacity reached 6.56 bcm by the end of 2022, accounting for 12.3% of its 2022 consumption.

Examining the annual total of stored natural gas, the quantity in 2022 rose by 21.9% compared to 2021, reaching 35.6 bcm—the highest level since 2018. In the first 8 months of 2023, a record-breaking volume of natural gas storage was achieved.

During this period, the cumulative natural gas storage increased by 122.2% compared to the corresponding period of the previous year, reaching a total of 38.4 bcm.

Chart 9: Development of the Amount of Natural Gas

In recent years, there have been notable advancements in underground storage activities, playing a crucial role in ensuring the security and diversification of natural gas supply. Türkiye currently has two underground natural gas storage facilities. Among these facilities, the Silivri Natural Gas Underground Storage Facility has a storage capacity of 3.2 bcm. By the end of 2022, the capacity of this facility was increased to 4.6 bcm.¹⁴ Following this expansion, the facility has become the largest natural gas storage facility in Türkiye. The second underground storage facility, the Tuz Gölü Underground Natural Gas Storage Facility, currently has a capacity of 1.2 bcm and aims to increase this capacity to 5.4 bcm in the near future.¹⁵

Moreover, the storage capacity of the four operational LNG terminals, designed for the storage, gasification, and transmission of LNG, has increased to 0.96 bcm. These include the Marmara Ereğlisi LNG Terminal (1994-BOTAŞ), Ege Gaz A.Ş. LNG Terminal (2006-Ege Gaz), Etki Liman LNG Facility (2016-Etki Liman), and BOTAŞ Dörtyol Floating Storage and Regasification Unit (FSRU), which started operating in 2017. The Saros FSRU, the fifth LNG terminal, was commissioned in January 2023.¹⁶

¹⁴ Anadolu Agency. https://www.aa.com.tr/tr/gundem/cumhurbaskani-erdogan-amacimiz-ulkemizi-dogalgaz-referans-fiyatinin-olustugu-kuresel-bir-merkezhaline-donusturmektir/2765560

¹⁵ BOTAŞ. https://www.botas.gov.tr/Sayfa/tuz-golu-dogal-gaz-depolama-tesisi/23#:~:text=Tuz%20G%C3%B6l%C3%BC%20Do%C4%9Fal%20Gaz%20 Depolama%20Tesisi%2C%20yerin%201%2C5%20km,tesisi%20olma%20%C3%B6zelli%C4%9Fiyle%20%C3%B6ne%20%C3%A7%C4%B1kmaktad%C4%B1r. ¹⁶ BOTAŞ. https://www.botas.gov.tr/Sayfa/saros-fsru/118

2.5. Development of Natural Gas Prices

Natural gas prices in Türkiye are determined based on BOTAŞ's long-term contracts, oil prices, and fluctuations in exchange rates. In the past, due to the absence of a liberalized natural gas market, the tariffs set by BOTAŞ for eligible consumers and distribution companies served as benchmark prices in the wholesale network.

In 2021, natural gas demand and prices experienced fluctuations. The declaration of war by Russia against Ukraine in February 2022 led to Europe's shift to alternative sources, causing an upward trend in both spot natural gas prices and LNG prices. The Dutch TTF (Title Transfer Facility) benchmark price, which averaged EUR 135 /MWh in March 2022, increased to EUR 235 /MWh in August. The milder weather in October and November led to a slight easing of natural gas prices, but by December, the TTF price was around EUR 115 /MWh. In the first half of 2023, the decline in the TTF price continued, and as of June, the TTF price dropped to EUR 32 /MWh. In the last quarter, prices experienced an upward trend after remaining stable throughout the third quarter.

Chart 10: Development of Natural Gas Prices

As anticipated, these global influences on natural gas have had an impact on Türkiye. In the upcoming months, the trajectory of natural gas prices in Türkiye will hinge on factors such as the share of natural gas in electricity generation, industrial natural gas consumption, the volume of gas in storage, and the fluctuation of air temperatures.

Source: Reuters, US Energy Information Administration (EIA), TSKB

Oil Market

Türkiye heavily relies on imports to satisfy over 90% of its demand for oil and oil products, given its limited domestic natural resources, which has contributed significantly to the growth of the country's foreign trade deficit. Recent advancements in oil and natural gas exploration projects have set the stage for an anticipated increase in production, driven by evolving technologies and new discoveries.

On May 2, 2023, President Recep Tayyip Erdoğan announced the discovery of new oil reserves located in the Cudi and Gabar Mountains of Şırnak. Erdoğan declared that the discovered reserve would cater to 10% of Türkiye's daily oil consumption. Additionally, he mentioned the potential to elevate the production capacity to 100 thousand barrels by implementing extensive drilling, involving the creation of 100 wells in the region.¹⁷

Turkish Petroleum Corporation (TPAO) Chairman and CEO Melih Han Bilgin revealed that the Gabar region has achieved a production level of 25 thousand barrels. He further stated that the goal is to attain a production capacity of 100 thousand barrels by the end of 2024.¹⁸

The share of oil and oil products in Türkiye's primary energy consumption is expected to decline gradually over the years. As per Türkiye National Energy Plan, the objective is to reduce the share of oil in primary energy consumption from 28.7% in 2020 to 28.5% in 2025, 27.5% in 2030, and 26.5% in 2035.

¹⁷ BBC News Türkçe, (2023). https://www.bbc.com/turkce/articles/cn0edzxlp4do, Accessed on: October 25, 2023.

¹⁸ Milliyet, (2023). https://www.milliyet.com.tr/ekonomi/gabarda-2024-hedefi-gunluk-100-bin-varil-7024623, Accessed on: November 21, 2023

3.1. Development of Oil Consumption

In 2021, total oil consumption rose compared to 2020 as the impacts of the pandemic lessened and the normalization process began. In 2022, there was a 6.4% increase compared to the previous year.

During the January-August period of 2023, the overall consumption of oil products increased by 4.8% compared to the corresponding period in the previous year, reaching a total of 29.1 million tons. The rise in consumption was largely driven by increased demand for marine and aviation fuels, as well as diesel fuel types.

	Consumption (Domestic Sales + Exports)									
Fuel Type (million tons)	2017	2018	2019	2020	2021	2022	2022-8	2023-8		
Gasoline Types	5.5	4.8	5.4	4.2	4.7	5.3	3.6	2.9		
Diesel Types	24.4	23.7	24.7	25.3	27.5	27.0	17.4	19.0		
Fuel Oil Types	0.7	0.6	0.9	0.3	0.5	0.6	0.4	0.4		
Aviation Fuels	5.0	5.2	6.2	3.1	3.6	5.2	3.5	4.1		
Marine Fuels	2.1	1.8	2.4	0.6	1.3	1.9	1.4	0.9		
Kerosene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Other Products	0.8	0.6	1.4	1.7	2.1	2.2	1.4	1.8		
Total	38.6	36.7	41.0	35.3	39.7	42.2	27.7	29.1		

Kaynak: EPDK, TSKB

3.2. Development of Oil Production

TPAO is a state-owned company responsible for oil and natural gas exploration and production. TPAO holds exclusive rights for oil exploration and production in Türkiye, and any foreign involvement in oil exploration is restricted to joint ventures with TPAO.

As of 2023, Türkiye is equipped with five refineries boasting a combined processing capacity of approximately 800 thousand barrels. Turkish Petroleum Refineries Corporation (TÜPRAŞ) operates four of the five refineries, contributing to over 60% of Türkiye's overall refining capacity. STAR Refinery, which commenced full-capacity production in August 2019, boasts a total daily refining capacity of 214 thousand barrels.

At the end of 2022, the overall refinery production of fuel oil and non-fuel oil in Türkiye reached 38.03 million tons, marking a 5.7% increase compared to the previous year. In the refining sector, TÜPRAŞ held a 66% share in total production in 2022 through its facilities in İzmit, İzmir, Kırıkkale, and Batman, while STAR contributed with a 34% share from its facility in İzmir.

By the end of 2022, Türkiye's producible oil reserves reached 507.3 million barrels, marking a 19% increase compared to 2021, with the majority of the reserves located in southeastern Türkiye.¹⁹ Due to the aging nature of most oil fields in Türkiye, the yields from wells are gradually diminishing. Therefore, the adoption of new technologies and practices aimed at enhancing production efficiency, as well as the implementation of new drilling initiatives, is crucial. According to TPAO data, in 2021, a total of 174 wells were drilled for exploration, appraisal, and production purposes in Türkiye, and this number increased to 191 in 2022.

¹⁹ Directorate General of Mining and Petroleum Affairs (MAPEG), TSKB "Türkiye's Crude Oil Reserves as of the End of 2022"

EPDK and TPAO have announced that the oil discovery in the Şehit Aybüke Yalçın field on Gabar Mountain, made in 2023, is the largest ever found in Türkiye's onshore areas. In July, Minister of Energy and Natural Resources Alparslan Bayraktar announced that, with the inclusion of the oil reserves discovered in Gabar Mountain in December 2022 and May 2023, the target is to increase daily oil production from an average of 72 thousand barrels per day in 2022 to 100 thousand barrels per day by the end of 2023 and further to 200 thousand barrels per day by the end of 2024.²⁰

3.3. Development of Oil Trade

Crude oil imports, which saw a 6.9% increase in 2021, continued to rise by 6.6% in 2022 compared to the previous year, reaching a total of 33.5 million tons. In the first 9 months of 2023, there was a notable decline compared to the same period in 2022. During this period, crude oil imports declined by 12.5% year-on-year to 22.5 million tons.

In 2022, the share of crude oil imported from the Russian Federation, Iraq, and Kazakhstan increased by 2.2% year-on-year, reaching 76.1%. In the first 8 months of 2023, the share of crude oil imported from Iraq decreased by 2.6% compared to the same period of the previous year, amounting to 22.7%.

Chart 12: Daily Average Production of Crude Oil

²⁰ Directorate of Communications of the Presidency of the Republic of Türkiye, (2023). https://www.iletisim.gov.tr/turkce/yerel_basin/detay/enerji-ve-tabiikaynaklar-bakani-bayraktar-gabardaki-yerli-petrol-ile-turkiyenin-ihtiyacinin-yuzde-20sinin-karsilanabilecegini-duyurdu, Accessed on: November 21, 2023. In 2022, the share of crude oil imported from the Russian Federation, Iraq, and Kazakhstan increased by 2.2% year-on-year, reaching 76.1%. In the first 8 months of 2023, the share of crude oil imported from Iraq decreased by 2.6% compared to the same period of the previous year, amounting to 22.7%.

A portion of the crude oil exported from Türkiye is conveyed through the 1,768-kilometer-long Baku-Tbilisi-Ceyhan Pipeline, linking Azerbaijan's Azer-Çırak-Güneşi oil field to the Mediterranean Sea. Another part of Türkiye's crude oil exports includes Kirkuk oil sourced from Northern Iraq. Kirkuk oil is transported via the 970-kilometer-long Iraq (Kirkuk)-Ceyhan Oil Pipeline, also recognized as the Iraq-Türkiye Crude Oil Pipeline.

Due to the seismic activity in the region and following incidents such as the earthquakes in Kahramanmaraş and floods in February 2023, ETKB announced the maintenance of the pipeline, leading to the suspension of oil flow on March 25, 2023.

3.4. Development of Oil Prices

The upward trajectory in Brent crude oil prices commenced in 2021, marked as a recovery year following the Covid-19 pandemic. The upward movement gained momentum in the last quarter of 2021, and the oil supply, further strained by the Russian-Ukrainian conflict, propelled Brent crude oil prices to reach USD 122/barrel in June 2022. In 2022, the average realized price reached USD 100.8 /barrel, marking a 42.6% increase compared to the previous year's full-year average. Following supply and demand imbalances, the Brent oil price experienced a 20% decrease in the first 10 months of 2023 compared to the same period in the previous year, averaging USD 90.8 /barrel in September 2023.

After Israel's attacks on Palestine in October 2023, the reevaluation of regional risks by oil producers in the area and the tightened balances resulting from Saudi Arabia's extension of voluntary supply cuts led to an increase of approximately USD 4.5 /barrel in the Brent oil price at the end of October compared to August.

The crude oil market is expected to remain volatile in the short term, given the uncertainties surrounding the conflict in the Middle East and the rapidly changing dynamics in the region.

Nuclear Energy Market

Türkiye's efforts to invest in nuclear energy date back to the 1950s, with several initiatives launched over the years. However, despite these efforts, these initiatives have yet to materialize into actual investments. On May 12, 2010, Türkiye and Russia signed an intergovernmental agreement for the construction and operation of a nuclear power plant by Rosatom, a public corporation of the Russian Federation. Based on a build-own-operate model, Rosatom will be responsible for both the construction and operation of the nuclear power plant. The Akkuyu Nuclear Power Plant (Akkuyu NPP), currently under construction in Gülnar, Mersin, will comprise four VVER-1200 reactors, each with an installed capacity of 1,200 MW, resulting in a total installed capacity of 4,800 MW. Currently, the first reactor is anticipated to become operational in 2024.

Apart from the Akkuyu NPP project, there are plans for the construction of another nuclear power plant in Sinop province. Figure 1: Akkuyu NPP Site

Source: Anadolu Agency

The Sinop Nuclear Power Plant was initially planned to be developed in collaboration with a Japanese-French consortium. However, no substantial progress has been achieved in this regard.

In 2022, EUAS International A.Ş. was established as a subsidiary of Electricity Generation Company (EÜAŞ), and subsequently, the organization's name was changed to Tuskish Nuclear Energy Company (TÜNAŞ). For the Sinop Nuclear Power Plant, TÜNAŞ submitted a site approval application for the power plant location in Inceburun, Sinop province, in May 2023, initiating the detailed evaluation process.

According to statements from Minister of Energy and Natural Resources Alparslan Bayraktar, Türkiye's third nuclear power plant is slated to be constructed in İğneada, within the Demirköy district of Kırklareli province.

While their origins trace back many years, small modular reactors (SMRs) have recently gained significance by embodying modularity. They allow for the production of key components of the nuclear steam supply system in a controlled factory environment, facilitating transportation to the installation site. While current nuclear power plants integrate factory-made components (modules) into their design, the assembly of these components still predominantly involves fieldwork at the plant's intended location. SMRs are anticipated to necessitate minimal "on-site preparation," offering a substantial reduction in the extended construction times typically associated with larger nuclear units.

The cost and mobility advantages inherent in SMRs present diverse opportunities for the extensive utilization of nuclear energy in Türkiye. Given that the typical duration from planning to construction for a nuclear power plant is around 10 years (and longer in nations initiating their first NPP projects), it can be asserted that SMRs, offering comparable generation efficiency and quicker deployment, might emerge as a substantial option for Türkiye, provided the suitable legal and economic groundwork is established.

In 2023, representatives from the UK-based Rolls-Royce Group, recognized for undertaking pilot studies and development projects related to SMRs, held discussions with officials from the ETKB to assess potential collaborations.²¹

²¹ Ministry of Energy and Natural Resources (ETKB), (2023). https://enerji.gov.tr/haber-detay?id=21181, Accessed on: November 10, 2023.

Renewable Energy Market

The energy sector is traditionally categorized into three main pillars: fossil fuels, nuclear, and renewable energy. Türkiye's priorities for enhancing the flexibility of the energy system include diversifying resources, increasing domestic and renewable energy production capacities, and ensuring the availability of affordable and sustainable energy.

5.1. Capacity Development of Renewable Energy Resources

Türkiye has experienced a consistent upward trend in its installed renewable energy capacity over the years. The installed capacity derived from renewable energy resources, standing at 31.6 GW in 2015, has witnessed an average annual growth of 8.1%. As of October 2023, it has surged to around 58.5 GW. Moreover, the proportion of renewables in the total installed capacity, initially at 43.3% in 2015, has climbed to 55.2% by October 2023.

			•							
Resource (MW)	2015	2016	2017	2018	2019	2020	2021	2022	2022/10	2023/10
Hydro	25,868	26,682	27,273	28,291	28,503	30,985	31,493	31,571	31,568	31,596
Wind	4,498	5,751	6,516	7,005	7,591	8,832	10,607	11,396	11,303	11,643
Solar	310	833	3,421	5,063	5,995	6,667	7,816	9,425	9,153	11,120
Geothermal	624	821	1,064	1,283	1,515	1,613	1,676	1,691	1,686	1,691
Biomass	345	467	575	739	1,163	1,485	2,035	2,309	2,211	2,440
Total	31,645	34,554	38,849	42,381	44,767	49,582	53,627	56,393	55,921	58,491

While HEPPs constituted 81.7% of the installed capacity within renewable energy sources in 2015, this share has gradually diminished over the years, primarily attributed to the surges in WPPs and SPPs. Nonetheless, as of October 2023, HEPPs still hold the largest share in the installed capacity of renewable energy sources, accounting for 54%. With the rapid increase in investments in unlicensed power plants in recent years, the share of WPPs and SPPs in the installed capacity of renewable energy resources increased to 19.9% and 19.0%, respectively, as of October 2023.

According to Türkiye National Energy Plan, considering Türkiye's renewable energy potential, the capacity of renewable energy is targeted to reach 122.7 GW in 2035, and its share in the installed electricity capacity is aimed to reach 64.7%. According to the Plan, a total capacity of 29.6 GW in wind (24.6 GW onshore, 5 GW offshore), 52.9 GW in solar, 35.1 GW in hydroelectric, and 5.1 GW in geothermal and biomass is envisaged by 2035. The Plan also states the expectation for the battery capacity to reach 7.5 GW by 2035.

Resource	2035 (GW)	Share in Renewable Energy Sources (%)	Share in Total (%)
Solar	52.9	43.1	27.9
Hydro	35.1	28.6	18.5
Wind	29.6	24.1	15.6
Geothermal and Biomass	5.1	4.2	2.7
Renewables Total	122.7	100.0	64.7
Resource	2035 (GW)	Share in Total Gas, Coal and Nuclear	Share in Total (%)
Gas	35.5	53.0	18.7
Coal	24.3	36.3	12.8
Nuclear	7.2	10.7	3.8
Grand Total	189.7	100.0	100.0

Table 3. Targeted Installed Canacity Under the Türkiye National F	Energy Plan

Source: Türkiye National Energy Plan, TSKB

The 12th Development Plan, unveiled in October 2023, sets the target of boosting wind capacity from 11,396 MW in 2022 to 18,000 MW by 2028, and solar capacity from 9,425 MW in 2022 to 30,000 MW by 2028.

5.2. Development of Generation from Renewable Energy Sources

From 84.1 TWh in 2015, electricity generation from renewable energy sources rose to 139.2 TWh by the end of 2022. In 2022, the electricity generated from renewable energy sources surpassed the amount generated in 2021. The notable increase in electricity generated from renewable sources in 2022 is attributed to the higher contribution of HEPPs to overall generation, as their output remained around 55.9 TWh for the entire year due to drought conditions in 2021. During the first 10 months of 2023, HEPP generation experienced a decline of 12.5% when compared to the corresponding period in the previous year. In the first 10 months of 2023, the proportion of renewable energy sources in total electricity generation dropped to 42%, marking a decline from the same period in the previous year. This decrease was attributed to the reduced electricity generation from WPPs and SPPs.

Resource (TWh)	2015	2016	2017	2018	2019	2020	2021	2022	2022/10	2023/10
Hydro	67.1	67.2	58.2	59.9	88.9	78.1	55.9	66.8	60.2	52.7
Wind	11.7	15.5	17.9	19.9	21.7	24.8	31.3	34.9	29.1	27.5
Solar	0.1	1.0	2.9	7.8	9.2	11.0	13.9	16.9	18.6	16.6
Geothermal	3.4	4.8	6.1	7.4	9.0	10.0	10.8	11.1	8.4	8.3
Biomass	1.8	2.4	3.0	3.6	4.6	5.7	7.8	9.5	7.5	7.3
Total	84.1	91.0	88.1	98.7	133.4	129.6	119.8	139.2	123.8	112.5

Table 4: Development of Electricity Generated from Renewable Energy Sources

Türkiye has considerable resources in terms of wind, geothermal, and solar energy. Harnessing these resources is crucial for addressing climate change concerns and lessening reliance on imported fossil fuels. The enactment of electricity storage legislation in the last two years has opened up new opportunities for harnessing solar and wind resources, triggering increased investments in these sustainable energy sources. Furthermore, the growing trend towards renewable resources is expected to persist in the near term, fueled by the capacity for self-generated energy and the commissioning of hybrid power plants.

According to Türkiye National Energy Plan, the goal is to achieve electricity generation from renewable sources of 278.2 TWh, with renewables accounting for 54.8% of total electricity generation by the year 2035. As per the Plan, the projections for electricity generation from renewable sources by 2035 include 90.1 TWh from wind, 84 TWh from solar, 87.9 TWh from hydro, and 16.2 TWh from geothermal and biomass. The Plan projects that by 2053, the share of renewables in total electricity generation will reach 69.1%.

Electricity Generation	2035 (TWh)	Share in Renewable Resources (%)	Share in Total (%)
Wind	90.1	32.4	17.7
Hydro	87.9	31.6	17.3
Solar	84.0	30.2	16.5
Geothermal and Biomass	16.2	5.8	3.2
Renewables Total	278.2	100.0	54.8
Electricity Generation	2035 (TWh)	Share in Total Thermal and Nuclear (%)	Share in Total (%)
Thermal	173.7	75.7	34.2
Nuclear	55.8	24.3	11.0
Grand Total	507.7	100.0	100.0

Table 5: Targeted Electricity Generation by Source under the Türkiye National Energy Plan

Source: TEİAŞ, TSKB

The 12th Development Plan anticipates a rise in the share of renewable resources in electricity generation from 42.4% in 2022 to 50% by 2028.

5.3. Renewable Energy Resources Support Mechanism (YEKDEM)

Since the second half of 2021, prices in the TL-based YEKDEM have been fluctuating in response to macroeconomic developments. In May 2023, the escalation model of TL-based prices for renewable energy power plants was revised to favor foreign currency, introducing dollar-based ceiling and floor prices, along with adjustments in the eligible power plants and the durations of benefits. Under the new YEKDEM-3, prices for Renewable Energy Source (RES) certified generation facilities operational between July 1, 2021, and December 31, 2025, are subject to monthly updates based on resources. These prices are indexed, with 60% tied to foreign currency (EUR and USD) and 40% linked to price developments, including the producer price index and consumer price index.

Chart 15: Development of YEKDEM Unit Prices and MCP

The dollar-based YEKDEM-1, in effect until the first half of 2021, significantly contributed to the growth of Türkiye's renewable energy capacity. It played a crucial role in surpassing the 50% mark for the share of renewable power plants in Türkiye's total installed capacity. The TL-based YEKDEM, known as YEKDEM-2, was introduced in the second half of 2021 and underwent quarterly updates based on an escalation formula. This formula consisted of 52% price indices and 48% foreign currency, adapting to changes in macroeconomic conditions. In response to feedback from industry stakeholders and perceived limitations, YEKDEM-2 underwent further revisions in 2023, transforming into YEKDEM-3. Despite YEKDEM-3 prices experiencing a trajectory below MCP prices, they have received positive reception from industry stakeholders.

An examination of the data from the last 6 months indicates that YEKDEM prices, when calculated for GPPs and pumped storage HEPPs, consistently remained above the MCP. For biomass power plants (BPP) utilizing biomethanization technology, the YEKDEM price has consistently exceeded the MCP since September. The data from the last 6 months suggests the likelihood that power plants utilizing other renewable energy sources might sell their electricity at the MCP rather than the YEKDEM price in the upcoming years, given that the prices for these sources have been below the MCP.

5.4. Renewable Energy Resource Area (YEKA) Model

The introduction of the Regulation on Renewable Energy Resource Areas, published in the Official Gazette No. 29852 on October 9, 2016, marked the implementation of a new investment model for harnessing renewable energy resources. This model aims to enhance the effective and efficient utilization of renewable energy resources by establishing YEKAs on public and treasury-owned properties, as well as privately owned properties. Furthermore, the goal is to initiate renewable energy facilities characterized by high domestic content and advanced technology through this model.

YEKA projects contribute to Türkiye's energy security and its strategy of utilizing domestic and renewable energy resources. These projects also play a crucial role in achieving sustainable energy targets. After the first tender in 2017, subsequent tenders for both WPPs and SPPs were held. ETKB has officially affirmed the continuity of the YEKA model, as outlined in the National Energy Plan. In this context, new prospective YEKAs, including offshore WPPs, onshore WPPs, and SPPs, were announced on August 4, 2023, August 15, 2023, September 30, 2023, and October 16, 2023. Furthermore, the requirement that the power generation facility to be established under the unlicensed electricity generation based on the YEKA for a consumer facility by May 10, 2023, must be located within the borders of the same incumbent supplier region has been eliminated.

In August 2023, ETKB declared that four offshore WPP areas in Bandırma, Bozcaada, Gelibolu, and Karabiga have been designated as potential YEKA candidates.

The YEKA SPP-5, initially announced as 76 competitions in 2021, has been postponed until this time and underwent updates in October 2023. As of the latest update, 45 candidate areas have been identified for YEKA SPP-5 in Aksaray, Antalya, Muş, and Van. The competition dates for these candidate YEKAs have not been announced yet.

Energy Efficiency

The growing population, rapid industrialization, urbanization, technological advancements, and international trade have highlighted the need for sustainability in existing energy resources. Consequently, there is an increasing emphasis on energy efficiency, aligning with the pursuit of more effective and efficient resource utilization. Energy efficiency entails optimizing resource utilization across the entire process, spanning from service and production to consumption. In other words, energy efficiency involves curbing energy losses in various forms and cutting down on energy consumption without compromising production, services, physical comfort, or societal well-being.

Energy efficiency, with its numerous advantages for both societies and economies, plays a pivotal role in enhancing competitiveness, lowering energy expenses, diminishing reliance on foreign sources, and securing a reliable energy supply. Moreover, energy efficiency practices play a crucial role in mitigating environmental impacts and minimizing the effects of climate change. In all these dimensions, energy efficiency stands as a paramount element of sustainable development, complementing other national objectives in the energy sector. It aids in the transition to a low-carbon economy, fostering sustainability and aligning with broader environmental goals.

The Energy Efficiency Law, enacted in 2007, marked a significant milestone, ushering in a series of regulations and communiqués that elevated the trajectory of energy efficiency. The 2012-2023 Energy Efficiency Strategy Paper, unveiled by the High Planning Council and published in the Official Gazette of February 25, 2012, sets forth the ambitious target of curbing energy intensity by a minimum of 20% in 2023 compared to the benchmarks set in 2011, with the overarching goal of mitigating energy losses. In line with efforts to align with European Union standards, the first National Energy Efficiency Action Plan (NEEAP) spanning from 2017 to 2023 was issued on January 2, 2018, through a decision by the High Planning Council. As part of NEEAP, the goal is to achieve a 14% reduction in primary energy consumption by 2023 (equivalent to 23.9 million tons of oil equivalent (mtoe)) through the implementation of 55 actions across building and services, energy, transport, industry and technology, agriculture, and horizontal topics.

The NEEAP Monitoring and Steering Committee coordinates the efforts of all public institutions and relevant stakeholders to efficiently carry out energy efficiency activities nationwide. It plays a crucial role in monitoring and ensuring the effective implementation of the actions outlined in the plan.

The annual NEEAP Progress Report evaluates the realization rate of actions according to the annual work program, the completion rate, and the ongoing work related to the actions outlined in the Plan.

The Türkiye National Energy Plan, formulated with the aim of achieving a net-zero emissions target by 2053, was disclosed to the public on January 19, 2023. This plan incorporates estimates and projections spanning until the year 2035. The Plan encompasses the energy requirements across various sectors such as industry, agriculture, transportation, buildings, and services. It also outlines supply scenarios devised to meet these demands, considering key indicators like population growth, economic development, and fuel prices.

Türkiye National Energy Plan aims to enhance energy efficiency through the adoption of advanced technology equipment at various levels. The plan sets a target for a 51% improvement in energy intensity from 2000 to 2035.

The Medium-Term Program (2024-2026), published in the Official Gazette No. 32301 of September 6, 2023, underscores the support for investments promoting energy efficiency. This support is outlined within the context of reconstruction efforts to enhance the resilience of regions affected by a significant earthquake disaster in Türkiye. As part of the EU Green Deal, sector-specific roadmaps will be developed for companies, focusing on aspects such as energy efficiency and digitalization. Additionally, awareness-raising initiatives will be conducted. The document outlines plans to establish the technical and administrative infrastructure required for the widespread adoption of energy performance contracts in public buildings and services. Moreover, efforts will be made to promote the Nearly Zero Energy Buildings (NZEB) approach, aiming to achieve high energy performance standards in public, commercial, and residential buildings.

In addition to the developments mentioned, the expiration of both the Energy Efficiency Strategy (2012-2023) and the Energy Efficiency Action Plan (2017-2023) by 2023 has necessitated the renewal of these documents. The ongoing efforts involve the revision of the Energy Efficiency Strategy Paper for the period 2024-2030 and the development of the second NEEAP.

The 12th Development Plan, released in the Official Gazette No. 32356 (bis) of November 1, 2023, for the period 2024-2028, highlights energy efficiency as a key aspect within categories such as green transformation, initiatives for ensuring energy supply security, and the impact of global developments on Türkiye. Energy efficiency will play a pivotal role in reaching the 2053 Net Zero Emission Target by aiding in the reduction of energy demand and ensuring supply security through effective cost management. The Plan states that investments are anticipated to gain momentum in sectors closely tied to energy efficiency, including the green transformation in industry, sustainable agriculture and transportation, circular economy, and green infrastructure and urban planning.

6.1. Advancements in Energy Efficiency Across Specific Sectors in Türkiye

In the buildings and services sector in Türkiye, final energy consumption has surged by 26%, rising from 30.3 mtoe to 38.1 mtoe during the period from 2012 to 2021. Experiencing an average annual growth in energy demand of 2.6%, this sector represented 30.8% of the total final energy consumption in the year 2021. Efforts have been made in Türkiye to enhance energy efficiency in buildings, involving the tightening of design standards for new constructions and a focus on savings, particularly insulation, in existing buildings. Recent developments in this area are outlined below.

- Central energy management units were established within governorships to enhance the efficiency of energy-related initiatives in public institutions and organizations.
- The definition of NZEB was included in the legislation, making it mandatory for new buildings to be designed as NZEBs.
- A target of 15% energy savings was established for 2,400 public buildings and campuses, totaling 1.3 mtoe in energy consumption, which are mandated to appoint energy managers.
- The Energy Efficiency in Public Buildings Project, backed by a USD 200 million budget from the World Bank, was initiated, and the implementation phase commenced.
- The loans offered for buildings with Class A and B Energy Performance Certificates saw an increase in the allotted amount.
- Amendments were introduced to the Income Tax Law, Stamp Tax Law, and Fees Law with the aim of incentivizing energy efficiency improvements in existing buildings.
- The Thermal Insulation Campaign was launched, offering insulation loans with a 60-month maturity and a 0.99% interest rate.
- As part of international cooperation, a Technology Atlas containing sectoral and material information on buildings was released. District heating potential was identified through mapping heating and cooling demand. Furthermore, municipalities and universities were provided with training, surveys, feasibility studies, and equipment procurement support to promote energy efficiency and renewable energy investments.

The relatively energy-intensive nature of the industrial sector in Türkiye is a critical aspect that requires close monitoring. This is essential not only due to its impact on energy costs affecting competition but also considering the potential for emissions taxation. While substantial progress has been achieved in the industrial sector over the past two decades, there remains considerable untapped potential for further improvements.

Final energy consumption in the industrial sector rose by 39%, increasing from 29.9 mtoe to 41.6 mtoe during the period from 2012 to 2021. During this period, the average annual rate of increase in energy demand was 3.7%. These data underscore the significant role of the industrial sector in Türkiye's overall energy consumption, highlighting the need for targeted efforts to enhance energy efficiency in this area. Some notable developments in energy efficiency initiatives within the industrial sector are outlined below.

- Collaborative efforts, both nationally and internationally, have been conducted to address topics such as process efficiency, energy management, industrial symbiosis, life cycle assessment, and the establishment of environmentally friendly Organized Industrial Zones (OIZs).
- The Energy Saving Potential Map in Industry was prepared, revealing the presence of potential energy efficiency investments with an average payback period of 2 years and a monetary value exceeding TL 5 billion.
- The Türkiye Waste Heat Potential Assessment Project, supported by the World Bank, was successfully implemented. The project findings reveal that the industrial sector in Türkiye holds a waste heat potential of 1,600-kilogram tons of oil equivalent (ktoe) with an estimated investment of around USD 1.37 billion. Additionally, there is a cogeneration potential of 2,515 MW, necessitating an investment of USD 2 billion. The implementation of the required investments is anticipated to result in annual savings of approximately USD 1.6 billion in the industrial sector.
- Over the period from 2009 to 2016, a total of 450 applications were submitted for efficiencyboosting project (EBP) supports. The number of applications increased by 96% to 884 in the period from 2017 to 2022. The implemented projects garnered a total investment exceeding TL 1.1 billion (equivalent to approximately USD 147 million at the relevant exchange rates).
- Cogeneration efficiency certificates were granted to 88 industrial facilities under the unlicensed generation framework in the electricity market. Businesses achieved a resource saving of 25-30% in their primary resource usage.
- The Development of a National Life Cycle Assessment Database and The Promotion of Energy-Efficient Engines in Small and Medium-Sized Enterprises in Türkiye projects were carried out.

In Türkiye, the transportation sector ranks as the third-largest consumer of final energy. Additionally, the transportation sector stands out as the fastest-growing contributor to energy demand, exhibiting an average annual growth rate of 4.5% over the past two decades. Numerous advancements within the transportation sector, notably escalating fuel prices, serve as compelling incentives for prioritizing the efficient utilization of energy resources. During the period from 2012 to 2021, there was a 57% surge in final energy consumption within the transportation sector, escalating from 19.5 mtoe to 30.6 mtoe. Experiencing an average annual growth rate of 5.1% in energy demand, the transportation sector attained a significant share, comprising 24.7% of the total final energy consumption in 2021. In a sector characterized by rapid energy demand growth, several efforts have been undertaken in the field of energy efficiency. A summary of some of these efforts is provided below.

- To incentivize the adoption of electric and hybrid vehicles, measures such as reductions in Special Consumption Tax (SCT) and Motor Vehicle Tax (MTV) were implemented. To understand the implications of electric vehicles on the Turkish distribution network, a thorough examination of four different distribution networks was undertaken. The analysis confirmed that, by 2030, these networks will have ample capacity to seamlessly integrate electric vehicles constituting 10% of the total passenger vehicle stock.
- As part of efforts to enhance rail transport, ongoing initiatives were focused on railway construction and renovation, as well as the implementation of signaling and electrification projects.
- To enhance environmental awareness and standardization, twenty port facilities operating in Türkiye were transformed and certified to meet the "Green Port" criteria, emphasizing the optimization of environmental sensitivity and the development of port quality management systems.
- The support for constructing new conventional ships in lieu of scrapped vessels was raised from 1 times the scrap cost per ton to 1.5 times. Moreover, for those opting for alternative environmentally friendly energy sources, the support was increased to 2.5 times the scrap cost per ton.

Food security is intricately linked to the effective, efficient, and sustainable execution of agricultural activities. The assessment of energy use in agriculture should be comprehensive, covering the entire process from start to finish. Appropriate measures should be implemented, and these efforts need to be strengthened through collaborative endeavors. Key highlights in this domain are outlined below.

- As part of the irrigation facilities renewal initiative, 55 facilities covering a total area of 166 thousand hectares were successfully brought into operation. Furthermore, land consolidation efforts led to the successful integration of over 6 million hectares of land.
- A total grant support of TL 73 million was allocated to fund 100 projects aimed at incorporating renewable energy sources into agricultural production structures such as greenhouses, barns, corrals, poultry houses, and more. Furthermore, initiatives were undertaken to establish Specialized (Greenhouse) OIZs centered around agriculture and utilizing geothermal resources.
- As part of the energy consumption inventory study within the aquaculture sector, an analysis was conducted on 164 enterprises with a combined annual production capacity of 9 thousand tons. These facilities collectively have an annual electricity consumption of around 5 thousand MWh. With 160 fishing facilities situated on land, the primary electricity consumption components for these facilities are the pumps.

Türkiye's energy consumption has experienced significant growth, driven by population expansion, the increasing demand for modern amenities, and the steady rise in gross domestic product over the years. Over the span of a decade, the primary energy supply surged by 35.9%, escalating from 117.1 mtoe in 2012 to 159.4 mtoe. Between 2012 and 2022, there was an increase in electricity consumption, rising from 239.4 TWh to 324.5 TWh. Similarly, natural gas consumption experienced growth during this period, advancing from 45.2 bcm to 59.7 bcm. While the expansion of the energy sector's supply capacity is positive, it is crucial to reinforce this capacity by implementing efficiency measures. Highlighted below are key developments in this domain.

- Through strategic investments in the network to mitigate losses, combat illegal electricity usage, and expand distributed generation, the loss rate in electricity transmission and distribution was successfully reduced from 13.42% in 2016 to 10.08% by 2022.
- In an effort to enhance transparency and offer consumers more detailed and comparable information on their electricity bills, regulatory measures were introduced. These adjustments now provide consumers with access to features such as daily energy consumption averages and historical consumption data for both the current year and the preceding calendar year.
- Thermal power plants with an installed capacity of 20 MW and above are mandated to prioritize studies exploring the effective utilization of their waste heat, particularly in district heating systems. Thermal and hydraulic power plants under the umbrella of EÜAŞ underwent thorough energy audits, leading to the development of projects aimed at enhancing efficiency across these facilities.
- The completion of cost-benefit analyses and GIS-based heat mapping studies marks significant progress toward the dissemination of efficient heating and cooling systems.
- Energy audits were conducted at compressor stations within the natural gas transmission system, and the findings were analyzed to identify potential energy-saving opportunities.²²

6.2. Energy Performance Contract (EPC)

EPC stands as an innovative financing method, successfully implemented in numerous developed countries. It serves as a financial mechanism for funding projects dedicated to enhancing energy efficiency. EPC functions as an agreement between the energy service company responsible for project implementation and the customer. The energy services company (ESCO) takes on the responsibility of making essential investments to enhance the customer's energy efficiency and bears the associated costs. In return, the customer remits a portion of the realized energy savings to the ESCO. The distribution of these savings is determined through mutual agreement upon the successful completion of the project.

EPC offers various advantages, including a turnkey project design and implementation, a guarantee on performance and energy savings, project financing without the necessity for working capital, effective risk management, elimination of maintenance costs, straightforward process management, and the ability to remotely monitor and report performance measurements.²³

In August 2020, the Presidency published the Decree on the Procedures and Principles Regarding

6.3. Efficiency-Boosting Projects (EBPs)

Currently, EBP stands out as the most effective mechanism, yielding tangible results in terms of savings. It provides crucial support for energy efficiency investments and continues to witness an increasing number of applications. Following the publication of the 2008 Regulation on Enhancing Efficiency in Energy Resource Utilization, modest strides were taken in this realm. Yet, over the years, ETKB has expedited and streamlined the application and approval mechanisms in this domain. As of the latest legislative iteration, companies operating in the industrial sector are eligible for up to 30% grant support, provided their annual energy consumption exceeds 0.5 ktoe and they have obtained or are in the process of applying for TS EN ISO 50001 Energy Management System Certification. This support is specifically allocated for efficiency improvement projects

Energy Performance Contracts in the Public Sector. Subsequently, in April 2021, the Communiqué on the Implementation of Energy Performance Contracts in the Public Sector was issued, laying the groundwork for the practical implementation of these contracts. These regulations are anticipated to facilitate the implementation of good practices, particularly within the public sector. This, in turn, is expected to play a pivotal role in catalyzing the overall strengthening of the sector. The establishment of long-term agreements within the public sector not only enables the expansion of energy efficiency measures but also provides an avenue for Energy Efficiency Consulting (EEC) companies to evolve into ESCOs over time, leveraging the experience gained through such initiatives.

The widespread adoption of the EPC method in Türkiye has not reached a sufficient level. Although there is international support for this methodology, further efforts are required to promote its implementation and adoption at the local level. Raising awareness about financing and implementing energy efficiency projects in Türkiye could play a pivotal role in making EPC more prevalent and, consequently, contribute significantly to enhancing energy efficiency.

with a simple payback period of less than 5 years and an investment value of up to TL 5 million. As of the end of 2021, the cumulative annual energy savings from a total of 571 projects, encompassing both completed and ongoing initiatives under this framework, amounted to 0.11 ktoe.²⁴ The majority of these projects was implemented in industrial facilities characterized by substantial energy consumption. There is a vision to gradually extend this support to smaller enterprises over time.

²³ ESCON (2023). Energy Efficiency Report of Turkish Industry.

²⁴ ETKB. Efficiency-Boosting Project Supports. https://enerji.gov.tr/evced-enerji-verimliligi-destekleri-verimlilik-artirici-proje-destekleri

Climate Developments

Climate change exerts profound impacts on every continent, country, sector, and species, generating heightened pressures across various industries. Greenhouse gas concentrations in the atmosphere are reaching unprecedented levels, leading to a surge in global temperatures and a consequential rise in sea levels. These changes also amplify the frequency and intensity of extreme weather events. As per climate change scenarios, precipitation in major cities of Türkiye is anticipated to decrease by an average of 7.1% in the 1.5°C scenario, with even more substantial reductions projected in higher temperature scenarios. Additionally, there is an expected increase in one-day heavy rainfall events. Türkiye experienced severe impacts of the climate crisis in 2022, followed by a somewhat less severe but still significant impact in 2023.

According to the World Economic Forum's Global Risk Report for the years 2019, 2020, 2021, 2022, and 2023, the top ten risks with the

highest impact and likelihood globally include extreme weather events driven by climate change, failure to mitigate climate change, inaction on climate change, inability to adapt to climate change-induced disasters and resource shortages, loss of biodiversity, and humanmade environmental disasters.

The Paris Agreement seeks to restrict the rise in the global average temperature to well below 2°C above pre-industrial levels, with a goal to strive for limiting the increase to 1.5°C above pre-industrial levels. Out of the 198 parties to the United Nations Framework Convention on Climate Change (UNFCCC), a total of 195 are currently parties to the Paris Agreement.

Carbon pricing mechanisms stand out as prominent practices for managing the costs associated with climate change and emissions. The European Union Emissions Trading System (EU ETS) is one of the pioneering examples of these mechanisms. Issued in 2019, the European Green Deal (EGD) is acknowledged as the EU's latest climate action plan, holding significant importance on the global climate agenda. The EGD serves as a framework for Europe's carbon reduction plan until 2050. It revolves around a fundamental transformation of the economy with the overarching goal of making the continent climate neutral. As a component of this initiative, the EU has committed to offering financial support and technical assistance to aid those most impacted by the shift to a green economy. This initiative is known as the Just Transition Mechanism.

With a growing emphasis on the commitments outlined in the Paris Agreement, the EU took a significant step in this direction by publishing the Climate Law in July 2021. In pursuit of the established targets, the EU introduced the "Fit for 55" package, comprising a set of legislative measures. The package emphasizes measures including strategies to address carbon leakage, optimize resource utilization, and implement carbon border adjustment. On July 14, 2021, the European Commission approved a set of legislative proposals with the objective of achieving climate neutrality in the EU by 2050. This includes an interim target of a minimum 55% net reduction in greenhouse gas emissions by 2030. The Carbon Border Adjustment Mechanism (CBAM), which imposes a carbon tax on products imported into the EU from non-EU countries, similar to the EU ETS, was initially agreed to apply to the cement, fertilizer, iron and steel, aluminum, electricity, and hydrogen sectors. Introduced in October 2023, the CBAM is initially designed to have a transition period focused on reporting, with the actual pricing expected to commence in 2026. The CBAM is envisaged to mitigate the competitiveness risk faced by European producers, both in environmental terms by aiding climate targets and economically by addressing costrelated impacts.

On July 15, 2021, the European Commission introduced the CBAM proposal, sparking discussions and varying perspectives within the European Council and the European Parliament. In the course of tripartite negotiations, the Council of Europe and the European Parliament achieved a preliminary agreement on the CBAM on December 13, 2022. Ultimately, on April 18, 2023, the European Parliament and on April 25, 2023, the European Council approved key components of the "Fit for 55" package.

Climate finance plays a pivotal role as a crucial component in the fight against climate change and the pursuit of sustainable development. In the past decade, global climate finance has exhibited a consistent upward trend, reaching a notable figure of USD 632 billion in 2019-2020. While climate change adaptation finance has seen an increase, the total amount allocated for adaptation falls significantly short of meeting the current needs. To meet the targets outlined in the Paris Agreement, it is estimated that an annual investment ranging from USD 6.3 to 6.9 trillion is required.

The year 2023 has proven to be challenging, marked by incidents of forest fires, floods, extreme weather events, and an escalating impact of the climate crisis globally. The heightened intensity and widespread occurrence of forest fires have resulted in the significant destruction of expansive forested areas, causing harm to biodiversity in numerous countries. Serious floods have occurred, displacing numerous communities, causing infrastructure destruction, and adversely affecting agricultural land. In addition to these disasters, the manifestations of the climate crisis, including extreme temperatures, droughts, and rising sea levels, are becoming increasingly pronounced. Amidst these ongoing developments, the formulation of National Climate Change Action Plans, Long-Term Climate Strategies, and Nationally Determined Contributions assumes a crucial role in steering the transition towards low-carbon economies. Adaptation and mitigation measures are mutually reinforcing components in the effort to combat climate change. Climate change adaptation endeavors to empower societies to cope with the challenges posed by climate change and mitigate negative impacts by minimizing associated risks. Climate change adaptation solutions exhibit variability based on the unique conditions prevalent in different geographic regions.

Developments in Türkiye

As of 2021, Türkiye's total greenhouse gas emissions are estimated to be 564.4 million tons of carbon dioxide (CO₂) equivalent. This amount corresponds to approximately 1% of global emissions, with a 7.7% increase in total greenhouse gas emissions compared to the previous year. The majority of Türkiye's emissions, accounting for 71.3%, originated from energy-related sources. Following energyrelated emissions, industrial processes contributed to 13.3%, agricultural activities and product use constituted 12.8%, and the waste sector accounted for 2.6% of Türkiye's total greenhouse gas emissions. In 2004, Türkiye became a party to the UNFCCC, followed by accession to the Kyoto Protocol in 2009 and the Paris Agreement in 2021. These milestones have prompted Türkiye to engage more actively in global initiatives to address climate change, driving the country to enhance its national policies in the context of climate action. The current legislation forms the framework for addressing a diverse range of issues, encompassing waste control, water quality and management, soil pollution and remediation, air quality monitoring and assessment, energy efficiency, and chemical management. The objective of sustainable development was reinforced by intensifying recycling and resource utilization efforts, leading to notable economic and environmental benefits. In the upcoming years, significant initiatives are planned, including the establishment of a deposit system and the formulation of a Climate Change Law.

The Regulation on the Monitoring of Greenhouse Gas Emissions, enacted in 2012 and subsequently updated in 2014, serves as a framework for the control and monitoring of greenhouse gas emissions. These regulations govern the procedures for monitoring, reporting, and verifying greenhouse gas emissions. Türkiye has formulated a range of national policy documents dedicated to both combating and adapting to climate change. The National Climate Change Adaptation Strategy and Action Plan, published in 2011, is centered around five primary areas. These documents are currently in the process of being updated.

In accordance with the Paris Agreement, Türkiye, like to all other signatory nations, is obligated to submit its Nationally Determined Contributions (NDCs) every five years. This declaration encompasses the actions undertaken to achieve the primary goals of the Agreement, covering mitigation, adaptation, finance, technology transfer, and capacity building. On November 10, 2021, Türkiye, having become a party to the Paris Agreement, revised its NDCs. Previously communicated at the "intended" level, Türkiye announced its new target at 27th Conference of the Parties (COP 27). Accordingly, Türkiye has pledged to reduce its emissions by 41% by 2030 compared to the baseline scenario. Furthermore, the country aims to achieve net-zero emissions by the year 2053. As per the updated NDCs, Türkiye anticipates that its emissions will peak in the year 2038. Subsequent to these advancements, in February 2022, Türkiye hosted its first Climate Council in Konya, centering on the theme "2053 Net-Zero Emission Target: Türkiye's Green Development Revolution."

During the Climate Council, discussions revolved around new roadmaps within the scope of seven distinct commissions.

Given that carbon pricing has not been implemented in Türkiye yet, studies on ETS are underway to mitigate the potential costs associated with the CBAM. In alignment with the EGD announced in 2019, Türkiye published its Green Deal Action Plan in July 2021. The plan encompasses 32 distinct targets, spanning areas such as the monitoring of greenhouse gas emissions to the promotion of sustainable energy production. Through this plan, Türkiye firmly conveys its commitment to swiftly address the challenges posed by climate change and transition towards a low-carbon economy. These initiatives are geared towards enhancing Türkiye's competitiveness in the global market.

Under the Green Deal Action Plan, "national taxonomy" studies are underway, coordinated by the Climate Change Presidency. These studies aim to align financial resources with green investments and provide guidance to investors. In this context, the Taxonomy Stakeholder Workshop was conducted in May 2023, concurrently with the first meeting of the Taxonomy Technical Expert Group. Furthermore, to bolster the implementation of the Green Deal Action Plan, in 2021, the Ministry of Treasury and Finance formulated and released the "Sustainable Financing Framework Document." This initiative aims to promote the utilization of instruments such as international green, social, or sustainable bonds and lease certificates in government bonds. Moreover,

in February 2022, the Capital Markets Board issued the "Green Debt Instrument, Sustainable Debt Instrument, Green Lease Certificate, Sustainable Lease Certificate Guidelines." The issuance of this guidance is anticipated to catalyze the growth of the sustainable finance market in Türkiye over a specific timeframe.

Türkiye, lacking a carbon pricing scheme, is currently in the process of formulating the Climate Change Law and ETS Regulation, which will establish the framework for the carbon market. Within this framework, the plan is to institute an ETS that directly or indirectly constrains and incentivizes greenhouse gas emissions and associated activities. This will be achieved through the trading of greenhouse gas emission allowances, adhering to the cap-and-trade principle.

In Türkiye, the evaluation of the EU CBAM transition period and the execution of cost-effective emission reduction policies in sectors promptly impacted by the EU CBAM are addressed in the Medium-Term Programme (MTP) for the period 2023-2025. As outlined in the MTP, endeavors will be undertaken to assess the Turkish tax system with the aim of formulating a national ETS in alignment with the CBAM. Additionally, there are plans to transform existing taxes into carbon taxes.

In summary, in 2023, Türkiye has sustained its commitment to combatting climate change and has achieved progress in emission reduction and sustainability by revising and updating its targets.

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