TSKB ADVISORY SERVICES

Monthly Energy Bulletin

TSKB Economic Research

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Bloomberg NEF publishes "New Energy Outlook 2024" report

According to the report, a 19% increase in the investments required to achieve the 2050 Net Zero Scenario is required when compared to the base scenario, which focuses only on economically competitive technologies, with the total investment reaching a cumulative USD 215 trillion between 2024 and 2050. The report emphasizes that the generation of clean energy must triple within 10 years if the Net Zero target is to be met, predicting that a USD 6.8 trillion of cumulative investment must be made in carbon capture technologies by 2040. Bloomberg NEF expects investments in electricity grid projects to reach approximately USD 1 trillion annually in the 2040s, while emphasizing that the targeted reduction in emissions can only be achieved with the use of cleaner energy technologies.

The International Energy Agency (IEA), meanwhile, published its "Global Critical Minerals Outlook 2024" report on the critical minerals required for clean energy technologies. While again emphasizing the importance of advancing clean energy technologies to achieve the goals set out in the net zero scenario, the report highlighted the significant surge in demand for critical minerals in 2023, while the demand for lithium grew by 30% with demand for nickel, cobalt, graphite and rare earth elements growing by between 8% and 15%. Based on the scenario reflecting the current policy environment, demand for critical minerals to be used in clean energy technologies is expected to double in 2030 compared to 2023; under the scenario of all national energy and climate targets being met, demand for critical minerals is on course to triple by 2030 and quadruple in 2040 according to the report, reaching approximately 40 million tonnes. While the report alludes to the limited diversification in supply in the mining of critical minerals, it predicts that geographical concentration will increase, posing a risk to the speed of energy transformation.

27.59 TWh	2,047.3 TL/MWh
March Gross Generation	Average MCP

13.4%

Daily average licensed electricity generation increased by 13.4% MoM and 5.2% YoY in May

Click for details.

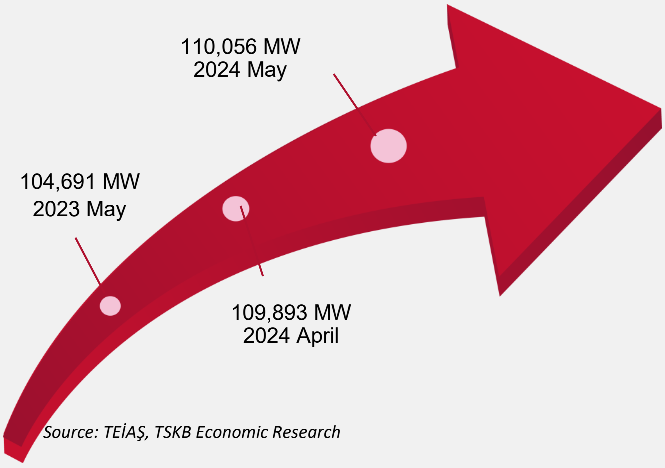
16.1%

Market Clearing Price (MCP) increased by 16.1% MoM and 7.3% YoY in May.

Click for details.

Installed Capacity Analysis

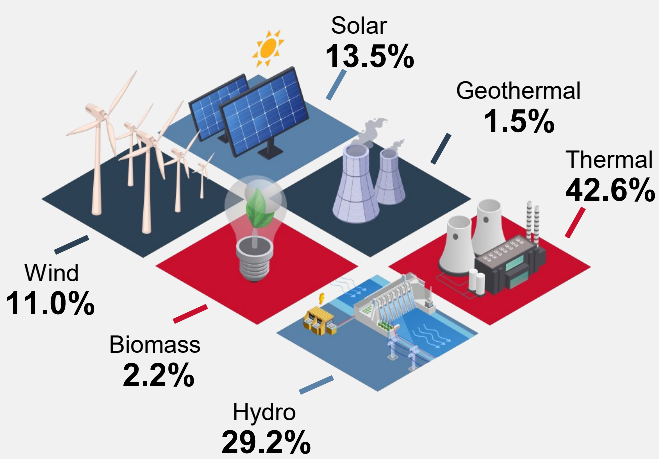
Türkiye's total installed generation capacity increased from 109,893 megawatts (MW) at the end of April to 110,056 MW in May. A total of 163.3 MW additional installed generation capacity was commissioned in May compared to April, with 161.9 MW consisting of solar power plants. There was also an increase of 1.4 MW in the installed generation of hydroelectric power plants compared to the previous month, with no change in the installed capacity of other resources.



Source: TEİAŞ, TSKB Economic Research

Of the power plants in operation in May, 57.4% of the installed capacity consisted of power plants generating electricity from renewable sources, sustaining the increase in the proportion of renewable resources. Hydroelectric power plants constituted 29.2% of Türkiye's total electricity installed generation capacity, with wind and solar power accounting for 24.5% of the country's total installed generation capacity.

May 2024 Installed Capacity Breakdown

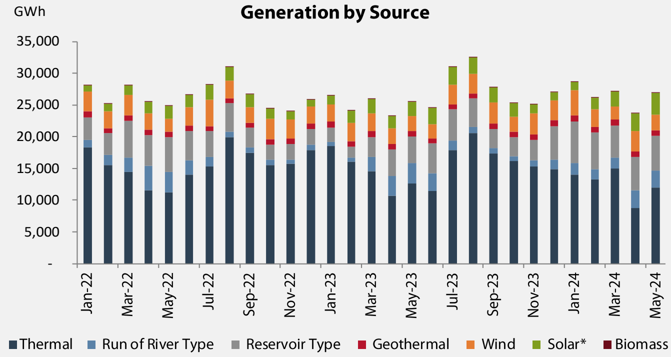


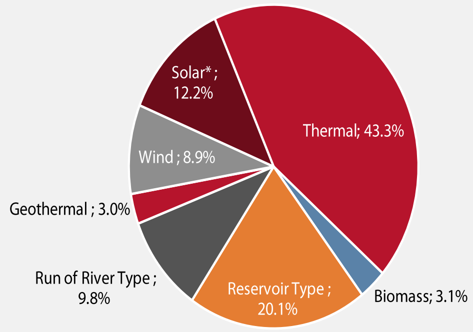
Source: TEİAŞ, TSKB Economic Research

Generation-Consumption Analysis

Total electricity generation, which was approximately 24.32 TWh in April 2024, reached 27.59 TWh in May. Average daily electricity generation in May were therefore up by 13.4% compared to the previous month and also up by 5.2% compared to the same period of the previous year.

Generation by Source





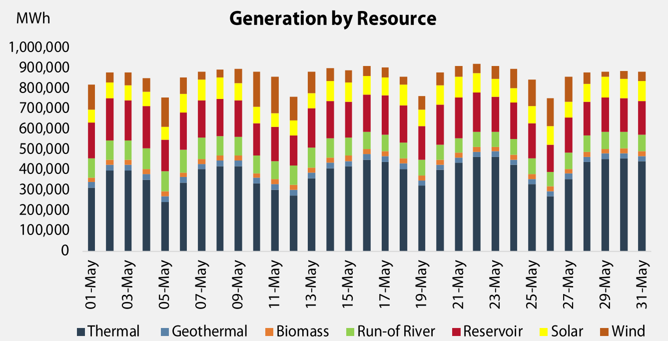
**Since figures for generation from unlicensed solar power plants for May have not yet been released by the TEIAŞ, total electricity generation from unlicensed solar power plants is calculated using the capacity factor of the same month of the previous year.*

Source: TEİAŞ, YTBS Daily Reports, TSKB Economic Research

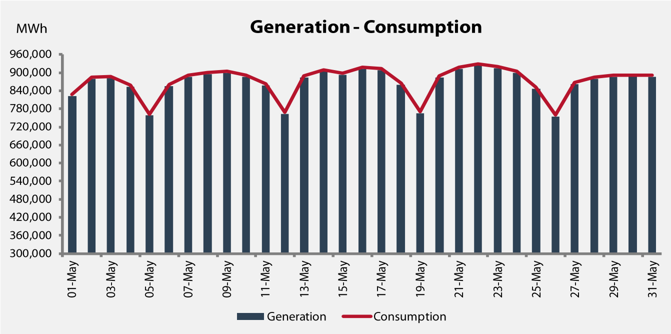
Thermal power plants provided 35.9% of the electricity generated in April and 43.3% of the total electricity generated in May. Looking at the breakdown of generation by source, hydroelectric power plants accounted for 29.9% of all electricity generated in May, compared to 33.3% in April, while wind accounted for 8.9% of the electricity generated during the month followed by a 3.3% share for geothermal power plants.

The share of renewable energy plants in electricity generation declined from 61.2% in April to 54.0% in May. During the same period, dam-type hydroelectric power plants contributed 20.1% of the total generation, while run-of-river hydroelectric power plants met 9.8% of the total generation. Meanwhile, 21.1% of the electricity was generated by wind and solar power plants during May. Solar power plants were the second main source of electricity sourced from renewables after dam-type hydroelectric power plants, with a share of 12.2%.

Generation by Resource



Source: TEİAŞ, YTBS Daily Reports, TSKB Economic Research



Source: TEİAŞ, YTBS Daily Reports, TSKB Economic Research

In May, licensed power plants generated an average of 867,552 megawatt hours (MWh) of electricity per day. The highest level of generation from licensed power plants during the month was 922,678 MWh on Wednesday, 22 May with the lowest generation from licensed power plants in the same period being 757,511 MWh on Sunday, 5 May.

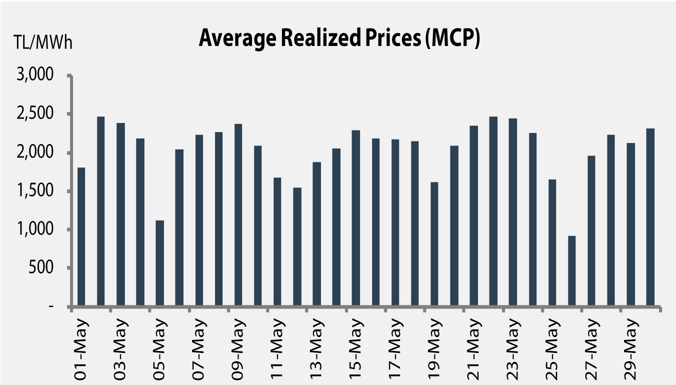
During the same period, electricity consumption averaged 872,797 MWh per day, with the highest level of consumption in May was recorded on Wednesday, 22 May at 927,922 MWh, with the lowest electricity consumption recorded on Sunday, 26 May at 759,773 MWh.

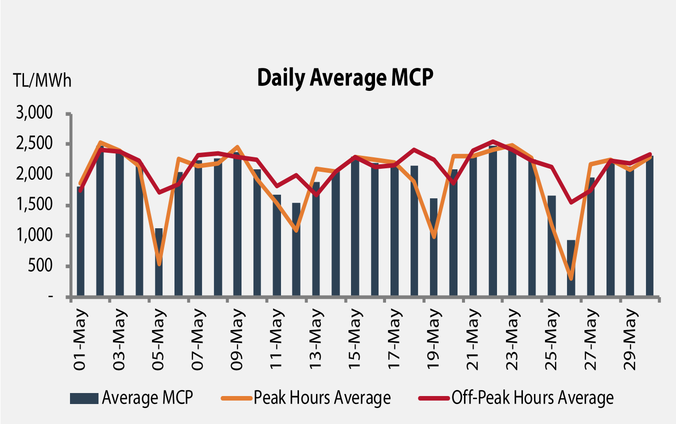
Electricity Price Analysis

In May, the daily average market clearing price (PTF) was between 925.2 TL/MWh and 2,472.0 TL/MWh. Daily PTF average in May was 2,047.3 TL/MWh. The highest daily average PTF value was recorded on Thursday, May 2, with 2,472.0 TL/MWh, while the lowest daily average PTF value was recorded on Sunday, May 26, with 925.2 TL/MWh.

When hourly data is examined, MTF was realized at the level of 2,700 TL/MWh, which is the maximum price limit determined for a total of 57 hours in April. The minimum hourly electricity price of 10.0 TL/MWh was recorded for Sunday, May 26, between 12.00-13.00.

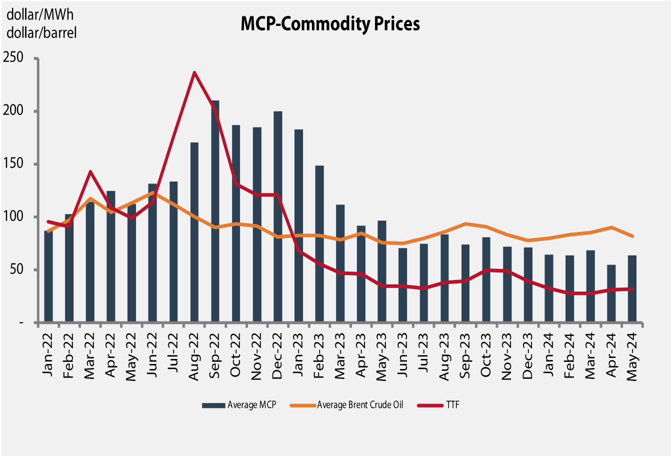
When the daily PTF analysis was performed for May, the peak hours average (08.00-20.00 interval) was 4.3% below the all hours average value and was recorded as 1,959.8 TL/MWh. While the maximum limit price of 2,700 TL/MWh was recorded 19 times during peak hours, the lowest price of 10.0 TL/MWh during peak hours was recorded 1 hour.





Source: EXIST, TSKB Economic Research

In the same period, the average off-peak hours (between 20.00-08.00) was 2,134.8 TL/MWh. While the maximum limit price of 2,700 TL/MWh was realized for 38 hours during off-peak hours, the lowest price of 249.0 TL/MWh during off-peak hours was recorded on Sunday, May 5, between 07.00-08.00. The PTF average, recorded as 54.5 dollars/MWh in April, increased to 63.5 dollars/MWh in May. Compared to the same period of the previous year, MTF was seen to be 34.4% lower in dollar terms.



Source: EPİAŞ, TCMB, EIA, TSKB Economic Research

Average Commodity Prices

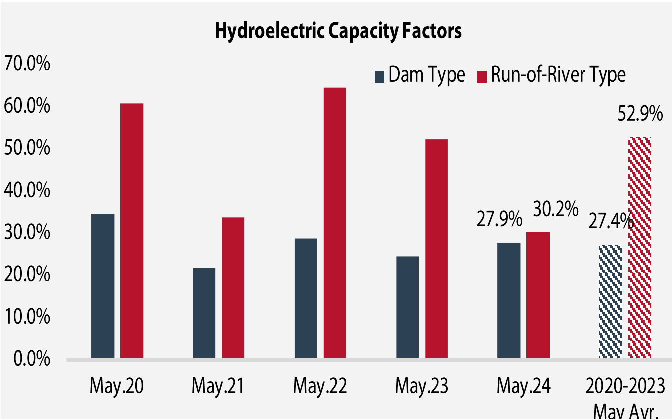
The price of a barrel of Brent crude oil, which averaged USD 89.9 in April, fell to USD 81.9 in May, marking a month-on-month decrease of 9%, although remaining 8.5% higher than in the same period of the previous year.

The TTF natural gas contract price, which averaged USD 31.00/MWh in April, increased by 3.9% on a monthly basis to reach USD 32.20/MWh. The TTF price decreased by 8.2% compared to the same period of the previous year.

Hydroelectric Capacity Factors

Dam-type hydroelectric power plants operated at 27.9% capacity in May 2024 while run-of-river type hydroelectric power plants operated at 30.2% capacity. These figures are 3.4 percentage points higher than May 2023 dam-based hydroelectric power plants but 22.1 percentage points lower for run-of-river type plants. Looking at the month of May in the last 5 years, the capacity factor of dam-type power plants was 6.6 percentage points lower than the high recorded in May 2024, while the capacity factor for run-of-river type power plants was 34.3 percentage points lower than the highest levels recorded in May 2022.

Dam-type hydroelectric power plants were operating at a rate 0.5 percentage points lower than the May for 2020-2023, while run-of-river type power plants were operating at a capacity factor rate as much as 22.6 percentage points lower than the average.



Source: TEIAS, EPIAS, TSKB Economic Research

Sector News

Local News

- First part of the bill on regulations in the field of energy accepted. According to the bill, the reporting obligation will only continue for "4th Group" mining operating licenses, in accordance with the National Mineral Resource and Reserve Reporting Commission code. According to other accepted articles, the seas, lakes behind a dam, artificial lakes and natural lakes, excluding reservoirs and wetlands providing drinking water and shores and coastlines within the scope of the Coastal Law, are declared as renewable energy resource areas by the Ministry of Energy and Natural Resources. The decision was taken that renewable energy generation plants could be established in the areas without a zoning plan. In addition, the definition of "liquefaction of natural gas" was added to the Natural Gas Market Law, while unlicensed production facilities which have completed their 10-year period within the scope of Renewable Energy Resource Area (YEKA) competitions will be permitted to generated licensed production at the end of the 10 year period. During the licensed production process, they will be able to sell electricity at the market clearing price. If the relevant market clearing price exceeds the current Renewable Energy Resources Support Mechanism (YEKDEM) price applied to the facility, the production facility will pay the price difference as a contribution fee.

- Türkiye to reach a daily natural gas supply capacity of 170 million cubic meters with the natural gas extracted from the Sakarya Gas Field, according to Minister of Energy and Natural Resources, Alparslan Bayraktar. Stating that Türkiye had invested approximately USD 4.3 billion to increase its natural gas storage capacity, Mr. Bayraktar added that Türkiye stored approximately 5.8 billion cubic meters of natural gas and would store as much as 20% of its annual natural gas usage by 2028.

- Türkiye Electricity Transmission Inc. (TEİAŞ) publishes the Capacity Mechanism Payment List for March 2024. According to the published list, the capacity support provided in March increased by 80% compared to the previous month to reach TL 501 million, while the highest support, of TL 72 million, was extended to the Soma Kolin Thermal Power Plant.

- TEİAŞ publishes "5 and 10 Year Connected Regional Production Facility Capacities" reort. According to the report, the total installed generation capacity is expected to increase from 107.8 gigawatts (GW) in 2023 to 184.3 GW in 2028 and 210.8 GW in 2033.

- Unit surveillance fee for photovoltaic cells updated to USD 85 per kg. The aim of this fee is to encourage domestic photovoltaic cell production, with the USD 25 increase in the surveillance fee, which had been determined as USD 60 per kg in January 2023 being paid for the storage of imported products in customs zones for a certain period of time.

- Minister of Industry and Technology Mehmet Fatih Kacır announces new incentive program for battery and energy storage technologies. Reflecting that the world's battery production capacity would rise 3.5-fold from 2.6 terawatt hours to 9 terawatt hours by 2030, Mr. Kacır added that the government planned to bring Türkiye to the regional battery production base. Emphasizing that TL 78 billion had been invested in this direction so far, Mr. Kacır emphasized that a new incentive program would be implemented for the production of critical raw materials and minerals in battery production and the planning of investments in this field.

- Agreement signed between Boru Hatları ile Petrol Taşıma A.Ş. (BOTAŞ) and ExxonMobil. In his statement on his social media account, the Minister of Energy and Natural Resources, Alparslan Bayraktar, stated that the long-term liquefied natural gas (LNG) supply agreement signed between BOTAŞ and ExxonMobil would play a role in diversifying energy resources.

- Studies being carried out to determine different natural gas and electricity tariffs for different income groups. According to the Bloomberg report, a study is being carried out by the Ministry of Energy and Natural Resources to consider ways of supporting low-income households with low bills. According to the report, the mechanism would mean tariffs could be increased gradually as income and consumption increased.

- Türkiye and Azerbaijan reach agreement on the transit transportation of Turkmen natural gas to Türkiye through Azerbaijan and Georgia. The Minister of Energy and Natural Resources, Alparslan Bayraktar, stated that with the agreement, additional volumes of Azeri natural gas in the Caspian Region would reach Türkiye by 2030, with some of this gas reaching Europe via Türkiye. Mr. Bayraktar added that the agreement would contribute to energy supply security in Türkiye and Europe.

- "Law on Amendments to the Mining Law and Certain Laws" published in Official Gazette and enters force. With the amendment to the Coastal Law, renewable energy production plants can be built in areas declared as renewable energy resource areas by the Ministry of Energy and Natural Resources without a zoning plan, while the provision for providing and updating the ceiling price in Turkish Lira in renewable energy competitions was abolished. In addition, the amount paid within the scope of Renewable Energy Resources Support Mechanism (YEKDEM) was introduced as the ceiling price for unlicensed production facilities that had completed the 10-year support period, while facilities seeking to gain licensed facility status were obliged to pay a fee to be determined by Energy Market Regulatory Authority (EMRA).

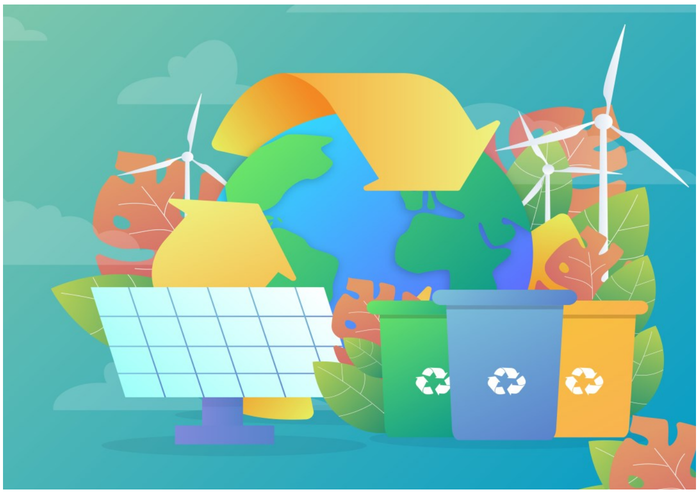
- Turkish Natural Gas Distributors Association (GAZBİR) publishes 2023 Natural Gas Distribution Sector Report. According to the report, natural gas consumption decreased by 6% in 2023 when compared to 2022, to 50 billion cubic meters. GAZBİR emphasized the impact of 2023 being warmer than 2022, the use of alternative energy sources instead of natural gas in electricity production, the decrease in natural gas consumption in industry and the Kahramanmaraş earthquakes affecting 11 provinces as the factors behind the fall in consumption. According to the report, domestic natural gas consumption decreased by 6% in 2023 when compared to 2022, with natural gas consumption in gas-fired power plants decreasing by 4% and consumption of natural gas in industry decreasing by 8%. GAZBİR added that investments in natural gas distribution increased from TL 12 billion in 2022 to TL 17 billion in 2023.

- Changes made to the Unlicensed Electricity Generation Regulation. According to the changes, if any part other than that has been accepted for projects exceeding 10 MW cannot be completed within the deadline, an update will be made based on the accepted part of the connection agreement. In addition, if the system usage agreement is not signed within one month following the date of commercial operation of the facilities that have been accepted and put into operation, the electricity they generate until they are disconnected from the grid will be accepted as a free contribution to the YEKDEM. In addition, the changes made provide the applicant with the right to apply for a site change or revision in case the technical interaction permit is rejected in unlicensed wind power project applications.

- Türkiye will not need to import USD 226.5 billion worth of natural gas imports by 2035, provided the country reaches the targets set out in the National Energy Plan. According to statements by Ramazan Usta, the Deputy General Director of Energy Affairs of the Ministry of Energy and Natural Resources, who spoke at the 2nd Energy Storage Systems Summit organized by the Energy Storage Systems Association (EDSİS) and the Digitalization in Energy Association (EDİDER), Türkiye will generate 326 billion kWh of electricity in 2023. Electricity generation is expected to reach 507 billion kWh by 2035. Deputy General Manager Ramazan Usta added that in order to achieve these targets, at least USD 73 billion would need to be invested in renewable energy power plants by 2035 with 74,353 MW of renewable energy capacity brought into operation. He added that this additional capacity would do away with the need to import 703 billion cubic meters of natural gas.

- GAZBİR publishes report on Natural Gas Distribution Activities After the 6 February Earthquakes. According to the report, the earthquakes which struck on 6 February 2023 and were centered on Kahramanmaraş, affecting 11 provinces, caused USD 600 million of direct damage to the energy sector, with USD 123 million inflicted against public companies and USD 472.5 million against private sector companies. The report additionally states that TL 1.04 billion of damages were caused to the natural gas distribution network by the earthquake.

- Drilling started in Göktepe-2 well underway, according to statements from Minister of Energy and Natural Resources, Alparslan Bayraktar. Stating that the drilling of Göktepe 2 well would be completed in July, Mr. Bayraktar stated that the daily production in the Sakarya Gas Field had reached 5 million cubic meters. Minister Bayraktar added a five-fold increase in production by 2028 in order to deliver natural



gas to a total of 20 million households in the Sakarya Gas Field. Mr. Bayraktar added that four reactors were planned in the Akkuyu Nuclear Power Plant with the first reactor set to be commissioned within the next year and the other reactors to be commissioned by 2028.

- EMRA publishes "Electricity Market Sector Report" and "Natural Gas Market Sector Report" for March. Electricity consumption in March increased by 3.9% compared to the same month of the previous year, to reach 27.8 TWh. This compares to the electricity consumption of 26.7 TWh in February. In addition, billed electricity consumption in March increased by 5.8% YoY to reach 21.3 TWh. According to the "Natural Gas Market Sector Report", total natural gas consumption in March increased by 5.4% compared to the same month of the previous year to reach 5.96 billion cubic meters (bcm), while 49.4% of the consumed natural gas was used in homes. Imports of natural gas imports decreased by 5.27% compared to March 2023, to 4.32 bcm.

Foreign News

- European Hydrogen Bank announces results of its first hydrogen tender. According to a statement issued by the European Commission, seven projects selected among 132 applications will receive EUR 720 million in grants. There are plans to produce 1.58 million tonnes of renewable hydrogen within ten years in seven related projects in Finland, Spain, Portugal and Norway. In the tenders held for projects expected to prevent over 10 million tonnes of carbon emissions, offers of between EUR 0.37 and EUR 0.48 per kilogram of renewable hydrogen were submitted.

- Global investment in the production of clean technologies to reach USD 200 billion in 2023. According to the report on "Improving the Production of Clean Technologies - Energy Technologies Perspective Special Report" published by the IEA, global investment in the production of clean technologies increased by 70% compared to the previous year to reach USD 200 billion. The report pointed out that USD 80 billion of this USD 200 billion investment consisted of investments in photovoltaic solar panel production with USD 110 billion in battery production. Stating that 40% of the investments undertaken in 2023 would enter operation in 2024, the report stated that battery production capacity could exceed 9 terawatt hours in 2030.

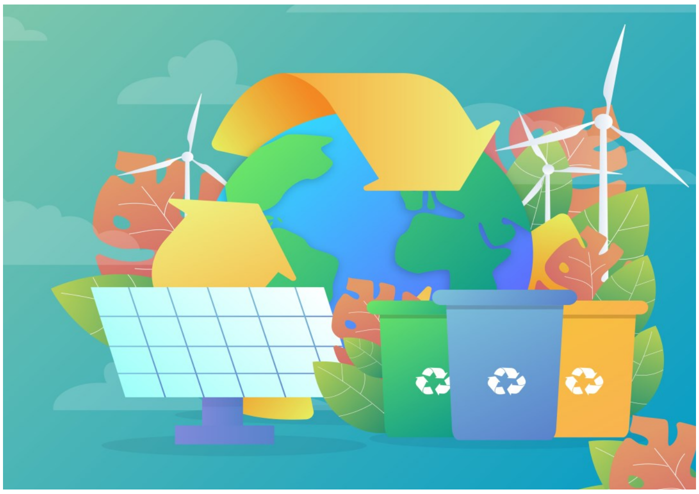
- Ember Climate publishes its 2023 Global Electricity Outlook report. According to the report, renewable energy resources will account for a 30% share of global electricity generation in 2023, up from 25% in 2017, breaking a new record. While Ember Climate highlighted that solar and wind energy account for the largest share in this, it reflected that the share of hydroelectric energy had fallen to the lowest level in the last 5 years due to drought. With global demand for electricity estimated to have increased by 627 TWh annually in 2023 to reach 29,470 TWh, Ember Climate highlighted that the increase in demand had been caused by electric vehicles, heat pumps, electrolyzers, air conditioning and data centers. According to the report, the share of renewable energy sources in Türkiye's electricity production increased from 27% in 2017 to 42% in 2023.

- The US Energy Information Administration (EIA) revised its oil price forecast downwards. According to the "May 2024 Short-Term Energy Outlook" report published by the EIA, Brent crude oil prices are projected to stand at USD 87.79/bbl in 2024 and USD 85.38/ bbl in 2025. In the previous forecast, the Brent crude oil price had been projected to be USD 88.55/ bbl in 2024 and USD 86.98/ bbl in 2025.

- IEA publishes its May Oil Market Report. The IEA revised its forecast for oil demand in 2024, now expecting an increase of 1.1 million barrels per day, a decrease of 140,000 barrels per day compared to the April forecast. The report cited the impact of weakening European deliveries as being behind its reduced forecast, while predicts that the increase in demand forecasted for 2025 would surpass the growth in 2024, at 1.2 million barrels per day.

- IEA publishes report on Strategies for an Affordable and Equitable Clean Energy Transition. According to the report, consumers' energy expenditures increased by 20% above the average of the previous 5 years to an average of USD 1200 per person in 2022, with high prices affecting the poor and vulnerable segments the most. While the IEA underlined the great disparities in energy use and ability to pay between different income groups in societies, it emphasized that 750 million people lacked access to electricity with over 2 billion people not having access to clean cooking technologies and fuel. Stating that reducing clean energy technology costs provided a new route of opportunity for the energy sector, the report explained that well-designed policies could bring clean energy technologies to underserved consumers. Accordingly, the IEA has emphasized that it is possible to ensure the participation of all segments of society in the transition to a clean energy system by creating large-scale investment and financing conditions with fair distribution and conscious policy designs. In addition, the report underlines the importance of infrastructure, power system flexibility and clarity of long-term goals against sudden market imbalances in the clean energy transition.

- Ren21 publishes 2024 Energy Demand Report within the scope of "Renewable Energy Resources 2024 Global Status Report". According to the report, industry accounted for 34% of the total energy consumed in 2021, followed by a 33% share for buildings, 30% for transportation and 3% for the agricultural sector. In addition to these, the share of renewable energy in total final energy consumption in 2021 stood at 16.8% for industry, 15.9% for buildings, 3.9% for transportation and 15.4% for agriculture.



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