

2024 KOREA ENERGY DEMAND OUTLOOK

2023 Second Half



Published by the Korea Energy Economics Institute (KEEI), Energy Demand Outlook takes a closer look at the global energy market and supply and demand trends in domestic energy and examines the outlook for short-term energy demand.

This report outlines the recent changes in the supply and demand of energy and provides important data and policy implications in an effort to contribute to the establishment and adjustment of a series of energy policies by the government.

This report is written by the Energy Outlook Research Team of the Center for Energy Information and Statistics in cooperation with the Energy Supply Statistics Research Team of KEEI and other related research divisions.

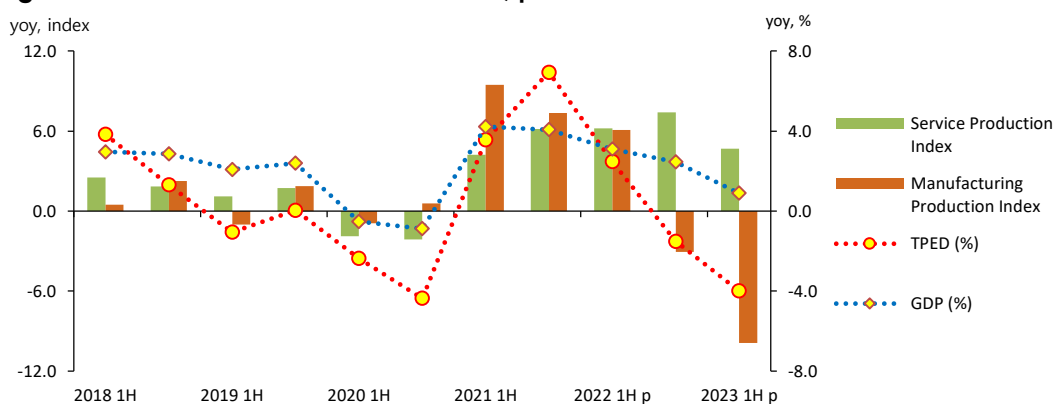
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1. Total Primary Energy Demand and Total Final Consumption

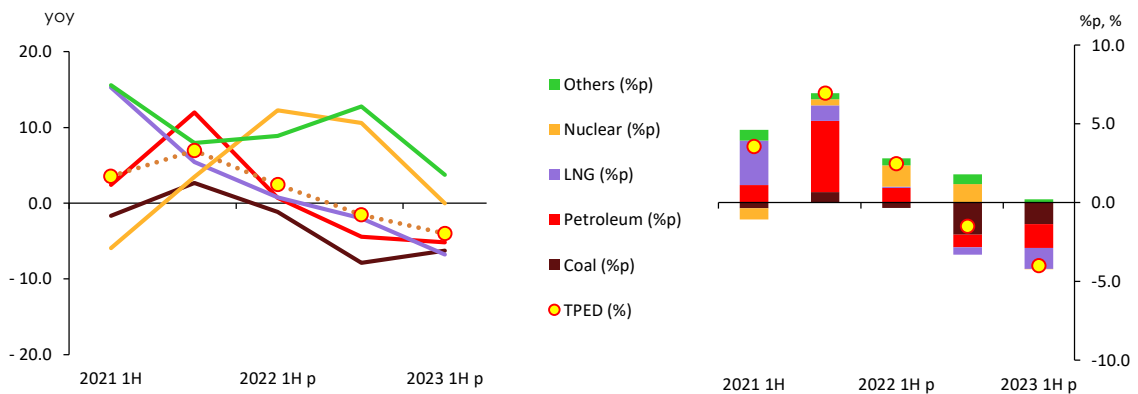
- **Total Primary Energy Demand (TPED) fell by 4.0% year-on-year in 1H 2023 due to weak manufacturing activity amid the economic slowdown.**
 - The domestic and global economic downturns that started since 2H 2022 and a consequent drop in industrial production were exacerbated in 1H 2023, and accordingly, the downward trend in energy consumption was accelerated.

Figure 1.1 Growth rate of GDP and TPED, production index



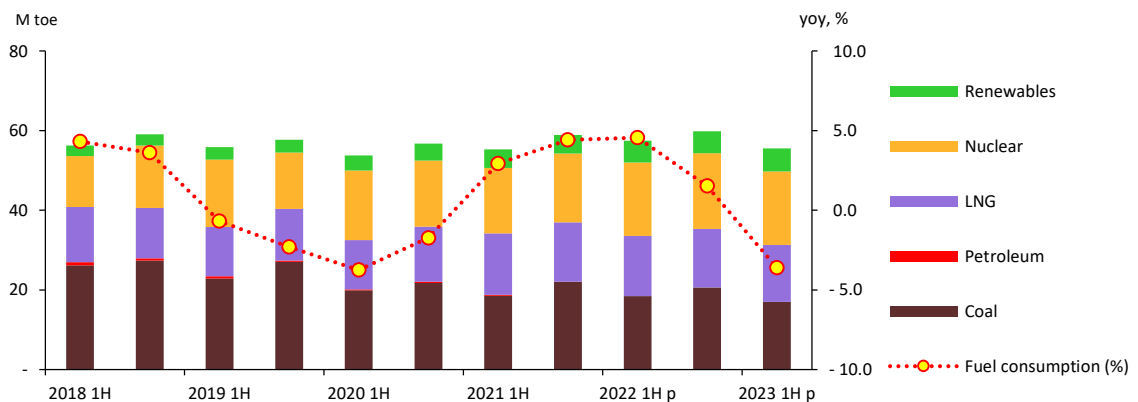
- **Petroleum, coal, and natural gas use fell sharply, while the use of nuclear energy remained flat, and renewable & other energy use slightly increased.**
 - Petroleum use dropped by 5.2% year-on-year, as its industrial use plunged due to a sharp drop in petrochemical production, although it slightly increased in the transport sector.
 - Coal use went down by 6.3% year-on-year, as it dropped fast in the power generation sector due to transmission constraints, and it also declined in the industrial sector owing to the decreased production.

Figure 1.2 Growth rate of TPED & contributions by sources



- Natural gas use fell by 6.8% year-on-year, as it declined in the power generation and end-use sectors.
- Nuclear power generation was flat on a year-on-year basis, even though the installed capacity was up 6.0% with the commissioning of a new large-scale reactor, as its capacity factor dropped by almost 5%p.
- Renewable & other energy use increased (3.8%), mostly in the power generation sector, although the growth was much slower.

Figure 1.3 Growth rate of fuel consumption at power plants & fuel consumption trend by sources



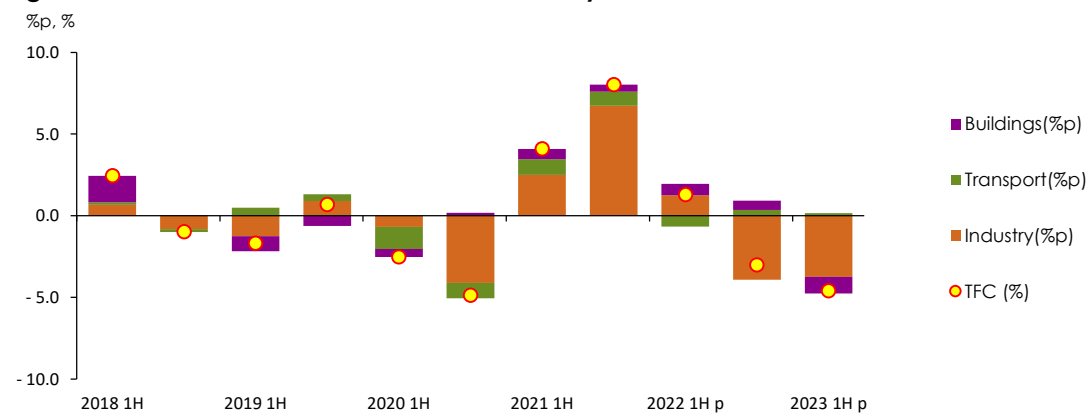
Note: Capacity factor is the ratio of actual power generation to power generation when the facility is operated at full capacity

- The final use of electricity was down 0.6% year-on-year, as its industrial use declined owing to the sluggish manufacturing activity, increased captive generation and decreased number of heating degree days, and as it grew more slowly in the building sector.

□ **Total Final Consumption (TFC) fell by 4.6% year-on-year, as energy use plunged in the industrial and building sectors, although it increased in the transport sector.**

- Industrial energy use fell by 6.1% year-on-year, as it dropped rapidly in the petrochemical sector that accounts for a large share of the total industrial energy use amid an overall slowdown in manufacturing activity.
- Transport energy use went up by 1.0% year-on-year, despite the overall economic slowdown, partly because domestic fuel prices declined including gasoline and diesel amid a downward trend in global oil prices.

Figure 1.4 Growth rate of TFC & contribution by sectors



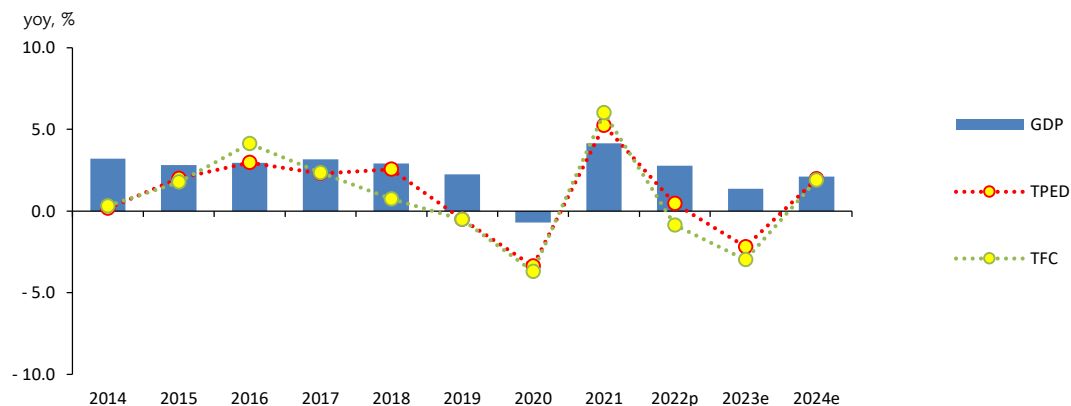
Note: Building sector includes residential, commercial, public-etc usage.

- In the building sector, energy use decreased by 4.3% year-on-year, as the number of heating degree days decreased, and the heating cost crisis emerged as a social issue following the city gas rate increase at the beginning of the year.

2. TPED & TFC Outlook

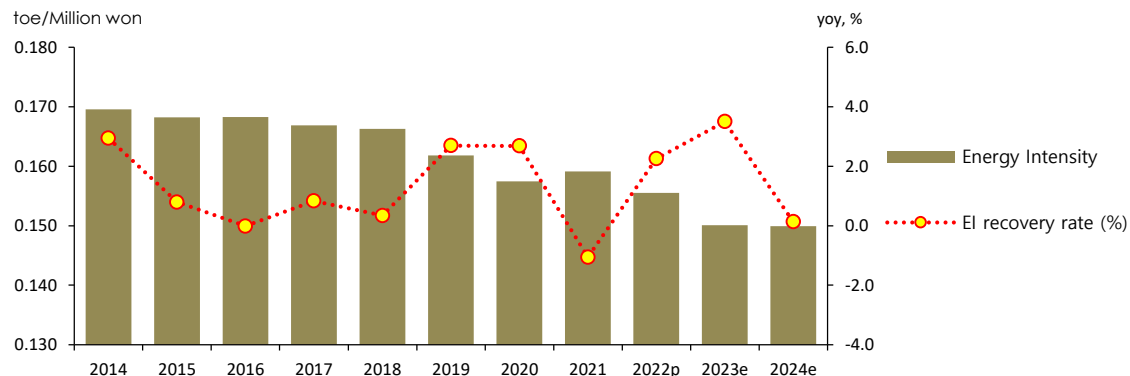
- **TPED is expected to drop by 2.2% in 2023, and then grow by 2.0% in 2024, reaching 305.4 Mtoe.**
 - While TPED is expected to drop in 2023, mostly in the industrial sector due to sluggish manufacturing activity, a rebound is expected in 2024, despite weak domestic demand, as production activity picks up amid growing exports.

Figure 2.1 Growth rate of GDP, TPED and TFC, trend and outlook



- In 2023, the energy intensity will rapidly improve (decline), despite the economic growth (1.4%), as energy consumption declines. In 2024, however, it is expected to improve at much slower pace, as the manufacturing sector that is highly energy intensive leads the economic recovery.

Figure 2.2 Energy intensity and EI recovery trends

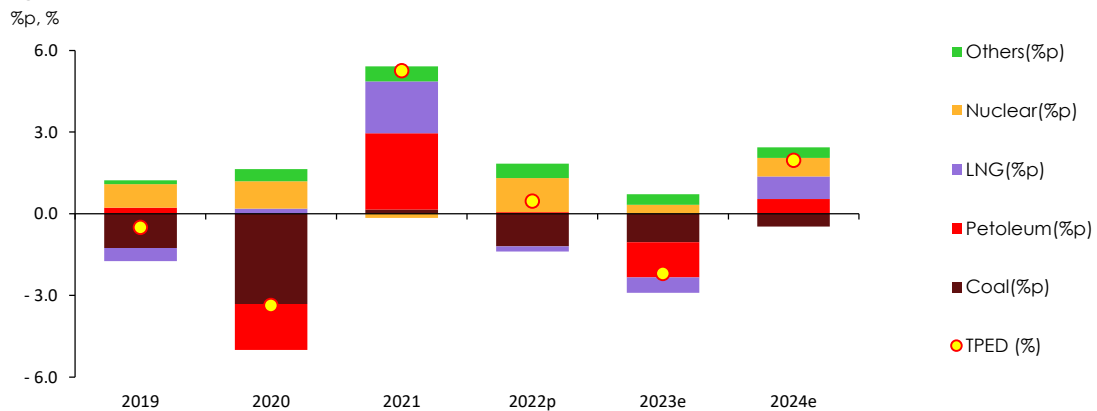


Note: Energy Intensity is calculated as the value of 'TPED/GDP', expressed in toe/million won, EI recovery rate multiplies EI increase rate by '-1'.

□ **In 2023, coal, petroleum, and gas are expected to lead the downward trend in energy use. In 2024, the use of all energy sources is forecast to increase except coal.**

- Petroleum demand is forecast to drop by 3.6% in 2023, especially for industrial feedstock use, while it is expected to grow by 1.7% in 2024, as overall manufacturing activity picks up, and the petrochemical industry recovers to some extent.
- Coal demand is forecast to drop by 4.8% in 2023, with the industrial and power generation sectors leading the downward trend. In 2024, it is expected to fall by 2.3%, although it continues to decline in the power generation sector, as industrial coal demand rebounds due to the base effect of the recent downward slide.
- Nuclear generation is expected to grow by 2.7% in 2023 and 5.4% in 2024, affected by the deployment of large-scale reactors.
- Natural gas demand is forecast to drop by 3.8% in 2023, as it declines in the power generation and end-use sectors all together, and then grow by 5.4% in 2024, with the demand bouncing back in each sector.

Figure 2.3 Growth rate of TPED & contributions by sources

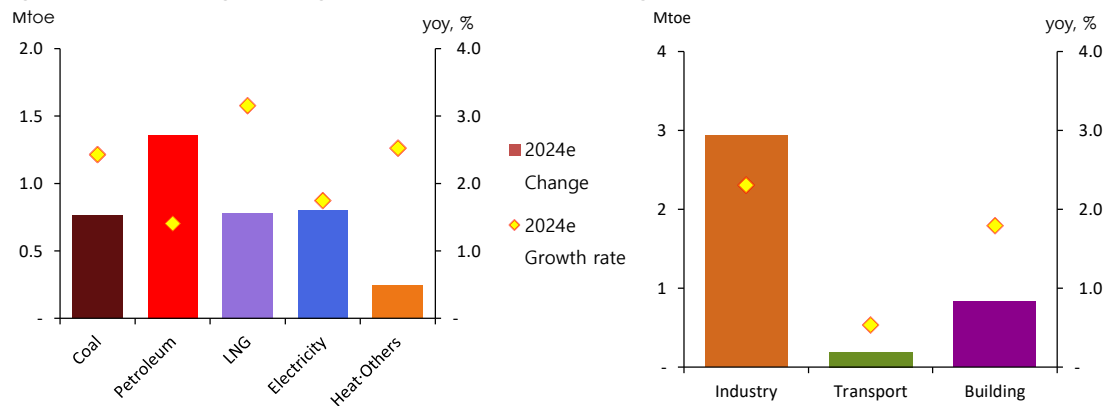


- Electricity demand in the end-use sectors is expected to be flat in 2023 compared to the previous year. In 2024, it is likely to grow by 1.7% due to a recovery in the manufacturing sector.

□ **Energy demand in the end-use sectors is forecast to decrease by 3.0% in 2023, and then increase by 1.9% in 2024.**

- In the industrial sector, energy demand is expected to decline by 3.4% in 2023 due to the slump in the petrochemical industry, which accounts for a large share of the total industrial energy use, while the demand is forecast to increase by 2.3% in 2024, owing to base effect and a recovery in production activity amid growing exports.

Figure 2.4 Change and growth rate of TFC by energy sources and end-use sectors



- In the transport sector, energy demand is forecast to decrease by 1.8% in 2023, driven by lower energy demand for cargo transport, but the demand growth of 0.5% is expected in 2024, as the economy recovers to some degree.
- In the building sector, energy demand is projected to drop by 2.6% in 2023 due to the decreased number of heating degree days and higher energy prices, while it is forecast to increase by 1.8% in 2024 partly due to base effect and the increased number of heating degree days.

3. Key Features and Implications

Outlook of petrochemical industry

- **Demand for petroleum products that are used as petrochemical feedstock decreased owing to the petrochemical industry's deepening slump, which started in 2H 2022, and weak production.**
 - Since 2H 2022, domestic production of petrochemical products declined, which was affected by the global economic slowdown and China's enhanced self-reliance in producing petrochemical products.

Table 3.1 Key petrochemical indicators

| | 2021 | 2022 | | | 2023p |
|---|----------|-----------|-----------|-----------|-----------|
| | | 1H | 2H | | 1H |
| Ethylene-Naphtha spread (\$/ton) | 374.1 | 270.8 | 178.6 | 224.7 | 208.5 |
| | (6.5) | (- 35.5) | (- 45.6) | (- 39.9) | (- 23.0) |
| Propylene-Naphtha spread (\$/ton) | 377.5 | 254.6 | 185.5 | 220.0 | 227.2 |
| | (- 9.8) | (- 45.2) | (- 36.2) | (- 41.7) | (- 10.7) |
| Basic petrochemicals production (1000 ton) | 34 434.5 | 17 120.4 | 15 733.7 | 32 854.1 | 15 069.1 |
| | (12.7) | (5.1) | (- 13.3) | (- 4.6) | (- 12.0) |
| Basic petrochemicals export (1000 ton) | 6 940.9 | 3 664.4 | 4 045.8 | 7 710.2 | 3 947.9 |
| | (6.6) | (15.3) | (7.5) | (11.1) | (7.7) |
| Basic petrochemicals domestic consumption (1000 ton) | 29 919.5 | 14 536.5 | 12 484.9 | 27 021.4 | 11 786.9 |
| | (11.9) | (- 0.2) | (- 18.7) | (- 9.7) | (- 18.9) |

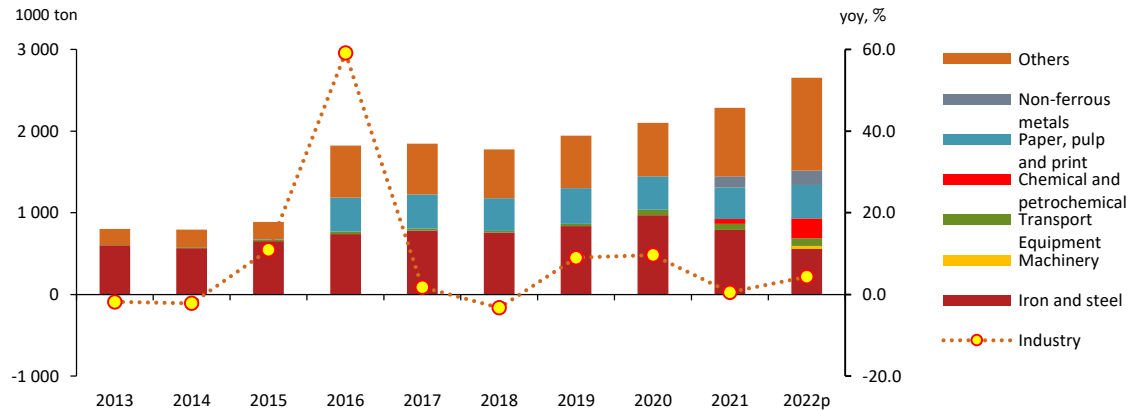
Note: The numbers in parentheses indicate the rate of change compared to the previous year

Source: Korea Petrochemical Industry Association

- **Although the recovery of the petrochemical industry has been delayed, the industry is widely expected to pick up by the second half of 2024.**
 - Until 1H 2023, the prevailing expectation was that the petrochemical industry would recover in the second half of the year. However, the recovery has been continuously delayed, as the oversupply issue of petrochemical products continued in the international market.

Industrial natural gas demand

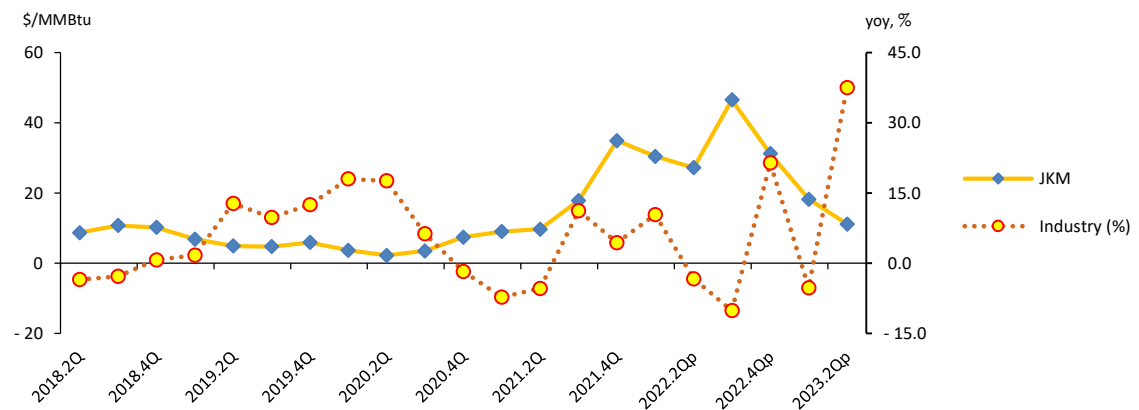
Figure 3.1 Natural gas consumption by industrial sectors & consumption growth trend



□ Industrial natural gas use that has been stagnant due to soaring global natural gas prices is expected to grow rapidly again during the outlook period.

- Industrial natural gas use had rapidly increased for the past few years, as growing number of sectors used more natural gas for captive power generation, which uses directly imported natural gas, and for combined heat and power generation in industrial sites.

Figure 3.2 Global natural gas prices & growth rates in industrial natural gas use

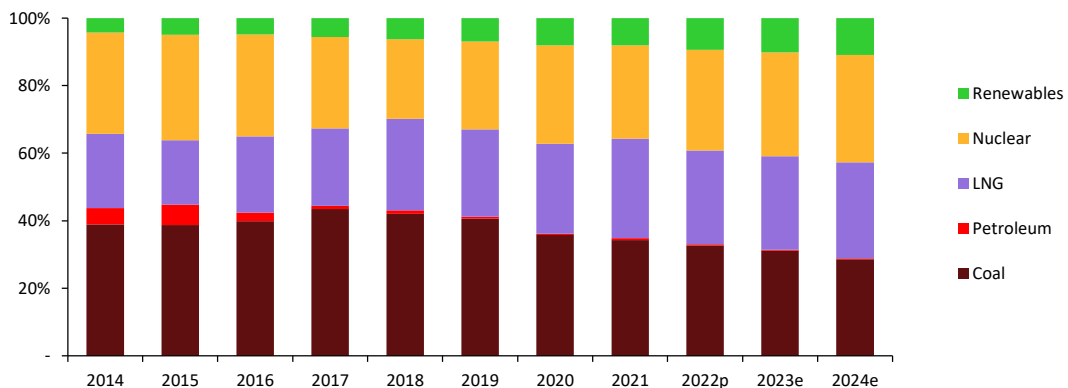


- Industrial natural gas demand is expected to grow fast during the outlook period. Still, global prices could possibly cause a large change in natural gas demand.

Changes in the energy mix

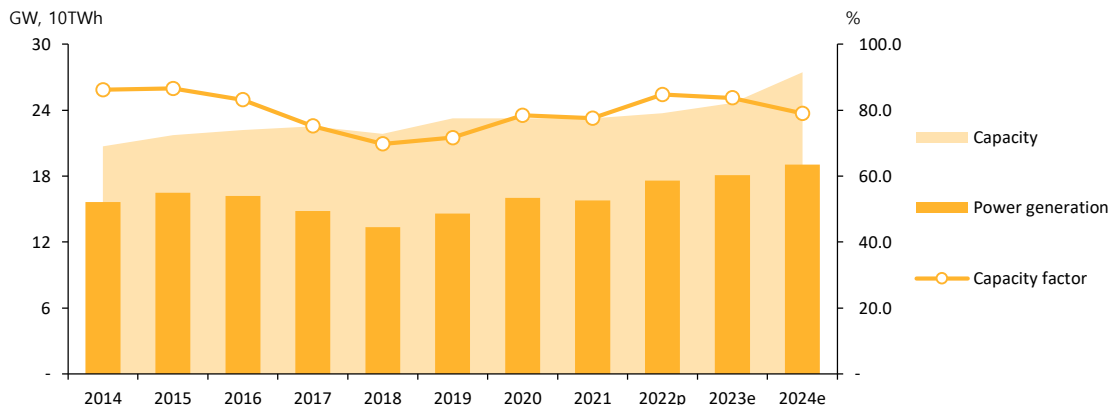
- In 2024, nuclear generation is expected to regain the dominant position in the energy mix, as nuclear generation's share surpasses that of coal-fired generation for the first time since 2007.
- The share of nuclear, renewable & other, and gas-fired generation is expected to increase, while that of coal-fired generation is expected to drop fast.

Figure 3.3 Changes in the energy mix by energy sources



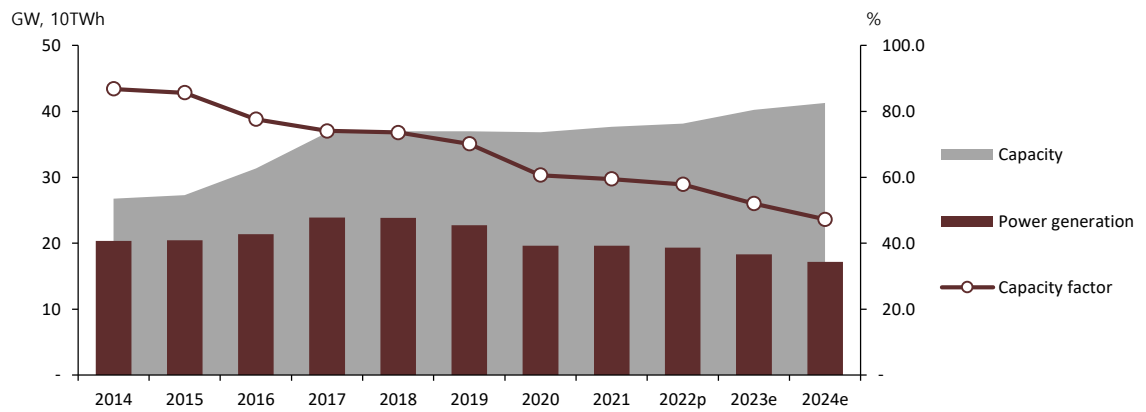
- Nuclear generation's share of the energy mix will rapidly increase during the outlook period, and the increased installed capacity will be the main contributing factor.

Figure 3.4 Nuclear installed capacity, capacity factor & power generation trends



- Previously, the drop in coal-fired generation's share was largely attributed to the government's fine dust and greenhouse gas emissions reduction policy. Since 2022, however, the transmission constraint issue is considered to have a larger impact.

Figure 3.5 Coal installed capacity, capacity factor & power generation trends



The Main Indicator and Energy Outlook Result

Main Economic and Energy Indicators

| | 2020 | 2021 | 2022p | | | 2023e | | | 2024e |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | | | 1H | 2H | | 1H | 2H | | |
| Economy and Population | | | | | | | | | |
| GDP (trillion won) | 1 839.5 | 1 915.8 | 960.9 | 1 007.9 | 1 968.8 | 969.5 | 1 026.0 | 1 995.5 | 2 037.3 |
| Industrial Production(2020=100) | 100.0 | 108.2 | 111.7 | 107.8 | 109.7 | 102.1 | 106.7 | 104.4 | 102.3 |
| Crude Oil Price (Dubai, USD/bbl) | 42.2 | 69.3 | 101.8 | 90.9 | 96.4 | 79.1 | 86.7 | 82.9 | 82.9 |
| Working Days | 275.5 | 273.5 | 133.5 | 139.0 | 272.5 | 136.5 | 137.0 | 273.5 | 272.5 |
| Population (million) | 51.8 | 51.7 | 51.6 | 51.6 | 51.6 | 51.6 | 51.6 | 51.6 | 51.5 |
| Average Temperature (°C) | 13.0 | 13.3 | 10.2 | 15.7 | 13.0 | 10.8 | 16.4 | 13.6 | 13.3 |
| Cooling Degree days | 85.2 | 101.3 | 18.5 | 123.4 | 141.9 | 2.6 | 131.0 | 133.6 | 99.6 |
| Heating Degree days | 2 448.0 | 2 404.7 | 1 577.8 | 989.3 | 2 567.1 | 1 458.0 | 926.2 | 2 384.2 | 2 433.2 |
| Energy Indicators | | | | | | | | | |
| Total Primary Energy Demand (Mtoe) | 289.7 | 304.9 | 154.3 | 152.0 | 306.2 | 148.1 | 151.4 | 299.5 | 305.4 |
| Energy Intensity (toe/million won) | 0.158 | 0.159 | 0.161 | 0.151 | 0.156 | 0.153 | 0.148 | 0.150 | 0.150 |
| TPED/capita (toe/capita) | 5.588 | 5.892 | 2.988 | 2.944 | 5.932 | 2.873 | 2.937 | 5.809 | 5.930 |
| Electricity Generation (TWh) | 548.9 | 572.4 | 289.6 | 300.9 | 590.5 | 284.6 | 303.4 | 588.0 | 598.4 |
| Electricity Generation/capita (MWh/capita) | 10.6 | 11.1 | 5.6 | 5.8 | 11.4 | 5.5 | 5.9 | 11.4 | 11.6 |
| Electricity Demand/capita (MWh/capita) | 9.6 | 10.1 | 5.2 | 5.2 | 10.4 | 5.1 | 5.3 | 10.4 | 10.6 |

Energy Demand

| | 2020 | 2021 | 2022p | | | 2023e | | | 2024e |
|------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | | | 1H | 2H | | 1H | 2H | | |
| Total Primary Energy Demand | | | | | | | | | |
| Coal (Mton) | 122.1 | 122.8 | 57.1 | 59.9 | 117.0 | 53.5 | 57.8 | 111.3 | 108.8 |
| Oil (Mbbl) | 775.7 | 830.7 | 407.2 | 407.3 | 814.5 | 386.1 | 399.0 | 785.1 | 798.2 |
| Gas (Bm³) | 41.5 | 45.8 | 24.3 | 21.3 | 45.6 | 22.6 | 21.2 | 43.8 | 46.2 |
| Nuclear (TWh) | 160.2 | 158.0 | 86.7 | 89.4 | 176.1 | 86.7 | 94.1 | 180.8 | 190.5 |
| Other Renewables (Mtoe) | 13.5 | 15.0 | 8.3 | 8.3 | 16.6 | 8.6 | 9.2 | 17.8 | 19.0 |
| Total (Mtoe) | 289.7 | 304.9 | 154.3 | 152.0 | 306.2 | 148.1 | 151.4 | 299.5 | 305.4 |
| Coal | 74.0 | 74.5 | 34.6 | 36.2 | 70.8 | 32.5 | 35.1 | 67.6 | 66.2 |
| Oil | 113.4 | 121.5 | 60.6 | 61.1 | 121.7 | 58.2 | 59.5 | 117.7 | 119.3 |
| Gas | 54.6 | 60.1 | 32.3 | 27.3 | 59.5 | 30.2 | 27.6 | 57.8 | 60.3 |
| Nuclear | 34.1 | 33.7 | 18.5 | 19.0 | 37.5 | 18.5 | 20.1 | 38.5 | 40.6 |
| Other Renewables | 13.5 | 15.0 | 8.3 | 8.3 | 16.6 | 8.6 | 9.2 | 17.8 | 19.0 |
| Total Final Consumption | | | | | | | | | |
| Coal (Mton) | 51.3 | 53.8 | 25.4 | 24.4 | 49.9 | 24.3 | 25.0 | 49.3 | 50.5 |
| Oil (Mbbl) | 752.3 | 809.1 | 399.7 | 399.2 | 798.9 | 376.5 | 390.3 | 766.8 | 778.9 |
| Gas (Bm³) | 22.0 | 22.7 | 13.8 | 9.6 | 23.4 | 12.6 | 9.0 | 21.6 | 21.9 |
| Electricity (TWh) | 496.9 | 520.3 | 265.9 | 269.4 | 535.3 | 264.3 | 271.5 | 535.8 | 545.1 |
| Heat (Mtoe) | 2.6 | 2.7 | 1.7 | 1.2 | 2.9 | 1.5 | 1.1 | 2.6 | 2.7 |
| Other Renewables (Mtoe) | 6.7 | 7.1 | 3.6 | 3.6 | 7.2 | 3.4 | 3.6 | 7.0 | 7.2 |
| Total (Mtoe) | 205.0 | 217.3 | 110.1 | 105.4 | 215.5 | 105.0 | 104.0 | 209.0 | 213.0 |
| Coal | 32.4 | 33.9 | 16.2 | 15.6 | 31.7 | 15.5 | 16.0 | 31.5 | 32.2 |
| Oil | 95.9 | 103.3 | 50.7 | 50.9 | 101.6 | 47.8 | 49.2 | 97.1 | 98.4 |
| Gas | 24.8 | 25.5 | 15.1 | 11.0 | 26.1 | 14.0 | 10.7 | 24.8 | 25.5 |
| Electricity | 42.7 | 44.7 | 22.9 | 23.2 | 46.0 | 22.7 | 23.3 | 46.1 | 46.9 |
| Heat | 2.6 | 2.7 | 1.7 | 1.2 | 2.9 | 1.5 | 1.1 | 2.6 | 2.7 |
| Other Renewables | 6.7 | 7.1 | 3.6 | 3.6 | 7.2 | 3.4 | 3.6 | 7.0 | 7.2 |
| Industry | 125.3 | 134.6 | 67.1 | 64.6 | 131.7 | 63.0 | 64.2 | 127.2 | 130.1 |
| Transport | 34.7 | 36.6 | 17.2 | 19.1 | 36.3 | 17.4 | 18.2 | 35.6 | 35.8 |
| Buildings | 45.0 | 46.1 | 25.7 | 21.7 | 47.4 | 24.6 | 21.6 | 46.2 | 47.0 |

Energy Demand

(yoy, %)

| | 2020 | 2021 | 2022p | | | 2023e | | | 2024e |
|------------------------------------|--------------|------------|------------|--------------|--------------|--------------|--------------|--------------|------------|
| | | | 1H | 2H | | 1H | 2H | | |
| Total Primary Energy Demand | | | | | | | | | |
| Coal (Mton) | - 12.0 | 0.6 | - 1.2 | - 7.9 | - 4.7 | - 6.3 | - 3.4 | - 4.8 | - 2.3 |
| Oil (Mbbl) | - 4.0 | 7.1 | 0.7 | - 4.4 | - 1.9 | - 5.2 | - 2.0 | - 3.6 | 1.7 |
| Gas (Bm³) | 1.2 | 10.4 | 0.8 | - 2.0 | - 0.5 | - 6.8 | - 0.5 | - 3.8 | 5.4 |
| Nuclear (TWh) | 9.8 | - 1.4 | 12.3 | 10.6 | 11.4 | - 0.0 | 5.3 | 2.7 | 5.4 |
| Other Renewables (Mtoe) | 10.8 | 11.7 | 8.9 | 12.8 | 10.8 | 3.8 | 10.6 | 7.2 | 6.7 |
| Total (Mtoe) | - 3.4 | 5.2 | 2.5 | - 1.5 | 0.5 | - 4.0 | - 0.4 | - 2.2 | 2.0 |
| Coal | - 11.8 | 0.6 | - 1.5 | - 8.0 | - 4.9 | - 6.1 | - 3.1 | - 4.6 | - 2.1 |
| Oil | - 4.3 | 7.2 | 2.4 | - 2.0 | 0.1 | - 3.8 | - 2.7 | - 3.3 | 1.4 |
| Gas | 1.0 | 10.1 | 0.4 | - 2.5 | - 1.0 | - 6.3 | 1.2 | - 2.9 | 4.3 |
| Nuclear | 9.8 | - 1.4 | 12.3 | 10.6 | 11.4 | - 0.0 | 5.3 | 2.7 | 5.4 |
| Other Renewables | 10.8 | 11.7 | 8.9 | 12.8 | 10.8 | 3.8 | 10.6 | 7.2 | 6.7 |
| Total Final Consumption | | | | | | | | | |
| Coal (Mton) | - 4.7 | 4.9 | - 3.3 | - 11.2 | - 7.4 | - 4.5 | 2.3 | - 1.2 | 2.5 |
| Oil (Mbbl) | - 5.5 | 7.6 | 1.4 | - 3.8 | - 1.3 | - 5.8 | - 2.2 | - 4.0 | 1.6 |
| Gas (Bm³) | - 2.0 | 3.3 | 4.6 | 0.7 | 2.9 | - 8.6 | - 6.4 | - 7.7 | 1.6 |
| Electricity (TWh) | - 2.1 | 4.7 | 4.1 | 1.8 | 2.9 | - 0.6 | 0.8 | 0.1 | 1.7 |
| Heat (Mtoe) | 4.9 | 4.2 | 6.4 | 6.3 | 6.4 | - 10.6 | - 4.1 | - 7.9 | 3.9 |
| Other Renewables (Mtoe) | 2.5 | 7.1 | - 2.0 | 2.4 | 0.2 | - 3.4 | 0.1 | - 1.7 | 2.0 |
| Total (Mtoe) | - 3.7 | 6.0 | 1.3 | - 3.0 | - 0.9 | - 4.6 | - 1.3 | - 3.0 | 1.9 |
| Coal | - 4.8 | 4.7 | - 2.7 | - 10.0 | - 6.4 | - 4.2 | 2.6 | - 0.8 | 2.4 |
| Oil | - 5.3 | 7.8 | 0.8 | - 4.0 | - 1.7 | - 5.7 | - 3.3 | - 4.5 | 1.4 |
| Gas | - 1.1 | 3.1 | 3.6 | 0.3 | 2.2 | - 7.0 | - 2.2 | - 5.0 | 3.2 |
| Electricity | - 2.1 | 4.7 | 4.1 | 1.8 | 2.9 | - 0.6 | 0.8 | 0.1 | 1.7 |
| Heat | 4.9 | 4.2 | 6.4 | 6.3 | 6.4 | - 10.6 | - 4.1 | - 7.9 | 3.9 |
| Other Renewables | 2.5 | 7.1 | - 2.0 | 2.4 | 0.2 | - 3.4 | 0.1 | - 1.7 | 2.0 |
| Industry | - 3.9 | 7.5 | 2.1 | - 6.2 | - 2.2 | - 6.1 | - 0.6 | - 3.4 | 2.3 |
| Transport | - 6.6 | 5.4 | - 4.1 | 2.1 | - 0.9 | 1.0 | - 4.3 | - 1.8 | 0.5 |
| Buildings | - 0.8 | 2.4 | 3.0 | 2.9 | 3.0 | - 4.3 | - 0.6 | - 2.6 | 1.8 |

Energy Demand by Sector

(Mtoe)

| | 2020 | 2021 | 2022p | | | 2023e | | | 2024e |
|-------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | | | 1H | 2H | | 1H | 2H | | |
| Industry | 125.3 | 134.6 | 67.1 | 64.6 | 131.7 | 63.0 | 64.2 | 127.2 | 130.1 |
| Coal | 32.2 | 33.7 | 16.1 | 15.4 | 31.5 | 15.4 | 15.9 | 31.3 | 32.1 |
| Oil | 57.7 | 63.4 | 31.7 | 30.3 | 62.0 | 28.8 | 29.5 | 58.3 | 59.5 |
| Gas | 9.5 | 10.0 | 5.2 | 4.8 | 10.0 | 5.0 | 4.9 | 9.9 | 10.3 |
| Electricity | 21.9 | 23.2 | 11.8 | 11.7 | 23.6 | 11.6 | 11.6 | 23.2 | 23.7 |
| Heat | - | - | - | - | - | - | - | - | - |
| Other Renewables | 4.0 | 4.4 | 2.3 | 2.3 | 4.6 | 2.2 | 2.3 | 4.5 | 4.6 |
| Transport | 34.7 | 36.6 | 17.2 | 19.1 | 36.3 | 17.4 | 18.2 | 35.6 | 35.8 |
| Coal | - | - | - | - | - | - | - | - | - |
| Oil | 32.7 | 34.6 | 16.2 | 18.0 | 34.2 | 16.4 | 17.2 | 33.6 | 33.8 |
| Gas | 1.1 | 1.1 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 1.0 | 0.9 |
| Electricity | 0.3 | 0.3 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 | 0.4 | 0.4 |
| Heat | - | - | - | - | - | - | - | - | - |
| Other Renewables | 0.7 | 0.7 | 0.3 | 0.4 | 0.7 | 0.3 | 0.3 | 0.7 | 0.7 |
| Buildings* | 45.0 | 46.1 | 25.7 | 21.7 | 47.4 | 24.6 | 21.6 | 46.2 | 47.0 |
| Coal | 0.2 | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 |
| Oil | 5.5 | 5.4 | 2.8 | 2.5 | 5.3 | 2.6 | 2.6 | 5.2 | 5.1 |
| Gas | 14.2 | 14.5 | 9.4 | 5.6 | 15.0 | 8.6 | 5.3 | 13.9 | 14.3 |
| Electricity | 20.5 | 21.2 | 10.9 | 11.3 | 22.1 | 11.0 | 11.5 | 22.5 | 22.8 |
| Heat | 2.6 | 2.7 | 1.7 | 1.2 | 2.9 | 1.5 | 1.1 | 2.6 | 2.7 |
| Other Renewables | 1.9 | 2.0 | 0.9 | 1.0 | 1.9 | 0.9 | 1.0 | 1.8 | 1.9 |
| Transformation** | 296.3 | 302.2 | 157.6 | 160.8 | 318.4 | 154.4 | 157.4 | 311.8 | 317.4 |
| Coal | 41.6 | 40.6 | 18.4 | 20.6 | 39.1 | 17.0 | 19.1 | 36.1 | 33.9 |
| Oil | 164.1 | 164.8 | 86.4 | 90.5 | 177.0 | 86.6 | 87.6 | 174.1 | 176.7 |
| Gas | 49.7 | 55.3 | 29.6 | 25.8 | 55.4 | 27.2 | 25.1 | 52.3 | 54.4 |
| Nuclear | 34.1 | 33.7 | 18.5 | 19.0 | 37.5 | 18.5 | 20.1 | 38.5 | 40.6 |
| Other Renewables | 6.8 | 7.9 | 4.7 | 4.8 | 9.5 | 5.2 | 5.6 | 10.8 | 11.9 |

* include residential, commercial, public-etc usage. ** Transformation is the sum of inputs from power generation, district heat, gas manufacture, and oil refinery processes.

Coal

(Mton)

| | 2020 | 2021 | 2022p | | | 2023e | | | 2024e |
|--------------------------------|--------------|--------------|-------------|-------------|--------------|-------------|-------------|--------------|--------------|
| | | | 1H | 2H | | 1H | 2H | | |
| Total Coal Demand | 122.1 | 122.8 | 57.1 | 59.9 | 117.0 | 53.5 | 57.8 | 111.3 | 108.8 |
| Transformation | 70.7 | 68.9 | 31.7 | 35.4 | 67.1 | 29.2 | 32.8 | 62.1 | 58.3 |
| Power Generation | 70.7 | 68.9 | 31.7 | 35.4 | 67.1 | 29.2 | 32.8 | 62.1 | 58.3 |
| Heat | - | - | - | - | - | - | - | - | - |
| Gas Manufacture | - | - | - | - | - | - | - | - | - |
| OilRefinery | - | - | - | - | - | - | - | - | - |
| Total Final Consumption | 51.3 | 53.8 | 25.4 | 24.4 | 49.9 | 24.3 | 25.0 | 49.3 | 50.5 |
| Industry | 50.8 | 53.4 | 25.3 | 24.1 | 49.4 | 24.1 | 24.7 | 48.9 | 50.1 |
| Transport | - | - | - | - | - | - | - | - | - |
| Buildings | 0.5 | 0.4 | 0.1 | 0.3 | 0.4 | 0.1 | 0.2 | 0.4 | 0.4 |
| Consumption by products | | | | | | | | | |
| Anthracite | 7.2 | 7.3 | 3.3 | 2.9 | 6.2 | 2.7 | 2.8 | 5.5 | 5.6 |
| Bituminous | 114.9 | 115.4 | 53.8 | 57.0 | 110.8 | 50.8 | 55.0 | 105.8 | 103.1 |
| Iron making | 32.8 | 34.1 | 15.8 | 15.6 | 31.4 | 15.5 | 16.5 | 32.0 | 32.7 |
| Cement | 3.4 | 3.6 | 1.7 | 1.9 | 3.7 | 1.8 | 1.8 | 3.6 | 3.6 |
| Power Generation | 69.8 | 68.0 | 31.4 | 34.8 | 66.2 | 28.8 | 32.3 | 61.1 | 57.5 |

Oil

(Mbbbl)

| | | | 2022p | | | 2023e | | | 2024e |
|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | 1H | 2H | | 1H | 2H | | |
| Total Oil Demand | 775.7 | 830.7 | 407.2 | 407.3 | 814.5 | 386.1 | 399.0 | 785.1 | 798.2 |
| Crude Oil & Refinery Feedstocks | 1 089.3 | 1 089.1 | 564.7 | 591.2 | 1 155.9 | 565.8 | 571.9 | 1 137.7 | 1 154.3 |
| Transformation | 1 089.3 | 1 089.1 | 564.5 | 590.9 | 1 155.4 | 565.5 | 571.5 | 1 137.1 | 1 153.7 |
| Oil Refinery | 1 089.3 | 1 089.1 | 564.5 | 590.9 | 1 155.4 | 565.5 | 571.5 | 1 137.1 | 1 153.7 |
| Petroleum products | - 313.6 | - 258.4 | - 157.5 | - 183.9 | - 341.4 | - 179.7 | - 172.9 | - 352.6 | - 356.1 |
| Transformation | -1 107.2 | -1 105.8 | - 576.4 | - 602.9 | -1 179.3 | - 578.5 | - 584.2 | -1 162.7 | -1 178.2 |
| Power Generation | 3.8 | 4.2 | 2.8 | 2.2 | 5.0 | 1.7 | 2.0 | 3.7 | 3.7 |
| Heat | 1.6 | 1.8 | 1.0 | 0.6 | 1.7 | 0.8 | 0.8 | 1.6 | 2.0 |
| Gas Manufacture | 0.3 | 1.7 | 2.0 | 1.4 | 3.4 | 2.0 | 1.2 | 3.2 | 3.3 |
| Oil Refinery* | -1 112.9 | -1 113.4 | - 582.3 | - 607.1 | -1 189.4 | - 583.0 | - 588.2 | -1 171.2 | -1 187.2 |
| Total Final Consumption | 752.3 | 809.1 | 399.7 | 399.2 | 798.9 | 376.5 | 390.3 | 766.8 | 778.9 |
| Industry | 462.2 | 505.8 | 254.5 | 242.5 | 496.9 | 231.4 | 239.5 | 470.9 | 482.9 |
| Transport | 245.4 | 259.0 | 122.2 | 135.8 | 258.0 | 123.4 | 129.5 | 252.9 | 253.8 |
| Buildings | 44.7 | 44.2 | 23.0 | 20.9 | 44.0 | 21.8 | 21.2 | 43.0 | 42.2 |
| Consumption by products | | | | | | | | | |
| Gasoline | 81.0 | 84.9 | 40.3 | 48.1 | 88.4 | 43.0 | 47.4 | 90.4 | 91.2 |
| Diesel | 155.0 | 156.3 | 73.3 | 78.4 | 151.8 | 73.4 | 75.7 | 149.0 | 150.1 |
| Kerosene | 16.8 | 16.5 | 8.1 | 7.3 | 15.4 | 6.8 | 6.8 | 13.6 | 13.1 |
| B-C | 6.8 | 6.4 | 3.6 | 3.1 | 6.7 | 3.7 | 3.3 | 7.0 | 6.8 |
| Jet Oil | 7.8 | 15.5 | 7.6 | 8.0 | 15.6 | 6.2 | 5.6 | 11.9 | 12.1 |
| LPG | 109.1 | 109.2 | 60.4 | 54.9 | 115.3 | 52.2 | 61.3 | 113.4 | 115.7 |
| Petrochem feedstock | 48.8 | 47.3 | 31.3 | 25.4 | 56.6 | 22.7 | 31.2 | 53.9 | 57.4 |
| Naphtha | 333.9 | 369.9 | 181.1 | 174.9 | 356.0 | 169.2 | 167.1 | 336.3 | 344.9 |
| Refinery gas | 8.5 | 9.0 | 4.4 | 4.8 | 9.3 | 2.7 | 3.1 | 5.8 | 7.4 |
| Other Non-Energy | 33.3 | 41.3 | 20.8 | 19.7 | 40.5 | 19.4 | 20.0 | 39.4 | 37.5 |

* Oil refinery is a process of manufacturing petroleum products by refining crude oil, and a negative (-) value means the production of petroleum products.

Gas

| | 2020 | 2021 | 2022p | | | 2023e | | | 2024e |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | | | 1H | 2H | | 1H | 2H | | |
| Natural Gas Demand (Mton) | 41.5 | 45.8 | 24.3 | 21.3 | 45.6 | 22.6 | 21.2 | 43.8 | 46.2 |
| Transformation | 38.0 | 42.4 | 22.6 | 19.7 | 42.4 | 20.8 | 19.2 | 40.0 | 41.6 |
| Power Generation | 20.0 | 23.2 | 11.5 | 11.2 | 22.7 | 10.9 | 11.6 | 22.5 | 23.5 |
| Heat | - | - | - | - | - | - | - | - | - |
| Gas Manufacture | 18.0 | 19.1 | 11.1 | 8.5 | 19.6 | 9.9 | 7.6 | 17.5 | 18.1 |
| OilRefinery | - | - | - | - | - | - | - | - | - |
| Total Final Consumption | 1.6 | 1.6 | 0.8 | 0.9 | 1.7 | 0.9 | 1.2 | 2.1 | 2.4 |
| Industry | 1.6 | 1.6 | 0.8 | 0.9 | 1.7 | 0.9 | 1.2 | 2.1 | 2.4 |
| City Gas Demand (Bm³) | 22.0 | 22.7 | 13.8 | 9.6 | 23.4 | 12.6 | 9.0 | 21.6 | 21.9 |
| Transformation | - 22.1 | - 23.3 | - 13.7 | - 10.6 | - 24.3 | - 12.2 | - 9.3 | - 21.6 | - 22.3 |
| Power Generation | 0.4 | 0.3 | 0.2 | 0.1 | 0.3 | 0.1 | 0.1 | 0.2 | 0.2 |
| Heat | 0.2 | 0.3 | 0.2 | 0.2 | 0.4 | 0.2 | 0.2 | 0.3 | 0.3 |
| Gas Manufacture | - 22.9 | - 24.4 | - 14.4 | - 11.1 | - 25.5 | - 12.9 | - 9.9 | - 22.8 | - 23.7 |
| OilRefinery | - | - | - | - | - | - | - | - | - |
| Total Final Consumption | 22.0 | 22.7 | 13.8 | 9.6 | 23.4 | 12.6 | 9.0 | 21.6 | 21.9 |
| Industry | 7.1 | 7.6 | 4.1 | 3.6 | 7.6 | 3.7 | 3.3 | 7.0 | 7.0 |
| Transport | 1.1 | 1.0 | 0.5 | 0.5 | 1.0 | 0.5 | 0.5 | 1.0 | 0.9 |
| Buildings | 13.8 | 14.1 | 9.2 | 5.5 | 14.7 | 8.4 | 5.2 | 13.6 | 14.0 |

* Gas manufacture is the process of evaporating natural gas and controlling the amount of heat to supply city gas, and a negative (-) value means the production of city gas.

Electricity

| | 2020 | 2021 | 2022p | | | 2023e | | | 2024e |
|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | | | 1H | 2H | | 1H | 2H | | |
| Net Electricity Demand | 548.9 | 572.4 | 289.7 | 301.0 | 590.7 | 284.7 | 303.4 | 588.1 | 598.4 |
| Own use and Losses | 52.0 | 52.1 | 23.8 | 31.5 | 55.3 | 20.4 | 31.9 | 52.3 | 53.3 |
| Total Final Consumption | 496.9 | 520.3 | 265.9 | 269.4 | 535.3 | 264.3 | 271.5 | 535.8 | 545.1 |
| Industry | 254.7 | 269.6 | 137.8 | 136.3 | 274.1 | 134.7 | 135.4 | 270.2 | 275.0 |
| Transport | 3.3 | 3.7 | 1.9 | 2.1 | 4.0 | 2.2 | 2.3 | 4.4 | 4.7 |
| Buildings | 238.8 | 247.1 | 126.2 | 131.0 | 257.2 | 127.4 | 133.8 | 261.2 | 265.4 |
| Installed Electrical Capacity (GW)* | 124.5 | 129.3 | 129.5 | 133.5 | 133.5 | 136.3 | 140.9 | 140.9 | 149.6 |
| Coal | 36.9 | 37.3 | 37.1 | 38.1 | 38.1 | 39.2 | 40.3 | 40.3 | 41.3 |
| Oil | 2.2 | 2.2 | 1.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| Gas | 41.2 | 41.2 | 41.2 | 41.2 | 41.2 | 41.7 | 43.2 | 43.2 | 45.4 |
| Nuclear | 23.3 | 23.3 | 23.3 | 24.7 | 24.7 | 24.7 | 24.7 | 24.7 | 27.5 |
| Other Renewables | 21.0 | 25.4 | 27.0 | 28.6 | 28.6 | 29.9 | 31.9 | 31.9 | 34.5 |
| Electricity Generation of Power Plants* | 548.9 | 572.4 | 289.7 | 301.0 | 590.7 | 284.7 | 303.4 | 588.1 | 598.4 |
| Coal | 196.3 | 196.2 | 90.7 | 102.6 | 193.2 | 88.4 | 94.8 | 183.3 | 171.3 |
| Oil | 2.3 | 3.5 | 1.2 | 0.8 | 2.0 | 0.9 | 0.7 | 1.6 | 1.6 |
| Gas | 145.9 | 168.4 | 83.0 | 80.6 | 163.6 | 79.3 | 83.3 | 162.6 | 170.0 |
| Nuclear | 160.2 | 158.0 | 86.7 | 89.4 | 176.1 | 86.7 | 94.1 | 180.8 | 190.5 |
| Other Renewables | 44.2 | 46.3 | 28.2 | 27.7 | 55.9 | 29.4 | 30.4 | 59.8 | 65.0 |
| Fuel Consumption of Power Plants (Mtoe)* | 110.4 | 114.5 | 57.8 | 60.1 | 117.9 | 55.7 | 60.9 | 116.6 | 118.9 |
| Coal | 41.6 | 40.6 | 18.4 | 20.6 | 39.1 | 17.0 | 19.1 | 36.1 | 33.9 |
| Oil | 0.6 | 0.6 | 0.4 | 0.3 | 0.6 | 0.2 | 0.3 | 0.5 | 0.5 |
| Gas | 26.1 | 30.4 | 15.1 | 14.6 | 29.7 | 14.3 | 15.1 | 29.4 | 30.8 |
| Nuclear | 34.1 | 33.7 | 18.5 | 19.0 | 37.5 | 18.5 | 20.1 | 38.5 | 40.6 |
| Other Renewables | 8.0 | 9.3 | 5.5 | 5.5 | 11.0 | 5.8 | 6.3 | 12.1 | 13.1 |

* District Heat is classified by fuel type since 2014

Heat and Other Renewables

(Mtoe)

| | 2020 | 2021 | 2022p | | | 2023e | | | 2024e |
|--------------------------------|-------------|-------------|------------|------------|-------------|------------|------------|-------------|-------------|
| | | | 1H | 2H | | 1H | 2H | | |
| Net Heat Demand | 3.1 | 2.7 | 1.9 | 1.3 | 3.2 | 1.6 | 1.3 | 2.9 | 3.1 |
| Own use and Losses | 0.6 | 0.1 | 0.2 | 0.2 | 0.4 | 0.2 | 0.2 | 0.3 | 0.3 |
| Total Final Consumption | 2.6 | 2.7 | 1.7 | 1.2 | 2.9 | 1.5 | 1.1 | 2.6 | 2.7 |
| Industry | - | - | - | - | - | - | - | - | - |
| Transport | - | - | - | - | - | - | - | - | - |
| Buildings | 2.6 | 2.7 | 1.7 | 1.2 | 2.9 | 1.5 | 1.1 | 2.6 | 2.7 |
| Other Renewables | 13.5 | 15.0 | 8.3 | 8.3 | 16.6 | 8.6 | 9.2 | 17.8 | 19.0 |
| Transformation | 6.8 | 7.9 | 4.7 | 4.8 | 9.5 | 5.2 | 5.6 | 10.8 | 11.9 |
| Total Final Consumption | 6.7 | 7.1 | 3.6 | 3.6 | 7.2 | 3.4 | 3.6 | 7.0 | 7.2 |
| Industry | 4.0 | 4.4 | 2.3 | 2.3 | 4.6 | 2.2 | 2.3 | 4.5 | 4.6 |
| Transport | 0.7 | 0.7 | 0.3 | 0.4 | 0.7 | 0.3 | 0.3 | 0.7 | 0.7 |
| Buildings | 1.9 | 2.0 | 0.9 | 1.0 | 1.9 | 0.9 | 1.0 | 1.8 | 1.9 |

Note: Heat is mostly produced through combined heat and power (CHP) generation, and CHP is included in the power generation

