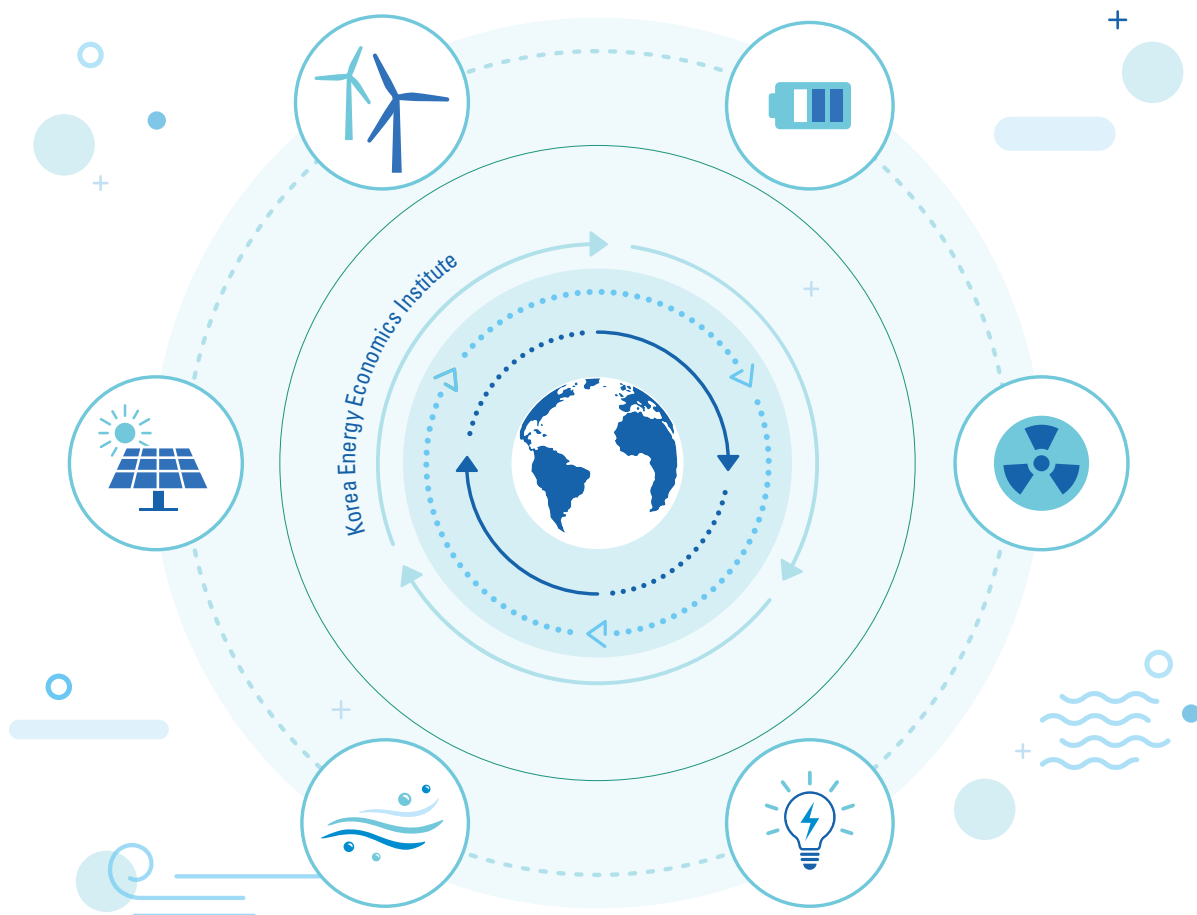


KEEi Korea Mid-term Energy Demand Outlook

(2022-2027)

2023



KEEI Mid-term Energy Demand Outlook (2022-2027) takes a closer look at the global energy market and supply and demand trends in domestic energy and examines the outlook for mid-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 Department of Energy Outlook Research of the Center for Energy Information and Statistics in cooperation with the Department of Energy Supply Statistics Research of KEEI and other related research divisions.

Byungkuk Kang (Electricity, Heat and Renewables, Transformation) wrote the report with the participation and support of Cherl-Hyun Kim (Economics, Coal, Gas), Seonggyun Kim (Oil). In addition, Donghwan Oh and Jeonghyeon Byeon assisted with the research.

If you have any further inquiries, please send an email to EnergyOutlook@keei.re.kr or call +82-52-714-2241.

1. Total Primary Energy Demand and Total Final Consumption

□ **Total Primary Energy Demand (TPED) increased by 0.7% on annual average between 2017 and 2022, reaching 304.5 Mtoe.**

- In recent years, TPED fluctuated in a wider range, falling sharply and then bouncing back, which was affected by stagnant production activities during the COVID-19 pandemic and the following recovery.

Figure 1.1 Trend in TPED & GDP growth rates and Manufacturing Production Index

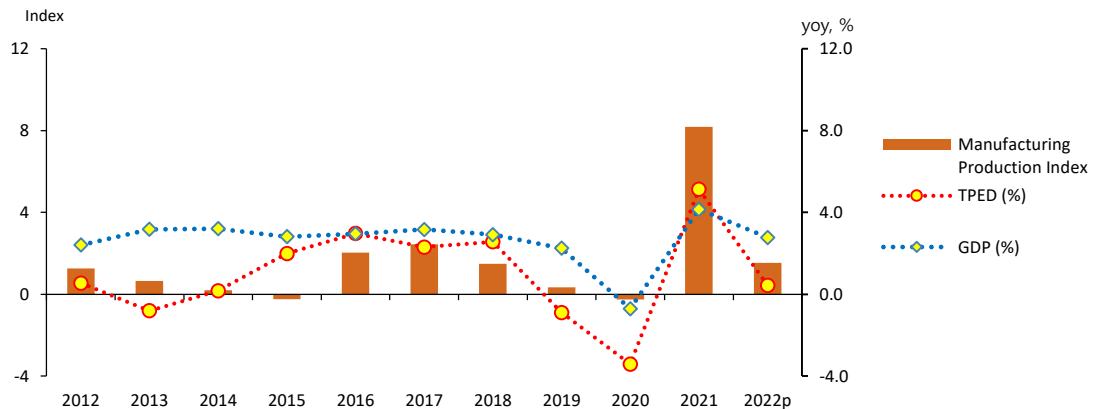
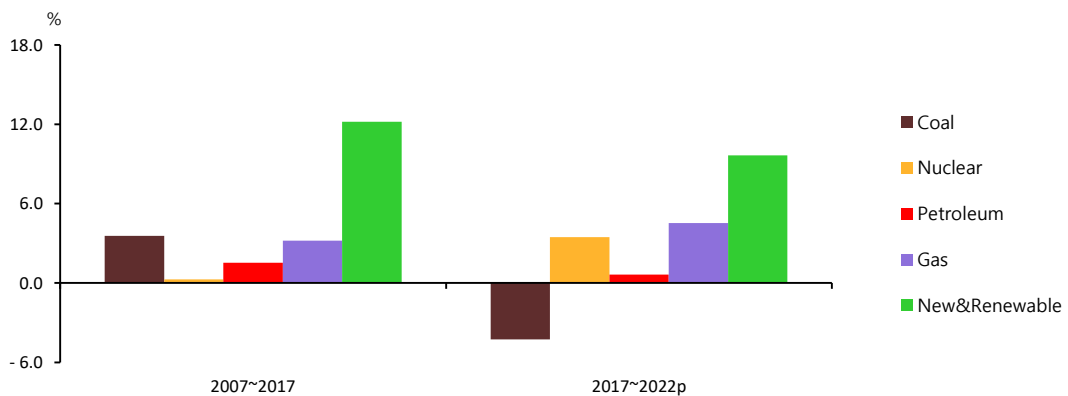


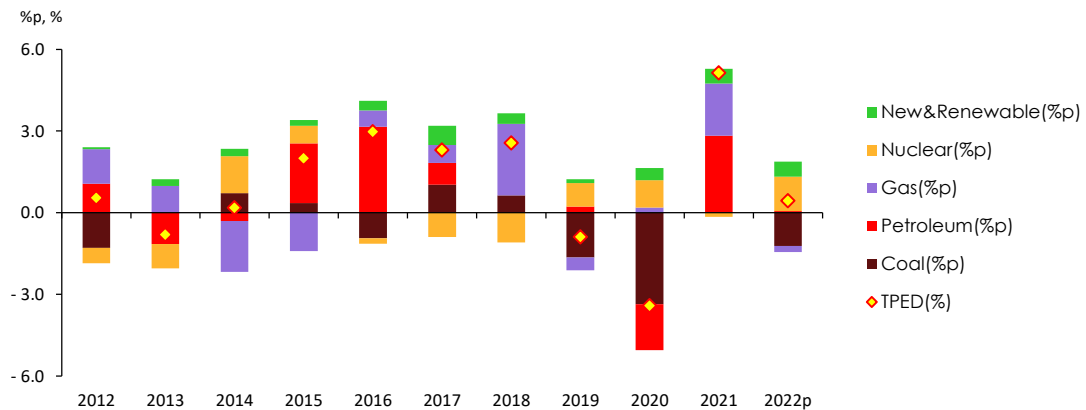
Figure 1.2 Annual growth rates by energy source in 2007-2017 and 2017- 2022



□ **During the recent five-year period, the use of nuclear energy, gas and renewable energy grew fast, while coal use decreased, and petroleum use remained stagnant.**

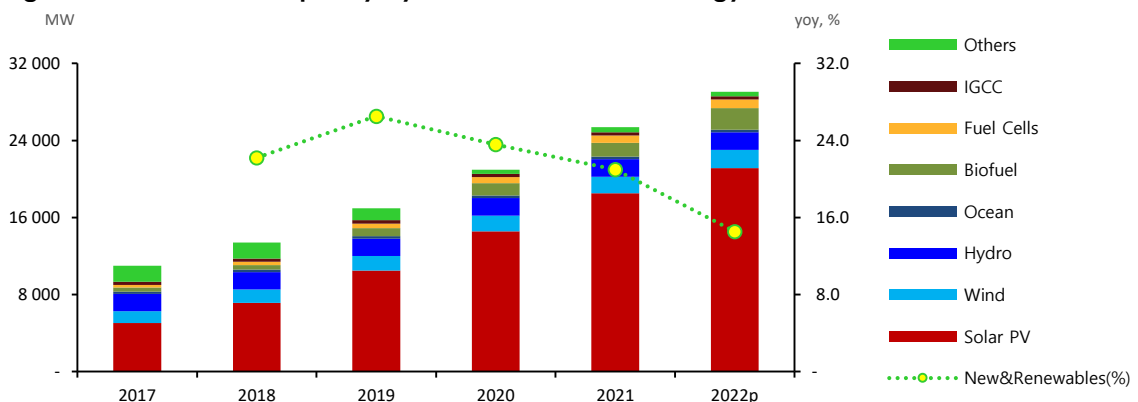
- Coal use had rapidly increased until the early 2010s, led by the power generation and steelmaking sectors. Between 2017 and 2022, however, it fell sharply by an annual average rate of 4.4% due to sluggish iron & steel business and the government's restrictions on coal-fired power plants.
- Petroleum use fluctuated between 2017 and 2022, as energy demand dropped during the COVID-19 spread and then recovered. In 2022, it remained at the level of 2017, at around 814.5 Mbbl.

Figure 1.3 Contribution by energy source to fluctuation of TPED



- Nuclear generation has increased by 3.5% on annual average between 2017 and 2022, as its installed capacity increased with the commissioning of a large-scale nuclear reactor. Renewable & other energy use has increased at an annual average rate of 9.6%, mostly in the power generation sector, based on the government's renewable energy deployment policy.

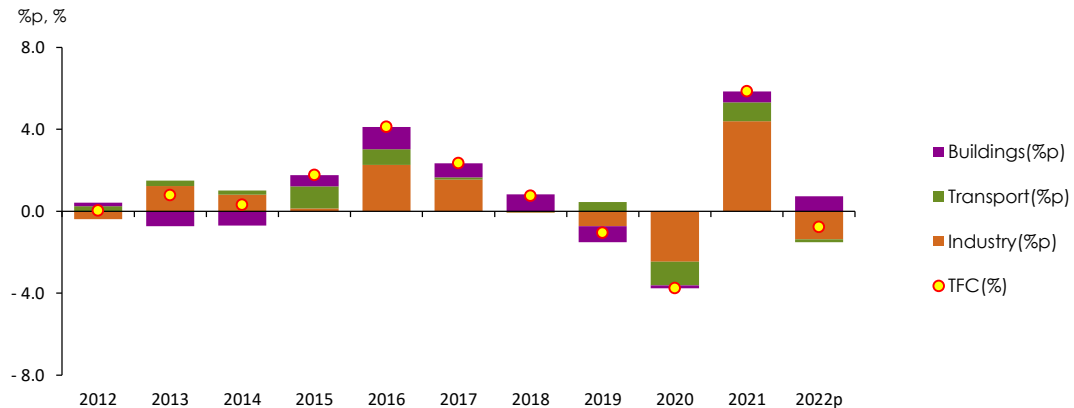
Figure 1.4 Installed capacity by renewable & other energy source



Note: The installed capacity of each renewable & other energy source is based on the data from Korea Electric Power Corporation (KEPCO)'s 'The Monthly Report on Electric Power Statistics'. By-product gas and waste energy are included in the 'Others' category.

- Natural gas use has grown at an annual average rate of 4.5% between 2017 and 2022, as it grew fast in the power generation sector, partially offsetting a drop in coal-fired power generation, although the final use of natural gas remained rather stagnant.
- Electricity use has been fluctuating more widely due to the recent abnormal weather conditions and the COVID-19 pandemic. It increased by 1.6% on annual average between 2017 and 2022.

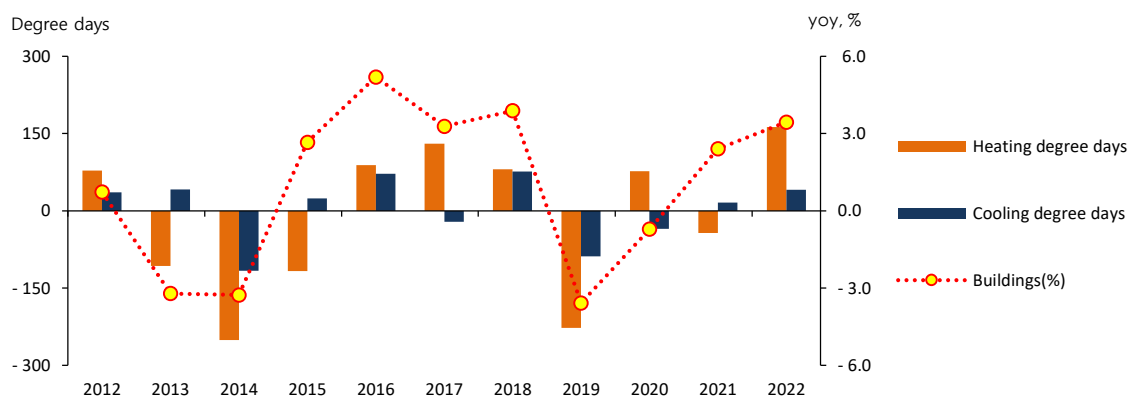
Figure 1.5 Contribution by energy source to fluctuation of TFC



□ **Total Final Consumption (TFC) was 212.4 Mtoe in 2017, and it increased by mere 0.1% on annual average between 2017 and 2022, reaching 214.0 Mtoe in 2022.**

- Industrial energy use recorded similar levels in 2017 (130.9 Mtoe) and in 2022 (130.0 Mtoe). Between 2017 and 2022, however, it fluctuated far more widely, partly affected by the COVID-19 pandemic.

Figure 1.6 Trend in cooling & heating degree days and growth rates in buildings' energy use



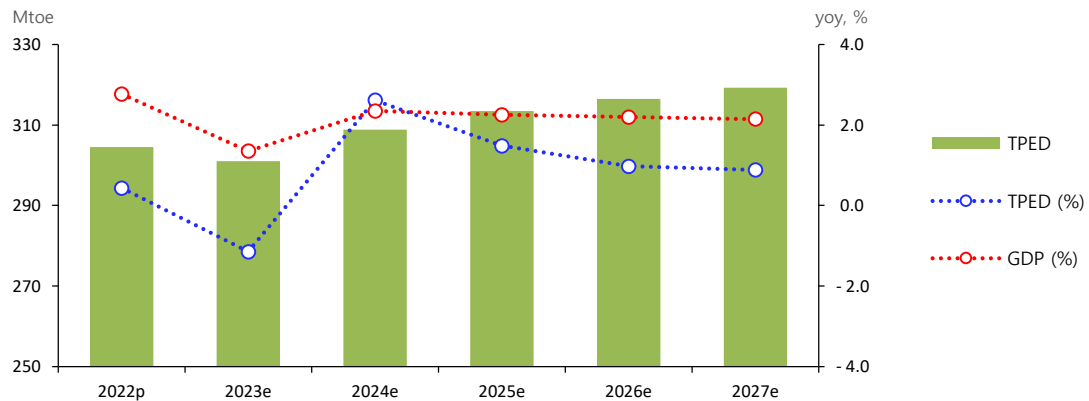
- In the building sector, energy use has been growing at slower rates due to the stagnant population growth and improved energy efficiency, and it has increased at an annual average rate of 1.0% between 2017 and 2022 owing to abnormal weather conditions, and as cooling demand increased following the revision of progressive tax rates for residential power use.
- In the transport sector, energy use fluctuated greatly in line with mobility demand that changed sharply depending on the implementation of social distancing rules during the COVID-19 spread. The growth rate in energy use was mere 0.1% on annual average between 2017 and 2022.

2. TPED & TFC Outlook¹

□ **TPED is expected to grow by 1.0% on annual average between 2022 and 2027, reaching 319.3 Mtoe by 2027.**

- TPED is likely to drop in 2023 amid a slowdown in the economic growth and grow in the mid-2% range in 2024 along with an economic recovery. Since then, it is expected to grow at slower rate of 1%.

Figure 2.1 Trend in GDP & TPED growth rates

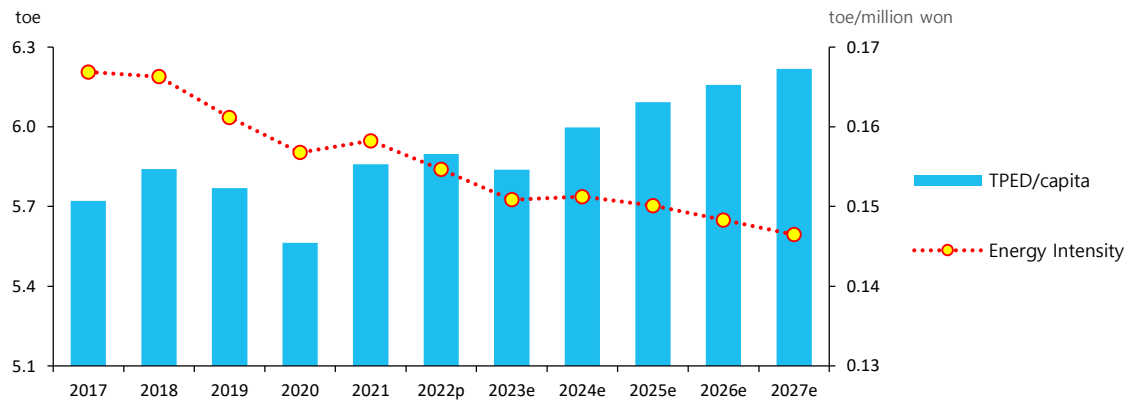


□ **Energy intensity that has recently improved rapidly is forecast to improve at a slower rate of around 1% on annual average during the outlook period.**

- Energy intensity (toe/million won) has improved (declined) rapidly at an annual average rate of 1.5% for the past five years, but the rate of improvement is expected to drop to 1.1% on annual average during the outlook period.

¹ The lowercase p and e, which are added to each year, indicates provisional and forecast values, respectively.

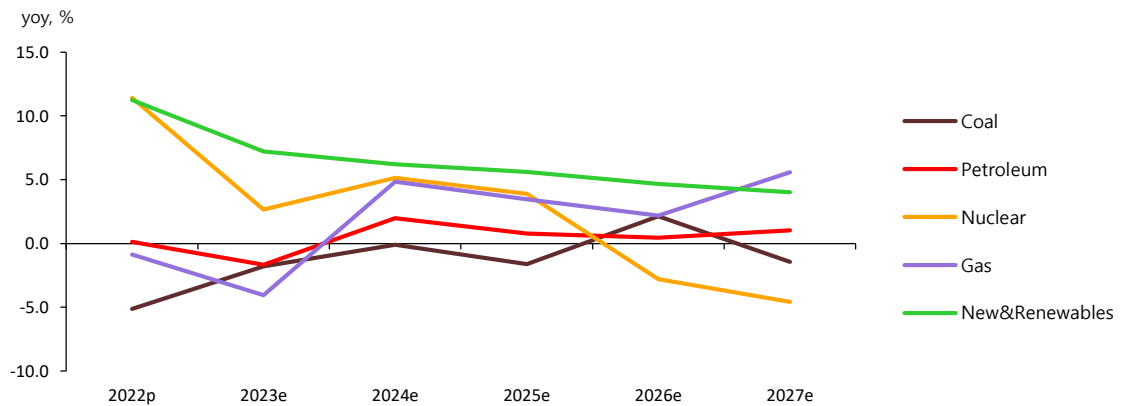
Figure 2.2 TPED per capita and energy intensity outlook



☐ **Nuclear energy, renewable & other energy and natural gas are forecast to lead the growth in TPED, while coal demand is expected to decrease.**

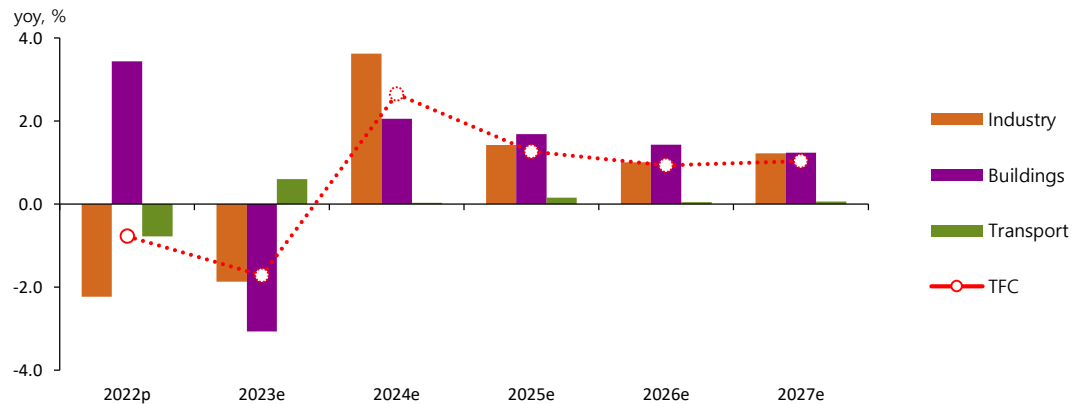
- Nuclear generation is estimated to grow by 0.8% on annual average with the commissioning of three large-scale new reactors during the outlook period. The growth, however, will be limited, as the maintenance work will be conducted at several aging reactors for their continued operation.
- Renewable & other energy demand is projected to grow faster than other energy sources, at an annual average rate of 5.5% during the outlook period, although the growth rate will be much lower than in the past due to less investment in solar PV installations.
- Petroleum demand is estimated to increase by 0.5% on annual average during the outlook period, even though it declines in the building sector and remains flat in the transport sector, as its industrial demand increases due to the construction of new petrochemical facilities.
- Industrial coal demand is expected to increase partly due to the base effect, while it is likely to decrease in the transformation sector owing to a shortage of transmission lines and government policies aimed at reducing coal-fired generation. Consequently, the coal demand is projected to drop by 0.7% on annual average during the outlook period.

Figure 2.3 Energy demand growth rates by energy source



- Gas demand is expected to increase at an annual average rate of 2.4% during the outlook period, despite lower city gas demand, as industrial entities' demand for directly imported natural gas increases quite strongly as well as the demand from the power generation sector.
- Electricity demand is expected to grow at an annual average rate of 1.4% during the outlook period, as it increases relatively fast in the commercial sector amid a rapid growth in service businesses and the expansion of data center infrastructures, although it remains rather stagnant in the industrial and residential sectors.

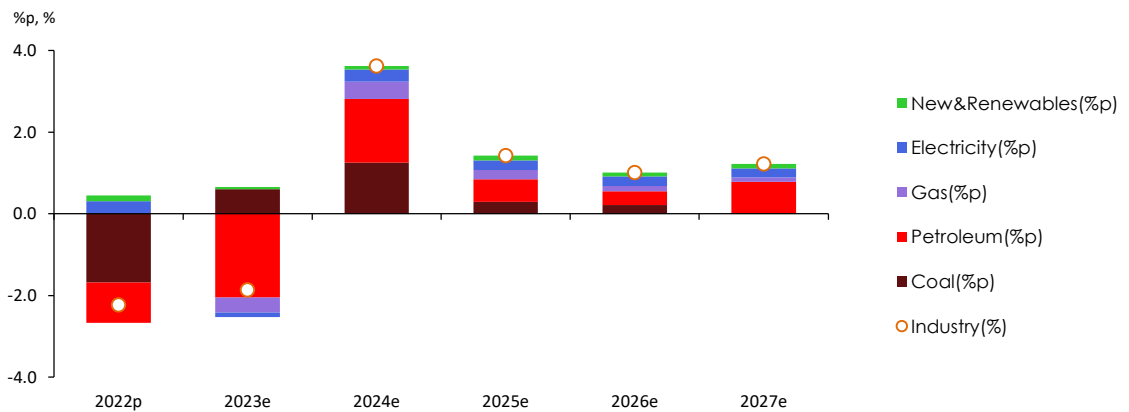
Figure 2.4 Energy demand growth rates forecast by end-use sector



- TFC is forecast to increase by 0.8% on annual average during the outlook period, reaching 223.0 Mtoe in 2027.

- TFC is expected to drop by around 2% in 2023, mostly the industrial and building sectors, and based on this forecast, the annual average growth rate of TFC is estimated to be less than 1% during the outlook period.
- Industrial energy demand is expected to fluctuate widely during the early outlook period according to the domestic and global economic conditions, and then, it is expected to grow in the low 1% range. On an annual average during the entire outlook period, it is projected to grow by 1.1%.

Figure 2.5 Contribution by energy source to fluctuation of industrial energy use



- In the transport sector, energy demand is expected to be flat, growing at an annual average rate of 0.2%, due to the relatively high oil price and slower economic growth.
- In the building sector, energy demand is forecast to grow by only 0.7% per year on average during the outlook period, as energy consumers' sentiment is weakened by rising electricity and city gas prices, and the energy efficiency of buildings and appliances steadily improves.

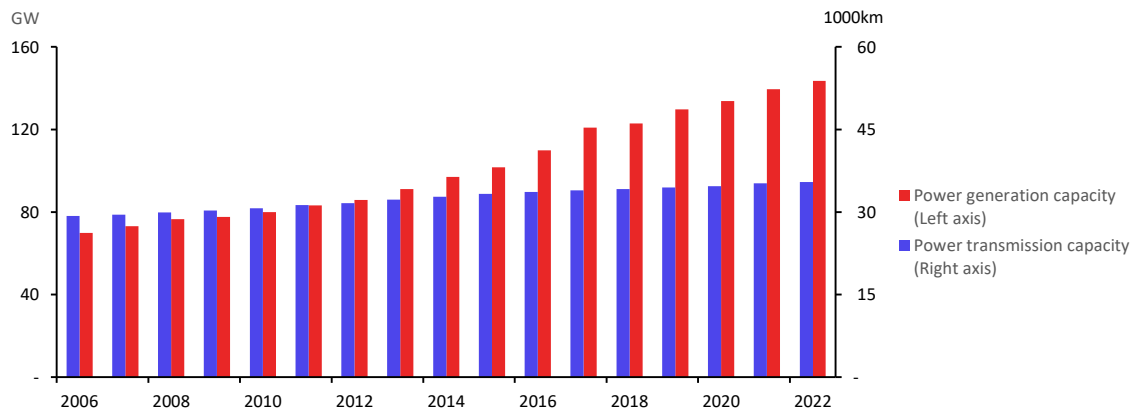
3. Key Features and Implications

Transmission constraints and decrease of coal-fired generation

□ **Constraints on transmission lines and a consequent decline in coal-fired generation are among the most important issues during the upcoming five years.**

- Recently, new large-scale generation projects (incl. nuclear & coal) have been rapidly increasing in the east coast area, but the construction of transmission lines has been delayed due to local communities' concerns, heightening the issue of transmission line constraints between the Seoul metropolitan and east coast areas.

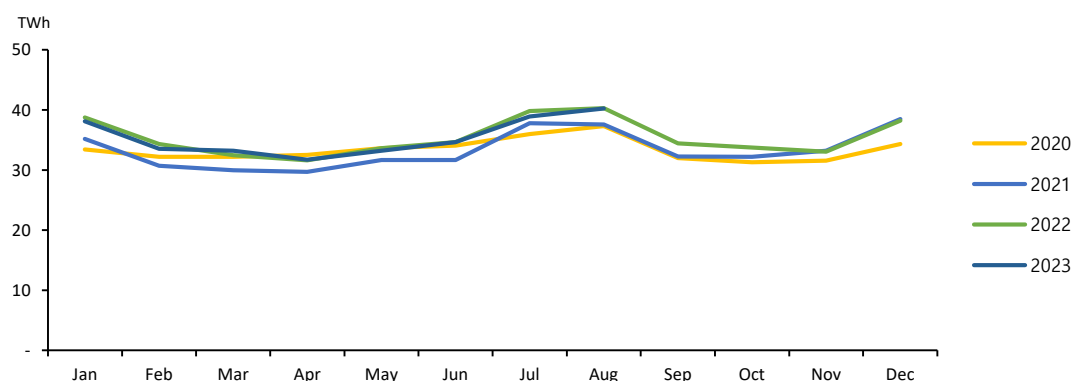
Figure 3.1 Trend in power generation & transmission capacity



Source: Figure 3.1 is drawn by the author using the data from KEPCO's 'Statistics of Electric Power in Korea (Series No. 92, 2022)'.

- In addition, the recent rapid deployment of new solar PV installations was concentrated in the Honam region, triggering the issue of insufficient transmission infrastructure between the Honam region and the Seoul metropolitan area. Accordingly, power reduction at nuclear power plants was planned during light-load hours in 2023.
- The transmission constraint issue has led to a drop in coal-fired generation that is given a lower priority in power generation than renewable and nuclear energy. This situation is likely to continue throughout the outlook period.

Figure 3.2 Monthly baseload generation (incl. renewables) since 2020



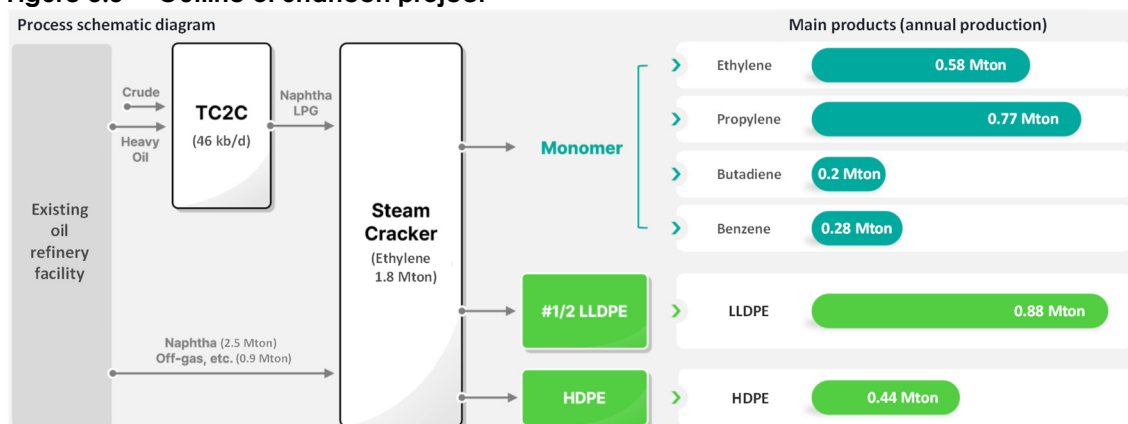
Note: In graph above, the baseload generation includes nuclear, coal and renewable energy generation.

Source: Figure 3.2 was drawn by the author using the data from KEPCO's 'The Monthly Report on Electric Power Statistics'.

- Considering such an issue, this report forecasts a rapid decline in coal-fired generation during the outlook period. Although it is expected to slightly increase in 2026, as the east coast area's transmission line issue is addressed, it will be followed by another downward trend in 2027.

To build a large-scale petrochemical facility, the Shaheen project

Figure 3.3 Outline of Shaheen project



Source: Shaheen Project Investor Relations documents (2022.11.)

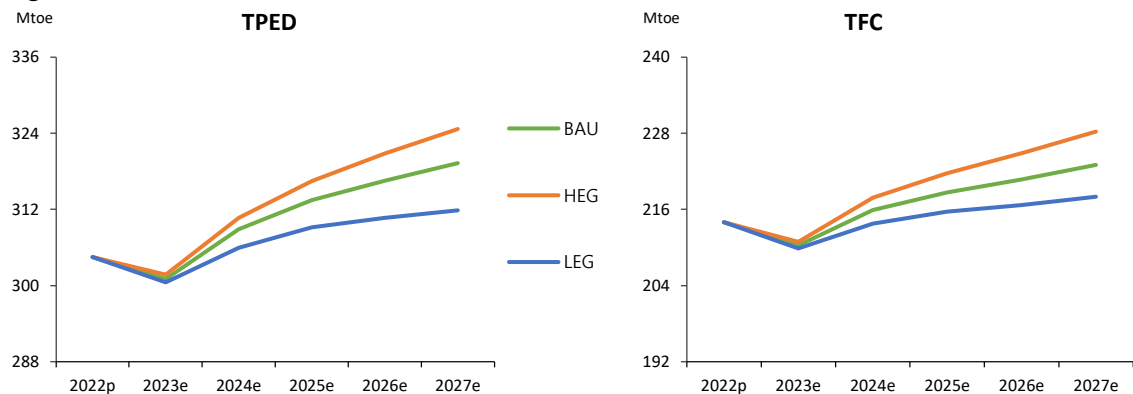
- S-Oil is building one of the largest petrochemical facilities in the world, and the production of petrochemical feedstocks is expected to increase from 2027.

- S-Oil's Shaheen project aims to build a decomposition facility of crude oil & its residues as well as a steam cracker with an ethylene production capacity of 1.8 million tons per year in Ulsan by the first half of 2026.
- The Thermal Crude to Chemicals (TC2C) technology will enable an annual production of around 1.5 million tons of naphtha and 100,000 tons of LPG, and if the steam cracker operates at its full capacity, the domestic demand for petroleum products is projected to grow by around 13 million barrels.

Economic growth scenarios

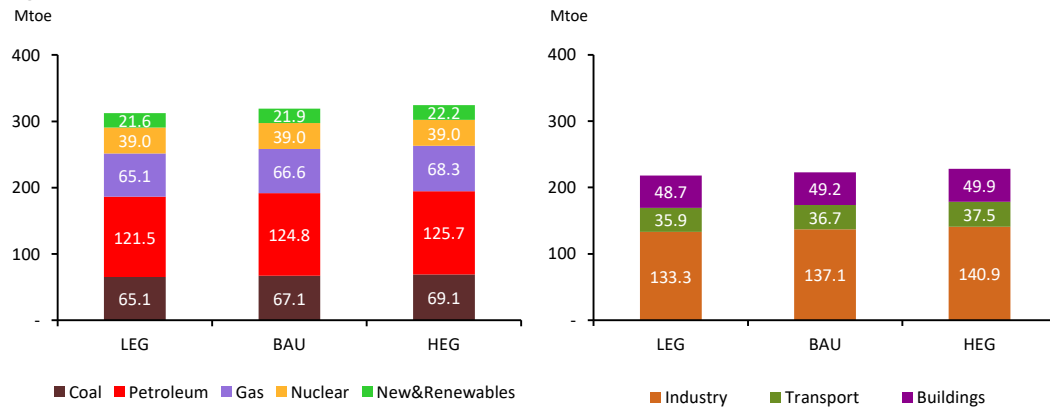
- **TPED is projected to increase at an annual average rate of 1.3% in the high economic growth (HEG) scenario and 0.5% in the low economic growth (LEG) scenario.**
 - The HEG and LEG scenarios were developed considering economic uncertainties during the outlook period (2023-2027).

Figure 3.4 TPED and TFC outlook across three scenarios



- In the HEG scenario, TPED grows by 1.3% on annual average to reach 325 Mtoe in 2027. In the LEG scenario, it grows by 0.5% on annual average to reach 312 Mtoe in 2027.

Figure 3.5 TPED & TFC outlook in 2027 across three scenarios



The Main Indicator and Energy Outlook Result

Main Economic and Energy Indicators - BAU Scenario

	South Korea										CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27	
Economy and Population												
GDP (2015 trillion won)	1,852.7	1,839.5	1,915.8	1,968.8	1,995.5	2,042.3	2,088.4	2,134.2	2,180.0	2.3	2.1	
Industrial Production(2020=100)	100.3	100.0	108.2	109.7	106.9	106.9	105.5	103.9	103.4	2.2	-1.2	
Crude Oil Price (Dubai, USD/bbl)	63.5	42.2	69.3	96.4	82.3	86.3	86.7	82.9	83.0	12.6	-2.9	
Working Days	272.5	275.5	273.5	272.5	273.5	272.5	273.5	275.0	277.5	0.2	0.4	
Population (million)	51.8	51.8	51.7	51.6	51.6	51.5	51.4	51.4	51.3	0.1	-0.1	
Average Temperature (°C)	13.5	13.0	13.3	13.0	13.4	13.3	13.3	13.3	13.3	-0.2	0.5	
Cooling Degree days	120.4	85.2	101.3	141.9	111.8	102.0	102.0	102.0	102.0	1.3	-6.4	
Heating Degree days	2,370.9	2,448.0	2,404.7	2,567.1	2,372.9	2,433.9	2,418.2	2,418.2	2,418.2	0.4	-1.2	
Energy Indicators												
Total Primary Energy Demand (Mtoe)	298.6	288.4	303.2	304.5	301.0	308.9	313.5	316.5	319.3	0.7	1.0	
Energy Intensity (toe/million won)	0.162	0.157	0.159	0.155	0.151	0.152	0.150	0.149	0.147	-1.5	-1.1	
TPED/capita (toe/capita)	5.769	5.564	5.859	5.898	5.838	5.998	6.093	6.158	6.218	0.6	1.1	
Electricity Generation (TWh)	559.6	548.9	572.4	590.5	589.2	600.5	610.6	620.4	629.7	1.5	1.3	
Electricity Generation/capita (MWh/capita)	10.8	10.6	11.1	11.4	11.4	11.7	11.9	12.1	12.3	1.4	1.4	
Electricity Demand/capita (MWh/capita)	9.8	9.6	10.1	10.4	10.4	10.6	10.8	11.0	11.2	1.5	1.5	

Energy Demand - BAU Scenario

											CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e		17-22	22-27
Total Primary Energy Demand												
Coal (Mton)	136.7	119.9	119.9	114.0	111.5	111.2	109.2	111.5	109.8		-4.4	-0.7
Oil (Mbbl)	808.2	775.7	830.7	814.5	799.7	817.0	823.7	827.7	836.6		-0.1	0.5
Gas (Bm³)	41.0	41.5	45.8	45.3	43.6	45.7	47.3	48.3	51.0		4.5	2.4
Nuclear (TWh)	145.9	160.2	158.0	176.1	180.7	190.0	197.4	191.9	183.1		3.5	0.8
New-Renewable (Mtoe)	12.1	13.4	15.0	16.7	17.9	19.0	20.1	21.0	21.9		9.6	5.5
Total (Mtoe)	298.6	288.4	303.2	304.5	301.0	308.9	313.5	316.5	319.3		0.7	1.0
Coal	82.8	72.8	72.8	69.1	67.8	67.8	66.7	68.1	67.1		-4.3	-0.6
Oil	118.5	113.4	121.5	121.7	119.6	122.0	123.0	123.5	124.8		0.6	0.5
Gas	54.0	54.6	60.1	59.5	57.1	59.6	61.7	63.0	66.5		4.5	2.3
Nuclear	31.1	34.1	33.7	37.5	38.5	40.5	42.0	40.9	39.0		3.5	0.8
New-Renewable	12.1	13.4	15.0	16.7	17.9	19.0	20.1	21.0	21.9		9.6	5.5
Total Final Consumption												
Coal (Mton)	51.9	49.2	51.0	46.9	48.1	50.5	51.0	51.3	51.3		-2.7	1.8
Oil (Mbbl)	796.1	752.3	809.1	798.9	780.5	797.5	804.2	808.0	816.8		-0.1	0.4
Gas (Bm³)	24.3	24.1	24.8	25.8	23.9	24.7	25.2	25.5	25.7		1.2	-0.0
Electricity (TWh)	507.5	496.9	520.3	535.3	536.5	546.9	556.1	565.0	573.5		1.6	1.4
Heat (Mtoe)	2.5	2.6	2.7	2.9	2.7	2.8	2.9	3.0	3.1		4.5	1.3
New-Renewable (Mtoe)	6.5	6.7	7.1	7.2	7.2	7.4	7.6	7.7	7.9		1.9	1.8
Total (Mtoe)	211.7	203.7	215.7	214.0	210.3	215.9	218.7	220.7	223.0		0.1	0.8
Coal	32.9	31.2	32.3	30.0	30.8	32.3	32.7	33.0	33.0		-2.4	1.9
Oil	101.2	95.9	103.3	101.6	99.1	101.1	101.9	102.3	103.4		-0.1	0.3
Gas	25.0	24.8	25.5	26.3	24.4	25.3	25.8	26.1	26.3		1.0	0.0
Electricity	43.6	42.7	44.7	46.0	46.1	47.0	47.8	48.6	49.3		1.6	1.4
Heat	2.5	2.6	2.7	2.9	2.7	2.8	2.9	3.0	3.1		4.5	1.3
New-Renewable	6.5	6.7	7.1	7.2	7.2	7.4	7.6	7.7	7.9		1.9	1.8
Industry	129.2	124.0	133.0	130.0	127.6	132.2	134.1	135.4	137.1		-0.1	1.1
Transport	37.2	34.7	36.6	36.4	36.6	36.6	36.6	36.7	36.7		0.1	0.2
Buildings	45.3	45.0	46.1	47.7	46.2	47.1	47.9	48.6	49.2		1.0	0.7

Energy Demand - BAU Scenario

	(yoy, %)											
	CAGR (%)										17-22	22-27
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e			
Total Primary Energy Demand												
Coal (Mton)	-6.6	-12.3	-0.0	-4.9	-2.2	-0.3	-1.9	2.2	-1.5	-4.4	-0.7	
Oil (Mbbl)	0.0	-4.0	7.1	-1.9	-1.8	2.2	0.8	0.5	1.1	-0.1	0.5	
Gas (Bm³)	-3.0	1.2	10.4	-1.0	-3.9	4.8	3.5	2.2	5.6	4.5	2.4	
Nuclear (TWh)	9.3	9.8	-1.4	11.4	2.7	5.1	3.9	-2.8	-4.6	3.5	0.8	
New-Renewable (Mtoe)	3.5	10.8	11.7	11.2	7.2	6.2	5.6	4.7	4.0	9.6	5.5	
Total (Mtoe)	-0.9	-3.4	5.1	0.4	-1.1	2.6	1.5	1.0	0.9	0.7	1.0	
Coal	-5.7	-12.1	0.0	-5.1	-1.8	-0.1	-1.6	2.1	-1.5	-4.3	-0.6	
Oil	0.5	-4.3	7.2	0.1	-1.7	2.0	0.8	0.5	1.0	0.6	0.5	
Gas	-2.6	1.0	10.1	-1.1	-4.0	4.4	3.5	2.1	5.6	4.5	2.3	
Nuclear	9.3	9.8	-1.4	11.4	2.7	5.1	3.9	-2.8	-4.6	3.5	0.8	
New-Renewable	3.5	10.8	11.7	11.2	7.2	6.2	5.6	4.7	4.0	9.6	5.5	
Total Final Consumption												
Coal (Mton)	-4.9	-5.2	3.6	-8.1	2.6	5.0	0.9	0.7	-0.0	-2.7	1.8	
Oil (Mbbl)	1.0	-5.5	7.6	-1.3	-2.3	2.2	0.8	0.5	1.1	-0.1	0.4	
Gas (Bm³)	-2.1	-1.1	3.1	3.9	-7.3	3.4	2.0	1.2	0.8	1.2	-0.0	
Electricity (TWh)	-1.1	-2.1	4.7	2.9	0.2	1.9	1.7	1.6	1.5	1.6	1.4	
Heat (Mtoe)	-2.5	4.9	4.2	6.4	-6.2	3.8	3.2	3.2	3.2	4.5	1.3	
New-Renewable (Mtoe)	-7.6	2.5	7.1	1.1	0.1	2.3	2.5	2.0	2.3	1.9	1.8	
Total (Mtoe)	-1.1	-3.8	5.8	-0.8	-1.7	2.7	1.3	0.9	1.0	0.1	0.8	
Coal	-4.1	-5.3	3.5	-7.0	2.6	5.1	1.1	0.8	0.0	-2.4	1.9	
Oil	0.8	-5.3	7.8	-1.7	-2.5	2.0	0.8	0.5	1.0	-0.1	0.3	
Gas	-2.1	-1.1	3.1	3.0	-6.9	3.4	2.0	1.2	0.8	1.0	0.0	
Electricity	-1.1	-2.1	4.7	2.9	0.2	1.9	1.7	1.6	1.5	1.6	1.4	
Heat	-2.5	4.9	4.2	6.4	-6.2	3.8	3.2	3.2	3.2	4.5	1.3	
New-Renewable	-7.6	2.5	7.1	1.1	0.1	2.3	2.5	2.0	2.3	1.9	1.8	
Industry	-1.2	-4.0	7.2	-2.2	-1.9	3.6	1.4	1.0	1.2	-0.1	1.1	
Transport	2.7	-6.6	5.4	-0.8	0.6	0.0	0.2	0.1	0.1	0.1	0.2	
Buildings	-3.6	-0.7	2.4	3.4	-3.1	2.1	1.7	1.4	1.2	1.0	0.7	

Energy Demand by Sector - BAU Scenario

											(Mtoe)	
											CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27	
Industry	129.2	124.0	133.0	130.0	127.6	132.2	134.1	135.4	137.1	-0.1	1.1	
Coal	32.6	30.9	32.0	29.8	30.6	32.2	32.6	32.9	32.9	-2.3	2.0	
Oil	60.1	57.7	63.4	62.0	59.4	61.4	62.1	62.5	63.6	0.4	0.5	
Gas	9.6	9.5	10.0	10.0	9.5	10.1	10.4	10.5	10.7	0.4	1.4	
Electricity	22.9	21.9	23.2	23.6	23.4	23.8	24.1	24.4	24.7	0.7	1.0	
Heat	-	-	-	-	-	-	-	-	-	-	-	
New-Renewable	4.0	4.0	4.4	4.6	4.7	4.8	4.9	5.0	5.2	2.0	2.6	
Transport	37.2	34.7	36.6	36.4	36.6	36.6	36.6	36.7	36.7	0.1	0.2	
Coal	-	-	-	-	-	-	-	-	-	-	-	
Oil	35.0	32.7	34.6	34.2	34.5	34.5	34.6	34.6	34.6	0.0	0.2	
Gas	1.2	1.1	1.1	1.0	1.0	0.9	0.9	0.9	0.8	-3.9	-3.8	
Electricity	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	7.0	7.1	
Heat	-	-	-	-	-	-	-	-	-	-	-	
New-Renewable	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	5.7	0.1	
Buildings*	45.3	45.0	46.1	47.7	46.2	47.1	47.9	48.6	49.2	1.0	0.7	
Coal	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	-12.4	-10.4	
Oil	6.1	5.5	5.4	5.3	5.2	5.2	5.2	5.2	5.2	-5.8	-0.5	
Gas	14.2	14.2	14.5	15.2	13.9	14.3	14.5	14.7	14.8	1.8	-0.6	
Electricity	20.5	20.5	21.2	22.1	22.3	22.8	23.3	23.7	24.1	2.4	1.7	
Heat	2.5	2.6	2.7	2.9	2.7	2.8	2.9	3.0	3.1	4.5	1.3	
New-Renewable	1.8	1.9	2.0	1.9	1.8	1.9	1.9	1.9	2.0	0.6	0.7	
Transform**	310.0	296.3	302.2	318.1	313.9	320.7	324.4	327.1	330.3	0.9	0.8	
Coal	49.9	41.6	40.6	39.1	37.1	35.4	34.0	35.1	34.1	-5.6	-2.7	
Oil	173.7	164.1	164.8	177.0	174.9	178.5	179.9	180.7	182.6	0.7	0.6	
Gas	49.7	49.7	55.3	55.1	52.7	54.7	56.0	57.1	60.6	4.0	1.9	
Nuclear	31.1	34.1	33.7	37.5	38.5	40.5	42.0	40.9	39.0	3.5	0.8	
New-Renewable	5.6	6.8	7.9	9.5	10.7	11.6	12.5	13.3	14.0	19.0	8.0	

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

Coal - BAU Scenario

(Mton)

										CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27
Total Coal Demand	136.7	119.9	119.9	114.0	111.5	111.2	109.2	111.5	109.8	-4.4	-0.7
Transform	84.8	70.7	68.9	67.1	63.4	60.7	58.2	60.2	58.5	-5.6	-2.7
Power Generation	84.8	70.7	68.9	67.1	63.4	60.7	58.2	60.2	58.5	-5.6	-2.7
Heat	-	-	-	-	-	-	-	-	-	-	-
Gas Manufacture	-	-	-	-	-	-	-	-	-	-	-
Oil refinery	-	-	-	-	-	-	-	-	-	-	-
Total Final Consumption	51.9	49.2	51.0	46.9	48.1	50.5	51.0	51.3	51.3	-2.7	1.8
Industry	51.3	48.7	50.5	46.5	47.7	50.2	50.7	51.1	51.1	-2.6	1.9
Transport	-	-	-	-	-	-	-	-	-	-	-
Buildings	0.6	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.2	-12.2	-10.4
Consumption by products											
Anthracite	7.9	7.2	7.3	6.2	6.0	5.9	5.5	5.3	5.2	-5.7	-3.5
Bituminous	128.8	112.7	112.6	107.8	105.5	105.3	103.7	106.2	104.6	-4.4	-0.6
Iron making	34.6	32.8	34.1	31.4	32.6	34.4	35.2	35.7	35.8	-2.1	2.6
Cement	4.0	3.4	3.6	3.7	3.8	4.0	3.9	4.0	4.0	-2.6	1.8
Power Generation	83.6	69.8	68.0	66.2	62.5	60.0	57.5	59.4	57.7	-5.6	-2.7

Oil - BAU Scenario

(Mbbbl)

										CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27
Total Oil Demand	808.2	775.7	830.7	814.5	799.7	817.0	823.7	827.7	836.6	-0.1	0.5
Crude oil & refinery feedstocks	1,159.0	1,089.3	1,089.1	1,155.9	1,142.7	1,165.9	1,175.0	1,180.3	1,192.8	0.0	0.6
Transform	1,159.0	1,089.3	1,089.1	1,155.4	1,141.9	1,165.1	1,174.2	1,179.6	1,192.0	0.0	0.6
Oil refinery	1,159.0	1,089.3	1,089.1	1,155.4	1,141.9	1,165.1	1,174.2	1,179.6	1,192.0	0.0	0.6
Petroleum products	-350.8	-313.6	-258.4	-341.4	-343.0	-348.9	-351.3	-352.7	-356.1	0.4	0.9
Transform	-1,188.6	-1,107.2	-1,105.8	-1,179.3	-1,165.8	-1,189.0	-1,198.3	-1,203.7	-1,216.4	0.0	0.6
Power Generation	5.7	3.8	4.2	5.0	3.9	3.8	3.8	3.8	3.8	-9.0	-5.3
Heat	1.7	1.6	1.8	1.7	1.8	2.1	2.2	2.3	2.3	7.3	6.8
Gas Manufacture	0.4	0.3	1.7	3.4	3.6	3.7	3.7	3.8	3.8	61.6	2.5
Oil refinery*	-1,196.3	-1,112.9	-1,113.4	-1,189.4	-1,175.0	-1,198.6	-1,208.1	-1,213.5	-1,226.3	0.1	0.6
Total Final Consumption	796.1	752.3	809.1	798.9	780.5	797.5	804.2	808.0	816.8	-0.1	0.4
Industry	483.9	462.2	505.8	496.9	478.6	495.8	502.2	505.8	514.6	0.4	0.7
Transport	263.2	245.4	259.0	258.0	259.1	259.0	259.4	259.5	259.6	0.0	0.1
Buildings	49.1	44.7	44.2	44.0	42.8	42.8	42.7	42.6	42.6	-4.9	-0.6
Consumption by products											
Gasoline	82.7	81.0	84.9	88.4	90.1	90.8	91.3	91.8	92.0	2.1	0.8
Diesel	163.8	155.0	156.3	151.8	152.3	152.8	153.3	153.4	153.6	-1.4	0.2
Kerosene	16.7	16.8	16.5	15.4	14.6	14.7	14.6	14.6	14.6	-3.8	-1.1
B-C	8.4	6.8	6.4	6.7	6.8	6.8	6.9	6.9	6.9	-9.5	0.7
Jet Oil	13.1	7.8	15.5	15.6	14.8	14.3	14.1	14.0	13.9	3.1	-2.2
LPG	110.9	109.1	109.2	115.3	107.1	109.7	112.6	112.6	113.3	3.3	-0.3
Petrochem feedstock	46.9	48.8	47.3	56.6	48.6	51.7	54.9	55.2	56.1	14.2	-0.2
Naphtha	365.4	333.9	369.9	356.0	348.0	360.6	363.1	366.4	374.3	-1.5	1.0
Refinery gas	6.3	8.5	9.0	9.3	7.6	8.1	8.5	8.5	8.4	15.8	-2.0
Other Non-Energy	28.8	33.3	41.3	40.5	39.1	39.6	39.7	39.7	39.7	7.1	-0.4

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

Gas - BAU Scenario

	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	CAGR (%)	
										17-22	22-27
Total Gas Demand (Mton)	41.0	41.5	45.8	45.3	43.6	45.7	47.3	48.3	51.0	4.5	2.4
Transform	38.0	38.0	42.4	42.1	40.4	41.9	42.9	43.7	46.4	4.0	1.9
Power Generation	19.4	20.0	23.2	22.5	22.6	23.3	24.0	24.7	27.3	6.5	4.0
Heat	-	-	-	-	-	-	-	-	-	-	-
Gas Manufacture	18.6	18.0	19.1	19.6	17.8	18.5	18.8	19.0	19.1	1.5	-0.6
Oil refinery	-	-	-	-	-	-	-	-	-	-	-
Total Final Consumption	1.5	1.6	1.6	1.7	1.7	1.9	2.0	2.2	2.3	3.9	6.1
Industry	1.5	1.6	1.6	1.7	1.7	1.9	2.0	2.2	2.3	3.9	6.1
City Gas (Bm3)	22.4	22.0	22.7	23.6	21.7	22.3	22.6	22.8	22.8	1.0	-0.7
Transform	-22.8	-22.1	-23.3	-24.3	-21.9	-22.7	-23.1	-23.3	-23.4	1.7	-0.8
Power Generation	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.3	0.3	-10.4	-0.8
Heat	0.3	0.2	0.3	0.4	0.3	0.4	0.4	0.4	0.4	8.0	1.0
Gas Manufacture*	-23.7	-22.9	-24.4	-25.5	-23.2	-24.2	-24.8	-25.2	-25.5	2.0	-0.1
Oil refinery	-	-	-	-	-	-	-	-	-	-	-
Total Final Consumption	22.4	22.0	22.7	23.6	21.7	22.3	22.6	22.8	22.8	1.0	-0.7
Industry	7.5	7.1	7.6	7.6	7.1	7.4	7.5	7.5	7.5	-0.2	-0.2
Transport	1.2	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.8	-3.8	-3.8
Buildings	13.8	13.8	14.1	15.0	13.6	14.0	14.2	14.3	14.4	2.0	-0.7

* 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 - BAU Scenario

	(TWh)										
										CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27
Net Electricity Demand	559.6	548.9	573.1	590.7	589.2	600.5	610.6	620.4	629.7	1.5	1.3
Own use and Losses	52.0	52.0	52.8	55.3	52.7	53.6	54.5	55.4	56.2	0.4	0.4
Total Final Consumption	507.5	496.9	520.3	535.3	536.5	546.9	556.1	565.0	573.5	1.6	1.4
Industry	266.6	254.7	269.6	274.1	272.5	276.9	280.5	284.1	287.5	0.7	1.0
Transport	3.2	3.3	3.7	4.0	4.3	4.6	4.9	5.3	5.7	7.0	7.1
Buildings	237.8	238.8	247.1	257.2	259.7	265.4	270.6	275.6	280.3	2.4	1.7
Power generation capacity (GW)*	119.9	124.0	129.1	132.1	138.4	144.9	150.4	149.5	149.8	3.4	2.6
Coal	37.0	36.9	37.7	37.7	39.6	40.7	40.3	37.4	36.6	0.5	-0.6
Oil	3.9	2.2	2.2	0.9	0.9	0.9	0.9	0.9	0.9	-26.0	-1.4
Gas	39.4	41.2	41.2	41.2	41.7	42.7	45.2	47.1	47.1	1.9	2.7
Nuclear	23.3	23.3	23.3	23.7	24.7	26.5	27.3	25.2	24.5	1.0	0.6
New-Renewable	16.4	20.5	24.8	28.6	31.6	34.2	36.7	38.9	40.9	21.6	7.4
power generation*	559.6	548.9	573.1	590.7	589.2	600.5	610.6	620.4	629.7	1.5	1.3
Coal	227.4	196.3	198.0	193.2	183.3	174.7	167.5	173.3	168.5	-4.1	-2.7
Oil	3.3	2.3	2.4	2.0	1.6	1.6	1.6	1.6	1.6	-17.9	-4.5
Gas	144.4	145.9	168.4	163.6	163.6	169.2	174.3	179.2	198.1	5.4	3.9
Nuclear	145.9	160.2	158.0	176.1	180.7	190.0	197.4	191.9	183.1	3.5	0.8
New-Renewable	38.6	44.2	46.4	55.9	60.0	64.9	69.8	74.4	78.5	12.6	7.0
Fuel Consumption of Power Plants (Mtoe)*	113.5	110.4	114.5	117.6	117.6	119.9	121.9	123.7	125.1	1.2	1.2
Coal	49.9	41.6	40.6	39.1	37.1	35.4	34.0	35.1	34.1	-5.6	-2.7
Oil	0.8	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	-12.0	-5.2
Gas	25.3	26.1	30.4	29.4	29.5	30.5	31.4	32.3	35.7	6.5	3.9
Nuclear	31.1	34.1	33.7	37.5	38.5	40.5	42.0	40.9	39.0	3.5	0.8
New-Renewable	6.3	8.0	9.3	11.0	12.1	13.1	14.0	15.0	15.8	19.2	7.5

* District Heat is classified by fuel type since 2014

Heat and New-Renewable - BAU Scenario

(Mtoe)

											CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e		17-22	22-27
Heat Demand	2.7	2.8	2.8	3.2	3.0	3.1	3.2	3.3	3.4		5.4	1.5
Own use and Losses	0.3	0.3	0.1	0.4	0.3	0.3	0.3	0.3	0.3		7.1	-1.8
Total Final Consumption	2.5	2.6	2.7	2.9	2.7	2.8	2.9	3.0	3.1		4.5	1.3
Industry	-	-	-	-	-	-	-	-	-		-	-
Transport	-	-	-	-	-	-	-	-	-		-	-
Buildings	2.5	2.6	2.7	2.9	2.7	2.8	2.9	3.0	3.1		4.5	1.3
New-Renewable Demand	12.1	13.4	15.0	16.7	17.9	19.0	20.1	21.0	21.9		9.6	5.5
Transform	5.6	6.8	7.9	9.5	10.7	11.6	12.5	13.3	14.0		19.0	8.0
Total Final Consumption	6.5	6.7	7.1	7.2	7.2	7.4	7.6	7.7	7.9		1.9	1.8
Industry	4.0	4.0	4.4	4.6	4.7	4.8	4.9	5.0	5.2		2.0	2.6
Transport	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7		5.7	0.1
Buildings	1.8	1.9	2.0	1.9	1.8	1.9	1.9	1.9	2.0		0.6	0.7

Main Economic and Energy Indicators - HEG Scenario

										CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27
Economy and Population											
GDP (2015 trillion won)	1,852.7	1,839.5	1,915.8	1,968.8	2,001.0	2,058.0	2,114.7	2,171.7	2,229.1	2.3	2.5
Industrial Production(2020=100)	100.3	100.0	108.2	109.7	106.8	106.9	105.2	103.4	103.0	2.2	-1.3
Crude Oil Price (Dubai, USD/bbl)	63.5	42.2	69.3	96.4	82.3	86.3	86.7	82.9	83.0	12.6	-2.9
Working Days	272.5	275.5	273.5	272.5	273.5	272.5	273.5	275.0	277.5	0.2	0.4
Population (million)	51.8	51.8	51.7	51.6	51.6	51.5	51.4	51.4	51.3	0.1	-0.1
Average Temperature (°C)	13.5	13.0	13.3	13.0	13.4	13.3	13.3	13.3	13.3	-0.2	0.5
Cooling Degree days	120.4	85.2	101.3	141.9	111.8	102.0	102.0	102.0	102.0	1.3	-6.4
Heating Degree days	2,370.9	2,448.0	2,404.7	2,567.1	2,372.9	2,433.9	2,418.2	2,418.2	2,418.2	0.4	-1.2
Energy Indicators											
Total Primary Energy Demand (Mtoe)	298.6	288.4	303.2	304.5	301.7	310.7	316.5	320.8	324.7	0.7	1.3
Energy Intensity (toe/million won)	0.162	0.157	0.159	0.155	0.151	0.151	0.150	0.148	0.146	-1.5	-1.2
TPED/capita (toe/capita)	5.769	5.564	5.859	5.898	5.852	6.033	6.151	6.242	6.323	0.6	1.4
Electricity Generation (TWh)	559.6	548.9	572.4	590.5	590.3	603.9	616.7	629.6	642.1	1.5	1.7
Electricity Generation/capita (MWh/capita)	10.8	10.6	11.1	11.4	11.4	11.7	12.0	12.2	12.5	1.4	1.8
Electricity Demand/capita (MWh/capita)	9.8	9.6	10.1	10.4	10.4	10.7	10.9	11.2	11.4	1.5	1.9

Energy Demand - HEG Scenario

										CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27
Total Primary Energy Demand											
Coal (Mton)	136.7	119.9	119.9	114.0	111.6	112.5	111.3	114.6	113.2	-4.4	-0.1
Oil (Mbbl)	808.2	775.7	830.7	814.5	801.8	822.0	832.6	840.5	852.9	-0.1	0.9
Gas (Bm³)	41.0	41.5	45.8	45.3	43.7	46.0	47.9	49.1	52.3	4.5	2.9
Nuclear (TWh)	145.9	160.2	158.0	176.1	180.7	190.0	197.4	191.9	183.1	3.5	0.8
New-Renewable (Mtoe)	12.1	13.4	15.0	16.7	17.9	19.1	20.2	21.3	22.2	9.6	5.8
Total (Mtoe)	298.6	288.4	303.2	304.5	301.7	310.7	316.5	320.8	324.7	0.7	1.3
Coal	82.8	72.8	72.8	69.1	67.9	68.5	68.0	70.0	69.1	-4.3	0.0
Oil	118.5	113.4	121.5	121.7	119.9	122.2	123.4	124.3	125.7	0.6	0.7
Gas	54.0	54.6	60.1	59.5	57.4	60.4	62.8	64.4	68.6	4.5	2.9
Nuclear	31.1	34.1	33.7	37.5	38.5	40.5	42.0	40.9	39.0	3.5	0.8
New-Renewable	12.1	13.4	15.0	16.7	17.9	19.1	20.2	21.3	22.2	9.6	5.8
Total Final Consumption											
Coal (Mton)	51.9	49.2	51.0	46.9	48.2	51.4	52.2	53.0	53.3	-2.7	2.6
Oil (Mbbl)	796.1	752.3	809.1	798.9	782.5	802.8	813.5	821.2	833.6	-0.1	0.9
Gas (Bm³)	24.3	24.1	24.8	25.8	24.0	25.1	25.7	26.0	26.3	1.2	0.4
Electricity (TWh)	507.5	496.9	520.3	535.3	537.5	550.0	561.6	573.4	584.7	1.6	1.8
Heat (Mtoe)	2.5	2.6	2.7	2.9	2.7	2.8	2.9	3.0	3.1	4.5	1.7
New-Renewable (Mtoe)	6.5	6.7	7.1	7.2	7.3	7.5	7.7	8.0	8.2	1.9	2.6
Total (Mtoe)	211.7	203.7	215.7	214.0	210.9	217.8	221.7	224.9	228.3	0.1	1.3
Coal	32.9	31.2	32.3	30.0	30.8	32.9	33.5	34.0	34.3	-2.4	2.7
Oil	101.2	95.9	103.3	101.6	99.3	101.7	103.0	104.0	105.5	-0.1	0.8
Gas	25.0	24.8	25.5	26.3	24.6	25.7	26.3	26.6	26.9	1.0	0.5
Electricity	43.6	42.7	44.7	46.0	46.2	47.3	48.3	49.3	50.3	1.6	1.8
Heat	2.5	2.6	2.7	2.9	2.7	2.8	2.9	3.0	3.1	4.5	1.7
New-Renewable	6.5	6.7	7.1	7.2	7.3	7.5	7.7	8.0	8.2	1.9	2.6
Industry	129.2	124.0	133.0	130.0	127.9	133.6	136.3	138.5	140.9	-0.1	1.6
Transport	37.2	34.7	36.6	36.4	36.7	36.8	37.1	37.3	37.5	0.1	0.6
Buildings	45.3	45.0	46.1	47.7	46.3	47.4	48.3	49.1	49.9	1.0	0.9

Energy Demand - HEG Scenario

	(yoy, %)										
	CAGR (%)										
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	
Total Primary Energy Demand											
Coal (Mton)	-6.6	-12.3	-0.0	-4.9	-2.1	0.8	-1.0	3.0	-1.3	-4.4	-0.1
Oil (Mbbl)	0.0	-4.0	7.1	-1.9	-1.6	2.5	1.3	0.9	1.5	-0.1	0.9
Gas (Bm³)	-3.0	1.2	10.4	-1.0	-3.6	5.3	4.0	2.6	6.5	4.5	2.9
Nuclear (TWh)	9.3	9.8	-1.4	11.4	2.7	5.1	3.9	-2.8	-4.6	3.5	0.8
New-Renewable (Mtoe)	3.5	10.8	11.7	11.2	7.4	6.5	6.0	5.0	4.4	9.6	5.8
Total (Mtoe)	-0.9	-3.4	5.1	0.4	-0.9	3.0	1.9	1.4	1.2	0.7	1.3
Coal	-5.7	-12.1	0.0	-5.1	-1.7	0.9	-0.8	2.9	-1.2	-4.3	0.0
Oil	0.5	-4.3	7.2	0.1	-1.4	1.9	1.0	0.7	1.2	0.6	0.7
Gas	-2.6	1.0	10.1	-1.1	-3.4	5.2	4.0	2.6	6.5	4.5	2.9
Nuclear	9.3	9.8	-1.4	11.4	2.7	5.1	3.9	-2.8	-4.6	3.5	0.8
New-Renewable	3.5	10.8	11.7	11.2	7.4	6.5	6.0	5.0	4.4	9.6	5.8
Total Final Consumption											
Coal (Mton)	-4.9	-5.2	3.6	-8.1	2.8	6.5	1.7	1.5	0.6	-2.7	2.6
Oil (Mbbl)	1.0	-5.5	7.6	-1.3	-2.1	2.6	1.3	1.0	1.5	-0.1	0.9
Gas (Bm³)	-2.1	-1.1	3.1	3.9	-6.7	4.5	2.2	1.3	1.0	1.2	0.4
Electricity (TWh)	-1.1	-2.1	4.7	2.9	0.4	2.3	2.1	2.1	2.0	1.6	1.8
Heat (Mtoe)	-2.5	4.9	4.2	6.4	-7.0	4.0	3.5	3.6	5.0	4.5	1.7
New-Renewable (Mtoe)	-7.6	2.5	7.1	1.1	0.4	3.0	3.4	3.1	3.4	1.9	2.6
Total (Mtoe)	-1.1	-3.8	5.8	-0.8	-1.5	3.3	1.8	1.4	1.5	0.1	1.3
Coal	-4.1	-5.3	3.5	-7.0	2.8	6.6	1.9	1.6	0.6	-2.4	2.7
Oil	0.8	-5.3	7.8	-1.7	-2.3	2.4	1.3	0.9	1.5	-0.1	0.8
Gas	-2.1	-1.1	3.1	3.0	-6.4	4.5	2.3	1.3	1.0	1.0	0.5
Electricity	-1.1	-2.1	4.7	2.9	0.4	2.3	2.1	2.1	2.0	1.6	1.8
Heat	-2.5	4.9	4.2	6.4	-7.0	4.0	3.5	3.6	5.0	4.5	1.7
New-Renewable	-7.6	2.5	7.1	1.1	0.4	3.0	3.4	3.1	3.4	1.9	2.6
Industry	-1.2	-4.0	7.2	-2.2	-1.6	4.4	2.0	1.6	1.8	-0.1	1.6
Transport	2.7	-6.6	5.4	-0.8	0.9	0.4	0.7	0.6	0.5	0.1	0.6
Buildings	-3.6	-0.7	2.4	3.4	-2.9	2.5	1.8	1.7	1.6	1.0	0.9

Energy Demand by Sector - HEG Scenario

	(Mtoe)										
	CAGR (%)										
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27
Industry	129.2	124.0	133.0	130.0	127.9	133.6	136.3	138.5	140.9	-0.1	1.6
Coal	32.6	30.9	32.0	29.8	30.6	32.7	33.4	33.9	34.1	-2.3	2.8
Oil	60.1	57.7	63.4	62.0	59.5	61.8	62.8	63.6	65.0	0.4	0.9
Gas	9.6	9.5	10.0	10.0	9.6	10.2	10.6	10.8	10.9	0.4	1.8
Electricity	22.9	21.9	23.2	23.6	23.5	24.0	24.5	25.0	25.4	0.7	1.5
Heat	-	-	-	-	-	-	-	-	-	-	-
New-Renewable	4.0	4.0	4.4	4.6	4.7	4.8	5.0	5.2	5.5	2.0	3.6
Transport	37.2	34.7	36.6	36.4	36.7	36.8	37.1	37.3	37.5	0.1	0.6
Coal	-	-	-	-	-	-	-	-	-	-	-
Oil	35.0	32.7	34.6	34.2	34.6	34.8	35.0	35.2	35.4	0.0	0.7
Gas	1.2	1.1	1.1	1.0	1.0	0.9	0.9	0.9	0.8	-3.9	-3.8
Electricity	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	7.0	7.1
Heat	-	-	-	-	-	-	-	-	-	-	-
New-Renewable	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	5.7	-0.0
Buildings*	45.3	45.0	46.1	47.7	46.3	47.4	48.3	49.1	49.9	1.0	0.9
Coal	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	-12.4	-10.4
Oil	6.1	5.5	5.4	5.3	5.2	5.2	5.2	5.2	5.1	-5.8	-0.7
Gas	14.2	14.2	14.5	15.2	14.0	14.5	14.8	15.0	15.1	1.8	-0.2
Electricity	20.5	20.5	21.2	22.1	22.4	22.9	23.4	23.9	24.4	2.4	2.0
Heat	2.5	2.6	2.7	2.9	2.7	2.8	2.9	3.0	3.1	4.5	1.7
New-Renewable	1.8	1.9	2.0	1.9	1.8	1.9	1.9	2.0	2.0	0.6	1.2
Transform**	310.0	296.3	302.2	318.1	314.4	316.9	319.2	320.6	321.5	0.9	0.2
Coal	49.9	41.6	40.6	39.1	37.1	35.7	34.5	35.9	34.9	-5.6	-2.2
Oil	173.7	164.1	164.8	177.0	175.3	174.0	173.5	172.5	171.5	0.7	-0.6
Gas	49.7	49.7	55.3	55.1	52.9	55.1	56.7	58.0	62.1	4.0	2.4
Nuclear	31.1	34.1	33.7	37.5	38.5	40.5	42.0	40.9	39.0	3.5	0.8
New-Renewable	5.6	6.8	7.9	9.5	10.7	11.6	12.5	13.3	14.0	19.0	8.0

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

Coal - HEG Scenario

(Mton)

										CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27
Total Coal Demand	136.7	119.9	119.9	114.0	111.6	112.5	111.3	114.6	113.2	-4.4	-0.1
Transform	84.8	70.7	68.9	67.1	63.4	61.1	59.1	61.6	59.8	-5.6	-2.3
Power Generation	84.8	70.7	68.9	67.1	63.4	61.1	59.1	61.6	59.8	-5.6	-2.3
Heat	-	-	-	-	-	-	-	-	-	-	-
Gas Manufacture	-	-	-	-	-	-	-	-	-	-	-
Oil refinery	-	-	-	-	-	-	-	-	-	-	-
Total Final Consumption	51.9	49.2	51.0	46.9	48.2	51.4	52.2	53.0	53.3	-2.7	2.6
Industry	51.3	48.7	50.5	46.5	47.8	51.0	51.9	52.7	53.1	-2.6	2.7
Transport	-	-	-	-	-	-	-	-	-	-	-
Buildings	0.6	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.2	-12.2	-10.4
Consumption by products											
Anthracite	7.9	7.2	7.3	6.2	6.1	6.1	5.7	5.7	5.7	-5.7	-1.8
Bituminous	128.8	112.7	112.6	107.8	105.6	106.4	105.6	108.9	107.5	-4.4	-0.1
Iron making	34.6	32.8	34.1	31.4	32.7	34.9	36.0	36.8	37.0	-2.1	3.3
Cement	4.0	3.4	3.6	3.7	3.8	4.0	4.0	4.0	4.1	-2.6	2.2
Power Generation	83.6	69.8	68.0	66.2	62.5	60.3	58.3	60.8	59.0	-5.6	-2.3

Oil - HEG Scenario

(Mbbbl)

										CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27
Total Oil Demand	808.2	775.7	830.7	814.5	801.8	822.0	832.6	840.5	852.9	-0.1	0.9
Crude oil & refinery feedstocks	1,159.0	1,089.3	1,089.1	1,155.9	1,145.1	1,136.7	1,133.0	1,126.7	1,120.3	0.0	-0.6
Transform	1,159.0	1,089.3	1,089.1	1,155.4	1,144.3	1,135.9	1,132.3	1,125.9	1,119.6	0.0	-0.6
Oil refinery	1,159.0	1,089.3	1,089.1	1,155.4	1,144.3	1,135.9	1,132.3	1,125.9	1,119.6	0.0	-0.6
Petroleum products	-350.8	-313.6	-258.4	-341.4	-343.3	-314.7	-300.5	-286.2	-267.4	0.4	-4.8
Transform	-1,188.6	-1,107.2	-1,105.8	-1,179.3	-1,168.2	-1,159.0	-1,155.2	-1,148.5	-1,141.8	0.0	-0.6
Power Generation	5.7	3.8	4.2	5.0	3.9	3.8	3.8	3.8	3.8	-9.0	-5.3
Heat	1.7	1.6	1.8	1.7	1.8	2.1	2.2	2.3	2.4	7.3	7.3
Gas Manufacture	0.4	0.3	1.7	3.4	3.6	3.7	3.7	3.8	3.8	61.6	2.5
Oil refinery*	-1,196.3	-1,112.9	-1,113.4	-1,189.4	-1,177.5	-1,168.6	-1,165.0	-1,158.3	-1,151.8	0.1	-0.6
Total Final Consumption	796.1	752.3	809.1	798.9	782.5	802.8	813.5	821.2	833.6	-0.1	0.9
Industry	483.9	462.2	505.8	496.9	480.0	499.4	508.3	514.6	526.0	0.4	1.1
Transport	263.2	245.4	259.0	258.0	259.9	260.8	262.7	264.2	265.4	0.0	0.6
Buildings	49.1	44.7	44.2	44.0	42.7	42.6	42.5	42.4	42.2	-4.9	-0.8
Consumption by products											
Gasoline	82.7	81.0	84.9	88.4	90.5	91.6	92.5	93.5	94.1	2.1	1.3
Diesel	163.8	155.0	156.3	151.8	152.7	153.7	154.8	155.6	156.2	-1.4	0.6
Kerosene	16.7	16.8	16.5	15.4	14.6	14.6	14.5	14.5	14.6	-3.8	-1.1
B-C	8.4	6.8	6.4	6.7	6.8	6.8	6.9	6.9	7.0	-9.5	0.8
Jet Oil	13.1	7.8	15.5	15.6	14.8	14.6	14.8	15.0	15.2	3.1	-0.6
LPG	110.9	109.1	109.2	115.3	107.2	110.2	113.7	114.2	114.8	3.3	-0.1
Petrochem feedstock	46.9	48.8	47.3	56.6	48.8	52.2	55.7	56.4	57.5	14.2	0.3
Naphtha	365.4	333.9	369.9	356.0	349.2	363.5	367.9	373.1	382.7	-1.5	1.5
Refinery gas	6.3	8.5	9.0	9.3	7.6	8.1	8.5	8.5	8.4	15.8	-2.0
Other Non-Energy	28.8	33.3	41.3	40.5	39.1	39.7	39.9	40.0	40.6	7.1	0.1

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

Gas - HEG Scenario

	CAGR (%)										
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27
Total Gas Demand (Mton)	41.0	41.5	45.8	45.3	43.7	46.0	47.9	49.1	52.3	4.5	2.9
Transform	38.0	38.0	42.4	42.1	40.5	42.2	43.4	44.4	47.6	4.0	2.5
Power Generation	19.4	20.0	23.2	22.5	22.7	23.7	24.5	25.4	28.5	6.5	4.9
Heat	-	-	-	-	-	-	-	-	-	-	-
Gas Manufacture	18.6	18.0	19.1	19.6	17.8	18.5	18.8	19.0	19.1	1.5	-0.6
Oil refinery	-	-	-	-	-	-	-	-	-	-	-
Total Final Consumption	1.5	1.6	1.6	1.7	1.7	2.0	2.2	2.3	2.4	3.9	7.2
Industry	1.5	1.6	1.6	1.7	1.7	2.0	2.2	2.3	2.4	3.9	7.2
City Gas (Bm3)	22.4	22.0	22.7	23.6	21.8	22.6	22.9	23.1	23.2	1.0	-0.3
Transform	-22.8	-22.1	-23.3	-24.3	-21.9	-22.7	-23.1	-23.3	-23.4	1.7	-0.8
Power Generation	0.4	0.4	0.3	0.3	0.2	0.2	0.3	0.3	0.3	-10.4	-0.0
Heat	0.3	0.2	0.3	0.4	0.3	0.4	0.4	0.4	0.4	8.0	1.3
Gas Manufacture*	-23.7	-22.9	-24.4	-25.5	-23.2	-24.2	-24.8	-25.2	-25.5	2.0	-0.0
Oil refinery	-	-	-	-	-	-	-	-	-	-	-
Total Final Consumption	22.4	22.0	22.7	23.6	21.8	22.6	22.9	23.1	23.2	1.0	-0.3
Industry	7.5	7.1	7.6	7.6	7.1	7.5	7.6	7.6	7.6	-0.2	-0.0
Transport	1.2	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.8	-3.8	-3.8
Buildings	13.8	13.8	14.1	15.0	13.7	14.2	14.4	14.6	14.8	2.0	-0.3

* 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 - HEG Scenario

	(TWh)										
										CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27
Net Electricity Demand	559.6	548.9	573.1	590.7	590.3	603.9	616.7	629.6	642.1	1.5	1.3
Own use and Losses	52.0	52.0	52.8	55.3	52.8	53.9	55.1	56.2	57.4	0.4	0.4
Total Final Consumption	507.5	496.9	520.3	535.3	537.5	550.0	561.6	573.4	584.7	1.6	1.4
Industry	266.6	254.7	269.6	274.1	273.2	279.2	284.6	290.1	295.6	0.7	1.0
Transport	3.2	3.3	3.7	4.0	4.3	4.6	4.9	5.3	5.7	7.0	7.1
Buildings	237.8	238.8	247.1	257.2	260.0	266.2	272.1	278.0	283.5	2.4	1.7
Power generation capacity (GW)*	119.9	124.0	129.1	132.1	138.4	144.9	150.4	149.5	149.8	3.4	2.6
Coal	37.0	36.9	37.7	37.7	39.6	40.7	40.3	37.4	36.6	0.5	-0.6
Oil	3.9	2.2	2.2	0.9	0.9	0.9	0.9	0.9	0.9	-26.0	-1.4
Gas	39.4	41.2	41.2	41.2	41.7	42.7	45.2	47.1	47.1	1.9	2.7
Nuclear	23.3	23.3	23.3	23.7	24.7	26.5	27.3	25.2	24.5	1.0	0.6
New-Renewable	16.4	20.5	24.8	28.6	31.6	34.2	36.7	38.9	40.9	21.6	7.4
power generation*	559.6	548.9	573.1	590.7	590.3	603.9	616.7	629.6	642.1	1.5	1.3
Coal	227.4	196.3	198.0	193.2	183.3	175.9	170.0	177.4	172.3	-4.1	-2.7
Oil	3.3	2.3	2.4	2.0	1.6	1.6	1.6	1.6	1.6	-17.9	-4.5
Gas	144.4	145.9	168.4	163.6	164.7	171.5	177.9	184.3	206.6	5.4	3.9
Nuclear	145.9	160.2	158.0	176.1	180.7	190.0	197.4	191.9	183.1	3.5	0.8
New-Renewable	38.6	44.2	46.4	55.9	60.0	64.9	69.8	74.4	78.5	12.6	7.0
Fuel Consumption of Power Plants (Mtoe)*	113.5	110.4	114.5	117.6	117.8	120.6	123.1	125.5	127.4	1.2	1.2
Coal	49.9	41.6	40.6	39.1	37.1	35.7	34.5	35.9	34.9	-5.6	-2.7
Oil	0.8	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	-12.0	-5.2
Gas	25.3	26.1	30.4	29.4	29.7	30.9	32.1	33.2	37.2	6.5	3.9
Nuclear	31.1	34.1	33.7	37.5	38.5	40.5	42.0	40.9	39.0	3.5	0.8
New-Renewable	6.3	8.0	9.3	11.0	12.1	13.1	14.0	15.0	15.8	19.2	7.5

* District Heat is classified by fuel type since 2014

Heat and New-Renewable - HEG Scenario

(Mtoe)

	CAGR (%)										
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27
Heat Demand	2.7	2.8	2.8	3.2	2.9	3.1	3.2	3.3	3.5	5.4	1.9
Own use and Losses	0.3	0.3	0.1	0.4	0.3	0.3	0.3	0.3	0.3	7.1	-1.4
Total Final Consumption	2.5	2.6	2.7	2.9	2.7	2.8	2.9	3.0	3.1	4.5	1.7
Industry	-	-	-	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-	-	-	-
Buildings	2.5	2.6	2.7	2.9	2.7	2.8	2.9	3.0	3.1	4.5	1.7
New-Renewable Demand	12.1	13.4	15.0	16.7	17.9	19.1	20.2	21.3	22.2	9.6	5.8
Transform	5.6	6.8	7.9	9.5	10.7	11.6	12.5	13.3	14.0	19.0	8.0
Total Final Consumption	6.5	6.7	7.1	7.2	7.3	7.5	7.7	8.0	8.2	1.9	2.6
Industry	4.0	4.0	4.4	4.6	4.7	4.8	5.0	5.2	5.5	2.0	3.6
Transport	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	5.7	-0.0
Buildings	1.8	1.9	2.0	1.9	1.8	1.9	1.9	2.0	2.0	0.6	1.2

Main Economic and Energy Indicators - *LEG Scenario*

											CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27	
Economy and Population												
GDP (2015 trillion won)	1,852.7	1,839.5	1,915.8	1,968.8	1,992.0	2,028.8	2,064.3	2,099.4	2,133.9	2.3	1.6	
Industrial Production(2020=100)	100.3	100.0	108.2	109.7	106.9	106.9	105.8	104.5	104.0	2.2	- 1.1	
Crude Oil Price (Dubai, USD/bbl)	63.5	42.2	69.3	96.4	82.3	86.3	86.7	82.9	83.0	12.6	- 2.9	
Working Days	272.5	275.5	273.5	272.5	273.5	272.5	273.5	275.0	277.5	0.2	0.4	
Population (million)	51.8	51.8	51.7	51.6	51.6	51.5	51.4	51.4	51.3	0.1	- 0.1	
Average Temperature (°C)	13.5	13.0	13.3	13.0	13.4	13.3	13.3	13.3	13.3	- 0.2	0.5	
Cooling Degree days	120.4	85.2	101.3	141.9	111.8	102.0	102.0	102.0	102.0	1.3	- 6.4	
Heating Degree days	2,370.9	2,448.0	2,404.7	2,567.1	2,372.9	2,433.9	2,418.2	2,418.2	2,418.2	0.4	- 1.2	
Energy Indicators												
Total Primary Energy Demand (Mtoe)	298.6	288.4	303.2	304.5	300.5	305.9	309.1	310.7	311.9	0.7	0.5	
Energy Intensity (toe/million won)	0.162	0.157	0.159	0.155	0.151	0.151	0.150	0.148	0.146	- 1.5	- 1.1	
TPED/capita (toe/capita)	5.769	5.564	5.859	5.898	5.828	5.941	6.009	6.045	6.074	0.6	0.6	
Electricity Generation (TWh)	559.6	548.9	572.4	590.5	588.5	597.7	605.1	611.9	618.1	1.5	0.9	
Electricity Generation/capita (MWh/capita)	10.8	10.6	11.1	11.4	11.4	11.6	11.8	11.9	12.0	1.4	1.0	
Electricity Demand/capita (MWh/capita)	9.8	9.6	10.1	10.4	10.4	10.6	10.7	10.8	11.0	1.5	1.1	

Energy Demand - LEG Scenario

										CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27
Total Primary Energy Demand											
Coal (Mton)	136.7	119.9	119.9	114.0	111.4	109.9	107.0	108.4	106.5	-4.4	-1.3
Oil (Mbbl)	808.2	775.7	830.7	814.5	798.7	811.6	815.3	815.5	820.0	-0.1	0.1
Gas (Bm³)	41.0	41.5	45.8	45.3	43.4	45.4	46.8	47.6	49.8	4.5	1.9
Nuclear (TWh)	145.9	160.2	158.0	176.1	180.7	190.0	197.4	191.9	183.1	3.5	0.8
New-Renewable (Mtoe)	12.1	13.4	15.0	16.7	17.9	19.0	20.0	20.8	21.6	9.6	5.3
Total (Mtoe)	298.6	288.4	303.2	304.5	300.5	305.9	309.1	310.7	311.9	0.7	0.5
Coal	82.8	72.8	72.8	69.1	67.8	66.9	65.3	66.2	65.1	-4.3	-1.2
Oil	118.5	113.4	121.5	121.7	119.5	120.9	121.2	121.1	121.5	0.6	-0.0
Gas	54.0	54.6	60.1	59.5	56.8	58.8	60.6	61.7	64.7	4.5	1.7
Nuclear	31.1	34.1	33.7	37.5	38.5	40.5	42.0	40.9	39.0	3.5	0.8
New-Renewable	12.1	13.4	15.0	16.7	17.9	19.0	20.0	20.8	21.6	9.6	5.3
Total Final Consumption											
Coal (Mton)	51.9	49.2	51.0	46.9	48.0	49.5	49.6	49.6	49.3	-2.7	1.0
Oil (Mbbl)	796.1	752.3	809.1	798.9	779.4	792.4	796.2	796.3	800.8	-0.1	0.0
Gas (Bm³)	24.3	24.1	24.8	25.8	23.7	24.2	24.7	25.1	25.3	1.2	-0.4
Electricity (TWh)	507.5	496.9	520.3	535.3	535.9	544.4	551.1	557.3	562.9	1.6	1.0
Heat (Mtoe)	2.5	2.6	2.7	2.9	2.7	2.8	2.8	2.9	3.0	4.5	0.9
New-Renewable (Mtoe)	6.5	6.7	7.1	7.2	7.2	7.3	7.4	7.5	7.6	1.9	1.1
Total (Mtoe)	211.7	203.7	215.7	214.0	209.8	213.8	215.6	216.7	218.0	0.1	0.4
Coal	32.9	31.2	32.3	30.0	30.7	31.7	31.8	31.9	31.7	-2.4	1.1
Oil	101.2	95.9	103.3	101.6	98.9	100.4	100.8	100.8	101.4	-0.1	-0.0
Gas	25.0	24.8	25.5	26.3	24.2	24.8	25.3	25.7	25.9	1.0	-0.3
Electricity	43.6	42.7	44.7	46.0	46.1	46.8	47.4	47.9	48.4	1.6	1.0
Heat	2.5	2.6	2.7	2.9	2.7	2.8	2.8	2.9	3.0	4.5	0.9
New-Renewable	6.5	6.7	7.1	7.2	7.2	7.3	7.4	7.5	7.6	1.9	1.1
Industry	129.2	124.0	133.0	130.0	127.2	130.5	131.8	132.4	133.3	-0.1	0.5
Transport	37.2	34.7	36.6	36.4	36.5	36.3	36.2	36.1	35.9	0.1	-0.2
Buildings	45.3	45.0	46.1	47.7	46.1	46.9	47.6	48.2	48.7	1.0	0.5

Energy Demand - LEG Scenario

	(yoy, %)										
	CAGR (%)										
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27
Total Primary Energy Demand											
Coal (Mton)	-6.6	-12.3	-0.0	-4.9	-2.3	-1.4	-2.6	1.4	-1.8	-4.4	-1.3
Oil (Mbbl)	0.0	-4.0	7.1	-1.9	-1.9	1.6	0.5	0.0	0.6	-0.1	0.1
Gas (Bm³)	-3.0	1.2	10.4	-1.0	-4.2	4.4	3.1	1.8	4.8	4.5	1.9
Nuclear (TWh)	9.3	9.8	-1.4	11.4	2.7	5.1	3.9	-2.8	-4.6	3.5	0.8
New-Renewable (Mtoe)	3.5	10.8	11.7	11.2	7.1	5.9	5.3	4.4	3.7	9.6	5.3
Total (Mtoe)	-0.9	-3.4	5.1	0.4	-1.3	1.8	1.0	0.5	0.4	0.7	0.5
Coal	-5.7	-12.1	0.0	-5.1	-1.9	-1.3	-2.4	1.4	-1.7	-4.3	-1.2
Oil	0.5	-4.3	7.2	0.1	-1.8	1.1	0.3	-0.1	0.3	0.6	-0.0
Gas	-2.6	1.0	10.1	-1.1	-4.5	3.5	3.2	1.7	4.8	4.5	1.7
Nuclear	9.3	9.8	-1.4	11.4	2.7	5.1	3.9	-2.8	-4.6	3.5	0.8
New-Renewable	3.5	10.8	11.7	11.2	7.1	5.9	5.3	4.4	3.7	9.6	5.3
Total Final Consumption											
Coal (Mton)	-4.9	-5.2	3.6	-8.1	2.4	3.1	0.2	-0.0	-0.5	-2.7	1.0
Oil (Mbbl)	1.0	-5.5	7.6	-1.3	-2.4	1.7	0.5	0.0	0.6	-0.1	0.0
Gas (Bm³)	-2.1	-1.1	3.1	3.9	-8.0	2.1	2.2	1.3	0.9	1.2	-0.4
Electricity (TWh)	-1.1	-2.1	4.7	2.9	0.1	1.6	1.2	1.1	1.0	1.6	1.0
Heat (Mtoe)	-2.5	4.9	4.2	6.4	-6.9	3.3	2.4	2.3	3.6	4.5	0.9
New-Renewable (Mtoe)	-7.6	2.5	7.1	1.1	-0.2	1.5	1.6	1.1	1.3	1.9	1.1
Total (Mtoe)	-1.1	-3.8	5.8	-0.8	-1.9	1.9	0.9	0.5	0.6	0.1	0.4
Coal	-4.1	-5.3	3.5	-7.0	2.4	3.2	0.4	0.1	-0.4	-2.4	1.1
Oil	0.8	-5.3	7.8	-1.7	-2.6	1.5	0.4	-	0.5	-0.1	-0.0
Gas	-2.1	-1.1	3.1	3.0	-7.7	2.1	2.2	1.3	0.9	1.0	-0.3
Electricity	-1.1	-2.1	4.7	2.9	0.1	1.6	1.2	1.1	1.0	1.6	1.0
Heat	-2.5	4.9	4.2	6.4	-6.9	3.3	2.4	2.3	3.6	4.5	0.9
New-Renewable	-7.6	2.5	7.1	1.1	-0.2	1.5	1.6	1.1	1.3	1.9	1.1
Industry	-1.2	-4.0	7.2	-2.2	-2.2	2.6	1.0	0.5	0.7	-0.1	0.5
Transport	2.7	-6.6	5.4	-0.8	0.5	-0.5	-0.3	-0.4	-0.5	0.1	-0.2
Buildings	-3.6	-0.7	2.4	3.4	-3.2	1.7	1.5	1.2	1.1	1.0	0.5

Energy Demand by Sector - *LEG Scenario*

	(Mtoe)											
											CAGR (%)	
											17-22	22-27
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e			
Industry	129.2	124.0	133.0	130.0	127.2	130.5	131.8	132.4	133.3	-0.1	0.5	
Coal	32.6	30.9	32.0	29.8	30.5	31.5	31.7	31.7	31.6	-2.3	1.2	
Oil	60.1	57.7	63.4	62.0	59.3	61.0	61.5	61.7	62.4	0.4	0.1	
Gas	9.6	9.5	10.0	10.0	9.3	9.6	10.0	10.2	10.3	0.4	0.7	
Electricity	22.9	21.9	23.2	23.6	23.4	23.7	23.8	24.0	24.1	0.7	0.4	
Heat	-	-	-	-	-	-	-	-	-	-	-	
New-Renewable	4.0	4.0	4.4	4.6	4.6	4.7	4.8	4.9	5.0	2.0	1.6	
Transport	37.2	34.7	36.6	36.4	36.5	36.3	36.2	36.1	35.9	0.1	-0.2	
Coal	-	-	-	-	-	-	-	-	-	-	-	
Oil	35.0	32.7	34.6	34.2	34.4	34.3	34.2	34.0	33.8	0.0	-0.2	
Gas	1.2	1.1	1.1	1.0	1.0	0.9	0.9	0.9	0.8	-3.9	-3.8	
Electricity	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	7.0	7.1	
Heat	-	-	-	-	-	-	-	-	-	-	-	
New-Renewable	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	5.7	-0.0	
Buildings*	45.3	45.0	46.1	47.7	46.1	46.9	47.6	48.2	48.7	1.0	0.5	
Coal	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	-12.4	-10.4	
Oil	6.1	5.5	5.4	5.3	5.2	5.2	5.2	5.2	5.2	-5.8	-0.6	
Gas	14.2	14.2	14.5	15.2	13.9	14.2	14.4	14.6	14.7	1.8	-0.7	
Electricity	20.5	20.5	21.2	22.1	22.3	22.8	23.2	23.5	23.8	2.4	1.5	
Heat	2.5	2.6	2.7	2.9	2.7	2.8	2.8	2.9	3.0	4.5	0.9	
New-Renewable	1.8	1.9	2.0	1.9	1.8	1.9	1.9	1.9	1.9	0.6	0.3	
Transform**	310.0	296.3	302.2	318.1	314.1	315.7	316.9	317.3	317.0	0.9	-0.1	
Coal	49.9	41.6	40.6	39.1	37.1	35.2	33.5	34.3	33.4	-5.6	-3.1	
Oil	173.7	164.1	164.8	177.0	175.3	174.0	173.5	172.5	171.5	0.7	-0.6	
Gas	49.7	49.7	55.3	55.1	52.6	54.3	55.4	56.3	59.1	4.0	1.4	
Nuclear	31.1	34.1	33.7	37.5	38.5	40.5	42.0	40.9	39.0	3.5	0.8	
New-Renewable	5.6	6.8	7.9	9.5	10.7	11.6	12.5	13.3	14.0	19.0	8.0	

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

Coal - LEG Scenario

(Mton)

	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	CAGR (%)	
										17-22	22-27
Total Coal Demand	136.7	119.9	119.9	114.0	111.4	109.9	107.0	108.4	106.5	-4.4	-1.3
Transform	84.8	70.7	68.9	67.1	63.4	60.4	57.4	58.8	57.2	-5.6	-3.2
Power Generation	84.8	70.7	68.9	67.1	63.4	60.4	57.4	58.8	57.2	-5.6	-3.2
Heat	-	-	-	-	-	-	-	-	-	-	-
Gas Manufacture	-	-	-	-	-	-	-	-	-	-	-
Oil refinery	-	-	-	-	-	-	-	-	-	-	-
Total Final Consumption	51.9	49.2	51.0	46.9	48.0	49.5	49.6	49.6	49.3	-2.7	1.0
Industry	51.3	48.7	50.5	46.5	47.6	49.2	49.3	49.3	49.1	-2.6	1.1
Transport	-	-	-	-	-	-	-	-	-	-	-
Buildings	0.6	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.2	-12.2	-10.4
Consumption by products											
Anthracite	7.9	7.2	7.3	6.2	6.0	5.7	5.3	5.0	4.8	-5.7	-5.0
Bituminous	128.8	112.7	112.6	107.8	105.4	104.1	101.7	103.4	101.7	-4.4	-1.2
Iron making	34.6	32.8	34.1	31.4	32.6	33.8	34.3	34.5	34.5	-2.1	1.9
Cement	4.0	3.4	3.6	3.7	3.8	3.9	3.9	3.9	3.9	-2.6	1.2
Power Generation	83.6	69.8	68.0	66.2	62.5	59.6	56.7	58.1	56.4	-5.6	-3.1

Oil - LEG Scenario

(Mbbbl)

										CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27
Total Oil Demand	808.2	775.7	830.7	814.5	798.7	811.6	815.3	815.5	820.0	-0.1	0.1
Crude oil & refinery feedstocks	1,159.0	1,089.3	1,089.1	1,155.9	1,145.1	1,136.7	1,133.0	1,126.7	1,120.3	0.0	-0.6
Transform	1,159.0	1,089.3	1,089.1	1,155.4	1,144.3	1,135.9	1,132.3	1,125.9	1,119.6	0.0	-0.6
Oil refinery	1,159.0	1,089.3	1,089.1	1,155.4	1,144.3	1,135.9	1,132.3	1,125.9	1,119.6	0.0	-0.6
Petroleum products	-350.8	-313.6	-258.4	-341.4	-346.4	-325.1	-317.7	-311.2	-300.3	0.4	-2.5
Transform	-1,188.6	-1,107.2	-1,105.8	-1,179.3	-1,168.2	-1,159.0	-1,155.2	-1,148.5	-1,141.9	0.0	-0.6
Power Generation	5.7	3.8	4.2	5.0	3.9	3.8	3.8	3.8	3.8	-9.0	-5.3
Heat	1.7	1.6	1.8	1.7	1.8	2.1	2.2	2.2	2.3	7.3	6.4
Gas Manufacture	0.4	0.3	1.7	3.4	3.6	3.7	3.7	3.8	3.8	61.6	2.5
Oil refinery*	-1,196.3	-1,112.9	-1,113.4	-1,189.4	-1,177.5	-1,168.6	-1,165.0	-1,158.3	-1,151.8	0.1	-0.6
Total Final Consumption	796.1	752.3	809.1	798.9	779.4	792.4	796.2	796.3	800.8	-0.1	0.0
Industry	483.9	462.2	505.8	496.9	477.8	492.4	497.2	498.5	504.4	0.4	0.3
Transport	263.2	245.4	259.0	258.0	258.8	257.2	256.3	255.3	253.9	0.0	-0.3
Buildings	49.1	44.7	44.2	44.0	42.7	42.7	42.7	42.5	42.5	-4.9	-0.7
Consumption by products											
Gasoline	82.7	81.0	84.9	88.4	90.1	90.3	90.4	90.4	90.1	2.1	0.4
Diesel	163.8	155.0	156.3	151.8	152.1	151.9	151.8	151.1	150.4	-1.4	-0.2
Kerosene	16.7	16.8	16.5	15.4	14.6	14.6	14.5	14.5	14.4	-3.8	-1.4
B-C	8.4	6.8	6.4	6.7	6.8	6.8	6.9	6.9	6.9	-9.5	0.6
Jet Oil	13.1	7.8	15.5	15.6	14.8	14.0	13.6	13.6	13.4	3.1	-3.0
LPG	110.9	109.1	109.2	115.3	107.0	109.3	111.9	111.6	111.9	3.3	-0.6
Petrochem feedstock	46.9	48.8	47.3	56.6	48.5	51.3	54.2	54.1	54.8	14.2	-0.7
Naphtha	365.4	333.9	369.9	356.0	347.3	357.8	359.2	360.5	365.6	-1.5	0.5
Refinery gas	6.3	8.5	9.0	9.3	7.6	8.1	8.5	8.5	8.4	15.8	-2.0
Other Non-Energy	28.8	33.3	41.3	40.5	39.1	39.5	39.5	39.4	39.7	7.1	-0.4

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

Gas - LEG Scenario

	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	CAGR (%)	
										17-22	22-27
Total Gas Demand (Mton)	41.0	41.5	45.8	45.3	43.4	45.4	46.8	47.6	49.8	4.5	1.9
Transform	38.0	38.0	42.4	42.1	40.3	41.6	42.4	43.1	45.3	4.0	1.5
Power Generation	19.4	20.0	23.2	22.5	22.5	23.1	23.6	24.1	26.2	6.5	3.1
Heat	-	-	-	-	-	-	-	-	-	-	-
Gas Manufacture	18.6	18.0	19.1	19.6	17.8	18.5	18.8	19.0	19.0	1.5	-0.6
Oil refinery	-	-	-	-	-	-	-	-	-	-	-
Total Final Consumption	1.5	1.6	1.6	1.7	1.7	1.8	2.0	2.1	2.2	3.9	5.6
Industry	1.5	1.6	1.6	1.7	1.7	1.8	2.0	2.1	2.2	3.9	5.6
City Gas (Bm3)	22.4	22.0	22.7	23.6	21.5	21.8	22.2	22.4	22.4	1.0	-1.0
Transform	-22.8	-22.1	-23.3	-24.3	-21.9	-22.7	-23.1	-23.3	-23.4	1.7	-0.8
Power Generation	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.3	-10.4	-1.6
Heat	0.3	0.2	0.3	0.4	0.3	0.4	0.4	0.4	0.4	8.0	0.5
Gas Manufacture*	-23.7	-22.9	-24.4	-25.5	-23.2	-24.2	-24.8	-25.1	-25.4	2.0	-0.1
Oil refinery	-	-	-	-	-	-	-	-	-	-	-
Total Final Consumption	22.4	22.0	22.7	23.6	21.5	21.8	22.2	22.4	22.4	1.0	-1.0
Industry	7.5	7.1	7.6	7.6	6.9	7.1	7.2	7.3	7.3	-0.2	-1.0
Transport	1.2	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.8	-3.8	-3.8
Buildings	13.8	13.8	14.1	15.0	13.6	13.8	14.1	14.2	14.3	2.0	-0.8

* 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 - *LEG Scenario*

	(TWh)										
										CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e	17-22	22-27
Net Electricity Demand	559.6	548.9	573.1	590.7	588.5	597.7	605.1	611.9	618.1	1.5	1.3
Own use and Losses	52.0	52.0	52.8	55.3	52.6	53.3	54.0	54.6	55.2	0.4	0.4
Total Final Consumption	507.5	496.9	520.3	535.3	535.9	544.4	551.1	557.3	562.9	1.6	1.4
Industry	266.6	254.7	269.6	274.1	272.0	275.0	276.8	278.5	280.0	0.7	1.0
Transport	3.2	3.3	3.7	4.0	4.3	4.6	4.9	5.3	5.7	7.0	7.1
Buildings	237.8	238.8	247.1	257.2	259.6	264.7	269.3	273.5	277.3	2.4	1.7
Power generation capacity (GW)*	119.9	124.0	129.1	132.1	138.4	144.9	150.4	149.5	149.8	3.4	2.6
Coal	37.0	36.9	37.7	37.7	39.6	40.7	40.3	37.4	36.6	0.5	-0.6
Oil	3.9	2.2	2.2	0.9	0.9	0.9	0.9	0.9	0.9	-26.0	-1.4
Gas	39.4	41.2	41.2	41.2	41.7	42.7	45.2	47.1	47.1	1.9	2.7
Nuclear	23.3	23.3	23.3	23.7	24.7	26.5	27.3	25.2	24.5	1.0	0.6
New-Renewable	16.4	20.5	24.8	28.6	31.6	34.2	36.7	38.9	40.9	21.6	7.4
power generation*	559.6	548.9	573.1	590.7	588.5	597.7	605.1	611.9	618.1	1.5	1.3
Coal	227.4	196.3	198.0	193.2	183.3	173.7	165.1	169.5	164.8	-4.1	-2.7
Oil	3.3	2.3	2.4	2.0	1.6	1.6	1.6	1.6	1.6	-17.9	-4.5
Gas	144.4	145.9	168.4	163.6	162.9	167.5	171.2	174.6	190.2	5.4	3.9
Nuclear	145.9	160.2	158.0	176.1	180.7	190.0	197.4	191.9	183.1	3.5	0.8
New-Renewable	38.6	44.2	46.4	55.9	60.0	64.9	69.8	74.4	78.5	12.6	7.0
Fuel Consumption of Power Plants (Mtoe)*	113.5	110.4	114.5	117.6	117.5	119.4	120.9	122.1	122.9	1.2	1.2
Coal	49.9	41.6	40.6	39.1	37.1	35.2	33.5	34.3	33.4	-5.6	-2.7
Oil	0.8	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	-12.0	-5.2
Gas	25.3	26.1	30.4	29.4	29.3	30.2	30.8	31.5	34.3	6.5	3.9
Nuclear	31.1	34.1	33.7	37.5	38.5	40.5	42.0	40.9	39.0	3.5	0.8
New-Renewable	6.3	8.0	9.3	11.0	12.1	13.1	14.0	15.0	15.8	19.2	7.5

* District Heat is classified by fuel type since 2014

Heat and New-Renewable - *LEG Scenario*

(Mtoe)

											CAGR (%)	
	2019	2020	2021	2022p	2023e	2024e	2025e	2026e	2027e		17-22	22-27
Heat Demand	2.7	2.8	2.8	3.2	2.9	3.1	3.1	3.2	3.3		5.4	1.0
Own use and Losses	0.3	0.3	0.1	0.4	0.3	0.3	0.3	0.3	0.3		7.1	-2.2
Total Final Consumption	2.5	2.6	2.7	2.9	2.7	2.8	2.8	2.9	3.0		4.5	0.9
Industry	-	-	-	-	-	-	-	-	-		-	-
Transport	-	-	-	-	-	-	-	-	-		-	-
Buildings	2.5	2.6	2.7	2.9	2.7	2.8	2.8	2.9	3.0		4.5	0.9
New-Renewable Demand	12.1	13.4	15.0	16.7	17.9	19.0	20.0	20.8	21.6		9.6	5.3
Transform	5.6	6.8	7.9	9.5	10.7	11.6	12.5	13.3	14.0		19.0	8.0
Total Final Consumption	6.5	6.7	7.1	7.2	7.2	7.3	7.4	7.5	7.6		1.9	1.1
Industry	4.0	4.0	4.4	4.6	4.6	4.7	4.8	4.9	5.0		2.0	1.6
Transport	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7		5.7	-0.0
Buildings	1.8	1.9	2.0	1.9	1.8	1.9	1.9	1.9	1.9		0.6	0.3



44543 Jung-gu District, Ulsan 405-11
TEL : 052-714-2114 FAX : 052-714-2028
www.keei.re.kr

