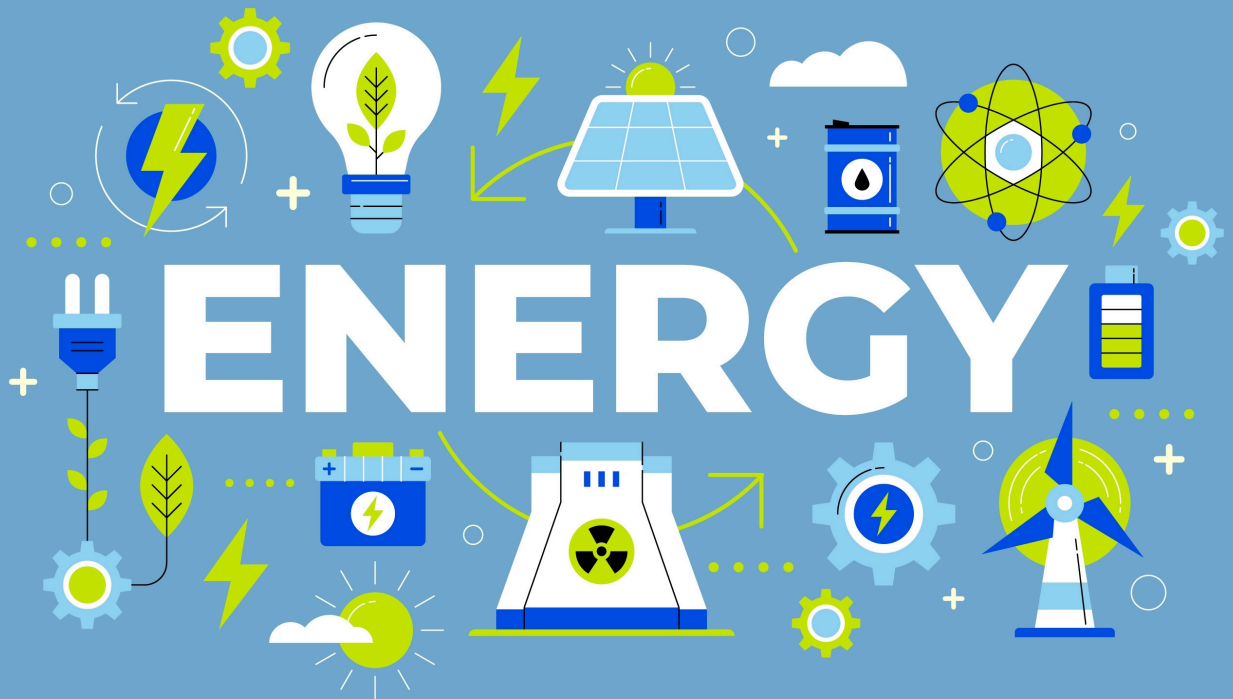


2024

**KEEi**  
**Korea Mid-Term  
Energy Outlook**  
(2023~2028)





KEEI Mid-Term Energy Outlook (2023-2028) 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 Supply Statistics Research of the Center for Energy Information and Statistics.

Cherl-Hyun Kim (Gas, Electricity, Heat & Renewables, Transformation) wrote the report with the participation and support of Do-Young Choi(Coal), Seonggyun Kim (Economy, Oil). And Donghwan Oh and Hyejin Goh assisted in writing the report.

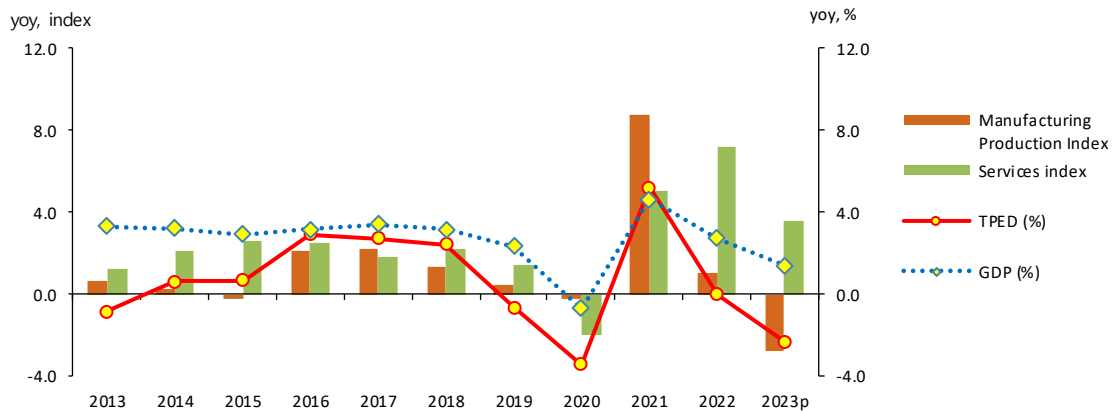
If you have any further inquiries, please send an email to [SupplyStat@keei.re.kr](mailto:SupplyStat@keei.re.kr) or call +82-52-714-2273.

# 1. Total Primary Energy Demand and Total Final Consumption

□ **Total Primary Energy Demand (TPED) is expected to decline by 0.3% per year on average from 2018 to 2023 due to COVID-19, global economic slowdown, etc.**

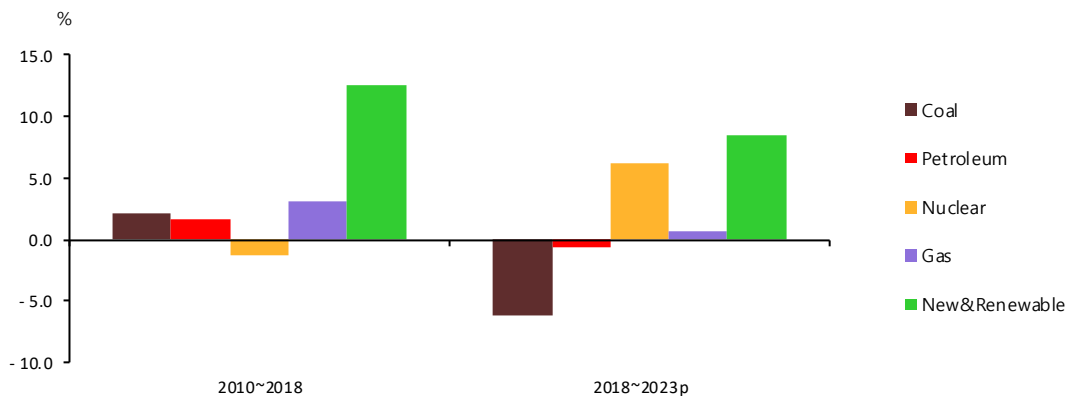
- TPED grew rapidly by more than 5% in 2021 due to the recovery from COVID-19, but then slowed to a decline in 2023 due to the global economic slowdown.

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



- Energy intensity (toe/million) improves (declines) rapidly over the 2022-2023 period, with TPED declining more rapidly than economic growth.

**Figure 1.2 Annual growth rates by energy source in 2010-2018 and 2018- 2023**

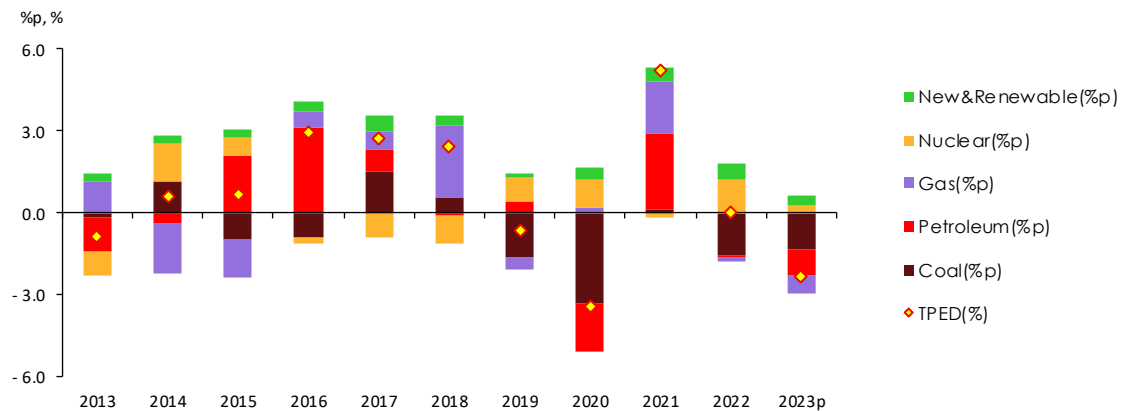


Note: Based on original unit

□ **Nuclear, renewables, and gas consumption have increased over the past five years (2018-2023), while coal has declined significantly.**

- Coal consumption peaked in 2018 and declined rapidly over the last five years at an average annual rate of 6.2%, with declines in both power generation and industrial use.
- Oil consumption declined by 0.7% CAGR from 2018 to 2023, despite large-scale petrochemical capacity additions<sup>1</sup> in 2021 and 2022, due to the continued rise in China's petrochemical self-sufficiency rate, COVID-19, etc.

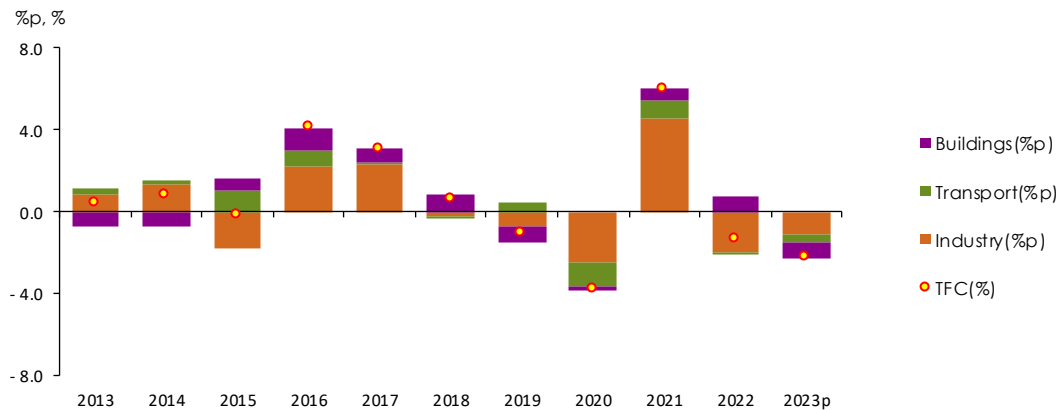
**Figure 1.3 Contribution by energy source to fluctuation of TPED**



- Gas (natural gas + city gas) consumption has slowed to an average annual growth rate of 0.7% over the last five years (2018-2023), with power generation and industrial use increasing, but building use decreasing.
- Nuclear power generation increased at an average annual rate of 6.2% from 2018 to 2023, driven by the entry of new nuclear power plants and increased capacity utilization.
- Consumption of renewable and other energy grew at an average annual rate of 8.5%, mainly in the power generation sector, thanks to the government's policy to expand its use.
- Electricity consumption increased at an average annual rate of 0.8% between 2018 and 2023, with recent volatility due to extreme weather events and COVID-19.

<sup>1</sup> Capacity ramp-up from the second half of 2021 to the first half of 2022, mainly LPG facilities.

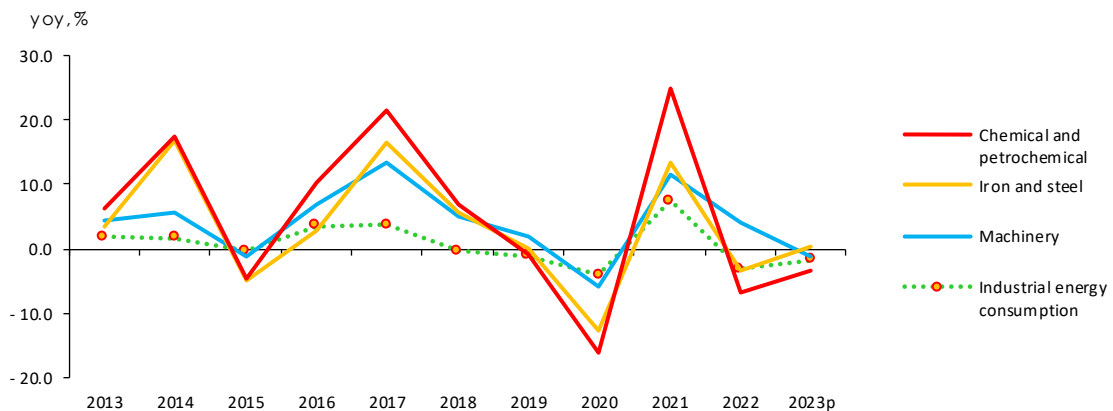
**Figure 1.4 Contribution by energy source to fluctuation of TFC**



□ **Total Final Consumption (TFC) will decrease at a CAGR of 0.5% from 214.4 million toe in 2018 to 208.6 million toe in 2023.**

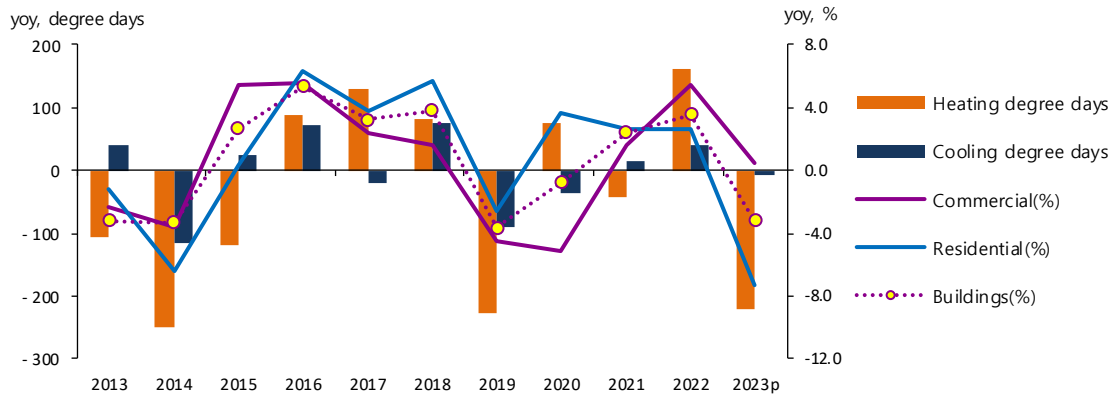
- Industrial sector energy consumption will decline by 0.6% over the 2018-2023 period, with year-on-year declines in every year since 2018 except 2021, when it grew rapidly due to recovery from COVID-19.

**Figure 1.5 Trend of growth rate of energy consumption in industrial and energy-intensive industries**



- Energy consumption in the buildings sector, which fluctuates significantly with temperature, is expected to decline by 0.4% per year on average from 2018 to 2023, with a mixed shift between residential and commercial due to COVID-19.

**Figure 1.6 Trends in heating and cooling degree-days and building energy consumption growth**



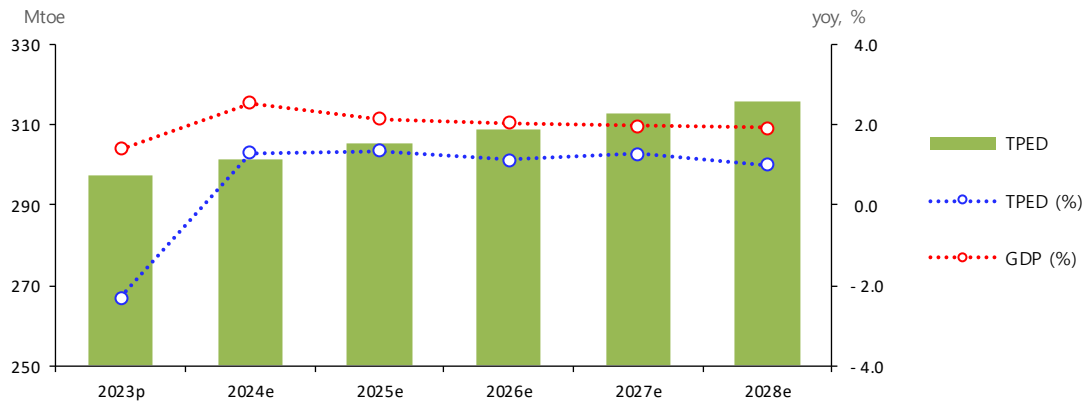
- Energy consumption in the transportation sector increased by more than 5% in 2021 due to the base effect, but it is expected to decrease by an average of 0.5% per year for the entire period from 2018 to 2023 due to factors such as rising oil prices, economic slowdown, and increased overseas travel.

## 2. TPED & TFC Outlook<sup>2</sup>

- **TPED is projected to grow at an average annual rate of 1.2% over the 2023-2028 period, reaching 315.9 million toe.**

- TPED will decline in 2023 as a result of slowing economic growth, then rebound in 2024 with the economic recovery and grow modestly in the mid-1% range thereafter.

**Figure 2.1 Trend in GDP & TPED growth rates**

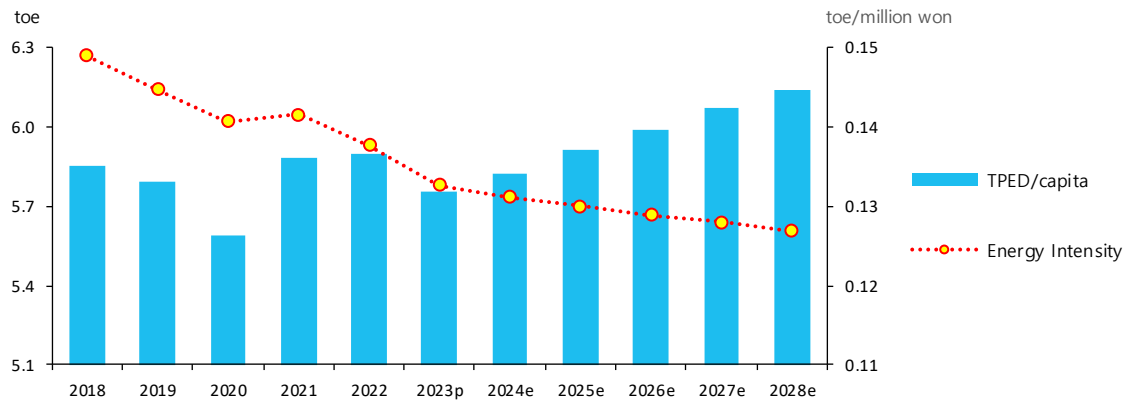


- **Energy intensity is expected to continue to improve at an average annual rate of 1% during the outlook period.**

- Energy intensity (toe/million KRW) has been improving at a faster pace in the last five years due to the impact of COVID-19 and steel plant shutdowns caused by typhoon damage, but is expected to improve moderately at the 1% level in the outlook period due to the recovery in energy demand.

<sup>2</sup> The lowercase p and e, which are added to each year, indicates provisional and forecast values, respectively.

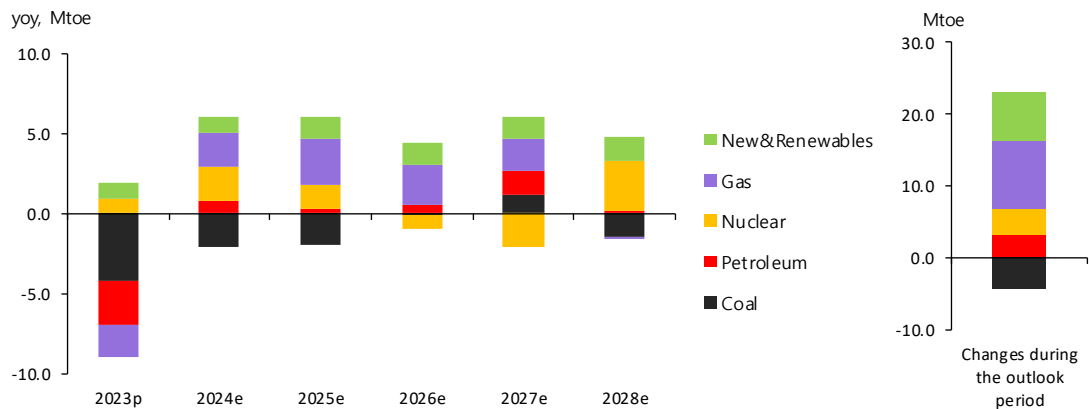
**Figure 2.2 TPED per capita and energy intensity outlook**



□ **Consumption of all energy sources except coal will increase over the outlook period, with gas experiencing the largest increases.**

- Coal demand will increase slightly in the industrial sector, but decline rapidly in the power generation sector, falling by an average of 1.5 percent per year over the outlook period, except in 2027.
- Oil demand will grow in both the industrial and transportation sectors, but at an average annual growth rate of only 0.7% due to sluggish demand from the domestic petrochemical industry, driven by structural factors such as a changing export environment and increased global competition.

**Figure 2.3 Energy demand growth rates by energy source**

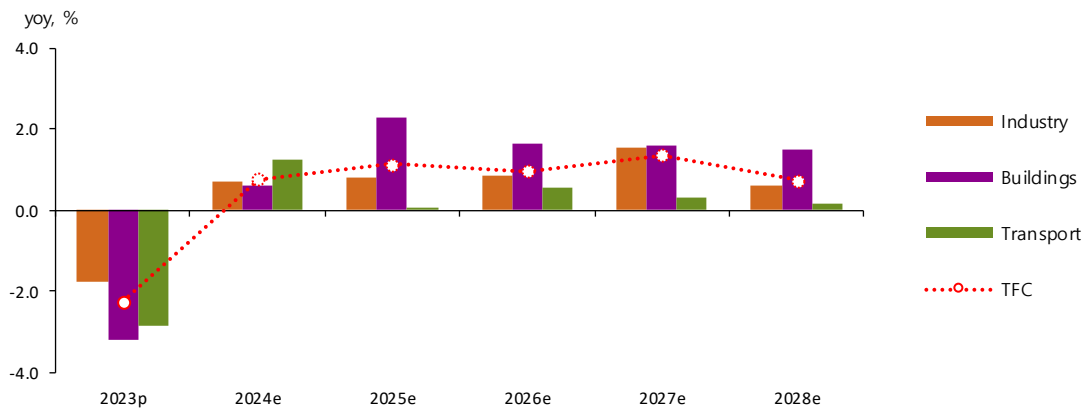


- Gas (natural gas + city gas) demand is expected to increase at a CAGR of 3.1% over the forecast period, driven by growth in both power generation and final consumption, driving TPED growth.
- Nuclear power generation is expected to grow at an average annual rate of 1.8% due to the entry of two new nuclear power plants. However, the growth in power generation is expected to be limited

due to the continued maintenance of a number of old nuclear power plants and the lack of transmission lines in the metropolitan area.

- Renewable and other energy demand will be the fastest growing, growing at a compound annual growth rate of 6.6% over the forecast period, but growth will be slower than in the past due to a slowdown in investment in solar power generation due to rising financing costs.
- Electricity demand is expected to grow at an average annual rate of 1.5%, driven by growth in both the industrial and building sectors.

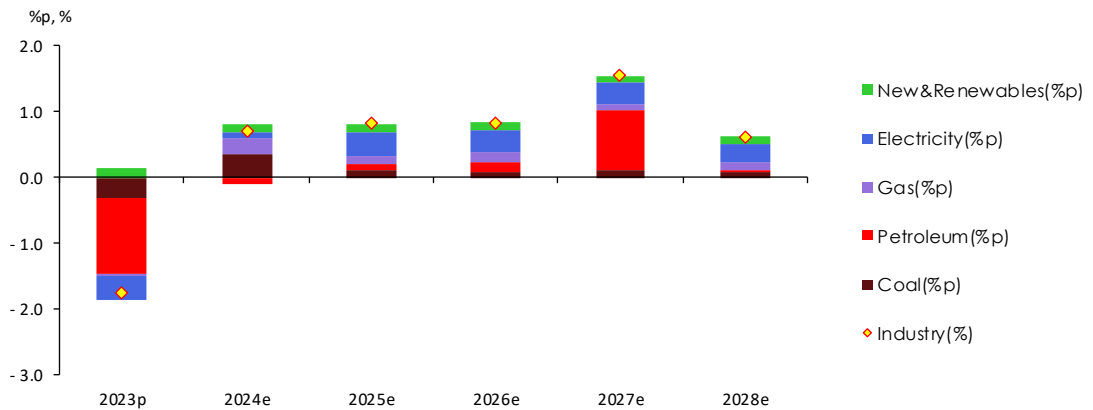
**Figure 2.4 Energy demand growth rates forecast by end-use sector**



□ **TFC is projected to grow at an average annual rate of 1.0% over the outlook period, reaching 219.2 million toe in 2028.**

- TFC is expected to rebound in 2024 due to base effects in all sectors, including industry, buildings, and transportation, and resume growth in 2025, led by a recovery in energy-intensive sectors.
- Energy demand from the industrial sector is expected to rebound in 2024, followed by modest growth before accelerating in 2027, growing at an average annual rate of 0.9 percent over the forecast period.

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



Note: Industrial sector energy demand growth (%) is the sum of contributions by energy source (%p).

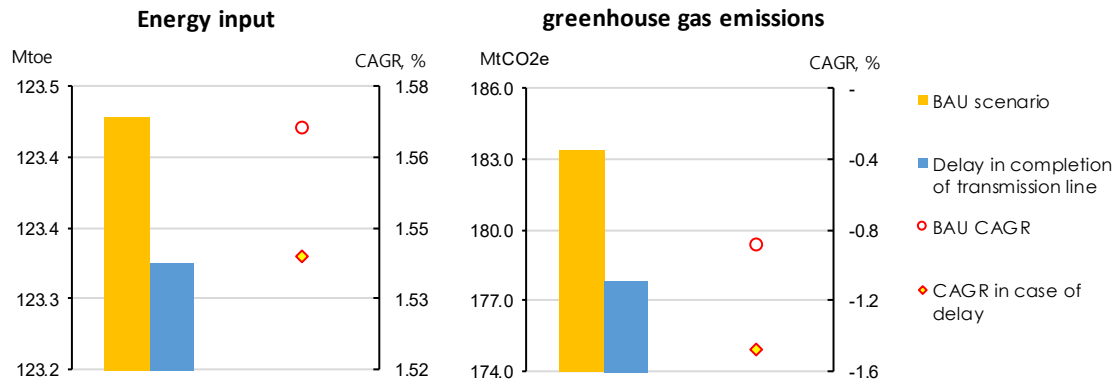
- Demand in the transportation sector is expected to grow at an average annual rate of only 0.6% due to stagnant growth in international travel, a declining and aging population, and downwardly stabilizing economic growth.
- Energy demand in the building sector is expected to grow at an average annual rate of only 1.5% over the forecast period, as rising electricity and gas prices dampen consumer sentiment and the recovery in food and accommodation and wholesale and retail is slow.

### 3. Key Features and Implications

#### Transmission line constraints and changing outlook for power generation

- **Uncertainty exists in the outlook for coal and gas power generation and energy input demand depending on the timing of transmission line completion.**
  - If the East Coast to Metropolitan Area Transmission Line is completed by 2026 as planned by the government, the shortage of transmission lines in the metropolitan area will be greatly alleviated, but there is uncertainty about the timing of completion due to unforeseen challenges such as resident acceptance.
  - Assuming that the shortage of transmission lines in the metropolitan area will begin to ease in 2027<sup>3</sup>, coal and gas generation is expected to decline by 3.1% and increase by 3.7% per year on average over the forecast period (2023-2028), respectively.
  - If the East Coast to Metropolitan Transmission Line is not completed by 2028, the decline in coal generation is expected to be even deeper than in the base case, and gas generation is expected to increase significantly and become the number one source of electricity generation.

**Figure 3.1 Power sector input energy and GHGs in 2028 under transmission line uncertainty**



Note: GHG emissions are estimated through emission factors using emissions through 2021 from national inventories and do not exactly match the values calculated through official inventory methods.

<sup>3</sup> The Hunan-Metropolitan Area Transmission Line is scheduled to be completed after 2032, so the transmission line shortage will persist despite the construction of the East Coast Transmission Line.

## Expanding into the petrochemical industry in Middle Eastern oil producing countries

### ☐ Middle East's expansion into petrochemicals is likely to limit South Korea's petrochemical energy demand growth in the medium to long term.

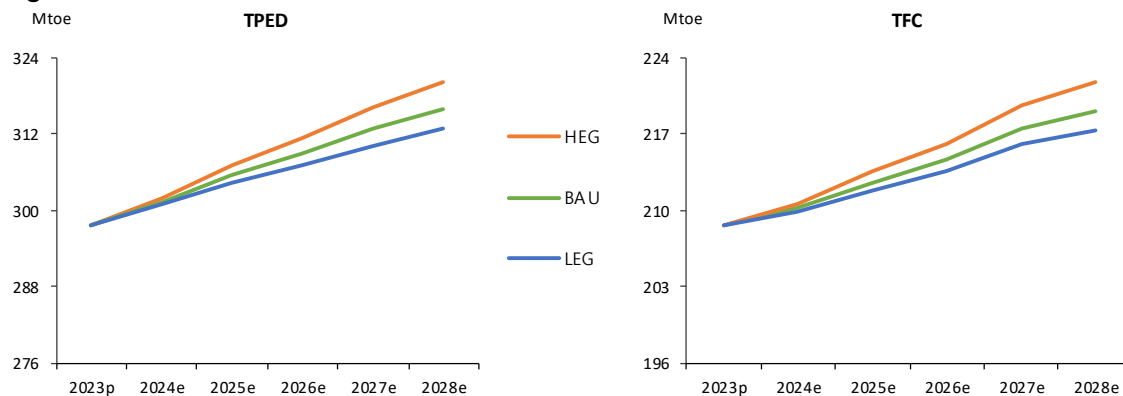
- Amidst the global energy transition, Middle East oil producers are looking to expand their petrochemical industry presence.
- The leading COTC project in the Middle East is the Ras al-Khair project<sup>4</sup>, a joint venture between Saudi Aramco and Saudi Basic Industries Corporation (SABIC) to build a 3 million tons per day ethylene COTC facility with an investment of approximately \$20 billion.

## Economic growth scenarios

### ☐ TPED increases by 1.5% CAGR over the forecast period in the high economic growth (HEG) and 1.0% CAGR in the low economic growth (LEG).

- The HEG and LEG scenarios were developed considering economic uncertainties during the outlook period (2023-2028).

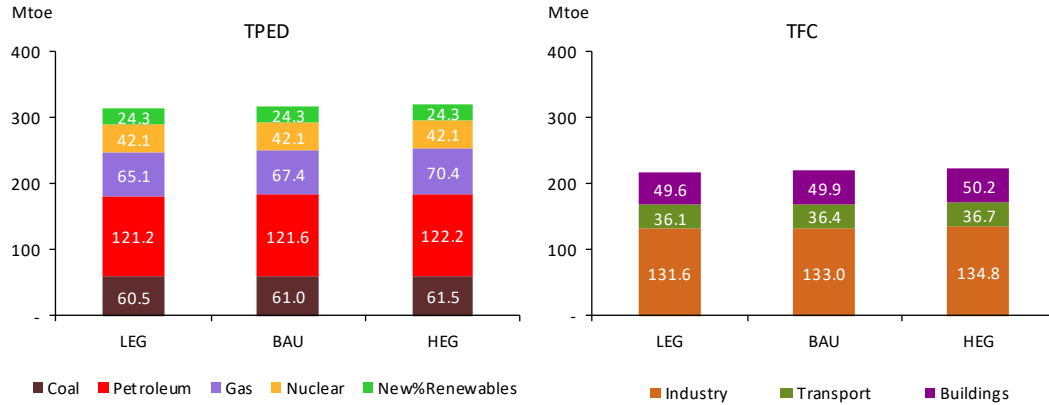
**Figure 3.2 TPED and TFC outlook across three scenarios**



<sup>4</sup> In November 2017, Aramco announced a project plan to build a COTC facility in Yanbu, Saudi Arabia by 2026 to process 400,000 barrels of crude oil per day and produce petrochemical products. However, in October 2020, the plan was changed to use the traditional NCC method instead of COTC. Instead, in November 2022, the company announced a plan to proceed with the Ras al-Khair project, which is almost identical to the Yanbu project. The information on the Ras al-Khair project introduced here is an estimate based on this.

- TPED is projected to grow at an average annual rate of 1.4% over the outlook period (2023-2028) in the HEG scenario, reaching 3.2 million toe in 2028, and at an average annual rate of 1.0% in the LEG scenario, remaining at 3.13 million toe.

**Figure 3.3 TPED & TFC outlook in 2028 across three scenarios**



# The Main Indicator and Energy Outlook Result

## Main Economic and Energy Indicators - BAU Scenario

											CAGR (%)	
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	18-23	23-28	
Economy and Population												
GDP (trillion won)	2,058.5	2,153.4	2,212.2	2,243.2	2,299.9	2,349.3	2,397.1	2,444.1	2,491.0	2.1	2.1	
Industrial Production(2020=100)	100.0	108.5	109.6	106.8	107.8	108.1	108.5	108.9	109.3	1.3	0.5	
Crude Oil Price (Dubai, USD/bbl)	42.2	69.3	96.4	82.1	83.9	81.6	80.3	80.4	80.7	3.4	- 0.4	
Working Days	275.5	273.5	272.5	273.5	272.5	273.5	275.0	277.5	272.5	0.3	- 0.1	
Population (million)	51.8	51.8	51.7	51.7	51.8	51.7	51.6	51.5	51.5	0.0	- 0.1	
Average Temperature (°C)	13.0	13.3	13.0	13.7	13.6	13.3	13.3	13.3	13.3	1.0	- 0.6	
Cooling Degree days	85.2	101.3	141.9	133.6	101.9	99.6	99.6	99.6	99.6	- 8.6	- 5.7	
Heating Degree days	2,448.0	2,404.7	2,567.1	2,347.8	2,314.2	2,406.3	2,406.3	2,406.3	2,406.3	- 2.0	0.5	
Energy Indicators												
Total Primary Energy Demand (Mtoe)	289.5	304.6	304.6	297.5	301.4	305.4	308.9	312.8	315.9	- 0.3	1.2	
Energy Intensity (toe/million won)	0.141	0.142	0.138	0.133	0.131	0.130	0.129	0.128	0.127	- 2.3	- 0.9	
TPED/capita (toe/capita)	5.585	5.884	5.894	5.754	5.824	5.909	5.985	6.070	6.140	- 0.3	1.3	
Electricity Generation (TWh)	548.7	572.7	590.5	584.4	592.4	602.1	613.8	623.6	633.3	0.6	1.6	
Electricity Generation/capita (MWh/capita)	10.6	11.1	11.4	11.3	11.4	11.7	11.9	12.1	12.3	0.6	1.7	
Electricity Demand/capita (MWh/capita)	9.6	10.1	10.4	10.3	10.4	10.6	10.8	11.0	11.2	0.8	1.6	

## Energy Demand - BAU Scenario

										CAGR (%)	
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	18-23	23-28
<b>Total Primary Energy Demand</b>											
Coal (Mton)	122.0	122.8	115.0	107.7	104.1	100.7	100.5	102.4	99.8	-6.2	-1.5
Oil (Mbbl)	775.7	830.7	814.5	779.7	784.9	792.0	793.6	804.7	805.4	-0.7	0.7
Gas (Bm³)	41.5	45.8	45.6	43.9	45.8	48.2	50.2	51.7	51.5	0.7	3.3
Nuclear (TWh)	160.2	158.0	176.1	180.5	190.1	197.1	193.0	183.1	197.7	6.2	1.8
New-Renewable (Mtoe)	13.5	15.0	16.7	17.6	18.6	20.0	21.3	22.7	24.3	8.5	6.6
<b>Total (Mtoe)</b>	<b>289.5</b>	<b>304.6</b>	<b>304.6</b>	<b>297.5</b>	<b>301.4</b>	<b>305.4</b>	<b>308.9</b>	<b>312.8</b>	<b>315.9</b>	<b>-0.3</b>	<b>1.2</b>
Coal	74.0	74.5	69.6	65.5	63.4	61.5	61.4	62.5	61.0	-5.9	-1.4
Oil	113.3	121.3	121.1	118.4	119.2	119.5	119.9	121.5	121.6	0.2	0.5
Gas	54.6	60.1	59.5	57.5	59.6	62.5	65.1	67.1	66.9	0.7	3.1
Nuclear	34.1	33.7	37.5	38.4	40.5	42.0	41.1	39.0	42.1	6.2	1.8
New-Renewable	13.5	15.0	16.7	17.6	18.6	20.0	21.3	22.7	24.3	8.5	6.6
<b>Total Final Consumption</b>											
Coal (Mton)	51.3	53.8	47.8	47.0	47.6	47.8	47.9	48.1	48.2	-3.6	0.5
Oil (Mbbl)	752.3	809.1	798.9	766.4	778.7	783.9	787.0	797.8	798.8	-0.6	0.8
Natural gas (Mton)	1.6	1.6	1.7	2.1	2.7	3.0	3.1	3.2	3.4	9.6	9.5
City gas (Bm³)	22.0	22.7	23.4	21.7	21.4	21.7	21.8	22.0	22.1	-1.3	0.4
Electricity (TWh)	496.9	520.3	535.4	534.7	539.2	549.4	559.3	568.7	577.3	0.8	1.5
Heat (Mtoe)	2.6	2.7	2.9	2.6	2.7	2.8	2.9	3.0	3.1	0.7	3.6
New-Renewable (Mtoe)	6.7	7.1	7.3	7.3	7.5	7.8	8.0	8.3	8.5	0.7	3.1
<b>Total (Mtoe)</b>	<b>204.0</b>	<b>216.3</b>	<b>213.4</b>	<b>208.6</b>	<b>210.2</b>	<b>212.6</b>	<b>214.7</b>	<b>217.6</b>	<b>219.2</b>	<b>-0.5</b>	<b>1.0</b>
Coal	32.4	33.9	30.6	30.1	30.6	30.7	30.8	30.9	31.0	-3.2	0.6
Oil	94.9	102.3	100.5	97.7	97.8	98.1	98.5	99.8	99.9	-0.4	0.5
Gas	24.8	25.5	26.1	24.9	25.3	26.0	26.3	26.6	27.0	-0.5	1.6
Electricity	42.7	44.7	46.0	46.0	46.4	47.3	48.1	48.9	49.7	0.8	1.5
Heat	2.6	2.7	2.9	2.6	2.7	2.8	2.9	3.0	3.1	0.7	3.6
New-Renewable	6.7	7.1	7.3	7.3	7.5	7.8	8.0	8.3	8.5	0.7	3.1
Industry	124.3	133.6	129.4	127.1	128.0	129.1	130.1	132.1	133.0	-0.6	0.9
Transport	34.7	36.6	36.3	35.3	35.7	36.0	36.2	36.3	36.4	-0.5	0.6
Buildings	45.0	46.1	47.7	46.2	46.5	47.6	48.3	49.1	49.9	-0.4	1.5

## Energy Demand - BAU Scenario

	(yoy, %)										
	CAGR (%)										
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	18-23	23-28
Total Primary Energy Demand											
Coal (Mton)	-12.0	0.6	-6.3	-6.3	-3.4	-3.3	-0.2	1.9	-2.5	-6.2	-1.5
Oil (Mbbl)	-4.0	7.1	-1.9	-4.3	0.7	0.9	0.2	1.4	0.1	-0.7	0.7
Gas (Bm³)	1.2	10.4	-0.5	-3.7	4.4	5.2	4.1	3.0	-0.3	0.7	3.3
Nuclear (TWh)	9.8	-1.4	11.4	2.5	5.3	3.7	-2.1	-5.1	8.0	6.2	1.8
New-Renewable (Mtoe)	10.8	11.7	10.9	5.8	5.6	7.2	6.7	6.7	6.7	8.5	6.6
Total (Mtoe)	-3.4	5.2	-0.0	-2.3	1.3	1.3	1.1	1.3	1.0	-0.3	1.2
Coal	-11.8	0.6	-6.5	-6.0	-3.2	-3.0	-0.1	1.8	-2.4	-5.9	-1.4
Oil	-4.4	7.1	-0.1	-2.3	0.7	0.2	0.4	1.3	0.1	0.2	0.5
Gas	1.0	10.1	-1.0	-3.3	3.7	4.8	4.2	3.0	-0.2	0.7	3.1
Nuclear	9.8	-1.4	11.4	2.5	5.3	3.7	-2.1	-5.1	8.0	6.2	1.8
New-Renewable	10.8	11.7	10.9	5.8	5.6	7.2	6.7	6.7	6.7	8.5	6.6
Total Final Consumption											
Coal (Mton)	-4.7	4.9	-11.1	-1.7	1.3	0.3	0.2	0.3	0.3	-3.6	0.5
Oil (Mbbl)	-5.5	7.6	-1.3	-4.1	1.6	0.7	0.4	1.4	0.1	-0.6	0.8
Natural gas (Mton)	9.7	0.6	4.4	25.9	26.6	10.5	4.3	3.9	3.8	9.6	9.5
City gas (Bm³)	-2.0	3.3	2.9	-7.4	-1.4	1.4	0.8	0.7	0.7	-1.3	0.4
Electricity (TWh)	-2.1	4.7	2.9	-0.1	0.8	1.9	1.8	1.7	1.5	0.8	1.5
Heat (Mtoe)	4.9	4.2	9.1	-10.7	2.8	5.0	3.8	3.3	3.3	0.7	3.6
New-Renewable (Mtoe)	2.5	7.1	1.7	0.5	2.4	3.9	3.4	3.1	2.8	0.7	3.1
Total (Mtoe)	-3.8	6.0	-1.3	-2.3	0.8	1.1	1.0	1.4	0.7	-0.5	1.0
Coal	-4.8	4.7	-9.9	-1.4	1.4	0.4	0.3	0.4	0.3	-3.2	0.6
Oil	-5.6	7.8	-1.7	-2.8	0.1	0.3	0.4	1.3	0.1	-0.4	0.5
Gas	-1.1	3.1	2.2	-4.5	1.8	2.6	1.3	1.2	1.2	-0.5	1.6
Electricity	-2.1	4.7	2.9	-0.1	0.8	1.9	1.8	1.7	1.5	0.8	1.5
Heat	4.9	4.2	9.1	-10.7	2.8	5.0	3.8	3.3	3.3	0.7	3.6
New-Renewable	2.5	7.1	1.7	0.5	2.4	3.9	3.4	3.1	2.8	0.7	3.1
Industry	-4.1	7.5	-3.1	-1.7	0.7	0.8	0.8	1.5	0.6	-0.6	0.9
Transport	-6.6	5.4	-0.9	-2.8	1.3	0.8	0.6	0.3	0.2	-0.5	0.6
Buildings	-0.8	2.4	3.6	-3.2	0.6	2.3	1.6	1.6	1.5	-0.4	1.5

## Energy Demand by Sector - BAU Scenario

											(Mtoe)	
											CAGR (%)	
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	18-23	23-28	
Industry	124.3	133.6	129.4	127.1	128.0	129.1	130.1	132.1	133.0	-0.6	0.9	
Coal	32.2	33.7	30.4	30.0	30.4	30.5	30.6	30.8	30.9	-3.1	0.6	
Oil	56.7	62.3	61.0	59.5	59.3	59.4	59.6	60.8	60.9	0.2	0.5	
Gas	9.5	10.0	10.0	10.0	10.3	10.5	10.6	10.8	10.9	0.8	1.8	
Electricity	21.9	23.2	23.6	23.1	23.2	23.7	24.2	24.6	25.0	-0.2	1.6	
Heat	-	-	-	-	-	-	-	-	-	-	-	
New-Renewable	4.0	4.4	4.5	4.6	4.8	5.0	5.1	5.2	5.3	1.6	2.9	
Transport	34.7	36.6	36.3	35.3	35.7	36.0	36.2	36.3	36.4	-0.5	0.6	
Coal	-	-	-	-	-	-	-	-	-	-	-	
Oil	32.7	34.6	34.2	33.2	33.6	33.9	34.1	34.2	34.3	-0.5	0.7	
Gas	1.1	1.1	1.0	1.0	0.9	0.9	0.9	0.8	0.8	-4.4	-4.9	
Electricity	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	8.9	5.6	
Heat	-	-	-	-	-	-	-	-	-	-	-	
New-Renewable	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.3	1.9	
Buildings*	45.0	46.1	47.7	46.2	46.5	47.6	48.3	49.1	49.9	-0.4	1.5	
Coal	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	-13.7	-7.8	
Oil	5.5	5.4	5.3	5.0	4.9	4.8	4.8	4.8	4.7	-5.7	-1.2	
Gas	14.2	14.5	15.0	13.9	14.1	14.6	14.8	15.1	15.3	-1.1	1.9	
Electricity	20.5	21.2	22.1	22.5	22.7	23.1	23.5	23.8	24.1	1.8	1.4	
Heat	2.6	2.7	2.9	2.6	2.7	2.8	2.9	3.0	3.1	0.7	3.6	
New-Renewable	1.9	2.0	2.1	2.0	1.9	2.1	2.2	2.3	2.4	-1.1	4.0	
Transform**	296.3	302.2	318.3	312.6	316.2	319.5	322.3	326.5	329.1	-0.1	1.0	
Coal	41.6	40.6	39.1	35.3	32.8	30.8	30.6	31.6	30.0	-8.0	-3.2	
Oil	164.1	164.8	177.0	176.6	178.9	179.5	180.2	182.6	182.8	0.2	0.7	
Gas	49.7	55.3	55.4	51.9	52.8	55.0	57.1	58.9	58.5	-0.1	2.4	
Nuclear	34.1	33.7	37.5	38.4	40.5	42.0	41.1	39.0	42.1	6.2	1.8	
New-Renewable	6.8	7.9	9.4	10.3	11.2	12.2	13.3	14.5	15.7	17.1	8.8	

\* Gas is the sum of natural gas and city gas. \*\* 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)

	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	CAGR (%)	
										18-23	23-28
<b>Total Coal Demand</b>	<b>122.0</b>	<b>122.8</b>	<b>115.0</b>	<b>107.7</b>	<b>104.1</b>	<b>100.7</b>	<b>100.5</b>	<b>102.4</b>	<b>99.8</b>	<b>-6.2</b>	<b>-1.5</b>
Transformation	70.7	68.9	67.1	60.7	56.4	52.9	52.6	54.3	51.6	-7.9	-3.2
Power Generation	70.7	68.9	67.1	60.7	56.4	52.9	52.6	54.3	51.6	-7.9	-3.2
Heat	-	-	-	-	-	-	-	-	-	-	-
Gas Manufacture	-	-	-	-	-	-	-	-	-	-	-
Oil Refinery	-	-	-	-	-	-	-	-	-	-	-
<b>Total Final Consumption</b>	<b>51.3</b>	<b>53.8</b>	<b>47.8</b>	<b>47.0</b>	<b>47.6</b>	<b>47.8</b>	<b>47.9</b>	<b>48.1</b>	<b>48.2</b>	<b>-3.6</b>	<b>0.5</b>
Industry	50.8	53.4	47.4	46.6	47.3	47.5	47.6	47.8	47.9	-3.5	0.6
Transport	-	-	-	-	-	-	-	-	-	-	-
Buildings	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	-13.5	-7.8
<b>Consumption by products</b>											
Anthracite	7.2	7.3	6.2	5.6	5.7	5.5	5.4	5.3	5.2	-9.5	-1.4
Bituminous	114.9	115.4	108.8	102.1	98.4	95.2	95.1	97.1	94.6	-6.0	-1.5
Iron making	32.8	34.1	31.4	31.6	32.3	32.7	33.0	33.1	33.3	-2.2	1.0
Power Generation	69.8	68.0	66.2	59.8	55.6	52.2	51.8	53.6	50.8	-8.0	-3.2

## Oil - BAU Scenario

(Mbbbl)

										CAGR (%)	
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	18-23	23-28
<b>Total Oil Demand</b>	<b>775.7</b>	<b>830.7</b>	<b>814.5</b>	<b>779.7</b>	<b>784.9</b>	<b>792.0</b>	<b>793.6</b>	<b>804.7</b>	<b>805.4</b>	<b>-0.7</b>	<b>0.7</b>
<b>Crude oil &amp; refinery feedstocks</b>	<b>1,089.3</b>	<b>1,089.1</b>	<b>1,155.9</b>	<b>1,150.1</b>	<b>1,163.0</b>	<b>1,166.7</b>	<b>1,171.2</b>	<b>1,186.6</b>	<b>1,188.0</b>	<b>-0.4</b>	<b>0.7</b>
Transform	1,089.3	1,089.1	1,155.4	1,149.6	1,162.6	1,166.3	1,170.8	1,186.3	1,187.6	-0.4	0.7
Oil refinery	1,089.3	1,089.1	1,155.4	1,149.6	1,162.6	1,166.3	1,170.8	1,186.3	1,187.6	-0.4	0.7
<b>Petroleum products</b>	<b>-313.6</b>	<b>-258.4</b>	<b>-341.4</b>	<b>-370.4</b>	<b>-378.1</b>	<b>-374.7</b>	<b>-377.5</b>	<b>-381.9</b>	<b>-382.6</b>	<b>0.2</b>	<b>0.7</b>
Transform	-1,107.2	-1,105.8	-1,179.2	-1,175.9	-1,198.9	-1,200.4	-1,206.4	-1,222.1	-1,223.8	-0.4	0.8
Power Generation	3.8	4.2	5.0	3.0	2.2	1.8	1.6	1.3	1.1	-18.9	-18.1
Heat	1.6	1.8	1.7	1.4	1.3	1.4	1.4	1.5	1.5	4.8	1.9
Gas Manufacture	0.3	1.7	3.4	2.7	1.8	1.2	1.3	1.3	1.3	16.0	-13.8
Oil refinery*	-1,112.9	-1,113.4	-1,189.4	-1,183.0	-1,204.2	-1,204.8	-1,210.6	-1,226.2	-1,227.7	-0.4	0.7
<b>Total Final Consumption</b>	<b>752.3</b>	<b>809.1</b>	<b>798.9</b>	<b>766.4</b>	<b>778.7</b>	<b>783.9</b>	<b>787.0</b>	<b>797.8</b>	<b>798.8</b>	<b>-0.6</b>	<b>0.8</b>
Industry	462.2	505.8	496.9	474.3	485.1	489.0	490.7	500.7	501.2	-0.2	1.1
Transport	245.4	259.0	258.0	250.3	252.8	254.8	256.3	257.2	257.8	-0.5	0.6
Buildings	44.7	44.2	44.0	41.8	40.8	40.1	40.0	39.9	39.8	-4.9	-1.0
<b>Consumption by products</b>											
Gasoline	81.0	84.9	88.4	90.4	94.0	94.5	94.9	95.1	95.2	2.5	1.1
Diesel	155.0	156.3	151.8	150.5	151.6	153.6	154.9	155.7	156.4	-1.3	0.8
Kerosene	16.8	16.5	15.4	13.2	12.5	11.9	11.7	11.5	11.4	-6.5	-2.9
B-C	6.8	6.4	6.7	7.0	6.6	6.8	6.8	6.9	6.9	-7.0	-0.2
Jet Oil	7.8	15.5	15.6	9.5	6.1	6.2	6.3	6.3	6.3	-7.1	-7.8
LPG	109.1	109.2	115.3	107.6	116.3	118.9	119.2	120.6	120.7	1.4	2.3
Petrochem feedstock	48.8	47.3	56.6	48.4	56.7	59.2	59.6	60.8	60.8	5.9	4.7
Naphtha	333.9	369.9	356.0	337.8	342.5	341.9	342.7	351.2	351.4	-1.9	0.8
Refinery gas	8.5	9.0	9.3	9.0	7.9	8.7	8.8	8.8	8.9	9.2	-0.4
Other Non-Energy	33.3	41.3	40.5	41.5	41.3	41.5	41.6	41.6	41.6	8.8	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 - BAU Scenario

	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	CAGR (%)	
										18-23	23-28
<b>Total Gas Demand (Mton)</b>	<b>41.5</b>	<b>45.8</b>	<b>45.6</b>	<b>43.9</b>	<b>45.8</b>	<b>48.2</b>	<b>50.2</b>	<b>51.7</b>	<b>51.5</b>	<b>0.7</b>	<b>3.3</b>
Transform	38.0	42.4	42.4	39.7	40.4	42.1	43.8	45.1	44.8	-0.1	2.4
Power Generation	20.0	23.2	22.7	21.6	22.2	23.5	25.1	26.2	25.8	1.2	3.7
Heat	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	-	32.0
Gas Manufacture	18.0	19.1	19.6	18.1	18.2	18.6	18.7	18.8	18.9	-1.6	0.9
Oil refinery	-	-	-	-	-	-	-	-	-	-	-
<b>Total Final Consumption</b>	<b>1.6</b>	<b>1.6</b>	<b>1.7</b>	<b>2.1</b>	<b>2.7</b>	<b>3.0</b>	<b>3.1</b>	<b>3.2</b>	<b>3.4</b>	<b>9.6</b>	<b>9.5</b>
Industry	1.6	1.6	1.7	2.1	2.7	3.0	3.1	3.2	3.4	9.6	9.5
<b>City Gas (Bm3)</b>	<b>22.0</b>	<b>22.7</b>	<b>23.4</b>	<b>21.7</b>	<b>21.4</b>	<b>21.7</b>	<b>21.8</b>	<b>22.0</b>	<b>22.1</b>	<b>-1.3</b>	<b>0.4</b>
Transform	-22.1	-23.3	-24.3	-22.1	-22.1	-22.4	-22.5	-22.6	-22.7	-1.7	0.6
Power Generation	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	-17.6	6.1
Heat	0.2	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	-1.5	4.7
Gas Manufacture*	-22.9	-24.4	-25.5	-23.5	-24.2	-25.8	-28.0	-31.8	-38.4	-1.2	10.3
Oil refinery	-	-	-	-	-	-	-	-	-	-	-
<b>Total Final Consumption</b>	<b>22.0</b>	<b>22.7</b>	<b>23.4</b>	<b>21.7</b>	<b>21.4</b>	<b>21.7</b>	<b>21.8</b>	<b>22.0</b>	<b>22.1</b>	<b>-1.3</b>	<b>0.4</b>
Industry	7.1	7.6	7.6	7.0	6.6	6.4	6.4	6.4	6.4	-1.6	-2.0
Transport	1.1	1.0	1.0	1.0	0.9	0.9	0.8	0.8	0.8	-4.2	-4.9
Buildings	13.8	14.1	14.7	13.7	13.8	14.3	14.6	14.8	15.0	-0.9	1.9

\* 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 (%)										
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	18-23	23-28
Net Electricity Demand	548.7	572.7	590.5	584.4	592.4	602.1	613.8	623.6	633.3	0.6	1.6
Own use and Losses	51.8	52.4	55.1	49.7	53.2	52.7	54.4	55.0	56.0	-1.4	2.4
Total Final Consumption	496.9	520.3	535.4	534.7	539.2	549.4	559.3	568.7	577.3	0.8	1.5
Industry	254.7	269.6	274.1	268.5	270.0	275.5	280.8	285.7	290.3	-0.2	1.6
Transport	3.3	3.7	4.1	4.7	5.2	5.5	5.7	6.0	6.2	8.9	5.6
Buildings	238.8	247.1	257.2	261.5	264.1	268.5	272.7	277.0	280.8	1.8	1.4
Power generation capacity (GW)*	124.5	129.3	133.3	139.7	147.0	151.0	152.8	156.3	162.7	4.1	3.1
Coal	36.9	37.3	37.7	38.6	40.6	40.3	37.4	36.5	34.7	0.9	-2.1
Oil	2.2	2.2	0.9	0.9	0.6	0.6	0.6	0.6	0.6	-27.6	-6.0
Gas	41.2	41.2	41.2	43.2	44.1	45.2	49.0	50.9	52.9	2.7	4.2
Nuclear	23.3	23.3	24.7	24.7	26.5	27.3	25.2	24.5	27.2	2.4	2.0
New-Renewable	21.0	25.4	28.9	32.4	35.1	37.6	40.6	43.8	47.3	19.3	7.8
power generation*	548.7	572.7	590.5	584.4	592.4	602.1	613.8	623.6	633.3	0.6	1.6
Coal	196.3	197.6	193.2	184.9	173.1	161.7	160.8	166.1	157.8	-5.0	-3.1
Oil	2.4	2.4	2.0	1.5	1.0	0.8	0.7	0.6	0.5	-23.7	-18.9
Gas	145.8	168.4	163.6	157.7	162.9	172.2	183.5	192.1	189.2	0.5	3.7
Nuclear	160.2	158.0	176.1	180.5	190.1	197.1	193.0	183.1	197.7	6.2	1.8
New-Renewable	44.0	46.4	55.7	59.7	65.3	70.2	75.7	81.7	88.1	10.9	8.1
Fuel Consumption of Power Plants (Mtoe)*	110.4	114.5	117.3	114.3	115.6	117.7	119.7	121.2	123.5	-0.2	1.6
Coal	41.6	40.6	39.1	35.3	32.8	30.8	30.6	31.6	30.0	-8.0	-3.2
Oil	0.6	0.6	0.6	0.4	0.3	0.2	0.2	0.2	0.2	-20.9	-17.9
Gas	26.1	30.4	29.7	28.2	29.1	30.7	32.7	34.3	33.8	1.2	3.6
Nuclear	34.1	33.7	37.5	38.4	40.5	42.0	41.1	39.0	42.1	6.2	1.8
New-Renewable	8.0	9.3	10.4	11.8	12.9	13.9	15.0	16.2	17.5	16.9	8.1

## Heat and New-Renewable - BAU *Scenario*

(Mtoe)

										CAGR (%)	
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	18-23	23-28
<b>Heat Demand</b>	<b>3.2</b>	<b>3.0</b>	<b>3.2</b>	<b>2.8</b>	<b>3.0</b>	<b>3.2</b>	<b>3.3</b>	<b>3.4</b>	<b>3.5</b>	<b>1.6</b>	<b>4.4</b>
Own use and Losses	0.7	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	12.0	6.1
<b>Total Final Consumption</b>	<b>2.6</b>	<b>2.7</b>	<b>2.9</b>	<b>2.6</b>	<b>2.7</b>	<b>2.8</b>	<b>2.9</b>	<b>3.0</b>	<b>3.1</b>	<b>0.7</b>	<b>3.6</b>
Industry	-	-	-	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-	-	-	-
Buildings	2.6	2.7	2.9	2.6	2.7	2.8	2.9	3.0	3.1	0.7	3.6
<b>New-Renewable Demand</b>	<b>13.5</b>	<b>15.0</b>	<b>16.7</b>	<b>17.6</b>	<b>18.6</b>	<b>20.0</b>	<b>21.3</b>	<b>22.7</b>	<b>24.3</b>	<b>8.5</b>	<b>6.6</b>
Transform	6.8	7.9	9.4	10.3	11.2	12.2	13.3	14.5	15.7	17.1	8.8
<b>Total Final Consumption</b>	<b>6.7</b>	<b>7.1</b>	<b>7.3</b>	<b>7.3</b>	<b>7.5</b>	<b>7.8</b>	<b>8.0</b>	<b>8.3</b>	<b>8.5</b>	<b>0.7</b>	<b>3.1</b>
Industry	4.0	4.4	4.5	4.6	4.8	5.0	5.1	5.2	5.3	1.6	2.9
Transport	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.3	1.9
Buildings	1.9	2.0	2.1	2.0	1.9	2.1	2.2	2.3	2.4	-1.1	4.0

## Main Economic and Energy Indicators - HEG Scenario

											CAGR (%)	
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e		18-23	23-28
<b>Economy and Population</b>												
GDP (trillion won)	2,058.5	2,153.4	2,212.2	2,243.2	2,308.5	2,369.6	2,429.7	2,489.5	2,549.7		2.1	2.6
Industrial Production(2020=100)	100.0	108.5	109.6	106.8	107.7	108.1	108.7	109.3	109.9		1.3	0.6
Crude Oil Price (Dubai, USD/bbl)	42.2	69.3	96.4	82.1	83.9	81.6	80.3	80.4	80.7		3.4	-0.4
Working Days	275.5	273.5	272.5	273.5	272.5	273.5	275.0	277.5	272.5		0.3	-0.1
Population (million)	51.8	51.8	51.7	51.7	51.8	51.7	51.6	51.5	51.5		0.0	-0.1
Average Temperature (°C)	13.0	13.3	13.0	13.7	13.6	13.3	13.3	13.3	13.3		1.0	-0.6
Cooling Degree days	85.2	101.3	141.9	133.6	101.9	99.6	99.6	99.6	99.6		-8.6	-5.7
Heating Degree days	2,448.0	2,404.7	2,567.1	2,347.8	2,314.2	2,406.3	2,406.3	2,406.3	2,406.3		-2.0	0.5
<b>Energy Indicators</b>												
Total Primary Energy Demand (Mtoe)	289.5	304.6	304.6	297.5	302.0	306.9	311.3	316.1	320.1		-0.3	1.5
Energy Intensity (toe/million won)	0.141	0.142	0.138	0.133	0.131	0.130	0.128	0.127	0.126		-2.3	-1.1
TPED/capita (toe/capita)	5.585	5.884	5.894	5.754	5.836	5.939	6.032	6.133	6.220		-0.3	1.6
Electricity Generation (TWh)	548.7	572.7	590.5	584.4	593.9	607.0	622.0	635.2	648.0		0.6	2.1
Electricity Generation/capita (MWh/capita)	10.6	11.1	11.4	11.3	11.5	11.7	12.1	12.3	12.6		0.6	2.2
Electricity Demand/capita (MWh/capita)	9.6	10.1	10.4	10.3	10.4	10.7	11.0	11.2	11.5		0.8	2.1

## Energy Demand - HEG Scenario

										CAGR (%)	
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	18-23	23-28
<b>Total Primary Energy Demand</b>											
Coal (Mton)	122.0	122.8	115.0	107.7	104.3	101.2	101.1	103.1	100.6	-6.2	-1.4
Oil (Mbbl)	775.7	830.7	814.5	779.7	785.5	793.3	795.6	807.4	808.9	-0.7	0.7
Gas (Bm3)	41.5	45.8	45.6	43.9	46.1	49.0	51.5	53.5	53.9	0.7	4.2
Nuclear (TWh)	160.2	158.0	176.1	180.5	190.1	197.1	193.0	183.1	197.7	6.2	1.8
New-Renewable (Mtoe)	13.5	15.0	16.7	17.6	18.6	20.0	21.3	22.7	24.3	8.5	6.6
<b>Total (Mtoe)</b>	<b>289.5</b>	<b>304.6</b>	<b>304.6</b>	<b>297.5</b>	<b>302.0</b>	<b>306.9</b>	<b>311.3</b>	<b>316.1</b>	<b>320.1</b>	<b>-0.3</b>	<b>1.5</b>
Coal	74.0	74.5	69.6	65.5	63.5	61.8	61.8	63.0	61.5	-5.9	-1.2
Oil	113.3	121.3	121.1	118.4	119.3	119.7	120.3	121.9	122.2	0.2	0.6
Gas	54.6	60.1	59.5	57.5	60.0	63.6	66.8	69.4	70.0	0.7	4.0
Nuclear	34.1	33.7	37.5	38.4	40.5	42.0	41.1	39.0	42.1	6.2	1.8
New-Renewable	13.5	15.0	16.7	17.6	18.6	20.0	21.3	22.7	24.3	8.5	6.6
<b>Total Final Consumption</b>											
Coal (Mton)	51.3	53.8	47.8	47.0	47.7	48.0	48.3	48.6	48.8	-3.6	0.8
Oil (Mbbl)	752.3	809.1	798.9	766.4	779.3	785.2	789.0	800.5	802.3	-0.6	0.9
Natural gas (Mton)	1.6	1.6	1.7	2.1	2.8	3.1	3.2	3.3	3.5	9.6	10.2
City gas (Bm³)	22.0	22.7	23.4	21.7	21.5	21.9	22.1	22.3	22.5	-1.3	0.8
Electricity (TWh)	496.9	520.3	535.4	534.7	540.5	553.9	566.8	579.2	590.7	0.8	2.0
Heat (Mtoe)	2.6	2.7	2.9	2.6	2.7	2.8	2.9	3.0	3.1	0.7	3.6
New-Renewable (Mtoe)	6.7	7.1	7.3	7.3	7.5	7.8	8.0	8.3	8.5	0.7	3.1
<b>Total (Mtoe)</b>	<b>204.0</b>	<b>216.3</b>	<b>213.4</b>	<b>208.6</b>	<b>210.6</b>	<b>213.6</b>	<b>216.2</b>	<b>219.6</b>	<b>221.7</b>	<b>-0.5</b>	<b>1.2</b>
Coal	32.4	33.9	30.6	30.1	30.6	30.8	31.0	31.2	31.4	-3.2	0.8
Oil	94.9	102.3	100.5	97.7	97.9	98.3	98.7	100.1	100.4	-0.4	0.6
Gas	24.8	25.5	26.1	24.9	25.5	26.3	26.7	27.1	27.5	-0.5	2.0
Electricity	42.7	44.7	46.0	46.0	46.5	47.6	48.7	49.8	50.8	0.8	2.0
Heat	2.6	2.7	2.9	2.6	2.7	2.8	2.9	3.0	3.1	0.7	3.6
New-Renewable	6.7	7.1	7.3	7.3	7.5	7.8	8.0	8.3	8.5	0.7	3.1
Industry	124.3	133.6	129.4	127.1	128.3	129.8	131.2	133.6	134.8	-0.6	1.2
Transport	34.7	36.6	36.3	35.3	35.7	36.1	36.4	36.6	36.7	-0.5	0.8
Buildings	45.0	46.1	47.7	46.2	46.5	47.7	48.6	49.4	50.2	-0.4	1.7

## Energy Demand - HEG Scenario

	(yoy, %)											
	CAGR (%)										18-23	23-28
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e			
Total Primary Energy Demand												
Coal (Mton)	-12.0	0.6	-6.3	-6.3	-3.2	-3.0	-0.0	2.0	-2.4	-6.2	-1.4	
Oil (Mbbl)	-4.0	7.1	-1.9	-4.3	0.7	1.0	0.3	1.5	0.2	-0.7	0.7	
Gas (Bm3)	1.2	10.4	-0.5	-3.7	5.1	6.2	5.1	3.9	0.7	0.7	4.2	
Nuclear (TWh)	9.8	-1.4	11.4	2.5	5.3	3.7	-2.1	-5.1	8.0	6.2	1.8	
New-Renewable (Mtoe)	10.8	11.7	10.9	5.8	5.6	7.2	6.7	6.7	6.7	8.5	6.6	
Total (Mtoe)	-3.4	5.2	-0.0	-2.3	1.5	1.6	1.4	1.5	1.3	-0.3	1.5	
Coal	-11.8	0.6	-6.5	-6.0	-3.0	-2.8	0.0	1.9	-2.2	-5.9	-1.2	
Oil	-4.4	7.1	-0.1	-2.3	0.8	0.3	0.5	1.4	0.2	0.2	0.6	
Gas	1.0	10.1	-1.0	-3.3	4.4	5.9	5.2	3.9	0.8	0.7	4.0	
Nuclear	9.8	-1.4	11.4	2.5	5.3	3.7	-2.1	-5.1	8.0	6.2	1.8	
New-Renewable	10.8	11.7	10.9	5.8	5.6	7.2	6.7	6.7	6.7	8.5	6.6	
Total Final Consumption												
Coal (Mton)	-4.7	4.9	-11.1	-1.7	1.5	0.6	0.5	0.6	0.6	-3.6	0.8	
Oil (Mbbl)	-5.5	7.6	-1.3	-4.1	1.7	0.8	0.5	1.5	0.2	-0.6	0.9	
Natural gas (Mton)	9.7	0.6	4.4	25.9	28.4	11.0	4.8	4.4	4.3	9.6	10.2	
City gas (Bm³)	-2.0	3.3	2.9	-7.4	-0.8	1.7	1.0	1.0	0.9	-1.3	0.8	
Electricity (TWh)	-2.1	4.7	2.9	-0.1	1.1	2.5	2.3	2.2	2.0	0.8	2.0	
Heat (Mtoe)	4.9	4.2	9.1	-10.7	2.8	5.0	3.8	3.3	3.3	0.7	3.6	
New-Renewable (Mtoe)	2.5	7.1	1.7	0.5	2.4	3.9	3.4	3.1	2.8	0.7	3.1	
Total (Mtoe)	-3.8	6.0	-1.3	-2.3	1.0	1.4	1.2	1.6	1.0	-0.5	1.2	
Coal	-4.8	4.7	-9.9	-1.4	1.6	0.7	0.6	0.7	0.6	-3.2	0.8	
Oil	-5.6	7.8	-1.7	-2.8	0.2	0.4	0.5	1.4	0.2	-0.4	0.6	
Gas	-1.1	3.1	2.2	-4.5	2.5	3.0	1.6	1.5	1.4	-0.5	2.0	
Electricity	-2.1	4.7	2.9	-0.1	1.1	2.5	2.3	2.2	2.0	0.8	2.0	
Heat	4.9	4.2	9.1	-10.7	2.8	5.0	3.8	3.3	3.3	0.7	3.6	
New-Renewable	2.5	7.1	1.7	0.5	2.4	3.9	3.4	3.1	2.8	0.7	3.1	
Industry	-4.1	7.5	-3.1	-1.7	1.0	1.1	1.1	1.8	0.9	-0.6	1.2	
Transport	-6.6	5.4	-0.9	-2.8	1.4	1.1	0.8	0.5	0.4	-0.5	0.8	
Buildings	-0.8	2.4	3.6	-3.2	0.7	2.5	1.8	1.8	1.6	-0.4	1.7	

## Energy Demand by Sector - HEG Scenario

	(Mtoe)											
	CAGR (%)										18-23	23-28
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e			
Industry	124.3	133.6	129.4	127.1	128.3	129.8	131.2	133.6	134.8	-0.6	1.2	
Coal	32.2	33.7	30.4	30.0	30.4	30.7	30.9	31.1	31.3	-3.1	0.9	
Oil	56.7	62.3	61.0	59.5	59.3	59.5	59.7	60.9	61.0	0.2	0.5	
Gas	9.5	10.0	10.0	10.0	10.5	10.7	10.9	11.1	11.3	0.8	2.5	
Electricity	21.9	23.2	23.6	23.1	23.3	24.0	24.7	25.3	25.9	-0.2	2.3	
Heat	-	-	-	-	-	-	-	-	-	-	-	
New-Renewable	4.0	4.4	4.5	4.6	4.8	5.0	5.1	5.2	5.3	1.6	2.9	
Transport	34.7	36.6	36.3	35.3	35.7	36.1	36.4	36.6	36.7	-0.5	0.8	
Coal	-	-	-	-	-	-	-	-	-	-	-	
Oil	32.7	34.6	34.2	33.2	33.6	34.0	34.3	34.5	34.7	-0.5	0.9	
Gas	1.1	1.1	1.0	1.0	0.9	0.9	0.9	0.8	0.8	-4.4	-4.9	
Electricity	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	8.9	5.6	
Heat	-	-	-	-	-	-	-	-	-	-	-	
New-Renewable	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.3	1.9	
Buildings*	45.0	46.1	47.7	46.2	46.5	47.7	48.6	49.4	50.2	-0.4	1.7	
Coal	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	-13.7	-9.3	
Oil	5.5	5.4	5.3	5.0	4.9	4.8	4.8	4.8	4.8	-5.7	-1.0	
Gas	14.2	14.5	15.0	13.9	14.1	14.7	14.9	15.2	15.4	-1.1	2.1	
Electricity	20.5	21.2	22.1	22.5	22.7	23.2	23.6	24.0	24.3	1.8	1.6	
Heat	2.6	2.7	2.9	2.6	2.7	2.8	2.9	3.0	3.1	0.7	3.6	
New-Renewable	1.9	2.0	2.1	2.0	1.9	2.1	2.2	2.3	2.4	-1.1	4.0	
Transform**	296.3	302.2	318.3	312.6	316.8	320.9	324.5	329.5	333.0	-0.1	1.3	
Coal	41.6	40.6	39.1	35.3	32.9	30.9	30.8	31.7	30.1	-8.0	-3.1	
Oil	164.1	164.8	177.0	176.6	179.0	179.8	180.7	183.2	183.6	0.2	0.8	
Gas	49.7	55.3	55.4	51.9	53.2	56.0	58.8	61.1	61.3	-0.1	3.4	
Nuclear	34.1	33.7	37.5	38.4	40.5	42.0	41.1	39.0	42.1	6.2	1.8	
New-Renewable	6.8	7.9	9.4	10.3	11.2	12.2	13.3	14.5	15.7	17.1	8.8	

\* Gas is the sum of natural gas and city gas. \*\* 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)

	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	CAGR (%)	
										18-23	23-28
<b>Total Coal Demand</b>	<b>122.0</b>	<b>122.8</b>	<b>115.0</b>	<b>107.7</b>	<b>104.3</b>	<b>101.2</b>	<b>101.1</b>	<b>103.1</b>	<b>100.6</b>	<b>-6.2</b>	<b>-1.4</b>
Transformation	70.7	68.9	67.1	60.7	56.5	53.1	52.9	54.5	51.8	-7.9	-3.1
Power Generation	70.7	68.9	67.1	60.7	56.5	53.1	52.9	54.5	51.8	-7.9	-3.1
Heat	-	-	-	-	-	-	-	-	-	-	-
Gas Manufacture	-	-	-	-	-	-	-	-	-	-	-
Oil Refinery	-	-	-	-	-	-	-	-	-	-	-
<b>Total Final Consumption</b>	<b>51.3</b>	<b>53.8</b>	<b>47.8</b>	<b>47.0</b>	<b>47.7</b>	<b>48.0</b>	<b>48.3</b>	<b>48.6</b>	<b>48.8</b>	<b>-3.6</b>	<b>0.8</b>
Industry	50.8	53.4	47.4	46.6	47.3	47.7	48.0	48.3	48.6	-3.5	0.8
Transport	-	-	-	-	-	-	-	-	-	-	-
Buildings	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.2	-13.5	-9.3
<b>Consumption by products</b>											
Anthracite	7.2	7.3	6.2	5.6	5.7	5.5	5.4	5.3	5.2	-9.5	-1.3
Bituminous	114.9	115.4	108.8	102.1	98.6	95.7	95.7	97.8	95.4	-6.0	-1.4
Iron making	32.8	34.1	31.4	31.6	32.4	32.8	33.2	33.5	33.7	-2.2	1.3
Power Generation	69.8	68.0	66.2	59.8	55.7	52.4	52.1	53.8	51.1	-8.0	-3.1

## Oil - HEG Scenario

(Mbbbl)

	CAGR (%)										
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	18-23	23-28
<b>Total Oil Demand</b>	<b>775.7</b>	<b>830.7</b>	<b>814.5</b>	<b>779.7</b>	<b>785.5</b>	<b>793.3</b>	<b>795.6</b>	<b>807.4</b>	<b>808.9</b>	<b>-0.7</b>	<b>0.7</b>
<b>Crude oil &amp; refinery feedstocks</b>	<b>1,089.3</b>	<b>1,089.1</b>	<b>1,155.9</b>	<b>1,150.1</b>	<b>1,163.9</b>	<b>1,168.7</b>	<b>1,174.2</b>	<b>1,190.8</b>	<b>1,193.6</b>	<b>-0.4</b>	<b>0.7</b>
Transform	1,089.3	1,089.1	1,155.4	1,149.6	1,163.5	1,168.3	1,173.8	1,190.4	1,193.2	-0.4	0.7
Oil refinery	1,089.3	1,089.1	1,155.4	1,149.6	1,163.5	1,168.3	1,173.8	1,190.4	1,193.2	-0.4	0.7
<b>Petroleum products</b>	<b>-313.6</b>	<b>-258.4</b>	<b>-341.4</b>	<b>-370.4</b>	<b>-378.4</b>	<b>-375.4</b>	<b>-378.6</b>	<b>-383.4</b>	<b>-384.6</b>	<b>0.2</b>	<b>0.8</b>
Transform	-1,107.2	-1,105.8	-1,179.2	-1,175.9	-1,199.9	-1,202.4	-1,209.5	-1,226.4	-1,229.6	-0.4	0.9
Power Generation	3.8	4.2	5.0	3.0	2.2	1.8	1.6	1.3	1.1	-18.9	-18.1
Heat	1.6	1.8	1.7	1.4	1.3	1.4	1.4	1.5	1.5	4.8	1.9
Gas Manufacture	0.3	1.7	3.4	2.7	1.8	1.3	1.3	1.3	1.3	16.0	-13.6
Oil refinery*	-1,112.9	-1,113.4	-1,189.4	-1,183.0	-1,205.1	-1,206.9	-1,213.8	-1,230.5	-1,233.5	-0.4	0.8
<b>Total Final Consumption</b>	<b>752.3</b>	<b>809.1</b>	<b>798.9</b>	<b>766.4</b>	<b>779.3</b>	<b>785.2</b>	<b>789.0</b>	<b>800.5</b>	<b>802.3</b>	<b>-0.6</b>	<b>0.9</b>
Industry	462.2	505.8	496.9	474.3	485.3	489.4	491.1	501.3	501.8	-0.2	1.1
Transport	245.4	259.0	258.0	250.3	253.1	255.6	257.7	259.1	260.4	-0.5	0.8
Buildings	44.7	44.2	44.0	41.8	40.9	40.2	40.1	40.1	40.1	-4.9	-0.8
<b>Consumption by products</b>											
Gasoline	81.0	84.9	88.4	90.4	94.0	94.5	94.9	95.1	95.2	2.5	1.1
Diesel	155.0	156.3	151.8	150.5	151.9	154.1	155.7	156.8	157.8	-1.3	1.0
Kerosene	16.8	16.5	15.4	13.2	12.5	11.9	11.7	11.5	11.4	-6.5	-2.9
B-C	6.8	6.4	6.7	7.0	6.6	6.8	6.8	6.9	6.9	-7.0	-0.2
Jet Oil	7.8	15.5	15.6	9.5	6.1	6.6	6.9	7.2	7.5	-7.1	-4.7
LPG	109.1	109.2	115.3	107.6	116.3	119.0	119.4	120.9	121.1	1.4	2.4
Petrochem feedstock	48.8	47.3	56.6	48.4	56.7	59.3	59.6	60.9	60.9	5.9	4.7
Naphtha	333.9	369.9	356.0	337.8	342.7	342.1	343.0	351.5	351.8	-1.9	0.8
Refinery gas	8.5	9.0	9.3	9.0	7.9	8.7	8.8	8.8	8.9	9.2	-0.4
Other Non-Energy	33.3	41.3	40.5	41.5	41.2	41.5	41.7	41.7	41.8	8.8	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

	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	CAGR (%)	
										18-23	23-28
<b>Total Gas Demand (Mton)</b>	<b>41.5</b>	<b>45.8</b>	<b>45.6</b>	<b>43.9</b>	<b>46.1</b>	<b>49.0</b>	<b>51.5</b>	<b>53.5</b>	<b>53.9</b>	<b>0.7</b>	<b>4.2</b>
Transform	38.0	42.4	42.4	39.7	40.7	42.8	45.0	46.8	47.0	-0.1	3.4
Power Generation	20.0	23.2	22.7	21.6	22.4	24.1	26.1	27.7	27.8	1.2	5.2
Heat	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	-	32.0
Gas Manufacture	18.0	19.1	19.6	18.1	18.3	18.8	18.9	19.1	19.2	-1.6	1.2
Oil refinery	-	-	-	-	-	-	-	-	-	-	-
<b>Total Final Consumption</b>	<b>1.6</b>	<b>1.6</b>	<b>1.7</b>	<b>2.1</b>	<b>2.8</b>	<b>3.1</b>	<b>3.2</b>	<b>3.3</b>	<b>3.5</b>	<b>9.6</b>	<b>10.2</b>
Industry	1.6	1.6	1.7	2.1	2.8	3.1	3.2	3.3	3.5	9.6	10.2
<b>City Gas (Bm3)</b>	<b>22.0</b>	<b>22.7</b>	<b>23.4</b>	<b>21.7</b>	<b>21.5</b>	<b>21.9</b>	<b>22.1</b>	<b>22.3</b>	<b>22.5</b>	<b>-1.3</b>	<b>0.8</b>
Transform	-22.1	-23.3	-24.3	-22.1	-22.2	-22.6	-22.7	-22.9	-23.1	-1.7	0.9
Power Generation	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	-17.6	7.7
Heat	0.2	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	-1.5	4.7
Gas Manufacture*	-22.9	-24.4	-25.5	-23.5	-24.4	-26.0	-28.3	-32.2	-38.8	-1.2	10.5
Oil refinery	-	-	-	-	-	-	-	-	-	-	-
<b>Total Final Consumption</b>	<b>22.0</b>	<b>22.7</b>	<b>23.4</b>	<b>21.7</b>	<b>21.5</b>	<b>21.9</b>	<b>22.1</b>	<b>22.3</b>	<b>22.5</b>	<b>-1.3</b>	<b>0.8</b>
Industry	7.1	7.6	7.6	7.0	6.7	6.6	6.6	6.6	6.6	-1.6	-1.3
Transport	1.1	1.0	1.0	1.0	0.9	0.9	0.8	0.8	0.8	-4.2	-4.9
Buildings	13.8	14.1	14.7	13.7	13.8	14.4	14.7	14.9	15.2	-0.9	2.1

\* 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 (%)										
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	18-23	23-28
Net Electricity Demand	548.7	572.7	590.5	584.4	593.9	607.0	622.0	635.2	648.0	0.6	2.1
Own use and Losses	51.8	52.4	55.1	49.7	53.4	53.1	55.2	56.0	57.3	-1.4	2.9
Total Final Consumption	496.9	520.3	535.4	534.7	540.5	553.9	566.8	579.2	590.7	0.8	2.0
Industry	254.7	269.6	274.1	268.5	271.3	279.2	287.1	294.4	301.4	-0.2	2.3
Transport	3.3	3.7	4.1	4.7	5.2	5.5	5.7	6.0	6.2	8.9	5.6
Buildings	238.8	247.1	257.2	261.5	264.1	269.2	274.0	278.8	283.0	1.8	1.6
Power generation capacity (GW)*	124.5	129.3	133.3	139.7	147.0	151.0	152.8	156.3	162.7	4.1	3.1
Coal	36.9	37.3	37.7	38.6	40.6	40.3	37.4	36.5	34.7	0.9	-2.1
Oil	2.2	2.2	0.9	0.9	0.6	0.6	0.6	0.6	0.6	-27.6	-6.0
Gas	41.2	41.2	41.2	43.2	44.1	45.2	49.0	50.9	52.9	2.7	4.2
Nuclear	23.3	23.3	24.7	24.7	26.5	27.3	25.2	24.5	27.2	2.4	2.0
New-Renewable	21.0	25.4	28.9	32.4	35.1	37.6	40.6	43.8	47.3	19.3	7.8
power generation*	548.7	572.7	590.5	584.4	593.9	607.0	622.0	635.2	648.0	0.6	2.1
Coal	196.3	197.6	193.2	184.9	173.4	162.5	161.6	166.9	158.5	-5.0	-3.0
Oil	2.4	2.4	2.0	1.5	1.0	0.8	0.7	0.6	0.5	-23.7	-18.9
Gas	145.8	168.4	163.6	157.7	164.0	176.3	191.0	202.9	203.2	0.5	5.2
Nuclear	160.2	158.0	176.1	180.5	190.1	197.1	193.0	183.1	197.7	6.2	1.8
New-Renewable	44.0	46.4	55.7	59.7	65.3	70.2	75.7	81.7	88.1	10.9	8.1
Fuel Consumption of Power Plants (Mtoe)*	110.4	114.5	117.3	114.3	115.9	118.5	121.2	123.3	126.1	-0.2	2.0
Coal	41.6	40.6	39.1	35.3	32.9	30.9	30.8	31.7	30.1	-8.0	-3.1
Oil	0.6	0.6	0.6	0.4	0.3	0.2	0.2	0.2	0.2	-20.9	-17.9
Gas	26.1	30.4	29.7	28.2	29.3	31.4	34.1	36.2	36.2	1.2	5.1
Nuclear	34.1	33.7	37.5	38.4	40.5	42.0	41.1	39.0	42.1	6.2	1.8
New-Renewable	8.0	9.3	10.4	11.8	12.9	13.9	15.0	16.2	17.5	16.9	8.1

## Heat and New-Renewable - HEG Scenario

(Mtoe)

											CAGR (%)	
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e		18-23	23-28
<b>Heat Demand</b>	<b>3.2</b>	<b>3.0</b>	<b>3.2</b>	<b>2.8</b>	<b>3.0</b>	<b>3.2</b>	<b>3.3</b>	<b>3.4</b>	<b>3.5</b>		<b>1.6</b>	<b>4.4</b>
Own use and Losses	0.7	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4		12.0	6.1
<b>Total Final Consumption</b>	<b>2.6</b>	<b>2.7</b>	<b>2.9</b>	<b>2.6</b>	<b>2.7</b>	<b>2.8</b>	<b>2.9</b>	<b>3.0</b>	<b>3.1</b>		<b>0.7</b>	<b>3.6</b>
Industry	-	-	-	-	-	-	-	-	-		-	-
Transport	-	-	-	-	-	-	-	-	-		-	-
Buildings	2.6	2.7	2.9	2.6	2.7	2.8	2.9	3.0	3.1		0.7	3.6
<b>New-Renewable Demand</b>	<b>13.5</b>	<b>15.0</b>	<b>16.7</b>	<b>17.6</b>	<b>18.6</b>	<b>20.0</b>	<b>21.3</b>	<b>22.7</b>	<b>24.3</b>		<b>8.5</b>	<b>6.6</b>
Transform	6.8	7.9	9.4	10.3	11.2	12.2	13.3	14.5	15.7		17.1	8.8
<b>Total Final Consumption</b>	<b>6.7</b>	<b>7.1</b>	<b>7.3</b>	<b>7.3</b>	<b>7.5</b>	<b>7.8</b>	<b>8.0</b>	<b>8.3</b>	<b>8.5</b>		<b>0.7</b>	<b>3.1</b>
Industry	4.0	4.4	4.5	4.6	4.8	5.0	5.1	5.2	5.3		1.6	2.9
Transport	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8		0.3	1.9
Buildings	1.9	2.0	2.1	2.0	1.9	2.1	2.2	2.3	2.4		-1.1	4.0

## Main Economic and Energy Indicators - *LEG Scenario*

											CAGR (%)	
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	18-23	23-28	
Economy and Population												
GDP (trillion won)	2,058.5	2,153.4	2,212.2	2,243.2	2,291.4	2,329.1	2,364.9	2,399.4	2,433.4	2.1	1.6	
Industrial Production(2020=100)	100.0	108.5	109.6	106.8	107.9	108.1	108.3	108.5	108.8	1.3	0.4	
Crude Oil Price (Dubai, USD/bbl)	42.2	69.3	96.4	82.1	83.9	81.6	80.3	80.4	80.7	3.4	- 0.4	
Working Days	275.5	273.5	272.5	273.5	272.5	273.5	275.0	277.5	272.5	0.3	- 0.1	
Population (million)	51.8	51.8	51.7	51.7	51.8	51.7	51.6	51.5	51.5	0.0	- 0.1	
Average Temperature (°C)	13.0	13.3	13.0	13.7	13.6	13.3	13.3	13.3	13.3	1.0	- 0.6	
Cooling Degree days	85.2	101.3	141.9	133.6	101.9	99.6	99.6	99.6	99.6	- 8.6	- 5.7	
Heating Degree days	2,448.0	2,404.7	2,567.1	2,347.8	2,314.2	2,406.3	2,406.3	2,406.3	2,406.3	- 2.0	0.5	
Energy Indicators												
Total Primary Energy Demand (Mtoe)	289.5	304.6	304.6	297.5	301.0	304.3	307.0	310.3	312.8	- 0.3	1.0	
Energy Intensity (toe/million won)	0.141	0.142	0.138	0.133	0.132	0.131	0.130	0.130	0.129	- 2.3	- 0.6	
TPED/capita (toe/capita)	5.585	5.884	5.894	5.754	5.816	5.888	5.949	6.021	6.078	- 0.3	1.1	
Electricity Generation (TWh)	548.7	572.7	590.5	584.4	591.4	598.3	607.3	614.5	622.0	0.6	1.3	
Electricity Generation/capita (MWh/capita)	10.6	11.1	11.4	11.3	11.4	11.6	11.8	11.9	12.1	0.6	1.4	
Electricity Demand/capita (MWh/capita)	9.6	10.1	10.4	10.3	10.4	10.6	10.7	10.9	11.0	0.8	1.3	

## Energy Demand - LEG Scenario

										CAGR (%)	
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	18-23	23-28
<b>Total Primary Energy Demand</b>											
Coal (Mton)	122.0	122.8	115.0	107.7	103.9	100.3	100.0	101.7	99.0	-6.2	-1.7
Oil (Mbbl)	775.7	830.7	814.5	779.7	784.4	790.9	792.0	802.5	802.5	-0.7	0.6
Gas (Bm3)	41.5	45.8	45.6	43.9	45.6	47.6	49.2	50.3	49.8	0.7	2.6
Nuclear (TWh)	160.2	158.0	176.1	180.5	190.1	197.1	193.0	183.1	197.7	6.2	1.8
New-Renewable (Mtoe)	13.5	15.0	16.7	17.6	18.6	20.0	21.3	22.7	24.3	8.5	6.6
<b>Total (Mtoe)</b>	<b>289.5</b>	<b>304.6</b>	<b>304.6</b>	<b>297.5</b>	<b>301.0</b>	<b>304.3</b>	<b>307.0</b>	<b>310.3</b>	<b>312.8</b>	<b>-0.3</b>	<b>1.0</b>
Coal	74.0	74.5	69.6	65.5	63.3	61.2	61.1	62.1	60.5	-5.9	-1.6
Oil	113.3	121.3	121.1	118.4	119.1	119.3	119.7	121.1	121.2	0.2	0.5
Gas	54.6	60.1	59.5	57.5	59.4	61.8	63.9	65.3	64.7	0.7	2.4
Nuclear	34.1	33.7	37.5	38.4	40.5	42.0	41.1	39.0	42.1	6.2	1.8
New-Renewable	13.5	15.0	16.7	17.6	18.6	20.0	21.3	22.7	24.3	8.5	6.6
<b>Total Final Consumption</b>											
Coal (Mton)	51.3	53.8	47.8	47.0	47.6	47.6	47.6	47.6	47.7	-3.6	0.3
Oil (Mbbl)	752.3	809.1	798.9	766.4	778.3	782.8	785.4	795.6	795.9	-0.6	0.8
Natural gas (Mton)	1.6	1.6	1.7	2.1	2.7	3.0	3.1	3.2	3.3	9.6	9.1
City gas (Bm <sup>3</sup> )	22.0	22.7	23.4	21.7	21.3	21.5	21.7	21.8	21.9	-1.3	0.2
Electricity (TWh)	496.9	520.3	535.4	534.7	538.3	546.0	553.4	560.4	567.0	0.8	1.2
Heat (Mtoe)	2.6	2.7	2.9	2.6	2.7	2.8	2.9	3.0	3.1	0.7	3.6
New-Renewable (Mtoe)	6.7	7.1	7.3	7.3	7.5	7.8	8.0	8.3	8.5	0.7	3.1
<b>Total (Mtoe)</b>	<b>204.0</b>	<b>216.3</b>	<b>213.4</b>	<b>208.6</b>	<b>209.9</b>	<b>211.9</b>	<b>213.5</b>	<b>216.0</b>	<b>217.3</b>	<b>-0.5</b>	<b>0.8</b>
Coal	32.4	33.9	30.6	30.1	30.5	30.6	30.6	30.6	30.6	-3.2	0.3
Oil	94.9	102.3	100.5	97.7	97.7	97.9	98.3	99.5	99.5	-0.4	0.4
Gas	24.8	25.5	26.1	24.9	25.2	25.8	26.1	26.4	26.7	-0.5	1.4
Electricity	42.7	44.7	46.0	46.0	46.3	47.0	47.6	48.2	48.8	0.8	1.2
Heat	2.6	2.7	2.9	2.6	2.7	2.8	2.9	3.0	3.1	0.7	3.6
New-Renewable	6.7	7.1	7.3	7.3	7.5	7.8	8.0	8.3	8.5	0.7	3.1
Industry	124.3	133.6	129.4	127.1	127.8	128.6	129.3	131.1	131.6	-0.6	0.7
Transport	34.7	36.6	36.3	35.3	35.7	35.9	36.1	36.1	36.1	-0.5	0.5
Buildings	45.0	46.1	47.7	46.2	46.5	47.4	48.2	48.9	49.6	-0.4	1.4

## Energy Demand - LEG Scenario

	(yoy, %)										
											CAGR (%)
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	18-23	23-28
<b>Total Primary Energy Demand</b>											
Coal (Mton)	-12.0	0.6	-6.3	-6.3	-3.5	-3.5	-0.3	1.8	-2.7	-6.2	-1.7
Oil (Mbbl)	-4.0	7.1	-1.9	-4.3	0.6	0.8	0.1	1.3	0.0	-0.7	0.6
Gas (Bm3)	1.2	10.4	-0.5	-3.7	4.0	4.4	3.3	2.2	-1.0	0.7	2.6
Nuclear (TWh)	9.8	-1.4	11.4	2.5	5.3	3.7	-2.1	-5.1	8.0	6.2	1.8
New-Renewable (Mtoe)	10.8	11.7	10.9	5.8	5.6	7.2	6.7	6.7	6.7	8.5	6.6
<b>Total (Mtoe)</b>	<b>-3.4</b>	<b>5.2</b>	<b>-0.0</b>	<b>-2.3</b>	<b>1.2</b>	<b>1.1</b>	<b>0.9</b>	<b>1.1</b>	<b>0.8</b>	<b>-0.3</b>	<b>1.0</b>
Coal	-11.8	0.6	-6.5	-6.0	-3.3	-3.3	-0.3	1.7	-2.5	-5.9	-1.6
Oil	-4.4	7.1	-0.1	-2.3	0.6	0.1	0.3	1.2	0.0	0.2	0.5
Gas	1.0	10.1	-1.0	-3.3	3.2	4.1	3.3	2.2	-0.9	0.7	2.4
Nuclear	9.8	-1.4	11.4	2.5	5.3	3.7	-2.1	-5.1	8.0	6.2	1.8
New-Renewable	10.8	11.7	10.9	5.8	5.6	7.2	6.7	6.7	6.7	8.5	6.6
<b>Total Final Consumption</b>											
Coal (Mton)	-4.7	4.9	-11.1	-1.7	1.2	0.1	-0.0	0.1	0.0	-3.6	0.3
Oil (Mbbl)	-5.5	7.6	-1.3	-4.1	1.6	0.6	0.3	1.3	0.0	-0.6	0.8
Natural gas (Mton)	9.7	0.6	4.4	25.9	25.6	10.2	4.0	3.6	3.4	9.6	9.1
City gas (Bm <sup>3</sup> )	-2.0	3.3	2.9	-7.4	-1.8	1.2	0.6	0.6	0.5	-1.3	0.2
Electricity (TWh)	-2.1	4.7	2.9	-0.1	0.7	1.4	1.4	1.3	1.2	0.8	1.2
Heat (Mtoe)	4.9	4.2	9.1	-10.7	2.8	5.0	3.8	3.3	3.3	0.7	3.6
New-Renewable (Mtoe)	2.5	7.1	1.7	0.5	2.4	3.9	3.4	3.1	2.8	0.7	3.1
<b>Total (Mtoe)</b>	<b>-3.8</b>	<b>6.0</b>	<b>-1.3</b>	<b>-2.3</b>	<b>0.6</b>	<b>0.9</b>	<b>0.8</b>	<b>1.2</b>	<b>0.6</b>	<b>-0.5</b>	<b>0.8</b>
Coal	-4.8	4.7	-9.9	-1.4	1.3	0.2	0.1	0.1	0.1	-3.2	0.3
Oil	-5.6	7.8	-1.7	-2.8	0.1	0.2	0.3	1.3	0.0	-0.4	0.4
Gas	-1.1	3.1	2.2	-4.5	1.3	2.4	1.1	1.1	1.0	-0.5	1.4
Electricity	-2.1	4.7	2.9	-0.1	0.7	1.4	1.4	1.3	1.2	0.8	1.2
Heat	4.9	4.2	9.1	-10.7	2.8	5.0	3.8	3.3	3.3	0.7	3.6
New-Renewable	2.5	7.1	1.7	0.5	2.4	3.9	3.4	3.1	2.8	0.7	3.1
Industry	-4.1	7.5	-3.1	-1.7	0.5	0.6	0.6	1.3	0.4	-0.6	0.7
Transport	-6.6	5.4	-0.9	-2.8	1.2	0.7	0.4	0.1	0.0	-0.5	0.5
Buildings	-0.8	2.4	3.6	-3.2	0.5	2.1	1.5	1.5	1.4	-0.4	1.4

## Energy Demand by Sector - LEG Scenario

	(Mtoe)										
										CAGR (%)	
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	18-23	23-28
Industry	124.3	133.6	129.4	127.1	127.8	128.6	129.3	131.1	131.6	-0.6	0.7
Coal	32.2	33.7	30.4	30.0	30.3	30.4	30.4	30.5	30.5	-3.1	0.4
Oil	56.7	62.3	61.0	59.5	59.3	59.4	59.6	60.8	60.8	0.2	0.4
Gas	9.5	10.0	10.0	10.0	10.2	10.4	10.5	10.6	10.7	0.8	1.4
Electricity	21.9	23.2	23.6	23.1	23.1	23.5	23.8	24.0	24.3	-0.2	1.0
Heat	-	-	-	-	-	-	-	-	-	-	-
New-Renewable	4.0	4.4	4.5	4.6	4.8	5.0	5.1	5.2	5.3	1.6	2.9
Transport	34.7	36.6	36.3	35.3	35.7	35.9	36.1	36.1	36.1	-0.5	0.5
Coal	-	-	-	-	-	-	-	-	-	-	-
Oil	32.7	34.6	34.2	33.2	33.5	33.8	33.9	34.0	34.0	-0.5	0.5
Gas	1.1	1.1	1.0	1.0	0.9	0.9	0.9	0.8	0.8	-4.4	-4.9
Electricity	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	8.9	5.6
Heat	-	-	-	-	-	-	-	-	-	-	-
New-Renewable	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.3	1.9
Buildings*	45.0	46.1	47.7	46.2	46.5	47.4	48.2	48.9	49.6	-0.4	1.4
Coal	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	-13.7	-6.3
Oil	5.5	5.4	5.3	5.0	4.9	4.8	4.8	4.7	4.7	-5.7	-1.3
Gas	14.2	14.5	15.0	13.9	14.0	14.6	14.8	15.0	15.2	-1.1	1.8
Electricity	20.5	21.2	22.1	22.5	22.7	23.0	23.3	23.7	24.0	1.8	1.3
Heat	2.6	2.7	2.9	2.6	2.7	2.8	2.9	3.0	3.1	0.7	3.6
New-Renewable	1.9	2.0	2.1	2.0	1.9	2.1	2.2	2.3	2.4	-1.1	4.0
Transform**	296.3	302.2	318.3	312.6	315.9	318.4	320.6	324.1	326.2	-0.1	0.9
Coal	41.6	40.6	39.1	35.3	32.8	30.7	30.5	31.5	29.9	-8.0	-3.3
Oil	164.1	164.8	177.0	176.6	178.8	179.2	179.8	182.0	182.1	0.2	0.6
Gas	49.7	55.3	55.4	51.9	52.6	54.3	55.9	57.1	56.3	-0.1	1.6
Nuclear	34.1	33.7	37.5	38.4	40.5	42.0	41.1	39.0	42.1	6.2	1.8
New-Renewable	6.8	7.9	9.4	10.3	11.2	12.2	13.3	14.5	15.7	17.1	8.8

\* Gas is the sum of natural gas and city gas. \*\* 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)

	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	CAGR (%)	
										18-23	23-28
<b>Total Coal Demand</b>	<b>122.0</b>	<b>122.8</b>	<b>115.0</b>	<b>107.7</b>	<b>103.9</b>	<b>100.3</b>	<b>100.0</b>	<b>101.7</b>	<b>99.0</b>	<b>-6.2</b>	<b>-1.7</b>
Transformation	70.7	68.9	67.1	60.7	56.3	52.7	52.4	54.1	51.4	-7.9	-3.3
Power Generation	70.7	68.9	67.1	60.7	56.3	52.7	52.4	54.1	51.4	-7.9	-3.3
Heat	-	-	-	-	-	-	-	-	-	-	-
Gas Manufacture	-	-	-	-	-	-	-	-	-	-	-
Oil Refinery	-	-	-	-	-	-	-	-	-	-	-
<b>Total Final Consumption</b>	<b>51.3</b>	<b>53.8</b>	<b>47.8</b>	<b>47.0</b>	<b>47.6</b>	<b>47.6</b>	<b>47.6</b>	<b>47.6</b>	<b>47.7</b>	<b>-3.6</b>	<b>0.3</b>
Industry	50.8	53.4	47.4	46.6	47.2	47.3	47.3	47.4	47.4	-3.5	0.3
Transport	-	-	-	-	-	-	-	-	-	-	-
Buildings	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	-13.5	-6.3
<b>Consumption by products</b>											
Anthracite	7.2	7.3	6.2	5.6	5.7	5.5	5.4	5.3	5.2	-9.5	-1.6
Bituminous	114.9	115.4	108.8	102.1	98.3	94.8	94.6	96.5	93.9	-6.0	-1.7
Iron making	32.8	34.1	31.4	31.6	32.3	32.6	32.7	32.8	32.9	-2.2	0.8
Power Generation	69.8	68.0	66.2	59.8	55.5	52.0	51.6	53.4	50.6	-8.0	-3.3

## Oil - LEG Scenario

(Mbbbl)

	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	CAGR (%)	
										18-23	23-28
<b>Total Oil Demand</b>	<b>775.7</b>	<b>830.7</b>	<b>814.5</b>	<b>779.7</b>	<b>784.4</b>	<b>790.9</b>	<b>792.0</b>	<b>802.5</b>	<b>802.5</b>	<b>-0.7</b>	<b>0.6</b>
<b>Crude oil &amp; refinery feedstocks</b>	<b>1,089.3</b>	<b>1,089.1</b>	<b>1,155.9</b>	<b>1,150.1</b>	<b>1,162.3</b>	<b>1,165.1</b>	<b>1,168.7</b>	<b>1,183.2</b>	<b>1,183.6</b>	<b>-0.4</b>	<b>0.6</b>
Transform	1,089.3	1,089.1	1,155.4	1,149.6	1,161.9	1,164.7	1,168.3	1,182.8	1,183.2	-0.4	0.6
Oil refinery	1,089.3	1,089.1	1,155.4	1,149.6	1,161.9	1,164.7	1,168.3	1,182.8	1,183.2	-0.4	0.6
<b>Petroleum products</b>	<b>-313.6</b>	<b>-258.4</b>	<b>-341.4</b>	<b>-370.4</b>	<b>-377.9</b>	<b>-374.2</b>	<b>-376.7</b>	<b>-380.7</b>	<b>-381.0</b>	<b>0.2</b>	<b>0.6</b>
Transform	-1,107.2	-1,105.8	-1,179.2	-1,175.9	-1,198.2	-1,198.7	-1,203.9	-1,218.6	-1,219.3	-0.4	0.7
Power Generation	3.8	4.2	5.0	3.0	2.2	1.8	1.6	1.3	1.1	-18.9	-18.1
Heat	1.6	1.8	1.7	1.4	1.3	1.4	1.4	1.5	1.5	4.8	1.9
Gas Manufacture	0.3	1.7	3.4	2.7	1.8	1.2	1.2	1.3	1.3	16.0	-14.0
Oil refinery*	-1,112.9	-1,113.4	-1,189.4	-1,183.0	-1,203.5	-1,203.2	-1,208.1	-1,222.7	-1,223.2	-0.4	0.7
<b>Total Final Consumption</b>	<b>752.3</b>	<b>809.1</b>	<b>798.9</b>	<b>766.4</b>	<b>778.3</b>	<b>782.8</b>	<b>785.4</b>	<b>795.6</b>	<b>795.9</b>	<b>-0.6</b>	<b>0.8</b>
Industry	462.2	505.8	496.9	474.3	484.8	488.7	490.3	500.2	500.5	-0.2	1.1
Transport	245.4	259.0	258.0	250.3	252.6	254.1	255.3	255.7	256.0	-0.5	0.4
Buildings	44.7	44.2	44.0	41.8	40.8	40.0	39.8	39.6	39.5	-4.9	-1.1
<b>Consumption by products</b>											
Gasoline	81.0	84.9	88.4	90.4	94.0	94.5	94.9	95.1	95.2	2.5	1.1
Diesel	155.0	156.3	151.8	150.5	151.5	153.2	154.3	154.9	155.3	-1.3	0.6
Kerosene	16.8	16.5	15.4	13.2	12.5	11.9	11.7	11.5	11.4	-6.5	-2.9
B-C	6.8	6.4	6.7	7.0	6.6	6.8	6.8	6.9	6.9	-7.0	-0.2
Jet Oil	7.8	15.5	15.6	9.5	6.0	6.0	5.8	5.7	5.5	-7.1	-10.4
LPG	109.1	109.2	115.3	107.6	116.2	118.7	119.0	120.3	120.3	1.4	2.3
Petrochem feedstock	48.8	47.3	56.6	48.4	56.6	59.2	59.5	60.7	60.7	5.9	4.6
Naphtha	333.9	369.9	356.0	337.8	342.2	341.6	342.4	350.8	351.0	-1.9	0.8
Refinery gas	8.5	9.0	9.3	9.0	7.9	8.7	8.8	8.8	8.9	9.2	-0.4
Other Non-Energy	33.3	41.3	40.5	41.5	41.3	41.5	41.6	41.6	41.5	8.8	-0.0

\* 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

	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	CAGR (%)	
										18-23	23-28
<b>Total Gas Demand (Mton)</b>	<b>41.5</b>	<b>45.8</b>	<b>45.6</b>	<b>43.9</b>	<b>45.6</b>	<b>47.6</b>	<b>49.2</b>	<b>50.3</b>	<b>49.8</b>	<b>0.7</b>	<b>2.6</b>
Transform	38.0	42.4	42.4	39.7	40.3	41.6	42.8	43.8	43.1	-0.1	1.7
Power Generation	20.0	23.2	22.7	21.6	22.1	23.1	24.3	25.1	24.4	1.2	2.5
Heat	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	-	32.0
Gas Manufacture	18.0	19.1	19.6	18.1	18.1	18.5	18.6	18.7	18.8	-1.6	0.7
Oil refinery	-	-	-	-	-	-	-	-	-	-	-
<b>Total Final Consumption</b>	<b>1.6</b>	<b>1.6</b>	<b>1.7</b>	<b>2.1</b>	<b>2.7</b>	<b>3.0</b>	<b>3.1</b>	<b>3.2</b>	<b>3.3</b>	<b>9.6</b>	<b>9.1</b>
Industry	1.6	1.6	1.7	2.1	2.7	3.0	3.1	3.2	3.3	9.6	9.1
<b>City Gas (Bm3)</b>	<b>22.0</b>	<b>22.7</b>	<b>23.4</b>	<b>21.7</b>	<b>21.3</b>	<b>21.5</b>	<b>21.7</b>	<b>21.8</b>	<b>21.9</b>	<b>-1.3</b>	<b>0.2</b>
Transform	-22.1	-23.3	-24.3	-22.1	-22.0	-22.3	-22.3	-22.4	-22.5	-1.7	0.4
Power Generation	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	-17.6	4.8
Heat	0.2	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	-1.5	4.7
Gas Manufacture*	-22.9	-24.4	-25.5	-23.5	-24.1	-25.6	-27.8	-31.6	-38.1	-1.2	10.1
Oil refinery	-	-	-	-	-	-	-	-	-	-	-
<b>Total Final Consumption</b>	<b>22.0</b>	<b>22.7</b>	<b>23.4</b>	<b>21.7</b>	<b>21.3</b>	<b>21.5</b>	<b>21.7</b>	<b>21.8</b>	<b>21.9</b>	<b>-1.3</b>	<b>0.2</b>
Industry	7.1	7.6	7.6	7.0	6.6	6.4	6.3	6.3	6.2	-1.6	-2.4
Transport	1.1	1.0	1.0	1.0	0.9	0.9	0.8	0.8	0.8	-4.2	-4.9
Buildings	13.8	14.1	14.7	13.7	13.8	14.3	14.5	14.7	14.9	-0.9	1.8

\* 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.

## Heat and New-Renewable - *LEG Scenario*

(Mtoe)

										CAGR (%)	
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e	18-23	23-28
<b>Net Electricity Demand</b>	<b>548.7</b>	<b>572.7</b>	<b>590.5</b>	<b>584.4</b>	<b>591.4</b>	<b>598.3</b>	<b>607.3</b>	<b>614.5</b>	<b>622.0</b>	<b>0.6</b>	<b>1.3</b>
Own use and Losses	51.8	52.4	55.1	49.7	53.1	52.3	53.8	54.1	55.0	-1.4	2.1
<b>Total Final Consumption</b>	<b>496.9</b>	<b>520.3</b>	<b>535.4</b>	<b>534.7</b>	<b>538.3</b>	<b>546.0</b>	<b>553.4</b>	<b>560.4</b>	<b>567.0</b>	<b>0.8</b>	<b>1.2</b>
Industry	254.7	269.6	274.1	268.5	269.1	272.8	276.2	279.2	282.2	-0.2	1.0
Transport	3.3	3.7	4.1	4.7	5.2	5.5	5.7	6.0	6.2	8.9	5.6
Buildings	238.8	247.1	257.2	261.5	264.0	267.7	271.5	275.2	278.6	1.8	1.3
<b>Power generation capacity (GW)*</b>	<b>124.5</b>	<b>129.3</b>	<b>133.3</b>	<b>139.7</b>	<b>147.0</b>	<b>151.0</b>	<b>152.8</b>	<b>156.3</b>	<b>162.7</b>	<b>4.1</b>	<b>3.1</b>
Coal	36.9	37.3	37.7	38.6	40.6	40.3	37.4	36.5	34.7	0.9	-2.1
Oil	2.2	2.2	0.9	0.9	0.6	0.6	0.6	0.6	0.6	-27.6	-6.0
Gas	41.2	41.2	41.2	43.2	44.1	45.2	49.0	50.9	52.9	2.7	4.2
Nuclear	23.3	23.3	24.7	24.7	26.5	27.3	25.2	24.5	27.2	2.4	2.0
New-Renewable	21.0	25.4	28.9	32.4	35.1	37.6	40.6	43.8	47.3	19.3	7.8
<b>power generation*</b>	<b>548.7</b>	<b>572.7</b>	<b>590.5</b>	<b>584.4</b>	<b>591.4</b>	<b>598.3</b>	<b>607.3</b>	<b>614.5</b>	<b>622.0</b>	<b>0.6</b>	<b>1.3</b>
Coal	196.3	197.6	193.2	184.9	172.8	161.0	160.2	165.5	157.2	-5.0	-3.2
Oil	2.4	2.4	2.0	1.5	1.0	0.8	0.7	0.6	0.5	-23.7	-18.9
Gas	145.8	168.4	163.6	157.7	162.1	169.1	177.7	183.6	178.4	0.5	2.5
Nuclear	160.2	158.0	176.1	180.5	190.1	197.1	193.0	183.1	197.7	6.2	1.8
New-Renewable	44.0	46.4	55.7	59.7	65.3	70.2	75.7	81.7	88.1	10.9	8.1
<b>Fuel Consumption of Power Plants (Mtoe)*</b>	<b>110.4</b>	<b>114.5</b>	<b>117.3</b>	<b>114.3</b>	<b>115.4</b>	<b>117.0</b>	<b>118.5</b>	<b>119.6</b>	<b>121.4</b>	<b>-0.2</b>	<b>1.2</b>
Coal	41.6	40.6	39.1	35.3	32.8	30.7	30.5	31.5	29.9	-8.0	-3.3
Oil	0.6	0.6	0.6	0.4	0.3	0.2	0.2	0.2	0.2	-20.9	-17.9
Gas	26.1	30.4	29.7	28.2	28.9	30.2	31.7	32.7	31.8	1.2	2.4
Nuclear	34.1	33.7	37.5	38.4	40.5	42.0	41.1	39.0	42.1	6.2	1.8
New-Renewable	8.0	9.3	10.4	11.8	12.9	13.9	15.0	16.2	17.5	16.9	8.1

## Heat and New-Renewable - *LEG Scenario*

(Mtoe)

											CAGR (%)	
	2020	2021	2022	2023p	2024e	2025e	2026e	2027e	2028e		18-23	23-28
<b>Heat Demand</b>	<b>3.2</b>	<b>3.0</b>	<b>3.2</b>	<b>2.8</b>	<b>3.0</b>	<b>3.2</b>	<b>3.3</b>	<b>3.4</b>	<b>3.5</b>		<b>1.6</b>	<b>4.4</b>
Own use and Losses	0.7	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4		12.0	6.1
<b>Total Final Consumption</b>	<b>2.6</b>	<b>2.7</b>	<b>2.9</b>	<b>2.6</b>	<b>2.7</b>	<b>2.8</b>	<b>2.9</b>	<b>3.0</b>	<b>3.1</b>		<b>0.7</b>	<b>3.6</b>
Industry	-	-	-	-	-	-	-	-	-		-	-
Transport	-	-	-	-	-	-	-	-	-		-	-
Buildings	2.6	2.7	2.9	2.6	2.7	2.8	2.9	3.0	3.1		0.7	3.6
<b>New-Renewable Demand</b>	<b>13.5</b>	<b>15.0</b>	<b>16.7</b>	<b>17.6</b>	<b>18.6</b>	<b>20.0</b>	<b>21.3</b>	<b>22.7</b>	<b>24.3</b>		<b>8.5</b>	<b>6.6</b>
Transform	6.8	7.9	9.4	10.3	11.2	12.2	13.3	14.5	15.7		17.1	8.8
<b>Total Final Consumption</b>	<b>6.7</b>	<b>7.1</b>	<b>7.3</b>	<b>7.3</b>	<b>7.5</b>	<b>7.8</b>	<b>8.0</b>	<b>8.3</b>	<b>8.5</b>		<b>0.7</b>	<b>3.1</b>
Industry	4.0	4.4	4.5	4.6	4.8	5.0	5.1	5.2	5.3		1.6	2.9
Transport	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8		0.3	1.9
Buildings	1.9	2.0	2.1	2.0	1.9	2.1	2.2	2.3	2.4		-1.1	4.0



44543 Jung-gu District, Ulsan 405-11  
TEL : 052-714-2114 FAX : 052-714-2028  
[www.keei.re.kr](http://www.keei.re.kr)

