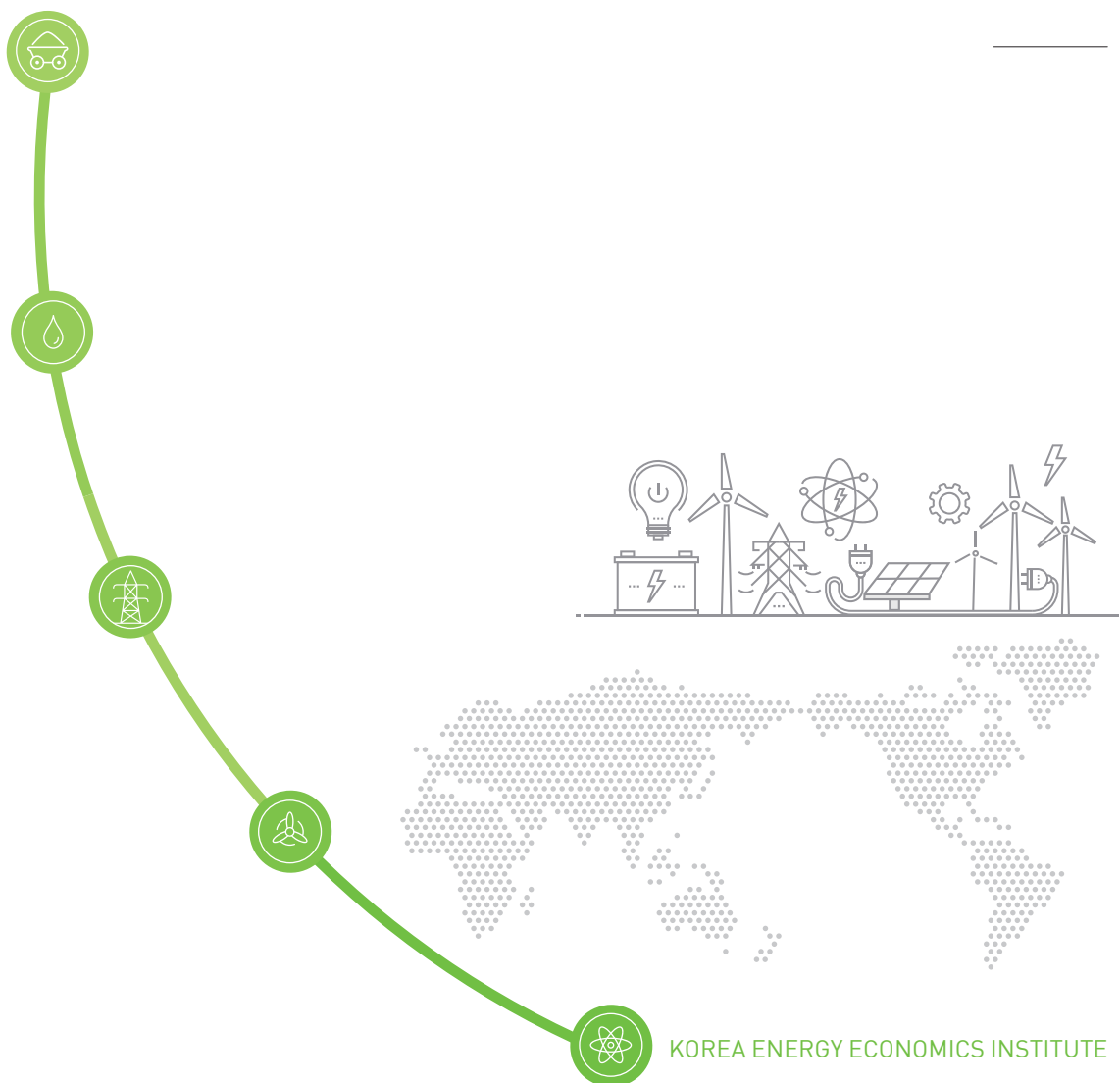


# KEEI Korea Energy Demand Outlook



2020 / First Half

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

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

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

Byungkuk Kang (Electricity, Transformation) wrote the report with the participation and support of Soo-il Kim(Coal, Gas), Seonggyun Kim (Oil), SungJae Lee (Economics, Prices, Heat and Renewables). Also, the report was reviewed carefully by Gwang-su Park.

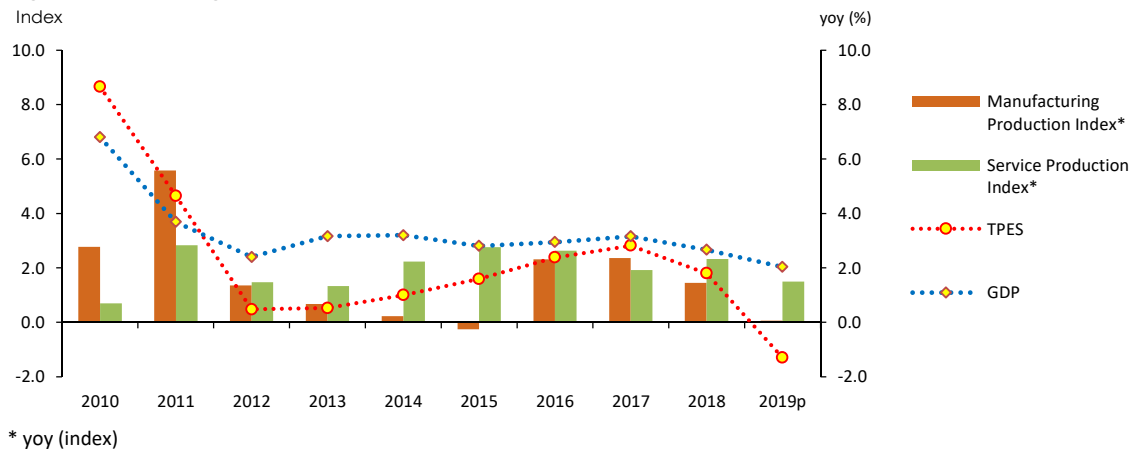
If you have any further inquiries, please send an email to [EnergyOutlook@keei.re.kr](mailto:EnergyOutlook@keei.re.kr) or call +82-52-714-2241.

## 1. Total Primary Energy Supply and Total Final Consumption<sup>1</sup>

□ **Total Primary Energy Supply (“TPES”) fell by 1.3% to 303.5 Mtoe in 2019 from the previous year.**

- TPES declined for the first time since 1998, which was attributed to the stagnant industrial & service production in the midst of the economic slowdown, increased preventive maintenance at petrochemical facilities and weather conditions.

**Figure 1.1 The growth rates of GDP and TPES, production index**



□ **Nuclear and renewable energy use increased, and petroleum use was almost at the prior-year level, while the use of coal and gas decreased.**

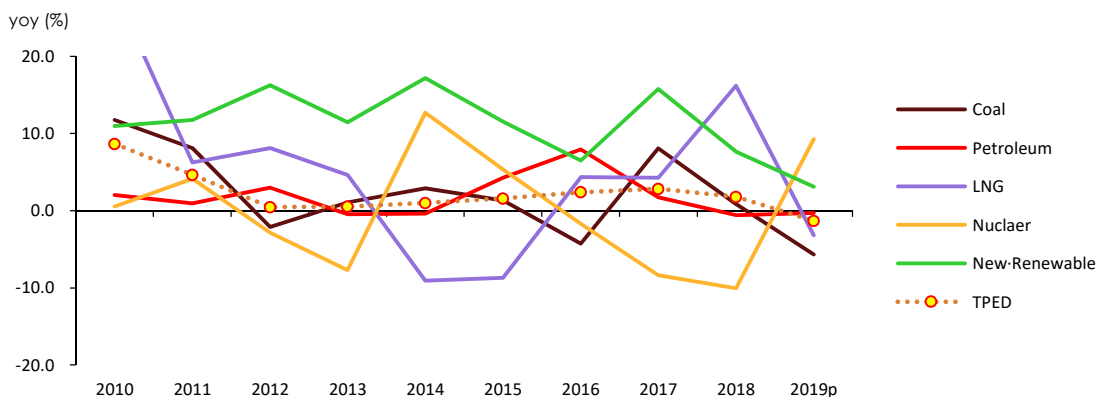
- Petroleum use fell by 0.3%, led by the domestic navigation sector where the use of fuel oil plunged due to the enforcement of the International Maritime Organization’s environmental regulations (“IMO 2020”)<sup>2</sup>, although it slightly increased in the industrial sector, with surging LPG use offsetting a drop in naphtha use, which takes a large share of the total industrial petroleum use.
- Coal use dropped by 5.7% year-on-year in 2019, as its industrial demand fell slightly partly due to weak production, and the demand fell more sharply in the power generation sector owing to the increased preventive maintenance, shutdown of some plants for safety issues and a cap on coal power generation as part of the government’s fine dust mitigation efforts.

<sup>1</sup> Growth rates of TPES and TFC by energy sources and sectors could be converted to tonnes of oil equivalent, and therefore they could be different from those measured with own unit of energy in (KEEI’s) reports on energy trend and outlook by energy sources.

<sup>2</sup> IMO decided to ban ships from using fuel oil with a sulfur content above 0.5% from 2020. The previous limit was 3.5%.

- Nuclear generation was up 9.3% year-on-year in 2019, as the total installed capacity increased (6.4%) with the commissioning of Shinkori unit 4 (Aug. 2019), and the average capacity factor also increased, with several reactors restarting after maintenance.
- Gas use slid by 3.2% year-on-year in 2019, as it rapidly declined in the power generation sector due to weak power demand and the high base effect from last year (21.5%) as well as increased nuclear generation, and as it also declined in the city gas production sector owing to a drop in heating demand amid mild winter.
- End-use of electricity fell by 1.1% year-on-year in 2019, as it declined in both of the industrial and buildings sectors; electricity use grew at slower pace in the fabricated metals and petrochemical sectors, and it dropped faster in the primary metals sector; the number of heating & cooling degree days plunged, and the service production index grew more slowly.

**Figure 1.2 The growth rate of TPES by energy sources**

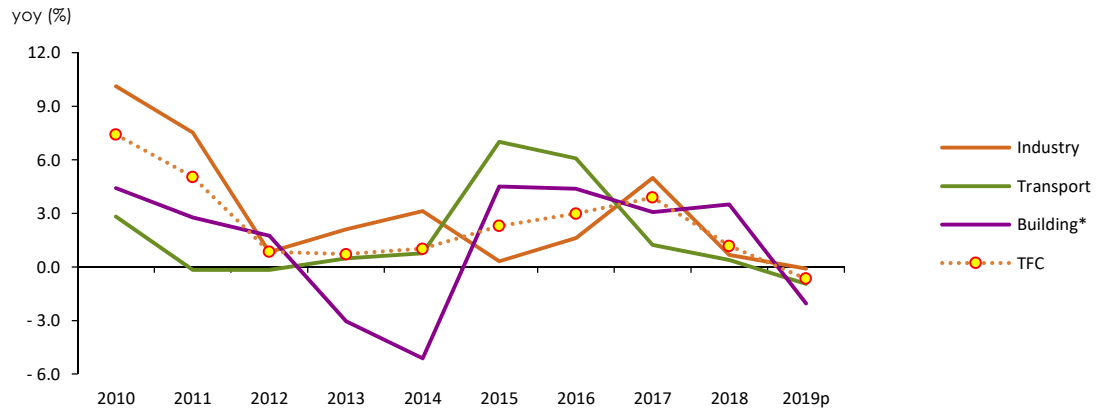


Note: measured in own unit of energy

- **Total Final Consumption ("TFC") dropped by 0.6% year-on-year in 2019, as the consumption declined in all the end-use sectors.**
  - Industrial energy use fell by 0.1% in 2019 from the previous year, as naphtha use declined due to increased maintenance work at naphtha cracking centers, although the use of bituminous coal for steelmaking slightly increased owing to the base effect.
  - Transport energy use declined by 0.9% year-on-year in 2019, led by a sharp drop in the domestic navigation sector as a result of IMO's environmental regulation, although it slightly increased in the road transport sector, because petroleum product prices decreased due to the global oil price decrease and temporary fuel tax cut.

- Buildings' energy use declined by 2.0% year-on-year in 2019, as the number of heating and cooling degree days plunged compared to the previous year which experienced both scorching heat and extremely cold weather.

**Figure 1.3 The growth rate of TFC by end-use sectors**

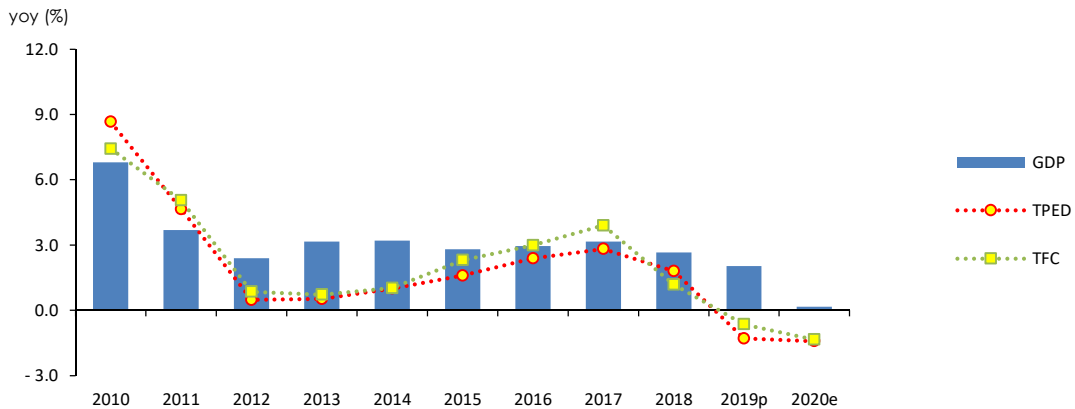


\* Building's energy use refers to the total amount of energy used in residential, commercial, public and other buildings.

## 2. TPES & TFC Outlook

- **TPES and TFC are expected to drop by 1.4% and 1.3% respectively in 2020 on a year-on-year basis.**
  - TPES and TFC are likely to drop for the 2<sup>nd</sup> consecutive year in 2020, owing to a slowdown in industrial and service production, hit by the COVID-19 pandemic, and a drop in transport demand during the social distancing period.
  - Energy consumption rate (toe/ KRW 1 million) is expected to grow at much slower pace in 2020 due to the high base effect of the previous year.

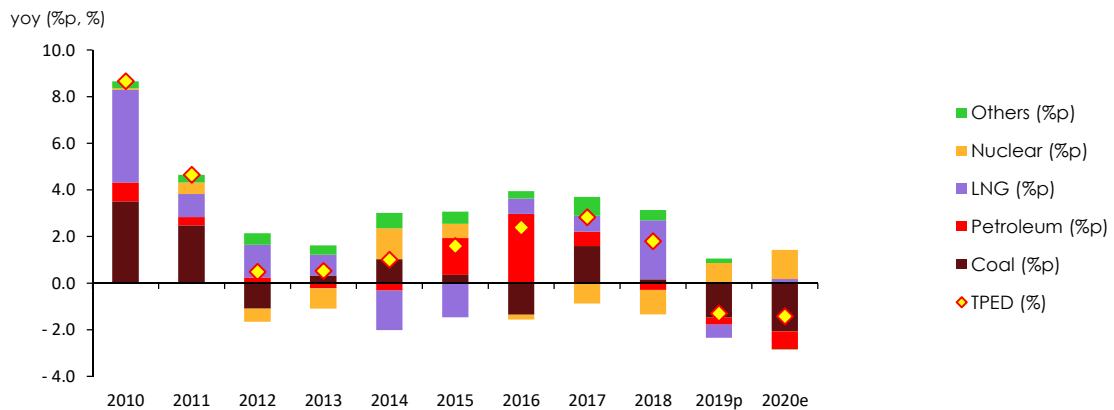
**Figure 2.1 The growth rates of GDP, TPES and TFC, trend and outlook**



- **Coal and petroleum demand are forecast to decrease (in 2020) while nuclear and gas demand are likely to increase.**
  - Petroleum demand is expected to drop by 1.0% in 2020 from the previous year, mostly in the transport sector, as overall traffic volume falls dramatically due to the social distancing measures that are adopted as a response to the spreading COVID-19.
  - Coal demand is forecast to drop by 7.7% year-on-year in 2020, with the power generation sector posting a double digit decline, although the demand falls just slightly in the end-use sectors.
  - Nuclear generation is likely to record a 12.2% year-on-year growth in 2020, considering the commissioning of a new reactor and recent growth in capacity factors at nuclear power plants.
  - Natural gas demand is expected to increase by 1.0% year-on-year in 2020, with the power generation sector leading the growth, although demand for city gas is likely to drop.

- Electricity demand is forecast to be down 0.6% year-on-year in 2020, despite a growth in its residential demand, as it declines in industrial and commercial sectors, which account for a much large share of the total consumption.
- Renewable energy demand is forecast to drop by 0.1% year-on-year in 2020, as it declines in the power generation sector partly due to a change in the renewable category, although the demand growth is expected to come from the end-use sectors.

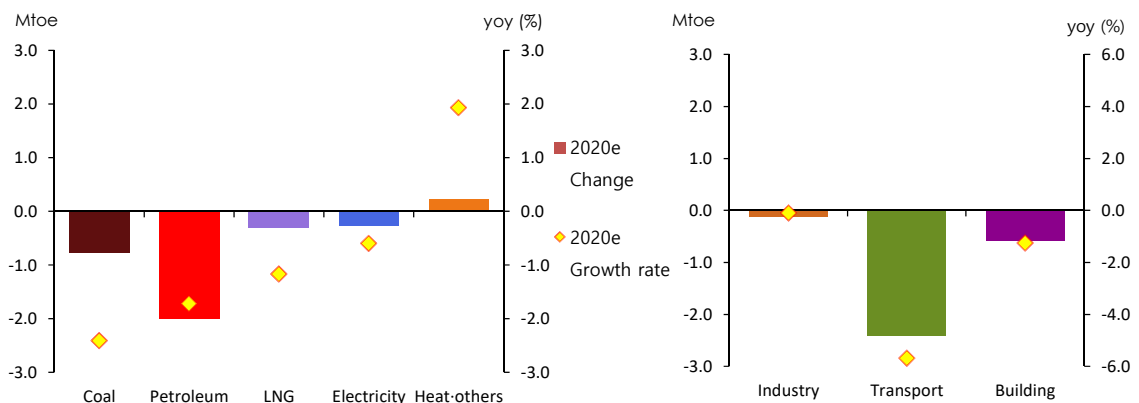
**Figure 2.2 The growth rate of TPES & contributions by sources**



□ **TFC is forecast to decrease in all the end-use sectors in 2020.**

- Industrial energy demand is expected to drop by 0.1% year-on-year in 2020; the demand is likely to drop faster (-1.0%) in 1H with the largest impact of COVID-19, and then drop more slowly (-0.8%) in 2H, showing signs of recovery.

**Figure 2.3 The change and growth rate of TFC by energy sources and end-use sectors, 2020**



- Transport energy demand is expected to drop by 5.7% year-on-year in 2020, led by a sharp decline in the road transport and aviation sectors.
- Buildings' energy demand is likely to fall by 1.2% year-on-year in 2020, mostly in commercial buildings hit hardest by COVID-19, while the number of heating degree-days remained flat.

### 3. Key Features and Implications

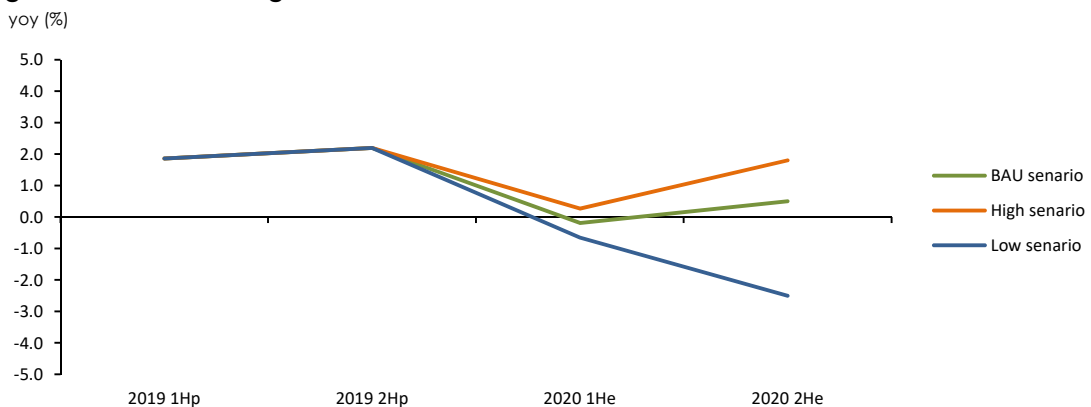
- **The global COVID-19 pandemic and more frequent extreme heat events are causing a lot more uncertainties in our energy demand outlook.**
  - The COVID-19 pandemic is the biggest factor that affects our energy demand outlook in this report, and the outlook will continue to be largely affected by the extent and duration of the COVID-19 spread.
  - Another factor that aggravates uncertainty in energy demand outlook is more frequent extreme weather events such as heat waves.
  - To cope with such uncertainty, this report suggests economic growth scenarios, depending on the extent and duration of the COVID-19 pandemic, and additionally summer heat wave scenario.

#### **The COVID-19 crisis and economic growth scenarios**

- **The spread of COVID-19 at home and abroad is causing unprecedented uncertainties in domestic and global economies, and thus requires analysis.**
  - The global economic growth will be much slower in 1H 2020, as economic activities slump amid the nationwide lockdown and border blockade in many countries. COVID-19 suppression measures and their outcome will be different country by country, and therefore the economy will slowly recover in 2H 2020.
  - COVID-19 is bringing changes in people's ways of life and behaviors, and it is likely to affect the pace of the economic recovery and the recovery pattern in different businesses & sectors as well as the energy consumption and its structure.
- **There remains uncertainty regarding the future of the global economy, depending on the extent and duration of the COVID-19 pandemic.**
  - KDI released economic scenarios (May 2020) to explore how the global economy might be affected by the extent and duration of the COVID-19 pandemic.
  - (Base scenario) The spread of COVID-19 slows down at home (1H) and abroad (2H) and then the situation gradually improves. Domestic economic activities slowly resume from May while that of the global economy restart from 2H along with growth in long-delayed investment.

- (High growth scenario) This scenario expects the global COVID-19 pandemic might be rapidly mitigated, and most countries see the situation return to normal in 2021 as it was before the pandemic. As COVID-19 cases are controlled at very low level and a treatment or vaccine becomes available, domestic economic activities pick up from May 2020, and the global economic activities see a visible recovery from 3Q 2020.
- (Low growth scenario) There are second and third waves of COVID-19 outbreak in countries where the crisis is well-stabilized or still severe, and therefore the number of new cases are high. Economic activities decline with deteriorating sentiment due to infection risk, and economic policies are not quite helpful in coping with the crisis, and private consumption and investment plunges globally.

**Figure 3.1 Economic growth scenarios**

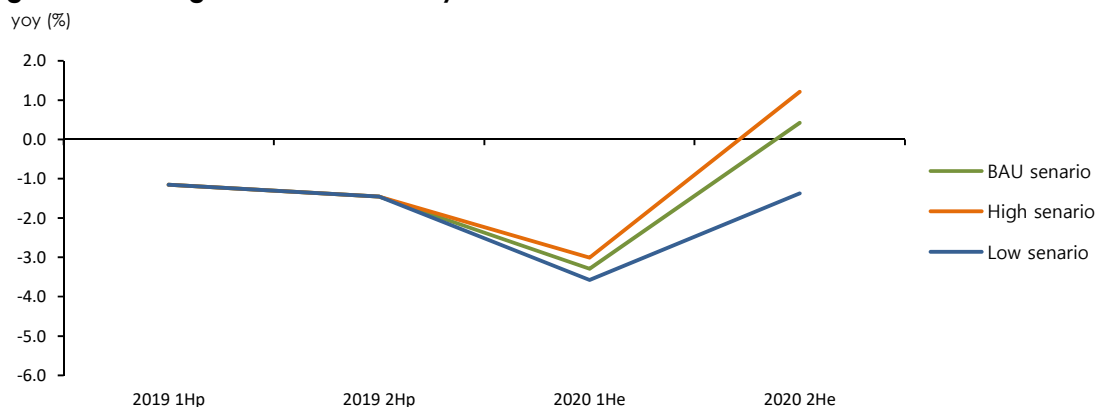


Source: KDI Economic Outlook 1H 2020 (KDI 2020.5)

☐ **The economic scenarios below suggest the negative impact of COVID-19 on the industry.**

- In low growth scenario, industrial and transport energy demand drop by 1.2% and 1.5% respectively compared to base scenario due to COVID-19, while the buildings sector is slightly less affected, posting a 0.9% drop in energy demand.
- In high growth scenario, energy use declines more slowly in the buildings and transport sectors and increase in the industrial sector compared to base scenario, as the domestic and global economies fast recover from the COVID-19 crisis.

**Figure 3.2 The growth rate of TPES by scenarios**



### Heat wave scenario

☐ **Heat waves have been occurring more frequently amid a visible upward trend in summer temperatures and the number of cooling degree days.**

- The number of cooling degree days surged by 87.2% year-on-year during the summer of 2016, and the total and buildings' power use were up 5.9% and 9.6% respectively in August when the weather was the most sweltering.
- 2018's heat wave was recorded as the most extreme heat event since the national weather forecast started. In that year, the number of cooling degree days rose by 57.5% year-on-year and 35.6% compared to 2016.
- Considering that Korea Meteorological Administration (KAM) expects another sweltering summer for 2020 (May 2020), an analysis is required on how the extreme heat event might affect electricity demand.

☐ **Assuming that the number of cooling degree days is the same as 2018, the growth rate of electricity demand increases by 0.6%p from base scenario.**

- Heat wave scenario assumes the number of cooling degree days in 2020 is the same as 2018 (209.0) when the weather was the hottest since national weather forecast started, and in this case, the number of cooling degree days increases by 73.6% from the previous year.
- Heat wave scenario shows the largest change in the residential sector compared to base scenario; electricity demand grows by 5.5% annually and by 11.1% in 3Q that includes the summer season.

- If COVID-19 coincides with heat waves, the impact of COVID-19 may partially offset that of heat waves in the commercial sector unlike the residential sector, even though both sectors refer to buildings.
- Industrial electricity demand is likely to be least affected by temperature changes; the growth rate of electricity demand is forecast to increase by mere 0.2%p from base scenario.

# The Main Indicator and Energy Outlook Result

## Main Economic and Energy Indicators

	2016	2017	2018			2019p			2020e		
			1H	2H		1H	2H		1H	2H	
Economy and Population											
GDP (2010 trillion won)	1 706.9	1 760.8	879.5	928.2	1 807.7	895.9	948.6	1 844.5	894.2	953.4	1 847.5
Industrial Production(2010=100)	102.2	104.8	104.9	107.8	106.4	103.5	109.1	106.3	105.5	109.4	107.5
Crude Oil Price (Dubai, USD/bbl)	41.2	53.2	68.0	70.9	69.4	65.5	61.6	63.5	38.1	36.3	37.2
Working Days	273.0	269.5	133.0	137.0	270.0	134.0	138.5	272.5	136.0	139.0	275.0
Population (million)	51.2	51.4	51.6	51.6	51.6	51.7	51.7	51.7	51.8	51.8	51.8
Average Temperature (°C)	13.6	13.1	9.9	16.1	13.0	10.4	16.7	13.5	11.0	16.1	13.5
Cooling Degree days	154.1	132.7	3.5	205.5	209.0	-	120.4	120.4	-	112.1	112.1
Heating Degree days	2 386.8	2 517.1	1 616.9	980.9	2 597.8	1 511.5	831.4	2 342.9	1 431.5	916.9	2 348.4
Energy Indicators											
Total Primary Energy Demand (Mtoe)	293.8	302.1	153.1	154.4	307.5	151.3	152.2	303.5	146.3	152.8	299.2
Energy Intensity (toe/million won)	0.172	0.172	0.174	0.166	0.170	0.169	0.161	0.165	0.164	0.160	0.162
TPED/capita (toe/capita)	5.736	5.881	2.966	2.993	5.959	2.926	2.943	5.869	2.826	2.952	5.778
Electricity Generation (TWh)	540.4	553.5	279.1	291.6	570.6	282.2	287.4	569.6	275.5	288.4	563.9
Electricity Generation/capita (MWh/capita)	10.6	10.8	5.4	5.7	11.1	5.5	5.6	11.0	5.3	5.6	10.9
Electricity Demand/capita (MWh/capita)	9.7	9.9	5.1	5.1	10.2	5.0	5.0	10.1	4.9	5.1	10.0

## Energy Demand

	2016	2017	2018			2019p			2020e		
			1H	2H		1H	2H		1H	2H	
<b>Total Primary Energy Supply</b>											
Coal (Mton)	129.3	139.8	68.9	72.1	141.0	63.0	70.0	133.0	56.5	66.3	122.8
Oil (Mbbbl)	921.1	937.1	466.6	465.2	931.8	454.8	474.2	929.0	440.7	479.2	919.8
Gas (Bm³)	34.9	36.4	22.6	19.7	42.3	21.4	19.5	40.9	22.6	18.7	41.3
Hydro (TWh)	6.6	7.0	3.4	3.9	7.3	3.0	3.2	6.2	3.1	3.5	6.6
Nuclear (TWh)	162.0	148.4	60.0	73.6	133.5	79.8	66.1	145.9	80.7	83.0	163.7
Other Renewables (Mtoe)	13.6	15.8	8.4	8.7	17.1	9.0	8.9	17.9	8.7	9.1	17.8
<b>Total (Mtoe)</b>	<b>293.8</b>	<b>302.1</b>	<b>153.1</b>	<b>154.4</b>	<b>307.5</b>	<b>151.3</b>	<b>152.2</b>	<b>303.5</b>	<b>146.3</b>	<b>152.8</b>	<b>299.2</b>
Coal	81.5	86.2	42.4	44.3	86.7	38.9	43.1	82.1	35.0	40.8	75.8
Oil	117.6	119.4	59.3	59.2	118.5	57.7	59.9	117.6	55.3	60.0	115.3
Gas	45.5	47.5	29.5	25.7	55.2	28.0	25.5	53.5	29.5	24.4	54.0
Nuclear	1.4	1.5	0.7	0.8	1.5	0.6	0.7	1.3	0.7	0.7	1.4
Hydro	34.2	31.6	12.8	15.7	28.4	17.0	14.1	31.1	17.2	17.7	34.9
Other Renewables	13.6	15.8	8.4	8.7	17.1	9.0	8.9	17.9	8.7	9.1	17.8
<b>Total Final Consumption</b>											
Coal (Mton)	49.0	50.4	24.3	24.9	49.2	24.1	24.1	48.2	23.4	24.0	47.4
Oil (Mbbbl)	899.3	926.6	459.4	460.6	920.0	450.0	470.3	920.3	437.7	475.3	913.0
Gas (Bm³)	21.3	22.6	14.0	10.3	24.3	13.6	9.6	23.3	13.3	9.7	23.0
Electricity (TWh)	497.0	507.7	261.7	264.5	526.1	259.9	260.6	520.5	254.9	262.5	517.4
Heat (Mtoe)	2.2	2.4	1.6	1.1	2.7	1.5	1.0	2.6	1.5	1.0	2.6
Other Renewables (Mtoe)	7.2	8.6	4.5	4.6	9.1	4.7	4.6	9.3	4.8	4.8	9.6
<b>Total (Mtoe)</b>	<b>221.4</b>	<b>230.0</b>	<b>117.9</b>	<b>114.9</b>	<b>232.7</b>	<b>116.7</b>	<b>114.5</b>	<b>231.2</b>	<b>113.1</b>	<b>115.0</b>	<b>228.1</b>
Coal	32.3	33.4	16.0	16.4	32.4	16.0	16.0	32.0	15.4	15.8	31.2
Oil	114.3	117.9	58.3	58.6	116.8	57.1	59.4	116.4	54.9	59.6	114.4
Gas	22.7	24.1	15.0	11.5	26.4	15.0	11.1	26.1	14.7	11.2	25.8
Electricity	42.7	43.7	22.5	22.7	45.2	22.3	22.4	44.8	21.9	22.6	44.5
Heat	2.2	2.4	1.6	1.1	2.7	1.5	1.0	2.6	1.5	1.0	2.6
Other Renewables	7.2	8.6	4.5	4.6	9.1	4.7	4.6	9.3	4.8	4.8	9.6
Industry	135.2	141.9	71.0	71.8	142.9	70.3	72.4	142.7	69.6	73.0	142.6
Transport	42.3	42.8	21.1	21.9	43.0	21.3	21.2	42.6	19.2	21.0	40.1
Buildings	44.0	45.3	25.7	21.2	46.9	25.1	20.9	46.0	24.3	21.0	45.4

## Energy Demand

(yoy, %)

	2016	2017	2018			2019p			2020e		
			1H	2H		1H	2H		1H	2H	
<b>Total Primary Energy Supply</b>											
Coal (Mton)	- 4.3	8.1	3.7	- 1.7	0.9	- 8.5	- 2.9	- 5.7	- 10.3	- 5.3	- 7.7
Oil (Mbbl)	8.0	1.7	1.9	- 2.9	- 0.6	- 2.5	1.9	- 0.3	- 3.1	1.1	- 1.0
Gas (Bm³)	4.4	4.3	21.6	10.5	16.2	- 5.2	- 0.8	- 3.2	5.6	- 4.1	1.0
Hydro (TWh)	14.5	5.5	5.6	2.5	3.9	- 11.6	- 16.6	- 14.3	3.6	9.0	6.4
Nuclear (TWh)	- 1.7	- 8.4	- 23.3	4.6	- 10.1	33.1	- 10.2	9.3	1.1	25.5	12.2
Other Renewables (Mtoe)	5.7	16.7	7.7	8.3	8.0	7.2	2.2	4.7	- 3.5	2.5	- 0.6
<b>Total (Mtoe)</b>	<b>2.4</b>	<b>2.8</b>	<b>2.9</b>	<b>0.7</b>	<b>1.8</b>	<b>- 1.2</b>	<b>- 1.5</b>	<b>- 1.3</b>	<b>- 3.3</b>	<b>0.4</b>	<b>- 1.4</b>
Coal	- 4.6	5.7	3.3	- 1.9	0.6	- 8.1	- 2.6	- 5.3	- 10.2	- 5.4	- 7.7
Oil	7.8	1.5	1.7	- 3.0	- 0.7	- 2.6	1.1	- 0.8	- 4.3	0.2	- 2.0
Gas	4.4	4.4	21.6	10.5	16.2	- 5.2	- 0.8	- 3.2	5.6	- 4.1	1.0
Nuclear	14.5	6.5	5.6	2.5	3.9	- 11.6	- 16.6	- 14.3	3.6	9.0	6.4
Hydro	- 1.7	- 7.5	- 23.3	4.6	- 10.1	33.1	- 10.2	9.3	1.1	25.5	12.2
Other Renewables	5.7	16.7	7.7	8.3	8.0	7.2	2.2	4.7	- 3.5	2.5	- 0.6
<b>Total Final Consumption</b>											
Coal (Mton)	- 6.8	2.7	- 2.0	- 2.5	- 2.3	- 0.8	- 3.4	- 2.1	- 3.2	- 0.3	- 1.7
Oil (Mbbl)	7.3	3.0	1.7	- 3.0	- 0.7	- 2.1	2.1	0.0	- 2.7	1.1	- 0.8
Gas (Bm³)	2.3	6.3	9.3	4.9	7.4	- 2.7	- 6.1	- 4.1	- 2.6	1.0	- 1.1
Electricity (TWh)	2.8	2.2	4.1	3.2	3.6	- 0.7	- 1.5	- 1.1	- 1.9	0.7	- 0.6
Heat (Mtoe)	11.0	11.8	15.6	2.2	9.9	- 4.8	- 5.0	- 4.9	- 2.3	3.9	0.2
Other Renewables (Mtoe)	- 5.6	20.4	5.8	5.1	5.5	4.9	0.3	2.6	1.1	3.8	2.4
<b>Total (Mtoe)</b>	<b>3.0</b>	<b>3.9</b>	<b>2.8</b>	<b>- 0.4</b>	<b>1.2</b>	<b>- 1.0</b>	<b>- 0.3</b>	<b>- 0.6</b>	<b>- 3.1</b>	<b>0.4</b>	<b>- 1.3</b>
Coal	- 7.2	3.1	- 2.7	- 2.9	- 2.8	- 0.1	- 2.6	- 1.4	- 3.7	- 1.1	- 2.4
Oil	6.9	3.1	1.4	- 3.1	- 0.9	- 2.1	1.4	- 0.3	- 3.8	0.3	- 1.7
Gas	2.6	6.0	10.6	9.0	9.9	0.5	- 3.2	- 1.1	- 2.6	0.7	- 1.2
Electricity	2.8	2.2	4.1	3.2	3.6	- 0.7	- 1.5	- 1.1	- 1.9	0.7	- 0.6
Heat	11.0	11.8	15.6	2.2	9.9	- 4.8	- 5.0	- 4.9	- 2.3	3.9	0.2
Other Renewables	- 5.6	20.4	5.8	5.1	5.5	4.9	0.3	2.6	1.1	3.8	2.4
Industry	1.6	5.0	2.0	- 0.6	0.7	- 1.0	0.8	- 0.1	- 1.1	0.8	- 0.1
Transport	6.1	1.2	1.0	- 0.2	0.4	1.0	- 2.9	- 0.9	- 10.0	- 1.4	- 5.7
Buildings	4.4	3.1	6.4	0.2	3.5	- 2.6	- 1.3	- 2.0	- 2.9	0.7	- 1.2

## Energy Demand by Sector

(Mtoe)

	2016	2017	2018			2019p			2020e		
			1H	2H		1H	2H		1H	2H	
<b>Industry</b>	<b>135.2</b>	<b>141.9</b>	<b>71.0</b>	<b>71.8</b>	<b>142.9</b>	<b>70.3</b>	<b>72.4</b>	<b>142.7</b>	<b>69.6</b>	<b>73.0</b>	<b>142.6</b>
Coal	31.8	32.8	15.8	16.2	32.0	15.9	15.8	31.7	15.3	15.6	30.9
Oil	66.8	69.8	34.6	34.7	69.3	33.4	36.0	69.4	33.7	36.8	70.4
Gas	8.0	8.8	5.2	5.3	10.5	5.6	5.2	10.7	5.4	5.1	10.5
Electricity	23.2	23.8	12.1	12.3	24.4	12.1	12.0	24.1	11.7	12.0	23.7
Heat	-	-	-	-	-	-	-	-	-	-	-
Other Renewables	5.3	6.6	3.3	3.4	6.7	3.5	3.3	6.8	3.5	3.5	7.0
<b>Transport</b>	<b>42.3</b>	<b>42.8</b>	<b>21.1</b>	<b>21.9</b>	<b>43.0</b>	<b>21.3</b>	<b>21.2</b>	<b>42.6</b>	<b>19.2</b>	<b>21.0</b>	<b>40.1</b>
Coal	-	-	-	-	-	-	-	-	-	-	-
Oil	40.3	40.9	20.0	20.8	40.8	20.2	20.2	40.4	18.2	19.9	38.0
Gas	1.3	1.3	0.6	0.6	1.2	0.6	0.6	1.2	0.6	0.6	1.2
Electricity	0.2	0.2	0.1	0.1	0.3	0.1	0.1	0.3	0.1	0.1	0.3
Heat	-	-	-	-	-	-	-	-	-	-	-
Other Renewables	0.4	0.4	0.3	0.3	0.7	0.3	0.3	0.7	0.3	0.3	0.7
<b>Buildings*</b>	<b>44.0</b>	<b>45.3</b>	<b>25.7</b>	<b>21.2</b>	<b>46.9</b>	<b>25.1</b>	<b>20.9</b>	<b>46.0</b>	<b>24.3</b>	<b>21.0</b>	<b>45.4</b>
Coal	0.6	0.5	0.2	0.3	0.4	0.1	0.2	0.3	0.1	0.2	0.3
Oil	7.1	7.2	3.6	3.1	6.8	3.4	3.2	6.6	3.0	2.9	6.0
Gas	13.4	14.0	9.2	5.5	14.7	8.9	5.3	14.2	8.7	5.5	14.1
Electricity	19.3	19.6	10.3	10.3	20.6	10.2	10.3	20.5	10.1	10.4	20.5
Heat	2.2	2.4	1.6	1.1	2.7	1.5	1.0	2.6	1.5	1.0	2.6
Other Renewables	1.4	1.6	0.9	0.9	1.7	0.9	0.9	1.8	1.0	1.0	1.9
<b>Transform</b>	<b>139.5</b>	<b>141.4</b>	<b>73.7</b>	<b>73.9</b>	<b>147.7</b>	<b>72.5</b>	<b>71.0</b>	<b>143.5</b>	<b>70.3</b>	<b>71.5</b>	<b>141.8</b>
Coal	49.2	52.8	26.4	27.9	54.2	23.0	27.1	50.1	19.6	25.0	44.6
Oil	3.3	1.5	1.0	0.7	1.7	0.7	0.5	1.2	0.4	0.5	0.9
Gas	45.0	46.7	29.0	24.8	53.8	27.0	24.3	51.3	28.6	23.3	51.8
Nuclear	34.2	31.6	12.8	15.7	28.4	17.0	14.1	31.1	17.2	17.7	34.9
Hydro	1.4	1.5	0.7	0.8	1.5	0.6	0.7	1.3	0.7	0.7	1.4
Renewables	6.4	7.2	3.9	4.1	8.0	4.3	4.3	8.6	3.9	4.4	8.2

\* include residential, commercial, public-etc usage

## Coal

(Mton)

	2016	2017	2018			2019p			2020e		
			1H	2H		1H	2H		1H	2H	
<b>Total Coal Demand</b>	<b>129.3</b>	<b>139.8</b>	<b>68.9</b>	<b>72.1</b>	<b>141.0</b>	<b>63.0</b>	<b>70.0</b>	<b>133.0</b>	<b>56.5</b>	<b>66.3</b>	<b>122.8</b>
Transform	80.3	89.4	44.6	47.2	91.8	38.9	45.9	84.8	33.2	42.3	75.4
Power Generation	80.3	89.4	44.6	47.2	91.8	38.9	45.9	84.8	33.2	42.3	75.4
Heat	-	-	-	-	-	-	-	-	-	-	-
Gas Manufacture	-	-	-	-	-	-	-	-	-	-	-
<b>Total Final Consumption</b>	<b>49.0</b>	<b>50.4</b>	<b>24.3</b>	<b>24.9</b>	<b>49.2</b>	<b>24.1</b>	<b>24.1</b>	<b>48.2</b>	<b>23.4</b>	<b>24.0</b>	<b>47.4</b>
Industry	47.8	49.3	24.0	24.3	48.3	23.9	23.7	47.6	23.2	23.7	46.8
Transport	-	-	-	-	-	-	-	-	-	-	-
Buildings	1.3	1.1	0.3	0.6	0.9	0.2	0.4	0.6	0.2	0.3	0.5
<b>Consumption by products</b>											
Anthracite	10.8	8.3	4.5	4.7	9.2	4.2	3.7	7.9	3.5	3.5	7.0
Bituminous	118.5	131.5	64.4	67.4	131.8	58.8	66.2	125.1	53.0	62.8	115.8
Iron making	33.5	36.3	16.9	17.7	34.6	17.3	17.7	35.0	17.1	17.8	35.0
Cement	4.6	4.2	1.8	1.9	3.7	2.0	2.0	4.0	1.9	2.0	3.9
Power Generation	77.8	88.3	44.3	46.5	90.8	38.3	45.4	83.6	32.7	41.8	74.5

## Oil

(Mbbbl)

	2016	2017	2018p			2019p			2020e		
			1H	2H		1H	2H		1H	2H	
<b>Total Oil Demand</b>	<b>921.1</b>	<b>937.1</b>	<b>466.6</b>	<b>465.2</b>	<b>931.8</b>	<b>454.8</b>	<b>474.2</b>	<b>929.0</b>	<b>440.7</b>	<b>479.2</b>	<b>919.8</b>
Transform	21.8	10.5	7.2	4.5	11.7	4.8	3.9	8.7	3.0	3.9	6.8
Power Generation	19.3	8.1	5.0	3.6	8.6	3.2	2.2	5.4	1.1	1.2	2.3
Heat	1.3	1.2	0.7	0.4	1.1	1.1	1.1	2.1	1.3	2.1	3.4
Gas Manufacture	1.2	1.2	1.5	0.6	2.0	0.6	0.6	1.2	0.6	0.6	1.2
<b>Total Final Consumption</b>	<b>899.3</b>	<b>926.6</b>	<b>459.4</b>	<b>460.6</b>	<b>920.0</b>	<b>450.0</b>	<b>470.3</b>	<b>920.3</b>	<b>437.7</b>	<b>475.3</b>	<b>913.0</b>
Industry	542.6	567.0	282.2	281.9	564.1	272.3	294.9	567.2	277.5	302.7	580.2
Transport	300.5	303.2	148.4	153.8	302.3	150.2	150.1	300.3	134.7	147.8	282.6
Buildings	56.3	56.4	28.8	24.9	53.7	27.5	25.4	52.8	25.4	24.8	50.3
<b>Consumption by products</b>											
Gasoline	78.9	79.6	39.0	40.7	79.7	40.6	42.2	82.8	37.5	41.3	78.8
Diesel (including Transformation)	163.5	165.9	79.9	84.2	164.1	83.2	83.9	167.0	73.9	81.7	155.6
Kerosene (including Transformation)	19.1	19.0	10.2	8.7	18.9	9.2	7.9	17.1	7.7	7.6	15.4
B-C (including Transformation)	47.5	35.8	18.3	15.4	33.7	13.9	10.5	24.4	11.9	10.2	22.1
Jet Oil	37.0	38.2	19.8	20.0	39.9	19.5	19.4	38.8	15.5	18.4	33.9
LPG (including Transformation)	109.0	105.1	56.6	52.8	109.4	55.8	66.4	122.1	66.1	73.5	139.6
Naphtha	430.1	458.4	226.5	224.7	451.2	215.3	223.3	438.6	211.2	226.0	437.2
Other Non-Energy	36.1	35.1	16.4	18.7	35.1	17.3	20.7	38.0	16.8	20.5	37.3

## Gas

	2016	2017	2018			2019p			2020e		
			1H	2H		1H	2H		1H	2H	
<b>Total Gas Demand (Mton)</b>	<b>34.9</b>	<b>36.4</b>	<b>22.6</b>	<b>19.7</b>	<b>42.3</b>	<b>21.4</b>	<b>19.5</b>	<b>40.9</b>	<b>22.6</b>	<b>18.7</b>	<b>41.3</b>
Transform	34.5	35.8	22.2	19.0	41.2	20.7	18.6	39.3	21.9	17.8	39.7
Power Generation	15.5	15.6	9.8	9.1	18.9	8.9	9.5	18.4	10.1	9.0	19.1
Heat	1.6	1.7	1.2	1.0	2.3	1.0	0.9	1.9	0.9	1.0	1.9
Gas Manufacture	17.5	18.5	11.1	8.8	20.0	10.7	8.2	18.9	10.8	7.9	18.7
Industry	0.4	0.6	0.4	0.7	1.1	0.8	0.9	1.7	0.7	0.9	1.6
<b>City Gas (Bm<sup>3</sup>)</b>	<b>21.3</b>	<b>22.6</b>	<b>14.0</b>	<b>10.3</b>	<b>24.3</b>	<b>13.6</b>	<b>9.6</b>	<b>23.3</b>	<b>13.3</b>	<b>9.7</b>	<b>23.0</b>
Industry*	7.2	7.8	4.5	4.3	8.8	4.4	3.9	8.3	4.3	3.8	8.1
Transport	1.2	1.2	0.6	0.6	1.2	0.6	0.6	1.2	0.6	0.6	1.2
Buildings	12.8	13.6	8.9	5.3	14.3	8.6	5.2	13.8	8.4	5.3	13.7

\* exclude industrial LNG usage

## Electricity

(TWh)

	2016	2017	2018			2019p			2020e		
			1H	2H		1H	2H		1H	2H	
<b>Net Electricity Demand</b>	<b>540.4</b>	<b>553.5</b>	<b>279.1</b>	<b>291.6</b>	<b>570.6</b>	<b>282.2</b>	<b>287.4</b>	<b>569.6</b>	<b>275.5</b>	<b>288.4</b>	<b>563.9</b>
Own use and Losses	43.4	45.8	17.4	27.1	44.5	22.3	26.8	49.1	20.5	26.0	46.5
<b>Total Final Consumption</b>	<b>497.0</b>	<b>507.7</b>	<b>261.7</b>	<b>264.5</b>	<b>526.1</b>	<b>259.9</b>	<b>260.6</b>	<b>520.5</b>	<b>254.9</b>	<b>262.5</b>	<b>517.4</b>
Industry	270.0	276.7	140.8	142.9	283.7	140.2	139.6	279.8	136.2	139.7	275.9
Transport	2.7	2.8	1.4	1.5	3.0	1.4	1.5	2.9	1.5	1.5	3.0
Buildings	224.4	228.3	119.4	120.0	239.5	118.2	119.6	237.8	117.2	121.2	238.4
<b>Installed Electrical Capacity (GW)*</b>	<b>402.7</b>	<b>450.1</b>	<b>233.8</b>	<b>236.3</b>	<b>470.1</b>	<b>239.3</b>	<b>245.8</b>	<b>485.1</b>	<b>250.1</b>	<b>253.5</b>	<b>503.6</b>
Coal	115.5	138.8	73.5	73.9	147.5	74.1	74.0	148.1	74.1	74.4	148.5
Oil	16.5	16.6	8.3	8.6	16.9	7.7	7.7	15.5	4.2	4.2	8.4
Gas	130.3	144.4	75.1	75.7	150.8	76.0	77.7	153.7	82.4	82.6	165.0
Nuclear	87.3	91.1	44.8	43.7	88.5	43.7	46.0	89.7	46.5	47.9	94.4
Hydro	25.9	25.9	13.0	13.0	26.0	13.0	13.0	26.0	13.0	13.0	26.0
Other Renewables	27.1	33.3	19.1	21.4	40.4	24.8	27.3	52.1	29.9	31.4	61.3
<b>Electricity Generation of Power Plants*</b>	<b>540.4</b>	<b>553.5</b>	<b>279.1</b>	<b>291.6</b>	<b>570.6</b>	<b>282.2</b>	<b>287.4</b>	<b>569.6</b>	<b>275.5</b>	<b>288.4</b>	<b>563.9</b>
Coal	213.8	238.8	116.1	122.3	238.4	104.2	123.2	227.4	91.2	116.3	207.5
Oil	14.0	5.3	3.4	2.4	5.7	2.4	1.7	4.2	0.9	0.9	1.8
Gas	121.0	126.0	80.9	72.6	153.5	70.3	73.4	143.7	81.8	69.2	151.0
Nuclear	162.0	148.4	60.0	73.6	133.5	79.8	66.1	145.9	80.7	83.0	163.7
Hydro	6.6	7.0	3.4	3.9	7.3	3.0	3.2	6.2	3.1	3.5	6.6
Other Renewables	23.0	28.0	15.4	16.9	32.2	17.3	15.5	32.8	15.8	15.5	31.3
<b>Fuel Consumption of Power Plants (Mtoe)*</b>	<b>114.4</b>	<b>114.7</b>	<b>57.3</b>	<b>61.0</b>	<b>118.3</b>	<b>57.0</b>	<b>59.0</b>	<b>116.0</b>	<b>54.7</b>	<b>59.7</b>	<b>114.3</b>
Coal	49.2	52.8	26.4	27.9	54.2	23.0	27.1	50.1	19.6	25.0	44.6
Oil	3.0	1.2	0.8	0.5	1.3	0.5	0.3	0.8	0.2	0.2	0.3
Gas	20.2	20.4	12.8	11.9	24.7	11.6	12.4	24.1	13.2	11.7	24.9
Nuclear	34.2	31.6	12.8	15.7	28.4	17.0	14.1	31.1	17.2	17.7	34.9
Hydro	1.4	1.5	0.7	0.8	1.5	0.6	0.7	1.3	0.7	0.7	1.4
Other Renewables	6.4	7.2	3.9	4.1	8.0	4.3	4.3	8.6	3.9	4.4	8.2

\* District Heat is classified by fuel type since 2014

## Heat and Other Renewables

(Mtoe)

	2016	2017	2018			2019p			2020e		
			1H	2H		1H	2H		1H	2H	
<b>Net Heat Demand</b>	<b>2.2</b>	<b>2.4</b>	<b>1.6</b>	<b>1.1</b>	<b>2.6</b>	<b>1.5</b>	<b>1.0</b>	<b>2.5</b>	<b>1.5</b>	<b>1.0</b>	<b>2.5</b>
Own use and Losses	0.0	0.0	-0.0	0.0	-0.0	-0.0	0.0	-0.0	-0.0	0.0	-0.0
<b>Total Final Consumption</b>	<b>2.2</b>	<b>2.4</b>	<b>1.6</b>	<b>1.1</b>	<b>2.7</b>	<b>1.5</b>	<b>1.0</b>	<b>2.6</b>	<b>1.5</b>	<b>1.0</b>	<b>2.6</b>
Industry	-	-	-	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-	-	-	-
Buildings	2.2	2.4	1.6	1.1	2.7	1.5	1.0	2.6	1.5	1.0	2.6
<b>Heat Production by fuel</b>											
Coal	-	-	-	-	-	-	-	-	-	-	-
Oil	1.4	1.5	1.0	0.7	1.7	1.0	0.7	1.7	1.0	0.7	1.7
Gas	0.8	1.0	0.6	0.4	0.9	0.5	0.4	0.9	0.5	0.4	0.9
Nuclear	-	-	-	-	-	-	-	-	-	-	-
Hydro	-	-	-	-	-	-	-	-	-	-	-
Other Renewables	-	-	-	-	-	-	-	-	-	-	-
<b>Fuel Consumption of District Heat</b>											
Coal	-	-	-	-	-	-	-	-	-	-	-
Oil	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.3	0.2	0.2	0.4
Gas	2.0	2.2	1.6	1.3	2.9	1.3	1.2	2.5	1.2	1.2	2.5
Nuclear	-	-	-	-	-	-	-	-	-	-	-
Hydro	-	-	-	-	-	-	-	-	-	-	-
Other Renewables	-	-	-	-	-	-	-	-	-	-	-
<b>Other Renewables</b>	<b>15.0</b>	<b>17.3</b>	<b>9.1</b>	<b>9.5</b>	<b>18.7</b>	<b>9.6</b>	<b>9.6</b>	<b>19.2</b>	<b>9.4</b>	<b>9.9</b>	<b>19.2</b>
Hydro	1.4	1.5	0.7	0.8	1.5	0.6	0.7	1.3	0.7	0.7	1.4
Transform	6.4	7.2	3.9	4.1	8.0	4.3	4.3	8.6	3.9	4.4	8.2
<b>Total Final Consumption</b>	<b>7.2</b>	<b>8.6</b>	<b>4.5</b>	<b>4.6</b>	<b>9.1</b>	<b>4.7</b>	<b>4.6</b>	<b>9.3</b>	<b>4.8</b>	<b>4.8</b>	<b>9.6</b>
Industry	5.3	6.6	3.3	3.4	6.7	3.5	3.3	6.8	3.5	3.5	7.0
Transport	0.4	0.4	0.3	0.3	0.7	0.3	0.3	0.7	0.3	0.3	0.7
Buildings	1.4	1.6	0.9	0.9	1.7	0.9	0.9	1.8	1.0	1.0	1.9

# KEEI

## Korea Energy Demand Outlook

