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# KEEI Korea Energy Demand Outlook

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

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

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

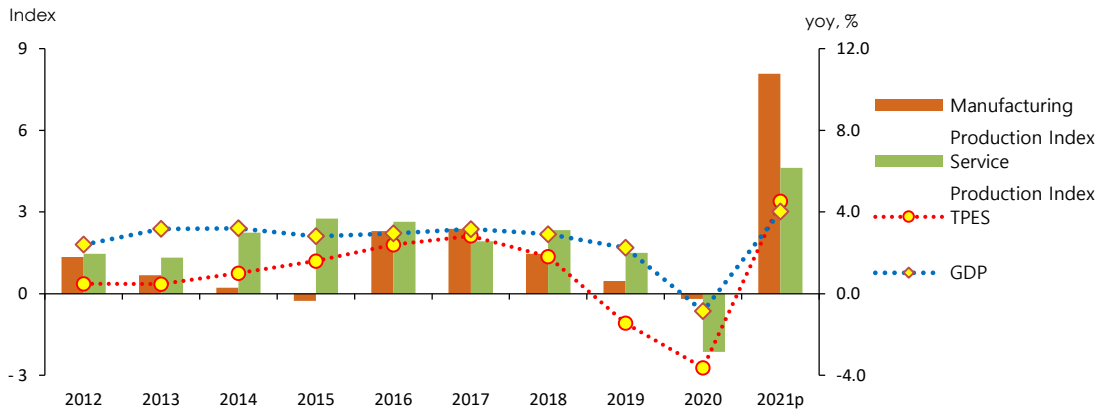
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# 1. Total Primary Energy Supply and Total Final Consumption

- **The Total Primary Energy Supply (“TPES”) increased by 4.5% year-on-year to 305.3 Mtoe in 2021 with the recovery of economic activities.**
  - TPES grew at the fastest rate since 2011 (4.9%), as exports and domestic demand increased amid the rapid economic recovery at home and abroad, which led to the growth in production activities of the manufacturing and service sectors.

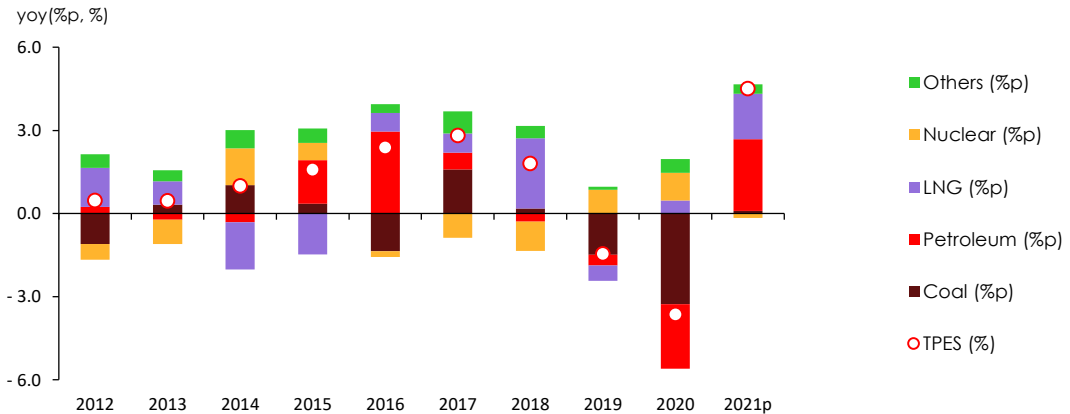
**Figure 1.1 The growth rates of GDP and TPES, production index**



Note: Production indexes show year-on-year differences.

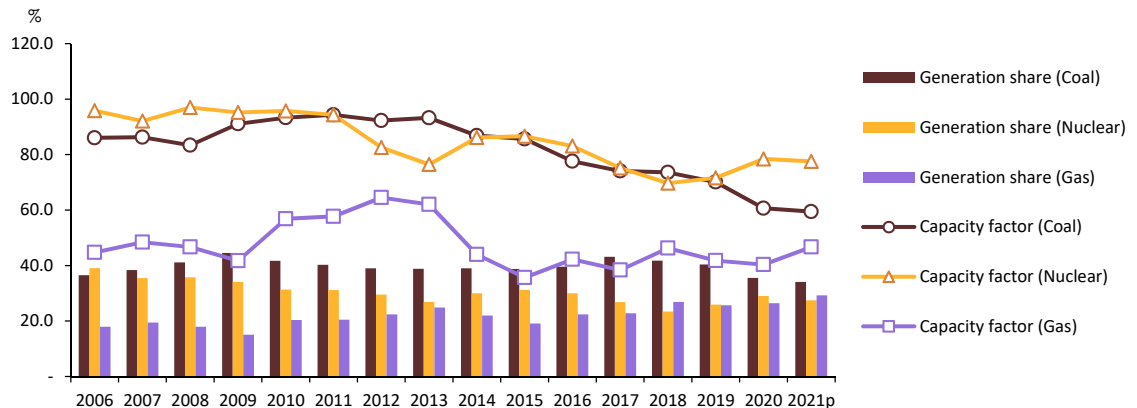
- **The use of almost all energy sources increased except nuclear energy, and the increase was mostly led by petroleum and gas.**
  - Petroleum use rose by 6.9%, which was driven by growing industrial energy use, especially those used as feedstock, owing to the economic recovery and the construction of additional petrochemical facilities, although the growth in transport energy use was stagnant due to the impact of COVID-19.
  - Coal use remained flat at the previous year’s level, despite the decent growth in industrial coal use, as it declined in the power generation sector.

**Figure 1.2 The growth rate of TPES & contribution by sources**



- Natural gas use went up by 8.7% year-on-year, as it surged in the power generation sector due to the increased electricity demand and decreased base load generation, and as it also grew decently in the city gas production sector.
- Nuclear generation fell by 1.4% without any change in its installed capacity, as nuclear capacity factor slightly decreased.
- Renewable and other energy use increased by 5.8%, partly due to the government policies that encourage the deployment of renewable installations.

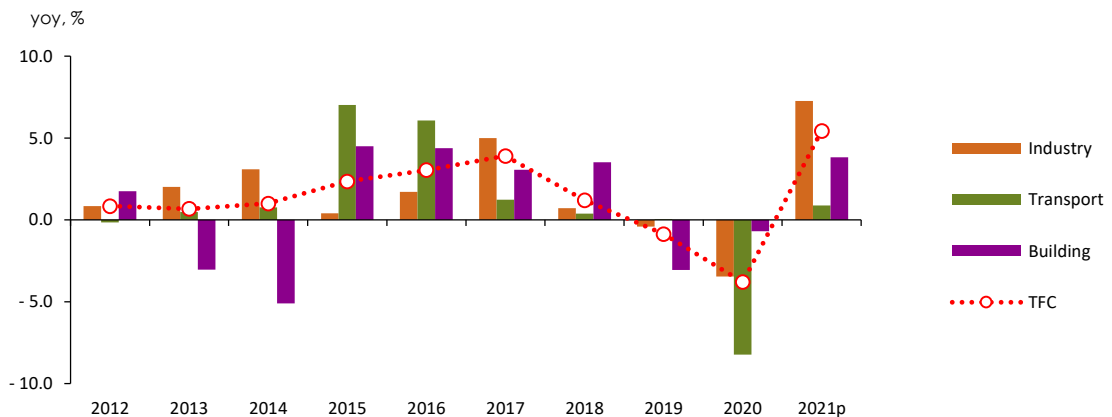
**Figure 1.3 Capacity factors by energy sources and power generation mix**



Note: Capacity factor is the ratio of the electrical energy produced to the electrical energy that could have been produced at continuous full power operation.

- Electricity use rose by 4.7% year-on-year, led by the industrial and building sectors; industrial electricity use grew rapidly with stronger production activities; buildings' electricity use increased due to the cold spell at the beginning of the year, increased cooling demand during the summer and the recovery of the service sector.
- **The Total Final Consumption("TFC") grew by 5.4% year-on-year in 2021, led by a surge in the industrial sector, which accounts for a large share of TFC, although transport energy use remained stagnant.**
  - Industrial energy use jumped 7.3%, as domestic demand and exports rose fast amid the economic recovery at home and abroad, which led to the increased production in the manufacturing sector, especially large-energy consuming businesses.
  - Transport energy use only slightly increased by 0.9%, despite the 1.4% growth in the road transport sector, as it declined in other transport sub-sectors.

**Figure 1.4 The growth rate of TFC by end-use sectors**



Note: The building sector includes residential, commercial, public-etc usage

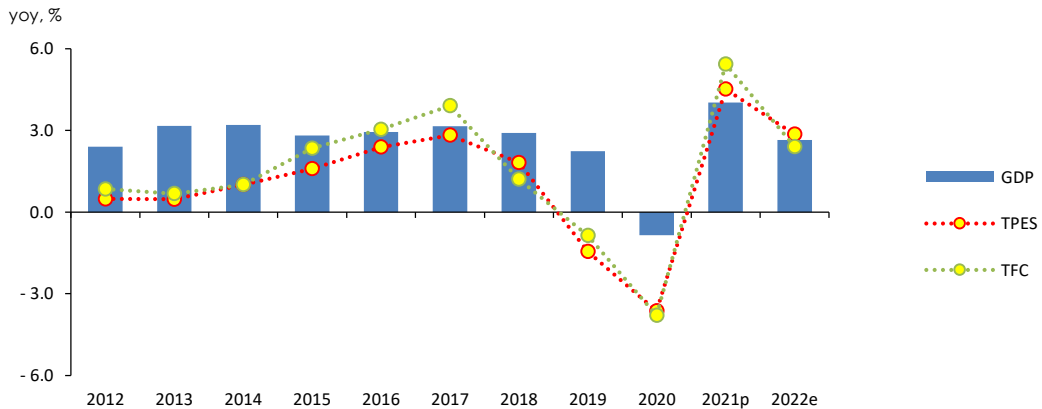
- Energy use in buildings posted a year-on-year growth of 3.8%, as it increased in both of the residential and commercial sectors due to the cold spell at the beginning of the year, increased cooling demand during the summer and the stronger service production.

## 2. TPES & TFC Outlook

□ TPES is expected to grow by 2.9% year-on-year in 2022 to reach 314.0 Mtoe.

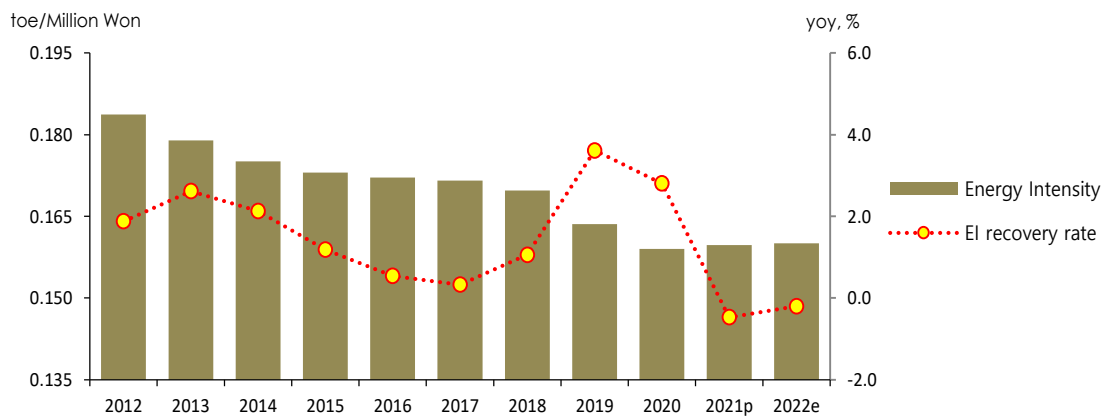
- Since the onset of the COVID-19 pandemic, TPES has been recovering rapidly, posting two consecutive years of growth, and in 2022, it is likely to exceed the previous peak seen in 2018.

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



- The rate of TPES growth is expected to be similar to that of the economic growth, and accordingly, energy intensity (toe/ KRW 1 million) will remain at the previous year's level.

**Figure 2.2 Energy Intensity and EI Recovery Trends**

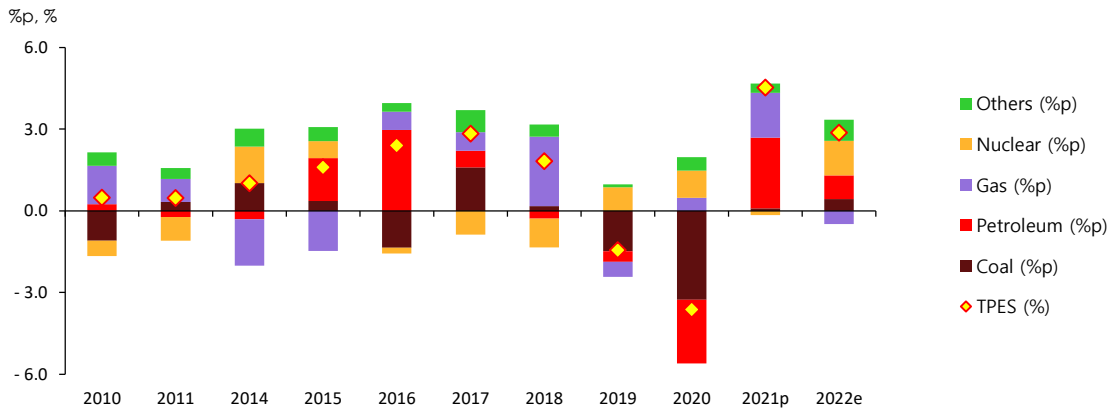


Note: Energy Intensity is calculated as the value of 'TPES/GDP', expressed in KRW 1 million, EI recovery rate multiplies EI increase rate by '-1'.

**Nuclear energy, petroleum and renewable energy will contribute the most to the growth in TPES this year, while gas use is expected to decline especially in the power generation sector.**

- Petroleum demand is forecast to grow by around 3%, despite the recent oil price hike, partly because the amount of petroleum used as feedstock increases amid the economic recovery from COVID-19 shocks and following the construction of additional petrochemical facilities.
- Coal demand is set to rebound, despite the stagnant growth in industrial coal use, which was hit by the supply chain crisis, as its demand increases in the power generation sector as a result of the slightly eased restriction on coal-fired generation amid the recent natural gas price hike.
- Nuclear generation is projected to increase by over 10%, leading the growth in TPES, along with the increased capacity factors than last year and following the commissioning of new reactors.
- Natural gas demand is expected to drop in the mid-2% range, as it decreases in the power generation sector due to the unprecedentedly high global natural gas price, and as it remains flat in the city gas production sector at the previous year's level.
- Final electricity demand is expected to reach 550TWh, marking the second consecutive year of fast recovery, after it declined from 2019 to 2020 due to temperature effect and the COVID-19 outbreak.

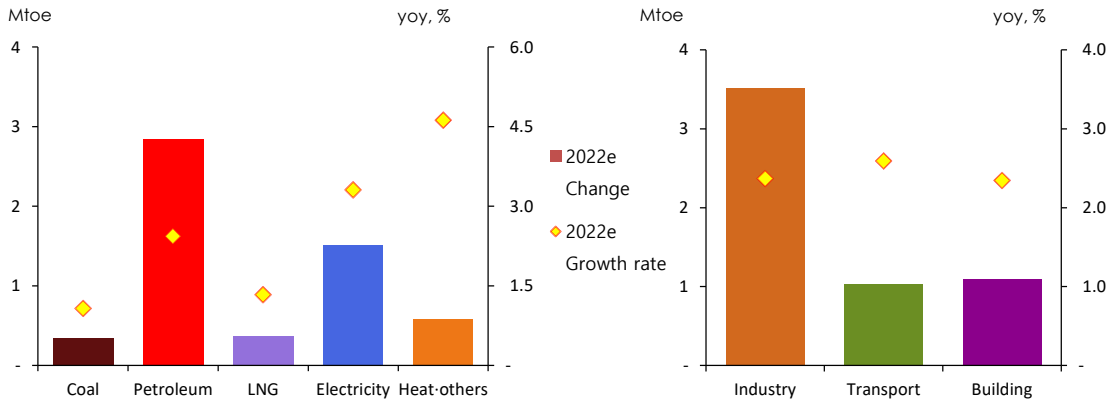
**Figure 2.3 The growth rate of TPES & contribution by sources**



**Final energy demand by end-users is expected to grow by 2.4% year-on-year to 240.3 Mtoe in 2022.**

- Industrial energy demand is forecast to grow by mid-2% amid a strong economic growth, though there are some factors that could increase uncertainties in this outlook, such as the global economic slowdown triggered by the supply chain crisis.

**Figure 2.4 The change and growth rate of TFC by energy sources and end-use sectors**



- Domestic and global travel demand is showing signs of recovery as the COVID-19 pandemic is subsiding. The growth in energy demand, however, is expected to be limited, affected by soaring gasoline and diesel prices amid the Russian-Ukraine War.
- Buildings' energy demand is expected to grow at the rate of the early 2% on a year-on-year basis due to temperature effect and the recovery of the service sector from the COVID-19 crisis.



### 3. Key Features and Implications

#### Energy Supply Chain Crisis

- **Global energy prices are expected to remain high during the outlook period amid the energy supply chain crisis.**
  - Global oil price had shown a strong upward move in 2H 2021, as the global economy started to recover from the COVID-19 pandemic. Since then, however, uncertainties surrounding the future oil prices have increased due to a potential global economic recession triggered by the Russian invasion of Ukraine in February 2022.

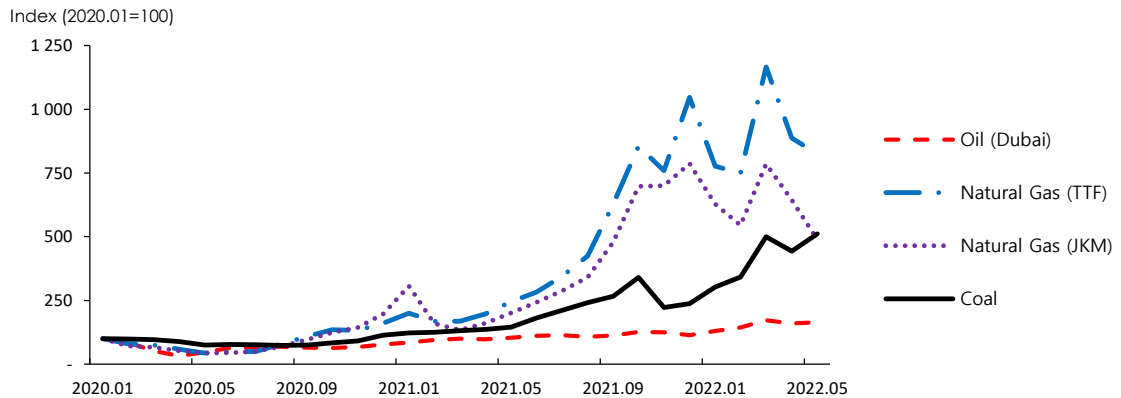
**Table 3.1 International Oil Price Forecast Dot Plot (US\$/bbl)**

Brent	Quarterly				Yearly				
	2022 2Q	2022 3Q	2022 4Q	2023 1Q	2022	2023	2024	2025	2026
130~135		.							
125~130									
120~125	....	.	.						.
115~120	.		.				.	.	
110~115	.....	....	.	..	..	.			
105~110	.....	.....			.....	.			
100~105	.....	.....	.....	...	.....	...			
95~100	...	....	.....	...	.....	..			
90~95	.	...	....	.....		.....	.		.
85~90	.	.	...	..	...	.....	....	..	
80~85		.	.	....		..	...	..	.
75~80		.	.		.	....	.....	....	....
70~75			.	.				....	...
65~70							.	...	..
60~65				.			.	...	...
55~60						.		.	.
50~55							.		
45~50									

Source: Refinitiv Eikon, "Reuters Commodity Polls"(2022.4.29)

- A group of experts reached a consensus on an expectation that oil prices will remain high until 2023 and then stabilize at low level.
- In a short-term, global oil prices will be largely affected by the Russian-Ukraine war, sanctions on Russia and the pace of the global economic recovery. In the mid- & long-term, the progress in energy transition will be a major factor that determines the oil price trend. For instance, if demand for and supply of fossil fuels decline at the same time throughout the energy transition process, it will have a limited impact on oil prices, while in the case of a demand-supply imbalance, oil price could fluctuate more significantly.

**Figure 3.1 International Energy Price Trend**

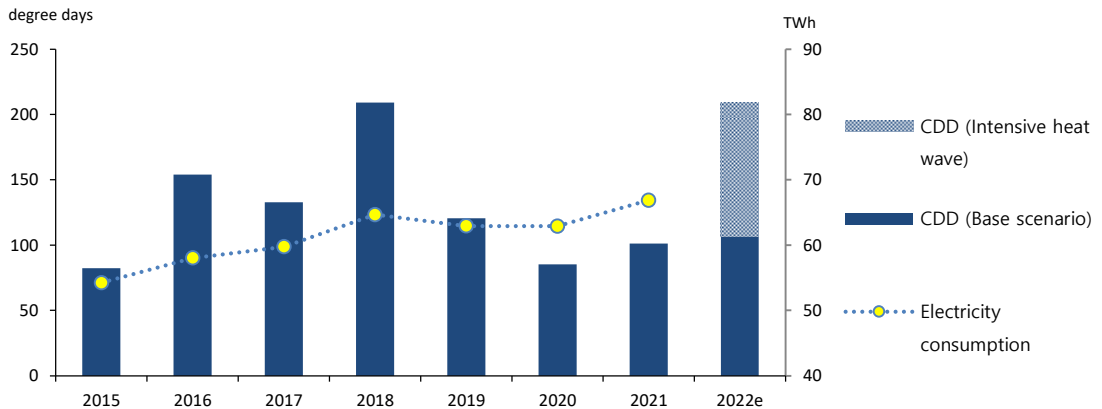


- Global natural gas and coal prices surged after Russia invaded Ukraine(2022.2.24) and then showed some downward trends, but the prices are expected to remain high compared to the previous year due to growing uncertainties amid the prolonged Russia-Ukraine crisis.
- **The drop in TFC is likely to be limited, despite the sharp increase in global energy prices.**
  - Domestic energy prices could face an upward pressure due to soaring global energy prices. However, the price increase will be limited thanks to the government policies aimed at stabilizing prices and reducing the burden on people, and consequently, general consumers' energy use is not expected to rapidly decline.
  - As mentioned above, soaring global energy prices will have only limited impact on domestic energy use. However, if inflation continues to rise worldwide, and austerity measures, that are taken as a response, lead to the economic recession, the production may slow down especially in the industrial sector, which could possibly decrease energy demand.

### Heat Wave Scenario

- **Electricity demand and supply emerged as a major energy issue for this summer, as a hotter than usual summer is expected.**
  - Since the extremely hot summer in 2016 and 2018, concerns intensify over scorching heat every summer, and how to respond to growing power demand for cooling is discussed as a major issue of energy demand and supply.

**Figure 3.6 Electricity consumption trend in the building sector in summer (Jul-Sep) and cooling degree days**



Note: The bottom of the cooling degree day bar of 2021 represents the number of possible cooling degree days assuming the average temperature of last ten years for this summer ('Base scenario') while the whole bar graph shows the value assuming that this summer will have the same number of cooling degree days as in 2018 ('Intensive heat wave scenario')

- Korea Meteorological Administration (“KMA”) predicted a high possibility of hotter than usual summer(KMA, June 2022) for this year, and therefore, changes in electricity demand needs to be analyzed under the heat wave scenario.
- **If the number of cooling degree days of 2022 is the same as in 2018, the growth rate of electricity demand will be 0.6%p higher compared to the base scenario.**
  - In the base scenario, the number of cooling degree days is expected to grow by 5.2% year-on-year in 2022, while it is expected to surge by 106.3% in the heat wave scenario, which assumed the same number of cooling degree days (209) recorded in 2018 when the weather was the hottest on record.
  - In the heat wave scenario, the residential electricity demand, which is affected the most by heat waves, is forecasted to increase by 5.0% year-on-year in 2022 and by 12.5% in 3Q which includes the summer season.
  - In the heat wave scenario, the commercial sector’s electricity demand (including the public sector) is estimated to grow by 3.6% year-on-year in 2022 and by 5.5% in 3Q, which is 0.5%p and 2.0%p higher than the rates in the base scenario.
  - The industrial sector is expected to show the smallest change in electricity demand due to temperature change, with its annual electricity demand increasing by just 0.2%p in the heat wave scenario compared to the base scenario.

- **If heat waves strike in the midst of the energy supply chain crisis, it is crucial to secure power generation fuels to guarantee energy security.**
  - If heat waves strike not only Korea but also the entire world this summer<sup>1</sup>, the demand for power generation fuels such as coal and natural gas is highly likely to surge, which could exacerbate the current energy supply chain crisis.
  - In our base scenario, the total gas-fired generation is to be 36.0 TWh in 3Q. In the heat wave scenario, if the growth rate of electricity demand goes up 0.6%p, the gas-fired generation is expected to grow by 9.8% to 39.5 TWh.
  - Securing power generation fuels is far more significant in the energy security aspect, inspite of inflationary conditions caused by soaring fossil fuel prices.

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<sup>1</sup> Asia Business Daily(June 28, 2022), “The worldwide heat waves and power emergency”

# The Main Indicator and Energy Outlook Result

## Main Economic and Energy Indicators

	2018	2019	2020			2021p			2022e		
			1H	2H		1H	2H		1H	2H	
<b>Economy and Population</b>											
GDP (2010 trillion won)	1 812.0	1 852.7	893.5	943.4	1 836.9	928.9	981.9	1 910.7	955.0	1 006.4	1 961.4
Industrial Production(2015=100)	106.3	106.7	103.1	109.8	106.4	112.1	116.6	114.3	116.8	118.4	117.6
Crude Oil Price (Dubai, USD/bbl)	69.4	63.5	40.7	43.8	42.2	63.5	75.0	69.3	99.5	100.0	99.7
Working Days	270.0	272.5	137.0	138.5	275.5	135.5	137.0	272.5	133.5	139.0	272.5
<hr/>											
Population (million)	51.6	51.8	51.8	51.8	51.8	51.7	51.7	51.7	51.6	51.6	51.6
Average Temperature (°C)	13.0	13.5	10.8	15.3	13.0	10.4	16.3	13.3	10.1	16.0	13.1
Cooling Degree days	209.0	120.4	3.5	81.7	85.2	-	101.3	101.3	-	106.6	106.6
Heating Degree days	2 597.8	2 370.9	1 473.4	974.6	2 448.0	1 492.3	912.4	2 404.7	1 576.4	922.6	2 499.0
<hr/>											
<b>Energy Indicators</b>											
Total Primary Energy Demand (Mtoe)	307.6	303.1	145.5	146.6	292.1	150.2	155.1	305.3	156.1	157.3	313.4
Energy Intensity (toe/million won)	0.170	0.164	0.163	0.155	0.159	0.162	0.158	0.160	0.164	0.156	0.160
TPED/capita (toe/capita)	5.962	5.855	2.807	2.827	5.635	2.903	2.997	5.899	3.024	3.047	6.071
Electricity Generation (TWh)	570.6	563.0	270.1	282.0	552.2	278.8	297.4	576.1	290.4	305.9	596.3
Electricity Generation/capita (MWh/capita)	11.1	10.9	5.2	5.4	10.7	5.4	5.7	11.1	5.6	5.9	11.5
Electricity Demand/capita (MWh/capita)	10.2	10.1	4.9	5.0	9.8	5.1	5.2	10.3	5.3	5.4	10.7

## Energy Demand

	2018	2019	2020		2021p			2022e			
			1H	2H	1H	2H		1H	2H		
<b>Total Primary Energy Supply</b>											
Coal (Mton)	141.1	133.0	55.9	60.7	116.6	54.9	61.9	116.8	56.1	62.9	119.0
Oil (Mbbbl)	931.8	927.1	441.1	431.3	872.4	452.7	479.5	932.2	476.9	484.6	961.6
Gas (Bm <sup>3</sup> )	42.3	41.0	21.2	20.9	42.1	24.1	21.7	45.8	24.0	20.7	44.6
Hydro (TWh)	7.3	6.2	3.2	4.0	7.1	3.4	3.4	6.7	2.8	3.6	6.5
Nuclear (TWh)	133.5	145.9	82.1	78.1	160.2	77.2	80.8	158.0	87.1	89.2	176.3
Other Renewables (Mtoe)	17.1	17.7	9.3	9.6	19.0	10.2	9.9	20.1	11.4	11.1	22.5
<b>Total (Mtoe)</b>	<b>307.6</b>	<b>303.1</b>	<b>145.5</b>	<b>146.6</b>	<b>292.1</b>	<b>150.2</b>	<b>155.1</b>	<b>305.3</b>	<b>156.4</b>	<b>157.6</b>	<b>314.0</b>
Coal	86.7	82.1	34.7	37.6	72.2	34.2	38.3	72.5	34.8	39.0	73.8
Oil	118.5	117.3	55.7	54.6	110.2	57.2	60.6	117.8	59.7	60.7	120.5
Gas	55.2	53.5	27.7	27.3	55.0	31.5	28.3	59.8	31.3	27.0	58.3
Hydro	1.5	1.3	0.7	0.8	1.5	0.7	0.7	1.4	0.6	0.8	1.4
Nuclear	28.4	31.1	17.5	16.6	34.1	16.4	17.2	33.7	18.5	19.0	37.5
Other Renewables	17.1	17.7	9.3	9.6	19.0	10.2	9.9	20.1	11.4	11.1	22.5
<b>Total Final Consumption</b>											
Coal (Mton)	49.3	48.2	22.0	23.8	45.8	23.4	24.4	47.8	23.2	25.3	48.4
Oil (Mbbbl)	920.0	918.5	438.3	427.5	865.8	448.5	475.1	923.6	473.3	480.6	953.9
Gas (Bm <sup>3</sup> )	26.3	26.1	14.4	11.6	25.9	15.2	11.8	27.0	15.7	11.7	27.3
Electricity (TWh)	526.1	520.5	252.3	257.0	509.3	261.8	271.6	533.4	271.9	279.1	551.1
Heat (Mtoe)	2.7	2.6	1.6	1.2	2.8	1.7	1.2	2.9	1.8	1.2	3.1
Other Renewables (Mtoe)	9.1	8.9	4.7	4.8	9.5	4.8	4.8	9.6	5.1	5.0	10.0
<b>Total (Mtoe)</b>	<b>233.4</b>	<b>231.4</b>	<b>112.7</b>	<b>109.9</b>	<b>222.6</b>	<b>117.0</b>	<b>117.6</b>	<b>234.7</b>	<b>121.1</b>	<b>119.2</b>	<b>240.3</b>
Coal	32.5	32.1	14.6	15.8	30.5	15.6	16.2	31.8	15.4	16.7	32.1
Oil	116.8	116.1	55.3	54.1	109.3	56.7	60.0	116.7	59.3	60.3	119.6
Gas	27.0	26.9	14.8	11.9	26.7	15.7	12.1	27.8	16.1	12.0	28.1
Electricity	45.2	44.8	21.7	22.1	43.8	22.5	23.4	45.9	23.4	24.0	47.4
Heat	2.7	2.6	1.6	1.2	2.8	1.7	1.2	2.9	1.8	1.2	3.1
Other Renewables	9.1	8.9	4.7	4.8	9.5	4.8	4.8	9.6	5.1	5.0	10.0
Industry	143.5	142.9	69.0	69.0	138.0	72.2	75.8	148.0	75.0	76.5	151.5
Transport	43.0	43.0	19.4	20.1	39.4	19.5	20.3	39.8	19.9	20.9	40.8
Buildings	46.9	45.5	24.3	20.8	45.2	25.3	21.6	46.9	26.1	21.8	48.0

## Energy Demand

(yoy, %)

	2018	2019	2020			2021p			2022e		
			1H	2H		1H	2H		1H	2H	
<b>Total Primary Energy Supply</b>											
Coal (Mton)	1.3	-5.7	-11.3	-13.3	-12.4	-1.9	2.1	0.2	2.2	1.6	1.9
Oil (Mbbbl)	4.3	-0.5	-3.0	-8.7	-5.9	2.6	11.2	6.9	5.4	1.1	3.1
Gas (Bm <sup>3</sup> )	-8.7	-3.1	-1.0	6.7	2.7	13.6	3.7	8.7	-0.5	-4.7	-2.5
Hydro (TWh)	-25.9	-14.1	5.6	22.6	14.4	6.3	-15.4	-5.8	-16.2	8.8	-3.8
Nuclear (TWh)	5.3	9.3	2.8	18.2	9.8	-5.9	3.5	-1.4	12.8	10.4	11.6
Other Renewables (Mtoe)	17.2	3.3	5.4	9.2	7.3	8.9	2.7	5.8	12.0	12.0	12.0
<b>Total (Mtoe)</b>	<b>1.6</b>	<b>-1.5</b>	<b>-3.7</b>	<b>-3.5</b>	<b>-3.6</b>	<b>3.2</b>	<b>5.8</b>	<b>4.5</b>	<b>4.1</b>	<b>1.6</b>	<b>2.9</b>
Coal	1.2	-5.3	-11.0	-13.0	-12.1	-1.4	2.0	0.4	1.8	1.8	1.8
Oil	4.2	-1.0	-3.6	-8.4	-6.0	2.8	11.0	6.9	4.4	0.2	2.3
Gas	-8.7	-3.1	-1.0	6.7	2.7	13.6	3.7	8.7	-0.5	-4.7	-2.5
Hydro	-25.9	-14.1	5.6	22.6	14.4	6.3	-15.4	-5.8	-16.2	8.8	-3.8
Nuclear	5.3	9.3	2.8	18.2	9.8	-5.9	3.5	-1.4	12.8	10.4	11.6
Other Renewables	17.2	3.3	5.4	9.2	7.3	8.9	2.7	5.8	12.0	12.0	12.0
<b>Total Final Consumption</b>											
Coal (Mton)	-0.8	-2.2	-8.9	-1.0	-4.9	6.4	2.6	4.4	-1.0	3.3	1.2
Oil (Mbbbl)	4.1	-0.2	-2.6	-8.8	-5.7	2.3	11.1	6.7	5.5	1.2	3.3
Gas (Bm <sup>3</sup> )	-5.4	-0.6	-3.7	3.6	-0.6	6.1	1.4	4.0	2.8	-0.6	1.3
Electricity (TWh)	1.3	-1.1	-2.9	-1.4	-2.2	3.8	5.7	4.7	3.9	2.8	3.3
Heat (Mtoe)	28.7	-1.3	-0.7	12.8	4.7	7.0	1.7	4.7	7.0	2.6	5.2
Other Renewables (Mtoe)	23.0	-2.2	5.0	8.1	6.5	3.4	-1.0	1.1	4.8	4.1	4.5
<b>Total (Mtoe)</b>	<b>2.3</b>	<b>-0.9</b>	<b>-3.5</b>	<b>-4.1</b>	<b>-3.8</b>	<b>3.9</b>	<b>7.1</b>	<b>5.4</b>	<b>3.5</b>	<b>1.3</b>	<b>2.4</b>
Coal	-1.0	-1.3	-8.5	-1.5	-5.0	6.6	2.4	4.4	-1.4	3.5	1.1
Oil	4.1	-0.6	-3.1	-8.5	-5.8	2.5	11.1	6.7	4.6	0.4	2.4
Gas	-5.4	-0.6	-3.7	3.6	-0.6	6.1	1.4	4.0	2.8	-0.6	1.3
Electricity	1.3	-1.1	-2.9	-1.4	-2.2	3.8	5.7	4.7	3.9	2.8	3.3
Heat	28.7	-1.3	-0.7	12.8	4.7	7.0	1.7	4.7	7.0	2.6	5.2
Other Renewables	23.0	-2.2	5.0	8.1	6.5	3.4	-1.0	1.1	4.8	4.1	4.5
Industry	0.4	-0.4	-2.0	-4.9	-3.5	4.7	9.9	7.3	3.9	1.0	2.4
Transport	7.0	0.0	-9.9	-6.6	-8.2	0.7	1.1	0.9	2.3	2.9	2.6
Buildings	4.5	-3.1	-2.4	1.4	-0.7	4.1	3.5	3.8	3.3	1.2	2.3

## Energy Demand by Sector

(Mtoe)

	2018	2019	2020		2021p			2022e			
			1H	2H		1H	2H		1H	2H	
<b>Industry</b>	<b>143.5</b>	<b>142.9</b>	<b>69.0</b>	<b>69.0</b>	<b>138.0</b>	<b>72.2</b>	<b>75.8</b>	<b>148.0</b>	<b>75.0</b>	<b>76.5</b>	<b>151.5</b>
Coal	32.0	31.8	14.6	15.7	30.2	15.5	16.0	31.6	15.3	16.6	31.9
Oil	69.3	69.2	34.0	32.5	66.5	35.2	38.1	73.2	37.6	38.0	75.5
Gas	11.1	11.4	5.7	5.7	11.4	6.2	6.1	12.2	6.1	5.9	12.0
Electricity	24.4	24.1	11.4	11.7	23.1	12.0	12.3	24.3	12.5	12.6	25.2
Heat	-	-	-	-	-	-	-	-	-	-	-
Other Renewables	6.7	6.4	3.3	3.4	6.7	3.4	3.2	6.6	3.5	3.3	6.8
<b>Transport</b>	<b>43.0</b>	<b>43.0</b>	<b>19.4</b>	<b>20.1</b>	<b>39.4</b>	<b>19.5</b>	<b>20.3</b>	<b>39.8</b>	<b>19.9</b>	<b>20.9</b>	<b>40.8</b>
Coal	-	-	-	-	-	-	-	-	-	-	-
Oil	40.8	40.8	18.4	19.0	37.4	18.5	19.3	37.8	19.0	19.9	38.8
Gas	1.2	1.2	0.5	0.6	1.1	0.5	0.5	1.1	0.5	0.5	1.0
Electricity	0.3	0.3	0.1	0.1	0.3	0.1	0.1	0.3	0.1	0.1	0.3
Heat	-	-	-	-	-	-	-	-	-	-	-
Other Renewables	0.7	0.7	0.3	0.4	0.7	0.4	0.4	0.7	0.4	0.4	0.7
<b>Buildings*</b>	<b>46.9</b>	<b>45.5</b>	<b>24.3</b>	<b>20.8</b>	<b>45.2</b>	<b>25.3</b>	<b>21.6</b>	<b>46.9</b>	<b>26.1</b>	<b>21.8</b>	<b>48.0</b>
Coal	0.4	0.3	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.2
Oil	6.8	6.1	2.9	2.5	5.5	3.0	2.7	5.7	2.8	2.4	5.2
Gas	14.7	14.2	8.6	5.6	14.2	9.0	5.5	14.5	9.5	5.6	15.1
Electricity	20.6	20.5	10.1	10.3	20.4	10.4	10.9	21.3	10.8	11.2	22.0
Heat	2.7	2.6	1.6	1.2	2.8	1.7	1.2	2.9	1.8	1.2	3.1
Other Renewables	1.7	1.8	1.0	1.1	2.1	1.1	1.2	2.3	1.2	1.3	2.5
<b>Transform</b>	<b>147.1</b>	<b>143.1</b>	<b>69.2</b>	<b>70.0</b>	<b>139.2</b>	<b>71.4</b>	<b>72.3</b>	<b>143.7</b>	<b>74.9</b>	<b>73.9</b>	<b>148.8</b>
Coal	54.2	50.1	20.0	21.8	41.8	18.6	22.1	40.7	19.4	22.3	41.7
Oil	1.7	1.2	0.4	0.5	0.9	0.5	0.6	1.1	0.4	0.5	0.9
Gas	53.2	50.6	26.0	25.4	51.4	29.8	26.5	56.3	29.6	25.3	54.8
Nuclear	28.4	31.1	17.5	16.6	34.1	16.4	17.2	33.7	18.5	19.0	37.5
Hydro	1.5	1.3	0.7	0.8	1.5	0.7	0.7	1.4	0.6	0.8	1.4
Renewables	8.0	8.8	4.7	4.8	9.5	5.3	5.1	10.5	6.3	6.1	12.5

\* include residential, commercial, public-etc usage



## Coal

(Mton)

	2018	2019	2020			2021p			2022e		
			1H	2H		1H	2H		1H	2H	
<b>Total Coal Demand</b>	<b>141.1</b>	<b>133.0</b>	<b>55.9</b>	<b>60.7</b>	<b>116.6</b>	<b>54.9</b>	<b>61.9</b>	<b>116.8</b>	<b>56.1</b>	<b>62.9</b>	<b>119.0</b>
Transform	91.8	84.8	33.9	36.8	70.7	31.5	37.5	68.9	32.9	37.7	70.5
Power Generation	91.8	84.8	33.9	36.8	70.7	31.5	37.5	68.9	32.9	37.7	70.5
Heat	-	-	-	-	-	-	-	-	-	-	-
Gas Manufacture	-	-	-	-	-	-	-	-	-	-	-
<b>Total Final Consumption</b>	<b>49.3</b>	<b>48.2</b>	<b>22.0</b>	<b>23.8</b>	<b>45.8</b>	<b>23.4</b>	<b>24.4</b>	<b>47.8</b>	<b>23.2</b>	<b>25.3</b>	<b>48.4</b>
Industry	48.4	47.6	21.8	23.5	45.3	23.3	24.1	47.4	23.0	25.0	48.0
Transport	-	-	-	-	-	-	-	-	-	-	-
Buildings	0.9	0.6	0.2	0.3	0.5	0.2	0.3	0.5	0.2	0.3	0.4
<b>Consumption by products</b>											
Anthracite	9.3	7.9	3.3	3.9	7.2	3.4	4.0	7.3	3.7	4.0	7.6
Bituminous	131.8	125.1	52.6	56.8	109.4	51.5	58.0	109.5	52.4	58.9	111.3
Iron making	34.6	35.0	16.3	17.5	33.8	17.6	17.8	35.3	16.9	18.5	35.4
Cement	3.7	4.0	1.7	1.7	3.4	1.7	1.9	3.6	1.7	1.8	3.6
Power Generation	90.8	83.6	33.4	36.4	69.8	31.0	37.0	68.0	32.5	37.3	69.8

## Oil

(Mbbbl)

	2018	2019	2020			2021p			2022e		
			1H	2H		1H	2H		1H	2H	
<b>Total Oil Demand</b>	<b>931.8</b>	<b>927.1</b>	<b>441.1</b>	<b>431.3</b>	<b>872.4</b>	<b>452.7</b>	<b>479.5</b>	<b>932.2</b>	<b>476.9</b>	<b>484.6</b>	<b>961.6</b>
Transform	11.7	8.6	2.8	3.8	6.6	4.2	4.5	8.7	3.6	4.0	7.7
Power Generation	8.6	5.7	1.3	2.5	3.8	1.7	2.4	4.1	0.7	1.1	1.8
Heat	1.1	1.7	0.9	0.7	1.6	0.9	0.8	1.8	1.3	1.8	3.1
Gas Manufacture	2.0	1.2	0.6	0.6	1.2	1.5	1.3	2.8	1.6	1.2	2.8
<b>Total Final Consumption</b>	<b>920.0</b>	<b>918.5</b>	<b>438.3</b>	<b>427.5</b>	<b>865.8</b>	<b>448.5</b>	<b>475.1</b>	<b>923.6</b>	<b>473.3</b>	<b>480.6</b>	<b>953.9</b>
Industry	564.1	566.2	278.5	265.3	543.9	286.8	310.3	597.1	309.2	311.7	620.9
Transport	302.3	303.2	136.0	141.2	277.2	137.0	143.1	280.1	140.2	147.3	287.5
Buildings	53.7	49.1	23.8	20.9	44.7	24.6	21.7	46.4	23.9	21.6	45.5
<b>Consumption by products</b>											
Gasoline	79.7	82.7	38.8	42.2	81.0	40.8	44.0	84.9	41.1	44.7	85.8
Diesel (including Transformation)	164.1	166.9	77.4	81.5	158.9	79.4	81.8	161.2	80.8	82.0	162.8
Kerosene (including Transformation)	18.9	17.1	9.4	7.6	17.0	8.8	8.0	16.7	8.7	7.2	16.0
B-C (including Transformation)	33.7	24.0	11.9	11.9	23.8	11.3	11.0	22.3	12.0	10.3	22.3
Jet Oil	39.9	38.8	11.6	10.1	21.7	10.4	10.8	21.2	11.8	15.1	26.9
LPG (including Transformation)	109.4	122.1	60.5	60.8	121.3	61.5	61.9	123.4	71.6	69.6	141.2
Naphtha	451.2	438.6	210.7	194.6	405.3	215.6	235.3	450.9	228.6	231.3	459.9
Other Non-Energy	35.1	36.7	20.8	22.7	43.5	24.9	26.9	51.8	22.4	24.4	46.8

## Gas

	2018	2019	2020		2021p			2022e			
			1H	2H		1H	2H		1H	2H	
<b>Total Gas Demand (Mton)</b>	<b>42.3</b>	<b>41.0</b>	<b>21.2</b>	<b>20.9</b>	<b>42.1</b>	<b>24.1</b>	<b>21.7</b>	<b>45.8</b>	<b>24.0</b>	<b>20.7</b>	<b>44.6</b>
Transform	40.7	38.8	19.9	19.4	39.3	22.8	20.3	43.1	22.6	19.4	42.0
Power Generation	18.5	17.9	8.7	9.9	18.6	10.9	10.6	21.5	10.0	9.9	19.9
Heat	2.3	1.9	0.9	0.8	1.8	1.1	1.0	2.1	1.1	1.1	2.2
Gas Manufacture	20.0	18.9	10.2	8.7	18.9	10.8	8.7	19.5	11.6	8.3	19.9
<b>City Gas (Bm<sup>3</sup>)</b>	<b>24.3</b>	<b>23.3</b>	<b>12.7</b>	<b>9.7</b>	<b>22.4</b>	<b>13.6</b>	<b>10.0</b>	<b>23.6</b>	<b>14.0</b>	<b>10.0</b>	<b>24.0</b>
Industry	10.8	11.1	5.5	5.6	11.1	6.0	5.9	11.9	5.9	5.8	11.7
Industrial City Gas	8.8	8.3	3.9	3.7	7.6	4.4	4.1	8.5	4.3	4.1	8.4
Industrial LNG	2.0	2.8	1.6	1.9	3.5	1.6	1.8	3.4	1.7	1.6	3.3
Transport	1.2	1.2	0.5	0.5	1.1	0.5	0.5	1.0	0.5	0.5	1.0
Buildings	14.3	13.8	8.3	5.5	13.8	8.7	5.3	14.1	9.2	5.4	14.6

## Electricity

(TWh)

	2018	2019	2020			2021p			2022e		
			1H	2H		1H	2H		1H	2H	
<b>Net Electricity Demand</b>	<b>570.6</b>	<b>563.0</b>	<b>270.1</b>	<b>282.0</b>	<b>552.2</b>	<b>278.8</b>	<b>297.4</b>	<b>576.1</b>	<b>290.4</b>	<b>305.9</b>	<b>596.3</b>
Own use and Losses	44.5	42.5	17.9	25.0	42.9	17.0	25.7	42.7	18.4	26.8	45.2
<b>Total Final Consumption</b>	<b>526.1</b>	<b>520.5</b>	<b>252.3</b>	<b>257.0</b>	<b>509.3</b>	<b>261.8</b>	<b>271.6</b>	<b>533.4</b>	<b>271.9</b>	<b>279.1</b>	<b>551.1</b>
Industry	283.7	279.8	133.0	135.7	268.7	139.1	143.3	282.4	145.6	146.9	292.4
Transport	3.0	2.9	1.5	1.6	3.2	1.5	1.6	3.1	1.3	1.7	3.0
Buildings	239.5	237.8	117.8	119.7	237.4	121.2	126.8	247.9	125.0	130.6	255.6
<b>Installed Electrical Capacity (GW)*</b>	<b>118.5</b>	<b>124.6</b>	<b>127.1</b>	<b>128.7</b>	<b>128.7</b>	<b>129.7</b>	<b>133.8</b>	<b>133.8</b>	<b>134.6</b>	<b>139.4</b>	<b>139.4</b>
Coal	37.0	37.0	37.1	36.9	36.9	35.8	37.7	37.7	37.3	38.4	38.4
Oil	4.3	3.9	2.1	2.2	2.2	2.2	2.2	2.2	1.0	1.0	1.0
Gas	37.9	39.4	41.2	41.2	41.2	41.2	41.2	41.2	41.2	42.2	42.2
Nuclear	21.9	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.7	23.7
Hydro	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Other Renewables	11.0	14.6	17.0	18.7	18.7	20.8	23.0	23.0	25.3	27.6	27.6
<b>Electricity Generation of Power Plants*</b>	<b>570.6</b>	<b>563.0</b>	<b>270.1</b>	<b>282.0</b>	<b>552.2</b>	<b>279.0</b>	<b>297.8</b>	<b>576.7</b>	<b>290.4</b>	<b>305.9</b>	<b>596.3</b>
Coal	238.4	227.4	94.2	102.1	196.3	89.5	108.4	198.0	93.3	109.4	202.8
Oil	5.7	3.3	0.8	1.4	2.3	1.0	1.3	2.4	0.9	0.6	1.5
Gas	153.5	144.4	69.4	76.5	145.9	85.7	82.6	168.3	80.0	77.7	157.7
Nuclear	133.5	145.9	82.1	78.1	160.2	77.2	80.8	158.0	87.1	89.2	176.3
Hydro	7.3	6.2	3.2	4.0	7.1	3.4	3.4	6.7	2.8	3.6	6.5
Other Renewables	32.2	35.9	20.4	19.9	40.3	22.1	21.2	43.3	26.2	25.3	51.4
<b>Fuel Consumption of Power Plants (Mtoe)*</b>	<b>117.7</b>	<b>115.6</b>	<b>54.4</b>	<b>57.4</b>	<b>111.8</b>	<b>55.6</b>	<b>59.4</b>	<b>115.0</b>	<b>58.0</b>	<b>61.3</b>	<b>119.3</b>
Coal	54.2	50.1	20.0	21.8	41.8	18.6	22.1	40.7	19.4	22.3	41.7
Oil	1.3	0.8	0.2	0.4	0.6	0.2	0.3	0.6	0.1	0.2	0.3
Gas	24.2	23.4	11.4	12.9	24.3	14.3	13.8	28.1	13.0	13.0	26.0
Nuclear	28.4	31.1	17.5	16.6	34.1	16.4	17.2	33.7	18.5	19.0	37.5
Hydro	1.5	1.3	0.7	0.8	1.5	0.7	0.7	1.4	0.6	0.8	1.4
Other Renewables	8.0	8.8	4.7	4.8	9.5	5.3	5.1	10.5	6.3	6.1	12.5

\* District Heat is classified by fuel type since 2014

## Heat and Other Renewables

(Mtoe)

	2018	2019	2020			2021p			2022e		
			1H	2H		1H	2H		1H	2H	
<b>Net Heat Demand</b>	<b>2.6</b>	<b>2.6</b>	<b>1.6</b>	<b>1.2</b>	<b>2.8</b>	<b>1.7</b>	<b>1.2</b>	<b>2.9</b>	<b>1.8</b>	<b>1.2</b>	<b>3.0</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>2.7</b>	<b>2.6</b>	<b>1.6</b>	<b>1.2</b>	<b>2.8</b>	<b>1.7</b>	<b>1.2</b>	<b>2.9</b>	<b>1.8</b>	<b>1.2</b>	<b>3.1</b>
Industry	-	-	-	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-	-	-	-
Buildings	2.7	2.6	1.6	1.2	2.8	1.7	1.2	2.9	1.8	1.2	3.1
<b>Heat Production by fuel</b>											
Coal	-	-	-	-	-	-	-	-	-	-	-
Oil	1.7	1.7	1.3	0.9	2.2	1.3	0.9	2.2	1.4	0.9	2.3
Gas	0.9	0.9	0.3	0.3	0.6	0.3	0.3	0.6	0.4	0.3	0.7
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	0.2	0.2	0.2	0.4
Gas	2.9	2.5	1.2	1.1	2.3	1.4	1.4	2.8	1.4	1.4	2.9
Nuclear	-	-	-	-	-	-	-	-	-	-	-
Hydro	-	-	-	-	-	-	-	-	-	-	-
Other Renewables	-	-	-	-	-	-	-	-	-	-	-
<b>Other Renewables</b>	<b>18.7</b>	<b>19.0</b>	<b>10.0</b>	<b>10.5</b>	<b>20.5</b>	<b>10.9</b>	<b>10.6</b>	<b>21.5</b>	<b>12.0</b>	<b>11.9</b>	<b>23.9</b>
Hydro	1.5	1.3	0.7	0.8	1.5	0.7	0.7	1.4	0.6	0.8	1.4
Transform	8.0	8.8	4.7	4.8	9.5	5.3	5.1	10.5	6.3	6.1	12.5
<b>Total Final Consumption</b>	<b>9.1</b>	<b>8.9</b>	<b>4.7</b>	<b>4.8</b>	<b>9.5</b>	<b>4.8</b>	<b>4.8</b>	<b>9.6</b>	<b>5.1</b>	<b>5.0</b>	<b>10.0</b>
Industry	6.7	6.4	3.3	3.4	6.7	3.4	3.2	6.6	3.5	3.3	6.8
Transport	0.7	0.7	0.3	0.4	0.7	0.4	0.4	0.7	0.4	0.4	0.7
Buildings	1.7	1.8	1.0	1.1	2.1	1.1	1.2	2.3	1.2	1.3	2.5

