

Volume 24, No. 2
ISSN 1599-9009

KEEI 2023 Korea Energy Demand Outlook

2022 Second Half

K O R E A E N E R G Y E C O N O M I C S I N S T I T U T E



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

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

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

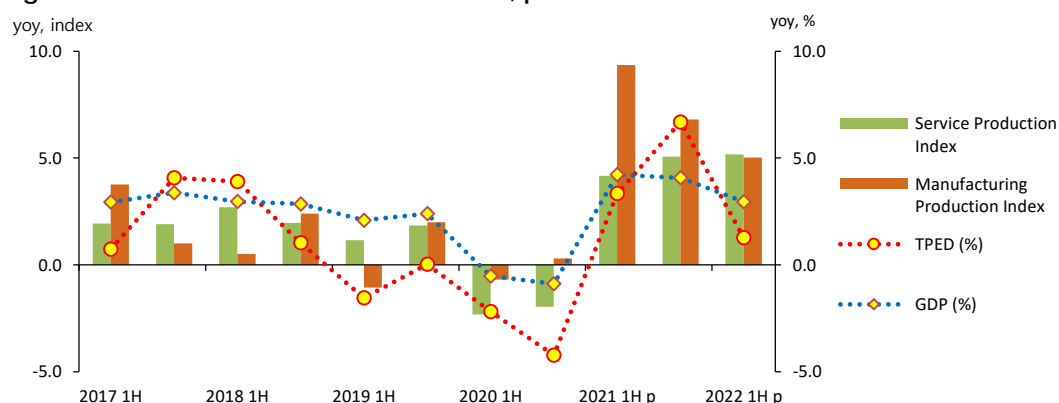
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1. Total Primary Energy Demand and Total Final Consumption

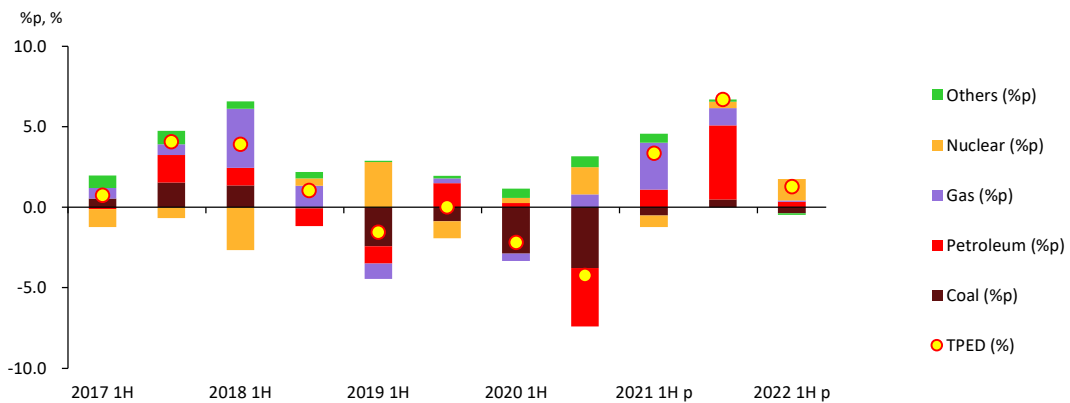
- **Total Primary Energy Demand (TPED) went up by 1.3% year-on-year in 1H 2022, as production activities continued to recover from COVID-19 disruptions to some extent.**
 - Energy consumption grew, as production activities continued an uptrend in the manufacturing and service sectors following last year's recovery, though the pace of growth was limited by higher energy prices amid the Russia-Ukraine conflict.

Figure 1.1 Growth rate of GDP and TPED, production index



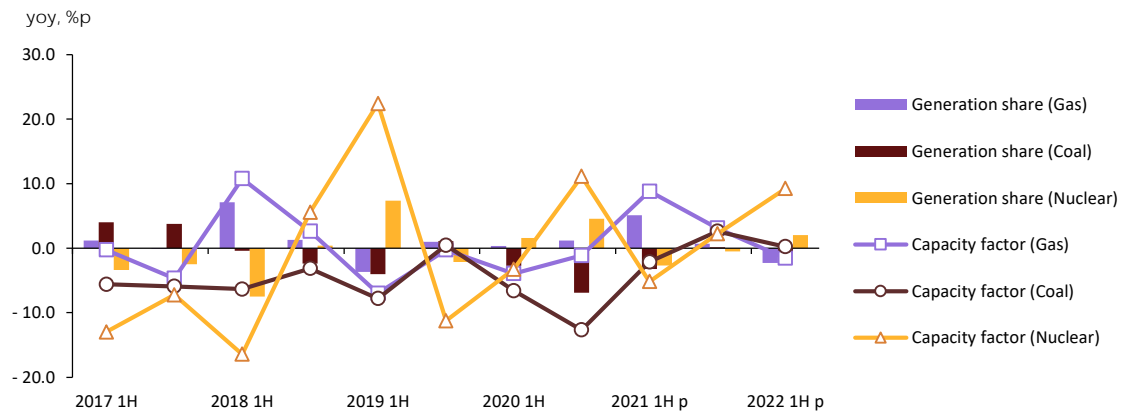
- **The use of nuclear energy surged, and that of petroleum and gas slightly increased, while coal and renewable & other energy use declined a bit.**
 - Petroleum use grew by 1.2% year-on-year, led by the industrial sector, which accounts for a major portion of the total petroleum use, following the construction of additional petrochemical facilities, although it declined in the transport and building sectors due to higher prices.
 - Coal use fell by 1.4% year-on-year, as its industrial use declined, especially in the steelmaking sector, although it slightly increased in the power generation sector.

Figure 1.2 Growth rate of TPED & contributions by sources



- Natural gas use rose by 0.3% year-on-year, as it grew decently in the city gas production sector, though it declined in the power generation sector owing to a surge in nuclear generation and soaring global natural gas prices.
- The total nuclear generation was up 12.3% year-on-year, as the capacity factor went up by over 9%p compared to the same period last year, though the total installed capacity remained the same.

Figure 1.3 Capacity factor and Generation share of major sources



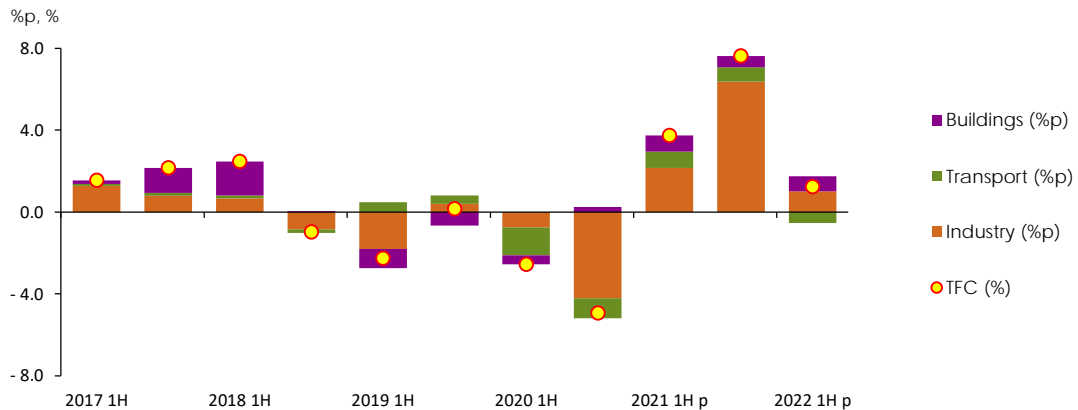
Note: Capacity factor is the ratio of actual power generation to power generation when the facility is operated 100%.

- Meanwhile, the final electricity use posted a year-on-year growth of 3.9%, as production activities rapidly increased in the manufacturing and service sectors, and the number of heating degree days rose sharply, especially in the 1st quarter.

□ **Total Final Consumption (TFC) increased by 1.2% year-on-year in 1H 2022, with the industrial and building sectors driving the growth, although it declined in the transport sector.**

- Industrial energy use grew by 1.7% year-on-year, as production activities grew quite strongly in the overall manufacturing sector in addition to a sharp increase in the use of petrochemical feedstock, which takes up a large part of the total industrial energy use.
- Transport energy use dropped by 3.2% year-on-year, despite the termination of social distancing measures of COVID-19, because fuel prices increased such as gasoline and diesel.

Figure 1.4 Growth Rate of TFC & Contribution by Sector



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

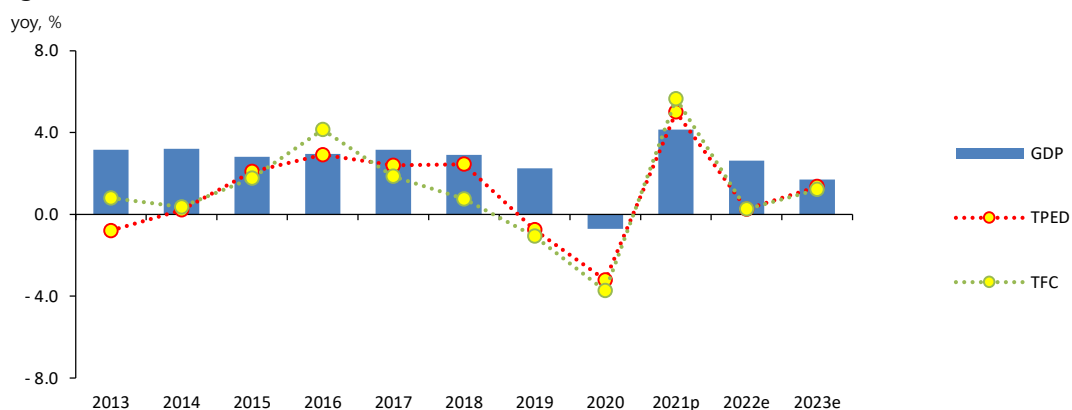
- Energy use in buildings posted a year-on-year growth of 3.2%, as it grew in both of the residential and commercial sectors amid the increased number of heating degree days and stronger service production as a result of the termination of all the social distancing rules.

2. TPED & TFC Outlook

□ **TPED is expected to grow by 0.3% in 2022 and 1.3% in 2023, reaching 309.0 Mtoe.**

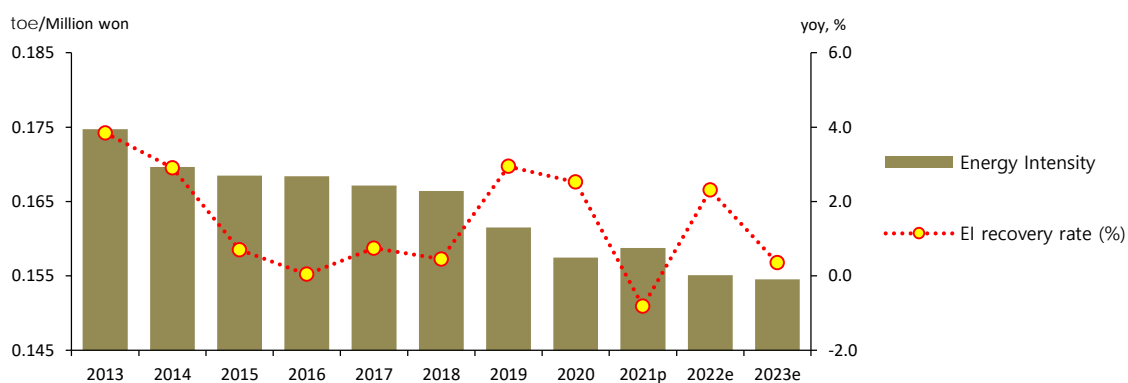
- In 2022, TPED is likely to grow much slowly compared to the economic growth rate due to disruptions to steel manufacturing in the aftermath of a typhoon, lower utilization rates at petrochemical facilities and a surge in energy prices. In 2023, however, TPED is expected to grow faster, as the contributing factors to the slower TPED growth in 2022 have less effect in 2023.

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



- The energy intensity (toe/million won) is expected to improve (drop) rapidly in 2022. In 2023, however, the rate of improvement will be much slower.

Figure 2.2 Energy Intensity and EI Recovery Trends

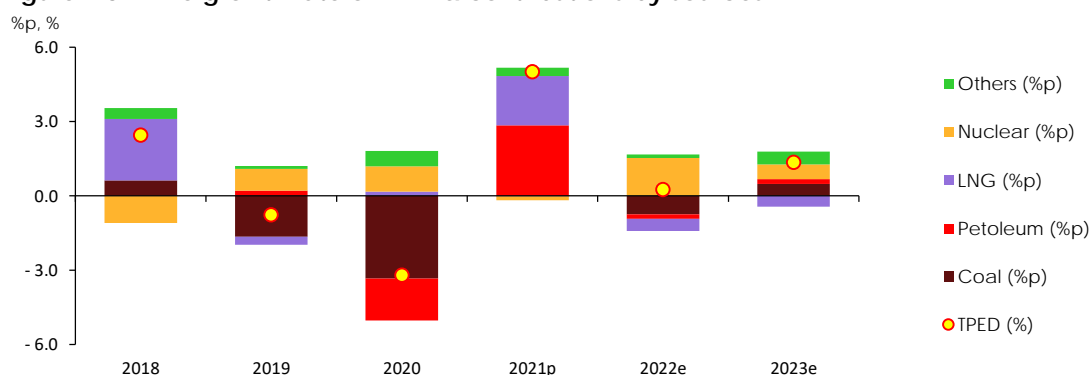


Note: Energy Intensity is calculated as the value of 'TPED/GDP', expressed in toe/million won, and EI recovery rate multiplies EI increase rate by '-1'.

☐ **In 2022 and 2023, nuclear and renewable & other energy are forecast to lead the growth in energy demand, while gas and petroleum demand steadily declines.**

- Petroleum demand is forecast to slightly decrease in 2022 and 2023, as petrochemical facilities operate at much lower utilization rates, although it is likely to increase until 1H 2022, led by the industrial sector.
- Coal demand is projected to fall by 3.0% in 2022, mostly in the industrial sector, while it is expected to increase by around 2% in 2023.
- Nuclear generation is forecast to grow by 14% in 2022 and 5% in 2023, the capacity factor and the total installed capacity increases.

Figure 2.3 The growth rate of TPED & contributions by sources

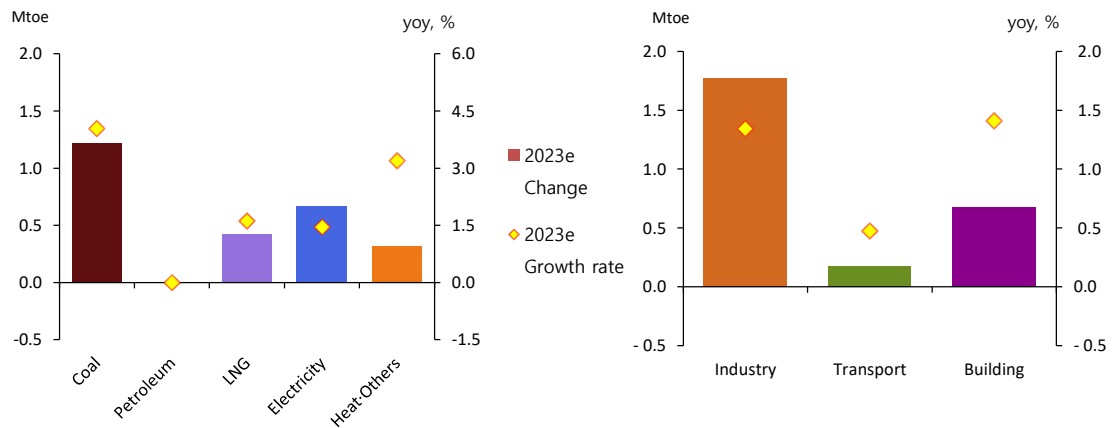


- Natural gas demand is expected to fall for two consecutive years of the outlook period, as it declines in the power generation sector due to global natural gas price hikes and the construction of additional baseload power plants, driving natural gas demand down, and as city gas demand grows at slower pace.
- The final electricity use is likely to grow fast until 2022, continuing the recovery from COVID-19 disruptions. Meanwhile, it is projected to grow in the mid 1% range in 2023, as production activities in industry slow down amid the domestic and global economic slump.

☐ **In the final consumption sector, energy demand is forecast to grow by 0.3% in 2022 and 1.2% in 2023.**

- In 2022, industrial energy demand is forecast to drop by 0.4% due to production delays in the iron & steel sector as a result of a typhoon and lower utilization rates at petrochemical facilities. In 2023, however, it is expected to rebound by low 1%, as production activities recover, especially in the second half of the year.

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



- Transport energy demand is projected to fall by 1.3% in 2022 partly due to higher petroleum products prices, while it is expected to bounce back a little in 2023, as prices decline, and mobility demand slowly recovers from COVID-19.
- Energy demand in buildings is forecast to grow by 3.3% in 2022, affected by temperature conditions and the recovery of the service industry. In 2023, however, the demand growth is expected to slow down to the low 1% range partly due to a drop in the number of cooling & heating degree days.

3. Key Features and Implications

☐ This is the first outlook report that was written based on the data from the revised Energy Balance.

- The old Energy Balance had been in place since the 1980s, but it had its limitations in fully reflecting the current structure of energy consumption and supply. Accordingly, it went through years of updating process, and the revised Energy Balance was designated as the nationally authorized statistics in October 2022, replacing the old version.
- This is the first outlook report that was produced based on the revised Energy Balance. This section briefly explains the difference between the old and revised Energy Balance and the noteworthy points in analyzing figures in this outlook report.

☐ Transformation Processes

- The transformation process refers to the production of secondary energy products (electricity, heat, city gas etc.) from the primary energy products (coal, natural gas, petroleum etc.). The structure of revised Energy Balance was modified as shown in the table below (Table 3.1).

Table 3.1 Comparison of the Transformation processes in the old and revised Energy Balance

Old Energy Balance	Revised Energy Balance
Transformation processes	Transformation processes
Electric generation	Electricity-only plants
	CHP plants
	Heat-only plants
	Petroleum Products
Gas manufacturing	Gas manufacturing
	Coal-to-Gas plants
	Non-specified Transformation
Own use and Losses	Transformation Own Use
	Losses

- “Electric generation” and “district heating” in the old Energy Balance, which are related to electricity and heat production, were subdivided into the categories of “Electricity-only plants”, “CHP plants¹” and “Heat-only plants” in the revised Energy Balance.

¹ CHP plants are used for integrated energy industries, which is divided into 1) district heating, 2) industrial complex and 3) district heating-industrial complex combined. In the revised Energy Balance, CHP only includes the data on district heating, while fuel input for industrial complex and the combined category are regarded as final consumption by each type of business in the industrial sector.

- Since Pumped-storage hydroelectricity generation was excluded in the revised Energy Balance, the total electric generation figures suggested in the revised Energy Balance are different from those of Korea Electric Power Corporation(KEPCO).
- The revised Energy Balance added “petroleum products manufacturing” as a new category within the transformation processes.
- “Gas manufacturing” refers to the transformation process of gasifying LNG into city gas, which was the same as in the old Energy Balance.
- In addition, the Integrated Gasification Combined Cycle(IGCC)’s gas and hydrogen manufacturing were subdivided into “coal-to-gas manufacturing” and “non-specified transformation”.²
- “Own use and Losses” in the old Energy Balance was further divided into the two categories of “Transformation own use” and “Losses” in the revised Energy Balance. “Transformation own use” includes some of the industrial energy use in the old Energy Balance.

Table 3.2 Comparison of Petroleum in the old and revised Energy Balance

Old Energy Balance	Revised Energy Balance
	Crude oil & refinery feedstocks
	Crude oil
	Refinery feedstocks
	Additives/blending components
	Other hydrocarbons
Petroleum	Petroleum
Energy-use	Gasoline
Gasoline	Kerosene
Kerosene	Diesel
Diesel	B-A
B-A	B-B
B-B	B-C
B-C	JA-1
JA-1	JP-4
JP-4	AVI-G
AVI-G	LPG
LPG	Propane
Propane	Butane
Butane	Non-Energy use
Non-Energy use	Naphtha
Naphtha	Solvent
Solvent	White spirit & SBP

² These two categories were created in preparation for the further expansion of the relevant fields and more clarified statistics, because they involve some limitations for now, as the amount of coal input cannot be estimated in the “coal-to-gas manufacturing” category, and the output exceeds the input in “non-specified transformation” category.

Asphalt	Bitumen
Lubricants	Lubricants
Para. -wax	Para. -wax
Pet. -coke	Pet. -coke
Others	Other oil products
	Refinery gas

☐ Petroleum

- In the revised Energy Balance, as petroleum products manufacturing was included into the transformation processes, energy products were placed in a different structure as in the table above, including the new category of “Crude oil & refinery feedstock”.
- Among all energy sources, the biggest statistical change was seen in the petroleum category of the revised Energy Balance, as petroleum products manufacturing was included into the transformation processes, and the statistical standards for international bunkering were changed.
- The revised Energy Balance compiled the data on crude oil & refinery feedstock inputs, petroleum products output and energy consumption and losses during the transformation process including oil refining, as petroleum products manufacturing was included into the transformation processes.
- Transportation sector changed to not include International Bunkering. It includes only consumption of Rail, Road, Domestic Navigation and Domestic Aviation.
- This report does not provide an outlook of primary energy consumption by petroleum products to avoid any confusion that could be caused when such consumption is negative. Instead, it only provides the outlook result on the final use of petroleum products.

☐ Gas

- In revised Energy Balance, the most distinct feature regarding gas is that the oil refining sector’s natural gas and city gas use was excluded from the final energy use and classified as the transformation sector’s own use, as the “Transformation own use” category was newly added.
- In the old Energy Balance, the final use of natural gas (LNG) represented the use of directly imported natural gas, but in addition to that, other categories were also added in the revised Energy Balance.

□ Coal

- In the revised Energy Balance, the types of bituminous coal were subdivided into more categories and businesses that consume anthracite were more specific than the old Energy Balance. See the table below (Table 2.3) for the subdivided types of coal in the revised Energy Balance.

Table 3.3 Comparison of Coal in the old and revised Energy Balance

Old Energy Balance	Revised Energy Balance
Coal	Coal
Anthracite	Anthracite
Domestic-c	Domestic-c
Import-c	Import-c
Bituminous	Bituminous
Coking-c	Coking coal
Steaming-c	Other bituminous
	Sub-Bituminous
	Lignite/Brown coal
	Peat
	Patent Fuel
	Coke Oven Coke

- The revised Energy Balance provides detailed coal products consumption data, suggesting more types of coal and the use of each coal product by subdivided sectors and businesses.
- In the old Energy Balance, coal consumption in the iron & steel sector, which is a large coal consumer, only represented coking coal consumption. In the revised Energy Balance, the data is compiled across three categories, i.e., coking coal, other bituminous coal and imported anthracite.

The Main Indicator and Energy Outlook Result

Main Economic and Energy Indicators

	2019	2020	2021p			2022e			2023e
			1H	2H		1H	2H		
Economy and Population									
GDP (2010 trillion won)	1 852.7	1 839.5	932.0	983.8	1 915.8	959.5	1 006.4	1 965.9	1 999.4
Industrial Production(2015=100)	106.7	106.4	112.1	116.5	114.3	117.1	118.0	117.5	119.8
Crude Oil Price (Dubai, USD/bbl)	63.5	42.2	63.5	75.0	69.3	101.8	92.1	97.0	89.9
Working Days	272.5	275.5	135.5	137.0	272.5	133.5	139.0	272.5	273.5
Population (million)	51.8	51.8	51.7	51.7	51.7	51.6	51.6	51.6	51.6
Average Temperature (°C)	13.5	13.0	10.4	16.3	13.3	10.2	15.7	13.0	13.2
Cooling Degree days	120.4	85.2	-	101.3	101.3	18.5	123.4	141.9	104.2
Heating Degree days	2 370.9	2 448.0	1 492.3	912.4	2 404.7	1 577.8	988.9	2 566.7	2 445.9
Energy Indicators									
Total Primary Energy Demand (Mtoe)	299.2	289.6	150.1	154.0	304.1	152.0	152.8	304.9	309.0
Energy Intensity (toe/million won)	0.162	0.158	0.161	0.157	0.159	0.159	0.152	0.155	0.155
TPED/capita (toe/capita)	5.780	5.587	2.901	2.976	5.877	2.945	2.960	5.905	5.993
Electricity Generation (TWh)	559.6	548.9	276.9	295.5	572.4	289.6	302.2	591.7	599.6
Electricity Generation/capita (MWh/capita)	10.8	10.6	5.4	5.7	11.1	5.6	5.9	11.5	11.6
Electricity Demand/capita (MWh/capita)	9.8	9.6	4.9	5.1	10.1	5.2	5.3	10.4	10.6

Energy Demand

	2019	2020	2021p			2022e			2023e
			1H	2H		1H	2H		
Total Primary Energy Demand									
Coal (Mton)	136.5	119.9	56.3	63.5	119.8	55.5	60.6	116.1	118.2
Oil (Mbbbl)	808.2	775.7	404.5	427.2	831.7	409.4	416.0	825.5	820.6
Gas (Mton)	41.0	41.5	24.1	21.7	45.9	24.2	20.0	44.2	43.5
Hydro (TWh)	2.8	3.9	1.5	1.5	3.1	1.3	2.3	3.6	3.6
Nuclear (TWh)	145.9	160.2	77.2	80.8	158.0	86.7	93.1	179.8	188.3
Other Renewables (Mtoe)	12.2	13.9	7.6	7.4	15.0	7.6	7.9	15.5	17.0
Total (Mtoe)	299.2	289.6	150.1	154.0	304.1	152.0	152.8	304.9	309.0
Coal	82.7	72.8	34.3	38.5	72.7	33.7	36.7	70.4	71.9
Oil	118.5	113.4	59.2	62.5	121.6	59.7	61.4	121.1	121.7
Gas	54.0	54.6	32.3	28.1	60.3	32.4	26.5	58.8	57.5
Hydro	0.6	0.8	0.3	0.3	0.7	0.3	0.5	0.8	0.8
Nuclear	31.1	34.1	16.4	17.2	33.7	18.5	19.8	38.3	40.1
Other Renewables	12.2	13.9	7.6	7.4	15.0	7.6	7.9	15.5	17.0
Total Final Consumption									
Coal (Mton)	51.7	49.1	24.8	26.0	50.8	23.8	23.9	47.7	49.6
Oil (Mbbbl)	796.1	752.3	393.9	414.4	808.3	399.8	407.9	807.7	800.5
Gas (Bm³)	22.4	22.0	13.2	9.6	22.7	13.7	9.9	23.6	23.9
Electricity (TWh)	507.5	497.3	255.8	265.2	521.0	265.9	271.4	537.3	545.1
Heat (Mtoe)	2.5	2.6	1.6	1.1	2.7	1.6	1.2	2.8	2.9
Other Renewables (Mtoe)	6.5	6.7	3.6	3.5	7.1	3.6	3.5	7.2	7.4
Total (Mtoe)	211.6	203.7	107.7	107.6	215.2	109.0	106.8	215.8	218.4
Coal	32.8	31.1	15.7	16.4	32.1	15.1	15.1	30.2	31.4
Oil	101.2	95.9	50.2	52.8	102.9	50.7	52.4	103.1	103.1
Gas	25.0	24.7	14.6	10.9	25.5	15.2	11.2	26.3	26.8
Electricity	43.6	42.8	22.0	22.8	44.8	22.9	23.3	46.2	46.9
Heat	2.5	2.6	1.6	1.1	2.7	1.6	1.2	2.8	2.9
Other Renewables	6.5	6.7	3.6	3.5	7.1	3.6	3.5	7.2	7.4
Industry	129.2	124.0	64.8	67.8	132.6	65.9	66.2	132.1	133.9
Transport	37.2	34.7	17.7	18.5	36.3	17.2	18.6	35.8	35.9
Buildings	45.2	45.0	25.2	21.2	46.4	26.0	22.0	47.9	48.6

Energy Demand

	(yoy, %)								
	2019	2020	2021p			2022e			2023e
			1H	2H		1H	2H		
Total Primary Energy Demand									
Coal (Mton)	2.3	-12.2	-2.4	2.0	-0.1	-1.4	-4.5	-3.0	1.8
Oil (Mbbbl)	-1.4	-4.0	2.4	12.2	7.2	1.2	-2.6	-0.7	-0.6
Gas (Mton)	15.0	1.2	15.4	5.7	10.6	0.3	-8.0	-3.6	-1.5
Hydro (TWh)	19.6	39.0	5.9	-37.3	-21.2	-15.1	51.1	18.0	-0.3
Nuclear (TWh)	-10.1	9.8	-5.9	3.5	-1.4	12.3	15.3	13.8	4.7
Other Renewables (Mtoe)	11.5	13.4	11.6	5.3	8.4	-0.6	6.4	2.8	9.9
Total (Mtoe)	2.4	-3.2	3.3	6.7	5.0	1.3	-0.8	0.3	1.4
Coal	2.2	-12.1	-2.1	1.9	-0.1	-1.6	-4.4	-3.1	2.1
Oil	-0.0	-4.3	2.8	11.9	7.3	0.8	-1.7	-0.5	0.5
Gas	15.3	1.0	15.0	5.9	10.6	0.4	-5.8	-2.5	-2.3
Hydro	19.6	39.0	5.9	-37.3	-21.2	-15.1	51.1	18.0	-0.3
Nuclear	-10.1	9.8	-5.9	3.5	-1.4	12.3	15.3	13.8	4.7
Other Renewables	11.5	13.4	11.6	5.3	8.4	-0.6	6.4	2.8	9.9
Total Final Consumption									
Coal (Mton)	1.6	-5.0	4.3	2.6	3.4	-4.1	-8.0	-6.1	4.0
Oil (Mbbbl)	-1.6	-5.5	2.7	12.4	7.4	1.5	-1.6	-0.1	-0.9
Gas (Bm ³)	3.0	-2.0	5.5	0.4	3.3	4.1	3.2	3.8	1.6
Electricity (TWh)	3.6	-2.0	3.8	5.7	4.8	3.9	2.3	3.1	1.4
Heat (Mtoe)	10.2	4.9	6.9	1.8	4.7	2.0	5.5	3.5	2.4
Other Renewables (Mtoe)	7.3	2.5	7.7	6.5	7.1	0.3	0.5	0.4	3.5
Total (Mtoe)	0.8	-3.7	3.7	7.6	5.6	1.2	-0.7	0.3	1.2
Coal	1.1	-5.1	4.4	2.3	3.3	-4.4	-7.9	-6.2	4.0
Oil	-1.7	-5.3	2.9	12.0	7.4	1.0	-0.6	0.1	-0.0
Gas	2.5	-1.1	4.5	1.1	3.0	4.2	2.3	3.4	1.6
Electricity	3.6	-2.0	3.8	5.7	4.8	3.9	2.3	3.1	1.4
Heat	10.2	4.9	6.9	1.8	4.7	2.0	5.5	3.5	2.4
Other Renewables	7.3	2.5	7.7	6.5	7.1	0.3	0.5	0.4	3.5
Industry	-0.1	-4.1	3.6	10.4	6.9	1.7	-2.4	-0.4	1.3
Transport	-0.1	-6.6	4.8	3.9	4.4	-3.2	0.5	-1.3	0.5
Buildings	4.0	-0.5	3.4	2.7	3.1	3.2	3.5	3.3	1.4

Energy Demand by Sector

(Mtoe)

	2019	2020	2021p			2022e			2023e
			1H	2H		1H	2H		
Industry	129.2	124.0	64.8	67.8	132.6	65.9	66.2	132.1	133.9
Coal	32.6	30.9	15.7	16.3	32.0	15.0	15.0	30.0	31.2
Oil	60.1	57.7	30.4	32.7	63.1	31.6	32.4	64.0	64.0
Gas	9.6	9.5	5.1	4.9	10.0	5.1	4.8	9.9	10.1
Electricity	22.9	21.9	11.4	11.7	23.2	11.9	11.8	23.7	23.9
Heat	-	-	-	-	-	-	-	-	-
Other Renewables	4.0	4.0	2.2	2.3	4.4	2.3	2.3	4.5	4.7
Transport	37.2	34.7	17.7	18.5	36.3	17.2	18.6	35.8	35.9
Coal	-	-	-	-	-	-	-	-	-
Oil	35.0	32.7	16.7	17.5	34.2	16.2	17.5	33.7	33.9
Gas	1.2	1.1	0.5	0.5	1.1	0.5	0.5	1.0	1.0
Electricity	0.3	0.3	0.1	0.2	0.3	0.2	0.2	0.3	0.4
Heat	-	-	-	-	-	-	-	-	-
Other Renewables	0.7	0.7	0.4	0.4	0.7	0.4	0.4	0.7	0.7
Buildings*	45.2	45.0	25.2	21.2	46.4	26.0	22.0	47.9	48.6
Coal	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.2
Oil	6.1	5.5	3.0	2.6	5.7	2.9	2.5	5.4	5.3
Gas	14.2	14.2	9.0	5.5	14.5	9.5	5.9	15.4	15.7
Electricity	20.5	20.6	10.4	10.9	21.3	10.9	11.3	22.2	22.6
Heat	2.5	2.6	1.6	1.1	2.7	1.6	1.2	2.8	2.9
Other Renewables	1.8	1.9	1.1	0.9	2.0	1.0	0.9	1.9	2.0
Transformation**	156.9	154.1	79.2	80.9	160.1	81.4	80.8	162.2	165.1
Coal	49.9	41.6	18.5	22.0	40.6	18.6	21.6	40.3	40.5
Oil	17.3	17.6	9.0	9.7	18.7	9.0	9.0	18.0	18.6
Gas	52.3	52.7	30.9	27.7	58.6	31.1	25.5	56.5	55.6
Nuclear	31.1	34.1	16.4	17.2	33.7	18.5	19.8	38.3	40.1
Hydro	0.6	0.8	0.3	0.3	0.7	0.3	0.5	0.8	0.8
Renewables	5.7	7.2	4.0	3.9	7.9	4.0	4.3	8.3	9.6

* include residential, commercial, public-etc usage

** include Electricity-only plants, CHP plants, Heat-only plants, Petroleum Products, Gas manufacturing

Coal

(Mton)

	2019	2020	2021p			2022e			2023e
			1H	2H		1H	2H		
Total Coal Demand	136.5	119.9	56.3	63.5	119.8	55.5	60.6	116.1	118.2
Transformation	84.8	70.7	31.5	37.5	68.9	31.7	36.7	68.4	68.6
Power Generation	84.8	70.7	31.5	37.5	68.9	31.7	36.7	68.4	68.6
District Heat	-	-	-	-	-	-	-	-	-
Gas Manufacture	-	-	-	-	-	-	-	-	-
Oil Refinery	-	-	-	-	-	-	-	-	-
Final Consumption	51.7	49.1	24.8	26.0	50.8	23.8	23.9	47.7	49.6
Industry	51.3	48.7	24.7	25.7	50.4	23.7	23.6	47.3	49.2
Transport	-	-	-	-	-	-	-	-	-
Buildings	0.4	0.5	0.1	0.3	0.4	0.1	0.3	0.4	0.4
Consumption by products									
Anthracite	7.7	7.1	3.4	3.9	7.3	3.4	3.4	6.8	6.8
Bituminous	128.8	112.7	52.9	59.6	112.5	52.1	57.2	109.3	111.4
Iron making	34.6	32.8	16.9	17.2	34.1	15.8	15.9	31.6	33.1
Cement	4.0	3.4	1.7	1.9	3.6	1.7	1.8	3.6	3.6
Power Generation	83.6	69.8	31.0	37.0	68.0	31.4	36.2	67.6	68.0

Oil

(Mbbbl)

	2019	2020	2021p			2022e			2023e
			1H	2H		1H	2H		
Total Oil Demand	808.2	775.7	404.5	427.2	831.7	409.4	416.0	825.5	820.6
Transformation	12.1	23.4	10.6	12.9	23.4	9.6	8.2	17.8	20.1
Power Generation	5.7	3.8	1.7	2.4	4.1	2.8	1.7	4.5	4.4
District Heat	1.7	1.6	0.9	0.8	1.7	1.0	0.8	1.8	2.5
Gas Manufacture	0.4	0.6	1.1	2.8	3.9	0.2	1.0	1.2	1.2
Oil Refinery	4.3	17.4	6.8	6.9	13.7	5.6	4.8	10.3	12.1
Final Consumption	796.1	752.3	393.9	414.4	808.3	399.8	407.9	807.7	800.5
Industry	483.9	462.2	243.9	261.9	505.8	254.9	255.7	510.6	503.6
Transport	263.2	245.4	125.5	131.0	256.5	121.3	131.5	252.8	253.6
Buildings	49.1	44.7	24.5	21.5	46.0	23.7	20.7	44.3	43.2
Final Consumption by products									
Gasoline	82.7	81.0	40.8	44.0	84.9	40.3	46.3	86.6	87.6
Diesel	163.8	155.0	77.2	78.7	155.8	72.8	76.4	149.2	150.2
Kerosene	16.7	16.8	8.7	7.8	16.4	8.1	7.4	15.5	15.2
B-C	8.4	6.8	3.2	3.3	6.5	3.7	3.3	6.9	6.9
Jet Oil	13.1	7.8	7.5	7.3	14.8	7.5	8.1	15.6	15.8
LPG	110.9	109.1	54.8	55.0	109.8	61.7	57.6	119.3	119.4
Petrochemical Feedstock	46.9	48.8	22.7	24.7	47.4	31.9	29.2	61.1	62.6
Naphtha	365.4	333.9	178.8	193.7	372.5	182.7	185.7	368.4	355.7
Refinery gas	6.3	8.5	3.3	3.0	6.2	3.3	3.5	6.8	6.7
Other Non-Energy	28.8	33.3	19.6	21.6	41.3	19.7	19.6	39.3	43.1

Gas

	2019	2020	2021p			2022e			2023e
			1H	2H		1H	2H		
Total Gas Demand (Mton)	41.0	41.5	24.1	21.7	45.9	24.2	20.0	44.2	43.5
Transformation	39.5	39.9	23.3	20.9	44.3	23.4	19.2	42.6	41.9
Power Generation	19.4	20.0	11.8	11.5	23.2	11.4	10.3	21.7	20.2
District Heat	-	-	-	-	-	-	-	-	-
Gas Manufacture	18.6	18.0	10.6	8.5	19.1	11.1	8.3	19.4	20.0
Oil Refinery	1.5	1.8	0.9	1.0	1.9	0.9	0.7	1.6	1.7
Final Consumption	1.5	1.6	0.8	0.8	1.6	0.8	0.8	1.6	1.6
Industry	1.5	1.6	0.8	0.8	1.6	0.8	0.8	1.6	1.6
City Gas (Bm3)	22.4	22.0	13.2	9.6	22.7	13.7	9.9	23.6	23.9
Transformation	- 22.0	- 21.6	- 12.4	- 9.9	- 22.3	- 12.9	- 9.5	- 22.5	- 23.3
Power Generation	0.6	0.7	0.4	0.4	0.8	0.5	0.4	0.9	0.8
District Heat	0.3	0.2	0.2	0.1	0.3	0.2	0.1	0.3	0.3
Gas Manufacture*	- 23.7	- 22.9	- 13.5	- 10.8	- 24.3	- 14.1	- 10.4	- 24.5	- 25.4
Oil Refinery	0.8	0.5	0.4	0.4	0.9	0.4	0.4	0.8	0.9
Final Consumption	22.4	22.0	13.2	9.6	22.7	13.7	9.9	23.6	23.9
Industry	7.5	7.1	3.9	3.7	7.6	4.0	3.6	7.6	7.7
Transport	1.2	1.1	0.5	0.5	1.0	0.5	0.5	1.0	1.0
buildings	13.8	13.8	8.7	5.3	14.1	9.3	5.7	15.0	15.2

* The process of gasifying LNG and adjusting the calorific value to supply city gas. Negative (-) value means the output of city gas.

Electricity

(TWh)

	2019	2020	2021p			2022e			2023e
			1H	2H		1H	2H		
Net Electricity Demand	559.6	548.9	277.2	295.9	573.1	289.6	302.2	591.7	599.6
Own use and Losses	52.0	51.6	21.4	30.7	52.1	23.7	30.7	54.4	54.5
Final Consumption	507.5	497.3	255.8	265.2	521.0	265.9	271.4	537.3	545.1
Industry	266.6	254.7	133.1	136.5	269.6	137.8	137.6	275.4	278.0
Transport	3.2	3.2	1.6	1.8	3.4	1.9	2.1	4.0	4.2
Buildings	237.8	239.4	121.1	126.9	248.1	126.2	131.8	258.0	262.9
Installed Electrical Capacity (GW)*	119.9	124.0	125.0	129.1	129.1	129.4	132.8	132.8	142.4
Coal	37.0	36.9	35.8	37.7	37.7	36.6	38.4	38.4	40.8
Oil	3.9	2.2	2.2	2.2	2.2	1.0	0.9	0.9	0.9
Gas	39.4	41.2	41.2	41.2	41.2	41.2	41.2	41.2	41.2
Nuclear	23.3	23.3	23.3	23.3	23.3	23.3	23.7	23.7	26.1
Hydro	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Other Renewables	14.6	18.7	20.8	23.0	23.0	25.5	26.8	26.8	31.6
Electricity Generation of Power Plants*	559.6	548.9	277.2	295.9	573.1	289.6	302.2	591.7	599.6
Coal	227.4	196.3	89.5	108.4	198.0	90.6	103.8	194.4	196.4
Oil	3.3	2.3	1.0	1.3	2.4	1.2	0.6	1.8	1.7
Gas	144.4	145.9	85.7	82.7	168.4	83.0	77.3	160.4	150.0
Nuclear	145.9	160.2	77.2	80.8	158.0	86.7	93.1	179.8	188.3
Hydro	2.8	3.9	1.5	1.5	3.1	1.3	2.3	3.6	3.6
Other Renewables	35.9	40.3	22.2	21.1	43.4	26.7	25.0	51.7	59.6
Fuel Consumption of Power Plants (Mtoe)*	114.2	111.1	55.4	59.2	114.5	57.1	60.3	117.4	118.8
Coal	49.9	41.6	18.5	22.0	40.6	18.6	21.6	40.3	40.5
Oil	0.8	0.6	0.2	0.3	0.6	0.4	0.2	0.6	0.6
Gas	26.0	26.8	15.8	15.4	31.2	15.4	13.8	29.2	27.2
Nuclear	31.1	34.1	16.4	17.2	33.7	18.5	19.8	38.3	40.1
Hydro	0.6	0.8	0.3	0.3	0.7	0.3	0.5	0.8	0.8
Other Renewables	5.7	7.2	4.0	3.9	7.9	4.0	4.3	8.3	9.6

* Exclude pumped storage

Heat and Other Renewables

(Mtoe)

	2019	2020	2021p			2022e			2023e
			1H	2H		1H	2H		
Net Heat Demand	2.7	2.8	1.7	1.2	2.9	1.9	1.3	3.2	3.2
Own use and Losses	0.3	0.2	0.1	0.1	0.2	0.2	0.2	0.4	0.4
Final Consumption	2.5	2.6	1.6	1.1	2.7	1.6	1.2	2.8	2.9
Industry	-	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-	-
Buildings	2.5	2.6	1.6	1.1	2.7	1.6	1.2	2.8	2.9
Renewables	12.8	14.7	8.0	7.7	15.7	7.9	8.4	16.2	17.7
Hydro	0.6	0.8	0.3	0.3	0.7	0.3	0.5	0.8	0.8
Power Generation, etc.	5.7	7.2	4.0	3.9	7.9	4.0	4.3	8.3	9.6
Final Consumption	6.5	6.7	3.6	3.5	7.1	3.6	3.5	7.2	7.4
Industry	4.0	4.0	2.2	2.3	4.4	2.3	2.3	4.5	4.7
Transport	0.7	0.7	0.4	0.4	0.7	0.4	0.4	0.7	0.7
Buildings	1.8	1.9	1.1	0.9	2.0	1.0	0.9	1.9	2.0

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