

Country Analysis Brief: South Korea

Last Updated: April 2023

Next Update: February 2025

Overview

Table 1. South Korea energy indicators, 2021

	Coal	Natural gas	Petroleum and other liquids	Nuclear	Renewables
Primary energy production (quads)	<0.1	<0.1	0.0	1.4	0.4
Primary energy production (%)	1%	<1%	11%	69%	20%
Primary energy consumption (quads)	3.2	2.4	5.3	1.4	0.4
Primary energy consumption (%)	25%	19%	41%	11%	3%
Generation (billion kWh)	209.3	174.4	6.9	150.5	47.4
Generation (%)	36%	30%	1%	26%	8%

Data source: U.S. Energy Information Administration, *International Energy Statistics*, and *BP Statistical Review of World Energy 2022*

Note: Percentages may not equal 100% due to independent rounding. Quads=quadrillion British thermal units, kWh=kilowatthours.

- South Korea relies on imports to meet almost 98% of its fossil fuel consumption as a result of insufficient domestic resources. Because it has no international oil or natural gas pipelines, South Korea relies on tanker shipments of liquefied natural gas (LNG) and crude oil to meet demand.¹
- South Korea released its Green New Deal in July 2020 as part of a larger economic initiative. The initiative aims to help South Korea achieve its goals of lowering greenhouse gas (GHG) emissions and increasing renewables generation capacity. The plan also calls for:
 - Increased energy efficiency in electricity infrastructure
 - Increased use of renewable energy
 - Preparing the economy for a shift to a low carbon and decentralized energy supply
 - Investing in innovations within the green industry space²

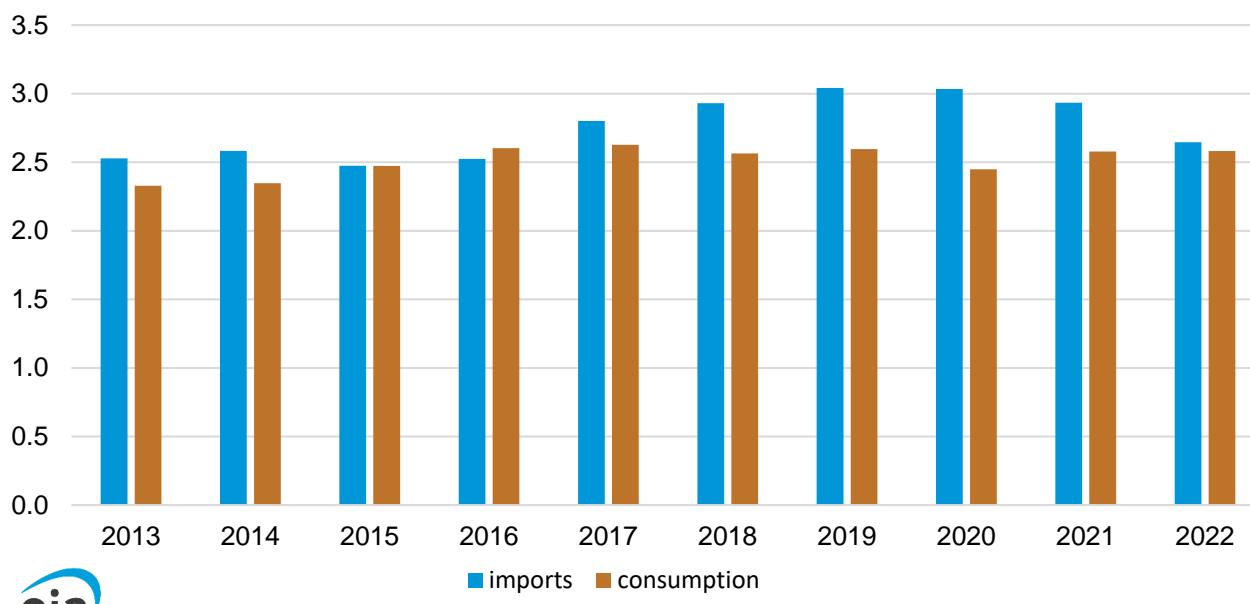
- South Korea was the world's seventh-largest energy consumer in 2021.³ The country's economic growth is fueled by exports, most notably exports of automobiles, ships, semiconductors, and petrochemicals, mainly to regional trading partners in Asia. Real gross domestic product (GDP) grew 4.1% in 2021 as a result of record demand (\$645 billion) for the country's exports.⁴
- Although renewables accounted for the smallest portion (3%) of South Korea's primary energy consumption in 2021, renewables were the only energy source with a steadily increasing share since 2015. At that time, renewables accounted for less than 1% of total energy consumption.⁵
- The Ministry for Trade, Industry and Energy (MOTIE) released its *10th Basic Plan for Long-Term Electricity Supply and Demand* at the end of 2022. The plan decreases the previous goal of renewables accounting for 30% of electricity generation to 22% in 2030. The plan also calls for nuclear power's share of generation to reach 32% in 2030 and 35% in 2036. This rise is a significant change from the previous administration's plan that was set to phase out nuclear.⁶
- MOTIE created a roadmap to accelerate its hydrogen economy. The government intends to increase hydrogen demand in the transportation, electric power, and industrial sectors. Outlined goals would produce 30,000 commercial hydrogen vehicles and 70 hydrogen refueling stations by 2030 and would have hydrogen account for 7% of power generation by 2036.⁷

Petroleum and Other Liquids

- South Korea has a small amount of domestic oil reserves; therefore, the country relies almost entirely on crude oil imports to meet demand (Figure 1). Virtually all of South Korea's total petroleum and other liquids production of 108,000 barrels per day (b/d) in 2021 was from refinery processing gains, nonconventional liquids, and biofuels production.⁸

Figure 1. South Korea's petroleum and other liquids imports and consumption, 2013—2022

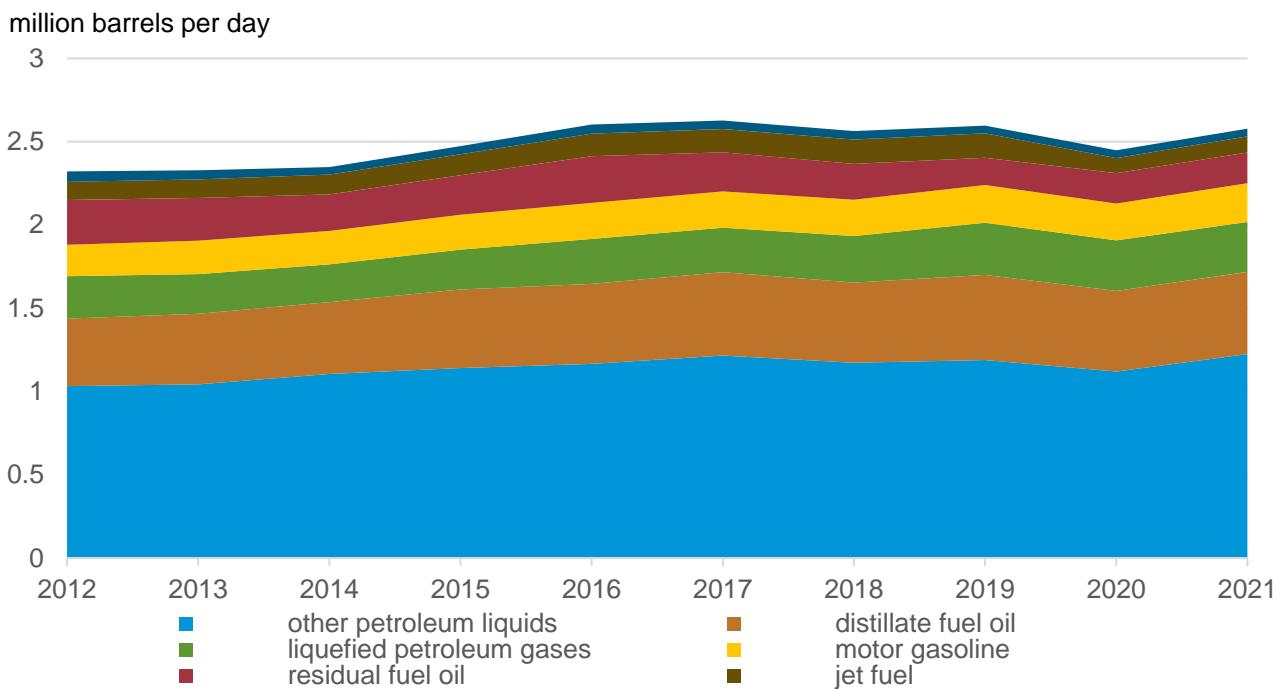
million barrels per day



Data source: U.S. Energy Information Administration, *International Energy Statistics* and Kpler

- South Korea was the eighth-largest consumer of petroleum and other liquids in the world in 2021. Consumption grew in 2021, mainly driven by higher use for transportation, new petrochemical facilities that required more liquefied petroleum gas (LPG) and naphtha, and higher use by domestic industry.⁹
- South Korea had 3.3 million b/d of crude oil refining capacity in the beginning of 2022 and had the fifth-largest refining capacity in the world (Table 2). There are no plans to increase refining capacity in the next few years.¹⁰

Figure 2. South Korea's refined petroleum products consumption, 2012 — 2021



Data source: U.S. Energy Information Administration, *International Energy Statistics*

Table 2. Operating refineries in South Korea

Name of company	Refinery location	Crude oil refining capacity (thousand barrels per day)
Hanwha Total	Daesan	167
Hyundai Oilbank	Daesan	484
Hyundai Lotte	Daesan (Seosan)	158
SK Energy	Inchean	93
SK Energy	Inchean	256
SK Energy	Ulsan	781
S-Oil	Ulsan	83
S-Oil	Ulsan	539
GS Caltex	Yeosu	744
Total		3,305

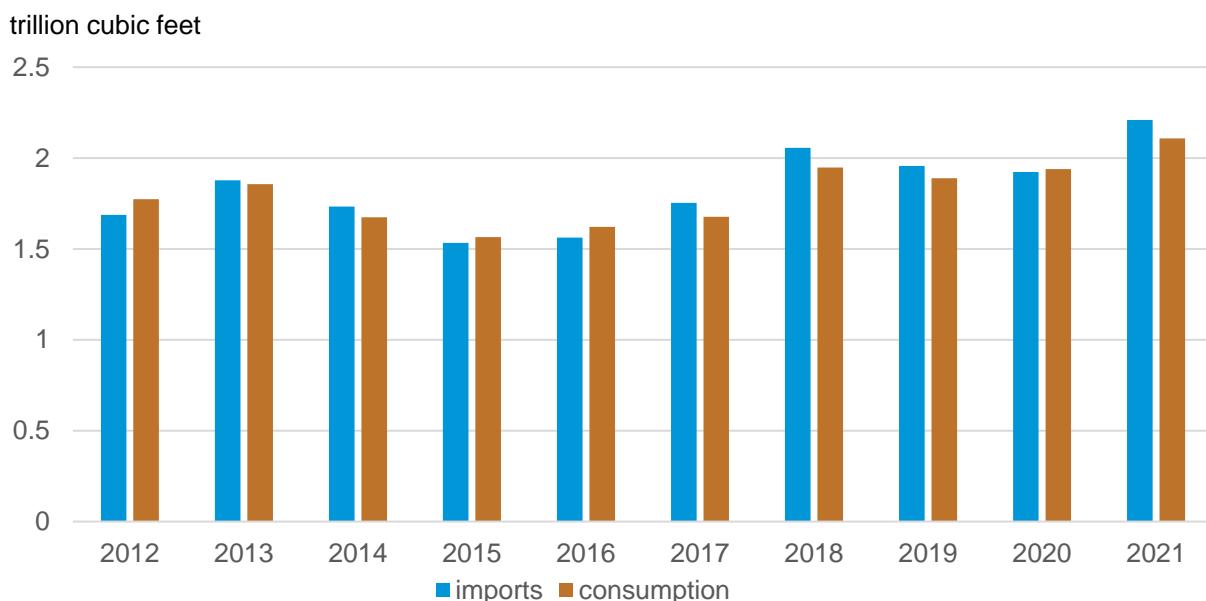
Data source: FACTS Global Energy, Asia Pacific Databook 2: Refinery Configuration, Fall 2022

- The Korea National Oil Corporation (KNOC) produced over 100,000 b/d of oil and 77 billion cubic feet (Bcf) of natural gas in its overseas operations.
- KNOC participates in several overseas exploration and production projects. Its largest producing assets are in North America. The Eagle Ford project in the United States produced almost 23,000 barrels of oil equivalent per day (BOE/d) in 2022. KNOC purchased Canada Harvest Operations Corporation and, at the end of 2021, produced 22,000 BOE/d from its Canadian assets, which they estimate to have 381 million BOE in total proved and probable reserves. However, KNOC's Al Dafra project in the United Arab Emirates will surpass these production levels if it reaches the 30,000 b/d production number the corporation expects. The exact date when it will reach peak production is unknown.¹¹
- KNOC operates nine state-run strategic storage facilities with 146 million barrels of capacity. As of 2021, KNOC held 98 million barrels of strategic reserves, and about 51 million barrels of inventories are stored as international stockpiles under agreements between South Korea and other governments.¹²

Natural Gas

- South Korea was the third-largest importer of LNG in the world, after China and Japan, in 2021.¹³ South Korea's annual production of domestic natural gas declined since reaching a high of 12 Bcf in 2017 to just under 2 Bcf in 2021.¹⁴

Figure 3. South Korea's natural gas imports and consumption, 2012—2021



Data source: U.S. Energy Information Administration, *International Energy Statistics*

- At 6.6 trillion cubic feet per year (Tcf/y), South Korea had the world's second-largest regassification capacity in 2021. With increased demand for natural gas, the annual utilization rate of South Korea's regassification facilities rose from 30% in 2020 to 34% in 2021.¹⁵

Table 3. South Korea's existing regasification terminals

Project name	Owners	Peak output (billion cubic feet per year)	Start year
Existing LNG import terminals			
Pyeontaek LNG	KOGAS	1,950	1986
Incheon	KOGAS	2,531	1996
Tongyeong LNG	KOGAS	1,278	2002
Gwangyang	POSCO	110	2005
Samcheok LNG	KOGAS	557	2014
Boryeong LNG	GS Caltex (50%), SK E&S (50%)	144	2017
Jeju LNG	KOGAS	48	2019
Total		6,618	

Data source: International Gas Union, 2022 *World LNG Report*

Note: LNG=liquefied natural gas.

- The Korea Gas Corporation (KOGAS) participates in natural gas projects around the world, and as of the end of 2022, KOGAS held investments in 22 projects, including exploration, production, LNG assets, and downstream facilities, in 11 countries (Table 4).¹⁶

Table 4. KOGAS overseas projects

Country	Project type	Project name	Owners
Australia	LNG	Australian GLNG	KOGAS (15%), Santos (30%), Total (27.5%), Petronas (27.5%)
	LNG	Prelude FLNG	KOGAS (10%), Shell (67.5%), Index (17.5%), OPIC (5%)
Canada	Production	Canadian Hon River Development Project	KOGAS (50%), Obintiv (50%)
	Production	Umiak Mine Project	KOGAS (20%), MGM (40%), ConocoPhilips (40%)
Cypress	LNG	LNG Canada	KOGAS (5%), Shell (40%), CNPC (15%), Mitsubishi (15%), Petronas (25%)
	Exploration	Cypress Ocean 2 Gwanggu	KOGAS (20%), Total (20%), ENI (60%)
	Exploration	Cypress Ocean 3 Gwanggu	KOGAS (20%), Total (30%), ENI (50%)
	Exploration	Cypress Ocean 9 Gwanggu	KOGAS (20%), Total (20%), ENI (60%)
Indonesia	Exploration	Exploration project for Inni Marine Mining	KOGAS (15%), ENI (85%)
	Production	Innisenoro Toilee Oil Gas Plant	Multi
	LNG	INNI DSLNG	KOGAS, SLD, Pertamina, Medco, Mitsubishi
Iraq	Production	Jubair Oilfield Project	KOGAS, ENI, BOC, MOC
	Production	Iraqi Badra Oilfield Project	KOGAS, Petronas, TPAO, OEC
	Production	Mansurya Gas Fields Project	KOGAS, TPAO, KEC OEC
Mozambique	Production	Akas Gas Field Project	KOGAS, NOC
	Exploration	Mozambique Area 4	KOGAS (10%), MRV (70%), Galp Energia (10%), ENH (10%)
Myanmar	LNG	Mozambique Coral FLNG	Multi
	Production	Myanmar A-1/A-3 Development Project	Multi
Oman	LNG	Oman OLNG	Multi
Qatar	LNG	Qatar RasGas	Multi
Uzbekistan	Production	Surgil Gas field and Gas Chemical Construction and Operation Project	KOGAS, Kor-Uz, Uzbekneftegaz, Lotte Chamical, GSE&R
Yemen	LNG	Yemen YLNG	Multi

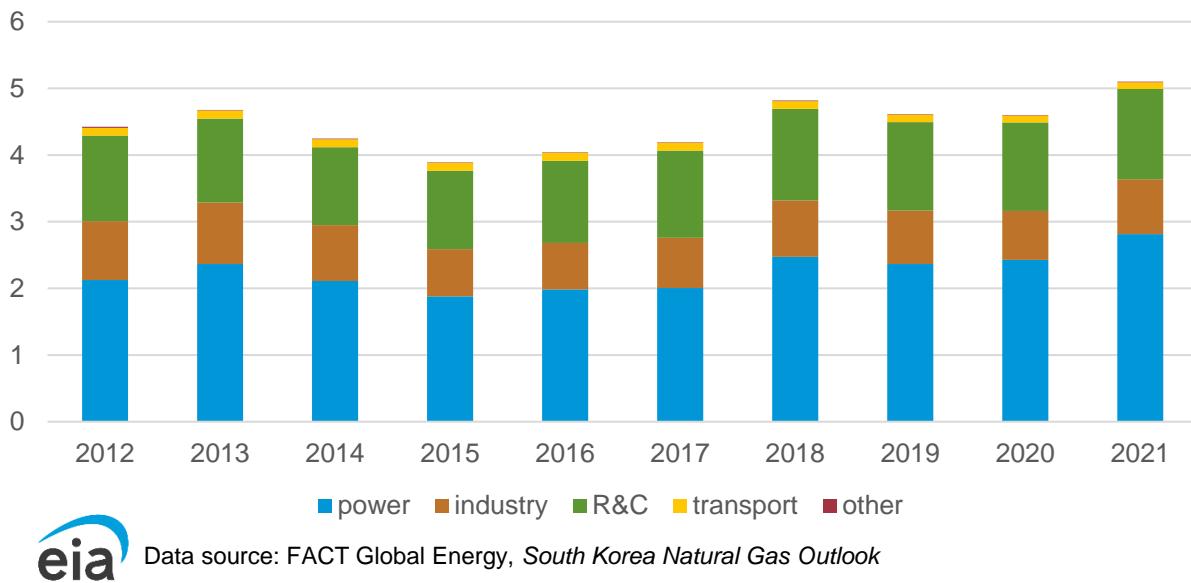
Data source: Korea Gas Corporation (KOGAS), [Overseas Business](#)

Note: Ownership status *multi* represents a business structure too complex to display in the table. LNG=liquefied natural gas.

- South Korea's natural gas demand grew by almost 9% in 2021. The main driver behind the growth was the electric power sector (Figure 4). Growing electricity demand combined with

unplanned nuclear maintenance led to a 16% increase in growth in natural gas use for electric power generation from 2020 to 2021.¹⁷

Figure 4. South Korea's natural gas consumption by sector, 2012-2021
billion cubic feet per day

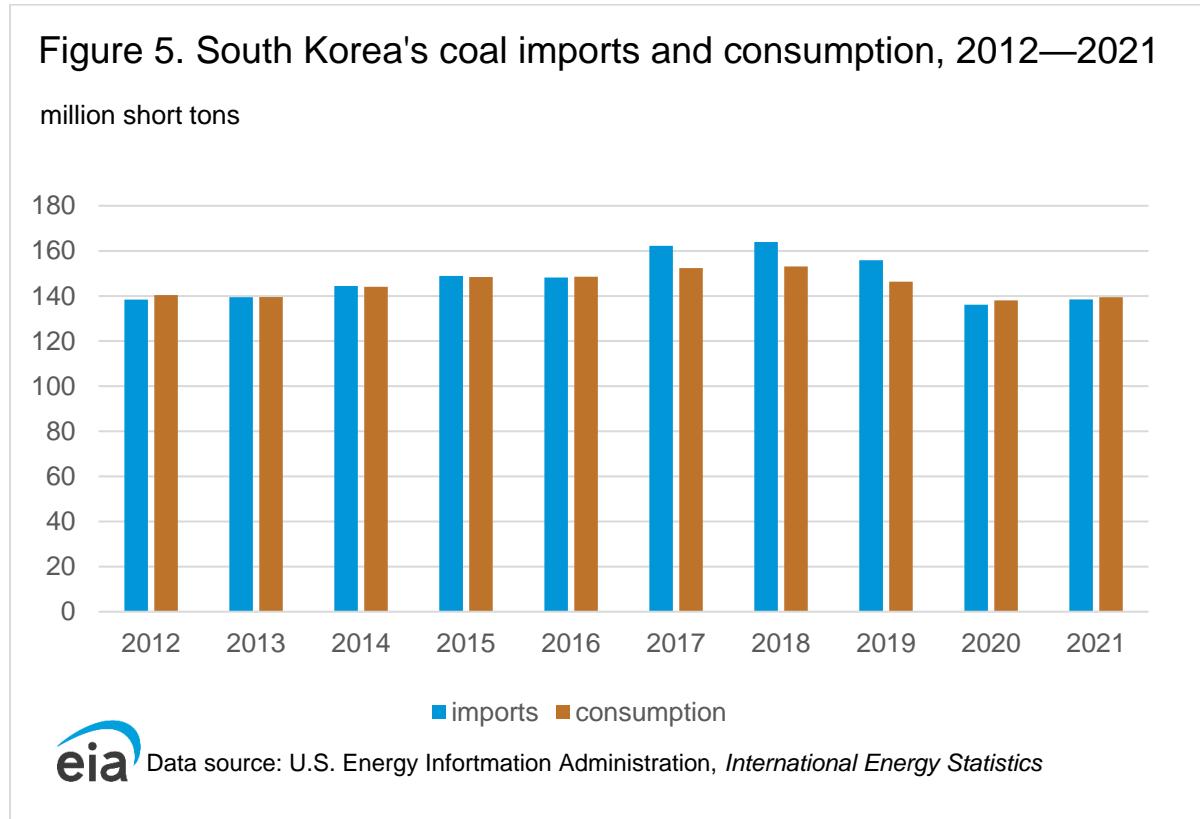


- South Korea's 1998 Gas Enterprise Law allows private companies to import LNG as long as these companies do not compete with KOGAS in the natural gas market. The allowance of independent importers led to a decrease in market share for KOGAS to 82% in 2021 from 90% in 2018.¹⁸
- South Korea's Hyundai Heavy Industries Group, Samsung Heavy Industries, and Daewoo Shipbuilding & Marine Engineering were the three top global shipbuilders for LNG carrier vessels in 2021.¹⁹

Coal

- South Korea produced just under 1 million short tons of coal from its anthracite reserves in 2021 and is its lowest amount of production in over four decades. This amount is only a fraction of its coal consumption of 139 million shorttons. South Korea relies mainly on imports to meet its demand (Figure 5).²⁰
- The previous administration led by president Moon Jae-in planned to completely phase out coal by 2050 as part of the country's net-zero target.²¹ Current president, Yoon Suk Yeol, has committed to upholding the net-zero target by 2050 and intends to accelerate the reduction of coal production to help fight air pollution.²²
- In 2021, South Korea agreed to place a moratorium on overseas financing of coal projects. Historically, South Korea was one of the largest providers of financing for coal projects. Investments, since 2010, totaled \$5.8 billion in overseas coal projects, most of which have gone

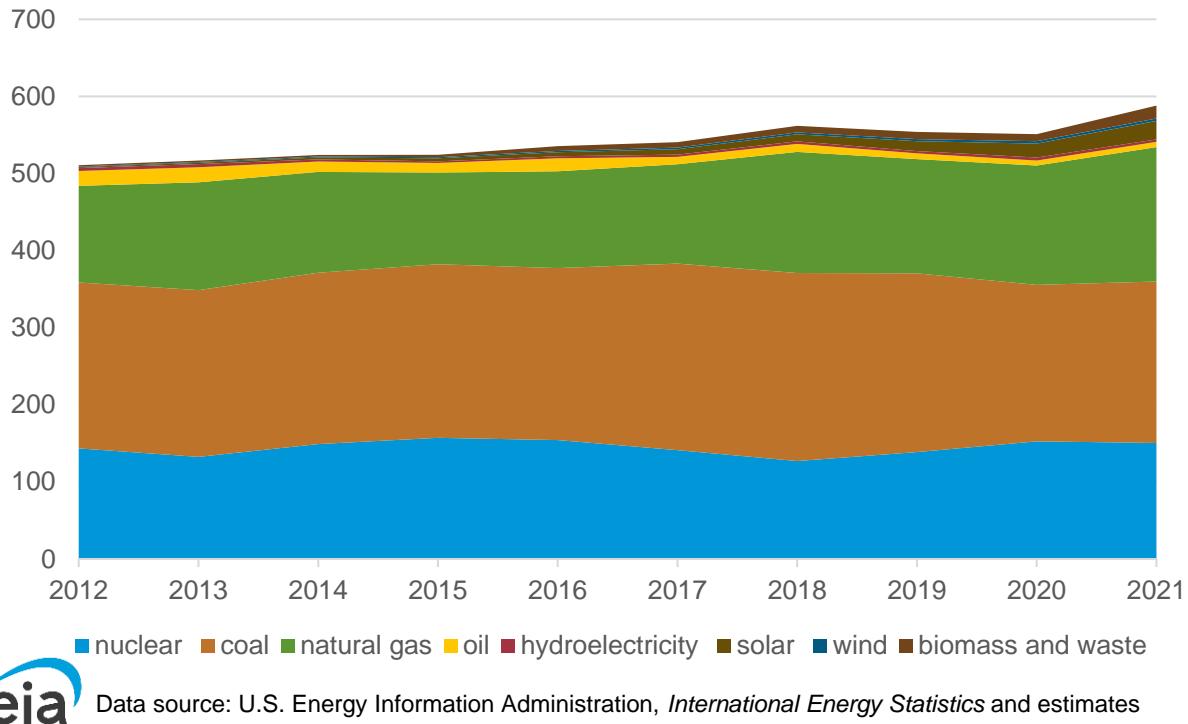
to Southeast Asia. Coal projects in Vietnam and Indonesia accounted for 94% of South Korea's overseas coal investments.²³



Electricity

- Fossil fuels accounted for two-thirds of South Korea's electricity generation in 2021, and nuclear power accounted for 26%. Non-hydro renewables are the fastest-growing generation source, although in 2021, they only represented 8% of power generation.²⁴ The *10th Basic Plan for Long-Term Electricity Supply and Demand* calls for a 31% renewables generation target share by 2036.²⁵

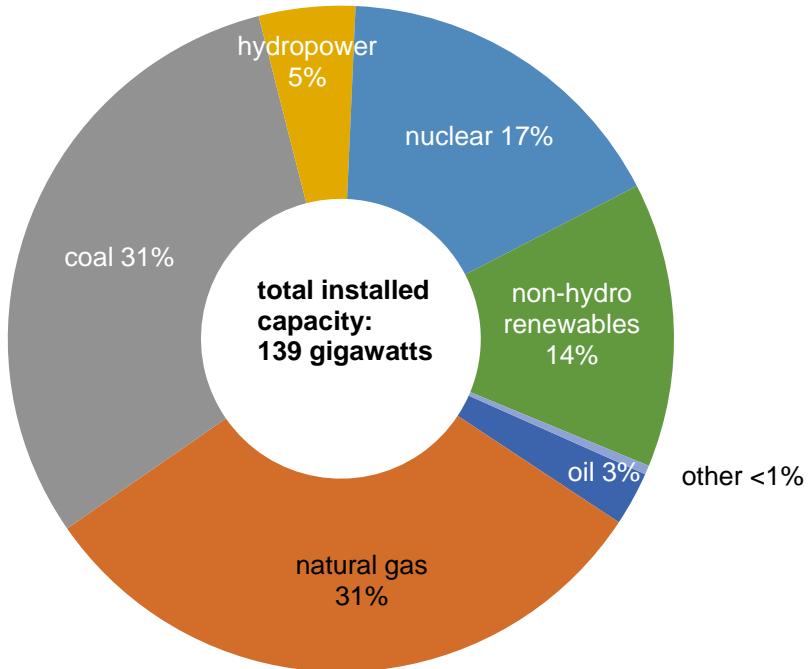
Figure 6. South Korea's generation by source, 2012—2021
terawatt hours



Data source: U.S. Energy Information Administration, *International Energy Statistics* and estimates

- In 2021, electricity consumption grew by almost 7%, driven by the industrial sector (increased production activity), as well as the residential and commercial sectors (increased space heating demand as a result of weather).²⁶
- South Korea's generating capacity grew by 4% in 2021 to 143 gigawatts (GW). Although fossil fuels account for almost 63% of installed capacity, almost all of the growth in 2021 can be attributed to solar and wind (Figure 12).²⁷
- Nuclear power accounted for 17% of installed generating capacity (Figure 7).²⁸ South Korea's targets for expanding installed nuclear capacity are expected to reach 29 GW by 2030 and just under 32 GW by 2036. The current administration has called for the restart of construction on Units 3 and 4 at the Shin Hanul nuclear power plant. By 2033, 6 new reactors are set to join the 12 that are already in operation.²⁹

Figure 7. South Korea's installed electricity generating capacity by type, 2020



Data source: International Energy Agency

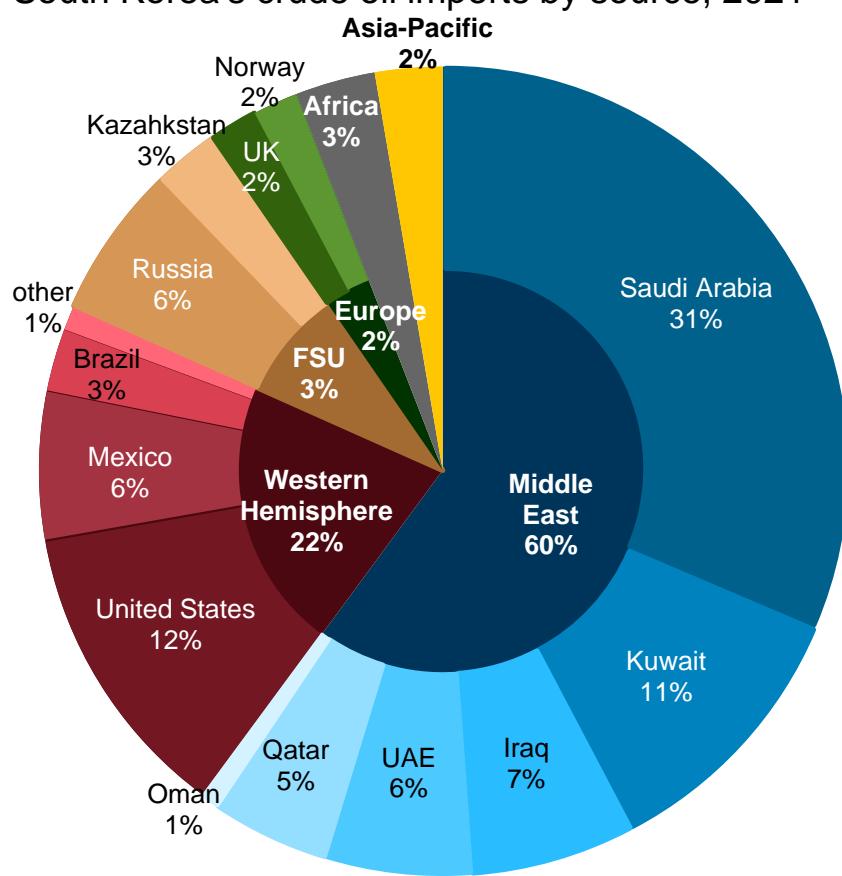
Note: Numbers may not equal 100% due to independent rounding.

Energy Trade

Petroleum and other liquids

- South Korea's crude oil imports declined since 2018 and dropped to just below 2.6 million b/d in 2021. South Korea is the fourth-largest crude oil importer in the world, and it mostly imports its crude oil from the Middle East, which accounted for more than 60% of its oil imports in 2021 (Figure 8). Russia supplied 6% of South Korea's crude imports in 2021. However, after Russia's full-scale invasion of Ukraine, imports from Russia were reduced, and in 2022, only about 3% of South Korea's crude oil imports came from Russia.³⁰

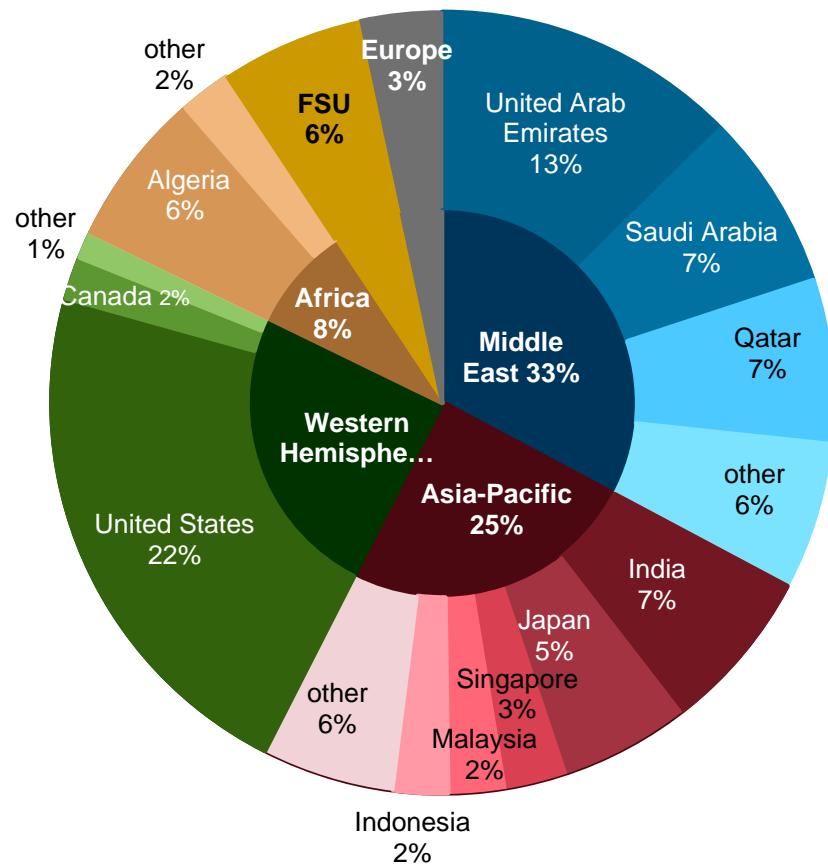
Figure 8. South Korea's crude oil imports by source, 2021



Data source: Global Trade Tracker

Note: Total may not equal 100% because of independent rounding. FSU = former Soviet

Figure 9. South Korea's petroleum products imports by source, 2022



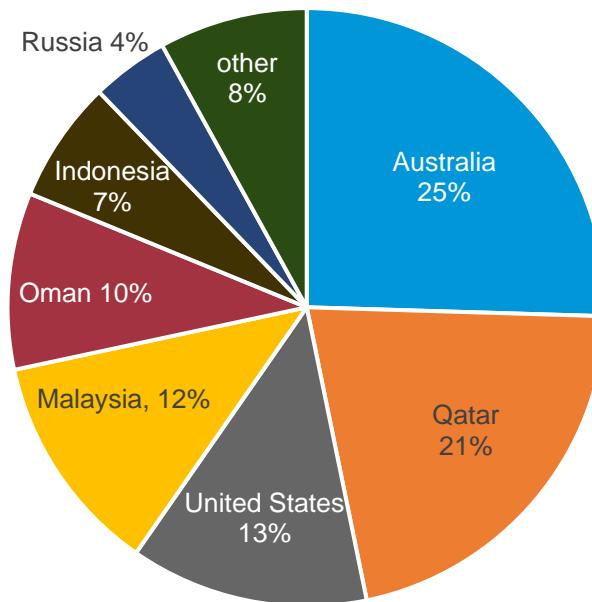
Data source: Vortexa

Note: Total may not equal 100% because of independent rounding. FSU= former Soviet Union.

Natural gas

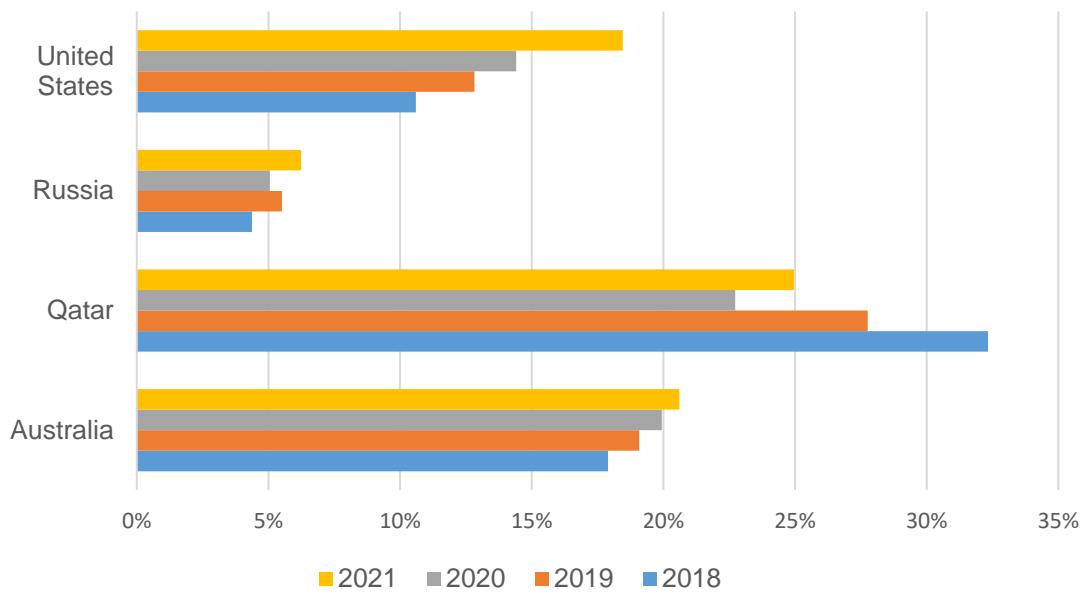
- South Korea's LNG imports remained relatively flat at 2.2 Tcf in 2022. The largest year-over-year increases in imports were from Malaysia (47%), followed by Indonesia (26%) and Australia (19%). The largest decreases occurred in imports from the United States (33%), Russia (27%), and Qatar (13%) (Figure 11).³¹

Figure 10. South Korea's LNG imports by source, 2022



Data source: Vortexa
Note: LNG=liquified natural gas.

Figure 11. South Korea's LNG market share changes, 2018-2021

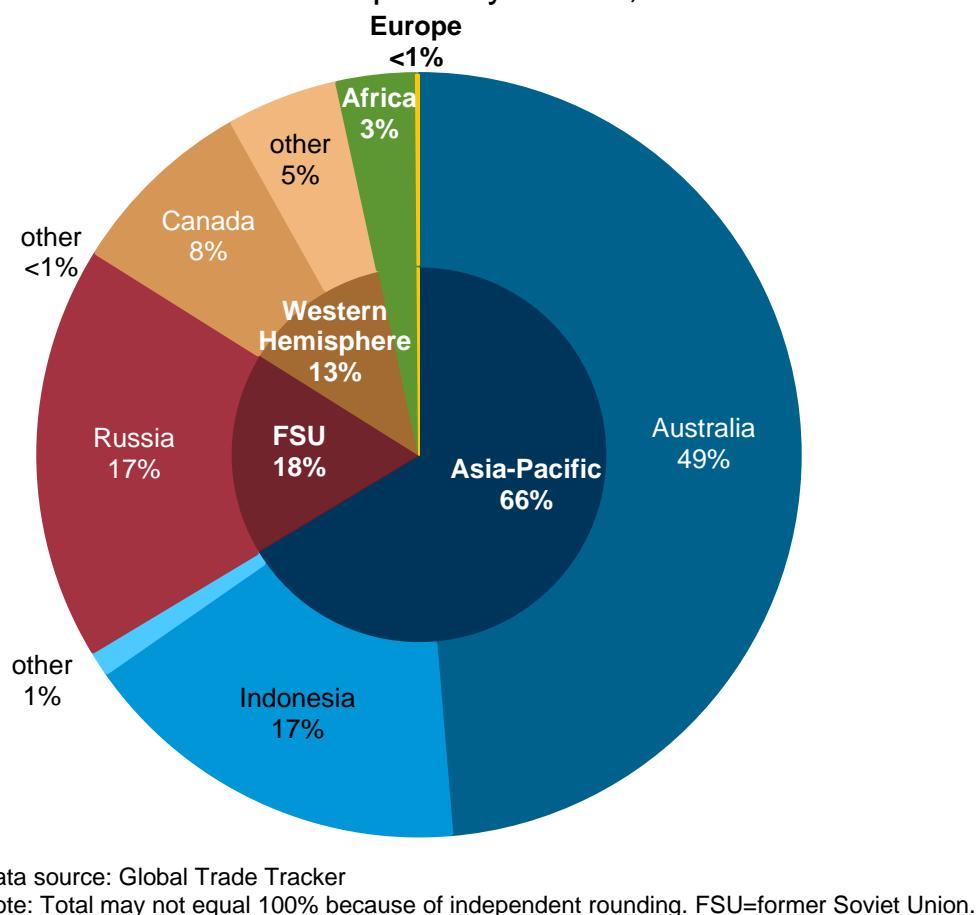


Data source: Global Trade Tracker (accessed January 2023)

Coal

- In 2021, coal imports were relatively flat compared with the previous year. Most of South Korea's coal use in 2021 is attributed to power generation (59%) followed by industrial use (41%).³²
- The majority of the coal imported in 2021 was bituminous (65%) and metallurgic (29%).³³ Although coal imports from Australia increased to 67 million short tons from 52 million short tons in 2020, imports from Indonesia and Russia declined. Following China's unofficial ban on Australia's coal imports in 2020, South Korea received a greater share of Australia's coal.³⁴

Figure 12. South Korea's coal imports by source, 2021



¹ U.S. Energy Information Administration, *International Energy Statistics*

² Republic of Korea, Green Climate Policy Division, National Strategy for a Great Transformation: Korean New Deal, pg. 25.

³ U.S. Energy Information Administration, *International Energy Statistics*

⁴ [World Bank data: GDP growth](#) (accessed December 2022); “[South Korea's GDP Growth Hit 11-Year High in 2021 as Exports Boom](#).” CNBC, January 25, 2022; Ani. “[South Korea Exports Post \\$644.5 Billion, Hitting All-Time High in 2021](#).” Business Standard News. Business-Standard, January 4, 2022.

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- ⁵ U.S. Energy Information Administration, *International Energy Statistics*.
- ⁶ Djunisic, Sladjana. "[South Korea Commits to Lower Renewables Target in Favour of Nuclear](#)." Renewablesnow.com. Renewables Now, January 16, 2023.
- ⁷ Li, Tng Yong. "[South Korea Outlines Hydrogen Roadmap to Boost Industry: Argus Media](#)." South Korea outlines hydrogen roadmap to boost industry, November 10, 2022.
- ⁸ U.S. Energy Information Administration, *International Energy Statistics*.
- ⁹ KEEI Energy Demand Outlook page 3; Energy Information Administration, *International Energy Statistics*; FACTS Global Energy Services, *Asia Pacific Petroleum Databook 1: Supply and Demand*, Fall 2022, page 26.
- ¹⁰ FACTS Global Energy, Asia Pacific Databook 2: Refinery Configuration, Fall 2022; BP Statistical Review of World Energy 2022.
- ¹¹ "[Korean National Oil Corporation - Operations](#)" Korea National Oil Corporation. Accessed February 15, 2023.
- ¹² [KNOC, Investor Relations](#) (accessed December 2022).
- ¹³ Vortexa (accessed February 2023)
- ¹⁴ U.S. Energy Information Administration, *International Energy Statistics*.
- ¹⁵ International Gas Union, 2022 World LNG Report, page 81.
- ¹⁶ "[Overseas Business](#)." KOGAS. Accessed January 29, 2023.
- ¹⁷ U.S. Energy Information Administration, *International Energy Statistics*; FACTS Global Energy, *South Korea Natural Gas Outlook*, August 2022, page 1.
- ¹⁸ FACTS Global Energy, *South Korea Natural Gas Outlook*, August 2022, page 3.
- ¹⁹ International Gas Union, 2022 World LNG Report, page 55.
- ²⁰ U.S. Energy Information Administration, *International Energy Statistics*.
- ²¹ Choi, Jeanne. "[South Korea's Net-Zero Ambitions and Overseas Public Financing](#)." The National Bureau of Asian Research (NBR), July 14, 2022.
- ²² FACTS Global Energy, *South Korea Natural Gas Outlook*, August 2022, page 3.
- ²³ Choi, Jeanne. "[South Korea's Net-Zero Ambitions and Overseas Public Financing](#)." The National Bureau of Asian Research (NBR), July 14, 2022; Global Energy Monitor (accessed March 2023)
- ²⁴ U.S. Energy Information Administration, *International Energy Statistics*.
- ²⁵ "[South Korea Increases Expected Contribution of Nuclear Power](#)." South Korea increases expected contribution of nuclear power: Nuclear Policies - World Nuclear News. Accessed January 27, 2023.
- ²⁶ Korea Energy Economics Institute, [Korean Energy Demand Outlook 2022 First Half](#), Vol. 24, No. 1, page 5.
- ²⁷ U.S. Energy Information Administration, *International Energy Statistics*.
- ²⁸ U.S. Energy Information Administration, *International Energy Statistics*.
- ²⁹ "[South Korea Increases Expected Contribution of Nuclear Power](#)." South Korea increases expected contribution of nuclear power: Nuclear Policies - World Nuclear News. Accessed January 27, 2023.
- ³⁰ Global Trade Tracker (accessed January 2023).
- ³¹ Global Trade Tracker (accessed January 2023).
- ³² Korea Energy Economics Institute, [Monthly Energy Statistics](#), March 2022, page 12
- ³³ U.S. Energy Information Administration, *International Energy Statistics*.
- ³⁴ Global Trade Tracker (accessed January 2023).