In charts: South Korea's new energy strategy which has nuclear at its core

South Korea hopes to achieve carbon neutrality by 2050 by expanding its renewable energy sources, namely nuclear power. In this article, our senior economist in Seoul looks at South Korea's journey to net-zero, and how this has been impacted by the war in Ukraine

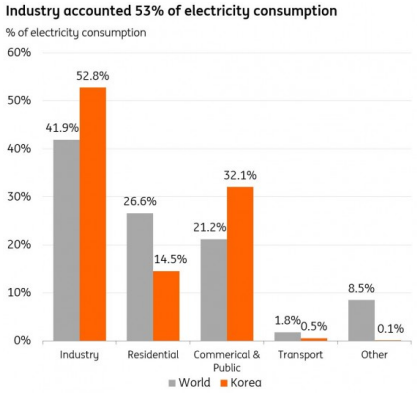
The Kori nuclear power plant in South Korea is the world's largest fully operational nuclear generating station

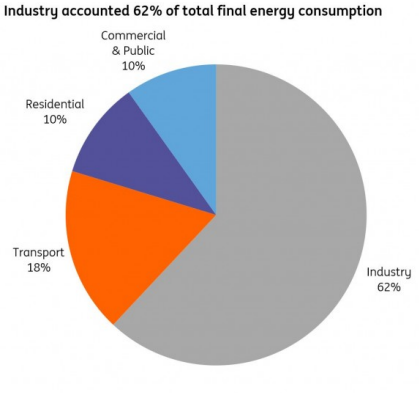
Korea's electricity supply and demand

South Korea wants to pursue reliable and cheaper energy sources. In the following charts, we look at the reliability of South Korea's current energy supply.

Industry (manufacturing) consumes more than half of electricity/energy

Industry depends on more reliable and cheaper energy sources



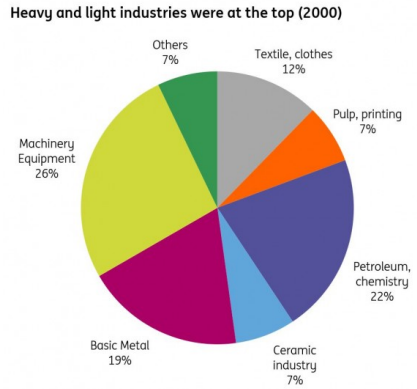


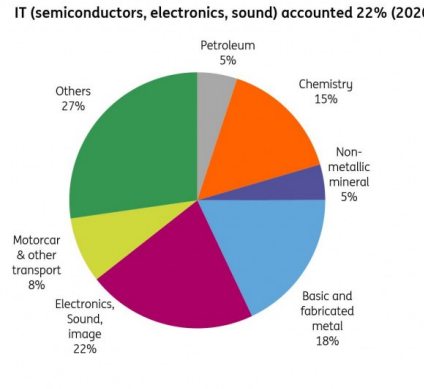
Source: IEA, Kepco (LHS). KEEI as of 2020 (RHS)

World as of 2019, Korea as of 2020 (LHS)

This is to do with the structure of the Korean economy/industry

Top electricity consumer shifted from Heavy Industry to IT. Both require a steady/reliable supply of electricity



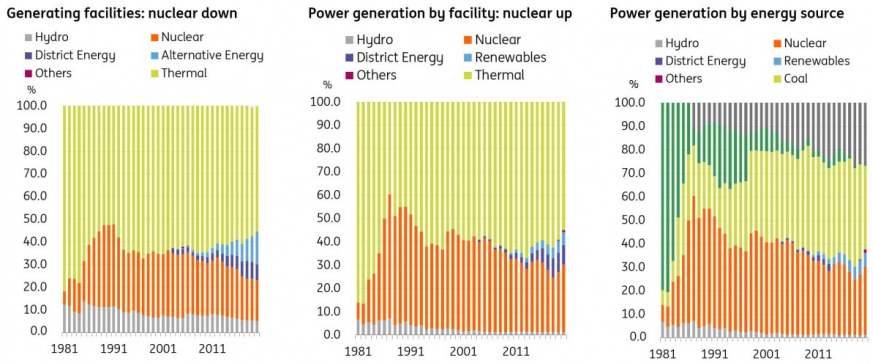


Source: KEPCO

Thus, Korea has been highly dependent on 'reliable' conventional energy

Electricity generation heavily depend on coal, LNG, and nuclear

Renewable facilities have grown fast to 14.5%. Power generation accounted 6% as of 2020

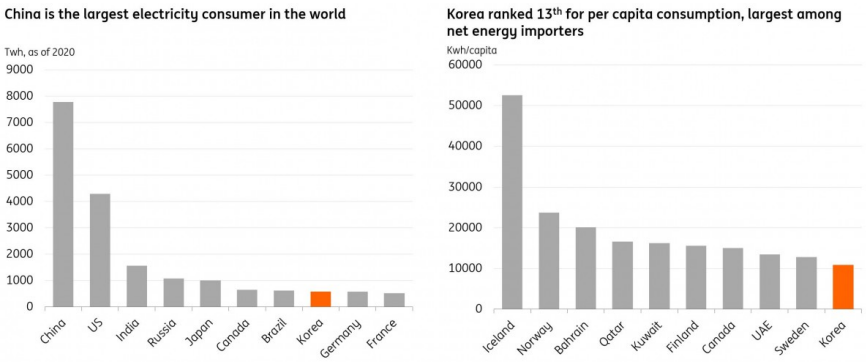


Source: KEPCO

In the next set of charts, we look at how inexpensive power is in Korea.

Inexpensive power: electricity consumption per capita ranked 13th

Electricity is an important factor in the Korean economy, supporting the activities of industry and households

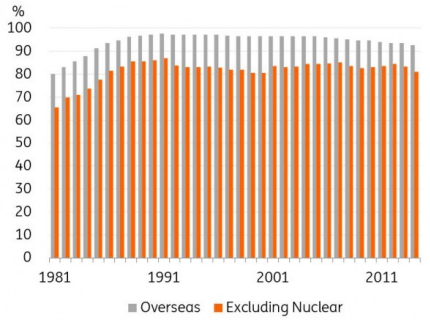


Source: BP statistical review of World Energy 2021

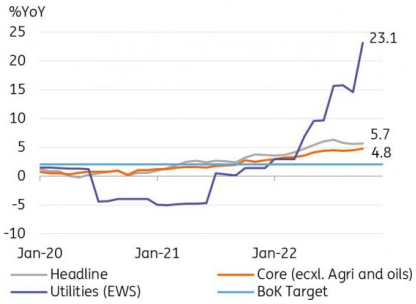
Almost 100% overseas dependence & isolated national power grid system

The economy heavily depends on energy imports and households are more sensitive to energy prices

Overseas energy dependency rate stayed at over 90% level



Utility prices rose faster than the headline

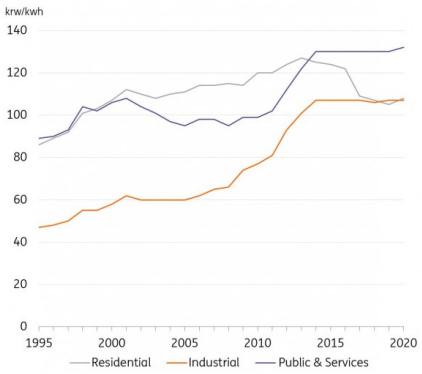


Source: KEEI and CEIC

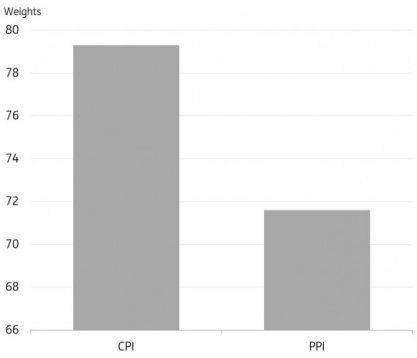
Higher energy prices affect Korea's macro economy: inflation

Households are more sensitive to energy prices and pay for electricity on a progressive rate

Consumer prices of energy changed over time



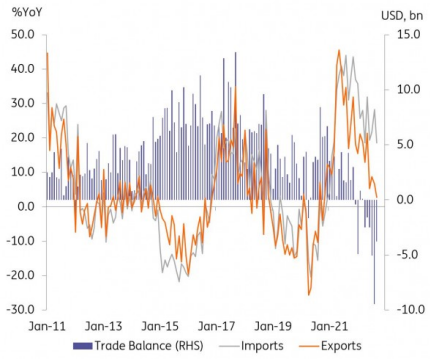
Larger energy weights for CPI than PPI



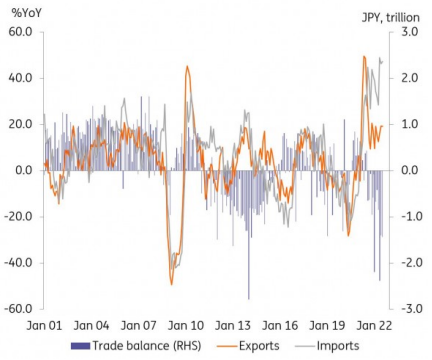
Source: KEEI, CEIC

Higher energy prices affect Korea's macro economy: trade balance

Recording trade deficit for almost a year. Unusual!



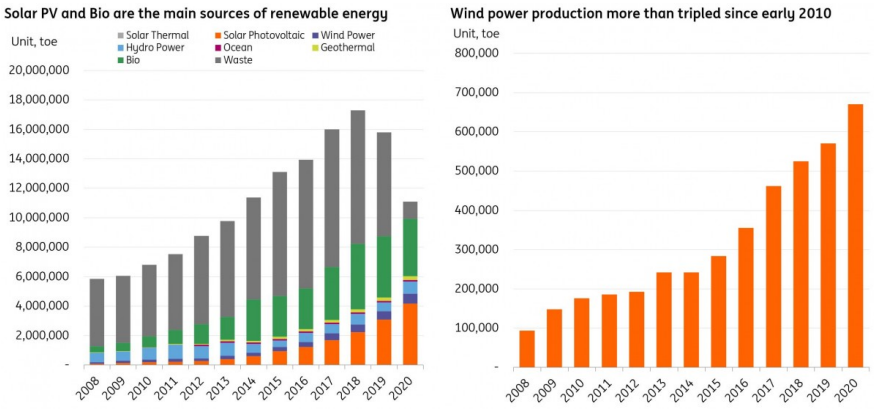
Japan: Energy imports changed the structure of trade since 2011 (Fukushima earthquake)



Source: CEIC

Production of renewable energy (calorific unit)

Renewable production increased steadily

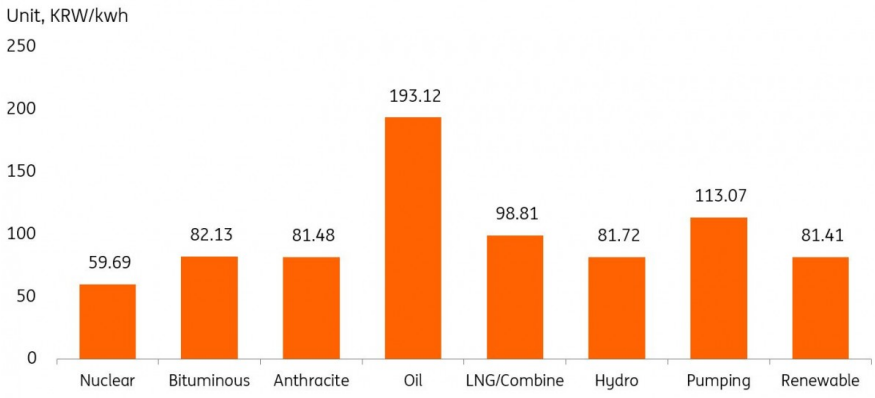


Source: Korea Energy Agency, as of 2020

Non-renewable waste data has been excluded since 4Q19

Inexpensive power: power purchasing unit cost by energy source

Unit cost of renewable has lowered and has reached comparable levels for coal and hydro (if excluding RPS)



Source: KEPCO

Fore renewable, excluding RPS (Renewable Portfolio Standard)

South Korea's efforts to achieve its net-zero 2050 target

Where does it want to be?

South Korea has become the 14th country in the world to legislate a carbon target, aiming for a 40% reduction in emissions from 2018 levels by 2030 to achieve carbon neutrality by 2050

What has it been doing to get there?

Since its formation in May 2021, the 2050 Carbon Neutrality and Green Growth Commission has implemented several measures in an effort to gradually move towards total carbon neutrality.

The Carbon Neutrality Act, for example, became effective in March 2022 and aims to facilitate the transition to a carbon-neutral society and increased green growth. Alongside legislative changes, the government has also increased its 2022 carbon neutrality budget to KRW 12 trillion from the previous year's KRW 7.3 trillion, with a newly established KRW 2.5 trillion climate fund.

Following a change of government in early 2022, progress on energy policy has come to a halt. Although the previous administration was criticised for setting overly ambitious goals and disregarding corporate voices, the new government has confirmed that it intends to stick to the original plans, with details set to be reviewed more closely moving forward.

The Ministry of Trade, Industry and Energy (MTIE) announced on 5 July that the government will resume the construction of Shin Hanul Units 3 and 4 nuclear reactors and maintain the current level of reactor capacity if safety is ensured.

As a result, nuclear will be responsible for more than 30% of power by 2030, up from 27.4% last year. In addition, the Korean government plans to create a new law for disposing of high-level radioactive waste in order to reduce potential hazards, organising a team exclusively for nuclear waste management. The revised outline, including the target for renewables, will be detailed in the 10th Basic Plan on Electricity Demand and Supply due in the fourth quarter of 2022.

The Transition Committee's five policy guidelines

1. Feasible Carbon Neutrality Plan and energy mix

No change for the internationally committed carbon neutrality objectives, but the implementation plans should be amended by embracing nuclear energy in its decarbonisation efforts.

2. Market-Based demand efficiency

A market-based initiative to promote energy demand efficiency, and foster market principles and market competition.

3. Energy policy as a new growth engine

Invest in nuclear power technology and export the K-nuclear plants. as well as foster renewable technologies such as solar, wind, and hydrogen as new growth engines

4. Strengthen resource security

Secure a reliable supply chain of energy and core minerals and reinforce resource security.

5. Strengthen energy welfare policy

Provide energy welfare policies for low-income households and reduce coal power generation, under the consideration of jobs and the local economy.

How has the war impacted the energy market?

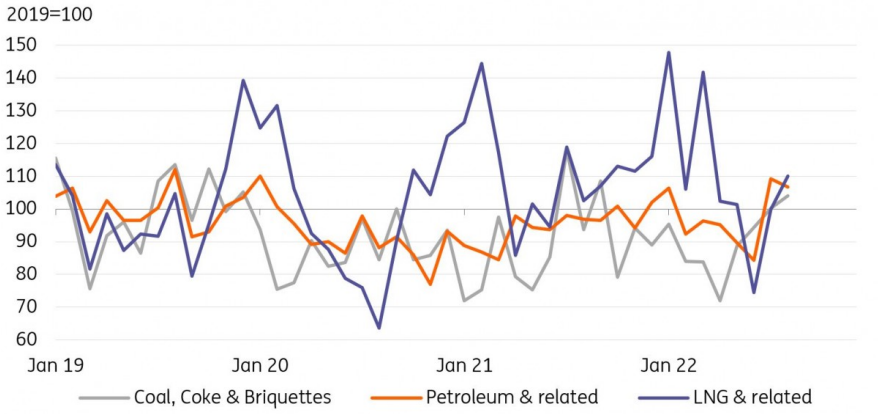
Similar to other energy importers, South Korea is suffering from the ongoing war due to high inflation and worsening trade conditions. However, as a major refining/petrochemical exporter, South Korea has significantly reduced its oil imports from Russia and this trend is likely to continue.

Meanwhile, LNG and coal imports have fallen but at a slower pace due to the high dependence on power generated by fossil fuels.

South Korea plans to expand its renewable energy sources, with the anticipated gap likely to be filled by nuclear power. Given its value as a reliable and affordable renewable energy source, nuclear power is expected to become an increasingly critical point of focus for the government moving forward.

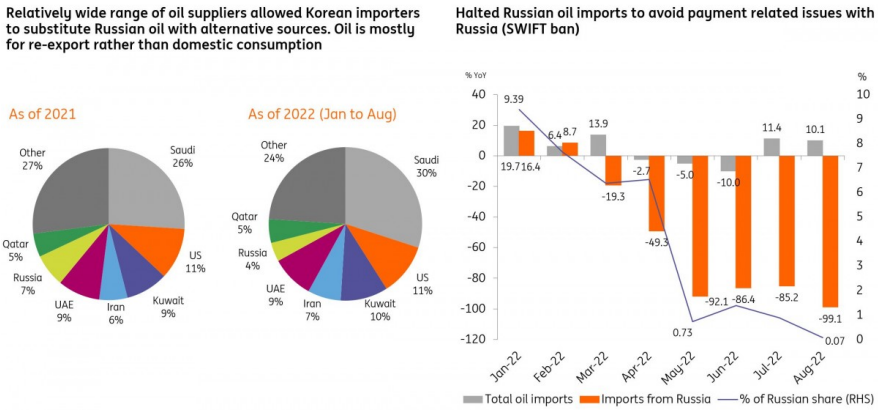
What's happened since the Ukraine war?

South Korea's imports of oil, coal, and LNG (in volume terms)



Source: CEIC

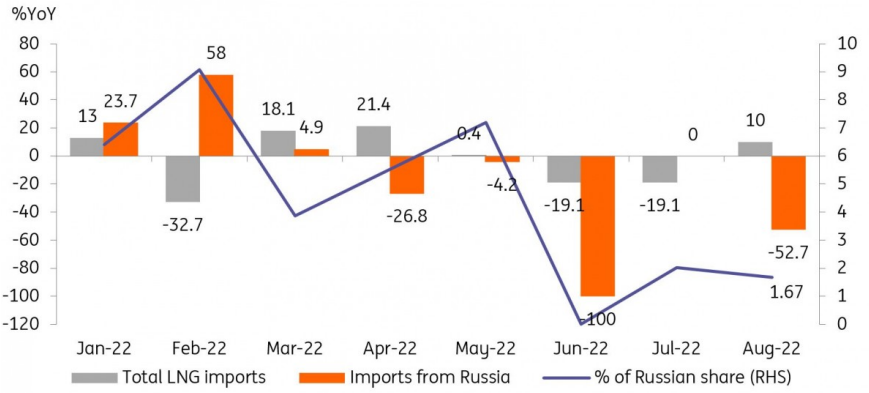
Oil has seen the most dramatic change



Source: KITA (Korea International Trade Association)

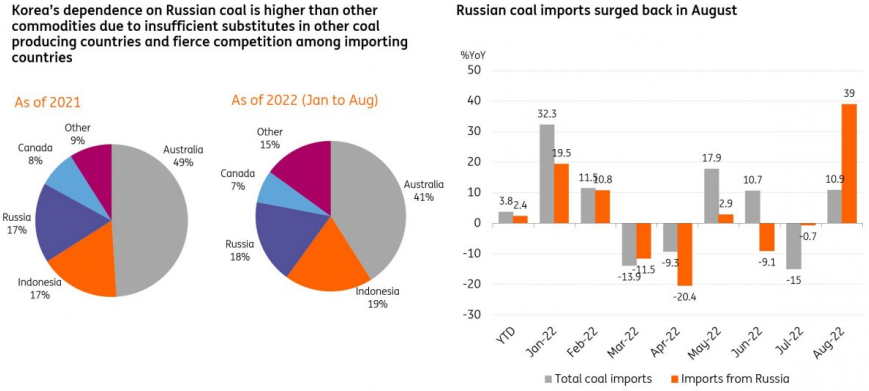
LNG: total imports volume declined -2.6% YoY due to high price

Russia's LNG import share significantly declined in 2022 and diversified imports sources 80% of LNG is provided under long-term contract



Source: KITA (Korea International Trade Association)

Coal: Russian import share actually increased in 2022



Source: KITA (Korea International Trade Association)

Author

Min Joo Kang
Senior Economist, South Korea and Japan
min.joo.kang@asia.ing.com

possession this publication comes should inform themselves about, and observe, such restrictions.