

Fossil fuel prices and inflation in South Korea



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Key findings

South Korea is highly dependent on fossil fuel imports and is exposed to global price volatility. The recent increase in global gas and coal prices has put pressure on Korea's state-run electricity sector, which relies heavily on fossil energy sources, and has driven up the cost of living. Oil import costs are cited by the Bank of Korea (BOK) as a key reason for rising inflation and the BOK expects prices could remain elevated "for a considerable period of time" (BOK, 2022). Amid a volatile global landscape and rising US interest rates, Korea's won has weakened significantly, which further raises the cost of importing fossil fuels.

Increases in the price of petrol, gas and diesel made an outsized contribution to inflation in South Korea this summer, accounting for a quarter of the annual inflation rate. Retail electricity prices, however, are not yet reflecting **the recent wave of global energy price increases due to regulated tariffs.** But Korea Electric Power Corporation (KEPCO), which has a monopoly on electricity supply, has recorded heavy financial losses, which may eventually need to be borne by the state. Recently, the Korean government approved an increase to electricity tariffs to counter KEPCO's skyrocketing deficit and further increases may be needed in 2023, if the gap between retail electricity prices and KEPCO's fuel costs becomes unsustainable.

The electricity market structure incentivizes ongoing reliance on imported fossil fuels. South Korea's electricity market has a cost-based mandatory pool system with a guaranteed fixed mark-up for electricity generators – regardless of fuel costs and emissions – and a state monopoly on retail electricity sales (KEPCO) (see box 1). In Korea, end users don't benefit from the lower costs of renewable electricity generation. Tariffs charged to industrial users don't reflect the full cost of fossil fuels. Electricity from renewables is priced at the wholesale market price, which is strongly influenced by the price of LNG, plus an additional certificate cost and is therefore more costly for users.

In addition, while renewables are highly competitive in South Korea, their lifetime cost per MWh hasn't fallen as fast as in other countries, partly due to complex permitting rules (Mayer Brown, 2022). The IEA and NGOs have called for a reform of Korea's wholesale electricity market to provide better incentives for renewables (IEA, 2021; SFOC, 2022).

Despite renewable energy being cheaper than new fossil fuel capacity, it is likely that South Korea will remain dependent on fossil fuels and therefore it will be exposed to macro-economic risks related to price volatility. IRENA data shows that lifetime cost of new renewables is now far below that of gas-fired power generation in Korea. However, Korea is far behind peer economies such as Japan and EU countries in terms of installed renewable capacity, and plans to build new capacity remain modest. Under South Korea's current plans, energy security risks remain high as does household and industry exposure to global fossil fuel price shocks.

With costs of renewables expected to fall further in South Korea, accelerating the deployment of renewables appears to be the right policy choice to support energy independence. However, this needs to be coupled with market reforms and streamlined regulatory processes.

Increasing the electrification of transport, industry and heating, coupled with an expansion of renewables, can significantly reduce household and business exposure to volatile fossil fuel prices, and limit the need for government intervention during times of high fossil fuel prices. Under the Green New Deal, future energy systems envisage a remodelling of public buildings and schools, the development of smart grids and eco-friendly vehicles. Extending these plans by investing in battery storage, green hydrogen and pumped hydro in order to eventually displace gas-fired peak load capacity, and revisiting the energy market structure could help bridge the gap to achieve the country's 2030 greenhouse gas emission reduction targets. Doing so would also help reduce South Korea's reliance on fossil fuels in electricity generation and reduce the risk of a deficit crisis for KEPCO.

Energy prices and inflation in South Korea

The world is experiencing a surge in the cost of living and corresponding inflation levels, which can be mostly attributed to supply-side factors. Soaring prices of fossil fuel-based energy preceded and accompanied this return to inflation in countries across the world. Many renewable energy sources are now cheaper than fossil fuels in electricity generation, especially for newly-built capacity (IRENA, 2022). However, many of these advantages are new and not fully understood across policy and investment landscapes. This paper sets out to explore the role of energy prices in inflation in South Korea, with a view to understanding the potential for faster energy transition measures to ease inflationary pressures and risks.

South Korea is highly dependent on fossil fuel imports

Korea's energy supply largely relies on fossil fuels: in 2018, 85% of Total Primary Energy Supply (TPES) in South Korea are from fossil fuels, 99% of which are imported (OECD, 2022). Due to the high dependence on imports, Korea has been seeking to diversify its oil and natural gas supplies, but in 2018 the Middle East was still the source of 70% of Korea's oil imports, and 43% of natural gas imports (IEA, 2020). In 2018, around 16% of Korean imports of oil products and 4% of its natural gas imports originated from Russia (ibid.). South Korea's electricity generation is also dominated by imported fossil fuels, with coal and gas contributing around 60% to the electricity generation mix. Renewables account for only around 10% of electricity production, which is much less than in other industrial nations such as Japan, Germany or Spain.

The energy market structure locks South Korea into its existing reliance on imported fossil fuels. South Korea's energy market has a cost-based mandatory pool system, a state monopoly on power market retail (KEPCO), and compensation schemes that essentially guarantees a fixed profit to electricity generators (see box 1). The resulting energy market is distorted, artificially boosting the competitiveness of fossil fuels, which leads to decreased incentives for industries to invest in renewables and does not incentivise consumers to curb electricity consumption (SFOC, 2022).

KEPCO is currently experiencing substantial financial strain due to increasing international fossil fuel prices, raising fears the company's deficit will increase and future costs could be passed onto consumers. Currently, the financial risks from higher wholesale system prices (see box 1 for more details) are born solely by KEPCO, with wholesale price increases not fully reflected in the electricity tariffs that Korean consumers are charged. With KEPCO's losses forecast to hit \$18bn in 2022 (Bloomberg, 2022a), it remains uncertain whether the Korean government will have to intervene to support KEPCO to fend off a financial crisis. Part of KEPCO's losses are currently mitigated through higher electricity tariffs, but KEPCO's remaining deficit is expected to be addressed through an increase in the bond issuance limit and/or direct government support with taxpayer money (SFOC, 2022).

The Korean government plans to increase energy efficiency and the share of renewables in power generation

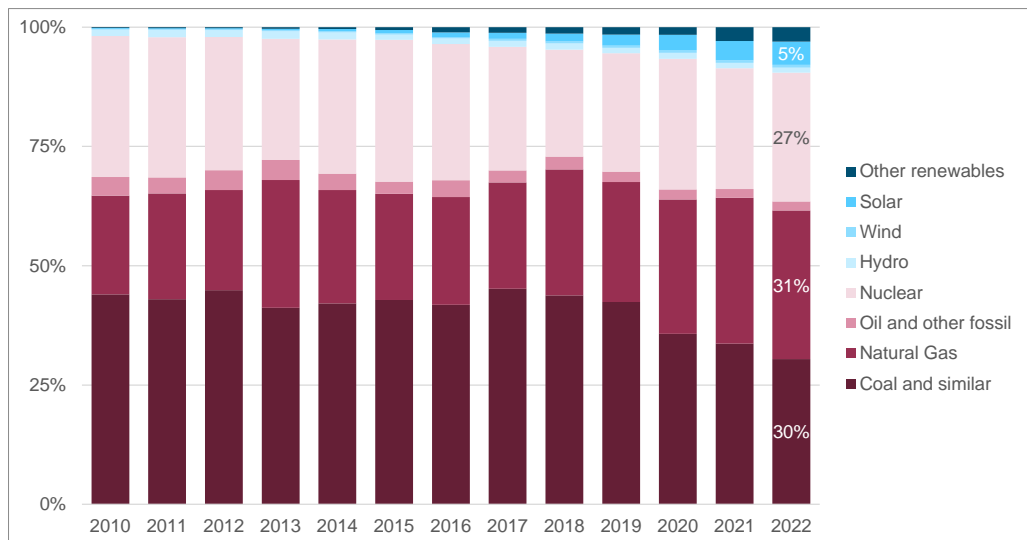
In the Third Energy Master Plan, the Korean government set out plans to reduce energy consumption through greater energy efficiency. The plan includes targets to reduce energy consumption by 18.6% compared to business-as-usual projections by 2040, in order to decrease energy imports and help stabilise the supply system (MOTIE, 2019).

The South Korean government is currently planning to expand the share of nuclear electricity production to 23% by 2030. Renewables are also expected to rise to 21.5% but coal and LNG will continue to play a substantial role, making up 21.2% and 20.9% of electricity used in 2030 (Yonhap News, 2022). Nuclear energy is the only major domestic energy source in South Korea, contributing roughly a quarter to Korea’s electricity production. Over 7,000 MW of new nuclear capacity is currently under construction. The Republic of Korea plans to reduce the number of coal fired power stations to help reduce emissions (IEA, 2020). This implies that energy production will have to come from other sources in the long term. The Yoon Suk-yeol government has stated that it intends to rebuild the Korean nuclear industry and support overseas expansion, while cutting Korea’s 2030 target for renewable energy production from 30% to 21.5%. This is a clear move away from the previous government’s path to meet the country’s climate goals, and global trends for faster renewables deployment (Bloomberg, 2022b).

Korea’s electricity production is strongly dependent on fossil fuels

Renewable energy sources only play a small role in South Korea’s electricity production, which is dominated by natural gas, coal and nuclear. In recent years, there has been some progress in the deployment of renewable energy sources, but their overall share in electricity generation remains small, as can be seen in Figure 1. Between 2018 and the first half of 2022, the share of renewables doubled, yet it remains below 10% of total electricity generation. Among renewable energy sources, solar PV has grown most in recent years, and now represents 5% of all electricity produced (first half of 2022). Wind and hydro power contribute only very small proportions to the electricity mix (ca. 1% each), meanwhile other renewables (namely, combustible renewable sources) account for roughly 3% of electricity production.

Figure 1 Electricity generation mix in South Korea, from 2010 to 2022 (Jan-May)



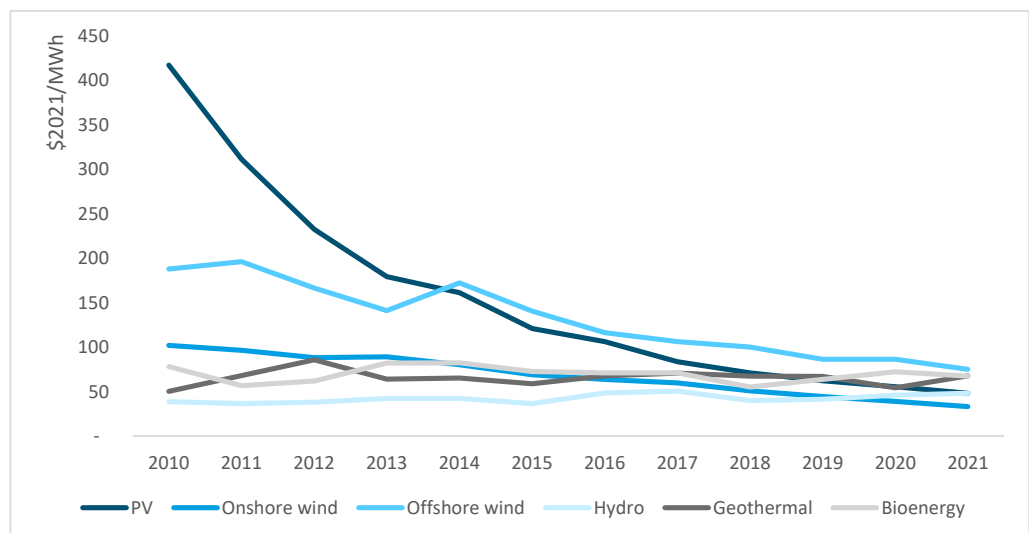
Source: IEA (MES_0522)

Coal and nuclear power provide the base load of the Korean grid, with a share of 30% and 27% respectively in the first half of 2022. Since 2019, the Korean government has sought to reduce the share of coal in electricity generation and increase the use of natural gas, by raising coal import taxes and lowering those on natural gas imports (IEA, 2020). As a result, the share of coal in electricity generation has declined (down from 44% in 2010 to 30% in 2022), and has been largely replaced by growing natural gas-fired electricity generation, which grew to 31% in 2022, up from 21% in 2010 (Figure 2). This has been supported by an increase in LNG imports.

The cost of renewables has consistently gone down

The lifetime cost of renewables is now below that of fossil fuel-based power generation including gas. The levelized cost of electricity (LCOE) of renewable energy technologies has been decreasing globally, as shown in Figure 2. The largest drop has been observed in the lifetime costs of solar photovoltaic power generation, which has fallen by 88%, from a global average cost of \$417 to \$48 per MWh (2021 prices). Similarly, offshore and onshore wind project costs have reduced by 60% and 68%, respectively. At the same time, the LCOE of fossil-fuel based electricity generation has remained largely unchanged until late 2021 (IRENA, 2022).

Figure 2 LCOE of renewable energy sources globally, 2010-2021 (in constant \$2021/MWh)



Source: IRENA, 2022

Note: Global weighted average of commissioned projects

Incentives to invest in renewables are lacking. New onshore wind projects and utility scale solar PV in South Korea were among the most expensive globally. Even though the costs of installing new renewable capacity is higher in South Korea than in most parts of the world, both wind and solar PV are highly competitive compared to fossil fuel-based alternatives (Figure 3). Their lifetime costs per MWh are only a fraction of the cost per MWh of gas-fired power plants, which are estimated at \$180 per MWh in 2022, almost three times as high as new wind power (IRENA, 2022). However, in the South Korean market, the cost per MWh of different technologies has little impact on the final price, due to the existence of a de-facto link between wholesale electricity prices (System Marginal Prices – SMP) and the cost of LNG-based electricity generation. Specifically, the Renewable Energy Portfolio Standard (RPS) mandates that large generators of over 500MW produce a fixed

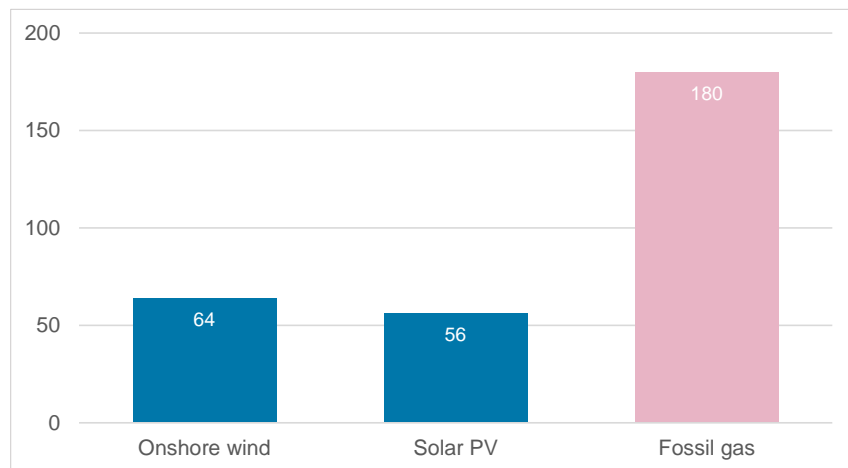
percentage of their energy from renewables (IEA, 2020a). Under the scheme, the price for renewable energy is calculated by adding the System Marginal Price (de-facto set by the gas price) and the Renewable Energy Certificate price. This price is ultimately set by large generators through their market power. This means that while industrial consumers continue to enjoy cheap fossil fuel-based electricity through their industrial tariffs, renewable energy, which is technically cheaper as it does not require purchasing fossil fuels, is priced out of the market (SFOC, 2022a).

The cost of renewables is likely to fall further in South Korea

South Korea’s policy settings contribute to the lifetime cost of solar PV and wind power being more expensive than in comparable countries.

Similar to the global trend, the LCOE of utility-scale solar PV projects have been falling in South Korea: between 2010 and 2021, lifetime costs per MWh decreased by 88% (from \$451 to \$56 per MWh). However, the costs of newly launched onshore (\$64 per MWh) and offshore wind (\$180 per MWh) projects are currently higher than in other developed countries. One of the reasons for this is the slow roll-out of wind power capacity in South Korea, which is a result of complex administration requirements, limited risk sharing by the government and consequently little progress in the development of a national wind power supply chain (Mayer Brown, 2022). Given South Korea’s ambitious offshore wind capacity targets and the current cost differential between the Asian and European average LCOE of new offshore wind capacity (\$83 vs. \$65 per MWh, respectively) (IRENA, 2022), it can be expected that costs in South Korea will continue to fall over the coming years. Regulatory changes, streamlined government permitting processes and increased government involvement in site selection should also help to bring offshore wind development costs down and closer to project costs in European countries (Mayer Brown, 2022).

Figure 3 Lifetime cost (LCOE) per MWh of new onshore wind and solar PV projects in commissioned in South Korea in 2021; fuel-only cost of gas-fired power plants in South Korea in 2022; all in 2021\$



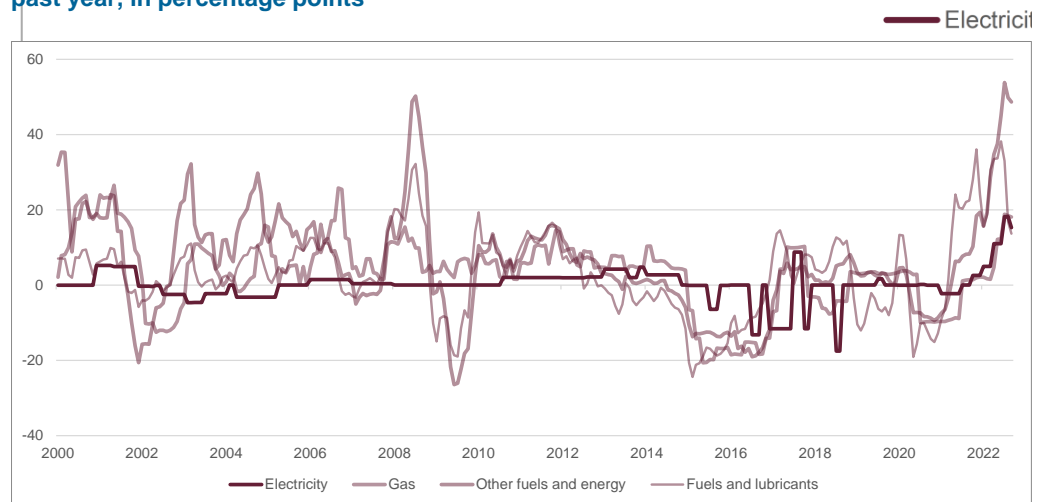
Source: IRENA 2022

Burdensome permitting processes are responsible for around 23% of the lifetime cost of renewables. This suggests that significant regulatory burdens and complex processes are a key driver of the higher cost of new renewable projects in South Korea compared to the EU or China. Offshore wind projects often take over seven years to obtain the necessary permits, and municipal permit regulation can present an important bottleneck both for wind and solar PV (Korea Energy Economics Institute, 2017).

Retail fossil fuel prices have been more volatile than electricity prices

Over the last 20 years, retail fuel and gas prices have been more volatile than retail electricity prices largely due to KEPCO’s monopoly. Figure 4 shows price changes for retail electricity (dark red line), as well as gas, ‘other fuels and energy’, and transport fuels and lubricants (pink lines) in each month. The evolution of retail electricity prices in South Korea has been much smoother over the last decade compared to retail fossil fuel and gas prices, which display greater price swings, a result of government control of electricity tariffs through the state-owned energy distributor KEPCO. While there are some step changes in the annual change in electricity prices between 2014 and 2018, the magnitude of the price change is far smaller compared to that of household and transport fossil fuels.

Figure 4 Price changes for electricity, gas and other fuels over the same month in the past year, in percentage points



Source: KOSIS 2022

But KEPCO’s monopoly has not been able to stop retail electricity price volatility in the face of the global energy crisis. Prices have been increasing since 2021, as can also be seen in Figure 4. In 2022, KEPCO raised retail and industrial electricity prices several times. Tariffs are now nearly 18% higher than at the end of 2021 (Nikkei, 2022). KEPCO has recently come under pressure due to soaring global energy prices and the weakening won, which hit a 13-year low against the US dollar (ibid.), and further increased the cost of energy imports.

Table 1 shows the retail price volatility (by reporting the standard deviation) and the average monthly price change for electricity, gas and key transport fuels, based on KOSIS data from 1995 to today. The volatility and price growth of the analysed energy sources exceeded the volatility and increase in overall consumer prices in South Korea over the past 27 years.

Electricity was the least volatile energy source in South Korea between 1995 and mid-2021 but then the energy crisis hit. Among key energy prices, the month-on-month change in electricity prices had the lowest standard deviation for the 1995 to July 2021 period and by far the smallest average monthly price change. The main reason for this is government control of electricity tariffs (see Box 1). However, since August 2021, electricity prices have been more volatile than petrol and diesel prices in South Korea, as can be seen from the much higher standard deviation of month-on-month electricity prices in Table 1. Since August 2021, the average monthly price change of electricity has increased from a historical average of 0.03% to 2.7%,

as shown in Table 1. This is unusual for households, which are rarely exposed to price changes of this magnitude.

There is increased uncertainty relating to future retail gas prices, as the government is now allowing Korea Gas Corporation (KOGAS) to pass on more of the global increase in gas prices to consumers. The recent price rises are the result of heightened pressure on energy security as Seoul's reliance on imports increased and the need to bridge the widening gap between the cost of LNG imports by KOGAS and the retail price of gas. The strain put on KOGAS by the widening gap between the import cost and the retail price was risking disruptions to South Korean LNG imports (S&P Global, 2022a).

Petrol and diesel prices have increased rapidly since August due to international market pressure. Despite recent fuel tax cuts introduced by the Korean government, the higher global market prices for energy since the war in Ukraine are clearly feeding through to retail prices for petrol and diesel.

Table 1 Standard deviation and average monthly price change for electricity, gas and fuels

	1995-2021:M7		2021:M8-2022:M7	
	Standard deviation	Average monthly price change (%)	Standard deviation	Average monthly price change (%)
Electricity	3.29	0.03	7.01	2.69
Gas	2.47	0.33	2.39	1.32
Other fuels	4.84	0.56	3.27	3.15
Gasoline (petrol)	3.27	0.39	5.95	0.54
Diesel	5.12	0.69	6.55	2.11
LPG for cars	4.37	0.48	3.67	0.82
All items	0.42	0.22	0.24	0.45

Source: KOSIS 2022

Note: The data series analysed are the month-on-month changes in the sub-indices of the consumer price indices

Box 1: Electricity price setting in South Korea**Wholesale**

Korea uses a cost-based mandatory pool to determine the wholesale price of electricity. In this system, prices strictly follow monthly marginal generation costs, limiting the flexibility of generators to set prices. More than 97% of power consumed is the result of trading in the spot-based CBP power market, operated by the Korea Power Exchange (SFOC, 2022).

In the Korean system, electricity generators offer price-quantity pairs that form the electricity supply. The price is based on predetermined variable costs, reported by generators on a monthly basis directly to the Korea Power Exchange (IEA & KEEI, 2021). Variable costs commonly include fuel costs. A dispatch mechanism which takes into account system and generator constraints is then used to assess whether the resulting price setting schedule can secure operation. Nuclear energy has been commonly dispatched first, followed by coal LNG and oil. The System Marginal Price (SMP) is formed by the fuel cost of the generator at the point where demand and supply meet. LNG generators fuel costs decide the SMP.

The compensation system for electricity generators adds another layer of complexity to electricity price setting in South Korea. The cost-plus markup system guarantees revenues for the main, KEPCO-owned electricity generators (GENCOs) that cover fuel costs, capital cost and an adequate return on investment. This system provides no incentive to GENCOs to adapt their power mix to tightening environmental standards and protects them from rising fossil fuel costs, by guaranteeing a risk-free return on investment.

Traditionally, the Korean cost-based system has not accounted for factors such as emissions and system security. This has resulted in diminished incentives for investment in clean technologies that could also promote greater energy independence, such as renewables. Instead, the pricing system has historically favoured low fuel cost technologies, such as coal-fired generation (IEA, 2021).

In January 2022, South Korea released a plan to reform the power system which would reflect the cost of purchasing greenhouse gas emission rights from power generators in the market. This is expected to increase the competitiveness of renewables, but current high fossil fuel and SMP prices mean that the impact of the measure is likely to be small (Seol, et al., 2022; Electimes, 2022a).

Retail

Retail electricity prices are regulated by the Ministry of Trade, Industry and Energy (MOTIE), based on procedures governed by the Electricity Utility Act and the Price Stabilisation Act (IEA, 2020). South Korea's system of electricity tariffs is complex and is comprised by six tariff categories – residential, commercial, educational, industrial, agricultural, and street lightning. Final retail electricity tariffs faced by consumers can also vary depending on voltage, season, time of the day and rate choice.

Structure of energy industry

There are six major electricity generation companies in South Korea, as well as smaller independent power producers and community energy systems. A single entity, KEPCO, is responsible for the distribution and almost all retail sales of electricity, which it purchases from the Korea Power Exchange (KEPCO, 2022). The gas industry of South Korea relies primarily on LNG imports which are controlled and managed by the Korea Gas Corporation (KOGAS). KOGAS also maintains a monopoly in the domestic wholesale market. KOGAS supplies both power generation companies and city gas companies.

All household energy prices have increased significantly since 2021.

Table 2 presents the increase in retail prices for electricity, gas, other fuels and energy, gasoline (petrol), diesel and LPG used for cars over the past 6, 12, 24 and 30 months as of September 2022. Since September 2020, liquid fossil fuel prices have risen more sharply than electricity prices. The increase in domestic liquid fossil fuel prices reflects rising international oil prices.

Table 2 Recent changes in household electricity, gas, other fuels and energy, gasoline, diesel, LPG (for cars) prices in South Korea

As of September 2022, Change since:	March 2022 (last 6m)	September 2021 (last 12m)	September 2020 (last 24m)	March 2020 (last 30m)
Electricity	12.4%	15.3%	15.3%	15.3%
Gas	17.0%	18.1%	19.8%	7.6%
Other fuels and energy	18.8%	48.7%	60.9%	47.4%
Gasoline	-10.2%	5.2%	27.3%	16.3%
Diesel	2.0%	28.4%	58.9	41.8
LPG (for cars)	-3.0%	7.2%	36.8	20.0
All items (overall inflation)	2.7%	5.6%	8.1%	9.0%

Source: KOSIS 2022

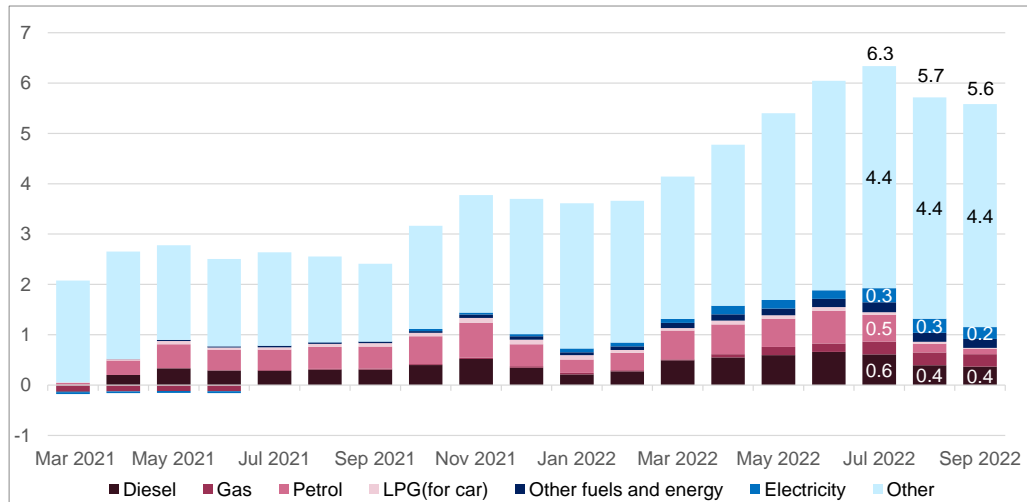
Retail energy prices are a key component of South Korea's consumer prices index. Household energy accounts for roughly 6% of the overall basket of goods and services included in the consumer price index – based on the long term CPI weights of each sub-component. Gas and transport fuels account for 4.9% and electricity for 1.5%. In September 2022, gas and transport fuels' contribution to CPI has jumped to 16.6% and electricity to 4.2%.

Over the summer of 2022, fossil fuels (petrol, diesel, natural gas, LPG) were a key driver of consumer price inflation in South Korea. Fossil fuels – excluding electricity contributions – contributed around 26% to the overall annual rate of inflation in July 2022. In June and July 2022 fossil fuel prices contributed strongly to the annual rate of consumer price inflation, accounting for 25.9% of the aggregated increase in consumer prices. This is significantly above their weight in the CPI basket, which is around 5%. As a result of cuts to fuel taxes, the contribution of fossil fuels in the annual inflation rate reduced to 16.6% in September 2022. During the same period, retail electricity prices contributed between 4.2% and 4.4% to overall CPI, nearly three times higher than the value of the CPI weight, 1.5%.

South Korea has been battling with rising inflation in recent months, as a result of rising energy prices and a weakening national currency (Reuters, 2022). The South Korean consumer price index (CPI) has been rising since March 2021. The annual rate of change in consumer prices rose from 1.9% in March 2021 to 4.1% in March 2022, and over 6% in July. The contribution of petrol, electricity, gas and diesel to the annual inflation rate grew from close to zero in March 2021 to 0.6 percentage points for diesel alone, and 0.3 percentage points from household gas. Latest CPI estimates place the annual inflation rate at 5.5% in September 2022, down from 5.7% in

August, and 6.3%, largely due to government intervention to reduce the cost of energy.

Figure 5 Contribution of electricity and key fossil fuels to consumer price inflation in South Korea, in % points



Source: KOSIS

Historically, household spending on energy in South Korea has remained largely stable.

Household spending on energy is primarily comprised of the cost of household gas and electricity, and both are under tight government control as described in Box 1. Recently, spending on energy has been rising, as the state-controlled energy suppliers KEPCO and KOGAS are increasingly passing on higher global market prices for energy to retail consumers. Despite historically stable prices, energy poverty in the South Korean capital has been on the political agenda since the 2000s. Energy voucher schemes, energy price schemes and building retrofit projects are being used in Seoul as a way to alleviate energy poverty. Yet, according to Hwang, Park and Baek (2020) 12.5% of low-income households in Seoul are facing twice the median share of energy expenditure in income.

Poor households spend a higher share of their incomes on energy

Low-income households spend a larger share of their disposable income on energy than richer households.

For all households, the share of energy in total household disposable income remained stable in the period between 2003-2013, and fell slightly to 2018. Since 2018, however, the difference in the share of household spending on energy between different income groups has widened. In 2021, the share of spending on energy was only 3.7% for the richest households but 10.4% for the poorest 20%. This is shown in Figure 6.

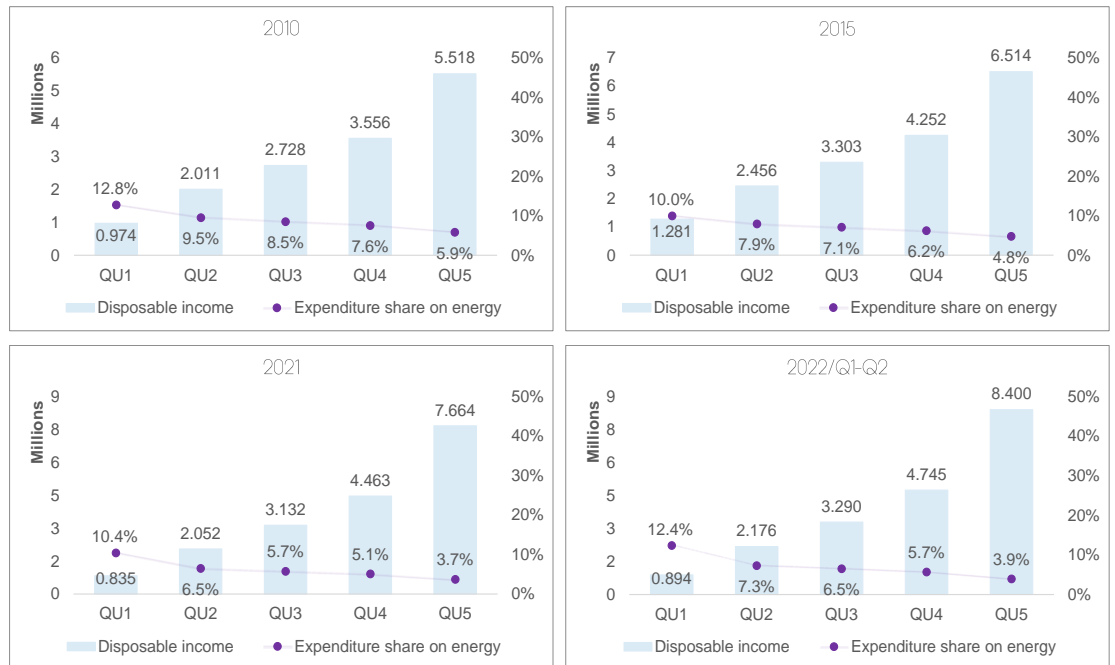
The share of household spending on energy has risen significantly since 2021, in particular for low-income households, and this is largely due to higher fossil fuel prices.

Back in 2020, due to the drop of fossil fuel prices during the Covid-19 pandemic, household spending on energy compared to disposable income decreased. Since July 2021, however, key energy prices have increased by almost 29%, while consumer prices overall have increased by roughly 6%. The relative impact of higher energy prices in 2022 varies across different income groups. For poorer households, the share of expenditure on energy compared to overall disposable income has increased by 2 percentage points compared to 2021. Based on CPI data as of August and September 2022, around three quarters of that 2 percentage point increase can be attributed to higher fossil fuel prices, and the remainder to electricity prices. For richer households, the share of energy expenditure in

household disposable income has risen by only 0.2 percentage points, based on data from the household income and expenditure survey for the first two quarters of 2022.

We estimate that the poorest 20% of households now spend over 12% of overall disposable income on energy, up from 10% in 2021, or around 287,000 won (\$215) more per year. In other words, poorer households now spend around 19% more on household energy than in 2021, and over three times more than the richest households relative to overall living expenses. Average households are estimated to spend around 410,000 won (ca. \$300) more on energy in 2022 than in 2021. This represents an increase from 5.7% to 6.5% of their total disposable income. For richer households, energy spending is up 550,000 won (ca. \$415) in 2022, making up 3.9% of total disposable income, up from 3.7% in 2021.

Figure 6 Household disposable income by quintile and expenditure on household energy and transportation fuels as a share of total disposable income (in current won)



Sources: Statistics Korea, Household Income and Expenditure Survey. DT_1L9U003, DT_1L9R003, DT_1L9U003

Note: Figures for 2010 and 2015 exclude single person households and farms. In 2021 and 2022, all households are included, and figures for 2021 and 2022 (H1) are directly comparable.

Korea’s government is intervening to reduce the adverse impacts of energy price hikes

The Bank of Korea (South Korea’s Central Bank) has recently tightened its monetary policy to strengthen the won and help combat inflation. The Korean won fell to a 13-year low against the US dollar in September 2022 which contributed to inflation due to higher import prices (Financial Times, 2022). This is compounded by the fact that South Korea is heavily reliant on fossil fuel imports (99% of all fossil fuels are imported), and therefore the high prices of fuel disproportionately impact inflation within South Korea. According to the Bank of Korea, higher oil prices were one of the drivers behind the decision to raise interest rates (BOK, 2022). Currently, inflation appears to be under control, with the annual rate of inflation falling slightly to 5.6% in September 2022 (Financial Times, 2022a). However, given the strain that energy prices exercise on the overall price index, reducing the country’s

reliance on fossil fuels could reduce the impact of energy prices on South Korea's inflation rate in the long run.

In response to inflationary pressure from surging energy costs, the South Korean government decided to extend tax cuts on fuel consumption. The July 2022 cuts effectively meant a decrease of the retail gasoline price by 57 won per liter (equivalent to \$0.04 per liter), diesel dropped by 38 won per liter (\$0.02 per liter). Taxes make up close to 50% of retail gasoline prices and 40% of diesel. This tentative measure will remain in place until the end of 2022, reducing the cost of gasoline, diesel and liquified petroleum gas (LPG) to end consumers, but electricity tariffs are expected to rise further (S&P Global, 2022b). The total cost of the price stabilizing measures, which the tax cuts are a part of, is close to 3.1 trillion won (around \$21.7 billion) (Financial Times, 2022b).

The full potential of renewables to reduce the cost pressures that consumers and industry face in South Korea can be difficult to identify, as it is largely determined by market structures and policy provisions. For example, energy production in South Korea greatly relies on imports that are subject to international market oscillations. Rising global fossil fuel prices push up local electricity prices (BOK, 2022). A reduction in import dependence through an increase in the share of renewables in the electricity mix could reduce wholesale energy price volatility in South Korea and potentially bridge the gap between retail and wholesale prices. The latter can alleviate some of the pressure felt by the national electricity provider, KEPCO, that is reporting heavy losses. KEPCO's losses are expected to exceed \$18 billion for 2022 (Bloomberg, 2022a).

Conclusions

Rising petrol, diesel and gas prices have recently made significant contributions to consumer price inflation in Korea. However, compared to other countries, South Korea seems to be less affected by the impact of inflation from global rising fossil fuel prices, despite its heavy reliance on imported fossil fuel energy sources. This is largely due to government regulation of electricity tariffs through the country's sole utility firm, KEPCO, which is amassing huge losses as a result of the mismatch between tariffs charged to consumers and the rising cost of procuring gas and coal from international markets.

In the short term, Korean consumers are feeling only a limited financial burden from rising global fuel prices. In the long term, however, the government will need to find ways to finance KEPCO's inability to meet its costs and service the growing debt being accumulated – which is likely to result in the use of taxpayer money to support the company.

Korea's current electricity market setup and policy direction incentivizes ongoing reliance on fossil fuels. Incentives for generation companies to transition towards clean and low-carbon energy sources are lacking in Korea and government's new plans for the energy transition is steered towards nuclear energy as a path to energy independence and lower emissions. Moreover, the Yoon administration's new energy policy includes a plan to decrease its 2030 renewable target to 21.6% from 30.2% set by the previous government, contrary to global market trends that favour a swift rise of renewables coupled with a phase-out of fossil fuel. This means that the current level of exposure of Korean households, industry and the electricity sector to volatile global market prices is unlikely to be reduced much over the coming year, while macro-economic risks of sudden inflationary pressure through energy price hikes persist.

The IEA and NGOs have suggested that Korea should seek to reform its electricity market to facilitate investment in renewables, which would build up domestic energy supply and reduce the country's energy import dependence. In the long run, reducing the Korean economy's dependence on fossil fuels across industry and households would benefit consumers by reducing their exposure to volatile global market prices.

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