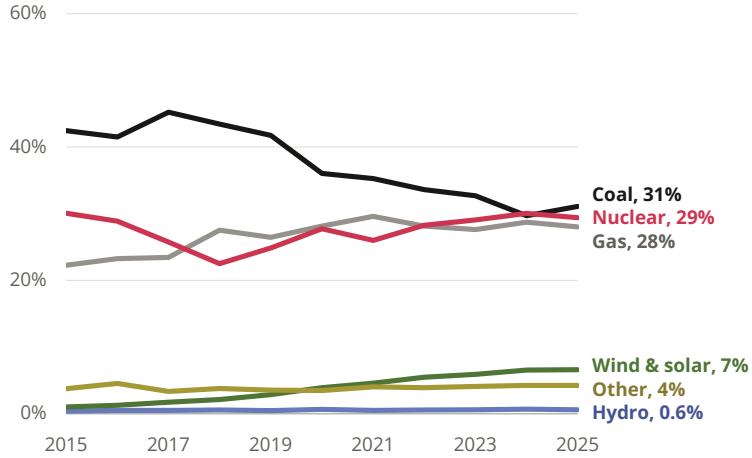
South Korea at a glance

South Korea is reframing the energy transition as an industrial competitiveness and energy security agenda, pursuing decarbonisation through a pragmatic and managed transition.

Key transition conditions: Political will and conglomerates' growing clean energy role drive change, but fossil-dependent industries, grid constraints and high renewable costs limit readiness.

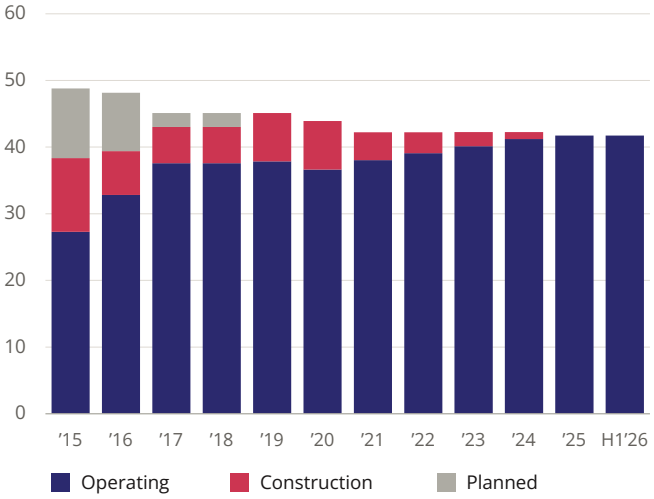
Electricity generation by source

2015–2025

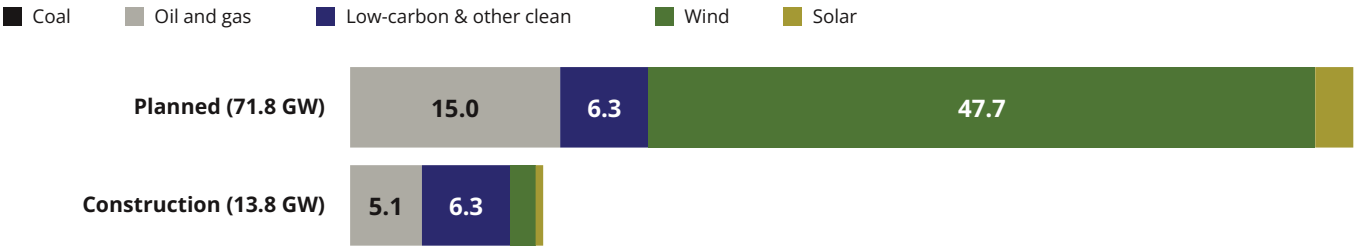


Coal capacity by status

GW, 2015–H1 2026



Capacity under development by source



Solar 2.7 GW (planned) · Wind 1.8, Solar 0.5 GW (construction)

Power system landscape

About **60%** of electricity and over 80% of energy came from fossil fuels in 2024. Nuclear and coal each supply around 30% of power, renewables a modest 10%. Korea is the 5th-largest LNG importer and 4th for crude and coal.

Clean transition trends

Plans target **100 GW** of renewables by 2030 and a coal phase-out by 2040, pledged at COP30 alongside joining the Powering Past Coal Alliance. The 2026 Hormuz crisis has recast the transition as industrial security.

Enablers and bottlenecks

The government has a mandate for renewables and KEPCO reform, and conglomerates are moving into batteries and EVs. But transmission lags, curtailment is growing, and around **60%** of public export finance backs global gas infrastructure.

Opportunities for international cooperation with *South Korea*

- **RE100 demand makes the industrial case for renewables:** cooperation can support grid access guarantees and deployment for strategic industries, alongside the West Coast Energy Highway.
- **The 2040 coal phase-out is a key policy anchor:** credibility rests on closure schedules for the 21 undecided units and clarity on 20 plants designed to run beyond 2040.
- **Keeping fossil fuel options flexible supports security:** shorter-tenor LNG in place of twenty-year contracts, with investment directed to grids, storage and offshore wind.

Sources: *Ember annual electricity data; Global Energy Monitor annual capacity charge data and coal plant tracker data*

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This country profile was produced as part of the report *Powering Across Divides – Clean energy cooperation in a fragmented world*, published November 2026. The full report is available from **https://www.e3g.org/publications/powering-across-divides-clean-energy-cooperation-fragmented-world/**

South Korea's profile

Outline and domestic political economy context

South Korea relies heavily on fossil fuels for its energy needs, with around 80% of its total energy supply coming from fossil fuels and approximately 60% of its electricity generation in 2025.[1] Coal accounts for 32% of electricity generation, followed by nuclear (29%) and gas (26%), while renewables contribute a comparatively small share (7%). South Korea is developing its 12th Basic Plan for Electricity Supply and Demand, integrating roadmaps and targets to reach 100 GW of renewables by 2030 and a coal phase-out by 2040,[2] as committed to at COP30 when it also joined the PPCA. However, implementation gaps remain, with clean energy progress sitting alongside heavy official reliance on nuclear power as a dominant baseload source and continued dependence on fossil gas and coal.

South Korea's centralised power-market structure presents challenges for renewable integration. Korea Electric Power Corporation (KEPCO) controls transmission and distribution networks and is the main electricity purchaser, while its five generation subsidiaries account for a substantial share of conventional power generation. Existing dispatch arrangements favour baseload generation over flexible resources, and the proposed merger of these subsidiaries introduces further uncertainty over its implications for grid access, competition and the integration of renewables.[3]

South Korea is a net importer of fossil fuels – one of the world's largest importers of crude oil (fourth), coal (fourth) and LNG (fifth) – and a net exporter of oil products.[4] Because the country has no cross-border pipelines and produces virtually no domestic coal and gas, or any substantive amount of oil, it relies almost entirely on maritime tanker shipments for all its fossil fuels to meet its massive industrial and power generation needs. In 2025, South

[1] IEA, 2025, **Korea** (webpage, accessed 7 August 2026)

[2] Argus Media, 2 February 2026, **South Korea sets out 2026 energy transition plan**; Ministry of Climate, Energy, and Environment, 15 August 2026, **Shifting to an Electricity-Based Nation: Policy Discussions on Electricity Demand and Renewable Energy Deployment Outlook 4th and 5th Policy Forums for the 12th Basic Plan Held**

[3] The Korean Times, 19 June 2026, **Public power generation firms' proposed merger sparks debate**

[4] IEA, 2025, **Korea** (webpage, accessed 7 August 2026)

Korea imported approximately 70% of its crude oil and 20% of its LNG from the Middle East,[5] with 95% of these imports passing through the Strait of Hormuz.[6]

Given that South Korea imports almost all its fossil fuels, reducing external vulnerability matters as much as climate logic, with the transition increasingly framed around energy security, economic resilience and industrial competitiveness. Current frameworks treat gas not as an open-ended bridge fuel but as a managed transition asset, leveraging its flexibility to balance short-term swings in nuclear and coal-fired generation while prioritising a structural shift towards a more self-reliant, zero-emission energy mix. The 2026 Hormuz crisis has sharpened this logic considerably: the near-simultaneous disruption of crude oil supply, naphtha input for petrochemicals, and LNG imports exposed the degree to which Korea's energy vulnerability and its industrial competitiveness risk are one and the same problem. The policy implication being drawn is not simply power sector resilience but a broader reframing of the energy transition as industrial security, as well as accelerating the shift to domestic clean energy, as a structural hedge against geopolitical chokepoints. However, because of this very dynamic, the challenges remain twofold: decarbonisation of the power system itself and of industrial sectors.

South Korea's economy is export-driven, with manufacturing above one-quarter of its GDP.[7] It was built on state-directed industrialisation in energy-intensive sectors (the eleventh-highest in manufacturing intensity globally in 2024),[8] such as steel, petrochemicals, shipbuilding, semiconductors and automotive. Its major industrial conglomerates are increasingly positioning themselves as key players in global battery technology and EV supply chains, pursuing significant commercial opportunities in green industries.[9] However, this growing engagement with clean technologies does not fundamentally alter the structural dependence on fossil fuels embedded in South Korea's established industries, making decarbonisation economically and politically costly. Steel production, petrochemical output and the refining industry all depend on fossil fuels not only as energy sources but as primary input materials. For instance, in 2024, South Korean refiners exported a near-record 490 million barrels of petroleum products worth US$45 billion, with over half of all imported crude re-exported as refined fuel.[10] South Korea's shipbuilders also play a leading role in the midstream of the value chain, capturing around

[5] Korea International Trade Association. 3 March 2026, **Korea's Imports depend on the Middle East for 70% of crude oil and 20% of LNG, raising concerns about the impact of a closure of the Strait of Hormuz on Korean industries (韓 원유 70%·LNG 20% 중동 의존…호르무즈 해협 막히면 韓산업 타격 우려)**

[6] Korea International Trade Association, 3 March 2026, **Inflationary pressure on oil prices as a blockade of the Strait of Hormuz looms… South Korean industry on high alert (호르무즈 해협 봉쇄 현실화에 유가급등 조짐…韓 산업계 '비상')**

[7] World Bank Group, 2025, **Manufacturing, value added (% of GDP) – Korea, Rep.** (webpage, accessed 7 August 2026)

[8] IEA, 2024, **Korea** (webpage, accessed 7 August 2026)

[9] IEA, May 2025, **Global EV Outlook 2025**

[10] The Korea Times, 3 February 2025, **Korea's exports of gasoline, diesel hit record high in 2024**

88% of global LNG carrier orders;[11] the government itself directs around 60% of public export finance towards global gas infrastructure,[12] further disincentivising the transition it officially supports.

In South Korea's industrial sectors, a transition requires not only replacing the power source but also the primary input material itself. This makes the transition fundamentally more disruptive to business models, as well as more capital-intensive, and more dependent on technologies such as green hydrogen, bio-feedstocks and carbon capture utilisation that are not yet commercially scaled. Substitution pathways remain immature and costly, and slow uptake of renewable energy means the preconditions for either transition (power sector and industrial) are not yet in place. Institutional memory of previous disorderly industrial collapse – epitomised by the 2016 Hanjin Shipping bankruptcy and its cascade of unemployment and state bailouts – also means policymakers are acutely averse to rapid, unmanaged sectoral decline.

Coal accounts for around one-third of generation in South Korea's power sector, but rapid plant closures remain politically and operationally difficult unless replacement capacity is demonstrably reliable. This reinforces a reliability-first approach to planning, particularly given the economy's long-standing dependence on abundant, stable and relatively low-cost fossil-based electricity to support manufacturing exports. The core tension is therefore between an industrial growth model built around affordable power and a transition that requires major investment in clean generation, transmission infrastructure, storage and more complex system coordination. Grid congestion, and a material lag in transmission expansion, further sharpen this tension: renewable resources are concentrated in coastal and rural areas, while industrial demand is centred in the northwest Seoul–Gyeonggi region and the southeastern Ulsan–Pohang corridor.[13] The issue is compounded by how South Korea's power market is designed: structured around baseload and must-run generation, it provides insufficient incentives for storage and the flexible resources needed to integrate renewables; curtailment of already-connected capacity is a growing problem that market reform has yet to resolve.[14] Local resistance to offshore wind farms and solar arrays deepens the bottleneck, as communities are concerned about land use,[15] marine livelihoods[16] and limited local benefits.[17] Coal-producing regions also highlight the need for credible just transition policies that provide

[11] Maritime Gateway, 20 May 2026, **Korean Shipyards Secure 10 LNG Carriers Worth $1.8 Billion**

[12] Solutions For Our Climate, 18 March 2026, **[Press Release] Hormuz Blockade lays bare structural limits of fossil fuel reliance in South Korea and Japan**

[13] Institute for Energy Economics and Financial Analysis, 2025, **Bottlenecks to Renewable Energy Integration in South Korea** (PDF)

[14] Solutions for Our Climate and Regulatory Assistance Project, 2026, **Reforming South Korea's Power Sector** (PDF)

[15] Solutions For Our Climate, 13 May 2026, **[Statement] South Korea's new Agrivoltaics Act: A Legal Milestone Shadowed by Land-use Barriers**

[16] Seona Park and Sun-Jin Yun, 2024, **Energy justice: Lessons from offshore wind farm siting conflicts in South Korea**, Energy Policy 185 (185), 113972, **10.1016/j.enpol.2023.113972**

[17] Institute for Energy Economics and Financial Analysis, 2025, **Bottlenecks to Renewable Energy Integration in South Korea** (PDF)

employment continuity and regional economic renewal, alongside plant closures. Roughly half of South Korea's coal capacity is located in South Chungcheong, a province already lagging behind in wages and employment, yet replacement generation and associated investment are often located elsewhere,[18] leaving unresolved questions over employment continuity and regional economic renewal.[19] Together, these spatial, structural, economic and distributional pressures reinforce a preference for a gradual, administratively managed transition over rapid market-led disruption.

Summary of key domestic transition factors

- **Key enabling factors include South Korea's political will and industrial conglomerates' growing involvement in the clean energy side of the transition**. South Korea's strategic prioritisation of semiconductors, AI and data centres could also accelerate the transition, as their expansion increases the need for abundant, reliable and increasingly clean electricity. This can strengthen the industrial case for faster renewable deployment and grid modernisation – provided demand growth does not default to nuclear expansion or coal retention as the path of least resistance. The Lee administration currently demonstrates strong political will to transition, with an explicit mandate for renewable energy and with institutional reforms to KEPCO's single-buyer model.

- **The main constraining factors are South Korea's low structural readiness.** Energy-intensive industries remain structurally entwined with fossil fuels as both fuel and input. KEPCO and the Korea Gas Corporation have historically prioritised supply stability and resisted market reforms, a concern heightened by the September 2026 announcement to merge KEPCO's five generation subsidiaries into a single 53 GW entity, which risks further fossil fuel entrenchment and weakens market signals for a renewable-led system.[20] Grid constraints and high cost of renewable deployment – driven by land scarcity, complex permitting, high capital costs and local opposition[21] – also mean that the economic case is still being made rather than won.

[18] Invest Korea, 9 September 2025, **Saemangeum National Industrial Complex, Emerging as a Hub of Future Industries and Renewable Energy**

[19] Sehoon Kim et al. 2025, **Leaving Someone Behind: Coal Phase-Out in South Korea**, Development Studies Series DS25-02, **10.2139/ssrn.5195619**

[20] The Korea Times, 19 June 2026, **Public power generation firms' proposed merger sparks debate**

[21] IEA, 2025, **Korea 2025 Energy Policy Review**

Opportunities for international collaboration

1. **Advance South Korea's 100 GW by 2030 renewable energy ambition through international cooperation on clean power deployment and grid reform.** Domestically, growing corporate demand for renewable electricity, driven partly by RE100 commitments[22] and supply-chain requirements, provides a strong economic rationale. International partnerships could complement domestic initiatives such as the West Coast Energy Highway through technology cooperation on grid modernisation and energy storage, alongside joint investment in offshore wind and measures to improve corporate access to clean electricity.

2. **Support implementation of the coal phase-out by 2040 commitment, the most consequential near-term policy anchor, to ensure credibility.** A decision to translate the headline end date into binding closure schedules for 21 coal plants has not yet been made; the question of whether 20 plants with design lives beyond 2040 are retained as emergency backup also requires resolving – this could be a loophole that might otherwise undermine the phase-out commitment. PPCA provides a useful platform for this work as it offers access to just transition expertise and finance, can help close the gap with the eight subnational members that preceded national accession – and also possibly push for a more ambitious date than 2040, in line with the OECD-2030 trajectory that the Alliance itself sets.

3. **Enhance green industrial supply chains to foster economic competitiveness and energy security.** South Korea is well placed to deepen cooperation through Asia-Pacific Economic Cooperation and bilateral frameworks, particularly with partners such as Australia, to develop cleaner and more resilient industrial supply chains, including collaboration on critical minerals and low-carbon steel. This could help South Korea decarbonise its energy-intensive manufacturing base while strengthening access to clean industrial inputs and reducing exposure to fossil fuel supply disruption.

[22] RE100 is a global corporate renewables initiative, led by Climate Group, bringing together over 400 influential businesses across over 150 markets worldwide. Its members have all committed to using 100% renewable electricity in their operations by 2050 at the latest.

ABOUT E3G

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We drive systemic action on climate by identifying barriers and constructing coalitions to advance the solutions needed. We create spaces for honest dialogue, and help guide governments, businesses and the public on how to deliver change at the pace the planet demands.

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