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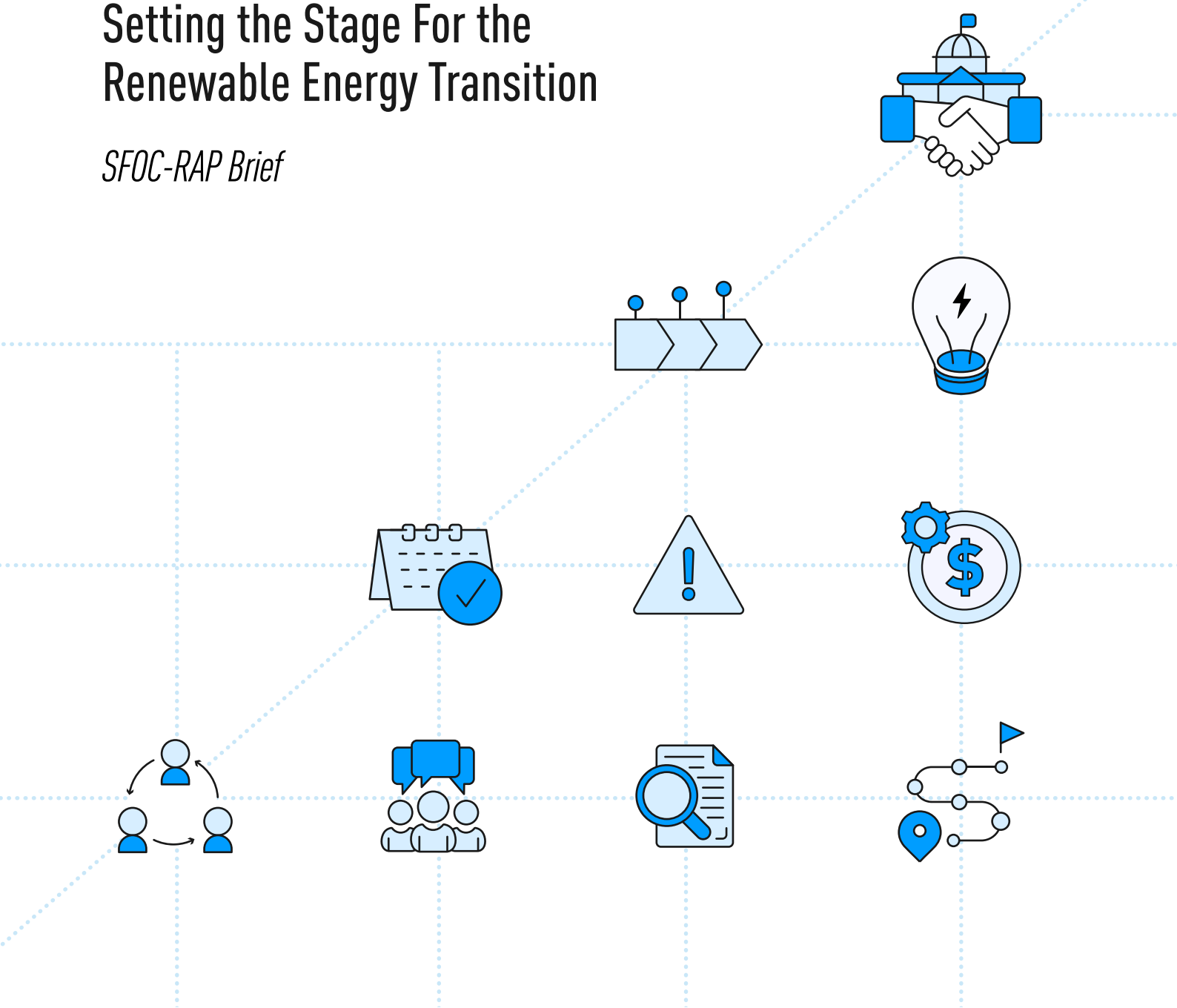
# REFORMING SOUTH KOREA'S POWER SECTOR

## Setting the Stage For the Renewable Energy Transition

*SFOC-RAP Brief*



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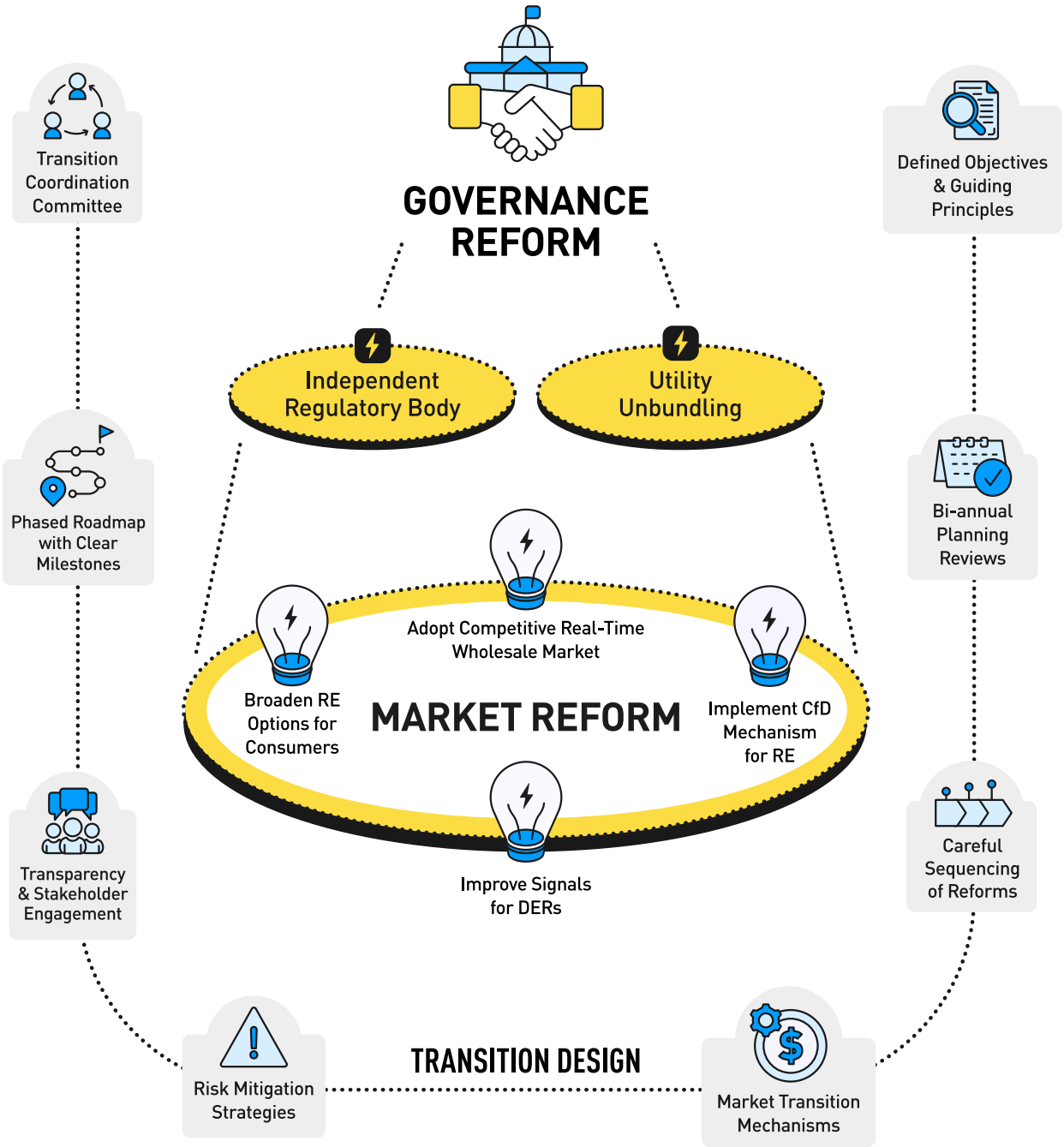
## Executive Summary

South Korea's power sector requires urgent reform to support national decarbonization goals while maintaining affordability and reliability. Renewable energy accounts for less than 10% of electricity generation—the lowest share among OECD countries—and the system remains dominated by large, centralized fossil and nuclear power plants with high emissions, high fuel costs, and limited operational flexibility. Existing market and regulatory frameworks were designed for this legacy system and no longer align with today's policy priorities or technological realities.

This brief draws on international experience and proposes a phased and strategic reform process, ideally led by a high-level transition coordination body under the Prime Minister. We outline how this transition process could be structured and emphasize that clear objectives, transparent decision-making, robust stakeholder engagement, and a roadmap with measurable milestones will be essential to sequence reforms effectively, mitigate risks, and ensure social acceptance.

For two broad areas of reform – governance and electricity market design – the brief highlights several selected issues that our team judges need urgent attention. In the governance area, we discuss establishing an independent electricity regulator with a net-zero mandate and advancing unbundling of KEPCO as critical steps for ensuring neutrality, enabling competition, and improving grid planning. Regarding electricity market design, we discuss developing competitive, bid-based wholesale markets, ending the cost-based day-ahead pool, and removing the practice of guaranteed cost recovery for fossil generators. We also discuss establishing a contracts for difference mechanism to support renewables, expanding options for consumers to choose clean energy sources, and establishing strong incentives for distributed energy resources. These are not the only reforms required – but each will be necessary to unlock flexibility, attract investment, and enable a reliable, cost-effective, low-carbon power system.




*Source: Solutions For Our Climate, Regulatory Assistance Project (RAP), 2026*

# Introduction

In order to meet goals for emissions while controlling costs and maintaining reliability, South Korea's power sector faces major reform challenges. Renewable energy penetration remains at less than 10%, ranked the last among OECD countries, and the power sector remains dominated by large-scale centralized power plants with high emissions, high fuel costs, and insufficient levels of flexibility.

South Korea's power sector reform discussions are proceeding against the backdrop of several complex institutional and political challenges. First, power authorities tend to focus on inefficient and costly solutions for reliability. Pointing to the isolation of Korea's power system,[1] officials have set very high reserve margins while underemphasizing the contributions that renewables and demand-side resources can make. Second, Korea's export-oriented economic structure results in prioritization of low electricity prices, which is accomplished through government administered compensation mechanisms. Third, retail electricity pricing is a highly politicized issue.

The existing market and regulatory framework in Korea were launched in an earlier time in a different context. In the intervening years, the government has set new priorities, including targets for decarbonization. At the same time, the cost and abilities of various technology options in the power sector (particularly renewables and battery storage) have changed dramatically – and will continue to evolve. The market and regulatory framework need to be redesigned to unlock the value and capabilities of clean energy resources – including on the demand side. This will help ensure that Korea can achieve its high-level policy objectives while maintaining system reliability and minimizing costs.

Many countries and regions around the world have been working on the process of power sector decarbonization a process that, in every case, has involved significant reforms to the market and regulatory frameworks. This brief highlights several selected issues that will be important for reform in Korea and draws on international experience to illuminate recommendations for Korean policymakers. These include new market structures and mechanisms to better reward flexibility and innovation. It also includes enabling storage, demand response, and distributed resources to compete on equal terms with conventional supply. We discuss how transparent and dynamic price signals should reflect real system conditions, to guide efficient investment and operational decisions. Making the best of market participation will require ensuring the creation of a level playing field, particularly to ensure that new businesses related to renewable energy will not be disadvantaged. For that, governance and regulation must be independent, transparent, and adaptive, ensuring decisions remain evidence-based and

1 The power system is not interconnected to any neighboring countries, making it an "energy island".

aligned with decarbonization goals. A successful reform effort will require careful consideration of all of these elements and weigh implementation sequencing in the context of political background.

## Section 1: Designing the transition

A successful power sector reform agenda requires attention not only to details of policy, regulation and market design, but also the sequence and timing of reform measures and to the development of institutional capacity. The process must be strategic, well-coordinated, and adaptive, while balancing technical, economic, and social concerns. In this section we make several suggestions for setting out a reform process.

**An effective first step would be to create a dedicated transition coordination committee under the Prime Minister.** A high-level steering committee or task force with clear authority should be set up and should include representatives from government, the regulatory agency, industry, civil society, and independent experts.

**Next, defining strategic objectives and guiding principles** is essential to provide direction and coherence across institutions involved with the power sector reform efforts. Setting overarching goals – such as achieving net-zero emissions, maintaining system reliability and affordability, while strengthening industrial competitiveness – would help clarify complex policy choices. Embedding principles of transparency, evidence-based policymaking and strong public consultation would strengthen both the legitimacy and the quality of decisions, helping to build lasting public and political trust in the reform process.

**Planning of the reform process should be supported by a phased roadmap with clear milestones.** This roadmap should lay out short-, medium-, and long-term steps for reform, including timelines for regulatory independence, market redesign, and infrastructure upgrades. Within this framework, monitoring and evaluation mechanisms should be institutionalized by setting key performance indicators and by formalizing an independent review process, enabling policymakers and stakeholders to track progress and adjust course as needed.

Alongside these structural components, **robust bi-annual planning reviews** can help raise reform ambition by identifying emerging challenges, gaps and opportunities. These periodic updates will serve as platforms for refining targets in light of changing market or policy contexts.

**Structured stakeholder engagement processes and open and transparent communication channels** will be vital. They can help anticipate resistance, align expectations, and foster consensus around the rationale and benefits of reform.

**Careful consideration of the sequence of reforms** and the impact on both vulnerable customers and those subject to international trade competition is another critical dimension. Some of the recommendations in this brief may put upward pressure on electricity rates, at least in the short term. However, other recommendations – expanding renewable energy, bolstering demand-side resources, and reducing use of imported fossil fuels – will moderate this effect in the longer term. It is important to model scenarios and sequence plans to bring about cost-efficient and equitable outcomes for society.

It is also essential to **anticipate risks and design robust risk mitigation strategies.** Potential challenges include regulatory capacity constraints, abuse of market power, and resource constraints. Identifying these risks early will allow for proactive contingency planning, minimizing potential setbacks.

**Finally, design of the reform process should incorporate explicit market transition mechanisms for existing market participants.** Those who have invested in the existing framework may take conservative positions due to the uncertainty that would be created by major reforms. Transition mechanisms can be designed to make sure their rights under the previous framework are broadly respected, while opening the door to efficiencies brought by the new framework. This would ensure fairness and stability without slowing the momentum toward a more efficient, competitive, and sustainable power system.

# Section 2: Selected issues for reform

This section presents several ***selected issues*** that our team judges need urgent attention in two areas: governance and electricity market design.

Governance reform and market design reforms need to work together. Unlocking the value of various resources – including renewable energy, storage, and distributed energy resources (DERs) will require substantial effort in both areas. In the current situation in Korea, investment in clean energy resources hinges on utility-driven planning and procurement processes; yet the incumbent utility lacks incentive to prioritize these resources, given their ownership of conventional fossil and nuclear power plants and given the utility's tendency to defend expensive and emission-intensive options as necessary for reliability. Only when market and governance reforms proceed in tandem can energy transitions realize their full potential for efficiency and innovation.

## 2.1 Reform of governance

### 2.1.1 Solidify an independent regulatory body with clear powers and responsibilities

**Korea context and developments**

Korea's current electricity regulation framework is fragmented and distorted by current institutional structures, which undermines its credibility and capacity to support the energy transition. The absence of a fully independent regulator is a barrier to stable long-term rulemaking insulated from short-term political and commercial interests.

The existing Electricity Regulatory Commission (ERC) operates under the Ministry of Climate, Energy, and Environment (MCEE), with no autonomy.[2] Major regulatory functions—such as electric business permits, tariff approval, market rule approval, and power sector reforms—are merely reviewed by ERC, but ultimately decided by MCEE. This subordination limits ERC's ability to function as an impartial, technically driven regulator and weakens the consistency of regulatory oversight.

The lack of an independent regulator has broad consequences for system fairness and innovation. Efficient grid planning and grid connection oversight are essential for the energy transition, yet these

2 MCEE appoints the ERC commissioners, who serve three-year terms, and retains ultimate authority over key sectoral decisions.

functions remain with Korea Electric Power Corporation (KEPCO), which retains transmission and distribution ownership alongside interests tied to legacy fossil and nuclear assets. With KEPCO serving as both the guarantor of grid reliability and the dominant actor in the power system, incumbents have gained unfair advantages; delaying variable renewable connections, inflating costs, and slowing overall modernization.

The Korean Power Exchange (KPX) – responsible for operating wholesale market, transmission stability assessments, and contingency planning – is also heavily influenced by KEPCO and the GENCOs [1]. Their representation across key decision-making bodies, including subcommittees and boards, blurs the distinction between regulated entities and regulators.

Without an independent regulator, the ability of political groups to pressure regulators has meant that retail tariffs have long been kept artificially low and weakly cost-reflective, creating chronic deficits at Korea Electric Power Corporation (KEPCO) [2]. While this may be helping to support electrification, it is muting price signals for both end-use energy efficiency and Distributed Energy Resources (DERs).

**International experience**

Well-functioning energy markets typically rely on independent, transparent, and accountable regulators. Clear independence from political influence can help ensure impartial, objective, and evidence-based decision-making. Effective regulatory agencies are characterized by transparent, accountable governance with independent leadership appointments for fixed term contracts; and robust staffing with sector experts. They also have financial independence through transparent, multi-annual funding mechanisms and operational autonomy that includes staffing decisions.

An independent regulator is an effective governance arrangement that has been useful in multiple countries and sub-national regions. In particular, this arrangement usefully separates energy policy decisions – such as the speed of decarbonization, the scope of retail competition and the desired reliability for the power sector – from technical decisions that deliver implementation of those policy objectives.

Regulatory agencies may be mandated to oversee the utility, energy market operator, system operator, and market participants. They may be mandated and given authority to ensure fair competition, transparency, and consumer protection; to license and monitor market participants; to approve network tariffs and prices; to enforce compliance with regulations; and to safeguard system reliability and security of supply.

Regulatory agencies also often have power to set performance-based regulations (PBR) for energy network companies (to motivate efficiency, reliability and support for energy transition).[3]

Several jurisdictions have moved towards explicitly strengthening the regulatory agency's mandate to support the energy transition. For example, the UK's regulatory agency, Ofgem, has been legally assigned a net-zero mandate, while Quebec's regulator is charged with 'orderly energy transition at the lowest cost'.

### Recommendations

- **Establish Korea's power sector regulatory agency as an independent regulatory authority** with clearly defined powers and responsibilities. Independence should be safeguarded through clear independence or structural separation of the ERC from MCEE, for instance by making the commissioners accountable to a body affiliated with the Prime Minister. Adopt transparent appointment processes for commissioners, ensure fixed terms with a limit on consecutive reappointments, and provide protection from political dismissal.
- **Define and expand the regulatory agency's mandate** to cover the following areas of authority:
  - Transmission and distribution networks: The agency should have responsibility for rule setting and oversight, including investment approval, allowed revenue determination, tariff design and tariff setting. The independent regulator should set performance-based regulations, including targets and incentives for transmission and distribution companies to improve on goals such as reliability, network buildout, non-wire solutions, renewable energy integration, and flexibility.
  - Competitive segments, including generation: The agency should have oversight, rule-setting, and rule-approval authority for wholesale market rules and be responsible for supervision of competitive electricity markets.
  - Dispute resolution: The agency should act as an independent and transparent authority for resolving market and network-related disputes.
  - Overarching mandate: We suggest a net-zero or energy transition mandate to guide regulatory decisions and align Korea's market design with long-term decarbonization objectives.

3 This is increasingly being complemented by adopting PBR approaches based on TOTEX (CAPEX + OPEX) to support non-wire alternatives and broader system flexibility, aligning investment incentives with efficient attainment of long-term transition goals.

### 2.1.2 Move ahead with utility unbundling

**Korea context and developments**

Korea's power sector remains largely vertically integrated, centered around KEPCO. KEPCO retains control over transmission, distribution and sales – all within a single corporate structure – and holds a dominant share of generation (approximately 60%) through six fully-owned GENCO subsidiaries (five thermal and one hydro and nuclear).

Although independent power producers (IPPs) are active in the generation market, KEPCO's dominant market position and continued ownership of GENCOs, networks and sales functions limits competition and risks discrimination in grid access and dispatch.

While functional and accounting separation measures are in place, they fall short of full unbundling of transmission and distribution from sales or power generation, and there is no truly independent and impartial transmission system operator (TSO) or distribution system operator (DSO).

Under the current bundled system, the government has blurred the line between commercial activities and public-interest activities involving KEPCO and its subsidiary GENCOS. This has complicated cost allocation. Meanwhile, KEPCO's financial distress – which has mainly been caused by the policies that have artificially lowered retail prices and artificially elevated costs that KEPCO must pay to mostly GENCO-owned fossil fuel plants – has depleted grid and market investment funds.[4] These overlapping roles weaken incentives for efficiency and innovation while limiting market clarity for new entrants.

Policy discussions on reforming GENCOs are currently ongoing. Unless accompanied by separation of the network segments (that is, the natural monopoly transmission and distribution segments[5]) from the power generation and retail sectors, which can be competitive activities, any structural changes in KEPCO/GENCOs will have limited impact.

4 In 2022, KEPCO recorded its worst operating loss ever and announced a medium- to long-term financial management plan, which includes reducing grid network investment and expanding the operation of coal-fired power plants. KEPCO reduced its investment into the grid in 2022 [2].

5 The power grid is a classic natural monopoly because building duplicate transmission and distribution lines is prohibitively expensive and wasteful, making it most efficient for one entity (e.g. governmental body) to serve an area.

### International experience

In the European Union, best practice distinguishes clearly between monopoly and competitive functions in the electricity value chain. Transmission and distribution networks are legally and functionally separated from generation and retail, which operate as competitive markets. This separation underpins neutral system planning, non-discriminatory access, and fair competition. Unbundling helps support a level playing field for all new entrants to the electricity market and is associated with more transparent tariff-setting, better-quality planning and network development, easier access for independent generation (especially renewables) and storage.

Even in the case of France, where EDF owns the assets of the transmission grid, governance has been crafted in such a way that the holding company does not have control of the TSO, Reseau de Transport d'Éléctricité (RTE), guaranteeing effective neutrality vis-à-vis other market participants.[6]

The UK has recently gone a step further, creating a state-owned entity for planning and system operation (NESO – National Energy System Operator), separate from actual ownership of the networks, which remain within three regional entities. In U.S. regions with competitive markets, organizations known as "ISOs or RTOs" – which are independent from transmission owners and generators and ultimately overseen by government – are responsible for system operations, market operations, and many important transmission planning functions.

Some countries and regions have implemented retail competition to try to drive down consumer costs and promote innovation in pricing structures and offers to consumers, (see below). In these places, distribution networks and retail sales segments are typically either unbundled by strict legal rules or through separate ownership.[7]

### Recommendations:

- **Follow through on unbundling** of generation by dismantling KEPCO's holding structure over GENCOs (fully severing financial and legal ties) and establishing a clearly independent structure for KEPCO's network business, to enhance the neutrality of the grid network. It is important that GENCOs remain separate from the system operator function and from the transmission and distribution companies.

6 In France, effective competition in retail and generation has been complemented by an obligation imposed on EDF to sell electricity from its dominant nuclear fleet at a fixed price under the Regulated Access to Historical Nuclear Electricity (ARENH) mechanism.

7 In best practice cases, these places also implement strict rules that separate branding, communications, revenues, and costs. This avoids consumer confusion and prevents market abuse through cross-subsidization of sales entities.

- **Prepare a roadmap** for unbundling of transmission from generation and distribution activities that clearly lays out steps and informs the market of the direction of travel. A first step of this roadmap would be full financial separation of transmission and distribution activities with transparent cost allocation.
- **Solidify independent system operator role** and **governance**, under oversight by the regulator. The independent system operator organization should have a lead role in planning processes (with a mandate for greater transparency and stakeholder involvement).[8]

## 2.2 Reform market design and market policy to support the transition

Korea's current market design and market policy framework were built for a centralized, fossil-fuel-based system and is increasingly misaligned with the needs of a decarbonizing grid. Cost-based pricing, limited competition, and opaque network charges fail to provide the dynamic signals required for integrating variable renewables, storage, and demand-side flexibility. Reforming market structures is essential to unlock investment, improve operational efficiency, and enable new business models such as those involving VPPs and corporate PPAs (power purchase agreements). This section outlines key changes—ranging from wholesale price formation to distributed resources participation—that will position Korea's power market to support reliability, affordability, and rapid renewable energy deployment.

### 2.2.1 Implement a competitive wholesale market and end the cost-plus markup scheme

#### Korea context and developments

KPX currently operates a day-ahead "market" mechanism called the Cost-Based Pool (CBP). The CBP is based on administratively assessed generation operational costs, rather than competitive price offers from market participants. These costs are used by the system operator to form the merit order, schedule which generators will operate, and set the hourly day-ahead system price.

The CBP, introduced in 2002 as a transitional measure to prevent wholesale price spikes during the power sector's initial reform, was meant to be phased out once full competition in generation was achieved. However, reform delays have prolonged its use. While discussions on the nationwide replacement of the CBP with a "price-based pool" (featuring competitive bid-based auctions) have

8 Ideally, that planning process should include a move from a rigid reserve standard towards resource adequacy based on stochastically determined loss of load expectation (LOLE) and volume of lost load (VOLL).

been ongoing, no concrete implementation timeline has been released. There are no intra-day or real-time markets.[9]

The core problem with this day-ahead scheduling approach, based on the CBP, is that it fails to provide good signals about real time fluctuations in supply, demand, and grid conditions. One aspect of this is that generators and demand-side resources have little incentive to actively manage positions and operations across day-ahead and intraday stages. More broadly, well-formed real time signals are very important in decentralized orchestration of a power system that features large amounts of variable generation, DERs, and storage. These pricing signals can also help to motivate investment in renewable energy resources and compensate for high up-front investment costs.

**Cost-Based Pool Mechanism**

The Electricity Market Operation Rules include a policy mechanism to "ensure that fuel costs, operation and maintenance costs, construction investment costs, and investment returns are recovered"[3]. In practice, the rule applies to nuclear and fossil-fired generators (both coal and gas generators owned by the GENCOs and only coal generators owned by private-entities) but not renewables or other resources.

The intended purpose of the mechanism may be to avoid "overcompensation" that may occur, for example, if coal fired power plants were to receive the system marginal price set by gas-fired power plants. However, despite the possible aim of cost reduction and avoidance of overcompensation, the mechanism effectively ensures that coal- and gas-fired power plants enjoy a guaranteed profit, distorting market signals and turning fossil fuel projects into near zero-risk.

In short, the current market was designed for a system dominated by fossil fuels – and did help in an earlier era to improve the overall efficiency of the fossil-fired generation fleet, partly by supporting gas-fired generation over coal power. However, the market design is poorly suited for a decarbonizing power grid.

9 Korea maintains its market through settling the differences between day-ahead and intraday/real-time operation in a CBP framework in the mainland grid. In Jeju Island, the real-time market has been introduced as a pilot project since 2024.

### International experience

In Europe and in the U.S. ISO/RTO regions, electricity markets are based on competitive bids that, with strong regulatory oversight to ensure sufficient competition,[10] provide efficient signals about real time fluctuations in supply, demand, and grid conditions.[11] Evidence indicates that these competitive approaches are having success in integrating variable generation, DERs, and storage, although the devil is often in small details of market design.

In U.S. ISOs/RTOs, European electricity markets, Japan, and other market-based systems, there is no fundamental guarantee that generators will recover fuel costs, operation costs or investment returns. Instead, resources earn revenue from selling energy and ancillary services at market-clearing prices. Some places also have capacity payment mechanisms, but these feature competitive auctions and do not guarantee full cost recovery. In best practice designs, high wholesale energy prices during scarcity and low prices during surplus send signals for investment and retirement decisions.

### Recommendations

Rapidly implement competitive day-ahead, real-time and intra-day wholesale markets in which prices are determined by participants' bids. Let supply, demand, and geographic location be reflected in clearing prices.[12] This will support better (and lower cost) orchestration of various resources on the demand and supply sides as grid conditions fluctuate throughout each day.

- In parallel with the implementation of the competitive markets, phase out the cost-plus mark-up scheme that distorts market signals by guaranteeing full cost recovery for GENCOs.
- Promote a greater number of independent market participants (see elsewhere in this brief on unbundling generators and promoting VPPs) and establish strong regulatory oversight. The existing structure for collecting cost data can be the basis for a market-monitoring and market power mitigation framework.

10 For example, in US ISO/RTO regions, offers from generators are screened for market power to ensure prices are set at competitive levels. In Europe, there are also strong measures to support competition and market transparency although the approach is different and there is a greater emphasis on ex-post monitoring by regulators (e.g., ACER, national regulators) to detect abuse.

11 In the U.S., Europe and other places there is nevertheless much detailed discussion about how to ensure that scarcity pricing is adequate and rational. If the decision is taken in Korea to pursue this route, then decisionmakers will face crucial decisions on how to design market rules and complementary mechanisms in order to support well-formed scarcity price signals.

12 Locational marginal pricing (LMP) in which price levels are different at different nodes throughout the system in each (e.g. five minute) period, would be a good approach for real time prices. Although various markets in U.S. started with zonal markets (such as CAISO, ERCOT and PJM), nowadays U.S. ISO/RTO regions all have full nodal LMP, and evidence from these regions shows that this approach can efficiently provide signals for generation investment to go into regions where energy is scarce, reduce transmission investment needs, provide efficient management of congestion, support renewable energy integration and promote the efficient deployment of DERs. Japan and some European countries use zonal pricing, but policymakers and stakeholders are in discussions about the possibility of shifting to a nodal LMP approach.

### 2.2.2 Implement a CfD mechanism to support renewable energy investment

#### Korea context and developments

Korea has an official 2030 target for renewable energy to provide 21.6% of electricity generation, set out in the 11th Basic Plan for Electricity Supply and Demand, which was finalized by MOTIE in early 2025.

Currently, South Korea's renewable energy support framework is centered on the Renewable Portfolio Standard (RPS), launched in 2012, which obligates large generators to generate or source a share of electricity from renewables. Although the RPS system helped support the initial wave of renewable energy generation buildout, it is not the best approach to support continued strong growth. Renewable energy investment would benefit from more certainty and stability regarding revenue. The government has held consultations on introducing a contracts for difference (CfD) mechanism to replace the RPS.

#### International experience

International experience suggests that, while an RPS approach is effective for kick-starting renewable energy development, it often exposes projects to high wholesale price volatility, which increases the cost of capital for RE developers and slows investment. In contrast, a CfD approach provides a long-term, stable revenue stream, significantly reducing financial risk and lowering the cost of capital.

Two-sided CfDs offer price and revenue stability for RE generators. The RE generator earns a compensatory payment when electricity market prices are low and the generator makes a payment when prices are high. Evidence from the UK's transition from a certificate-based system (similar to an RPS mechanism) to a CfD mechanism, suggests benefits in the form of lower renewable energy investment costs.

#### Recommendations

- Commit to implementation of an official CfD scheme to help meet the 2030 and 2035 RE targets. Design CfDs as two-sided contracts to stabilize revenues for developers.
- Design CfD auctions with transparent, competitive bidding processes and strong regulatory oversight to ensure cost efficiency.
- Align CfD implementation with the broader market reforms discussed in this brief—such as moving to bid-based pools—so that CfDs complement rather than distort price signals. Encourage expansion of private PPA market to complement CfD scheme.

### 2.2.3 Broaden renewable energy options for consumers

**Korea context and developments:**

KEPCO dominates retail sale of electricity and there are few options for end-users to choose renewable energy or low carbon options.[13] KEPCO and the Korean Energy Agency (KEA) offer a "renewable purchase program" called Green Premium, however, the program design has major shortcomings and funds from the program have not had significant impact on renewable energy capacity additions.[14]

PPAs are currently the only method by which consumers can directly buy RE[15], however, regulations continue to restrict their utilization. First, there are restrictions limiting contracts involving multiple suppliers and buyers ("N:N" contracts) [4]. Second, regulations stipulate that an officially authorized middleman (known as a renewable energy supplier), is required for even direct PPAs. Third, under current regulations, the role of renewable energy suppliers in supplying electricity is limited to administering PPA transactions, restricting their ability to provide electricity for an end-user's full demand and simplify procurement.[16]

**International experience**

Various countries have adopted reforms that expand options for consumers to purchase renewable energy. These have taken several forms, including the following.

- *Ending the retail monopoly*: Some places, such as Texas, Australia, and Japan allow consumers to freely choose suppliers. Japan's liberalization which started in 2016, has helped support corporate renewable procurement and RE100 participation. In Australia and Texas, retail market liberalization is well developed, and renewable energy choices are accessible for both large and small consumers.
- *Removing barriers for PPAs*: In the EU, the recent electricity market reform encourages EU Member States to remove any administrative and regulatory barriers to PPA contracts and mandates that support schemes for renewable electricity should permit projects to reserve a portion of their electricity for PPA – making it easier for corporates to access PPAs while allowing renewable energy investors to diversify risk and optimize returns.

13 Residential consumers can only buy electricity from KEPCO (at regulated tariffs).

14 Despite its widespread use, there have been concerns about the program related to its additionality, transparency, and how the generated funds are utilized [6].

15 The PPA mechanism was introduced in 2021, marking the first opportunity for consumers to both procure RE and buy electricity separately from KEPCO.

16 For some discussion of recent developments, including some recent minor reforms to PPA rules, see B. Savoy, 2025. *Accelerating Renewable PPAs in South Korea: 2025 Regulatory Updates and Unresolved Challenges.*

- *Allowing small consumers to share in local renewable generation*: Some places enable households and small businesses to benefit from shared local renewable energy projects—such as community solar in the U.S. and local ownership models in the UK.[17] These approaches expand access to clean energy beyond rooftop installations.

**Recommendations**

- Remove regulatory barriers to corporate PPAs. Permit multi-buyer and multi-seller (N:N) contract structures, and allow direct PPAs without mandatory intermediary requirements. This will broaden access to PPAs for smaller projects and buyers, reduce transaction costs, and improve market liquidity.
- Empower aggregators and renewable energy suppliers. Grant aggregators and renewable energy suppliers clear rights and obligations to pool renewable generation, demand response, storage, and ancillary services, and to contract these bundled products on behalf of multiple consumers and producers.
- Enable retail choice for consumers. Gradually open the retail market to allow end-users to choose suppliers.[18] Grant expanded rights to renewable energy suppliers to provide all electricity needs of a customers, not just PPA contracted electricity Ensure a level playing field through transparent regulation and robust consumer protection mechanisms.

### 2.2.4 Establish strong signals for distributed energy resources

**Korea context and developments**

The need for flexible distributed energy resources (DERs) is growing due to the geographic development of renewable energy and transmission grid constraints. The Honam region, an area with strong potential for renewable energy, has seen high curtailment of renewable energy generators and KEPCO is blocking new renewable energy projects from coming online due to these issues. This curtailment of RE energy and slowdown in RE energy investment – such as in Honam – could be addressed, in part, by unlocking value from DERs throughout the country.

Aggregations of DERs such as demand response, battery storage and electric vehicles – often called virtual power plants (VPPs) – can be flexible and clean alternatives to traditional inflexible fossil fuel

17 In the UK, small consumers can be owners of a share of the production of renewable energy facilities and earn benefits in the form of electricity credited to bills by retailers (such as Ripple Energy).

18 There could be benefits from bringing more choice to residential and small commercial customers, although, as in many countries, this is a politically sensitive issue, and this could be developed later in the reform process.

power plants and can relieve pressure on the grid. However, Korea's power system remains highly centralized and dominated by large fossil-fuel plants.

Current market design and policy frameworks undervalue DERs, prevent them from competing on a level field, and give them inadequate incentives for flexibilities.[5] The current power market framework, as discussed above, fails to provide good signals about real-time fluctuations in supply, demand, and grid conditions and inadequately compensates DERs for provision of ancillary services.[19] The simultaneous ownership of traditional generation units and the distribution network by KEPCO presents a conflict of interest, as KEPCO has scope to potentially implement barriers to DERs and other new market entrants that would act as competitors. Governance and market reform will be essential to ensure the success of DERs in Korea.

### International experience

No country or region yet has an ideal approach to DERs, VPPs, or demand-side resources. However, there are decades of useful experience. Some market designers have developed market participation models that seek to compensate DERs/VPPs fairly for all the services they can provide. For example, Australia's National Electricity Market allows aggregated DERs to bid into energy and ancillary service markets, while parts of Europe (e.g., Germany) have introduced frameworks for VPPs to provide balancing services and receive performance-based compensation.

### Recommendations

- Reform market mechanisms to allow DERs and VPPs to capture a 'full value stack' based on the full range various services they can provide – including energy, capacity, and ancillary services – on equal terms with supply-side resources.
- Upgrade infrastructure by replacing substandard AMI with smart meters and deploying bidirectional EV chargers to enable vehicle-to-grid participation.
- Give the network utility incentives (using performance-based regulation) to promote and support DERs and VPPs.[20]

19 In addition, fossil-fired generators enjoy substantial capacity payments that VPPs do not.

20 The recommendation to ensure DSO independence from ownership of the power generation and supply –mentioned in an earlier section of this brief – will also be important to support DERs.

## Conclusion

Korea's power sector reform process will not be a single policy adjustment but a systemic transformation that must unfold in stages. The next phase should focus less on setting new targets and more on aligning institutions, incentives, and governance structures with those already in place. Achieving this alignment will determine whether Korea's decarbonization ambitions translate into practical, durable change.

The reform process must begin with clarity of purpose and accountability. Establishing a high-level transition coordination body—anchored under the Prime Minister's Office—would help align ministries, regulators, and utilities around common objectives. This coordination should be supported by an independent regulator capable of enforcing transparent, evidence-based rules and by stakeholder consultation that strengthens public trust in decision-making.

Equally important is the sequencing of reform. Unbundling, market redesign, and tariff reform each have wide-reaching socioeconomic impacts that must be managed deliberately. Transition mechanisms should protect vulnerable consumers and investors who are tied to existing frameworks, while ensuring that outdated generation cost-recovery guarantees do not stall market innovation. Early reform wins could build momentum and demonstrate tangible benefits.

Korea's reform will succeed only if it treats governance independence, market innovation, and social acceptance as interdependent goals. Digitalization, integrated planning, and performance-based regulation can link these elements together, enabling resilience and adaptability as technologies evolve.

Ultimately, the power sector's transformation is not just an energy challenge but a governance test—of how effectively Korea can adapt existing institutions to a carbon-free future. With steady political commitment, transparent rulemaking, and inclusive participation, Korea can move from policy aspiration to implementation leadership, positioning its power sector as a model for equitable, secure, cost-effective, and low-carbon growth.

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# Reforming South Korea's Power Sector

## Setting the stage for the renewable energy transition


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Solutions for Our Climate(SFOC) is an independent policy research and advocacy group that aims to make emissions trajectories across Asia compatible with the Paris Agreement 1.5°C warming target.