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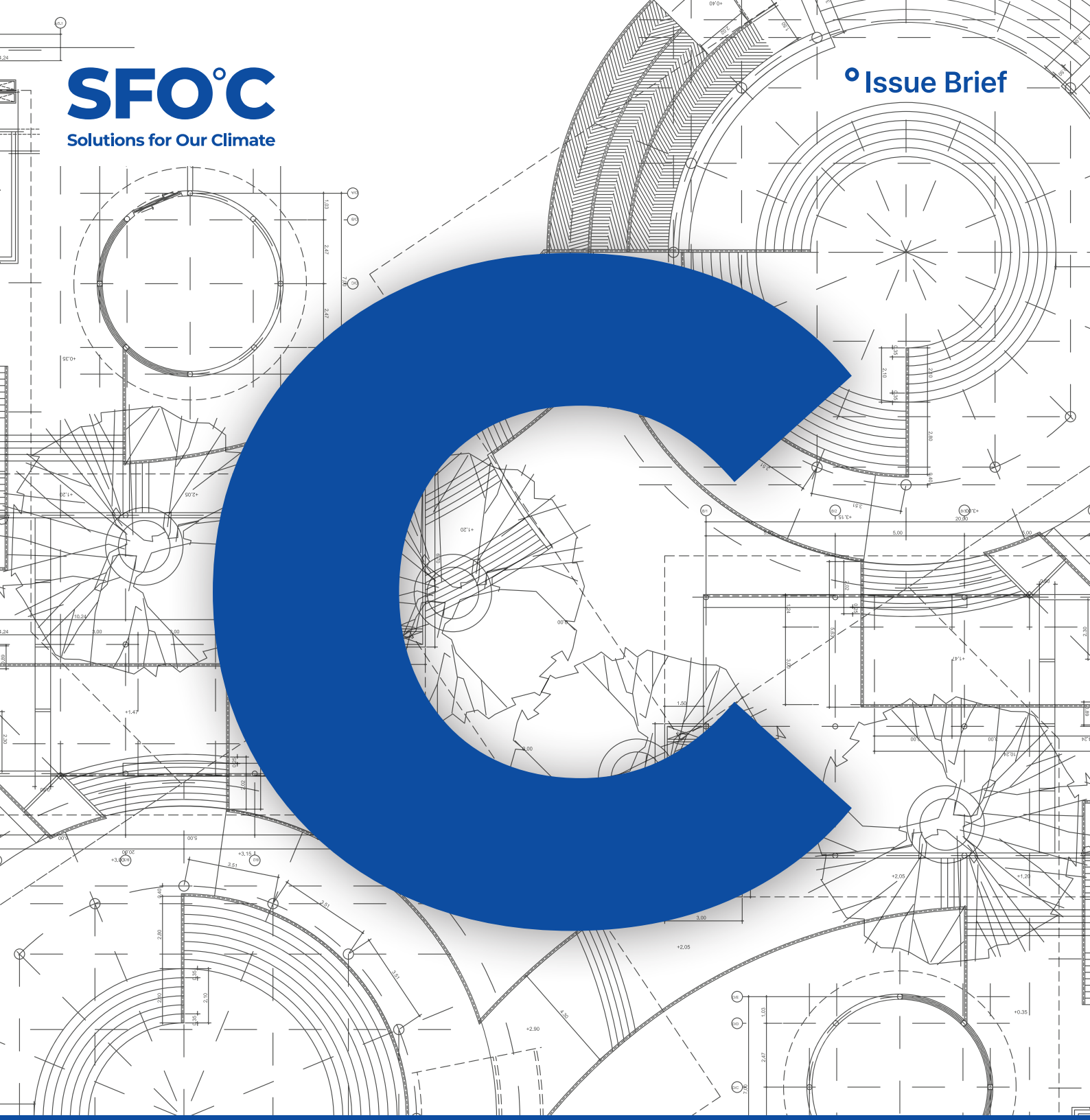


The Way Forward for Korea's Grid Governance to Power the Energy Transition

Contents

I. Policy Misalignment Between Renewable Energy Expansion and Grid Integration Restrictions

1. Renewable Energy Expansion Policies and Deployment Status

The Lee Jae Myung administration, which assumed office in 2025, has placed strong emphasis on climate action and expanding the deployment of renewable energy. These priorities are reflected in the administration's inclusion of "climate action and decarbonizing the industrial structure" among its ten key presidential pledges, as well as "completion of the West Coast Energy Highway Project by 2030" and "energy transition centered on renewable energy" as major policy tasks of the Presidential Committee on Policy Planning. In addition, the administration established the Ministry of Climate, Energy and Environment (MCEE) to oversee climate action and to provide integrated leadership for energy-transition policies.[1]

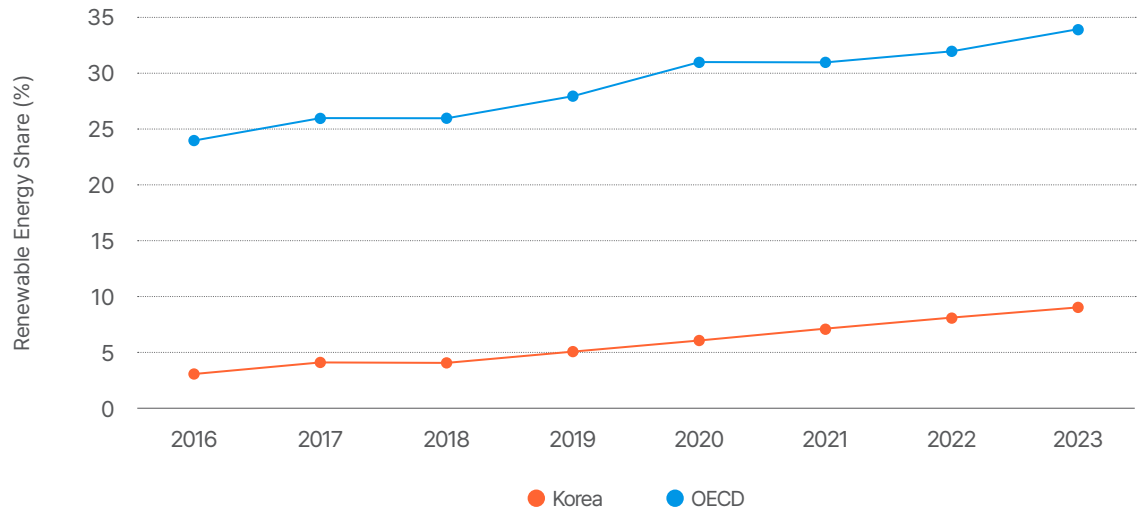
Meanwhile, Korea's share of renewable energy in total electricity generation continues to lag well behind global trends. As of 2023, the average share among OECD member states stood at 34%, compared with just 8.5% in Korea. Under the 11th Basic Plan for Long-term Electricity Supply and Demand (BPE), the government aims to raise this share to 18.8% by 2030, entailing a more than twofold increase over the coming five years. To achieve this target, installed renewable energy capacity must increase to 78GW[2], representing approximately 2.6 times the 2023 level. Reaching 100GW—a target proposed by the Minister of Climate, Energy and Environment—would require an even greater expansion, amounting to roughly a three-fold increase.[3] However, constraints on grid connection, which have recently emerged as a critical issue, are increasingly acting as a key bottleneck to achieving Korea's energy transition goals.

1 The Ministry of Climate, Energy and Environment was established through the transfer of energy-sector responsibilities from the Ministry of Trade, Industry, and Resources to the Ministry of Environment.

2 Ministry of Trade, Industry and Energy, 'The 11th Basic Plan for Long-term Electricity Supply and Demand', 2025. 2.

3 Electimes, "Minister Kim Sung-hwan Calls for 100GW of Renewable Energy Within Five Years", 2025. 9. https://www.electimes.com/news/articleView.html?idxno=360014

Figure 1. Trends in Renewable Energy Share



Source: Korea Energy Agency; Our World in Data; adapted by SFOC

2. Grid Management Substation Designation and Grid Connection Restrictions for Renewable Energy

In May 2024, the Ministry of Trade, Industry and Energy (MOTIE) announced its *Plan to Minimize Curtailment and Alleviate Grid Saturation* amid concerns that generation facilities exceeding available grid integration capacity could face persistent curtailment. Citing that the construction of power grid infrastructure requires a minimum of six years, Korea Electric Power Corporation (KEPCO) designated substations located in areas with saturated integration capacity—where routine curtailment may occur—as "grid management substations."

A total of 205 substations were designated nationwide, with new generation facilities in Gwangju, Jeonnam, and Jeonbuk subject to restrictions on grid connections until the end of 2031 and those in Jeju facing restrictions until further notice. In addition, in December 2024, KEPCO introduced a "conditional grid connection agreement" under which renewable energy facilities are required to accept unlimited and prioritized curtailment in order to connect to a grid management substation until the grid construction is completed. These decisions triggered strong opposition from renewable

energy generators and local governments,[4] leading to requests during the National Assembly audit for KEPCO to present concrete follow-up measures.[5] Since then, the government has taken measures to withdraw and reallocate certain phantom capacities that have obtained generation permits but remain unconnected to the grid.[6] However, no structural solutions have yet been put in place to address grid connection challenges.

Table 1. Designation Status of Grid Management Substations

Category (# of Substations)		Eligible Substations			
		Voltage Level (# of Units)	Substations	Grid Connection Available From	Effective Date
Gwangju, Jeonnam (103)		345kV(11) 154kV(92)	All All	Jan 2032	After the grace period (Aug 31, 2024) *Effective immediately for Sinan
Jeonbuk (61)		345kV(8) 154kV(53)	All All	Jan 2032	After the grace period (Aug 31, 2024) *Effective immediately for Gunsan
East Coast (25)	Gangwon (19)	765kV(1) 345kV(4) 154kV(14)	All except Shin** Buk***** Yi*	Jul 2026	Effective immediately
	Gyeongbuk (6)	345kV(1) 154kV(5)	All except Shin** Bong*		
Jeju (16)		154kV(16)	All	Generation license temporarily on hold	Effective immediately
Total (205)			205		

※ Jeju: Effective immediately for units over 1MW, and after the grace period (Aug 31, 2024) for those under 1MW

Source: KEPCO

Grid saturation—the primary reason cited by KEPCO for designating grid management substations—arises mainly within the transmission grid, rather than the distribution grid. KEPCO has stated that grid connections are restricted when transmission capacity is unavailable, even in cases where sufficient

4 News1, "What is 'Grid Management' and Why Are Renewable Energy Generators Protesting?", 2024. 8. https://www.news1.kr/local/gwangju-jeonnam/5523008

5 Electimes, "[2024 National Assembly audit] Rep. Seo Wang-jin Warns Grid Management Substations Are Undermining Honam's Renewable Energy Industry", 2024. 10. https://www.electimes.com/news/articleView.html?idxno=344365

6 The Chosun Ilbo, "Government to Withdraw and Redistribute 4.1GW of Grid Connection Capacity from Dormant Projects", 2025. 10. https://www.chosun.com/economy/industry-company/2025/10/01/PDCNXZ2PBBCUXPPHNM4ENQ5HNQ/

capacity exists at the distribution level[7]—an outcome that is not uncommon among grid management substations. In effect, insufficient transmission facilities act as a bottleneck, preventing surplus electricity generated in regional areas from being delivered to the metropolitan area and leading to increased curtailment of renewable energy.[8] While announcing the *Plan to Minimize Curtailment and Alleviate Grid Saturation*, MOTIE acknowledged that the pace of electricity grid construction has not kept up with the speed of renewable energy deployment. Indeed, of the 31 major transmission facilities scheduled for construction under the 10th Basic Plan for Long-term Electricity Supply and Demand (BPE), only five (16%) were completed within the planned timeline.[9]

In addition, traditional power sources account for a large share of regional energy mixes—most notably 86% in Jeonnam and 92% in Gyeongbuk. This high share of traditional generation limits grid integration capacity for renewable energy, as available capacity for renewables is determined by total electricity demand minus the minimum output of traditional power sources. In other words, the higher the guaranteed minimum output for traditional power sources, the more renewable energy curtailment increases. The setting of minimum output levels for traditional power sources, as well as the planning of curtailment are led by the system operator, the Korea Power Exchange (KPX).[10]

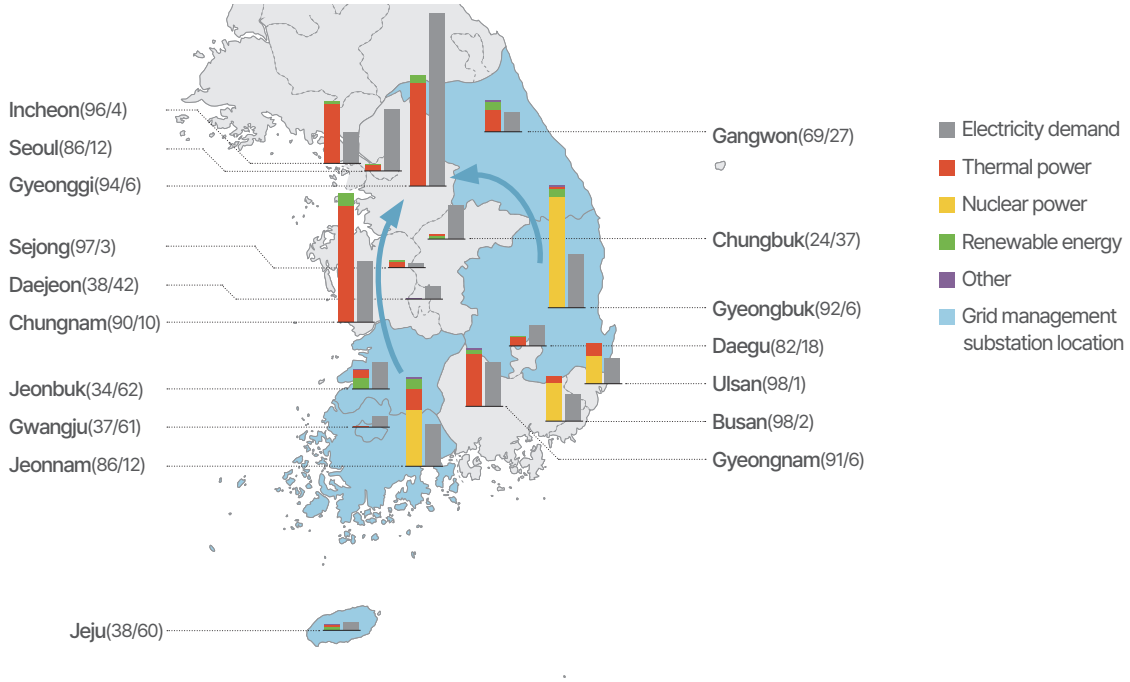
7 Electimes, "KEPCO Seeks to Redistribute Generation Assets to Regions with Available Grid Capacity", 2024. 7. https://www.electimes.com/news/articleView.html?idxno=339679

8 The Seoul Shinmun Daily, "Electricity Colonization? Grid Construction Sparks Regional Tensions Across the Country", 2024. 11. https://www.seoul.co.kr/news/society/2024/11/12/20241112500143

9 The Chosun Ilbo, "Still Delayed: 26 of 31 Transmission Line Projects Behind Schedule", 2024. 11. https://www.chosun.com/economy/industry-company/2024/11/29/DOFFSACMDVH6PFHS5TGIXU5GRU/

10 Available capacity for renewable energy is determined by total projected electricity demand minus the minimum output of centralized dispatch resources, which corresponds to the aggregate minimum generation capacity of must-run generators. Minimum generation capacity refers to the minimum output that individual generators are required to maintain, in compliance with environmental regulations, in order to ensure stable operations. Must-run generators are those that must operate at a given time due to grid-related constraints or generator-specific constraints. Rules on Operating Electricity Market, Article 1.1.2, Paragraph 22; Addenda 9, Article 5.12; Detailed Operating Regulations for Grid Evaluation, Article 8.2.3.

Figure 2. Electricity Supply, Demand, and Generation Shares by Region



* Numbers in parentheses show generation ratio by power source (Thermal·Nuclear / Renewable) / Based on 2024
Source: KEPCO; adapted by SFOC

Against this backdrop, expanding renewable energy will require not only the timely construction of power grid infrastructure, but also measures to enhance grid integration capacity for renewables. The following chapter examines the power governance structure that has resulted in limited grid integration capacity for renewable energy and has slowed the implementation of the government's energy transition policies.

II. Power Grid Governance Constraints on Renewable Energy Deployment

1. Insufficient Incentives for KEPCO to Expand Grid Integration of Renewables

The power sector restructuring aimed at improving efficiency that was pursued in the late 1990s was designed to proceed in three stages. First, competition was to be promoted by separating KEPCO's power generation operations into multiple subsidiaries. Second, the distribution division was to be unbundled, and the transmission grid opened to allow multiple distribution companies to access it, thereby enabling electricity generation and retail businesses to trade electricity. Third, the distribution grid was to be fully opened so that consumers could freely choose their electricity retailers. However, the reform process came to a halt in 2004 when the divestment of generation subsidiaries and the separation of the distribution division were suspended. As a result, the restructuring stalled at the first stage, following the separation of KEPCO and its generation subsidiaries in 2001.[11]

KEPCO currently maintains a monopoly across the power sector, encompassing the installation and management of transmission facilities that deliver electricity from power plants, the installation and management of distribution facilities that supply electricity to end users, and retail electricity sales to end users. In addition, KEPCO remains financially linked to its generation subsidiaries despite their status as legally separate entities: KEPCO holds 100% ownership of the subsidiaries' shares and includes their profit and loss results in its consolidated financial statements. As of 2024, the generation subsidiaries account for approximately 68% of total electricity generation[12], of which 95% is derived from traditional power sources such as thermal and nuclear, while only 0.3% comes from renewable energy sources.

11 National Archives of Korea, 'Power Sector Restructuring', 2007. 12. https://www.archives.go.kr/next/newsearch/listSubjectDescription.do?id=006612&pageFlag=&sitePage=

12 Electric Power Statistics Information System, 'Electricity Trading Volume By Member Company" https://epsis.kpx.or.kr/epsisnew/selectEkmaPtdBgcChart.do?menuId=040502

Figure 3. KEPCO's Market Dominance

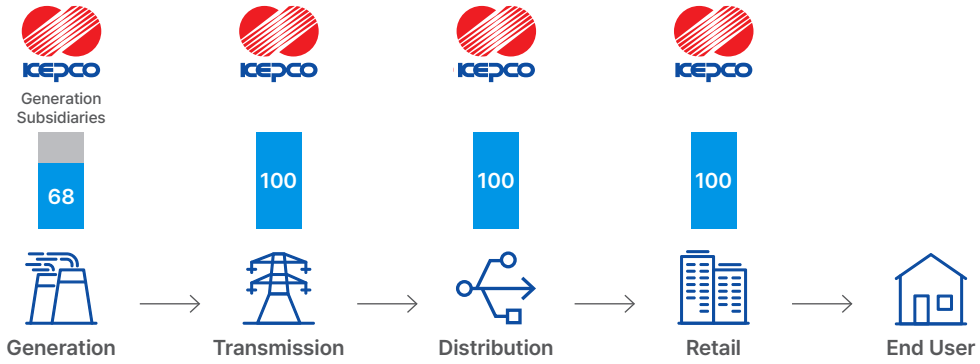
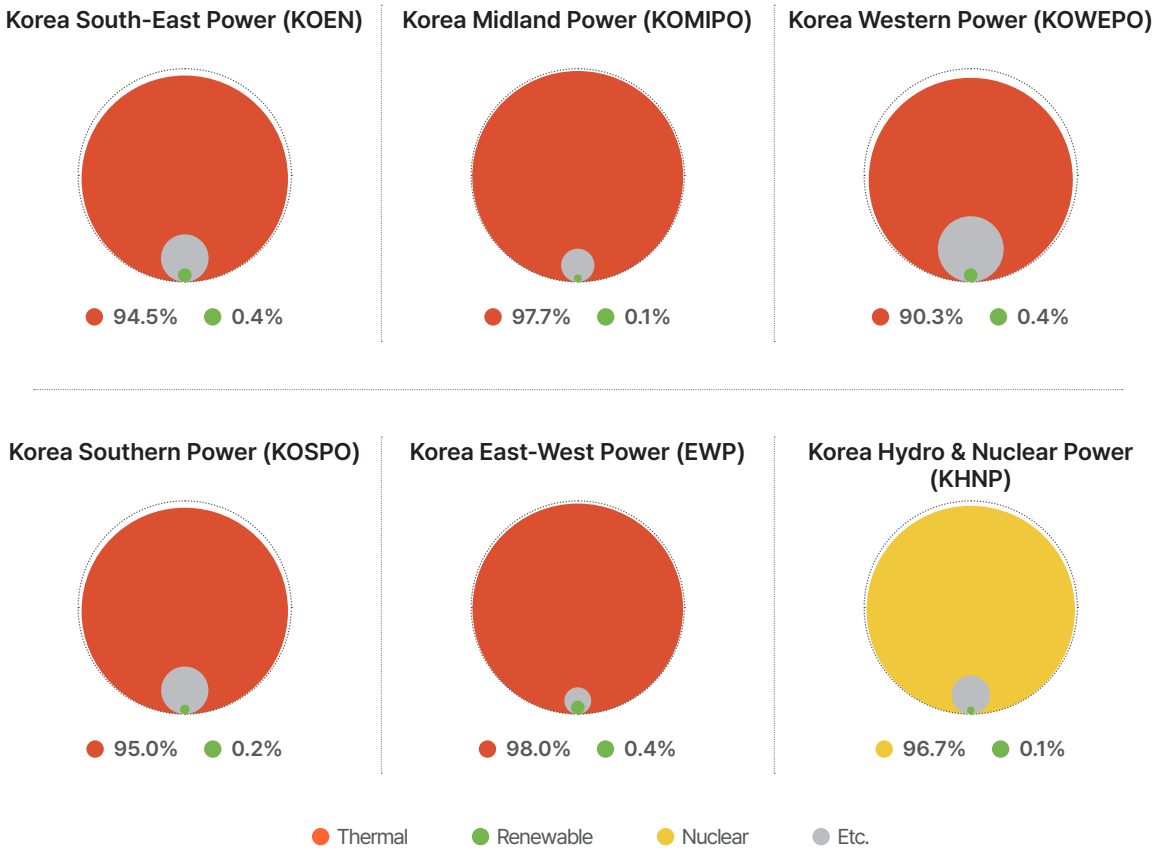


Figure 4. Share of Generation Subsidiaries' Electricity Generation by Source



* Thermal (Coal, LNG, Oil-fired), Renewable (Solar, Wind) / Data as of 2024
Source: KEPCO; adapted by SFOC

In addition, as the sole grid owner in the country, KEPCO is responsible for reinforcing and maintaining grid infrastructure to ensure system reliability and to meet electricity quality standards.[13] Because renewable energy output is inherently more volatile than that of traditional power sources, increasing renewable facilities makes it progressively more challenging to balance supply and demand and to maintain appropriate frequency and voltage levels. As a result, the expansion of renewable energy increases the burdens on KEPCO to maintain existing reliability standards while simultaneously preventing grid failures, minimizing electricity losses, and investing in grid infrastructure. This dynamic weakens KEPCO's incentives to invest in the facilities required to expand grid integration of renewable energy. In short, KEPCO's financial ties to traditional generation assets combined with its responsibility of grid maintenance and reinforcement create a structural conflict of interest within the KEPCO-centric power sector.

2. Lack of Independence in Grid Governance

KEPCO formulates its long-term plans for transmission and distribution facilities based on the Basic Plan for Long-term Electricity Supply and Demand (BPE) and develops grid infrastructure accordingly.[14] In addition, KEPCO establishes the requirements and procedures for grid connections through its regulations governing the use of electricity transmission and distribution facilities, thereby controlling the connection of generation facilities to the grid.

The Korea Power Exchange (KPX) has been responsible for grid operations since 2001 following its separation from KEPCO to enable independent operation. KPX determines which generation resources are available and the volume of electricity they can supply on an hourly basis, and issues real-time dispatch orders accordingly. However, the KPX bylaws on the Board of Directors restrict the appointment of non-executive directors representing members to executives from KEPCO or its generation subsidiaries.[15] In addition, the member companies participating in the committees responsible for establishing grid operation rules, as well as in KPX's working-level consultative committee that develops agenda items, are composed primarily of KEPCO and its generation subsidiaries, along with some thermal power generation companies.[16] This governance structure demonstrates that KPX remains institutionally centered on traditional power sources and therefore

13 Electric Utility Act, Article 27; Electric Power System Reliability and Electricity Quality Maintenance Standards, Article 39, Paragraph 1

14 Electric Power System Reliability and Electricity Quality Maintenance Standards, Article 39, Paragraph 3

15 KPX, Articles of Incorporation, Article 36, Paragraph 3; Addenda (2001. 4. 2), Article 2

16 As of September 2025, 6 of the 8 member companies participating in the rule amendment committee and its working-level consultative committee were affiliated with KEPCO and its generation subsidiaries, while the remaining 2 participants were POSCO International and Goseong Green Power. 5 out of 7 member companies participating in the grid evaluation committee and its working-level consultative committee were from KEPCO and its generation subsidiaries, with the remaining 2 represented by Pocheon Power and GSEPS.

lacks the safeguards necessary to ensure fair and neutral grid operations.

The Electricity Regulatory Commission (KOREC) operating under the Ministry of Climate, Energy and Environment (MCEE) is a regulatory body established in 2001 as a part of the power sector restructuring process. The Commission is composed of nine members including the Commissioner and is supported by the Secretariat consisting of nine public officials from MCEE. However, KOREC's role as an independent regulatory agency has been constrained by its limited powers and capacity, with its functions largely confined to deliberating on major policy decisions prior to their adoption by the Minister of Climate, Energy and Environment. Although KOREC formally holds authority to monitor, among other matters, the fairness of KEPCO's provision of grid infrastructure and the power system operations of KPX, these monitoring functions are currently carried out by KPX's internal Market Monitoring Commission.[17]

The limited independence of KPX and KOREC constrains effective regulation of the monopoly grid owner, KEPCO, and hampers the provision of incentives to expand grid integration for renewable energy. In the absence of effective oversight of KEPCO's formulation and implementation of grid plans by both the system operator and the independent regulatory agency, the efficient construction and operation of the power grid cannot be ensured. The following chapter examines case studies from the United Kingdom and the United States and discusses their implications for improving grid governance in support of expanding grid integration of renewable energy.

Korea's Grid Governance Structure and Roles	Entity		Power Grid Planning	Power Grid Connection
	Regulatory Agency	KOREC	Deliberates on long-term transmission grid plan	Deliberate on regulations
	System Operator	KPX	Provides support to KOREC and KEPCO	Provides support to KOREC and KEPCO
	Grid Owner	KEPCO	Establishes and implements the long-term transmission grid plan	Establishes transmission grid connection regulations and controls grid connections

17 KPX, 'Research on Mid To Long-Term Reforms of the Monitoring and Supervisory Framework to Enhance Fairness in the Power Sector', 2023. 12.

III. Grid Governance Structures and Institutional Roles Abroad

1. Grid Governance Reforms in the United Kingdom and the United States

As an initial step in power sector restructuring during the 1990s, the United Kingdom and the United States introduced open access policies under which transmission grids were made accessible to all electricity market participants. At the time, the question of who should control and operate the transmission grid emerged as a key issue.

First, the United Kingdom pursued ownership unbundling by selling all government-owned electricity generation, transmission, distribution, and retail businesses to the private sector. While allowing local monopolies in transmission and distribution, the U.K. government prohibited these entities from participating in electricity generation and retail activities, and by statute, transferred comprehensive operational responsibility for the power grid to the National Energy System Operator (NESO). The primary objective of this structural reform was to ensure non-discriminatory access to the grid for all electricity market participants by entrusting transmission planning and grid connection management to NESO. To support a fully separated grid operations framework, the government also transferred authority over regulatory rulemaking, process oversight, and the determination of grid network charges to the Office of Gas and Electricity Markets (Ofgem), an independent regulatory institution not affiliated with any specific government ministry.

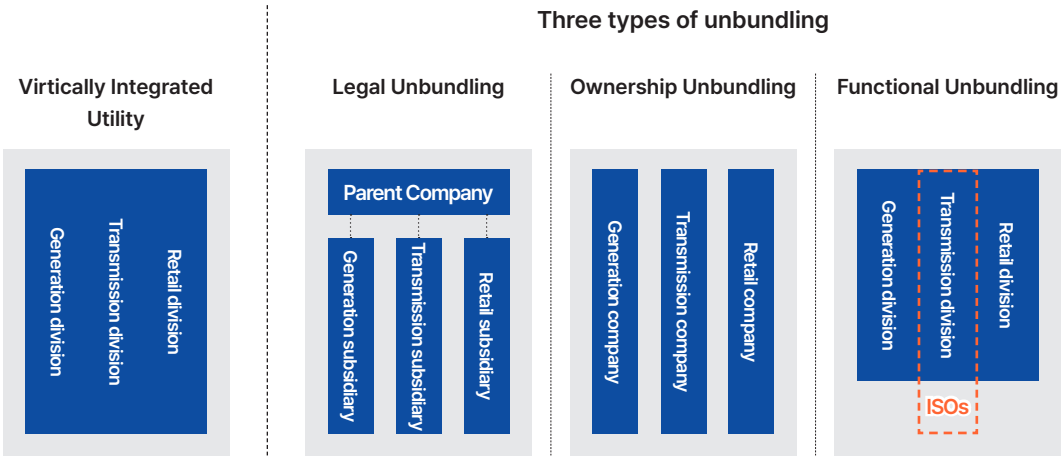
Ofgem was established by law as a non-ministerial department to ensure regulatory independence, meaning that it is not subject to ministerial control but by Parliament and the judiciary. In addition, Ofgem holds the authority to make its regulatory decisions independently (Ofgem Decisions). The U.K. government retains ownership of NESO, while Ofgem regulates NESO's powers through codes and licenses.

In the United States, regionally based vertically integrated utilities historically owned and operated all segments of the electricity sector, including generation, transmission, distribution, and retail prior to power sector restructuring. Because fully separating privately owned transmission assets from generation and retail activities would have been time-consuming, the government adopted a model of functional unbundling, under which private ownership of transmission assets was retained while operational control of the grid was transferred to newly established power system operating bodies, namely Independent System Operators (ISOs) and Regional Transmission Organizations (RTOs). Under this framework, ISOs and RTOs are responsible for controlling both the expansion of the transmission grid and grid connections. In other words, grid independence is ensured by assigning ISOs and RTOs

authority over transmission planning, construction planning, bidding, construction management, and transmission grid connection.[18] In parallel, the Federal Energy Regulatory Commission (FERC) was established as an independent regulatory agency with authority to establish regulatory rules, oversee the independent operation of the grid, and regulate transmission grid charges.

Since the FERC was established by statute as an independent regulatory agency to ensure independency, it is not subject to control by the U.S. Executive Branch and exercises both legislative and judicial functions. FERC regulates ISOs and RTOs by conferring public authority through contractual instruments known as Tariffs.

Figure 5. Three Types of Power Sector Restructuring



Source: REI

2. Case Study: The United Kingdom

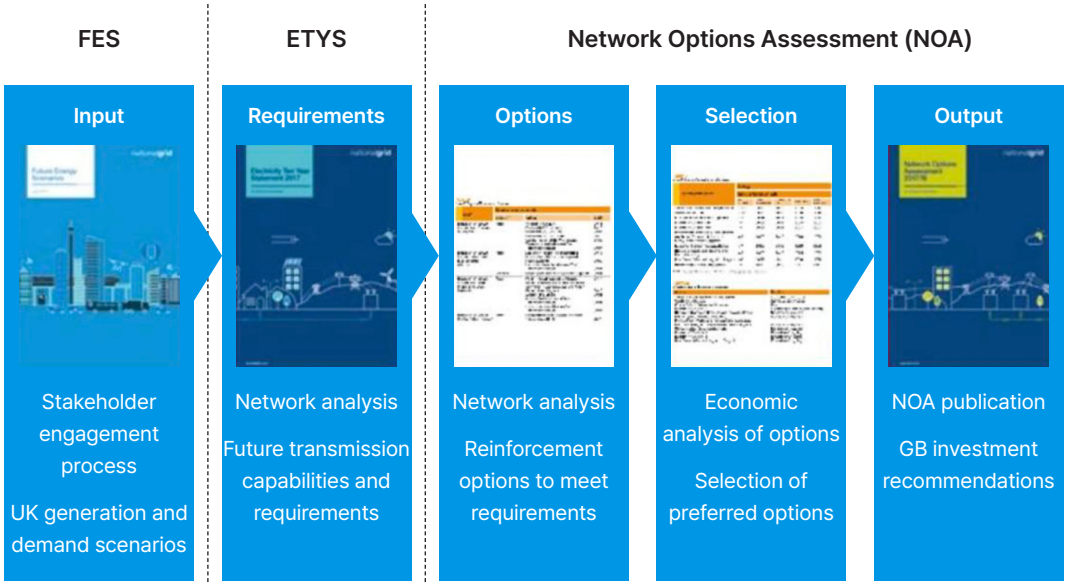
Roles of System Operator and Independent Regulator in Transmission Grid Planning and Implementation

In the United Kingdom, the roles of grid owners, the system operator, and the independent regulatory agency in grid planning and implementation are clearly defined and institutionally separated. The system operator, NESO, publishes the *Electricity Ten Year Statement* annually, drawing on *Future Energy Scenarios (FES)*—an annual strategic document that presents long-term projections for

18 PJM, 'RTEP: Planning for Long-Term Transmission Needs', 2025. 2. https://www.pjm.com/-/media/DotCom/about-pjm/newsroom/fact-sheets/rtep-fact-sheet.pdf

electricity supply and demand.[19] Based on these two documents, Transmission Network Owners (TNOs) are required to submit proposals for transmission grid construction. NESO then assesses these proposals for feasibility and on their suitability in achieving the future energy scenarios, and reflects its conclusions in the *Network Options Assessment (NOA)*. Following this process, grid owners may independently develop their business plans for grid construction, which are subsequently approved by Ofgem before proceeding to implementation.

Figure 6. Transmission Planning Procedures in the UK



Source: NESO

Ofgem's primary role in approving transmission grid construction proposals is to determine the profit cap applicable to grid owners. In the U.K., transmission grid charges are calculated based on grid operating costs, construction costs, and allowed profitability under the RIIO model (Revenue = Incentives + Innovation + Output). In addition, performance-based incentives—such as those related to innovation and operational efficiency—are incorporated into the framework. These elements are used to set both the profit cap and the charge cap in advance for each regulatory period, which spans five years.[20]

19 ESO, 'Network Options Assessment', 2018. 9. https://www.ofgem.gov.uk/sites/default/files/docs/2018/11/riio-et2_cost_-_wg2_eso_noa_-_25.09.2018.pdf

20 KEPCO Economy & Management Research Institute, 'Review of Changes to the U.K.'s Ofgem RIIO Method', 2025. 10.

Roles of System Operator and Independent Regulator in Transmission Grid Connections

In the U.K., transmission grid connections are managed by NESO, which establishes detailed procedures for grid connections as well as the associated legal and administrative management policies.[21] For comprehensive reforms of transmission grid connection policies, planning responsibility rests with the government while Ofgem is responsible for policy implementation.[22] Final responsibility for connection management remains with NESO, as Ofgem exercises supervisory authority over NESO through regulatory codes and licensing arrangements. This governance framework enables the system operator and the regulatory agency to manage grid connections independently, thereby implementing policies without being constrained by revenue considerations or conflicts of interest.

Amid a surge in renewable energy grid connection requests and worsening connection delays, NESO implemented a Connection Reform in 2025, shifting from a *first-come, first-served* approach to a *first ready and needed, first served* framework. The reform was designed to address situations in which projects that were ready to proceed faced prolonged delays because not-yet-ready projects occupied positions in the connection queue. As the implementing entity for transmission grid connections, NESO developed the detailed design of the reform and sought approval from Ofgem,[23] after which Ofgem enacted the proposed regulatory changes. As a result, all pending grid connection requests in the U.K. have been placed on hold, with applicants now required to demonstrate project readiness so that grid access can be prioritized for projects that are ready to proceed.[24]

The U.K.'s Grid Governance Structure and Roles	Entity		Power Grid Planning	Power Grid Connection
	Regulatory Agency	Ofgem	Approves transmission grid construction proposals and regulates grid charges	Approves and reforms Codes and Licenses
	System Operator	NESO	Develops long-term transmission grid plans	Manages transmission grid connection processes
	Grid Owner	TNO	Proposes and implements transmission grid construction	Executes transmission grid connections

21 Ofgem, 'ISOP Roles Guidance 2023-2025', 2024. 5. https://www.ofgem.gov.uk/sites/default/files/2024-05/ISOP_Roles_Guidance_2023-2025_CLEAN.pdf

22 Ofgem, 'Ofgem and DESNZ announce joint Connections Action Plan', 2023. 11. https://www.ofgem.gov.uk/publications/ofgem-and-desnz-announce-joint-connections-action-plan

23 Norton Rose Fulbright 'TMO4+ connection reform proposals receive stamp of approval', 2025. 4. https://www.nortonrosefulbright.com/en/knowledge/publications/0101e3b9/tmo4-connection-reform-proposals-receive-stamp-of-approval#:~:text=On%2015%20April%202025%2C%20Ofgem,(TMO4%2B)%20package%20of%20reforms

24 NESO, 'Connections reform timeline' https://www.neso.energy/industry-information/connections-reform/connections-reform-timeline

3. Case Study: The United States

Roles of System Operators and Independent Regulatory Agency in Transmission Grid Planning and Implementation

In the United States, Independent System Operators (ISOs) and Regional Transmission Organizations (RTOs) in each region are required to prepare and submit annual transmission expansion plans and to implement them in accordance with Order No. 890 enacted by the Federal Energy Regulatory Commission (FERC).[25] Unlike the United Kingdom, ISOs and RTOs are authorized to request grid owners to carry out transmission grid construction based on their approved plans. Except in cases essential for maintaining system reliability, ISOs and RTOs rely on competitive bidding processes to prevent preferential treatment of incumbent generators.[26] Transmission planning involves stakeholder participation, with the structure and scope of engagement varying according to the governance arrangements of each ISO or RTO. For example, PJM, which oversees grid operations across thirteen states in the eastern and the midwestern United States as well as Washington D.C., operates under a member-based governance structure and conducts deliberations through regional and committee-level processes.[27] In contrast, CAISO, which manages grid operations in California, is closely aligned with the state policy objectives and allows participation by non-member stakeholders, who may submit comments and take part in meetings as part of the planning process.[28]

Unlike the United Kingdom, the relationship between FERC and ISOs/RTOs is defined through Tariffs, which serve as contractual instruments governing ISO and RTO operational rules. Decisions made by the boards of ISOs or RTOs on agenda items that fall within FERC's jurisdiction require FERC's approval. Accordingly, while ISOs and RTOs may independently approve, implement, and manage transmission grid plans, the determination of transmission grid charges remains subject to FERC's approval.

To address surging demand for power grid infrastructure and strengthen system reliability, the FERC enacted Order No. 1920 in 2024 through the formal rulemaking process, the *Notice of Proposed Rulemaking (NOPR)*. The central objective of Order No. 1920 is to enable more efficient transmission

25 FERC, 'Summary of Compliance Filing Requirements - Order No. 890' https://www.ferc.gov/industries-data/electric/industry-activities/open-access-transmission-tariff-oatt-reform/summary-compliance-filing-requirements-order-no-890

26 FERC, 'Order No. 1000 - Transmission Planning and Cost Allocation' https://www.ferc.gov/electric-transmission/order-no-1000-transmission-planning-and-cost-allocation

27 PJM, 'PJM Manual 34: PJM Stakeholder Process Revision: 17', 2022. 7. Process https://www.pjm.com/-/media/DotCom/documents/manuals/archive/m34/m34v17-stakeholder-process-07-27-2022.pdf

28 Utility Dive, 'CAISO board approves $6.1B transmission plan with focus on access to clean energy', 2024. 5. https://www.utilitydive.com/news/caiso-2023-transmission-plan-offshore-wind-sunzia/717093/

development by requiring ISOs to: (1) develop 20-year transmission planning horizons; (2) reform transmission grid charges; (3) incorporate new technologies, including dynamic line ratings, advanced power flow control devices, advanced conductors, and transmission switching; (4) establish formal processes for stakeholder participation in transmission planning; and (5) strengthen interstate transmission connectivity. In addition, FERC introduced procedures to solicit input from individual states during the transmission cost determination process, with the aim of improving coordination among diverse state-level power policies.[29] The development of Order No. 1920 took more than two years, during which FERC collected input from over 200 stakeholders.

Roles of System Operators and Independent Regulatory Agency in Transmission Grid Connections and Operations

Transmission grid connections in the United States are managed by ISOs and RTOs under the authority conferred by FERC. The detailed procedures and methodologies governing transmission grid connections are set out in Tariffs, with ISOs and RTOs responsible for the fair execution of these procedures. Any changes to the connection process must undergo internal deliberation within the ISO or RTO, followed by submission for review to FERC and final approval by the Commission.[30]

The United States likewise faced an urgent need to overhaul its grid connection framework, as a surge in renewable energy connection requests resulted in prolonged delays.[31] In response to multiple requests from ISOs and RTOs to amend their Tariffs, FERC initiated the NOPR process and enacted Order No. 2023 in 2022, pursuing a comprehensive reform of connection procedures rather than addressing each ISO or RTO on an individual basis. As a result, the U.S. shifted away from the traditional *first come, first served* principle toward a *first ready and needed, first served* approach, similar to the reform adopted in the U.K. Under Order No. 2023, ISOs and RTOs are developing revisions to their Tariffs tailored to local conditions and submitting them to FERC for approval in order to implement the new grid connection framework.

29 Utility Dive, 'FERC expands states' role in regional transmission planning, cost allocation', 2024. 11. https://www.utilitydive.com/news/ferc-states-transmission-planning-cost-allocation-rehearing/733698/

30 Utility Dive, 'FERC approves CAISO interconnection reform plan', 2024. 10. https://www.utilitydive.com/news/ferc-california-caiso-interconnection-reform-plan/728633/?utm_source=Sailthru&utm_medium=email&utm_campaign=Issue:%202024-10-08%20Utility%20Dive%20Storage%20%5Bissue:66624%5D&utm_term=Utility%20Dive:%20Storage

31 RMI, 'Waiting in Queue: RMI's Solutions to the Gridlocked US Power Sector', 2024. 9. https://rmi.org/waiting-in-queue-rmis-solutions-to-the-gridlocked-us-power-sector/

The U.S.'s Grid Governance Structure and Roles	Entity		Power Grid Planning	Power Grid Connection
	Regulatory Agency	FERC	Regulates transmission grid charges	Confers authority on ISOs/RTOs and intervenes when Tariff revisions are required
	System Operator	ISO/RTO	Develops and implements long-term transmission grid plans	Manages transmission grid connection processes
	Grid Owner	TO	Constructs transmission grid infrastructure	Executes transmission grid connections

IV. Grid Governance Reform for Renewable Energy Expansion

With KEPCO monopolizing the grid, Korea's power sector faces structural limitations in expanding grid integration of renewable energy. These constraints stem from inherent conflicts of interest arising from KEPCO's financial ties to traditional power sources, combined with its responsibility for maintaining system reliability. Moreover, the composition of key decision-making bodies within KPX, the system operator, remains heavily centered on stakeholders from traditional power sources, while the regulatory agency, KOREC, lacks effective regulatory power over KEPCO and KPX. Drawing on the experiences of the U.K. and the U.S., this report proposes the following directions to enhance grid integration of renewables through the separation of authority over grid planning and grid connection and related institutional reforms.

Separation of Grid Ownership, Operation, and Regulation

To address KEPCO's conflict of interest with respect to expanding grid integration of renewable energy, authority over transmission grid planning and connection management should be transferred to the system operator, KPX, in a manner comparable to the roles assigned to NESO and ISOs/RTOs. In addition, an independent regulatory agency, similar to Ofgem or FERC, should be established to define the scope of authority delegated to the system operator and to approve the operational rules developed by the system operator based on stakeholder input.

Ensuring the Independence of System Operator and Regulatory Agency

KPX should move away from its governance structure centered on traditional power sources by ensuring broader participation from other member companies and relevant stakeholders. In addition, a new independent regulatory agency should be established as a central administrative agency, separated from MCEE and placed directly under the Prime Minister's Office. This agency should be endowed with quasi-legislative functions, enabling it to independently establish regulatory rules, following the model of Ofgem or FERC.

Reforming Grid Connection Policies for Fairness and Efficiency

Drawing on the experience of the U.K.'s Connection Reform and the U.S.'s Order No. 2023, Korea should likewise shift from a *first come, first served approach to a first ready and needed, first served* principle for grid connections. Under the supervision of an independent agency, renewable energy projects that are ready for connection should be granted timely access to the grid, rather than relying on reactive measures that withdraw and reallocate connection rights projects that have yet to reach readiness.

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The Way Forward for Korea's Grid Governance to Power the 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.