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Settled in Secret

The Opaque Grid Fee System Undermining Renewable Energy PPA Expansion in South Korea

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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.

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Contents

Executive Summary 4

I. Introduction 6

II. Problematic Power Grid Fee Regulation in South Korea 9

III. Comparing Fee Setting Systems in South Korea, USA, and Great Britain. 12

1. Existence of an Independent Regulatory Authority responsible for setting grid fee rates 12
2. Publicly Available Fee Calculating Methodology & Disclosure of Costs Included in the Rate Base 15
3. Consideration of net-zero grid investments in the approval process 17
4. Opportunities for public participation 18

IV. Conclusion 20

Appendix 21

References 26

Executive Summary

Power Purchase Agreements (PPA) for renewable energy are an essential tool to secure investment to build new generation and advance the energy transition. However, in South Korea PPAs are impeded by a system of rigid regulations and a blackbox of opaque power grid fee rate setting standards set by the fossil-fuel oriented utility Korea Electric Power Corporation (KEPCO). Companies in South Korea that want to support the expansion of renewable energy through PPAs have stated that this opaque grid fee setting system needs to be addressed to revitalize PPA adoption. Combined with the lack of competition in the power sector, this highlights the importance of having transparent grid fee setting systems, as power grid fees are a significant factor in a PPAs long-term price.

The Federal Energy Regulatory Commission (FERC) and PJM Interconnection (PJM) in the United States, and the Office of Gas and Electricity Markets (Ofgem) and the National Energy System Operator (NESO) in Great Britain, are two regulatory systems well known for their transparent and pragmatic grid fee setting procedures. Ofgem also goes a step further in incorporating actions for net-zero as factors in their approval process, stimulating investments for a renewable-friendly and sustainable power grid. These systems offer effective examples to improve South Korea's grid fee setting systems to be more accountable, transparent, and sustainable.

1. **Existence of an Independent Regulatory Authority responsible for setting grid fees**
   South Korea lacks an independent regulatory authority, leaving full responsibility for setting grid-related fees to the grid owner. This is in stark contrast with the US and GB, where FERC and Ofgem respectively operate as completely independent regulatory authorities responsible for monitoring and approving allowed income of transmission companies, grid use fees, and ancillary service fees.

2. **Publicly available fee calculating methodology & disclosure of costs included in the rate base**
   KEPCO currently does not publish the grid fee rate setting methodology used to calculate customer's specific grid rates; neither does the utility disclose specifics on the actual investment and operational costs involved, or calculations of grid fee rates. Under FERC/PJM, all charging rules and methodologies are published in PJM Manual 27: Open Access Transmission Tariff Accounting guideline, and all transmission companies under PJM must disclose detailed business costs in public FERC rate filings (see Appendix 2). Under Ofgem/NESO, the Use of System Charging Methodology discloses all charging rules and methodologies. The rates are regulated through the RIIO system, which pre-approves budgets for each transmission company and discloses allowed revenue, including breakdowns of budgets allocated. Publishing grid fee setting methodology and disclosing the costs included in the rate base ensures accountability and allows customers to know if they are being fairly charged.

3. **Consideration of net-zero investments in the approval process**
   Actions and investments for achieving net-zero are not currently a factor that's legally required for grid fee rate approval in South Korea. The United Kingdom, on the other hand, has formally legislated the

region's transition to net zero, and Ofgem has reflected this by introducing net-zero evaluation criteria in its approval processes. Incorporating such criteria ensures investments made in the grid and paid for through customer grid fees are directed to support the renewable energy transition.

4. Opportunities for public participation

In South Korea, meetings of the Electricity Regulatory Commission, which is supposed to review the grid fee rates submitted by KEPCO, and the Cost Evaluation Committee of Korea Power Exchange, which reviews ancillary fee rates, are not open to the public to observe or participate in, and the minutes of these meetings are also not disclosed. By contrast, FERC has a dedicated Office of Public Participation and proceedings on a transmission company's rates are open to the public. Citizens can also file challenges to rates. Ofgem also provides opportunities for the public to provide feedback on transmission companies' allowed revenues, which determine grid fee rates, and NESO often holds forums for the public on charging methodologies.

[Table 1] Features of a fair, transparent, and sustainable grid fee regulatory system found in PJM, Ofgem, and South Korea

	South Korea	USA - FERC & PJM	Great Britain - Ofgem
Independent regulatory authority	✖	●	●
Publicly available rate setting methodology + Disclosure of costs included in the rate base	✖	●	●
Consideration of net-zero investments in the approval process	✖	✖	●
Opportunities for public participation	✖	●	▲

Recommendations

- Introduce an independent regulatory body that oversees power grid planning and rate approval
- Publish calculating methodologies for grid use fee rates, including disclosure of all costs which make up the rate base of power grid use tariffs and how the rate base is used to calculate the rates
- Include requirements for planning and investments in grid enhancements for net-zero in the grid fee approval process
- Allow open access to regulatory committee meetings and allow public feedback

I. Introduction

A lack of transparency on power grid fees has been pointed out as a major ethical issue worldwide[1,2]. Such fees are an unavoidable cost borne by both electricity generators and end users because the only way to sell or use electricity (excluding self-generators) is by being connected to the electricity grid. Additionally, the power grid owners have a natural monopoly over the sector of delivering electricity. This is because there is only one grid we can connect to, meaning users don't have a choice in what company owns the grid that they sell to or receive their electricity from. As a result, many countries have implemented systems to simulate competition by regulating the rates of power system fees. However, many of these systems remain opaque.[3]

Insufficient disclosure of data and public access to these systems leaves open room for grid owners and operators to set regulations and tariffs in favor of themselves and their own assets, instead of considering fairness for the power grid users. It can also be used to deliberately stifle new players such as renewable energy generators, VPPs, and RE consumers. Traditional incumbent electric utilities, which are largely fossil-fuel based, can wield significant power over regulatory authorities[4]. These utilities often see independent renewable energy generation as direct competition to them, and it has been found that renewable energy projects are often charged higher fees than comparable fossil fuel generation projects[5].

Such has been the case in South Korea, where the power sector has been monopolized by the state-owned utility Korea Electric Power Corporation (KEPCO). The power system was completely vertically integrated under KEPCO until 2001 when the government partially unbundled the power generation sector.[6] Following the unbundling, private companies were allowed to enter the generation sector to produce electricity. However, KEPCO retained financial ownership of generation assets[7], and complete ownership over the transmission, distribution, and retail of electricity, resulting in the utility still having a virtual monopoly over the power system.

The system remained in this state until 2021, when the Electric Utility Act was amended to allow sale of

1 Von Hammerstein, Christian; Jahn, Andreas; Graichen, Patirck. Agora Energiewende. 2018. *Stromnetzentgelte: Eine Blackbox, die nicht geöffnet werden kann? Eine rechtliche Analyse der aktuellen Situation., page 4*. https://www.agora-energiewende.de/aktuelles/blackbox-netzentgelte-tarife-dernetzbetreiber-vermutlich-oft-ueberhoeht-ueberpruefung-ist-unmoeglich.

2 Lusiani, Niko. The Roosevelt Institute. 2024. *Entrenched power: how shareholder-owned electric utilities hinder the clean energy transition*, Entrenched Power: How Shareholder-Owned Electric Utilities Hinder the Clean Energy Transition - Roosevelt Institute

3 For example, in 2019, Agora Energiewiende and Regulatory Assistance Project released a joint report revealing how the German electricity regulator not only didn't publish regulatory decisions as legally required, but also released misleading and imprecise data on fees and revenue of the grid operator. (Von Hammerstein, Christian; Jahn, Andreas; Graichen, Patirck. Agora Energiewende. 2018.)

4 Lusiani, Niko. The Roosevelt Institute. 2024. *Entrenched power: how shareholder-owned electric utilities hinder the clean energy transition, page 7.*

5 Lusiani, Niko. *Entrenched power: how shareholder-owned electric utilities hinder the clean energy transition, page 8 and 13*

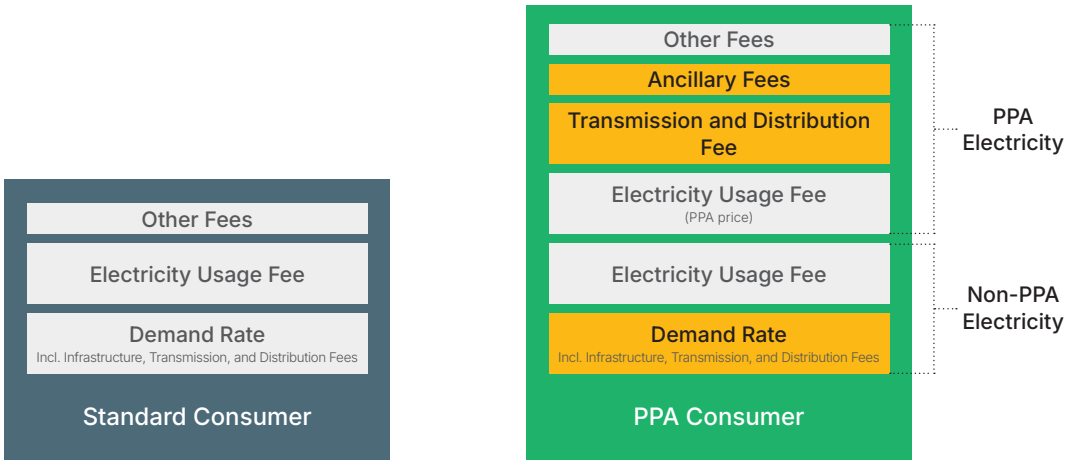
6 Kim, Jinwoo. National Archives of Korea. 2007. https://www.archives.go.kr/next/newsearch/listSubjectDescription.do?id=006612&sitePage=)

7 70% of the generation assets are fossil-fuel based generators

renewable-based electricity through PPAs[8]. This amendment marked significant development as it partially opened the retail sector and introduced new competition for KEPCO, something the utility had never faced before. The introduction of the PPA system allowed companies to drive new renewable energy capacity by increasing bankability of projects due to the long-term stable financing for generators provided through the PPA contracts.

Companies often favor signing PPAs for their electricity supply due to the affordability and predictability these contracts provide. However, this predictability is only guaranteed for the price of the electricity itself. Companies who sign PPAs are billed for multiple other services that are required to deliver that electricity. This includes use of the transmission and distribution grids, grid stability services, backup generation capacity, and various other necessary services. The price charged for many of these services are set behind closed doors by the monopoly state-owned utility KEPCO who has little incentives to allow the PPA market to grow and lose retail market share for the utility.

[Figure 1] Electricity tariff structure for regular users and direct PPA users in South Korea



Since the introduction of the PPA system, companies that have signed PPAs have been subject to discriminatory pricing of electricity fees by KEPCO.[9] This serves as a barrier imposed by the utility onto large customers seeking to procure electricity directly from new renewable energy generators through PPAs. The discriminatory pricing and lack of transparency on power grid fees has actually deterred many companies from signing PPAs.[10] This is a crucial issue for the renewable energy transition, as PPAs play a key role in securing investment for new projects. To ensure fair access and fair charging for use of the power grid, it is essential that transparency and disclosure are embedded in the power system's processes. Thus, this report examines South Korea's power grid fee setting processes and compares them with that

8 Ministry of Trade and Industry. 2021. *재생에너지 전기를 사용자가 직접 구매 가능해져*. https://www.motir.go.kr/kor/article/ATCL3f49a5a8c/164668/view

9 This is expanded upon in the following section "Problematic Power Grid Fee Regulation in South Korea."

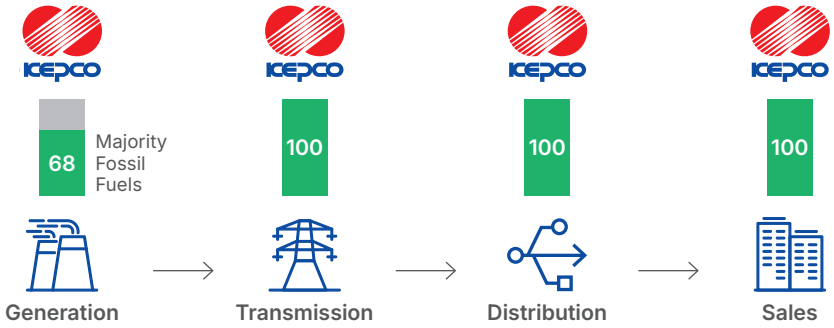
10 Hankook Research, Korea RE100 Council, Solutions For Our Climate. 2025. *기업의재생에너지 직접구매(PPA) 망 이용요금에 관한 설문 조사.*

of the United States (US) and Great Britain, two countries with established independent and transparent regulating systems. Through the analysis we provide key policy recommendations to improve the fairness and transparency of the power grid fee regulating systems.

II. Problematic Power Grid Fee Regulation in South Korea

In South Korea, grid usage fees and ancillary service fees are set by KEPCO and Korea Power Exchange (KPX)[11], respectively. Although KPX is legally separate from KEPCO, many KEPCO affiliates work as board and committee members.[12] KEPCO is the most powerful player within the power system, maintaining ownership and control over a majority of the sector (see Figure 2). The company still financially owns the assets of the six generation companies (GENCOs) that were formed from the power sector unbundling of 2001, with about 95% of the electricity generated by GENCOs[13] coming from fossil fuel-based generators. This financial linkage reveals the inherent bias that this powerful actor has for the incumbent fossil fuel generation.

[Figure 2] The structure of the power system in South Korea



Gradual regulatory changes have slowly allowed for the entry of new market players into the power system such as independent PPA users. As these players grow in number, pressure has increased on KEPCO as the company loses more of its customer base. Combined with KEPCO's inherent bias for fossil fuel generation, this environment gives KEPCO incentive to ensure that fossil fuel generators do not face significant competition from renewable energy generation by reducing fiscal and regulatory incentives for private renewable energy PPAs.

An example of such practice was the introduction of a separate electricity rate system for PPA users in 2022. Under this system, the "Demand Rate" (see Figure 1) charged for KEPCO-provided supplementary electricity[14] was set at a price 1.5 times higher than the demand rate charged to non-PPA users for their

11 Korea Power Exchange is the electricity grid operator, managing the wholesale power market and any costs associated with maintaining stability of the power grid.

12 Solutions For Our Climate. 2025. *전력거래소 거버넌스,변화하는 전력시장 참여자의 대표성 강화 방안*. https://forourclimate.org/ko/research/610

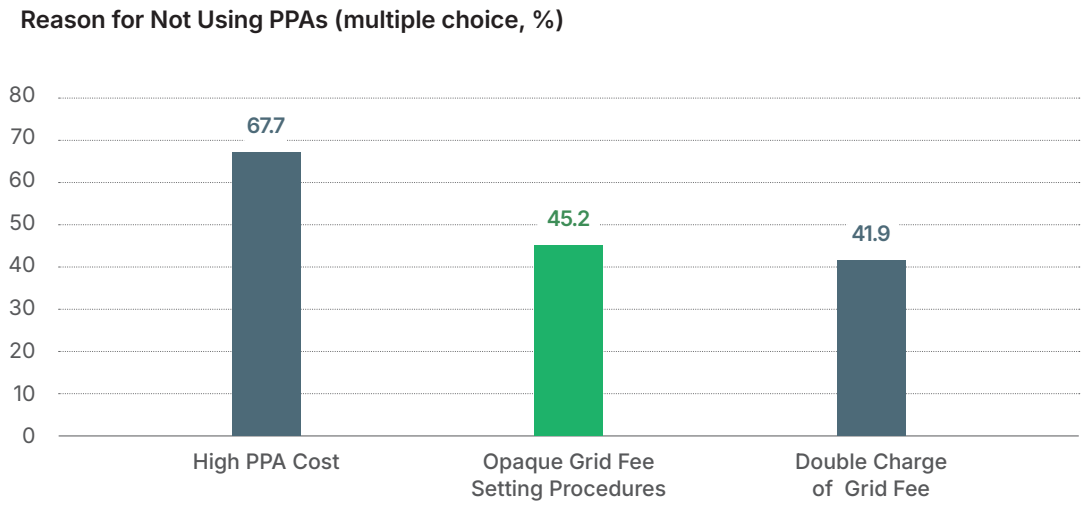
13 Excluding Korea Hydro & Nuclear Power, which generates 97% of its electricity using nuclear power.

14 Any electricity not covered by the PPA and bought from KEPCO.

KEPCO-provided electricity.[15] Consumers that sign PPAs would be subject to higher rates for the same electricity they would be receiving as a non-PPA consumer. The new tariff system could have unfairly increased annual electricity costs by 10 billion won for mid-size manufacturers and by 6-10 billion won for large corporations[16]. Although the discriminatory tariff system was eventually suspended due to industry criticism and pressure, this example presents the risk that KEPCO could use their systemic power to prevent the loss of customers to new renewable energy market players. This singling out of PPA users stifles voluntary renewable energy procurement, which not only reduces potential renewable energy growth, but also puts Korean companies at risk of losing competitiveness on the global stage.

The untransparent grid fee setting system is yet another tool KEPCO is using to inhibit the expansion of PPA adoption. A recent survey of Korean corporations revealed how the lack of transparency in grid fee setting procedures is deterring them from signing PPAs (see Figure 3). Given the virtual monopoly KEPCO has on transmission, retail, and majority of generation of electricity, it can be viewed as an abuse of power if costs are unfairly charged. By increasing transparency and disclosing the costs that go into setting grid use fees and ancillary fees, customers will be more likely to accept the costs of reasonable investments into grid enhancement. A conclusion which is backed by the results of the survey cited. This is why it is now more important than ever to explore how to improve the grid fee regulatory systems and bolster investments in renewable energy.

[Figure 3] Results from a survey of corporations on grid fees[17]

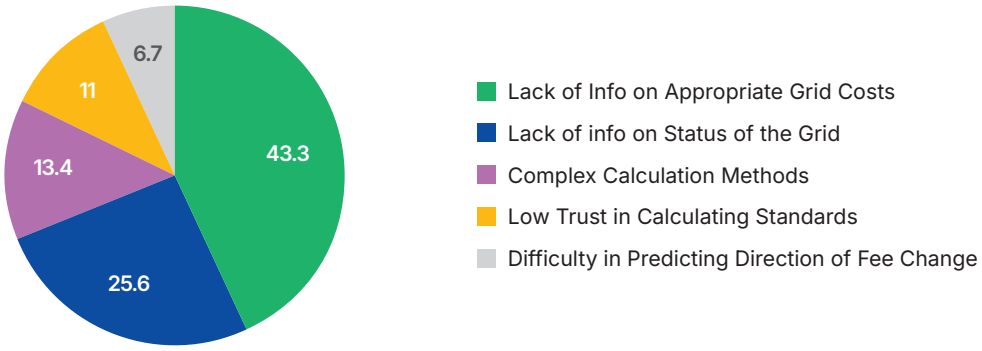


15 에너지경제. 2023. *전력시장 개방 '허울' 논란…PPA 요금제에 "한전 갑질·횡포" vs "체리피킹 방지"*. https://www.ekn.kr/web/view.php?key=20230118010004093

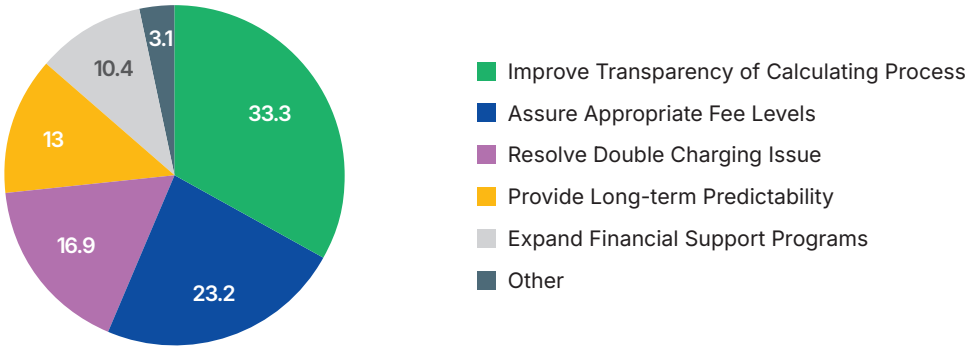
16 Choi, Ho; Byeon, Sanggeun. ETNews. 2023. *한전, '직접 PPA' 요금제 도입 무기한 유예…산업계 반발에 보완 검*. https://www.etnews.com/20230710000172

17 Hankook Research, Korea RE100 Council, Solutions For Our Climate. 2025. *기업의 재생에너지 직접구매(PPA) 망 이용요금에 관한 설문조사*.

Top Reason for Considering Grid Fees Untransparent (%)



Top Feature of Grid Fee to Change to Support PPAs (%)



III. Comparing Fee Setting Systems in South Korea, USA, and Great Britain.

To evaluate South Korea's power grid fee regulatory system, we examined the regulatory systems of the Federal Energy Regulatory Commission (FERC) in the US and the Office of Gas and Electricity Markets (Ofgem) in Great Britain, two regulatory authorities well known for being independent and transparent. Five defining features which characterized FERC and/or Ofgem's systems as fair, transparent, and sustainable were identified and compared with South Korea (See Figure 4).

[Figure 4] Features of a fair, transparent, and sustainable grid fee regulatory system found in he United States, Great Britain, and South Korea

	South Korea	USA - FERC & PJM	Great Britain - Ofgem
Independent regulatory authority	✖	●	●
Publicly available rate setting methodology + Disclosure of costs included in the rate base	✖	●	●
Consideration of net-zero investments in the approval process	✖	✖	●
Opportunities for public participation	✖	●	▲

1. Existence of an Independent Regulatory Authority responsible for setting grid fee rates

1) FERC/PJM

FERC is the national level regulatory authority in the US which is responsible for regulating interstate electricity transmission.[18] The organization oversees six multi-state regional transmission organizations (RTOs) in the US, all of which are independent system operators responsible for regulation, coordination, control, and monitoring of multi-state transmission grids[19]. One of these RTOs is PJM Interconnection (PMJ), an RTO covering thirteen states and the District of Columbia in the northeast of the US. To examine how regulation is implemented at the regional level, we use PJM as our data source, an RTO well known for its transparency.

FERC is tasked with implementing the Federal Power Act. The Federal Power Act (FPA) states that that all rules, rates, and charges related to the transmission and sale of electric energy shall be **just and**

18 Federal Electric Regulatory Commission. 2025. *Overview*. https://www.ferc.gov/electric

19 FERC. 2025. *Electric Power Markets*. https://www.ferc.gov/electric-power-markets

reasonable[20], and it empowers FERC to address any "rate, charge, or classification" which they determine to be "**unjust, unreasonable, or unduly discriminatory or preferential.**"[21] The FPA gives FERC legal authority to independently regulate power grid fees, and it requires any entity providing transmission service to do so on a nondiscriminatory basis, referred to as 'open access.'[22] At the regional level, PJM implements the open access mandate through its "Open Access Transmission Tariff."[23] PJM also requires that its board members and employees are independent from any company it regulates to ensure there are no conflicts of interest.[24]

Every year transmission companies within the PJM region submit detailed financial information to the RTO and FERC to prove their required revenue through a formula rate protocol.[25] FERC reviews and approves the required revenue, which is then used to set the network integration transmission rate (the grid use fee) for the relevant zone. FERC and PJM are also responsible for approving and/or calculating rates for ancillary services.[26] All users connected to the transmission grid within the same zone pay the same rates for the network integration fees and ancillary service fees.

2) Ofgem/NESO

Ofgem is a non-ministerial government department which acts as the independent energy regulatory authority for Great Britain. Ofgem regulates both electricity transmission owners (ETOs) and distribution network operators (DNOs) of the electricity system. Under the Energy Act of 2023 and the government's energy policy for Great Britian, Ofgem is tasked with protecting consumers interests, particularly those of vulnerable citizens[27,28]. Under Ofgem, transmission and distribution investment costs are pre-approved based on five-year plans submitted in advance to the regulator. Ofgem goes a step further in its regulatory system by considering in advance how planned expenses will affect customers as well as ensuring action and investment for a net-zero power system.

Ofgem determines allowed revenue of ETOs and DNOs through a price control system called RIIO (Revenue = Incentives + Innovation + Outputs). The RIIO system provides incentives to reward innovation and actions that help the country meet its policy goals of reduced carbon emissions, cost savings

20 "[a]ll rates and charges ... for or in connection with the transmission or sale of electric energy... and all rules and regulations affecting or pertaining to such rates and charges shall be just and reasonable," (Vann, Adam. Congressional Research Service. 2020. *The legal framework of the federal power act*. https://www.congress.gov/crs-product/IF11411)

21 "empowers FERC to initiate a proceeding to address any 'rate, charge or classification' related to the transmission or sale of electricity that the agency determines is 'unjust, unreasonable, unduly discriminatory or preferential.'" (Vann, Adam. Congressional Research Service. 2020.)

22 Vann, Adam. Congressional Research Service. 2020. *The legal framework of the federal power act*. https://www.congress.gov/crs-product/IF11411

23 PJM Interconnection. 2025. *Open access transmission tariff*. https://agreements.pjm.com/oatt/3897

24 PJM. 2025. Oversight and transparency. https://www.pjm.com/-/media/DotCom/about-pjm/newsroom/fact-sheets/oversight-and-transparency-factsheet.pdf

25 FERC. 2022. https://www.ferc.gov/formula-rates-electric-transmission-proceedings-key-concepts-and-how-participate

26 PJM. 2025. *PJM manual 27: Open access transmission tariff accounting*. https://www.pjm.com/pjmfiles/directory/manuals/m27/index.html

27 Government of the United Kingdom. 2023. *Energy Act 2023*. https://www.legislation.gov.uk/ukpga/2023/52

28 Department for Energy Security and Net Zero. 2024. *Strategy and policy statement for energy policy in Great Britain, article 27*. https://www.gov.uk/government/publications/strategy-and-policy-statement-for-energy-policy-in-great-britain/strategy-and-policy-statement-for-energypolicy-in-great-britain-accessible-webpage#energy-system-roles-and-responsibilities

for customers, and growth[29]. Detailed explanations of innovation and output factors used to evaluate expenditure plans are listed out in the publicly available Sector Specific Methodology documents published on Ofgem's website.[30] ETOs and DNOs submit five-year investment plans to Ofgem which reviews and then calculates the final allowed revenue determinations[31] (see Appendix 1). Unlike the grid use fees, the ancillary service fees are calculated retroactively according to costs incurred in day-to-day operation. The rates are set by the independent national electric system operator, NESO.[32]

3) South Korea

In South Korea, an independent regulator similar to FERC or Ofgem does not exist. KEPCO, the transmission and distribution grid owner, sets the grid use fee rates internally - a potential conflict of interest. The closest comparable body to an independent regulator is the Electricity Regulatory Commission housed within MCEE which is responsible for reviewing power grid use tariffs. KEPCO submits accounting documents to the committee every year for review. However, this commission, being directly overseen by the Minister of MCEE, is not independent of the government. Additionally, the commission is not equipped with adequate resources to thoroughly monitor and evaluate KEPCO's proposed grid fees against the company's accounting documents.[33] It is also not clear whether all grid users are charged the same rate according to their electricity type as grid fee rates are only disclosed publicly for non-KEPCO users and not for KEPCO customers.

[Figure 5] Grid use fee rate approval process in South Korea[34]

29 Office Gas and Electricity Markets. 2025. *Energy Network Price Controls.* https://www.ofgem.gov.uk/energy-regulation/how-we-regulate/energy-network-price-controls

30 Ofgem. 2024. *RIIO-3 sector specific methodology decision – ET annex*. https://www.ofgem.gov.uk/sites/default/files/2024-07/RIIO-3_SSMD_ET_Annex.pdf

31 Ofgem. 2021. *RIIO-2 Final Determinations Electricity Transmission System Annex (REVISED)*. https://www.ofgem.gov.uk/sites/default/files/docs/2021/02/final_determinations_et_annex_revised.pdf

32 National Energy System Operator. *Daily Balancing Services Use of System (BSUoS) Cost Data* https://www.neso.energy/data-portal/daily-balancing-costs-balancing-services-usesystem#:~:text=The%20BSUoS%20charge%20recovers%20the%20cost%20of%20day-today,basis%20in%20a%20annual%20file%2C%20are%20provided%20here.

33 The commission consists of limited personnel, is not independent from the Ministry, and does not have the power to independently set rules regarding grid fee charging methodology (SFOC. 2025. "성공적인 에너지 전환의 핵심, 계통 거버넌스 개선 방향")

34 Final approval of the grid use rates was the responsibility of the Ministry of Trade, Industry, and Energy (MOTIE) until 2025, when the Energy division was moved to the new Ministry of Climate, Energy, and Environment (MCEE).

2. Publicly Available Fee Calculating Methodology & Disclosure of Costs Included in the Rate Base

1) FERC/PJM

PJM's governing document, the "Open Access Transmission Tariff", lists all rules, standards, regulations, and accounting formulas relevant to the operation of the transmission grid.[35] Additionally, 'PJM Manual 27: Open Access Transmission Tariff Accounting' details accounting criteria and standards for charging fees to grid users and is also published online on the website[36]. The standard form used for rate calculating is available on FERC's website.[37] Under PJM, all of the transmission companies have a version of the form tailored for their company in the "Open Access Transmission Tariff." Through these documents, the public has access to understand how their power grid fees are being calculated. This includes both the grid use fees and the ancillary fees.

The FPA requires by law that all licensees and public utilities keep accounts and records as required by FERC.[38] To comply with this, on PJM's website[39], financial statements detailing the operation, maintenance, investment costs, and more are published for each transmission company that operates within the regulatory zone (see Appendix 2). These are the financial documents used to calculate the network integration transmission service rate that each company is allowed to charge to network customers. The approved revenue requirements and service rates for all transmission companies are published online by PJM (see Appendix 3). Revenue requirements associated with providing ancillary services are also published online on PJM's website and on FERC's docket library for service revenues that are approved by FERC such as voltage control service.

2) Ofgem/NESO

Under Ofgem, allowed revenues for ETOs and DNOs are predetermined in advance through RIIO.[40] Detailed explanations of innovation and output factors used to evaluate expenditure plans are listed out in the publicly available Sector Specific Methodology documents published on Ofgem's website.[41] The final power grid fee rates applied to customers are the Transmission Network Use of System (TNUoS)

35 PJM Interconnection. 2025. *Open action transmission tariff*. https://agreements.pjm.com/oatt/3897

36 PJM Interconnection. 2025. PJM manual 27: Open access transmission tariff accounting. https://www.pjm.com/pjmfiles/directory/manuals/m27/index.html

37 FERC. 2020. *Form No. 1 – Annual Report of Major Electric Utility*. https://www.ferc.gov/industries-data/electric/resources/industry-forms/form-no-1-annual-report-major-electricutility#:~:text=The%20Form%20No.%201%20is%20a%20comprehensive%20financial,audits%20by%20Major%20electric%20utilities%2C%20licensees%20and%20others.

38 Vann, Adam. Congressional Research Service. 2020. The legal framework of the federal power act. https://www.congress.gov/crs-product/IF11411

39 PJM. Formula Rates. https://www.pjm.com/markets-and-operations/billing-settlements-and-credit/formula-rates

40 The final determinations are subject to annual adjustments through the Annual Iteration Process and true-ups which may change the true final revenue received. This is to ensure the process remains flexible to unforeseen changes.

41 Ofgem. 2024. *RIO-3 sector specific methodology decision – ET annex*. https://www.ofgem.gov.uk/sites/default/files/2024-07/RIIO-3_SSMD_ET_Annex.pdf

charge, Distribution Use of System (DUoS), and Balancing Services Use of System (BSUoS)[42] charge. The TNUoS and BSUoS charges are calculated following the Use of System Charging Methodology described in the Connection and Use of System Code (CUSC)[43], while the DUoS charge is calculated following the Common Distribution Charging Methodology described in the Distribution Connection and Use of System Agreement (DCUSA).[44] The Connection and Use of System Code is published online and lists out detailed methodologies and formulas for setting the charges for each designated region. The finalized rates are published online by NESO for TNUoS and BSUoS charges, and on the DNOs' websites for DUoS charges. Like in PJM, all customers are able to check the calculating methodology to better understand their grid fees.

All final determinations of allowed revenue for ETOs and DNOs are published online on Ofgem's website (see Appendix 1). The revenue requirements are broken down into more detailed sections such as 'load and non-load related capex,' 'network operating costs,' 'business support costs,' and 'closely associated indirects' (see Appendix 4). The business plans which each electricity network company submits to Ofgem are also posted on their respective websites. Costs related to the BSUoS charge are published online by the network operator, NESO[45] (see Appendix 5). The costs are broken down into six functional categories with definitions of what each service provides. The data is provided in costs by settlement period, with settlement periods being every 30 minutes, and the data is updated regularly.

3) South Korea

The methodology used by KEPCO to calculate grid use fee rates is not disclosed publicly. The administrative rules governing calculation standards state that grid use fees must be set at a level that compensates for costs incurred in transmission/distribution grid operation, including a reasonable rate of return on investment,[46,47] and that costs of grid operation must be distributed among the grid users so that the burden is shared equitably.[48,49] However, the actual formulas KEPCO uses to determine what these levels should be are not disclosed. This means that customers have no way of understanding how their grid fees are set or why they are set at a certain rate. On the other hand, KPX – who is in charge of the ancillary service fee calculation – does publish their fee calculation methodology in the 'Electricity Market Operation Rules'.[50]

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42 British equivalent of ancillary service fee

43 National Energy System Operator. *Connection and use of system code*. https://www.neso.energy/industry-information/codes/connection-and-use-systemcode-cusc

44 DCUSA Ltd. *Distribution Connection and Use of System Agreement*. https://www.dcusa.co.uk/dcusa-document/

45 National Energy System Operator. *Daily Balancing Services Use of System (BSUoS) Cost Data*. https://www.neso.energy/data-portal/daily-balancing-costsbalancing-services-use-system#:~:text=The%20BSUoS%20charge%20recovers%20the%20cost%20of%20day-today,basis%20in%20a%20annual%20file%2C%20are%20provided%20here.

46 MOTIR, Electricity Market Division. 2012. *Transmission grid use fee calculation standards, Article 2*. https://law.go.kr/LSW/admRulLsInfoP.do?admRulSeq=2000000074807#AJAX

47 MOTIR, Electricity Market Division. 2012. *Distribution grid use fee calculation standards, Article 2*. https://law.go.kr/LSW/admRulLsInfoP.do?admRulId=33705&efYd=0

48 MOTIR. 2012. *Transmission grid use fee calculation standards, Article 3.*

49 MOTIR. 2012. *Distribution grid use fee calculation standards, Article 3.*

50 Korea Power Exchange.2025. *Electricity Market Operation Rules.* https://marketrule.kpx.or.kr/lmxsrv/law/lawDetail_areaC.do?SEQ=2&LAWGROUP=1&PAGE=1&SEQ_HISTORY=0

Financial statements for KEPCO are published on the website "All Public Information In-One" (ALIO). This includes sector-separated accounting financial information per generation, transmission, distribution, and sales; and an independent audit report on KEPCO's finances. Although these statements are published, the information includes only a general summary of total profits and operating expenses per sector. The statement does not offer detailed breakdowns of what investment and operational costs are involved, or how these costs are incorporated into the calculation of grid fee rates. For the ancillary fee, there are twelve categories of costs that make up the fee basis. However, there is no publicly available information on how much each of these items cost. The detailed amounts of ancillary charges incurred during the previous year are shared and discussed during the Cost-Evaluation Committee meeting in June of each year. However, the only entities who have access to this meeting are the committee members.

3. Consideration of net-zero grid investments in the approval process

1) FERC/PJM

The transition to net-zero is not currently a factor that must be legally considered in PJM's transmission planning or rate approval processes, as the direction of energy mix planning is often decided by state-level policy. However, PJM's regional transmission plan includes language that acknowledges investments needed for the transition to using renewables. One statement says "The [Regional Transmission Expansion Plan] also examines trends that continued throughout 2024 and will drive PJM's grid of the future, including the ongoing shift from fossil fuels to renewables and the impact of public policy"[51]. PJM may prioritize the approval of enhancement plans and budgets that support the trending shift towards renewables as long as they retain this policy.

2) Ofgem/NESO

In the United Kingdom, the transition to net-zero is legislated into law, setting a goal of reaching net-zero greenhouse gas emissions by 2050.[52] As a result, carbon emission reduction and energy transition efforts are a significant factor in power system development plans and RIIO evaluation criteria. For example, network companies submit Environmental Action Plans to Ofgem during the allowed revenue determination process[53]. Recently approved funding included 3.6 billion pounds for supporting the growth of green energy and net-zero projects[54]. Additional funding for net-zero investments can be approved by Ofgem

51 PJM. 2025. RTEP 2024. Regional Transmission Expansion Plan. https://www.pjm.com/library/reports-notices/rtep-documents.aspx

52 Department for Business, Energy & Industrial Strategy. 2019. *UK becomes first major economy to pass net zero emissions law*. https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law

53 Ofgem. 2024. *RIIO-3 sector specific methodology decision – Overview document.* https://www.ofgem.gov.uk/sites/default/files/2024-07/RIIO_3_SSMD_Overview.pdf

54 Ofgem. 2020. *Energy network price controls. Overview of final determinations. 2021-2026*. https://www.ofgem.gov.uk/sites/default/files/docs/2020/12/riio2_overview_document_web_1.pdf

if the electricity network companies can justify the investments[55]. The additional investments are subject to consultation, stakeholder input, and regulatory decision by Ofgem. Including net-zero investments in the grid fee setting process contributes to ensuring grid fees are being used to effectively support the renewable energy transition, while balancing affordability and reliability.

3) South Korea

The transition to net-zero is not currently a factor that must be legally considered in KEPCO's transmission planning or rate approval processes.[56] As a sole grid owner, KEPCO must maintain reliability and power quality, but rising variable renewables makes system maintenance more difficult. This disincentivizes KEPCO to invest in the grid upgrades needed for higher renewable penetration. In 2024, KEPCO announced measures to ease grid congestion, restricting new connections of renewable energy into the grid up until 2031, when new transmission lines are expected to be built in the Honam region. Including requirements for grid enhancement investments to meet net-zero goals in the grid fee approval process would ensure grid fees are being effectively used for the renewable energy transition.

4. Opportunities for public participation

1) FERC/PJM

Members of the public are able to attend and engage with FERC proceedings, and FERC has a dedicated Office of Public Participation.[57] Constituents can also file challenges to a utility's formula rate. Within PJM, many of the committee meetings are open to the public to attend.[58] This means that civic society has access to listen to all proceedings of the regulatory authority. This is an essential component of a transparent organization that can also ensure accountability. The schedules, agendas, and minutes for each meeting are posted online on PJM's website.

2) Ofgem/NESO

During the RIIO process to determine allowed revenues of ETOs and DNOs there are times where open public meetings are held, such as after the publication of draft allowed revenue determinations. Open public meetings are held to discuss responses to the draft determinations before the final determinations are

55 Ibid.

56 According to the Enforcement Decree of the Electric Utility Act Article 6, approval of grid use fees requires that: 1. Fees are calculated by adding a reasonable profit margin to the reasonable cost, 2. Non-discriminatory use of electrical facilities shall be guaranteed, and 3. The rights and obligations regarding the use of electrical facilities are clearly defined

57 FERC. 2025. *Energy markets*. https://www.ferc.gov/opp/energy-markets

58 PJM. 2025. Oversight and transparency. https://www.pjm.com/-/media/DotCom/about-pjm/newsroom/fact-sheets/oversight-and-transparency-factsheet.pdf

published[59]. Ofgem also puts out open calls for consultation and opinions on many regulatory decisions, which can be found on their website[60]. NESO also holds forums on charging methodologies to receive feedback from stakeholders. Through these open calls for consultations, the public is able to review potential changes and share their feedback.[61]

3) South Korea

Unlike PJM, committee meetings within KEPCO, KPX, and Electricity Regulatory Commission are not open to members of the public, and the public does not have opportunities to provide feedback on regulatory decisions such as is done in Ofgem. This is particularly problematic due to the conflicts of interest many members of these committees have. However, some large corporations have been granted access to the Cost Evaluation Committee under KPX.

59 https://www.ofgem.gov.uk/publications/riio-2-open-meetings

60 https://www.ofgem.gov.uk/consultations/consultations-and-calls-input

61 Ofgem. *How we consult*. https://www.ofgem.gov.uk/consultations/how-we-consult

IV. Conclusion

Good practices of regulating power grid use tariffs can be found within existing systems such as FERC and PJM in the US and Ofgem and NESO in Great Britain. With the power grid being a natural monopoly, it is essential that fairness, transparency, and sustainability are ensured through independent and accountable regulation. The current system of regulating and setting power grid tariffs in South Korea does not adequately meet any indicators of a fair, transparent, and sustainable system which were identified in the US and Great Britain. This lack of fairness and transparency has deterred customers from pursuing independent electricity procurement such as through PPAs, essentially dampening private and voluntary demand for more renewable-based electricity. To resolve this issue, KEPCO and MCEE must:

- Introduce an independent regulatory body that oversees power grid planning and rate approval
- Publish calculating methodologies for grid use fee rates, including disclosure of all costs which make up the rate base of power grid use tariffs and how the rate base is used to calculate the rates
- Include requirements for planning and investments in grid enhancements for net-zero
- Allow open access to regulatory committee meetings and allow public feedback

Enhancements and investments in the power grid to support renewable energy generation are essential for the energy transition. Many customers, especially those who wish to voluntarily procure renewable energy, are aware of this fact. However, opaque tariff setting systems deter these same users, as it is impossible for them to know if the tariffs are fair or how they will change. Building trust and acceptance can only be achieved with disclosure of information and independent regulation.

Appendix

[Appendix 1] Baseline allowance granted by Ofgem for ETO revenue 2021-2026 and DNO revenue 2023-2028

ETO	ETO's baseline request (£m)	Ofgem Draft Determination (£m)	Ofgem Final Determination (£m)
NGET	7090	3332	5377
SHET	2388	1609	2158
SPT	1389	970	1226
ET sector total	10867	5911	8761

Table 12 RIIO-ED2 submitted totex vs allowed totex (£m, 2020/21 prices)[107]

DNO Group	DNO	Submitted Totex	DD Allowed Totex	FD Allowed Totex	FD vs. Submitted	Difference (%)
ENWL	ENWL	1,890	1,640	1,722	-168	-8.9%
NPg	NPgN	1,393	1,129	1,186	-207	-14.9%
	NPgY	1,838	1,521	1,596	-242	-13.2%
NGED	WMID	1,934	1,588	1,679	-255	-13.2%
	EMID	2,058	1,697	1,838	-220	-10.7%
	SWALES	1,143	953	1,015	-127	-11.1%
	SWEST	1,758	1,343	1,449	-309	-17.6%
UKPN	LPN	1,499	1,323	1,416	-83	-5.6%
	SPN	1,554	1,394	1,476	-78	-5.0%
	EPN	2,470	2,137	2,277	-192	-7.8%
SPEN	SPD	1,676	1,451	1,469	-207	-12.4%
	SPMW	1,721	1,477	1,476	-245	-14.3%
SSEN	SSEH	1,406	1,087	1,227	-179	-12.7%
	SSES	2,835	2,199	2,397	-439	-15.5%
Total		**25,175**	**20,939**	**22,224**	**-2,951**	**-11.7%**

* Ofgem. 2024. *RIIO-3 sector specific methodology decision*. https://www.ofgem.gov.uk/decision/riio-3-sector-specific-methodology-decisiongas-distribution-gas-transmission-and-electricity-transmission-sectors
* Ofgem. 2022. *RIIO-ED2 final determinations overview document*. https://www.ofgem.gov.uk/sites/default/files/2022-11/RIIO-ED2%20Final%20Determinations%20Overview%20document.pdf

[Appendix 2] Excerpt of a financial filing from American Transmission Systems, Inc, a transmission company under PJM, to provide basis for rate calculation

Formula Rate - Non-Levelized | Rate Formula Template Utilizing FERC Form 1 Data | For the 12 months ended 12/31/2023

American Transmission Systems, Inc.

Line No.	(1)	(2) Form No. 1 Page, Line, Col.	(3) Company Total	(4) Allocator		(5) Transmission (Col 3 times Col 4)
	RATE BASE:					
	GROSS PLANT IN SERVICE					
1	Production	205.46.g (Notes U & X)	-	NA		
2	Transmission	207.58.g (Notes U & X)	5,736,002,767	TP	1.00000	5,736,002,767
3	Distribution	207.75.g (Notes U & X)	-	NA		
4	General & Intangible	205.5.g & 207.99.g (Notes U & X)	368,788,929	W/S	1.00000	368,788,929
5	Common	356.1 (Notes U & X)	-	CE	1.00000	-
6	TOTAL GROSS PLANT (sum lines 1-5)		6,104,791,697	GP=	100.000%	6,104,791,697
	ACCUMULATED DEPRECIATION					
7	Production	219.20-24.c (Notes U & X)	-	NA		
8	Transmission	219.25.c (Notes U & X)	1,301,586,986	TP	1.00000	1,301,586,986
9	Distribution	219.26.c (Notes U & X)	-	NA		
10	General & Intangible	200.21.c & 219.28.c (Notes U & X)	148,950,334	W/S	1.00000	148,950,334
11	Common	356.1 (Notes U & X)	-	CE	1.00000	-
12	TOTAL ACCUM. DEPRECIATION (sum lines 7-11)		1,450,537,321			1,450,537,321
	NET PLANT IN SERVICE					
13	Production	(line 1- line 7)	-			
14	Transmission	(line 2- line 8)	4,434,415,781			4,434,415,781
15	Distribution	(line 3 - line 9)	-			
16	General & Intangible	(line 4 - line 10)	219,838,595			219,838,595
17	Common	(line 5 - line 11)	-			-
18	TOTAL NET PLANT (sum lines 13-17)		4,654,254,376	NP=	100.000%	4,654,254,376
	ADJUSTMENTS TO RATE BASE (Note F & HH)					
19	Account No. 281 (enter negative)	Appendix G(3)	-	NA		
20	Account No. 282 (enter negative)	Appendix G(3)	(996,174,366)	NP	1.00000	(996,174,366)
21	Account No. 283 (enter negative)	Appendix G(3)	(52,583,460)	NP	1.00000	(52,583,460)
22	Account No. 190	Appendix G(3)	152,732,273	NP	1.00000	152,732,273
23	Account No. 255 (enter negative)	Appendix G(3)	-	NP	1.00000	-
24	TOTAL ADJUSTMENTS (sum lines 19- 23)		(896,025,553)			(896,025,553)
25	LAND HELD FOR FUTURE USE	214.x.d (Notes G & Y)	-	TP	1.00000	-
	WORKING CAPITAL (Note H)					
26	CWC	calculated	24,755,530			24,136,355
27	Materials & Supplies (Note G)	227.8.c & .16.c (Note Y)	700,368	TE	0.96083	672,935
28a	Prepayments (Account 165)	111.57.c (Notes Y & CC)	3,535,508	GP	1.00000	3,535,508
28b	Unfunded Reserve Plant-related (enter negative) (Acct Nos. 228.1-228.4, 242) (Notes Y & Z)		-	NP	1.00000	-
28c	Unfunded Reserve Labor-related (enter negative) (Acct Nos. 228.1-228.4, 242) (Notes Y & Z)		-	W/S	1.00000	-
29	TOTAL WORKING CAPITAL (sum lines 26 - 28c)		28,991,406			28,344,798
30	RATE BASE (sum lines 18, 24, 25, & 29)		3,787,220,229			3,786,573,621

Transmission Enhancement Credit - True-up
To be completed after Appendix D for the True-up Year is updated using actual data

Line No.	(a) Project Name	(b) RTEP Project Number	(c) Actual Appendix D Revenues	(d) Projected Annual Revenue Requirement	(e) Actual Appendix D Revenues Allocated to Projects	(f) Actual Annual Revenue Requirement	(g) True-up Adjustment Principal Under/(Over)	(h) Applicable Interest on Under/(Over)	(i) True-up Adjustment with Interest Under/(Over)
				Projected Appendix D p 2 of 2, col. 12	[Col. c, line 1 * (Col. d, line 2x / Col. d, line 3)]	Actual Appendix D p 2 of 2, col. 12	Col. f - Col. e	Col. g * [(line 4a / line 4b) - 1]	Col. g + Col. H
1	[A] Actual PJM TEC Revenues for True-up Year		$ 29,338,394						
2a	New Mansfield 69kV Switching Station	b1587		$ 2,044,901	$ 2,102,870	$ 1,975,558	$ (127,312)	$ (22,216)	$ (149,528)
2b	Re-conductor Galion-GM Mansfield-Ontario-Cairns	b1920		$ 3,294,674	$ 3,388,072	$ 3,164,262	$ (223,810)	$ (39,056)	$ (262,865)
2c	New Toronto Substation looping in Sammis-Wylie Ridge	b1977		$ 6,786,984	$ 6,979,382	$ 6,381,589	$ (597,792)	$ (104,317)	$ (702,109)
2d	West Fremont - Groton - Hayes 138 kV line	b1959		$ 15,249,290	$ 15,681,578	$ 14,898,214	$ (783,364)	$ (136,700)	$ (920,064)
2e	McDowell-Campbell - Construct approximately 5.5 miles of 138 kV line	b2124.4		$ 572,294	$ 588,518	$ 1,810,383	$ 1,221,865	$ 213,219	$ 1,435,085
2f	McDowell Substation - Add a new 138 kV line exit	b2124.1		$ 4,784	$ 4,920	$ 464,811	$ 459,891	$ 80,252	$ 540,143
2g	Campbell Substation - Construct a 138 kV ring bus and install a 138/69 kV autotransformer	b2124.2		$ 44,059	$ 45,308	$ 1,055,866	$ 1,010,558	$ 176,345	$ 1,186,903
2h	Build a new East Springfield - London #2 138 kV line	b2435		$ -	$ -	$ 8,759,827	$ 8,759,827	$ 1,528,617	$ 10,288,444
2i	Lallendorf-Monroe 345kV-Reconductor	b2972		$ 532,646	$ 547,746	$ 576,060	$ 28,314	$ 4,941	$ 33,255
3	Subtotal			28,529,634	29,338,394	39,086,571			
4a	Revenue Requirement True-up with Interest (Appendix H)						(34,720,748)		
4b	Revenue Requirement True-up - Over/Under Recovery (Appendix H)						(29,562,073)		

NOTE
[A] Amount included in revenues reported on page 330, column k of FERC Form 1.

* American Transmission Systems, Incorporated. 2025. *Docket No. ER25-2145-000 2025 PTRR Informational Filing*. https://www.pjm.com/markets-and-operations/billing-settlements-and-credit/formula-rates

[Appendix 3] 2025 revenue requirements and service charges for some of the transmission companies under PJM

Annual Transmission Revenue Requirements (ATRR) and Network Integration Transmission Service (NITS) Rates				
Transmission Zone	**Transmission Owner**	**Annual Revenue Requirement**	**Total Zonal Annual Revenue Requirement**	**Network Integration Transmission Service Rate ($/MW-Year)**
AECO	Atlantic City Electric Company	$ 214,683,252.00	**$ 214,683,252.00**	**$ 83,665.00**
AEP	AEP East Operating Companies	$ 1,252,733,679.68		
	AEP East Transmission Companies	$ 1,650,145,419.05		
	AMP Transmission, LLC	$ 3,021,458.58		
			$ 2,905,900,557.31	**$ 130,204.25**
APS	South FirstEnergy Operating Companies	$ 156,143,555.00		
	Keystone Appalachian Transmission Company	$ 67,758,206.00		
			$ 223,901,761.00	**$ 25,051.72**
ATSI	American Transmission Systems, Inc.	$ 1,083,189,136.00		
	AMP Transmission, LLC	$ 22,630,794.60		
			$ 1,105,819,930.60	**$ 88,389.94**
BGE	Baltimore Gas and Electric Company	$ 399,660,633.00	**$ 399,660,633.00**	**$ 59,070.00**
ComEd	Commonwealth Edison Company	$ 992,308,573.00	**$ 992,308,573.00**	**$ 46,025.00**
DAY	The Dayton Power and Light Company	$ 151,084,225.00		
	AMP Transmission, LLC	$ 544,281.80		
			$ 151,628,506.80	**$ 45,060.48**
DEOK	Duke Energy Ohio, Inc. and Duke Energy Kentucky, Inc.	$ 244,320,968.00	**$ 244,320,968.00**	**$ 47,248.00**
DOM	Virginia Electric and Power Company	$ 1,754,104,936.07	**$ 1,754,104,936.07**	**$ 75,876.81**
	Virginia Electric and Power Company (Dominion Underground)	$ 12,108,222.57	**$ 12,108,222.57**	**$ 541.18**

* PJM. 2025. *Annual Transmission Revenue Requirements (ATRR) and Network Integration Transmission Service (NITS) Rates*. https://www.pjm.com/-/media/DotCom/markets-ops/settlements/network-integration-trans-service-june-2025.pdf

[Appendix 4] Examples of some of the expenses included within the approved baseline allowance of ETO's under Ofgem

Load and non-load related capex			
ETO	**ETO's baseline request[20] (£m)**	**Ofgem Draft Determination (£m)**	**Ofgem Final Determination (£m)**
NGET	3766.5	1635.1	3228.9
SHET	1664.0	1257.8	1609.7
SPT	938.5	692.2	892.8
Total	6369.0	3585.1	5731.4

Network Operating Costs			
ETO	**ETO's baseline request (£m)**	**Ofgem Draft Determination (£m)**	**Ofgem Final Determination (£m)**
NGET	1174.6[21]	549.0	723.4
SHET	207.8	90.2	165.8
SPT	110.1	85.6	110.1
Total	1492.5	724.8	999.3

* Ofgem. 2021. *RIIO-2 final determinations electricity system annex (revised)*. https://www.ofgem.gov.uk/sites/default/files/docs/2021/02/final_determinations_et_annex_revised.pdf

[Appendix 5] Table from NESO's website showing costs of BSUoS per settlement period (£/MWh)

Settlement Date	Settlement Period	Energy Imbalance	Frequency Control	Positive Reserve	Constraints	Negative Reserve	Other
2025-04-01	1	-17526.165	41.34634596845396	0	23596.734061063784	3.182154317894385	9.60243
2025-04-01	2	-12761.908	0	0	16173.143462845715	18.93534103125045	36.14719
2025-04-01	3	-9180.006	69.07390454795365	0	16964.8648957301	6.9983436196626245	6.30685
2025-04-01	4	-14223.552	77.07274547125547	0	14093.338917430528	0.5972858974048904	108.8130
2025-04-01	5	-32112.82	41.05317296917052	0	15852.855473081514	15.558793510025094	123.1085
2025-04-01	6	-20290.459	423.3114982784862	0	15955.476630591224	0	204.489
2025-04-01	7	-4999.562	1183.4741105288233	0	14620.352641759457	68.41215806937143	233.932
2025-04-01	8	1351.875	496.7046382583145	6.5161668443543	15618.563312955595	0	1759.937
2025-04-01	9	26.502	3923.8502527336254	-12.356714495064171	9421.307596845794	-173.861	3181.036
2025-04-01	10	-669	2211.9313903516363	0	17975.338415067952	0	271.16319

* NESO. 2025. *Daily balancing costs 2025-2026*. https://www.neso.energy/data-portal/daily-balancing-costs-balancing-services-use-system/daily_balancing_costs_2025-2026

References

- American Transmission Systems, Incorporated. 2025. *Docket No. ER25-2145-000 2025 PTRR Informational Filing*. https://www.pjm.com/markets-and-operations/billing-settlements-and-credit/formula-rates
- Choi, Ho; Byeon, Sanggeun. ETNews. 2023. *한전, '직접 PPA' 요금제 도입 무기한 유예…산업계 반발에 보완 검*. https://www.etnews.com/20230710000172
- DCUSA Ltd. *Distribution Connection and Use of System Agreement*. https://www.dcusa.co.uk/dcusa-document/
- Department for Business, Energy & Industrial Strategy. 2019. *UK becomes first major economy to pass net zero emissions law*. https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law
- Department for Energy Security and Net Zero. 2024. *Strategy and policy statement for energy policy in Great Britain, article 27*. https://www.gov.uk/government/publications/strategy-and-policy-statement-for-energy-policy-in-great-britain/strategy-and-policy-statement-for-energy-policy-in-great-britain-accessible-webpage#energy-system-roles-and-responsibilities
- Government of the United Kingdom. 2023. *Energy Act 2023*. https://www.legislation.gov.uk/ukpga/2023/52
- Federal Electric Regulatory Commission. 2020. *Form No. 1 – Annual Report of Major Electric Utility*. https://www.ferc.gov/industries-data/electric/resources/industry-forms/form-no-1-annual-report-major-electric-utility#:~:text=The%20Form%20No.%201%20is%20a%20comprehensive%20financial,audits%20by%20Major%20electric%20utilities%2C%20licensees%20and%20others.
- Federal Electric Regulatory Commission. 2022. *Formula Rates in Electric Transmission Proceedings: Key Concepts and How to Participate*. https://www.ferc.gov/formula-rates-electric-transmission-proceedings-key-concepts-and-how-participate
- Federal Electric Regulatory Commission. 2025. *Overview*. https://www.ferc.gov/electric
- Federal Electric Regulatory Commission. 2025. *Energy markets*. https://www.ferc.gov/opp/energy-markets
- Federal Electric Regulatory Commission. 2025. *Electric Power Markets*. https://www.ferc.gov/electric-power-markets
- Hankook Research, Korea RE100 Council, Solutions For Our Climate. 2025. *기업의재생에너지 직접구매(PPA) 망 이용요금에 관한 설문 조사.*
- Kim, Jinwoo. National Archives of Korea. 2007. https://www.archives.go.kr/next/newsearch/listSubjectDescription.do?id=006612&sitePage=)
- Korea Power Exchange. 2025. *Electricity Market Operation Rules*. https://marketrule.kpx.or.kr/lmxsrv/law/lawDetail_areaC.do?SEQ=2&LAWGROUP=1&PAGE=1&SEQ_HISTORY=0
- Lusiani, Niko. The Roosevelt Institute. 2024. *Entrenched power: how shareholder-owned electric utilities hinder the clean energy transition*, Entrenched Power: How Shareholder-Owned Electric Utilities Hinder the Clean Energy Transition - Roosevelt Institute
- Ministry of Trade and Industry, Electricity Market Division. 2012. *Distribution grid use fee calculation standards, Article 2*. https://law.go.kr/LSW/admRulLsInfoP.do?admRulId=33705&efYd=0
- Ministry of Trade and Industry, Electricity Market Division. 2012. *Transmission grid use fee calculation standards, Article 2*. https://law.go.kr/LSW/admRulLsInfoP.do?admRulSeq=2000000074807#AJAX
- Ministry of Trade and Industry. 2021. *재생에너지 전기를 사용자가 직접 구매 가능해져*. https://www.motir.go.kr/kor/article/ATCL3f49a5a8c/164668/view
- National Energy System Operator. *Connection and use of system code*. https://www.neso.energy/industry-information/codes/connection-and-use-system-code-cusc
- National Energy System Operator. *Daily Balancing Services Use of System (BSUoS) Cost Data*. https://www.neso.energy/data-portal/daily-balancing-costs-balancing-services-use-system#:~:text=The%20BSUoS%20charge%20recovers%20the%20cost%20of%20day-to-day,basis%20in%20a%20annual%20file%2C%20are%20provided%20here.

- National Energy System Operator. *2025. Daily balancing costs 2025-2026*. https://www.neso.energy/data-portal/daily-balancing-costs-balancing-services-use-system/daily_balancing_costs_2025-2026
- Office Gas and Electricity Markets. *How we consult*. https://www.ofgem.gov.uk/consultations/how-we-consult
- Office Gas and Electricity Markets. 2020. *Energy network price controls. Overview of final determinations. 2021-2026*. https://www.ofgem.gov.uk/sites/default/files/docs/2020/12/riio2_overview_document_web_1.pdf
- Office Gas and Electricity Markets. 2021. *RIIO-2 Final Determinations Electricity Transmission System Annex (REVISED)*. https://www.ofgem.gov.uk/sites/default/files/docs/2021/02/final_determinations_et_annex_revised.pdf
- Office Gas and Electricity Markets. 2022. *RIIO-ED2 final determinations overview document*. https://www.ofgem.gov.uk/sites/default/files/2022-11/RIIO-ED2%20Final%20Determinations%20Overview%20document.pdf
- Ofgem. 2024. *RIIO-3 sector specific methodology decision*. https://www.ofgem.gov.uk/decision/riio-3-sector-specific-methodology-decision-gas-distributiongas-transmission-and-electricity-transmission-sectors
- Office Gas and Electricity Markets. 2024. *RIIO-3 sector specific methodology decision – Overview document*. https://www.ofgem.gov.uk/sites/default/files/2024-07/RIIO_3_SSMD_Overview.pdf
- Office Gas and Electricity Markets. 2025. *Energy Network Price Controls*. https://www.ofgem.gov.uk/energy-regulation/how-we-regulate/energy-network-price-controls
- PJM Interconnection. *Formula Rates*. https://www.pjm.com/markets-and-operations/billing-settlements-and-credit/formula-rates
- PJM Interconnection. 2025. *Open action transmission tariff*. https://agreements.pjm.com/oatt/3897
- PJM Interconnection. 2025. *Oversight and transparency*. https://www.pjm.com/-/media/DotCom/about-pjm/newsroom/fact-sheets/oversight-and-transparency-fact-sheet.pdf
- PJM Interconnection. 2025. *PJM manual 27: Open access transmission tariff accounting*. https://www.pjm.com/pjmfiles/directory/manuals/m27/index.html
- PJM Interconnection. 2025. *RTEP 2024. Regional Transmision Expansion Plan*. https://www.pjm.com/library/reports-notices/rtep-documents.aspx
- Solutions For Our Climate. 2025. *전력거래소 거버넌스,변화하는 전력시장 참여자의 대표성 강화 방안*. https://forourclimate.org/ko/research/610
- Vann, Adam. Congressional Research Service. 2020. *The legal framework of the federal power act*. https://www.congress.gov/crs-product/IF11411
- Von Hammerstein, Christian; Jahn, Andreas; Graichen, Patirck. Agora Energiewende. 2018. *Stromnetzentgelte: Eine Blackbox, die nicht geöffnet werden kann? Eine rechtliche Analyse der aktuellen Situation*. https://www.agora-energiewende.de/aktuelles/blackbox-netzentgelte-tarife-der-netzbetreiber-vermutlich-oft-ueberhoeht-ueberpruefung-ist-unmoeglich
- 에너지경제. 2023. *전력시장 개방 '허울' 논란…PPA 요금제에 "한전 갑질·횡포" vs "체리피킹 방지"*. https://www.ekn.kr/web/view.php?key=20230118010004093

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Settled in Secret

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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.