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The need for power transmission sector reforms in the Philippines

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The Need for Power Transmission Sector Reforms in the Philippines

Adoracion M. Navarro

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The Need for Power Transmission Sector Reforms in the Philippines

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Abstract

This study examines the structural, regulatory, and institutional challenges facing the power transmission sector in the Philippines amid rapidly rising electricity demand and comparatively slow grid expansion. While electricity consumption grew by about 140 percent from 2003 to 2024, transmission network growth lagged significantly, contributing to congestion, reliability concerns, and energy insecurity. Using a qualitative research approach, the study analyzes key documentary sources, including the transmission concession agreement, transmission development plans, regulatory filings, and regulatory decisions.

The analysis situates Philippine transmission sector performance within the context of economic theories on transmission as a regulated natural monopoly in liberalized power markets. It highlights gaps between theory and practice, particularly in regulatory practices, investment incentives, system operation, and risk allocation. The study identifies persistent issues such as project delays, regulatory lag in rate-setting, right-of-way constraints, weaknesses in ancillary services procurement, coordination failures among institutions, ownership and national security concerns, and increasing transmission congestion.

The findings suggest that while private participation and performance-based regulation were intended to improve efficiency and investment, regulatory delays and uncertainty as well as institutional frictions have weakened incentives for timely and adequate grid expansion. The study concludes by drawing policy implications and proposing reforms aimed at strengthening regulatory capacity and credibility, improving coordination, aligning investment incentives with public interest objectives, and enhancing the reliability and resilience of the Philippine power transmission system.

Keywords: power transmission, liberalized power markets, grid regulation, return-on-rate base regulation, performance-based regulation, transmission investment, transmission congestion

Table of Contents

1. Introduction	1
2. Review of literature	2
3. Background on the power transmission sector in the Philippines	3
3.1 Evolution of the national grid: from state monopoly to private concession	3
3.2 Power transmission in small and isolated grids	4
4. Economic theories of power transmission versus practice in the Philippines	5
4.1 Transmission economics in liberalized power markets	5
4.2 Regulatory and institutional design	5
4.3 Unbundling and the role of the system operator	6
4.4 Theory-practice gaps	6
5. Key issues facing the power transmission sector in the Philippines	7
5.1 Project delays	7
5.2 Regulatory concerns	7
5.3 Right-of-way constraints	13
5.4 Grid reliability, reserves, and ancillary services	14
5.5 Coordination and institutional frictions	14
5.6 Ownership and national security concerns	14
5.7 Transmission capacity and congestion	15
6. Policy implications and recommendations	15
Bibliography	19

List of Boxes

Box 1. Treatment of performance incentives	11
Box 2. Return on capital explained	12

List of Tables

Table 1. Annual revenue requirement for the 4th RP (in million PHP)	10
Table 2. Transmission rates impact	10

The Need for Power Transmission Sector Reforms in the Philippines

*Adoracion M. Navarro**

1. Introduction

From 2003 to 2024, total electricity consumption in the Philippines grew substantially, increasing from 52,941 GWh in 2003 (Department of Energy 2010) to 126,941 GWh in 2024 (Department of Energy 2025)--an increase of approximately 140 percent over the 21-year period. By contrast, the expansion of the transmission network has been more modest in relative terms. From 20,774 circuit-kilometers (ckt-km) in 2003 (Department of Energy 2010), transmission lines increased to around 23,110 ckt-km as of end-2024 (RE Global 2025), an increase of only 11 percent over the same period. This underinvestment in transmission contributed to the ongoing energy insecurity in the Philippines. The problems due to underinvestment were compounded by other concerns such as inadequate ancillary services, which made the power system unreliable especially during peak hours in the summer months.

Problems in the transmission sector have been attracting attention from Congress and the general public. Among the issues raised thus far are as follows: severe technical constraints in transmission, insufficient transmission capacity especially during peak periods, insufficient contracting by NGCP for ancillary services, delays in transmission projects, absence of transmission connection in some renewable energy zones, and weaknesses in regulation. Knowledge gaps on the root causes of these problems exist. This study thus contributes to closing the gaps and identifies policy recommendations to improve the performance of the transmission sector in the country.

This study adopts a qualitative research approach based on a systematic review and analysis of key documentary sources related to the Philippine transmission sector. The materials examined include the transmission concession agreement, transmission development plans, regulatory filings, regulatory decisions, and other relevant government documents.

The study generally aims to uncover issues in the Philippine power transmission sector, why these issues arise, and how to resolve these issues. The study's specific objectives are:

- a. To explore what economic theories prescribe when it comes to planning, investing in, and regulating electric power transmission in a liberalized power market and compare these with the practices in the power transmission sector in the Philippines;
- b. To assess key issues in the power transmission sector, including how the current concession agreement with the NGCP is meeting the requirements of the electric power industry; and
- c. To identify needed reforms and formulate policy recommendations.

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This study is organized into six sections, starting with this introduction. Section 2 provides a brief review of literature, Section 3 provides a brief background on the transmission sector in the Philippines, and Section 4 compares what economic theory prescribes or predicts with Philippine realities. Section 5 analyzes the issues facing the sector and Section 6 derives the policy implications and recommendations.

2. Review of literature

Only a limited body of academic literature directly examines the Philippine transmission sector. The discussion below reviews the key studies that engage with this topic.

Delina and Ludovice (2024) trace the historical development of the Philippine electricity grid from 1892 to 2021, focusing on the political, economic, and institutional forces that shaped its evolution. Using archival records, policy documents, and market data, the study constructs a long-term narrative of how regulatory shifts, technological change, and market restructuring influenced the grid's development. The authors show that the transformation of the power system was neither linear nor uniform but occurred in distinct phases. Early concession-based arrangements during the colonial period supported initial infrastructure development and industrial growth. Following independence, stronger state intervention reshaped sector governance. Later, restructuring reforms and privatization introduced competition and redefined market organization. While these changes improved efficiency and encouraged innovation, the authors note that these also created new challenges related to regulatory oversight and equitable access. Overall, the study provides valuable historical context and highlights the need for adaptive policy frameworks that balance market forces with public service objectives.

Bacon (2019) examines the impact of electricity sector reforms initiated under EPIRA and related policy initiatives, with particular attention to changes in institutional arrangements, regulation, and market performance. The study evaluates the transition from a largely state-controlled system to a more competitive, market-oriented framework, drawing lessons from efficiency gains, private sector participation, and service delivery outcomes. Bacon notes that while the reforms produced notable improvements, there are persistent challenges, including high electricity prices, uneven service quality, and difficulties in aligning regulation with evolving market conditions. With respect to transmission, the study highlights that unbundling transmission from generation enhanced transparency and competition, attracted private investment, and supported modernization. However, it also points to continuing concerns about investment adequacy, grid expansion to meet growing demand, integration of new generation sources, and effective regulatory oversight. These findings underscore the need for ongoing policy refinement and targeted infrastructure investment to sustain sector performance.

Grana and Virtudez (2023) is one of the few studies that directly addresses a component of the transmission sector. Focusing on the NGCP in Northeastern Mindanao, the study assesses performance from the perspectives of both internal stakeholders (employees) and external stakeholders (corporate clients and customers). It evaluates perceptions of NGCP's technical assistance, maintenance practices, infrastructure improvements, and asset inspection processes, as well as their contribution to power reliability. The study also compares satisfaction levels between

internal and external respondents to assess whether operational performance aligns with customer expectations. The findings suggest that NGCP performs well across multiple operational dimensions, with both groups rating reliability as high, although internal stakeholders consistently gave more favorable assessments than external stakeholders.

While Delina and Ludovice (2024) offers valuable historical context, it does not address the current transmission-sector issues that demand policy attention. Bacon (2019) provides a more focused analysis of post-EPIRA reforms, but its treatment of transmission remains limited, particularly in identifying the root causes of transmission-related problems. The largely positive assessment of NGCP in Grana and Virtudez (2023) is notable but may reflect the study's reliance on perception-based measures and its narrow geographic scope. Taken together, these studies do not adequately capture the urgent, system-wide challenges facing the Philippine transmission sector. This gap in the literature highlights the need for further research, which the present study seeks to address.

3. Background on the power transmission sector in the Philippines

The structure of the Philippine power transmission sector has undergone a fundamental transformation over the past two decades, shifting from a vertically integrated state monopoly to a privately operated transmission network under a long-term concession arrangement.

3.1 Evolution of the national grid: from state monopoly to private concession

Before the restructuring of the electric power industry in 2001, the Philippine power grid operated under a centralized, state-owned structure. The National Power Corporation (NPC) functioned as a vertically integrated monopoly responsible for electricity generation, transmission, and parts of distribution nationwide. During the 1980s, political instability and economic crises led to underinvestment in generation capacity, while a weakening currency increased the cost of maintaining transmission assets. These constraints resulted in frequent blackouts and power shortages, particularly in Metro Manila. A severe power crisis in the early 1990s forced the government to adopt emergency measures, including contracting independent power producers (IPPs).

NPC's operational inefficiencies and mounting financial losses eventually led to a broader fiscal risk. In response, Congress enacted Republic Act (RA) 9136 or the Electric Power Industry Reform Act (EPIRA) in 2001, fundamentally restructuring the power sector. The EPIRA unbundled the industry by separating generation, transmission, distribution, and supply. It mandated the privatization of government-owned generation assets, the creation of a competitive generation market, and the separation of transmission from NPC.

Under this framework, ownership of transmission assets was transferred to the National Transmission Corporation (TransCo), a government-owned entity, while the Power Sector Assets and Liabilities Management Corporation (PSALM) was established to manage the privatization of NPC's assets and liabilities. Transmission operations, maintenance, and expansion were to be privatized through a long-term concession.

In 2008, the government awarded this concession to the National Grid Corporation of the Philippines (NGCP). The 25-year concession took effect on January 15, 2009, granting the NGCP responsibility for operating, maintaining, and expanding the national transmission system. While the TransCo retains ownership of the grid assets, the concession agreement requires the NGCP to perform its functions as if it were the owner. The NGCP also operates under a separate 50-year legislative franchise granted through RA 9511.

Under the current institutional arrangement, the NGCP serves as the sole transmission network provider and system operator of the interconnected national grid. Transmission investments and system reinforcements are guided by long-term Transmission Development Plans, which align grid expansion with projected demand growth, new generation capacity, and reliability requirements. The most recent of these is the 2024-2050 Transmission Development Plan.

3.2 Power transmission in small and isolated grids

The evolution of transmission in small and isolated grids follows a distinct institutional path. Prior to the EPIRA, electrification and transmission in these areas, often referred to in policy documents as “off-grid” or “missionary” areas, were also managed by the NPC. Following the power industry restructuring, responsibility for generation and transmission in areas not connected to the main grid was assigned to the NPC’s Small Power Utilities Group (SPUG).

In the 2020s, the institutional setup for small-grid transmission further evolved. TransCo was designated by the Department of Energy (DOE) as the system operator for four island grids-- Palawan, Mindoro, Marinduque, and Catanduanes. At the same time, NPC-SPUG continues to manage most small transmission lines and oversee power dispatch in isolated grids not yet connected to the national transmission backbone.

The long-term plan for the transmission sector includes improving the infrastructure in the small island grids and connecting them with the national grid. A key policy objective underpinning this plan is the gradual reduction of dependence on the universal charge for missionary electrification (UCME) through grid interconnection and improved transmission infrastructure. Interconnecting small grids with the main transmission network is intended to enhance reliability, lower generation costs, and reduce the long-term fiscal burden of subsidizing isolated systems.

Overall, the Philippine transmission sector is characterized by a hybrid governance model in which the state retains ownership of core transmission assets while delegating operational and investment responsibilities to private and public operators through a concession agreement. This structure reflects broader reform objectives under the EPIRA, but it also introduces complex coordination, regulatory, and accountability challenges that continue to shape transmission sector performance today.

4. Economic theories of power transmission versus practice in the Philippines

Economic theory offers a clear framework for how power transmission should function in liberalized electricity markets, emphasizing natural monopoly regulation, independent system operation, and incentive-based investment planning. The following section contrasts these theoretical principles with the Philippine experience, examining how regulatory design, institutional arrangements, and the unbundling of transmission have played out in practice, and where gaps between theory and implementation remain.

4.1 Transmission economics in liberalized power markets

Power transmission economics (Hogan 1999; Joskow and Tirole 2000) treats transmission as a natural monopoly characterized by high fixed costs, economies of scale, and network externalities. In liberalized electricity markets, transmission plays a critical coordinating role by enabling competition in generation and supply while remaining subject to economic regulation. A central concern in transmission economics is dynamic efficiency, particularly how investment incentives are shaped under uncertainty.

Transmission investments are typically large, lumpy, and irreversible. Decisions must be made under significant uncertainty related to future electricity demand, generation mix, fuel prices, and policy direction. Economic theory emphasizes that, under such conditions, investors value flexibility and are highly sensitive to risk. If investors or planners are risk-averse, they may delay or underinvest in transmission capacity unless regulatory frameworks provide sufficiently strong and credible incentives.

In theory, flexibility options such as energy storage, demand response, and increased interconnection can interact with transmission investment decisions. These options may reduce the need for certain transmission projects, but they also alter the risk-return profile of network investments. Well-designed market and regulatory institutions are therefore essential to ensure that transmission expansion keeps pace with system needs without imposing excessive costs on consumers.

In the Philippine context, these theoretical concerns are evident. Transmission expansion is planned through long-term Transmission Development Plans. But implementation faces uncertainty arising from fluctuating demand projections, delays in generation projects, right-of-way issues, and evolving energy policies. These risks shape the incentives of the NGCP, the transmission concessionaire, and influence the timing and scale of investments.

4.2 Regulatory and institutional design

Because transmission is a regulated monopoly, regulatory economics plays a central role in both theory and practice. Traditional rate-of-return regulation is often criticized in economic theory for encouraging overinvestment, commonly referred to as the Averch-Johnson effect or “gold-plating”. Averch and Johnson (1962) show that under rate-of-return regulation, firms have an

incentive to overinvest in capital relative to the cost-minimizing level because higher capital stocks expand the allowed revenue base. This “Averch-Johnson effect” implies systematic allocative inefficiency, as regulated firms substitute capital for other inputs even when it raises total production costs.

Performance-based regulation, by contrast, is favored by many economists because it links revenues to measurable outcomes such as reliability, efficiency, and service quality, while reducing the need for detailed regulatory micromanagement (Laffont and Tirole 1993).

In Philippine practice, while the NGCP’s revenues are regulated by the Energy Regulatory Commission (ERC) under a performance-based regulation regime, lapses in the past compelled it to revert to a modified return-on-rate base regulation which heavily relies on historical data (as discussed in Section 5 below). Although the regulatory framework incorporates elements intended to incentivize efficiency and timely investment, regulatory processes are often contested.

4.3 Unbundling and the role of the system operator

Economic theory in liberalized power markets (Hogan 1998; Joskow 2004) emphasizes the importance of unbundling transmission from generation and supply to reduce conflicts of interest and ensure non-discriminatory access to the network. Because of information asymmetries and the technical complexity of grid operations, independent system operators are theorized to play a crucial coordinating role.

In the Philippines, unbundling was introduced through sector reforms that separated transmission ownership, operation, and generation. The NGCP serves both as the transmission network provider and system operator for the main grid. This arrangement differs from textbook models that fully separate investment and system operation, though it reflects a pragmatic compromise shaped by institutional capacity and political economy considerations.

Recent institutional theory introduces the concept of regulatory intermediation, where the system operator acts not only as an implementer of rules but also as a planner and intermediary between the government, regulators, and market participants (Wolak 2021; Walters 2023). In practice, the NGCP performs many of these functions through transmission planning, grid impact studies, and coordination with generation companies and government agencies. However, the concentration of roles also raises concerns about accountability and information asymmetry, issues that economic theory flags as critical in regulated monopoly settings.

4.4 Theory-practice gaps

Overall, the Philippine power transmission sector illustrates some gaps with economic theory. While liberalization aims to promote efficiency and investment through private participation, the persistence of regulatory risk, planning uncertainty, and institutional complexity can weaken investment incentives. At the same time, the evolved governance model reflects practical constraints that pure theoretical models often abstract away from, such as capacity limitations within the ERC and the political sensitivity of electricity pricing.

These divergences between theory and practice suggest that improving transmission sector performance requires not only market liberalization reforms but also careful attention to institutional details, regulatory credibility, and risk allocation. Policymakers need to understand these gaps between theoretical ideals and actual implementation so that they could appreciate current transmission challenges and design reforms that are both economically sound and institutionally feasible.

5. Key issues facing the power transmission sector in the Philippines

Building on the preceding discussion of theory and practice, this section turns to the challenges and issues shaping the performance of the Philippine power transmission sector. It examines a set of interrelated issues--ranging from project delays driven by regulatory and right-of-way constraints to persistent challenges in rate-setting, cost recovery, grid reliability, reserves, and the provision of ancillary services--that directly affect the transmission system's ability to expand and operate efficiently. The discussion also highlights coordination and institutional frictions, ownership and national security concerns, and the growing problem of transmission capacity limitations and congestion, underscoring the gap between regulatory objectives and on-the-ground outcomes.

5.1 Project delays

One of the most pressing issues confronting the Philippine transmission sector is the persistent delay in the execution of transmission projects. In July 2023, the ERC issued a Show Cause Order requiring NGCP to explain delays in 37 transmission projects, explicitly linking delays to system consequences and accountability expectations (ERC 2023a). In a January 2025 Congressional hearing, it was claimed that only 75 out of 258 planned NGCP projects have been completed (Cervantes 2025). These delays raise concerns about the NGCP's ability to keep pace with growing demand for transmission capacity and evolving generation patterns.

Although the Energy Regulatory Commission (ERC) has imposed financial penalties on NGCP for unjustified delays, the persistence of project slippages suggests that existing sanctions may not be sufficient to serve as an effective deterrent. While NGCP has emphasized that the transmission component accounts for a relatively small share of the overall electricity bill, critics argue that the economic costs of delayed investments--such as congestion, reliability issues, and foregone access to cheaper generation--are substantial and often underestimated.

5.2 Regulatory concerns

Setting transmission rates or wheeling charges is another area of significant concern. In 2003, the ERC shifted away from the traditional Return on Rate Base (RORB) approach for setting transmission rates. Beginning May 29, 2003, it adopted Performance-Based Regulation (PBR) to determine transmission wheeling rates for the TransCo, which at that time still operated the national grid. Under PBR, transmission rates are set based on forecasts of costs and investments, with the aim of determining the regulated entity's allowable revenues over a fixed five-year

regulatory period. These rates are reviewed and reset through a formal regulatory reset process conducted every five years.

In 2009, the ERC updated this framework through the issuance of the Rules for Setting Transmission Wheeling Rates (RTWR). These rules governed transmission rates for the period 2011 to 2015, known as the Third Regulatory Period (3rd RP).

However, for reasons still insufficiently addressed in public discourse, the ERC was unable to conduct on time the regulatory reset for 2016 to 2020 (the Fourth Regulatory Period or 4th RP). This delay is inappropriate because PBR is designed to be forward-looking, relying on forecasts to establish rates before the start of each regulatory period. As a result, transmission rates for the 4th RP were not determined as scheduled and the NGCP was allowed to operate using the wheeling charges set during the 3rd RP.

In 2022, under new leadership, the ERC addressed this regulatory gap by amending the 2009 RTWR through ERC Resolution No. 08 (the Amended RTWR), which established new procedures for setting transmission wheeling rates for the already-lapsed 4th RP and for subsequent periods (ERC 2022). Because the 4th RP had already passed, the ERC departed from the usual forecasting approach and instead relied on actual or historical cost data submitted by the NGCP, as well as information already available to the Commission. The ERC emphasized that even under these circumstances, approved rates must remain just and reasonable, reflect the efficiency or inefficiency of NGCP's expenditures, and allow the recovery of prudent costs and a reasonable return to ensure continued viability of grid operations.

Using the amended rules, the ERC determined that the 4th RP should cover the entire lapsed period from January 1, 2016 to December 31, 2022, rather than ending in 2020. The NGCP opposed this interpretation and requested that the 4th RP be limited to the original five-year period, while also seeking further amendments to the rules. Following extensive regulatory exchanges and filings in 2022 and 2023, the ERC opted for a phased approach to avoid further delay. Phase 1 covered the review period 2016 to 2020, while Phase 2 covered 2021 to 2022.

On September 5, 2023, the ERC denied NGCP's petition to amend the rules, thereby affirming that the 4th RP spans 2016 to 2022. Shortly thereafter, on September 13, 2023, the ERC issued its Partial Initial Determination (PID) for Phase 1 of the 4th RP, marking a significant step toward resolving long-standing transmission rate issues.

Because the period has already elapsed, the ERC was able to directly examine whether NGCP's expenditures were necessary, prudent, and efficient, and to set rates that reasonably compensate NGCP only for costs that meet these standards, consistent with the Amended RTWR.

On April 11, 2025 the ERC promulgated its decision on the Final Determination (FD) of maximum allowable revenue (MAR). The FD consolidates the results of both Phase 1 (2016–2020) and Phase 2 (2021–2022) of the review. The same methodology used in Phase 1 was applied to Phase 2, and the findings from both phases were combined to form the final regulatory outcome for the entire 4th RP. The MAR for the 4th RP is PHP335.79 billion, which is lower than the PHP552.19 billion

claimed by the NGCP (ERC 2025a). Table 1 below shows the approved annual revenue requirement vis-à-vis the application and Table 2 shows the impact on the consumers.

Table 1. Annual revenue requirement for the 4th RP (in million PHP)

Particulars	2016	2017	2018	2019	2020	2021	2022	Total
NGCP Application	71,613.95	73,651.99	76,567.20	80,117.03	85,852.65	79,735.00	84,652.77	552,190.60
ERC- Approved ARR (Draft FD)	36,374.26	38,664.84	40,865.02	44,129.95	46,960.58	50,541.19	53,430.68	310,966.53
ERC- Approved (FD)	39,730.48	41,893.95	43,933.05	47,276.49	50,326.34	54,528.34	58,100.01	335,788.65

Note: NGCP- National Grid Corporation of the Philippines; ERC- Energy Regulatory Commission; FD- Final Determination; ARR- Annual Revenue Requirement

Source: ERC (2025a).

Table 2. Transmission rates impact

2024 Average Transmission Rates (PhP/kWh)	Increase in transmission (PhP/kWh)	Collect amount (PhP/kWh)	Total Increase (PhP/kWh)
0.4884	0.0629	0.0384 in 84 months	0.1013

Source: ERC (2025a).

The ERC had to be careful in deciding on and explaining how performance-based regulatory instruments were treated in the context of the 4th RP, given its unique reliance on historical rather than forward-looking data. The final decision clarifies the ERC’s rationale for not applying efficiency adjustments or performance incentives retroactively, consistent with the design and intent of the Amended RTWR (see Box 1).

Box 1. Treatment of performance incentives

The Amended RTWR includes a Net Efficiency Adjustment (NEA), which can either increase or decrease allowed revenues depending on efficiency performance. However, the rules also allow the ERC to suspend or modify the NEA if service delivery standards from previous periods were not consistently met.

For the 4th RP, the ERC set the NEA at zero. This decision reflects the fact that the NEA is designed for a forward-looking regulatory framework, where efficiency gains are shared with consumers over time. Applying it retrospectively, that is, after the period has already passed and in the absence of an approved rate reset, would distort cost recovery and risk regulatory overreach.

Importantly, the ERC already evaluated NGCP’s actual operating expenses (OPEX) and actual capital expenditures (CAPEX) during the 4th RP. Since NGCP’s real performance was directly reviewed, applying an additional efficiency adjustment on top of actual outcomes was deemed inappropriate.

The Performance Incentive Scheme (PIS) is intended to use performance outcomes from one regulatory period to set targets and incentives for the next regulatory period. Because the 4th RP has already occurred, and no performance standards were established in advance, the ERC found that the PIS does not apply to this period.

The Amended RTWR contains no provisions for retroactively applying the PIS to a historical period. As a result, the ERC concluded that there is no legal or factual basis either to grant performance incentives or to impose penalties under the PIS for the 4th RP.

Source: ERC (2025a).

Observers have criticized the historically high weighted average cost of capital (WACC) approved for NGCP (e.g., Senate of the Philippines 2023). In the 3rd RP, this was set to 15.04 percent (ERC 2023b, p. 51). Because of delays in the 4th RP, the higher WACC was carried over to the succeeding regulatory period.

The high allowed return inflated the “return on capital” component of transmission charges (see Box 2 for an explainer on return on capital). Under performance-based rate-setting, WACC is a major building block that determines how much return the grid operator is allowed to earn on its regulated asset base. Keeping NGCP’s WACC at roughly 15 percent meant consumers continued

paying transmission rates anchored on a cost-of-capital assumption that later regulatory reviews considered materially high versus updated market conditions (as evidenced by the ERC later adopting a much lower WACC in its 4th RP work).

Box 2. Return on capital explained

The Amended RTWR defines Return on Capital using the following formula:

$$\text{Return on Capital} = (\text{Regulatory Asset Base} + \text{Working Capital}) \times \text{WACC}$$

where:

Regulatory Asset Base (RAB) includes transmission system and non-system assets;
Working Capital (WC) means support to day-to-day operations; and
WACC reflects the cost of financing these assets.

It is important to distinguish between:

- return on capital - the allowed earnings on invested assets; and
- return of capital - the recovery of the original investment through depreciation.

Each year, the RAB increases with new capital spending and decreases as assets are depreciated. The size of the RAB directly affects transmission rates under performance-based regulation.

Source: ERC (2025a).

The regulatory lag also created “lapsed-period” distortions and large true-ups, instead of timely, forward-looking prices. The 4th RP was finalized only in 2025, that is, years after the period had already elapsed. This undermines one of the main purposes of incentive regulation--setting efficient, forward-looking allowances ex ante--by turning the reset into a backward-looking reconciliation exercise. The combination of high WACC plus regulatory reset delay weakened consumer protection and amplified bill volatility. With an “old” high WACC persisting beyond its intended period, consumers bore higher-than-necessary financing costs embedded in the wheeling charge, while the delayed reset increased the likelihood of sizable catch-up adjustments later--effectively shifting from smoother, predictable price paths to retroactive corrections.

Given the retrospective nature of the 4th RP, the ERC calculated WACC using historical values from 2016 to 2022, rather than forward-looking assumptions. For the 4th RP reset, the ERC engaged independent consultants to review NGCP’s historical capital and operating expenditures and to determine the appropriate WACC. The ERC approved a final regulatory WACC of 11.33 percent, lower than the NGCP-proposed WACC of 12.15 percent (ERC 2025a).

In reviewing the operating expenditures (OPEX), the ERC disallowed certain expense items for two reasons: first, some expenses were deemed not necessary for the operation of the transmission system; and second, other expenses were insufficiently documented. This approach reinforces

regulatory discipline by ensuring that only justified and verifiable costs are passed on to consumers.

For the lapsed 4th RP, the ERC adopted the “As Spent” approach to capital expenditures (CAPEX). Under this method, capital costs are added to the RAB as they are incurred, rather than only when projects are completed and commissioned. This approach reflects the unique nature of the 4th RP. Unlike prior regulatory periods, which were forward-looking, the 4th RP has already occurred and effectively functions as a regulatory true-up.

The ERC determined that the “As Spent” approach is more beneficial to consumers than the alternative “As Commissioned” approach. By allowing costs to be recovered gradually as projects progress, rate impacts are smoothed over time, avoiding sharp and sudden rate increases that would otherwise occur once delayed projects are finally commissioned. In contrast, the “As Commissioned” approach would force NGCP to defer cost recovery during the lapsed period, leading to a build-up of unrecovered costs, higher financing expenses, and potentially large one-time rate hikes--all of which would ultimately be borne by consumers.

Under the adopted approach, verified and validated costs for completed projects and verified expenditures for ongoing projects (as of December 2022) are included in the annual revenue requirement (ARR) through regulatory depreciation. As a safeguard, ongoing projects remain subject to annual review by the ERC to ensure compliance with approved timelines and performance. Overall, the ERC concluded that the “As Spent” method is the most practical and consumer-protective solution for resolving the long-delayed rate reset for the 4th RP.

But this approach has drawn criticism such as from the Transco, which argue that it weakens incentives for timely project completion (Cervantes 2025). It is claimed that the inclusion of incomplete projects in the regulatory asset base, made possible by the as-spent cost recovery mechanism, can inflate transmission rates.

5.3 Right-of-way constraints

Right-of-way (ROW) issues remain a major structural bottleneck to transmission expansion. Securing land access for transmission lines and substations is complicated by fragmented land ownership, valuation disputes, and protracted expropriation processes. Many ROW cases end up in court, where judicial delays can extend project timelines by several years.

Security concerns compound these challenges. Some transmission corridors pass through conflict-affected areas, exposing infrastructure to risks such as sabotage or attacks on transmission towers. These factors contribute to delays in project execution and have led to a growing backlog of transmission applications pending regulatory approval due to unresolved ROW issues (Delilan 2024).

5.4 Grid reliability, reserves, and ancillary services

Grid reliability has also emerged as a critical issue, particularly following episodes of yellow and red alerts linked to shortfalls in ancillary services (Racho-Sabugo 2022). Ancillary services, such as frequency regulation and reserve capacity, are essential for maintaining system stability, especially in a power system with increasing shares of variable renewable energy.

Historically, the absence of firm contracting arrangements for ancillary services raised concerns about the adequacy and reliability of reserves. Policy debates intensified over whether NGCP should be required to secure fixed capacity commitments, with some stakeholders warning that such requirements could increase costs. In response, reforms were introduced, including competitive procurement of ancillary services and the eventual integration of reserves into market mechanisms. The full operation of the Reserve Market within the Wholesale Electricity Spot Market framework marked an important institutional development, though the deferred recovery of ancillary service payments has raised concerns about future rate impacts and political sensitivity (Cordero 2024).

5.5 Coordination and institutional frictions

Transmission development is further hindered by coordination problems across multiple institutions. Beyond right-of-way issues, transmission projects must navigate complex permitting processes involving local governments and environmental authorities. Weak coordination among agencies lead to overlapping requirements, inconsistent timelines, and administrative delays.

At a broader level, tensions persist between the private operation of the grid and the public interest objectives of affordability, reliability, and security. The respective roles of government entities in planning, oversight, and regulation remain contested, highlighting the challenges inherent in managing a privately operated but publicly critical infrastructure.

5.6 Ownership and national security concerns

Ownership structure and national security considerations have also become increasingly salient. A significant portion of NGCP's equity is held by the State Grid Corporation of China, prompting debates over foreign participation in critical infrastructure. Some observers have raised concerns about potential influence over operational decisions and the implications for cybersecurity and national security.

Recent developments, including the entry of the Maharlika Investment Corporation by acquiring 20 percent preferred shares in Synergy Grid and Development Philippines Inc. (SGP) (Maharlika Investment Corporation 2025a), signal a renewed effort by the Philippine government to rebalance control and oversight. SGP holds a 40.2 percent effective ownership in the NGCP. While this may help address governance concerns, the long-term implications for sector performance and investor confidence remain to be seen.

5.7 Transmission capacity and congestion

Most consequential of all issues is the insufficient transmission capacity, resulting in growing congestion in key regions of the country. Delays in grid expansion limit the system's ability to integrate new generation capacity, particularly renewable energy projects. When transmission infrastructure is not available on time, lower-cost or cleaner generation gets curtailed, forcing the system to rely on more expensive alternatives.

Congestion is especially acute in fast-growing load centers (such as cities in the Visayas), where demand growth has outpaced transmission upgrades. These constraints not only increase system costs but also undermine broader policy objectives related to energy security and decarbonization.

Taken together, these issues point to deep-seated challenges in the Philippine transmission sector that extend beyond technical constraints. Project delays, regulatory design flaws, cost recovery mechanisms, coordination failures, and governance concerns interact to shape sector outcomes. Addressing these challenges will require not only targeted policy reforms but also stronger institutional coordination and clearer alignment between regulatory incentives and public interest objectives.

6. Policy implications and recommendations

The challenges facing the Philippine transmission sector point to the need for a more coherent alignment between regulatory incentives, institutional roles, and long-term system objectives. Recurring project delays suggest that current regulatory mechanisms do not sufficiently reward timely completion or adequately penalize prolonged non-delivery.

Rate-setting practices also warrant closer scrutiny. Ensuring that allowed returns reflect prevailing risk and capital market conditions is critical to balancing investor confidence with consumer protection. More transparent and forward-looking regulatory practices could help reduce disputes, improve predictability, and strengthen public trust in transmission pricing.

Addressing right-of-way constraints and coordination failures requires reforms that extend beyond the energy sector. Streamlining permitting processes, improving inter-agency coordination, and strengthening mechanisms for resolving land acquisition disputes would materially reduce implementation risks and project delays. These measures are especially important given the central role of transmission in enabling renewable energy integration and power system balance.

The evolution of ancillary services procurement and reserve markets highlights the importance of institutional adaptability, but it also underscores the need to carefully manage cost pass-throughs to consumers. As grid complexity increases, regulatory frameworks must ensure reliability while maintaining transparency and accountability in cost recovery.

Ownership and governance issues raise broader questions about oversight, accountability, and national security in the management of critical infrastructure. Recent efforts to rebalance ownership and strengthen public oversight suggest growing recognition of these concerns, but sustained attention to governance arrangements will be essential.

Finally, policy makers must be deeply concerned about transmission congestion. It matters because of higher and more volatile power costs where congestion binds, reduced reliability margins in sub-grids where single contingencies have outsized impacts, and renewables integration risk, including load curtailment due to limited interconnection or constrained export capability.

Taken together, these policy implications reinforce the need for reforms that are not only technically sound but also institutionally credible and politically feasible. Improving transmission sector performance will depend on regulatory capacity and clarity, effective coordination, and a governance framework that consistently prioritizes reliability, affordability, and long-term system resilience. The policy recommendations outlined below build directly on the observed gaps between regulatory design and actual sector outcomes.

Reassess regulatory incentives and cost recovery rules

A central policy question concerns whether the current regulatory framework provides sufficiently strong incentives for timely and efficient transmission investment. Persistent project delays suggest that the existing balance between risk protection for the concessionaire and accountability for delivery may be misaligned. Strengthening enforcement of Transmission Development Plan timelines through agreed milestones, binding triggers, and escalating penalties for unjustified delays would help internalize the welfare costs of delayed grid expansion.

In this context, the current application of the “as-spent” approach to capital expenditure recovery warrants reassessment. The rationale for this approach is grounded in investment theory: by allowing early recovery of capital costs, regulators reduce the risk that large, irreversible investments will later be deemed unrecoverable, thereby encouraging network expansion. However, as observed in practice, this approach may weaken incentives for project completion and exacerbate concerns related to cost pass-throughs to consumers.

An alternative “used-and-useful” or prudent investment principle, which limits cost recovery to fully commissioned and operational assets, strengthens completion incentives. Yet, taken to an extreme, it could discourage investment in a capital-intensive and uncertain environment. A hybrid approach--where capital expenditures are provisionally included to support financing but only fully recognized for depreciation and return upon commissioning--offers a more balanced policy option. International experience in liberalized markets suggests that such hybrid designs can better align investment incentives with consumer protection (e.g., “split CAPEX” method in the UK (Oxera 2014)).

Strengthen regulatory capacity and credibility

Effective incentive design depends critically on regulatory capacity. The ability of the ERC to timely conduct rate resets, recalibrate the WACC, and enforce compliance is central to restoring confidence in transmission regulation. Delays or weaknesses in regulatory action can amplify uncertainty, distort incentives, and fuel perceptions of regulatory capture.

Policy discussions around amending the EPIRA to strengthen the ERC’s mandate, resources, and institutional independence are therefore highly relevant. Enhancing analytical capacity, staffing, and enforcement powers would improve the credibility of regulatory decisions and reduce the scope for prolonged disputes over rates, investments, and penalties.

Accelerate right-of-way acquisition and permitting

Right-of-way and permitting constraints require policy responses that engage not only the energy regulator but other national and subnational government entities. Transmission expansion depends on effective coordination among the DOE, the ERC, local governments, courts, and the NGCP. Aligning these institutions around clearly defined grid expansion priorities and streamlining approval processes would significantly reduce project lead times.

Policy measures could include standardized valuation guidelines for land acquisition, faster judicial processes for expropriation, and enhanced community engagement in affected areas. In conflict-prone regions, greater coordination with local security forces and civil society organizations is essential to protect critical infrastructure and ensure project continuity.

Have judicious policies on national security considerations

The presence of foreign ownership in a critical infrastructure asset has raised concerns related to control, transparency, cybersecurity, and national security. Addressing these concerns requires judicious policies that enhance oversight without undermining investor confidence.

Potential measures include stronger disclosure requirements to designated oversight bodies, regular independent audits of cyber and physical security systems, and mandatory stress-testing or “red team” exercises (i.e., adversarial simulation) to assess operational resilience. Proposals to structurally separate system operations from transmission asset management, placing system operation under a government-controlled or tightly regulated entity (e.g., Gatchalian 2025), merit careful study as a way to reduce governance and security risks.

The entry of the Maharlika Investment Corporation (MIC) into the ownership structure of NGCP’s parent company represents a significant development in the sector’s political economy. But its long-term effects remain uncertain. It must also be noted that premature assumptions regarding concession extensions, such as the MIC chief’s announcement Maharlika Investment Corporation 2025b), or guaranteed performance improvements risk creating conditions conducive to regulatory capture. From a regulatory economics perspective, it is critical that any future decisions on concession renewal or restructuring be based on rigorous performance evaluation, transparent regulatory review, and demonstrated public interest benefits rather than anticipated or speculative gains.

Address congestion, reliability, and grid resilience

Congestion and reliability challenges highlight the need for a more proactive approach to capacity expansion and grid modernization. Delays in transmission projects impose system-wide costs by limiting renewable energy integration, increasing reliance on higher-cost fossil fuel generation, and heightening the risk of outages.

Project-level evidences of renewable projects being warned of curtailment due to network limits already exist. ERC decisions have included explicit load curtailment or dispatch-prioritization conditions for new renewable injections where the transmission network is constrained, pending completion of reinforcements. One example is the ERC's October 2025 ruling on Lihangin Wind Energy Corp.'s request to interconnect its 206.25-megawatt San Isidro Wind Power Project in Northern Samar with the Visayas grid (ERC 2025b).

Policy interventions should therefore incentivize timely capacity upgrades and investments in grid resilience. Incentives should encourage investments on modern transmission technologies, strengthening of substations to withstand extreme weather events, and the gradual integration of smart grid solutions that improve monitoring, control, and flexibility. Such investments are increasingly important as the power system becomes more complex and exposed to climate-related risks.

Overall, the policy recommendations outlined above underscore the need for reforms that simultaneously strengthen incentives, enhance regulatory capacity, improve coordination, and address governance risks. The Philippine transmission sector's challenges are not solely technical but institutional and political in nature. Effective policy responses must therefore be grounded in economic theory, informed by actual sector performance, and designed to be credible and enforceable within existing institutional constraints.

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