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Making electricity subsidies work: Cross-country lessons for Philippine energy policy

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Making Electricity Subsidies Work: Cross-Country Lessons for Philippine Energy Policy

Kris A. Francisco and Patricia Thea A. Basilio

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Making Electricity Subsidies Work: Cross-Country Lessons for Philippine Energy Policy

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Abstract

Electricity subsidies serve diverse policy goals but pose significant fiscal, efficiency, and equity challenges. This paper focuses on the Philippines' three major electricity subsidy mechanisms, which includes the Universal Charge for Missionary Electrification (UCME), Lifeline Rate, and Senior Citizen Discount, and situates their design and outcomes within a broader international evidence base. We synthesize recent empirical work from peer-reviewed journals and international organizations to identify design features associated with improved efficiency and equity. We center on prevalent mechanisms such as increasing block tariffs, cross-subsidy mechanisms, time-variant pricing, and targeting approaches. Our systematic review analyzes how these mechanisms perform across contexts and examines transferability to the Philippine setting, given the country's institutional capacity, political economy constraints, and electricity market structure. Our key findings highlight recurring design flaws including fiscal sustainability pressures, leakage and mis-targeting of benefits, and regressive distribution patterns, as well as effective practices such as targeted, transparent, and administratively feasible reforms that align subsidies with intended vulnerable groups. The paper concludes with implications for policy design, implementation, and future research directions, emphasizing the value of international lessons to inform fiscally sustainable and socially equitable electricity subsidies in the Philippines.

Keywords: Electricity Subsidies, Philippine Energy Market, Subsidy Reform

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1. Introduction

Electricity subsidies are commonly utilized in many countries with a diverse range of applications from social protection to achieving specific development targets. In low-income countries, their implementation is aimed at improving access and affordability of electricity, health outcomes, and economic opportunities. In more advanced countries, such subsidies are strategically used to enhance the process of industrialization, encourage technology adoption, or support infrastructure expansion. A case in point is China's industrial development that was supported by electricity subsidies designed to reduce the production costs of energy-intensive industries, hastening job creation and economic diversification (Peng and Pan 2006). Electricity subsidies have also been utilized to support the expansion of renewable energy or encourage infrastructure investment in expanding electricity services in cases of unfavorable commercial returns. The prevalence of such subsidies across different contexts suggests their perceived effectiveness in achieving policy targets.

However, while highly useful as a policy tool, the literature also highlights several trade-offs that policymakers should carefully navigate. First, subsidies create intense fiscal strain on government budgets. A case in point is Indonesia's electricity subsidies, which equated to 1 percent of its gross domestic product in 2016 (CEIC 2016), placing the country among the world's largest electricity subsidy providers. According to the International Monetary Fund (2015), Indonesia had the world's fourth-largest electricity subsidies in US dollar terms in 2013, after Russia, Iran, and Saudi Arabia. Second, subsidies have been found to lead to inefficient energy use due to their distortionary effects on prices, masking the true cost of energy consumption and in effect, encouraging uneconomical usage among consumers and firms (Hu et al. 2024; Jia and Lin 2021). Third, and perhaps the most concerning, subsidies often demonstrate regressive distribution patterns. Llorca and Rodriguez-Alvarez's (2025) assessment of Spain's Bono Social de Electricidad, designed to reduce electricity prices for vulnerable consumers including those with large families and the unemployed, found that while the program contributes to reducing energy poverty, its impact is constrained by insufficient coverage of the poorest households and inefficiencies in subsidy allocation. Similarly, research on Russia's electricity subsidies revealed that more affluent households benefit disproportionately compared with lower-income households, as subsidies are distributed proportionally to consumption levels, which tend to increase with income (World Bank 2021). In the Philippine context, Francisco (2024) uncovered that consumption-based criteria for Lifeline Rate discount favor non-poor households, with over 60 percent of households qualifying for the discount at the regional level despite many being above poverty thresholds. These studies highlight that while electricity subsidies help achieve important development goals, their design and implementation matter immensely as these determine whether the objectives are achieved efficiently and equitably.

There are three major electricity mechanisms in the Philippines, each with their own policy objectives and set of challenges. The Universal Charge for Missionary Electrification (UCME) aids power provision in off-grid areas, growing from ₱7 billion in 2015 to a projected ₱24 billion in 2024, which is more than thrice the initial amount in less than a decade. The Lifeline Rate offers discounted electricity prices to consumers using less than 100 kWh per month, covering more than 60 percent of households in many regions. The Senior Citizen Discount provides minimum 5 discount (recently expanded to 15 percent through House Bill 11400) for electricity

consumption of households with members aged 60 years or older. These programs collectively represent substantial financial commitments that are funded through cross-subsidization mechanisms that are making electricity prices more expensive for other types of consumers. A concerning fact is that these programs operate within the challenging context of the Philippines having comparatively higher electricity prices among ASEAN countries (Ravago and Hall 2022) and this is seen to negatively impact industrialization and economic competitiveness (Ravago et al. 2019). Recent studies have uncovered significant targeting issues, including leakages of the Lifeline Rate to non-poor households, UCME subsidies benefitting economically viable areas, and fiscal sustainability concerns as the senior population grows and elderly households consuming more electricity (Francisco, 2024; Abrigo and Ortiz 2024). These findings suggests that Philippine electricity subsidies are not optimally designed and are suffering from issues on efficiency and equity, despite their enormous scale and long operational history.

Specific aspects of Philippine electricity subsidies have already been covered in previous studies. However, a comprehensive study that systematically synthesizes lessons from international experience and relate them to the Philippine context remains lacking. This gap is important due to several reasons. First, policies proven to be ineffective or counterproductive in other economies can be avoided, saving the Philippines from costly policy experimentation. Second, understanding unintended consequences of electricity subsidies, as experienced by other countries, can unveil hidden dynamics that policymakers might otherwise overlook in program design. Third, international evidence on successful targeting mechanisms that reach vulnerable groups can inform improvements to Philippine programs. Fourth, investigating how other countries have navigated subsidy-phase outs, redesigns, and transitions can serve as useful strategies for potentially controversial policy shifts. The timeliness of such analysis is also backed by mounting pressures on all three programs: UCME's rapid expenditure growth; persistent issues about Lifeline Rate's targeting effectiveness; and demographic transition pushing sustainability concerns for senior citizen discounts. In the absence of reforms that are based on robust evidence and international best practice, these programs risk becoming fiscally unsustainable and achieving their core equity objectives.

The aim of this study is to examine recent international literature on electricity subsidies to elicit actionable lessons for improving the efficiency and equity of the Philippines major electricity subsidy programs. By employing a systematic review of literature, we analyze electricity subsidy policies and their outcomes across multiple countries, with particular attention to increasing block tariffs, cross-subsidy mechanisms, time-variant pricing structures, and various targeting approaches. Our analysis centers on empirical studies published within the past decade (2015-2025), obtained from peer-reviewed academic journals and publications by recognized international organizations including the World Bank, Asian Development Bank, and OECD. From the literature search, we extract information on subsidy design features, implementation mechanisms, target groups, challenges encountered, and documented outcomes. We then perform a comparative analysis, relating international evidence to the specific contexts of the Philippines' three major subsidy programs: UCME, Lifeline Rate, and Senior Citizen Discount. This strategy allows us to identify which international insights are most applicable, considering the Philippines' institutional capacity, political economy constraints, and electricity market structure. Our study makes several contributions to the body of literature. First, it

provides the first comprehensive international comparison applied systematically to Philippine electricity subsidies. Second, it presents specific, actionable reforms for each program grounded in empirical evidence. Third, it offers an integrated reform approach that addresses common design flaws across programs. Lastly, it establishes fundamental evidence to inform ongoing policy debates about electricity subsidy reform.

The rest of this paper is organized as follows. In Section II, we explain our Methodology, detailing our research design and approach. In Section III, we present our review of conceptual frameworks and international literature on electricity subsidy mechanisms, including increasing block tariffs, cross-subsidies, and time-variant pricing. In Section IV, we discuss the design, implementation and challenges of the Philippines' major electricity subsidy programs. In Section V, we offer a comparative analysis of the three major electricity subsidy programs, drawing from specific lessons acquired from international experience. In Section VI, we synthesize our findings across the three major subsidy programs, identify cross-cutting themes and propose an integrated reform framework. Finally, in Section VII, we provide concluding reflections and direction for future research and policy development.

2. Methodology

2.1. Research Design and Approach

Our study employs systematic literature review to analyze international electricity subsidy policies, using explicit search and selection criteria to minimize bias. Likewise, the systematic literature review approach allows for a more extensive coverage of relevant studies across diverse contexts that is instrumental for identifying patterns and extracting valuable lessons that goes beyond the experience of a single country. Our structured approach enables the comparison of different policy designs, implementation contexts and outcomes. As opposed to meta-analysis, which quantitatively combines the results of different studies on the same research question to attain a robust and reliable conclusion, our systematic literature review approach involves thematic synthesis to facilitate pattern identification, extraction of insights, and association of findings to the Philippine context. The appropriateness of our approach is justified by the homogeneity across country context (ex. developed vs developing), design of electricity subsidies (ex. consumption-based), as well as the methodological approach (ex. quantitative, qualitative) of related studies.

We complement the systematic review of international evidence with a detailed contextual analysis of the Philippines' major electricity subsidy programs namely, the Universal Charge for Missionary Electrification (UCME), the Lifeline Rate, and the Senior Citizen Discount. We draw information from policy documents, regulatory proceedings, government reports, and recent empirical studies to detail program design, identify implementation issues, and establish the baseline from which international evidence will be compared and assessed for relevance. Combining international evidence synthesis with Philippine context analysis creates a strong dual approach that would enable us to identify actionable and context-appropriate policy recommendations that reflects implementation realities.

2.2. Literature Search Strategy

2.2.1. International Literature

We conducted comprehensive literature searches across academic databases and government repositories (March-October 2025). For academic databases, we utilized JSTOR (for social sciences and policy journals), ScienceDirect (for energy economics and engineering journals), and Google Scholar (for working papers and reports). We also checked International Organization Repositories such as World Bank Open Knowledge Repository, Asian Development Bank Publications and Research, Organisation for Economic Co-operation and Development iLibrary, International Monetary Fund Working Papers and Publications, International Energy Agency Publications, and International Renewable Energy Agency Reports. For country-specific and regional documents, we used the Philippine Institute for Development Studies Discussion Papers, Energy Regulatory Commission Philippines Reports and Decisions, Department of Energy Philippines Publications, and ASEAN Centre for Energy Publications.

In consideration of the multidimensional nature of electricity subsidy search, we developed a set of search terms for this study. We used *subsidy mechanism terms* such as electricity subsidy, energy subsidy, power subsidy, cross-subsidy, socialized pricing, lifeline tariff, social tariff, increasing block tariff, time-of-use pricing, and other related terms. We also included *terms for target groups* such as low-income household, off-grid, industrial subsidy, senior citizen, etc. In addition, we incorporated *outcome/impact terms* like targeting, efficiency, reform, affordability, redesign, transition, etc.; and finally, *geographic terms* such as developing/developed countries, name of specific countries (especially if quite experimental with electricity subsidies like China), regional groupings (ex. ASEAN, SEA), etc. Complementary to our search terms, we expanded our search strategy by citation chaining and forward citation tracking. Citation chaining involves reviewing the list of references of key studies and influential reviews to ensure that we did not miss relevant sources of information. Forward citation tracking on the other hand, entails using Google Scholar's "cited by" function to capture research building of established frameworks in electricity subsidy research.

We placed high priority to studies published between 2015 to 2025 to capture recent evidence, on-going policy debates, and current subsidy designs. This ten-year window balances relevance with temporal depth, allowing us to identify trends and longer-term outcomes. We, however, made exceptions for seminal works that provide important theoretical frameworks. An example is the study of Komives et al. (2005), which remains an important reference for utility subsidy targeting.

Our search was restricted to publications available in English language. While practically a resource constraint issue, major research articles as well as international policy literature usually appear in English-language outlets. Moreover, international organizations such as the World Bank, Asian Development Bank, etc. synthesize multi-country evidence in their reports, partially addressing the language constraint. There is still however, a chance that we may have excluded relevant country-specific reports about electricity subsidy programs published in local language.

The studies that were identified through our search process goes through inclusion and exclusion screening based on predefined criteria to ensure quality, relevance, and appropriateness to our research objectives.

2.2.1.1. *Inclusion Criteria*

Studies were included if they addressed electricity subsidy policies, mechanisms, design, implementation, or outcomes. Studies about wholesale electricity market subsidy, generation subsidies, or fuel subsidies should cover retail price impacts on consumers to be included. Eligible sources of publication include peer-reviewed journal articles, working papers from reputable research institutions, reports from international organizations, and government documents. In terms of content, studies must be grounded in real-world evidence, which could be in the form of empirical analysis, substantive case studies, or rigorous policy evaluations. For accessibility and coverage, as previously discussed, studies must be published in English and accessible through online subscriptions or open-access repositories, published between the period 2015 to 2025.

2.2.1.2. *Exclusion Criteria*

Conversely, studies meeting *any* of the following will be excluded from the portfolio. As previously mentioned, studies should investigate retail price impacts on consumers. Any deviation from this is considered *scope misalignment* and would lead to automatic exclusion. Studies with *insufficient analytical depth* are also excluded. Examples of this are studies presenting opinion or advocacy without empirical evidence, purely theoretical model without empirical validation, and non-substantive analysis. To ensure *quality*, studies should have clear methodologies and data sources, peer-reviewed in a quality journal, and cited in subsequent works. For *redundancy* criteria, findings that were already covered in a more comprehensive or recent publication are excluded.

2.2.2. Philippine Context

To complement our synthesis on international literature, we conducted a detailed analysis of the Philippines three major subsidy programs namely, the Universal Charge for Missionary Electrification, the Lifeline Rate, and the Senior Citizen Discount. We utilized relevant policy and legal documents (ex. House Bills, Republic Acts), regulatory proceedings and decisions, government reports and statistics, stakeholder documents, and recent studies on these subsidy programs. In this analysis, we defined the current program design, traced their evolution, examined their scale and coverage, and identified implementation issues and challenges to establish the baseline from which international evidence is assessed against. This process facilitated the synthesis of existing evidence to provide fuller grasp of the Philippines' subsidy architecture.

2.3. *Analytical Framework*

The conceptual framework that guides our analysis classifies electricity subsidy mechanisms along three dimensions namely, targeting approach, funding mechanisms, and policy objectives. This three-dimensional framework provides the

necessary structure to allow for systemic comparison of the Philippines' subsidy programs across diverse international experiences and enables identification of design coherence or misalignment. Our framework is centered on the following key questions:

Related to Targeting:

- Which approaches are most effective at achieving stated objectives?
- What do evidence say on targeting accuracy across different methods?
- How do targeting approaches balance administrative cost and accuracy?
- What conditions allow for effectivity of means-testing?

Related to Funding:

- Are there documented impacts of cross-subsidization as compared to funding, market efficiency, competitiveness, and equity?
- How do different types of funding mechanisms affect fiscal sustainability and transparency?
- Is there evidence on the optimal scope for cross-subsidization?

Related to Objectives:

- How do successful programs convey and prioritize objectives?
- What are the trade-offs for programs with numerous objectives?
- How do design features support stated objectives?

Related to Combinations:

- Which targeting-funding-objectives combinations perform well together?
- What type of mismatches creates issues?

Our structured approach allows coverage of relevant international evidence that fits well with the Philippine context. It permits systematic synthesis of insights rather than a disjointed presentation of country experiences.

2.4. Limitations

Limitations include potential language barriers, post-search publications, and inaccessible internal documents. Second, we may also have captured evidence bias towards successful reforms and positive outcomes as opposed to failed policies, as these tend to be more favorable for journal publication. Government reports may likewise downplay failures and magnify successes. We attempted to partially address this bias by actively seeking for references on reform failures and unintended consequences. Third, the studies utilized for our analysis employ diverse methodology from high-quality causal studies with rigorous identification strategy to descriptive case studies constrained by data limitations. This uneven evidence distribution has direct implications on the strength of evidence backing our recommendations. For transparency, we have been cautious about this heterogeneity throughout our synthesis. Lastly, most of the studies captured during our search examine a subsidy program in isolation. Empirical evidence on overlapping subsidy mechanisms remain limited. This implies that some

recommendations on program integration and consolidation, are anchored on economic logic rather than direct empirical evidence of integrated systems.

3. Conceptual Frameworks and International Literature on Electricity Subsidies

Electricity subsidies are pervasively used in many countries, but these are characterized by varying objectives, mechanisms, and degrees of success. We synthesize international literature on three prevalent pricing structures: These are increasing block tariffs, cross-subsidy mechanisms, and time-variant pricing. Our review examines each mechanism based on design principles, efficiency and equity outcomes, targeting challenges, and lessons learned from implementation successes and failures. This thematic organization will enable direct comparison with Philippine subsidy mechanisms which are also examined in the subsequent sections.

3.1. Theoretical Foundation of Electricity Subsidies

Prior to diving into the mechanisms, we first establish the motivations and trade-offs of electricity subsidies. Electricity subsidies serve social protection, economic development, and infrastructure expansion goals. Evidence from a study in France shows that poorest households allot 15 to 25 percent of their income on energy (Cayla et al. 2011). Relatedly, studies reveal that affordability of electricity remains a constraint for low-income households (Lampietti et al. 2007, Komives et al. 2005). Studies on electricity subsidies in China demonstrate how subsidies are utilized to achieve certain economic goals. The country's industrial development was backed by electricity subsidies designed to reduce the production costs of energy-intensive industries. The natural consequences of industrial growth were job creation and industry diversification, further fueling economic progression. Energy-related support, including subsidies for irrigation infrastructure and agricultural machinery, was provided to China's agricultural sector to enhance productivity and support the food security and rural development targets of the government (OECD 2025). In addition to these, electricity subsidies are useful in achieving universal access goals. On market development, subsidies help mitigate the cost of infrastructure investment required to expand electricity services, which private companies would be reluctant to spend if commercial returns appear unfavorable. Electricity subsidies help overcome market failures in remote areas, addressing issues of unavailability of service in low-density areas (Pueyo and Hanna 2015). Furthermore, they accelerate the development and adoption of new technologies such as renewable energy systems (U.S. DOE 2010).

While useful in achieving development goals, there are however, fundamental trade-offs generated by electricity subsidies that create tensions in subsidy policy design. The huge fiscal burden caused by energy subsidies is well-documented in the literature. Indonesia's energy subsidy in 2016, for example, equated to around 1 percent of its gross domestic product for the same year (Burke 2018). This places Indonesia among the world's largest provider of electricity subsidies (International Monetary Fund 2015, Gobel et al. 2024). Burke (2018) further points out that budget pressures related to electricity subsidies limit investment in other priority areas. Electricity subsidies have likewise been flagged to cause consumption inefficiencies

and environmental externalities. Studies by Hu et al. (2024) and Jia and Lin (2021) show that electricity subsidies create distorted price signals leading to consumption inefficiencies. This is concerning as overconsumption could exacerbate emissions and delay the transition to cleaner energy sources. Meanwhile, the most controversial finding in the literature is the regressive distribution of electricity subsidies wherein benefits often accrue to non-poor households. This has been shown in the works of Llorca (2025), which analyzes Spain's Bono Social de Electricidad, and Leschinskaya et al. (2023), which examines Russia's cross-subsidy in electricity.

More recent discussions on electricity subsidies underscores the importance of subsidy design rather than purely subsidy existence. Critical policy dialogue has now shifted towards designing subsidy mechanisms in a way that it achieves its objectives, in parallel to minimizing leakages and fiscal burden (Foster and Witte, 2020).

3.2. Pricing Structures

3.2.1. Increasing Block Tariff (IBT)

Increasing Block Tariffs (IBT) is the most prevalent electricity pricing structure implemented by many countries globally. Foster and Witte (2020) reveal that around 65 percent of countries in the World Bank's Regulatory Indicators for Sustainability database employ IBT structures. The attractiveness of IBTs rests on its design logic. IBTs allow for the differentiation of prices between high-income and low-income households and facilitate self-selection among consumers. This pricing structure practically deals with the heterogeneity in consumer types and their demand characteristics. High-income households have lower price elasticity and therefore, can absorb higher electricity prices. Low-income households on the other hand, uses electricity mostly for basic needs and are highly reliant on lifeline rates. With IBTs, different consumer types can self-select into different blocks with varying prices, wherein the price for each block increases with more units consumed. The blocks may be divided based on levels of income or consumption.

A discernable lesson from the literature is that an effective IBT design requires empirical foundation. The studies of Lin and Jiang (2012) and Navajas and Puig (2024) both utilized household expenditure survey data to gather essential distributional information for evidenced-based threshold setting. Lin and Jiang (2012) criticized China's original three-tier structure, which they found to be ineffective in providing a safety net for low-income households and inducing energy conservation among high-volume users. Instead, the study proposes a four-tier design which featured higher prices and inclusion of an extra block (serves as the fourth block) for very high consumption levels. The authors claim that their proposed structure would improve equity and efficiency, enhance electricity savings and emission reductions, as well as generate additional revenues for power companies. A similar study of Navajas and Puig (2024) examined Argentina's IBT structure consisting of six different fixed charges and eighteen distinct block prices, which they found to be problematic as middle-income rates are too close to low-income rates. Overall, the study highlights the need to balance cost recovery and affordability in designing an IBT structure.

3.2.1.1. Energy Conservation Evidence

Schoengold and Zilberman (2014) note the “theoretical efficiency problem” with average cost pricing for natural monopolies such as water or energy utilities, wherein the price does not equate to the actual marginal cost of the resource, leading to economically inefficient consumption. The authors argue that average cost pricing, while it guarantees cost recovery for utilities, induces overconsumption because it sets the price lower than the marginal cost when marginal cost is increasing. The study explored IBT as a potential alternative mechanism to balance economic efficiency, cost recovery, and equity goals. They note however that while IBT can improve efficiency and equity relative to flat average cost pricing, it is unable to fully address the issue due to inherent constraints in budget.

Chinese evidence shows mixed IBT effectiveness. Fang et al. (2025) find tiered pricing more effective for upper-tier users with flexible consumption. Lower-income families in contrast, frequently consume electricity for basic needs, limiting them to cut back on their usage. The study underscores the need to optimize pricing structure to induce conservation among different types of users, to maintain effectiveness of tiered pricing policies. Consistently, a study done by Zou et al. (2020) examined the impact of increasing block pricing on urban household electricity consumption in China, where they found significant treatment effect on consumption of households facing upper-tier blocks. The findings of Hu et al. (2022) likewise support the effectiveness of IBT in curbing electricity consumption of high-income households. On the contrary, the study of Khanna et al. (2016) found no significant effect of IBTs on overall reduction in electricity consumption in China. This study points out that using IBT as a lone tool for demand-side management is insufficient and must be accompanied by an effective information feedback mechanism (ex. prepaid metering system) to encourage energy-saving behavior. As a key takeaway, the mixed evidence on the effectiveness of IBTs for energy conservation depends largely on the magnitude of price differentials between tiers and the awareness of consumers about tier structures. It is also evident that energy conservation effects can be drawn from upper-tier users in response to higher prices, but not from lower-tier users.

3.2.1.2. Welfare and Affordability Implications

IBTs address affordability. Reasonable tariffs allowing budget space for other needs (Foster and Witte, 2020). Affordability benchmarks for utility services typically suggest that a reasonable amount of household electricity consumption would be about 5 to 10 percent of the total household budget, though actual expenditures vary significantly by income level and region. (see for instance Lampietti et al. 2007, Komives et al. 2005). This affordability has become more of a problem for the world’s poor. Using French household data, Cayla et al. (2011) found that the least well off has a very large percentage of energy consumption vis-a-vis household budget at 15 to 25 percent. This is often augmented by IBT, by permitting pricing below marginal cost for the lowest block which consists of the least well off. Borenstein (2012) has shown that there is a modest redistribution effect of IBTs, particularly from high-income to low-income consumers. Studies show that this redistribution effect is dependent on the design structure. In the Ethiopian case as shown by Cardenas and Whittington (2019), only 7 percent of the total subsidies went to households in the

poorest quintile while 37 percent went to households in the wealthiest quintile. The study also uncovered that 80 percent in the poorest quintile were nonprimary consumers (those who pay a primary account holder), and most of the households with shared connections were in poorer quintiles. This raises a legitimate question about the association of electricity consumption and household wealth. A comparable study on South Africa by Burger and Jansen (2014) shows that the middle-income deciles benefit most from the IBT, not the lowest decile. The highest decile conversely, pays the highest premium. Overall, these studies imply that IBT structure has the potential to induce progressive distribution. However, the actual outcome will still rely on threshold calibration and block pricing.

3.2.1.3. Targeting and Leakages

IBT targeting faces a fundamental challenge: consumption-based criteria incorrectly assume low consumption equals low income. Whittington (1992) points out that the two foremost criticisms against the initial welfare implications of IBT structure in the context of developing countries. First, it fails to account for high-density conditions in most developing countries wherein several individuals or households share a single electric meter. These conditions mean a higher electricity bill for a single household since they would belong to the highest block. Second, some low-income households have no private electricity connections and pass the burden on their neighbors whom they rent out electricity. Pashardes and Hajispyrou (2002) propose that IBT structure should consider the household size and composition, especially in areas where private meters are deficient and large families are common. This suggestion involves making the pricing structure more reflective of actual per capita use by adjusting the consumption block thresholds. Alternatively, Barde and Lehmann (2014) advocate for means-test targeting to ensure that the subsidies are given to households that meet specific eligibility requirements. As opposed to the IBT, means-test targeting involves examining the financial situation (means) of possible beneficiaries to ascertain their need for assistance. In their study, the authors, however, found that despite better performance of means-tested subsidy in terms of reaching the poor, a huge number of poor households might still be excluded due to implementation challenges. It is worth noting that the effectiveness of means-test targeting banks on robust administrative systems useful for the collection and verification of household information. The logistical and financial demands of collecting this data act as constraints to implementation. The same study proposes combining existing IBT structures with means-tested overlays to target the poor while at the same time maintaining consumption-based tiers for the rest of the population. This hybrid approach will be able to tackle leakages without the pain of a complete structural overhaul.

3.2.1.4. Implementation Challenges in Developing Countries

IBT faces implementation challenges in developing countries such as infrastructure, cost recovery, and administrative capacity. The availability of private meters varies widely within and among developing countries. To exacerbate this problem, metering technologies are required for more sophisticated tier structures. Moreover, shared

connections are widespread in high-density urban poor locations, making IBT targeting much more complicated. Second, there exist cost recovery tensions among firms. Electricity can command more equitable distribution than water utilities since there exists variation in the marginal cost of inputs, which often includes coal, biomass, hydro gas, wind, and solar among others. The idea driving this argument is that firms can use the producer surplus from low-cost inputs such as coal to achieve a more equitable distribution for consumers (Schoengold and Zilberman, 2014). Yet, the use of low-cost inputs such as coal has environmental implications. The last point relates to administrative capacity. The IBT structure requires constant monitoring of consumption patterns of households across multiple tiers. It also requires sophisticated billing systems as well as an effective feedback mechanism to educate consumers about their consumption patterns. These technologies and systems are usually limited in developing countries and requires huge financial investment and systems overhaul.

3.2.1.5. *Key Lessons for Policy Design*

The literature offers several valuable lessons related to the IBT structure. As consistently shown in many studies, several design features can improve IBT's effectiveness in achieving pro-poor outcomes while upholding economic efficiency.

Empirically-grounded threshold setting –an effective IBT design relies on empirically-grounded threshold setting using household expenditure surveys instead of relying on arbitrary consumption cutoffs. Successful IBT structures calibrate block thresholds to mirror actual consumption patterns among different income groups. Household expenditure surveys are useful tools that provide information on consumption distribution, allowing policymakers to identify consumption levels that differentiates subsistence needs from discretionary use.

Sufficient price differentials between tiers –the literature emphasizes the importance of sufficient price differentials between tiers to induce effective behavior responses. The magnitude of differentials is critical; it is likely that small increases may be absorbed without consumption adjustment, substantial differential on the other hand, may alter usage pattern and improve the redistributive impact of the price structure.

Balancing precision with simplicity –Lin and Jiang (2012) suggest that four-tier structures are optimal for balancing precision with administrative simplicity. They note that four-tier systems provide sufficient grouping to distinguish between lifeline consumption, low-income household use, average-middle income consumption, and high-volume users. The four-tier system is manageable for utilities and comprehensible to consumers.

Integration with means testing –Barde and Lehmann (2014) demonstrate the importance of combining IBT mechanisms with means-testing for identifying extremely poor households. Consumption-based targeting like IBTs inevitably produces inclusion errors (ex. low-consuming high-income households) and exclusion errors (large family households exceeding lifeline thresholds). Combining IBT with means-testing can identify extremely poor households for additional support. The hybrid approach addresses the weakness of pure consumption-based targeting while preserving the administrative efficiency of IBTs.

Overall, the synthesis of studies on IBT suggests that effective implementation requires careful balancing of local context, robust data infrastructure, and complementary targeting mechanisms. High-quality household surveys should be utilized to inform threshold calibration; establish price differentials sufficient to induce behavioral responses while avoiding affordability issues; adopt structures that balance precision with simplicity; and develop complementary mechanisms to reach households that may have been excluded. Integrating these elements coherently into the IBT structures can lead to progressive redistribution in utility pricing.

3.2.2. Cross-Subsidy Mechanisms

Cross-subsidies redistribute costs internally. Certain consumers pay above-cost rates to subsidize others. Implementation varies by country context.

China's experience with electricity subsidies demonstrates how such mechanisms are utilized to achieve multiple development goals. In the early 1950's China's development strategy involved supporting heavy industry through electricity subsidization, which facilitated the country's industrialization and urbanization (Lin et al., 2003). This historical legacy embedded cross-subsidy mechanisms into China's electricity sector. Along with rural electrification which gained momentum after 1979, China similarly used cross-subsidization to accelerate agricultural modernization through subsidized energy inputs. Agricultural sector support and modernization was China's response to food security concerns (Peng and Pan, 2006). Presently, cross-subsidies in electricity still exist in China, not only between sectors (residential, industrial, commercial) but also between consumers with different levels of consumption (Xie and Huang 2025).

In the context of developing countries such as India, Brazil, Pakistan, electricity cross-price subsidies flow from industrial and commercial sectors to residential (Chattopadhyay, 2007, Khalid and Salman, 2020, Uhr et al., 2019). Higher electricity prices are charged to industrial and commercial sectors to provide electricity access to majority of households (Chattopadhyay, 2004, Saha and Bhattacharya, 2018).

The differences in local economic priorities and political considerations backing cross-price subsidies makes cross-country comparison challenging. Policy transfer is also tricky in the sense that what works in one context may not work for others because of differences in characteristics of consumers and institutional arrangements.

3.2.2.1. *The Club Good Framework*

The Club Good Framework provides a good theoretical foundation for electricity networks. Faulhaber's game theoretic approach (1975) abstracts electricity networks as club goods characterized by its non-rival but excludable nature. Every consumer that connects to the network imposes an incremental cost to the provider, saving the consumer significant amount of expenses for self-provision of electricity (ex. installing own generator). Cross-subsidization occurs in two scenarios:

Price too low –when the price is set too low, the cost levied is unable to cover the real incremental costs the consumer imposes on the electricity system. This means that other consumers will shoulder the remaining difference.

Price too high –when the price is set too high, the cost exceeds what a consumer should pay for stand-alone provision. The excess in payment will cover the costs of other consumers.

Faulhaber's framework, however, is difficult to operationalize in real life due to the complexity of electricity systems. The implementation challenges are daunting. First, it is immensely difficult to estimate what it would cost a consumer group to self-provide electricity as this would entail specifying all alternative technologies, their capital costs, operating efficiency, reliability, etc. Second, computing for a consumer's incremental cost to the system is very complex as that would require establishing allocation rules to attribute the cost of a transmission line that serves industrial, commercial and residential consumers. Lastly, Faulhaber's framework is static, comparing costs and prices at a point in time. Electricity systems by contrast, is comprised of long-lived assets with costs distributed over time. Therefore, a methodological challenge arises because theory collides with practical constraints. The balance between conceptual elegance and operational feasibility creates a measurement landscape that is filled with trade-offs between accuracy, manageability, and policy relevance.

3.2.2.2. *Measurement Approaches*

Accounting methods allocate costs through fully-distributed or incremental cost approaches. A critical limitation of accounting cost methods is that they miss intertemporal consumption smoothing where the costs are distributed across a consumer's lifetime, rather than captured in single-period accounting. This creates measurement errors that directly affect profit maximization of firms that make sunk investments in long-lived assets.

The price gap approach that was formalized by Corden (1957) is also widely applied to electricity subsidies. It offers a fundamental simplification where the subsidy is computed as: $(Reference\ price - Domestic\ price) \times Quantity\ consumed$. The reference price is based on the world market price that is adjusted for transport, and the domestic price is the actual price paid by consumers. Lin and Jiang (2011) study about China's energy subsidy exemplified the method's power. The study reveals China's electricity subsidy amounted to 356.73 billion CNY in 2007, equivalent to 1.43 percent of their GDP. The strength of the price gap approach is its simple data requirements and straightforward calculation. However, the estimates form a lower-bound for total support. The price gap data should also be supplemented with periodic detailed policy reviews of financial transfers to fuels.

3.2.2.3. *Distributional Impacts*

Cross-subsidies often fail equity goals, disproportionately benefiting higher-income households (Komives et al., 2009). Chen (2017) similarly found regressive patterns in China's cross-subsidies. This regressivity occurs mainly because consumption is

often used as a criterion for cross-subsidies, but consumption imperfectly correlates with income. Wealthier households also have more flexible demand for electricity and can thus, adjust their consumption to capture the benefits from cross-subsidies. In developing countries, poorest households may be excluded from the subsidy entirely due to the lack of connection to the electricity network.

3.2.2.4. Welfare and Efficiency Consequences

While electricity cross-subsidies are well-intentioned, empirical evidence suggests that they cause broader economic harms. Hahn and Metcalf's (2021) analysis of California's CARE program reveal that the subsidy reduces economic welfare because of distorted consumption decisions and inefficient allocations it induced. Meanwhile, Hu et al. (2024) unveiled that subsidy-driven price increases hamper industrial productivity. The study finds an inverted U-shaped relationship between electricity prices and industrial efficiency in China, implying that moderate price increases can induce positive efficiency but beyond a turning point, price increases inhibit firm operations. Relatedly, Karimu's (2025) study in Ghana showed that small-to-medium enterprises (SMEs) bearing the costs of cross-subsidies entail high production costs, impairing their competitiveness. This is particularly evident in energy-intensive SMEs.

3.2.2.5. The Reform Trap

Cross-subsidy systems are politically challenging to reform once established. Beneficiaries understand exactly what they receive, while costs are distributed among many payers in small increments that are embedded in their monthly bills. Poor households confronting higher prices generate public sympathy and political support. Politicians on the other hand, face asymmetric political incentives that favor maintaining dysfunctional systems. This path dependency highlights the significance of initial mechanism design rather than subsequent corrections.

3.2.2.6. Key Lessons for Policy Design

There are several lessons that emerge from the analysis. Cross-subsidies can work if (1) there is clear identification of subsidy flows and magnitude –without such, regressive outcomes may occur despite progressive intent; (2) there is regular evaluation of distributional impacts because electricity consumption patterns and systems costs are not static; (3) there is a complementary targeting mechanism to reduce leakages; and (4) there is recognition of efficiency trade-offs with explicitly policy decisions.

3.2.3. Time-Variant Pricing Mechanisms

Time-variant pricing (TVP) is a fundamentally different approach to electricity pricing. The underlying idea is to align retail prices with temporal variations in wholesale costs

instead of implementing price discrimination across consumer groups. Essentially, TVP imposes a dynamic structure to influence consumers' energy consumption. It is one of the most economically sound yet historically underutilized tools in electricity pricing design.

3.2.3.1. *The Economic Rationale*

Electricity demand varies temporally, with daily peaks during morning/evening, seasonal patterns from heating/cooling. For instance, higher use of air conditioning appliances during summer season, or higher use of heating appliances during winter season.

This demand variability leads to capacity constraint. All components of the electricity system, from generation, transmission, and distribution, must be built with capacity to serve peak demand, regardless of how infrequently those peaks occur. On the contrary, consumers have historically faced flat retail prices, regardless of the variation in their temporal consumption. This produces a significant mismatch between actual costs and consumer prices. This then results to a lot of inefficiencies in the electricity sector. Since consumers are unaware of the variation in their consumption costs throughout the day or the seasons, they have no incentive to adjust their behavior. Peak demands will remain artificially high, and utilities will continue to maintain expensive infrastructure that will sit idle for certain periods. This system-wide cost is reflected by higher average rates of electricity that is being charged to consumers.

TVP addresses the mismatch between actual costs and consumer prices, by aligning price signals with the economic reality of electricity supply. Retail prices rise during peak periods, signaling that the system is strained and therefore electricity is expensive. This price signal induces an incentive structure for load shifting. Households, industrial facilities, and commercial buildings might schedule their energy-intensive activities during inexpensive hours. The aggregate of these responses can significantly restructure the load curve. The benefits of this will cascade through the entire system, resulting to reduced system costs, lesser infrastructure investments, and higher overall savings, which will flow back to consumers in the form of lower electricity prices.

3.2.3.2. *Three Primary Mechanisms*

There are three primary forms of TVP: real-time pricing, time-of-use rates, and critical peak pricing. Each of these forms represent different trade-offs between price signal accuracy, consumer predictability, and administrative complexity.

- *Real-Time Pricing (RTP)* –under RTP, prices vary in real-time to reflect the changes in rates in the wholesale electricity market. This is facilitated by smart meter technology, reporting real-time consumption data needed for accurate billing. While in principle, RTP offers the most direct and efficient price signal, empirical evidence reveals major complications. Allcott's (2011) analysis of US households exposed to RTP revealed that although consumers did reduce

energy use during peak hours, off-peak consumption remained unaffected. Paradoxically, price volatility led many households to reject RTP even when it would reduce their costs, as the mental effort of managing unpredictable bills outweighed the financial benefits. This highlights RTP's central tension between achieving precise price signals and exposing consumers to financial uncertainty.

- *Time-of-Use (TOU) Rates* –TOU sacrifices price signal precision for predictability and simplicity. It establishes pre-defined price schedules based on historical patterns. The rates vary by season, day of the week, and time of day. With this design, consumers are well-informed and can plan behavioral responses.

The global implementation of TOU is highly varied in structure and complexity. Singapore, electricity retailers implement two-tier TOU systems where off-peak hours generally run from 11PM to 7AM, with certain retailers offering extended windows from 9PM to 9AM. Senoko Energy's LifeSavvy24 plan exemplifies this pricing structure, offering off-peak electricity at 20.05¢/kWh, which represents approximately 54 percent of the peak rate of 36.95¢/kWh (Energy Market Authority). The Spanish TOU framework divides weekdays into three periods: peak (10 AM-2 PM and 6 PM-10 PM), off-peak (midnight-8 AM), and mid-peak (remaining hours). Weekends and national holidays receive off-peak pricing for the entire day (Enrich et al. 2024). This finer granularity enhances efficiency but risks making the system more complex for consumers.

- *Critical Peak Pricing (CPP)* –CPP focuses price signals on the system's most strained periods; moments of extreme demand or supply constraints when system capacity is scarce and wholesale costs are high. Utilities determine these events and allow consumers to prepare, typically in 24 hours.

Empirical evidence suggests CPP's effectiveness. Jang et al. (2015) found that commercial and industrial businesses in Korea during was responsive to CPP signals. They did notice a short-term learning curve, but responsiveness improved over time as businesses gained experience with the pricing mechanism and aligned their operational strategies. Likewise, Herter et al. (2007) found statistically significant consumption reductions during critical peak events. These studies highlight the potential of CPP as a tool for managing emergency demand.

3.2.3.3. *Design Considerations and Success Factors*

Faruqui (2010) identifies four critical TVP design criteria:

- 1) *Short-peak periods* –shorter peaks require less intense behavioral shifts, making compliance more likely. For example, a three-hour peak window during evening hours can influence households to delay tasks such as running the dishwasher, adjust dinner preparation, or adjust the thermostat. By contrast, an

eight-hour peak window imposes extended inconvenience that might cause households to fully resist behavioral change.

- 2) *Strong price signals* –the difference between peak and off-peak prices influences incentives to conserve electricity. Substantial price differentials result to significant savings that captures consumer attention and justifies behavioral shifts.
- 3) *Rates reflecting actual system cost* –peak prices should fully mirror the marginal costs experienced by the system during capacity-constrained periods. When consumers understand that higher peak prices equate to real scarcity and higher production costs rather than utilities simply using arbitrary rates to extract surplus, consumer acceptance increases. Cost-reflective prices likewise guarantee that resulting behavioral responses will improve system efficiency instead of merely redistributing welfare.
- 4) *Easily understandable* –Cognitive and mental fatigue will make financially attractive but complicated pricing schemes fail. Clarity enhances behavioral adjustment. A rate structure that is simple enough to explain to younger household members has far better prospects than an alternative one requiring a spreadsheet to understand. Complexity can be in the form of multiple tiers, intricate seasonal adjustments, and conditional pricing rules.

Faruqui underscores the value of pilot-testing before full-scale deployment as they provide empirical basis of a rate's design effectiveness within a specific consumer population and regulatory context. Pilot-testing can reveal which aspects of the design work, and which aspects need refinement. They also perform a political function, by generating data that can convince regulators, consumer advocates, and the public. The investment required in careful piloting is justified by the reduction in risk associated with costly policy failures, as well as strengthening institutional knowledge necessary for successful implementation. Overall, these design considerations highlight that in TVP, technical correctness is necessary but not enough to guarantee success. TVP design should carefully accommodate human psychology, institutional constraints, and the actual realities of how households make energy decisions.

3.2.3.4. *Implementation Barriers in Developing Countries*

The feasibility of implementing TVP in developed and developing countries is significantly different due to critical constraints mainly related to capacity.

- *Metering technology requirement* –the metering requirement serves a major barrier. TVP tools achieve superior results with smart meters (Faruqui and Sergici, 2010), but in developing countries the capital costs of meter deployment far exceed the gains from operational savings. The technical expertise required for maintaining smart meters and data management adds to the challenge. Smart metering is difficult to sustain since developing countries are often faced with skilled labor shortages in utility sector (Monyei et al., 2018).

Moreover, electricity reliability issues can compromise meter functionality and data accuracy, eroding the effectiveness of TVP.

- *Electrification gaps* –in the Philippine context, universal electrification still hasn't been achieved, and several islands are yet to be connected to the electricity grid. Underlying is a policy prioritization dilemma of having to choose between using scarce resources to improve basic access or optimizing consumption patterns among consumers. A finding from sub-Saharan Africa mirrors this, with grid extension showing higher welfare gains than demand-side management in the context of incomplete electrification (Lee et al., 2020).

Even among electrified households, TVP faces implementation challenges because it requires clearly defined consumer accounts with reliable billing systems. In developing countries, utilities grapple with revenue collection and illegal connections. Shared meters and illegal connections make individual household consumption tracking very difficult.

- *Consumer behavior considerations* –there are two types of enrolment frameworks in TVP programs, the opt-in and opt-out options. Opt-in programs require active effort to join. This often leads to loss aversion and decision avoidance in consumers. Opt-out programs, in comparison, require active effort to reject. This makes inertia favor enrollment. Thaler and Sunstein (2008) argue that defaults shape decisions through multiple mechanisms, including inertia (people's tendency to stick with the given option) and implied endorsement (the perception that defaults represent recommendations). Samuelson and Zeckhauser (1988) documented people's tendency to stick with the status quo even when alternatives present superior outcomes. Leveraging this bias, Pichert and Katsikopoulos (2008) found that making green electricity the default option (with opt-out available) led to 68 percent adoption in Germany, compared to much lower rates when customers had to actively opt in. Default enrollment has proven effective in similar contexts; for example, Sacramento Municipal Utility District's pilot achieved over 95 percent participation through opt-out enrollment, compared to only 20 percent through opt-in enrollment (Cappers et al. 2016).

Opt-out option, however, relies on institutional trust, which may be lacking in developing context. Distribution utilities in developing countries often have histories of unreliable service, non-transparent billing, or corruption, that automatic enrollment may be viewed by consumers as exploitation rather than beneficial (Rai and Beck, 2015). This implies the need for substantial consumer education campaigns that likewise requires financial resources and administrative capacity.

Supply side management for effective participation necessitates access to timely information. Conversely, demand side management requires reducing communication barriers such as low literacy rates, limited smart phone penetration, and language diversity, which are prevalent in developing countries.

- *Household capacity constraints* –the load flexibility assumption may not be applicable for lower income households. In developing country context, consumption patterns focus on essential uses such as lighting, cooking,

refrigeration, hence the capacity for consumption adjustment is very tight. Consistent with this is the finding of Jessoe and Rapson (2014) stating that demand response elasticity positive correlates with income. Wealthier households with discretionary loads can shift their consumption without sacrificing their comfort. In addition, households in developing country have limited appliances, suggesting that there are fewer loads to shift. Load shifting also assumes temporal flexibility, or the ability to delay household activities. However, informal workers are constrained with time; most of their time is dedicated to working. This limits the capacity to adjust their behavior towards electricity consumption. Lastly, time-variant pricing is tricky in developing country context as it may lead to energy poverty. High cost of electricity during peak periods when consumption is inevitable can create cash flow challenges to households spending large portions of their income on electricity.

Largely, the challenges discussed above, suggest that the effectiveness of TVP depends heavily on infrastructural and socio-economic requirements that are lacking in many developing countries. Some important implications emerge: TVP requires established utility infrastructure including consistent service delivery, clear billing practices, complete electrification, and institutional credibility, as prerequisites rather than concurrent objectives. Implementing pricing reforms before these foundations are laid risks exacerbating existing inequalities by burdening vulnerable households unable to adjust consumption patterns, while potentially eroding public support for electricity sector reforms.

3.2.3.5. Data Requirements for Effective Design

Effective time-variant pricing depends on robust data systems to identify periods of high system costs, forecast grid conditions, and estimate how consumers will respond to price signals. Developing countries usually lack this detailed information due to underdeveloped data infrastructure.

The literature demonstrates what type of granulated data is required for conventional forecasting techniques that would allow differentiation of genuine peak periods and shoulder periods. The study of Suganthi and Samuel (2012) describe conventional forecasting techniques for system-level demand forecasting, which includes regression analysis, time-series decomposition, and ARIMA models. These models utilize historical consumption data to predict future load patterns. They require information on economic variables (GDP growth, industrial production indices, sectoral output), demographic factors (population growth, urbanization rates, household formation), data on electrification expansion (connection rates, grid extension plans), climate variables (temperature, humidity, seasonal patterns affecting cooling/heating loads), and sometimes day-type distinctions (weekday/weekend distinctions, holidays, cultural events). However, distribution utilities in many developing countries lack comprehensive historical load data. System-level data from sub-stations may exist but may suffer from data gaps, inconsistencies or poor quality. Jacobsen and Juul (2015) note that prediction is more challenging and error-prone in developing countries due to rapid structural shifts such as electrification surges, appliance saturation changes, industrial composition

evolution, which violate the stationarity assumption of most demand forecasting models. An alternative technique is residential load modeling wherein load profiles from household-level components are utilized to estimate aggregate consumption load. Adeoye and Spataru (2019) implemented this approach for Nigeria and West Africa. The study exhibited that residential demand profiles can be constructed from appliance inventory data and behavioral usage patterns; information usually provided by specialized energy surveys. Many developing economies, however, lack the resources and institutional capacity to administer these specialized energy surveys on a regular basis.

3.2.3.6. *Key Lessons for Policy Design*

International experience in implementing TVP reveals a consistent pattern of successes and failure that offers valuable lessons for policy design. These lessons emphasize the value of simplicity, appropriate incentives, technological alignment, and contextual adaptation.

The following factors were identified from successful implementations:

- *Simple, transparent rate structures* –Programs that have simpler and straightforward schedules yield higher consumer participation. Singapore's TOU tariff utilizes two periods, a structure that is easily comprehensible. Likewise, Spain's "discriminación horaria" uses three clearly defined periods, consistent with consumer intuition about daily rhythms.
- *Concentrated peak periods with strong price signals* –Programs that achieve significant load reduction typically have sufficient price differential (peak-to-off-peak ratios of 3:1 or greater) and limited peak duration (peak periods of 3-6 hours). California's statewide pricing pilot programs tested various time-of-use rate structures. Studies found that concentrated peak windows with substantial price differentials generally produced stronger demand response than extended periods with lower price ratios.
- *Strategic pilot testing* –Successful programs performed strategic pilot testing prior to mass deployment to gather actual information which will be used in load profile validation, price responsiveness estimation, operational testing, and assessing political legitimacy. Oklahoma Gas and Electric tested its SmartHours TOU program with 6,000 customers over two years, applying lessons learned to improve rate structures and outreach methods prior to system-wide residential deployment (Fenrick et al. 2014).
- *Opt-out enrollment design* –Default enrolment raises consumer participation dramatically. Successful opt-out option implementations provide (1) bill protection guarantees wherein customers are assured to pay no more than flat-rate equivalents during introductory periods; (2) clear communication where consumers are provided multiple touch points such as mail, email, public consultation, to explain the changes in the procedure; (3) easy opt-out mechanisms where consumers have easy access to decline participation (ex.

phone call or online forms); and lastly, (4) regulatory frameworks that expressly permit default enrollment while mandating consumer protection.

- *Comprehensive consumer education* –Programs should include sustained education campaigns than solely rely on tariff notification. This can help achieve better outcomes. Some strategies to consider are multi-channel communication (ex. social media, community partnerships, flyers attached to the bill); behavioral guidance (ex. specific advise on load-shifting strategies); feedback mechanisms (ex. providing comparative statistics over time and with similar households to support positive behavior); and targeted outreach or extending extra support to populations with lower educational attainment, language barriers, or limited digital access.

It is worth noting that TVP advances efficiency goals through load shifting and cost reduction but does not resolve affordability or equity issues. Hence, it should supplement rather than substitute equity-oriented measures such as lifeline rates.

3.2.4. Cross-Cutting Themes and Synthesis

This section integrates findings from international literature and reveals critical patterns that go beyond specific mechanism types. We offer several lessons for policy design:

- *The targeting paradox*

All three mechanisms are problematic in reaching its beneficiaries. This isn't just a design flaw but a reflection of the difficulty of electricity consumption as a proxy for household welfare. A key insight that emerged from the literature is that hybrid targeting –one that combines consumption thresholds with complementary means-testing, performs better. Thus, policymakers should focus their attention on layering targeted criteria to improve precision.

- *Design execution matters more than mechanism selection*

The literature shows more variations in results within mechanism types than between them. This suggests that focus should be shifted away from theoretical mechanism debates (which one to adopt) to practical implementation quality. Governments should improve at:

- Empirical calibration using household data
- Regular performance evaluation
- Adaptive adjustment based on outcomes
- Administrative capacity to implement effectively

The contrast between overly complex vs simple designs underscores the message that over-engineering can weaken effectiveness.

- *The Philippine advantage*

A crucial advantage of the Philippines is having a regular household survey (FIES) that can facilitate improving its targeting mechanisms. In the absence of reliable

household data, sophisticated targeting becomes unfeasible. However, the challenge is integrating this household survey to administrative system. Having the necessary data is a necessary condition, but using data for operational targeting is an entirely different undertaking. The Philippines, thus, need to:

- Link FIES household identifiers to either utility consumer base or HECS
 - Update targeting criteria as household circumstances change
 - Automate eligibility determinations instead of relying on manual processes
- *Realities of political economy*

The political economy analysis raises some important notes. The main finding is that inefficient subsidies persist worldwide because of two factors: (1) concentrated and visible beneficiaries who organize and resist reforms; and (2) costs that are dispersed among a huge number of individual bill payers (low salience).

Successful reform experiences suggest a preferable sequencing:

1. Start with intolerable leakages (ex. wealthy households, viable areas)
2. Improve targeting prior to lessening benefits to maintain political support
3. Frame reforms positively (ex. “better reach those in need” instead of benefit cuts); this recognizes the reality that reform sustainability involves public acceptance

- *The fiscal sustainability time-bomb*

Indonesia’s experience with electricity subsidies serves as a cautionary tale. Policymakers should be mindful of the growth dynamics of subsidies. First, the beneficiary pool expands due to electrification and demographic. Then the cost escalates due to fuel prices, needed infrastructure, etc. However, political resistance will build up and prevent adjustments. The result is a compounding fiscal burden that will eventually turn into a crisis and force painful reform.

The contrast between proactive and reactive reform is extremely important. The literature shows that countries that act early avoids crisis-driven reforms that often impairs vulnerable population more. This implies that the Philippines should view subsidy reform as inevitable rather than optional.

- *Integration vs Fragmentation*

The literature reveals that advanced economies combine fragmented subsidies into coherent social protection frameworks. The observed evolution path is:

- Developed countries have integrated social protection with cash transfers
- Middle-income countries have sector-specific subsidies with overlapping beneficiaries
- Low-income countries have limited and poorly targeted subsidies

Comparatively, the Philippines’ three mechanism structure that includes UCME + Lifeline rate + Senior citizen discount, falls within the developmental stage. The evolution path suggests that the Philippines needs to assess whether maintaining the three mechanism is efficient considering (1) the administrative redundancy of multiple systems tracking the same beneficiaries; (2) confused incentives giving

conflicting price signals; and (3) missed opportunities of integrating these subsidies with broader social protection programs like 4Ps or social pension.

4. Electricity Subsidy Programs in the Philippines

The Philippines operates three main mechanisms that are designed to achieve complementary social objectives. The main subsidy mechanisms are (1) the Universal Charge for Missionary Electrification –intended for the expansion of electricity access to off-grid areas; (2) Lifeline Rate –seeks to provide discounted prices to low-income households; and (3) Senior Citizen discount –favors elderly population with reduced electricity cost. This section examines the design, implementation, and sustainability challenges confronting each of the subsidy mechanisms.

4.1. *Universal Charge for Missionary Electrification (UCME)*

4.1.1. Policy Background and Institutional Framework

Missionary electrification provides infrastructure to off-grid areas disconnected from the National Grid (ERC, 2011). Off-grid areas typically deter private investment because of factors such as low population density, minimal energy demand, and underdeveloped rural economies. Such conditions generate fundamental viability challenges, with high infrastructure investment requirements combined with weak revenue potential discouraging distribution utility participation (Waddle, 2012).

The Philippines employs a tiered approach in achieving its universal electrification mainly due to its archipelagic geography and dispersed population. The institutional framework designates responsibility across multiple actors. Distribution utilities (DUs) hold franchises for service territories, with adjoining private-owned utilities or electric cooperatives providing coverage when DUs cannot. When both arrangements fail to materialize, the National Power Corporation–Small Power Utilities Group (NPC-SPUG) assumes responsibility as the provider of last resort.

4.1.2. Historical Evolution and Performance

Rural electrification began in the 1960s, establishing around 200 electric cooperatives (Waddle, 2012). The National Rural Electrification Act of 1969 reinforced this commitment by creating the National Electrification Administration (NEA) as the primary implementing agency, authorized to provide long-term, below-market loans to rural electric cooperatives.

Early program outcomes demonstrated success, as cooperatives achieved both high connection rates and financial cost recovery (Waddle, 2012). Subsequent implementation phases, however, exhibited declining performance. Many cooperatives failed to comply with safeguards mandated by international funding agencies such as USAID, leading to diminished cost recovery and mounting financial deficits. Research suggests that political interference in rural electric cooperatives correlates significantly with reduced collection efficiency, undermining financial

sustainability (Escresa and Glova, 2024). Similar patterns have been documented across developing countries, where weak political competition within cooperative franchise areas associates with poor operational performance (Holstenkamp, 2019).

4.1.3. The Universal Charge Mechanism

The Electric Power Industry Reform Act (EPIRA) of 2001 introduced the Universal Charge for Missionary Electrification (UCME) under Section 34 of Republic Act 9136. This mechanism imposes a non-bypassable charge of approximately Php 0.18-0.20 per kWh on all end-users connected to the main grid, collected by distribution utilities (ERC, ongoing). Functionally, UCME operates as a cross-subsidy from grid-connected consumers to off-grid areas, with collections funding generation subsidies for missionary electrification providers.

4.1.4. Financial Sustainability Challenges

The financial sustainability of missionary electrification faces multiple structural pressures. Geographic barriers in the Philippine archipelago create fuel transport delays and supply uncertainties, particularly for diesel-dependent generation. Price volatility in petroleum markets compounds these challenges, with missionary electrification's heavy diesel reliance creating fiscal unpredictability (MEDP, 2024). International evidence confirms that off-grid electrification programs dependent on fossil fuels face inherent cost escalation dynamics (Lee et al., 2020).

Limited economies of scale in small, dispersed service areas prevent cost-effective operations. Power distributors serving low-density areas incur disproportionately high per-customer infrastructure costs while facing high system losses. These factors, combined with the challenge of recruiting and retaining qualified technical personnel in remote locations, create persistent operational deficits that requires continuous subsidy support.

4.1.5. Burden on Grid-connected Consumers and Targeting Inefficiencies

UCME contributions directly increase electricity costs for grid-connected consumers, exacerbating the Philippines' already high regional electricity prices (Ravago and Hall, 2022). These elevated costs impede industrialization and economic growth (Ravago et al., 2019), creating a fundamental tension between rural electrification objectives and broader economic competitiveness.

Significant targeting inefficiencies compound these concerns. The ERC's broad definition of missionary electrification includes large, privately-operated, viable islands not connected to the main grid, such as Palawan and Mindoro. IRENA (2017) documents that these relatively prosperous areas capture substantial UCME subsidies, representing classic subsidy leakage to non-intended beneficiaries. Cross-subsidy mechanisms routinely exhibit such leakage patterns, with benefits accruing disproportionately to wealthier households within qualifying categories (Komives et al., 2009).

The absence of degression policies for areas achieving viability further exacerbate inefficient resource allocation. UCME subsidies grew from Php 7 billion in 2015 to a projected Php 24 billion in 2024 (MEDP, 2024), reflecting both expanding coverage and the failure to phase out support for areas no longer requiring assistance. This growth trajectory mirrors patterns observed in other developing countries where subsidy systems lack adjustment mechanisms that responds to changing local conditions (World Bank, 2018).

4.1.6. Operational and Governance Challenges

The implementation of UCME suffers from fragmented institutional responsibilities and lengthy regulatory processes. While the Department of Energy (DOE) provides policy direction through Missionary Electrification Development Plans, the Energy Regulatory Commission (ERC) controls practical outcomes by approving contracts, setting rates, and establishing standards. This separation of policy-making and regulatory authority creates potential for misalignment and delays (IRENA, 2017).

Subsidy disbursement involves multiple sequential steps requiring information verification across three entities: National Power Corporation (NPC) receives claims from power producers, petitions ERC for subsidy approval through lengthy regulatory review, and ultimately receives disbursement from the Power Sector Assets and Liabilities Management Corporation (PSALM). This multi-layered process introduces significant lags between expenditure and reimbursement, straining producer cash flows. Research on public infrastructure procurement in developing countries demonstrates that such bureaucratic complexity often generates cost overruns and quality compromises (Wolfram et al., 2020).

Additional procedural barriers impede market entry for qualified third-party providers. Before DOE/ERC approval, distribution utilities or electric cooperatives must waive existing franchises, creating institutional resistance to potentially superior alternative suppliers. These entry barriers limit competition and innovation in missionary electrification service delivery.

4.1.7. Policy Design Ambiguities

Definitional inconsistencies create implementation confusion. Republic Act 9136 does not specify missionary electrification criteria. Instead, definitions appear in the implementing rules and regulations alongside ERC Resolution No. 21 of 2011. These sources provide unclear guidance regarding unviable versus viable areas, enabling the inclusion of major islands with stable private operations but lacking main grid connection.

The subsidy structure itself may perversely reduce competitiveness. Since UCME covers actual generation costs not recovered from consumers, producers face limited incentive to minimize costs or adopt cheaper fuel sources (IRENA 2017, Mesina 2016). Cost-plus subsidy structures typically generate efficiency losses by insulating providers from market discipline. Without performance-based incentive mechanisms, missionary electrification subsidies risk enabling high-cost operations.

Funding fragmentation compounds these issues. Multiple sources (UCME, government appropriations, and producer contributions, support missionary electrification without clear allocation rules or coordinated planning, as acknowledged in the 2024-2028 Missionary Electrification Development Plan (MEDP, 2024).

4.2. *Lifeline Rate*

4.2.1. Historical Development and Legal Framework

The lifeline rate (formalized in EPIRA 2001) provides discounted electricity to marginalized consumers. Informal structures predated formal authorization. Manila Electric Company (MERALCO) implemented subsidized residential rates during the 1990s, documented in regulatory proceedings before the Energy Regulatory Board, predecessor to the current Energy Regulatory Commission (Villamejor-Mendoza, 2003).

Pre-EPIRA cross-subsidization employed industrial and commercial tariffs to support residential consumers. As economic growth increased electricity demand, revenue collected under existing rate blocks proved insufficient for utility cost recovery. This prompted MERALCO to propose revised tariff structures. The approved revision maintained cross-subsidization through higher rates for large consumers while introducing an informal lifeline rate of Php 1.81/kWh for the first 50 kWh consumed by qualifying households (Villamejor-Mendoza, 2003).

The current lifeline provisions differ substantially; lifeline beneficiaries consume below 100 kWh/month and receive varying discounts based on distribution area. Republic Act 11552 extended program authorization for fifty years from 2021. Proposed House Bill 01635 would increase the qualification threshold to 135 kWh/month, potentially expanding beneficiary coverage while intensifying targeting and leakage concerns.

4.2.2. International Context and Comparative Thresholds

Lifeline tariffs are common globally. The Philippines' 100 kWh/month threshold ranks among the highest internationally (Mpholo et al., 2020). Cross-country evidence suggests that higher thresholds amplify inclusion errors, as consumption-based targeting imperfectly correlates with household welfare (Komives et al., 2009).

Research demonstrates that lifeline subsidies consistently fail to reach intended beneficiaries while benefiting non-poor households. Evidence from Sub-Saharan Africa reveals that lifeline rates often exhibit regressive distributional impacts, with higher-income households capturing disproportionate benefits due to superior access to grid connections and ability to manage consumption near threshold levels (Foster and Tre, 2000; World Bank, 2002). These targeting failures reflect the fundamental limitation of using electricity consumption as a welfare proxy: poor households may consume little electricity due to income constraints, but many low-consumption households are not poor.

4.2.3. Targeting Performance and Leakage

Analysis of Philippine lifeline implementation confirms significant targeting inefficiencies. Francisco (2024) documents persistent leakage to non-marginalized households, consistent with international evidence on consumption-based targeting failures.

Several structural factors explain targeting failures. Multi-family households sharing meters may exceed consumption thresholds despite individual family poverty. Conversely, wealthy households with multiple residences can distribute consumption across properties to qualify each location for subsidies. Small formal-sector businesses may consume below thresholds while operating profitably. These gaming opportunities weaken program equity while increasing fiscal costs.

4.2.4. Affordability Objectives and Energy Poverty

Electricity affordability remains a persistent challenge despite lifeline subsidies. Research shows that electricity consumption globally exhibits regressive patterns, with low-income households spending larger income proportions on energy than wealthy households (Fankhauser and Tepic, 2007). Poor households are continuously relying on traditional energy sources such as fuelwood and kerosene due to electricity unaffordability (Louw et al., 2008). This implies that lifeline discounts are inadequate in overcoming access barriers.

Evidence from China suggests that appropriately designed lifeline tariffs can improve energy affordability for targeted populations (Sun and Lin, 2013). However, design quality proves critical. Studies show that improperly calibrated thresholds, inadequate discount levels, or weak targeting mechanisms generate limited poverty reduction while imposing fiscal costs. The Philippine experience demonstrates these limitations, as energy poverty persists despite decades of lifeline rate implementation.

4.2.5. Financial Viability and Revenue Neutrality

Cross-subsidy mechanisms require strict regulatory oversight to maintain utility financial viability (World Bank, 2013). Because lifeline rates are set below cost, regulators must approve compensatory tariffs for non-lifeline customers to achieve revenue neutrality. This condition guarantees that subsidy costs are fully offset by additional revenue from non-subsidized consumers. The 2015 PricewaterhouseCoopers analysis documented Php 0.86 billion in under-recoveries attributable to lifeline subsidies, requiring regulatory intervention through supplementary customer charges (PWC, 2015; ERC Case 2007-157).

These under-recoveries imply that achieving equity objectives through below-cost pricing creates cost-recovery challenges requiring higher rates elsewhere. If compensatory tariffs prove insufficient or if regulators delay adjustments, utilities face financial deficits endangering service quality and sustainability. Maintaining this balance demands continuous evaluation and responsive rate-setting. Unfortunately,

these institutional capabilities are usually lacking in many developing countries (World Bank, 2013).

4.2.6. Economic Efficiency and Competitiveness Implications

Lifeline mechanisms generate broader economic consequences beyond direct subsidy costs. Areas with high lifeline beneficiary concentrations face disproportionately elevated business electricity costs, as commercial and industrial customers fund residential cross-subsidies (Francisco 2024). With this mechanism, enterprises face disincentives to locate in high-lifeline-user areas due to resulting higher power rates.

These localized effects compound national competitiveness challenges. The Philippines exhibits among the highest electricity prices in ASEAN (Ravago and Hall, 2022), identified as a major deterrent to foreign direct investment in manufacturing (Ravago et al., 2019). Cross-subsidization for equity objectives thus conflicts with economic efficiency goals, requiring careful regulatory balancing that international evidence suggests is consistently difficult (World Bank, 2013).

4.3. *Senior Citizen Discount*

4.3.1. Legal Framework and Eligibility Criteria

Republic Act 9994 (2010) mandates minimum 5 percent electricity discounts for citizens aged 60 above, with consumption less than or equal to 100kWh. Recent legislative action through House Bill 11400 expands benefits to 15 percent minimum discount while increasing the consumption threshold to 200 kWh monthly.

Analysis of 2018 Family Income and Expenditure Survey data reveals that 31 percent of households consuming below the 100kWh lifeline threshold include senior citizens (Francisco, 2024), indicating substantial overlap between lifeline and senior citizen beneficiary populations. This overlap raises questions regarding administrative efficiency and whether multiple mechanisms targeting similar populations represent optimal policy design.

4.3.2. Financial Sustainability Through Cross-Subsidization

Distribution utility financial sustainability operates under revenue neutrality principles; wherein senior citizen discount costs are recovered through higher tariffs on non-qualifying consumers. This cross-subsidy structure theoretically protects utility finances while achieving social equity objectives. However, significant administrative costs undermine this theoretical protection.

Implementation requires substantial ongoing resource allocation. Distribution utilities bear responsibility for processing applications, verifying eligibility documentation, ensuring consumption compliance with threshold limits, and managing annual renewals. The Department of Social Welfare and Development (DSWD) collects submissions through senior citizen centers, but primary verification responsibility

remains with utilities. Document authentication which involves confirming age and citizenship through valid identification or birth certificates, demands dedicated personnel. Preventing fraud and leakage also necessitates continuous billing system monitoring to ensure qualified households remain conformant.

Mandatory annual renewal processes intensify administrative burdens. These recurring costs require sustained manpower and resource allocation, which generates higher operational expenses that is ultimately incorporated into regulated tariffs and passed to all consumers. While revenue neutrality theoretically protects utility finances, administrative cost recovery through tariff increases represents hidden societal costs of program operation.

4.3.3. Demographic Trends and Fiscal Implications

Population aging creates systematic upward pressure on cross-subsidy costs. Research demonstrates that elderly households consume more electricity than younger households (Abrigo and Ortiz 2024), reflecting greater time spent at home, different appliance usage patterns, and potentially higher comfort requirements. As the Philippine population ages, both the number of qualifying households and their average consumption levels will increase, escalating total subsidy costs.

This demographic trajectory suggests that financial burdens on non-senior consumers will grow disproportionately over time, intensifying market distortions. The combination of expanding beneficiary populations consuming higher electricity volumes creates compounding fiscal effects. Without adjustments to eligibility criteria, benefit levels, or funding mechanisms, demographic change will systematically increase cross-subsidy requirements, further elevating electricity costs for non-qualifying households and businesses.

International evidence demonstrates similar challenges in aging societies where age-based benefits create escalating fiscal pressures. Countries with mature social protection systems increasingly recognize that demographic transitions require proactive policy adaptation to maintain sustainability (World Bank, 2018). The Philippines faces early stages of this challenge, suggesting that delay in addressing structural issues will compound future adjustment costs.

4.3.4. Overlapping Administrative Structures

The substantial overlap between lifeline and senior citizen beneficiary populations raises efficiency concerns (Francisco, 2024). Maintaining separate verification systems, application processes, and monitoring mechanisms for overlapping populations creates administrative redundancy. Moreover, resources devoted to parallel systems could instead be utilized to achieve more superior outcomes through integrated program design.

International experience demonstrates that fragmented social protection mechanisms generate higher administrative costs and create benefit delivery gaps compared to integrated systems (World Bank, 2018). Countries that consolidate overlapping programs typically achieve improved targeting, reduced administrative

overhead, and enhanced beneficiary experience through simplified application and verification processes.

4.4. Cross-Cutting Themes and Synthesis

Analysis of the Philippines' three electricity subsidy mechanisms (Universal Charge for Missionary Electrification (UCME), lifeline rates, and senior citizen discounts, reveals patterns that transcend individual program design. While each mechanism addresses distinct policy objectives, they share common challenges regarding targeting accuracy, administrative efficiency, fiscal sustainability, and economic impacts. This synthesis examines these cross-cutting themes as they manifest specifically in Philippine implementation, drawing connections across the three mechanisms to identify systemic issues requiring coordinated policy attention.

4.4.1. Targeting Failures Across All Three Mechanisms

Each Philippine subsidy mechanism exhibits distinct targeting challenges that, collectively, reveal fundamental limitations in current eligibility determination approaches. UCME's broad definition of missionary electrification includes large, privately-operated islands like Palawan and Mindoro that maintain stable electricity supply and relatively higher income levels. These areas capture substantial subsidy resources despite lacking the viability constraints that justify missionary electrification support. IRENA (2017) documents that such viable islands receive a disproportionate share of UCME funds. The definitional ambiguity enabling this leakage stems from reliance on grid connection status rather than actual economic viability or household welfare.

Lifeline rates face different targeting limitations inherent to consumption-based eligibility. Francisco (2024) demonstrates that the 100 kWh/month threshold fails to effectively distinguish marginalized from non-marginalized households. Wealthy households distribute consumption across multiple residences to qualify each location separately, while multi-family households sharing meters exceed thresholds despite individual poverty. Small businesses consuming below 100 kWh qualify despite operating profitably. These patterns reflect the imperfect correlation between electricity consumption and household welfare, a fundamental challenge when using energy use as a poverty proxy.

The senior citizen discount presents a third targeting concern: age-based eligibility without welfare verification creates benefits accruing to both poor and wealthy elderly households indiscriminately. Analysis reveals 31 percent of lifeline-qualifying households already include senior citizens (Francisco, 2024), indicating substantial beneficiary overlap between the two programs. This overlap means certain households receive dual subsidies, lifeline discounts plus senior citizen benefits, while administrative systems process separate applications and verifications for overlapping populations.

The common thread connecting these failures is reliance on single-dimension eligibility: geographic location for UCME, consumption level for lifeline, age for senior citizens. None incorporate direct welfare assessment despite the Philippines

maintaining robust household income data through FIES and welfare verification infrastructure through 4Ps. Rather than redesigning the fundamental mechanism, targeting improvements could be achieved by integrating existing welfare data with current eligibility frameworks, thereby substantially reducing leakage while preserving existing program structures.

4.4.2. Escalating Costs and Divergent Growth Drivers

All three mechanisms face cost escalation, but the drivers differ substantially, revealing distinct sustainability challenges. UCME subsidies grew from Php 7 billion in 2015 to a projected Php 24 billion in 2024, more than tripling within nine years (MEDP, 2024). This growth reflects multiple factors: expanding off-grid electrification coverage adds new subsidy recipients; rising diesel prices increase generation costs for fuel-dependent systems; and viable areas continue receiving subsidies absent degression mechanisms. The absence of criteria to phase out support as areas achieve self-sufficiency means the beneficiary pool only expands, never contracts.

Lifeline rates create utility under-recoveries that require regulatory intervention. The 2015 analysis documented Php 0.86 billion in losses attributable to below-cost lifeline pricing (PWC, 2015; ERC Case 2007-157). While revenue neutrality principles theoretically protect utilities through compensatory tariffs on non-lifeline customers, achieving this balance requires continuous regulatory adjustment. Each under-recovery prompts tariff increases for businesses and non-qualifying households, contributing to the Philippines' high regional electricity prices that demonstrably impede industrial investment (Ravago et al., 2019).

The senior citizen discount faces systematic pressure from demographic change and legislative expansion. Population aging increases qualifying households while elderly consumption patterns elevate average electricity use per beneficiary (Abrigo and Ortiz, 2024). Recent legislative proposals compound these trends: the minimum discount is proposed to increase from 5 percent to 15 percent, while the consumption threshold is proposed to double from 100 kWh to 200 kWh monthly. It is worth noting that the combination of growing eligible population, higher per-household consumption, and expanded benefits will create multiplicative rather than additive cost growth.

These divergent growth patterns create distinct policy challenges. UCME requires viability assessment mechanisms and degression criteria to prevent indefinite subsidy continuation regardless of area development. Lifeline rates need threshold recalibration using empirical consumption data to balance coverage and fiscal sustainability. Senior citizen discounts require demographic projections integrated into benefit design to prevent unsustainable cost trajectories. However, all three share a common characteristic: costs escalate without built-in adjustment mechanisms, requiring proactive policy intervention rather than automatic responsiveness to changing conditions.

4.4.3. Administrative Fragmentation and Institutional Coordination Gaps

Each mechanism exhibits institutional fragmentation that creates inefficiency, though the manifestations differ. UCME disbursement requires sequential processing through three entities: NPC receives producer claims, petitions ERC for subsidy approval through regulatory review, then receives funds from PSALM for distribution. This multi-step verification process introduces significant time lags between producer expenditure and reimbursement, creating cash flow pressures that particularly burden smaller off-grid operators. The separation reflects institutional design. NPC as implementer, ERC as regulator, PSALM as fund manager, but the coordination requirements create operational friction.

UCME also suffers from policy-regulatory authority separation. DOE establishes strategic direction through Missionary Electrification Development Plans, identifying priority areas and coverage targets. However, ERC controls implementation through contract approval, rate-setting, and standards enforcement. When DOE policy priorities diverge from ERC regulatory decisions, regarding viable area inclusion, subsidy levels, or provider qualification, the misalignment creates delays and undermines strategic objectives. The 2024-2028 MEDP explicitly acknowledges these coordination challenges (MEDP, 2024).

Lifeline and senior citizen programs maintain entirely parallel administrative systems despite serving overlapping populations. Both require distribution utilities to process applications, verify eligibility documentation, monitor consumption against thresholds, and manage annual renewals. The 31 percent beneficiary overlap (Francisco, 2024) means utilities operate duplicate verification processes for nearly one-third of qualifying households. Each program maintains separate record-keeping, reporting requirements, and regulatory compliance mechanisms, administrative redundancy that increases operational costs ultimately recovered through consumer tariffs.

The fragmentation extends to data systems. UCME implementation uses DOE planning data, ERC regulatory information, and NPC operational records, systems that don't automatically share information requiring manual coordination. Lifeline and senior citizen programs rely on utility customer databases without access to FIES household welfare data or 4Ps beneficiary lists that could improve targeting. Distribution utilities verify senior citizen eligibility through DSWD submissions but cannot cross-check against lifeline qualification to identify overlap or ensure consistent treatment.

These coordination gaps create tangible costs: delayed subsidy disbursements strain producer finances; policy-regulatory misalignment produces implementation confusion; duplicate verification wastes administrative resources; siloed data systems prevent targeting improvements. Addressing fragmentation need not require institutional restructuring, improved information sharing, streamlined processes, and integrated verification could reduce costs while maintaining current organizational structures. The challenge is primarily operational coordination rather than fundamental redesign.

4.4.4. Cumulative Burden on Electricity Costs and Economic Competitiveness

The three mechanisms collectively elevate Philippine electricity costs through different but compounding pathways. UCME imposes Php 0.18 to 0.20 per kWh on all grid-connected consumers, a non-bypassable charge funding off-grid electrification. Lifeline rates require utilities to charge non-qualifying customers above cost-recovery rates to offset below-cost pricing for subsidized households. Senior citizen discounts similarly necessitate compensatory tariffs on non-senior consumers. Grid-connected, non-lifeline, non-senior households and businesses thus bear cumulative costs from all three subsidy mechanisms simultaneously.

These cumulative effects help explain the Philippines' position as having the highest electricity prices in ASEAN (Ravago and Hall, 2022). While multiple factors contribute, generation fuel costs, transmission infrastructure, regulatory frameworks, subsidy-driven cross-subsidization represents a significant component. The geographic variation compounds competitiveness impacts: areas with high concentrations of lifeline and senior citizen beneficiaries face disproportionately elevated business electricity costs as commercial and industrial consumers fund larger subsidy pools. Francisco (2024) documents that enterprises face clear disincentives to locate in such high-subsidy areas.

The industrial competitiveness implications extend beyond location decisions. Energy-intensive manufacturing sectors, which the Philippines seeks to develop for export-oriented growth, face cost disadvantages relative to regional competitors with lower electricity prices. Ravago et al. (2019) demonstrate empirically that high electricity costs deter foreign direct investment in manufacturing, contributing to the Philippines' relatively limited industrial base. The equity-efficiency tension becomes stark: subsidy mechanisms designed to improve affordability for vulnerable populations simultaneously undermine economy-wide competitiveness affecting all households through constrained job creation and income growth.

The challenge lies not in choosing between equity and efficiency, both represent legitimate policy objectives, but in achieving equity through mechanisms minimizing efficiency costs. Current approaches impose substantial economic drag: UCME's tripling costs intensify grid consumer burden; lifeline's imperfect targeting subsidizes non-poor households unnecessarily; senior citizen benefits expanded without corresponding means-testing. More precise targeting would maintain equity support for genuinely vulnerable populations while reducing the broader economic costs from excessive subsidy reach. This represents an optimization opportunity rather than a fundamental trade-off requiring sacrifice of either objective.

4.4.5. Overlapping Beneficiaries and Program Redundancy

International experience demonstrates that electricity subsidy reform proves consistently more difficult than initial implementation, reflecting fundamental political economy dynamics (Inchauste and Victor, 2017). Beneficiaries understand exactly what they receive and organize politically to defend benefits, while costs disperse across many consumers with low individual salience. Loss aversion, the behavioral tendency for benefit removal to generate stronger opposition than equivalent new

costs, further complicates reform efforts. These patterns apply directly to Philippine circumstances across all three mechanisms.

UCME generates concentrated benefits for off-grid power producers and residents while imposing diffuse costs on grid-connected consumers. This asymmetry creates political dynamics favoring subsidy maintenance. Off-grid stakeholders mobilize intensively, while grid consumers, each paying modest amounts, lack comparable organization. The result is that subsidies will persist despite documented inefficiencies (viable area inclusion, lack of degression) because reform faces organized resistance while efficiency gains accrue to diffuse, unorganized populations.

Lifeline and senior citizen programs show similar dynamics. Beneficiaries recognize subsidies while non-qualifying consumers lack visibility into cross-subsidy costs. Recent benefit expansions demonstrate political pressure favoring coverage over targeting precision.

Evidence from successful reform experiences suggests specific sequencing approaches that manage these political constraints (IMF, 2013). First, addressing unacceptable leakages. UCME subsidies to viable islands, lifeline benefits to demonstrably wealthy households, proves most defensible politically while generating fiscal savings. Second, improving targeting infrastructure before adjusting benefit levels maintains political support by demonstrating that reforms enhance rather than undermine equity objectives. Third, framing reforms as improving assistance to those truly in need, rather than as cuts, acknowledges loss aversion while building supportive coalitions.

The Philippines faces a fundamental choice between proactive and reactive reform approaches. Proactive reform, gradual targeting improvements, phased adjustments, early action on identified inefficiencies, costs less politically and economically than crisis-driven intervention. Reactive reform, forced by fiscal constraints or economic stress, typically harms vulnerable populations most while generating political backlash undermining sustainability. Indonesia's trajectory, where compounding subsidies reaching 2.8 percent of GDP forced painful adjustments (World Bank, 2023), illustrates reactive reform costs. The Philippines' current subsidy growth dynamics suggest that early action, while politically challenging, proves preferable than delayed crisis response.

4.4.6. Mechanism Complementarity Versus Redundancy

The three mechanisms theoretically address distinct objectives: UCME extends access to unviable areas, lifeline rates improve affordability for low-income households, senior citizen discounts support elderly populations. However, empirical analysis reveals substantial overlap alongside coordination gaps, raising questions about whether current design achieves complementarity or creates redundancy.

The 31 percent overlap between lifeline and senior citizen beneficiaries represents the clearest redundancy. These households receive dual benefits through parallel administrative systems requiring separate applications, verification processes, and monitoring mechanisms. While both programs serve legitimate equity objectives, income-based support and age-based assistance, the overlap suggests that integrated design could achieve equivalent outcomes more efficiently. International

evidence demonstrates that consolidating overlapping programs reduces administrative costs while improving beneficiary experience through simplified processes (World Bank, 2018).

Coordination gaps manifest differently. UCME focuses exclusively on access expansion without affordability mechanisms for off-grid consumers, who may face higher electricity costs than grid-connected households despite subsidy support for infrastructure. Conversely, lifeline and senior citizen programs address affordability for grid-connected populations but provide no support for missionary electrification areas. This separation creates potential for off-grid low-income households to receive infrastructure subsidies through UCME while facing unaffordable tariffs due to lifeline program inapplicability.

The funding mechanism differences compound coordination challenges. UCME operates through non-bypassable charges on grid consumers, lifeline and senior citizen discounts through utility-level cross-subsidization. This creates multiple simultaneous transfers: grid consumers subsidize off-grid access (UCME), non-lifeline consumers subsidize qualifying households (lifeline), non-senior consumers subsidize elderly populations (senior citizen). The cumulative effect, grid-connected, non-qualifying, non-senior households bearing multiple subsidy costs, generates the Philippines' high regional electricity prices while creating geographic and demographic cost variations that distort economic decisions.

Effective complementarity requires mechanisms addressing different objectives with minimal beneficiary overlap and coordinated implementation. International examples demonstrate such design: infrastructure subsidies for access expansion (similar to UCME) paired with cash transfers for poverty alleviation (replacing consumption-based subsidies), or geographically-targeted programs for remote areas (missionary electrification) combined with demographic programs for vulnerable populations (integrated senior/disability support). These approaches match tools to problems while avoiding the redundancy and coordination gaps characterizing Philippine current implementation.

4.4.7. Data and Institutional Capacity for Targeting Improvements

The Philippines maintains robust data infrastructure potentially enabling substantial targeting improvements across all three mechanisms. FIES provides regular household income and expenditure data, information that could inform UCME viability assessments, lifeline threshold calibration, and senior citizen means-testing. The 4Ps database demonstrates operational capacity for welfare verification at scale, with systems processing eligibility determinations for millions of households. The Energy Regulatory Commission possesses technical expertise in tariff design and subsidy program oversight accumulated over decades of implementation experience.

However, these capabilities remain largely disconnected from subsidy program operations. FIES data informs policy discussions but doesn't link to utility customer databases for household-level targeting. The 4Ps system identifies welfare-qualified households but operates separately from electricity subsidy eligibility, requiring parallel verification. Distribution utilities track consumption patterns but cannot access welfare databases to distinguish genuinely poor from wealthy low-

consumption households. ERC receives aggregated program statistics but lacks granular beneficiary-level data enabling targeting evaluation.

Operational integration represents the primary challenge rather than fundamental capacity building. For UCME, linking missionary electrification area data with regional economic indicators from FIES could inform viability classifications distinguishing areas requiring ongoing support from those achieving self-sufficiency. For lifeline rates, integrating utility consumption data with 4Ps welfare status could enable hybrid targeting reducing both leakage to non-poor and exclusion of poor households exceeding consumption thresholds. For senior citizen discounts, combining age verification with FIES income data could target benefits to elderly households genuinely requiring assistance while reducing costs from universal age-based eligibility.

The technical feasibility of integration is demonstrated by existing inter-agency data sharing for other programs. DSWD already coordinates with utilities for senior citizen verification. The 4Ps system links PSA household data with program delivery mechanisms. What remains is extending these models to electricity subsidy targeting, establishing data sharing protocols, developing integrated verification systems, and automating eligibility determinations currently processed manually. These represent operational improvements rather than technological breakthroughs, suggesting that implementation depends primarily on institutional coordination and political commitment rather than capability development.

5. Integrated Policy Reforms

International evidence on electricity subsidy reform reveals consistent patterns across diverse contexts. Design quality matters more than mechanism selection, variation within mechanism types exceeds differences between them (IMF, 2013). Successful programs share common characteristics including empirical calibration using household data, regular performance evaluation, adaptive adjustment based on outcomes, and administrative capacity for effective implementation (ESMAP, 2017). Political economy dynamics complicate reform universally; concentrated beneficiaries resist change, costs disperse across unorganized populations, and loss aversion makes benefit reduction particularly difficult (Inchauste and Victor, 2017).

The Philippines possesses unusual advantages enabling evidence-based reform; having comprehensive household welfare data through FIES, operational means-testing infrastructure through 4Ps, technical regulatory expertise through ERC, and documented program performance through Francisco (2024) and other Philippine-centered studies. The primary challenge is operational integration rather than capability development, linking existing systems, coordinating across agencies, and sustaining political commitment to gradual improvement. Reform proposals emphasize phased implementation, strategic sequencing recommended in international literature, addressing unacceptable leakages first, improving targeting before reducing benefits, framing reforms positively (IMF, 2013), and building on existing institutional strengths rather than wholesale program elimination.

5.1. *Improving UCME Efficiency*

5.1.1. Refining Viability Assessment and Targeting

The Universal Charge for Missionary Electrification faces a fundamental definitional challenge. UCME subsidies grew from Php 7 billion in 2015 to a projected Php 24 billion in 2024, more than tripling in less than a decade (MEDP, 2024). This growth partly reflects the inclusion of large, privately-operated, economically viable islands such as Palawan and Mindoro. IRENA (2017) documents that such viable areas capture disproportionate subsidy resources despite lacking fundamental viability constraints justifying missionary electrification support.

International cross-subsidy literature provides guidance on establishing clearer viability thresholds. Faulhaber's (1975) game-theoretical framework suggests that a cross-subsidy occurs when pricing either falls below incremental costs or exceeds stand-alone costs. Applied to UCME, this indicates that subsidies should target only areas where electricity provision costs exceed what consumers can reasonably afford at sustainable tariff levels, not merely areas disconnected from the main grid. The concept of "missionary electrification" requires redefinition to distinguish between areas genuinely unviable due to structural constraints and those simply off-grid but economically sustainable.

Reform should establish multi-dimensional viability criteria replacing the current single-criterion approach based solely on grid connection status. Drawing from successful rural development programs documented internationally, areas should be classified into tiers based on: (1) economic viability metrics, population density, commercial electricity demand growth, registered businesses, tax revenues; (2) infrastructure development markers, road/port accessibility, system losses, utility cost recovery ratios; and (3) electricity demand patterns, commercial versus residential load composition, peak demand growth, per capita consumption trends. This tiered classification enables subsidy levels corresponding to actual viability constraints rather than categorical eligibility.

5.1.2. Implementing Degression Mechanisms

A critical gap in UCME design is the absence of degression policies, mechanisms to gradually reduce subsidies as areas become more economically viable. International literature on electricity subsidy phase-out demonstrates that abrupt removal creates significant political resistance and potential harm to vulnerable populations, while graduated approaches allow smoother transitions (IMF, 2013). Indonesia's experience with electricity subsidies reaching 2.8 percent of GDP (World Bank, 2023) demonstrates the fiscal risks of open-ended commitments without built-in adjustment mechanisms.

When an area demonstrates sustained improvement across viability metrics over a defined period (for example, three consecutive years), a predetermined degression schedule would activate. Subsidies for highly unviable areas would remain at 100 percent of generation costs; moderately unviable areas receive 75 percent; developing viability 50 percent; achieved viability phases out over 3-5 years with subsidies decreasing by 20 percent annually. This graduated structure provides predictable transitions for utilities and consumers while maintaining affordability

safeguards for genuinely vulnerable households through complementary off-grid lifeline mechanisms.

International experience suggests that transparency in degression criteria is crucial. Publishing clear metrics and providing regular progress reports builds public understanding and reduces political interference. Framing should emphasize resource reallocation toward areas of greatest need rather than subsidy cuts, "helping those truly requiring support" resonates better politically than "reducing benefits to viable areas." The MEDP could serve as the vehicle for announcing reclassification criteria and timeline, establishing transparency around phaseout processes.

5.1.3. Streamlining Administration and Incentivizing Efficiency

Current UCME implementation suffers from fragmented responsibilities creating operational inefficiencies. Subsidy disbursement requires sequential processing through three entities: NPC receives producer claims, petitions ERC for approval through regulatory review, and receives funds from PSALM. This multi-layered verification introduces significant lags between expenditure and reimbursement. Drawing lessons from time-variant pricing literature's emphasis on administrative simplicity (Faruqui, 2010), the UCME system would benefit from consolidation, complexity creates delays, increases costs, and reduces policy effectiveness.

Reform should establish single-window processing where PSALM directly handles claims with ERC performing ex-post audits rather than ex-ante approvals for routine disbursements. This mirrors risk-based regulation in other sectors. Standardized digital reporting templates would address Heald's (1997) observation that cross-subsidy measurement often relies on accounting costs with significant time lags, digitalization enables real-time monitoring. Resolving DOE-ERC coordination through formal memoranda of agreement specifying each agency's scope would ensure coherent implementation.

A particularly problematic aspect of current UCME design is the lack of incentives for cost-efficient power production. Subsidies covering the gap between actual generation costs and consumer tariffs create moral hazard. Producers have limited motivation to minimize costs since inefficiencies are subsidized. Following principles from price cap regulation, UCME should incorporate performance-based design; benchmark generation costs for different technologies and conditions, with subsidies calculated based on efficient benchmarks rather than actual costs. Utilities achieving below-benchmark costs retain savings; those exceeding benchmarks absorb additional costs. Premiums for renewable energy adoption would address fuel transport challenges and price volatility while encouraging diversification from diesel dependence.

5.1.4. Diversifying Financing and Linking Access with Affordability

UCME imposes Php 0.18-0.20 per kWh on grid consumers, contributing to high electricity costs that impede competitiveness (Ravago and Hall, 2022). International practice suggests exploring diversified funding: partial support through general tax

revenues (common in telecommunications universal service obligations), concessional development finance for renewable infrastructure, and clearer pathways for private sector participation currently hindered by franchise waiver requirements.

UCME currently subsidizes generation costs but provides no affordability support for off-grid consumers, who may face higher tariffs despite infrastructure subsidies. Because lifeline rates apply only to grid-connected populations, off-grid low-income households receive infrastructure support without consumption subsidies for affordability. Reform should extend lifeline-type discounts to qualifying off-grid households using 4Ps data for eligibility, creating integrated targeting that addresses both geographic viability and household-level economic vulnerability. This recognizes that universal access and affordability represent complementary rather than competing goals requiring coordinated mechanisms.

5.2. Redesigning the Lifeline Rate: From Consumption-Based to Welfare-Based Targeting

5.2.1. The Fundamental Targeting Problem

The Philippine lifeline rate mechanism suffers from a critical design flaw common to consumption-based subsidies worldwide. It conflates low electricity consumption with poverty. Francisco's (2024) analysis reveals that more than 60 percent of households at the regional level qualify for lifeline discounts based solely on consuming 100kWh or less per month. However, cross-referencing consumption patterns with appliance ownership and per capita income exposes significant leakages, many qualifying households are non-poor.

This phenomenon is not unique to the Philippines. International literature documents similar targeting failures: Burger and Jansen's (2014) examination of South Africa's increasing block tariff found that middle-income deciles captured the largest subsidy share intended for the poor. Cardenas and Whittington (2019) identified substantial leakages to wealthier households in Ethiopia's consumption-based targeting. Even Spain's Bono Social de Electricidad, specifically designed for vulnerable consumers, showed no measurable impact on poor households (Llorca, 2025), suggesting that categorical targeting based on demographic characteristics fails without comprehensive welfare verification.

The theoretical foundation for this failure lies in the weak correlation between electricity consumption levels and household welfare in developing countries. Whittington (1992) identified two critical structural factors: high-density living where multiple households share a single meter, and low-income households without private connections who purchase electricity from neighbors. Both patterns push poor households into higher consumption blocks despite individual poverty. Moreover, the 100kWh threshold appears generous in international comparison, most countries employ significantly lower cutoffs: Uganda (15 kWh), Brazil (30 kWh), South Africa (50 kWh), Nigeria (50 kWh) (Mpholo et al., 2020). Only Bangladesh matches the Philippine threshold, while Indonesia and Ghana use 300 kWh though criticized for excessive leakages.

5.2.2. Implementing Hybrid Targeting with Means-Testing

The most direct solution to consumption-based targeting failures is implementing means-tested tariffs that discriminate based on household welfare indicators rather than electricity consumption levels. Barde and Lehmann's (2014) comparative analysis of water tariff structures in Lima, Peru demonstrates the superiority of means-tested approaches over consumption-based increasing block tariffs for achieving progressive redistribution. Their findings show that uniform means-tested tariffs clearly outperform in redistributing income toward the poor while non-poor households appropriately contribute to system sustainability.

The Philippines already maintains the Listahanan (National Household Targeting System for Poverty Reduction), which identifies poor households using a proxy means test based on observable household characteristics: housing quality indicators (roof material, floor type, wall construction), household assets (vehicle ownership, appliances), access to services (water source, sanitation facilities), household composition (dependents, education levels), and geographic location (urban/rural, barangay poverty incidence). This existing infrastructure could be leveraged for electricity subsidy targeting, reducing administrative costs and ensuring consistency across social programs.

Complete abandonment of consumption-based structure may not be politically feasible or administratively practical in the near term. A hybrid model preserving the increasing block tariff structure while incorporating means-tested targeting offers pragmatic transition. Two options merit consideration: (1) Tiered lifeline rates maintaining the 100kWh threshold but introducing differentiated subsidy levels, extreme poor receive full subsidy at marginal distribution cost, poor receive 50 percent of standard residential rate, non-poor receive no subsidy. Only households verified as poor through Listahanan access subsidized tiers, addressing Francisco's (2024) finding that the current mechanism allows non-poor low consumers to receive subsidies unnecessarily. (2) Separate welfare-based and consumption-based tracks, where identified poor households receive fixed monthly discounts (Php 200-500) regardless of consumption up to reasonable caps (150-200 kWh), while consumption-based track continues with more restrictive criteria (50 kWh threshold) to minimize leakages.

5.2.3. Addressing Geographic Cross-Subsidy Distortions

Francisco's (2024) analysis identifies a particularly damaging unintended consequence: firms are disincentivized from locating in areas with high proportions of lifeline users because resulting higher electricity prices reduce competitiveness. This geographic distortion compounds regional inequality, poor areas with many lifeline households face additional economic disadvantages through higher business electricity costs, deterring investment and job creation that could lift households out of poverty. Currently, distribution utility service areas determine cost-spreading, so areas with concentrated poverty shoulder disproportionate burdens.

Reform options to address geographic distortions include national subsidy pooling where costs are redistributed based on a formula (proportional to total residential customers) rather than each utility recovering lifeline costs only from its non-lifeline

customers. This approach mirrors universal service funds in telecommunications. Alternatively, removing lifeline costs from electricity tariffs entirely and funding through general taxation or dedicated social protection budgets would eliminate geographic distortions. Ravago et al. (2019) document that power prices significantly affect structural transformation and industrialization in the Philippines, addressing cross-subsidy geographic effects could support manufacturing development in currently disadvantaged regions.

5.2.4. Strengthening Revenue Neutrality Enforcement

Cross-subsidy mechanisms require strict regulatory oversight to maintain utility financial viability (World Bank, 2013). Because lifeline rates are set below cost, regulators must approve compensatory tariffs for non-lifeline customers to achieve revenue neutrality. The 2015 PricewaterhouseCoopers analysis documented Php 0.86 billion in under-recoveries attributable to lifeline subsidies (PWC, 2015; ERC Case 2007-157), indicating implementation challenges. These under-recoveries create financial deficits endangering service quality.

Reforms should introduce automatic tariff adjustment mechanisms, including formula-based compensatory rate increases tied to subsidy costs, thereby removing regulatory discretion and delay. Conducting quarterly reconciliations of actual subsidy costs against recovered revenues with corresponding true-up adjustments prevents the buildup of under-recoveries. Setting subsidy cost caps as a share of utility revenues also triggers an automatic program review once exceeded, limiting financial exposure while preserving the utility's fiscal stability needed to maintain service quality.

5.2.5. Phased Transition Pathway

Based on international evidence and Philippine context, a staged transition from consumption-based to means-tested system is recommended.

Table 1. Phased Implementation Timeline to Transition from Consumption-based to Means-Tested System

Phase	Timeline	Key Activities
Phase 1 Foundation Building	Years 1-2	Focus: Institutional Setup & Pilot Testing - Formalize data-sharing agreements between DSWD, ERC, and distribution utilities - Pilot means-tested targeting in 2-3 utility areas with varying poverty levels - Conduct comprehensive cost-benefit analysis - Develop standardized verification protocols - Build integrated IT systems for subsidy administration

Phase	Timeline	Key Activities
Phase 2 Hybrid System	Years 3-4	Focus: Gradual Transition & System Integration • Implement means-tested subsidies for Listahanan-verified households • Maintain modified consumption threshold (reduced to 50 kWh) for non-verified households • Establish national subsidy pooling mechanism • Monitor targeting accuracy through regular assessments • Track welfare impacts and adjust parameters as needed
Phase 3 Full Transition	Years 5+	Focus: Complete Transition & Continuous Improvement • Complete transition to fully means-tested subsidy system • Phase out consumption-based eligibility entirely • Implement regular welfare reassessments and database updates • Maintain continuous monitoring and evaluation framework • Refine targeting mechanisms based on outcomes data

Note: Timeline flexibility should be maintained based on pilot results, stakeholder readiness, and implementation challenges. Each phase includes built-in evaluation points to inform subsequent phase rollout.

This pathway balances improved targeting against practical implementation constraints, allowing systems and stakeholder capacity to develop while progressively reducing leakages. Building political support requires transparency in cost analysis demonstrating that current leakages force higher costs on the majority; phased implementation with grandfathering existing beneficiaries rather than immediate disqualification; and using savings from reduced leakages to either lower non-subsidized rates or increase subsidies for verified poor households, creating winners who benefit from reform.

5.3. Reforming the Senior Citizen Discount

Unlike the lifeline rate and UCME which are electricity sector-specific interventions, the senior citizen discount represents a broader social protection policy that intersects with the electricity sector. Mandated by Republic Act 9994 (Expanded Senior Citizens Act of 2010), this discount applies across multiple sectors but creates particular challenges within electricity markets due to its consumption-based eligibility criteria and cross-subsidy funding mechanism. The current 5 percent minimum discount on electricity consumption up to 100 kWh monthly for Filipino citizens aged 60 and above faces proposed expansion through House Bill 11400, increasing the discount to 15 percent and raising the threshold to 200 kWh monthly.

5.3.1. Financial Sustainability and Demographic Pressures

While revenue neutrality theoretically protects distribution utilities' financial viability, the mechanism creates an escalating burden on non-senior households that compounds over time due to demographic and consumption dynamics. Abrigo and Ortiz (2024) report that elderly households consume more electricity than younger households, reflecting greater time spent at home, different appliance usage patterns, and potentially higher comfort requirements. Population aging means both growing proportions of eligible households and higher average consumption per beneficiary, creating upward pressure on subsidy amounts.

The House approval of House Bill 11400 on June 4, 2025, tripling the electricity discount to 15 percent and doubling the threshold to 200 kWh, occurred without corresponding analysis of long-term fiscal sustainability or alternative funding mechanisms. The bill awaits Senate action before becoming law. Combined with population aging trends, this expansion suggests the current model requires fundamental rethinking rather than incremental adjustments. International evidence demonstrates that aging societies where age-based benefits create escalating fiscal pressures increasingly recognize that demographic transitions require proactive policy adaptation to maintain sustainability (World Bank, 2018). Countries with mature social protection systems commonly shift from universal age-based to means-tested approaches as fiscal pressures intensify.

5.3.2. Administrative Complexity and Overlapping Programs

The implementation of senior citizen discounts adds significant administrative layers to distribution utilities' operations. Francisco (2024) found that 31 percent of households qualifying for the lifeline threshold include a senior citizen, highlighting substantial overlap between these subsidy mechanisms. For this overlapping population, distribution utilities must manage dual subsidy calculations, separate verification processes, and potentially conflicting eligibility criteria, particularly as thresholds diverge (100kWh for lifeline versus proposed 200 kWh for seniors).

Implementation requires substantial ongoing resource allocation relating to processing applications, verifying eligibility documentation (confirming age and citizenship status), ensuring consumption compliance with threshold limits, and managing mandatory annual renewals. The Department of Social Welfare and Development collects submissions through senior citizen centers, but primary verification responsibility remains with utilities. These recurring costs require sustained manpower and resource allocation generating higher operational expenses ultimately incorporated into regulated tariffs and passed to all consumers.

International experience demonstrates that fragmented social protection mechanisms generate higher administrative costs and create benefit delivery gaps compared to integrated systems (World Bank, 2018). Reform should establish unified application processes determining eligibility for all electricity subsidies simultaneously; consolidated verification databases tracking household characteristics enabling multi-program eligibility assessment; and coordinated renewal cycles so overlapping households complete both renewals simultaneously.

Integration reduces administrative costs while improving beneficiary experience through simplified procedures.

5.3.3. Market Distortions and Equity Concerns

Beyond administrative challenges, the senior citizen discount raises fundamental questions about electricity pricing efficiency and whether age-based criteria effectively target those most in need. Current age-based eligibility provides benefits to both poor and wealthy elderly households indiscriminately. The 100kWh threshold (and proposed 200kWh) may include middle-income elderly households. No means-testing component distinguishes income levels among seniors, and consumption-based eligibility assumes consumption correlates with need, an assumption that may not hold for elderly populations.

The mechanism adds to already high Philippine electricity prices deterring FDI and industrialization (Ravago et al., 2019; Ravago and Hall, 2022). Geographic concentration effects mirror lifeline rate challenges, areas with many eligible seniors face higher rates for businesses. Unlike lifeline rates and increasing block tariffs which have extensive international precedents, age-based electricity subsidies are less commonly documented in electricity pricing literature. Most countries address elderly welfare through direct pension systems or integrated social protection programs rather than sector-specific cross-subsidies, suggesting alternative approaches merit consideration.

5.3.4. Recommended Reforms

Reform should introduce means-testing linking benefits to genuine need. Cross-reference senior citizen applicants with FIES income data and 4Ps beneficiary status, elderly households below poverty thresholds receive full benefits; higher-income seniors receive reduced or no discounts. Establish graduated benefit structure rather than uniform 15 percent discount: poor elderly households receive 15 percent; lower-middle-income 15 percent; middle-income 10 percent; upper-income no discount. Senior citizens already receiving 4Ps benefits automatically qualify for maximum electricity discount without separate application, reducing administrative burden for poorest elderly households.

Establish consumption limits preventing unlimited subsidy exposure. Rather than percentage discounts on unlimited consumption up to 200 kWh, implement absolute monthly subsidy limits (for example, maximum Php 500 discount regardless of consumption level). The 200-kWh threshold substantially exceeds international practice and lifeline levels, consider reducing to 150 kWh or maintaining differentiated thresholds based on means-testing. Require actuarial projections of senior citizen discount costs incorporating population aging, consumption trends, and benefit levels, enabling proactive adjustment before demographic pressures create fiscal crisis.

Means-testing faces potential political resistance from elderly advocacy groups arguing for universal age-based support. However, framing as "targeting limited resources toward seniors most in need" while emphasizing protection for poor elderly

households can build acceptance. International evidence demonstrates that well-designed means-tested senior benefits achieve greater equity than universal programs while reducing fiscal burdens (World Bank, 2018). The Philippines faces early stages of demographic challenges; proactive reform while fiscal pressures remain manageable proves less politically and economically costly than crisis-driven changes.

5.4. Cross-Program Integration and Implementation Strategy

5.4.1. Unified Welfare Verification Platform

Beyond mechanism-specific reforms, the three programs share integration opportunities addressing systemic inefficiencies. Establish integrated data system linking FIES household identifiers, 4Ps beneficiary status, utility customer records, and senior citizen registration. This platform would enable single-point eligibility determination for all electricity subsidies, households provide information once, system assesses qualification for UCME (if off-grid), lifeline rates, and senior citizen discounts simultaneously. Automate verification reducing manual processing, eligibility updates automatically when household circumstances change in FIES or 4Ps systems. Provide real-time program monitoring, regulators and policymakers access aggregated data on beneficiary characteristics, overlap patterns, and targeting accuracy enabling evidence-based adjustments.

The technical feasibility of unified platforms is demonstrated by existing DSWD-utility and PSA-4Ps coordination. Extension to electricity subsidy integration represents scaling proven approaches rather than developing novel capabilities. The Department of Social Welfare and Development already collects and verifies household data for Pantawid Pamilyang Pilipino Program and other programs. Coordination between DSWD and distribution utilities through formalized data-sharing agreements and integrated information systems could operationalize means-tested electricity subsidies without building parallel verification systems.

5.4.2. Coordinated Reform Sequencing

International evidence demonstrates that subsidy reform sequencing significantly affects political feasibility and equity outcomes. Successful reform experiences suggest a preferable sequencing: start with unacceptable leakages (wealthy households, viable areas); improve targeting prior to reducing benefits to maintain political support; frame reforms positively ("better reach those in need" instead of benefit cuts) recognizing that reform sustainability involves public acceptance (IMF, 2013).

For the Philippines' three mechanisms, recommended sequence prioritizes unacceptable leakages while building institutional capacity:

Table 2. Three-phase Reform Sequence for the Philippines' Electricity Subsidy Mechanisms

Phase	Timeline	Reform Priorities & Key Actions
Phase 1 Data Integration & Obvious Leakages	Years 1-2	Focus: Establish unified welfare verification platform while addressing most defensible targeting failures Address unacceptable leakages: • UCME subsidies to Palawan/Mindoro • Lifeline benefits to demonstrably wealthy households • Senior citizen benefits to high-income elderly Build institutional capacity: • Establish unified welfare verification platform • Generate fiscal savings to fund system development
Phase 2 Hybrid Targeting Implementation	Years 3-4	Focus: Deploy integrated eligibility systems using operational verification platform Deploy integrated systems: • Implement integrated eligibility systems for lifeline and senior citizen programs • Use operational verification platform for targeting Begin strategic adjustments: • Begin UCME degression for areas demonstrating development Monitor and document: • Track targeting improvements • Document reduced leakage and improved equity outcomes
Phase 3 Threshold & Benefit Calibration	Years 5+	Focus: Complete threshold and benefit calibration using empirical evidence from improved data systems Evidence-based adjustments: • Adjust consumption limits based on empirical evidence • Refine discount levels using improved data systems • Recalibrate viability classifications for UCME areas Graduated implementation: • Implement changes gradually with proper stakeholder engagement

Phase	Timeline	Reform Priorities & Key Actions
		• Provide transition protection for existing beneficiaries facing reductions

This sequencing improves targeting accuracy before adjusting benefit levels, demonstrating that reforms enhance equity rather than simply reducing support, managing political resistance. Communication should emphasize "better reaching those truly in need" rather than "cutting subsidies," respecting loss aversion dynamics while building reform coalitions.

5.4.3. Fiscal Sustainability Monitoring

All three mechanisms lack built-in fiscal sustainability safeguards, costs escalate without automatic adjustment mechanisms. International evidence demonstrates that electricity subsidy systems in developing countries commonly exhibit the pattern observed in Philippine implementation: targeting failures, fiscal pressures, administrative fragmentation, efficiency trade-offs. Indonesia's trajectory, where compounding subsidies reaching 2.8 percent of GDP forced painful adjustments (World Bank, 2023), illustrates reactive reform costs.

Recommended monitoring framework includes comprehensive public reporting of UCME, lifeline, and senior citizen costs including growth rates, beneficiary numbers, average subsidy per household, and fiscal burden as percentage of government revenue; automatic review thresholds initiating mandatory program review (for example, total subsidy costs exceeding 2 percent of government revenue, annual growth above 10 percent, or beneficiary expansion beyond population growth rates); forward-looking cost estimates incorporating demographic trends (aging population for senior citizen), electrification expansion (UCME), and economic development (lifeline). These mechanisms create institutional commitment to fiscal sustainability without requiring continuous political intervention, automatic triggers and regular reporting maintain attention on cost trajectories.

5.5. *Implementation Considerations*

The proposed reforms address identified challenges while recognizing implementation constraints. No single reform in isolation will address systemic issues; rather, an integrated approach combining clearer targeting, degression policies, administrative streamlining, efficiency incentives, and diversified financing offers the best path forward. The urgency of reform is underscored by subsidy growth trajectories and contributions to overall electricity prices deterring investment and economic growth. However, reforms must be carefully sequenced and implemented with appropriate safeguards ensuring genuine missionary electrification needs, affordability for vulnerable populations, and elderly welfare support continue while eliminating inefficiencies and leakages.

International evidence consistently demonstrates that design quality matters more than mechanism selection, variation within mechanism types exceeds differences between them. The Philippines possesses unusual advantages: comprehensive household welfare data (FIES), operational means-testing infrastructure (4Ps), technical regulatory expertise (ERC), and documented program performance. The primary challenge is operational integration rather than capability development. Successful reform requires strong data infrastructure, phased implementation allowing adjustment based on experience, transparent communication emphasizing equity improvements, and protection for vulnerable populations during transitions. The Philippines exhibits these prerequisites.

The alternative, maintaining current mechanisms unchanged, faces its own risks. UCME costs tripling in nine years, senior citizen benefits quadrupling without targeting refinement, and lifeline leakage persisting despite known inefficiencies create fiscal trajectories requiring eventual intervention. The choice is between proactive reform, gradual, planned, protecting vulnerable populations, and reactive adjustment forced by fiscal crisis. International experience consistently demonstrates that proactive approaches prove less costly politically and economically while generating superior equity outcomes. The Philippines' current position, with identified challenges but intact institutional capacity, favors early action before accumulated pressures force less favorable adjustments. The experiences of Indonesia, China, Peru, South Africa, Spain, and other countries documented in the literature demonstrate both the possibilities and pitfalls of electricity subsidy reform, with careful design and implementation, the Philippines can achieve more effective poverty reduction, improved market efficiency, and enhanced economic competitiveness while maintaining commitments to universal access and affordability.

6. Conclusion

This study examined international evidence on electricity subsidy mechanisms to elicit actionable lessons for improving the efficiency and equity of the Philippines' three major subsidy programs: the Universal Charge for Missionary Electrification, lifeline rates, and senior citizen discounts. Through systematic review of literature on increasing block tariffs, cross-subsidization, and time-variant pricing, combined with detailed analysis of Philippine program implementation, several critical insights emerge regarding both the possibilities and limitations of electricity subsidies as policy instruments.

6.1. *Key Findings from International Literature*

International experience reveals that design quality matters more than mechanism selection. Variation in outcomes within mechanism types exceeds differences between them, poorly designed increasing block tariffs perform worse than well-designed cross-subsidies, and vice versa. This finding has important implications: rather than debating which mechanism type to adopt, policymakers should focus on design features that distinguish successful from unsuccessful implementations. Empirical calibration using household data, regular performance evaluation, adaptive

adjustment based on outcomes, and administrative capacity for effective implementation consistently separate programs achieving equity objectives from those generating fiscal burdens without corresponding welfare gains.

The targeting challenge proves universal across mechanisms and contexts. Consumption-based approaches, whether through increasing block tariffs or lifeline rates, exhibit weak correlation between electricity use and household welfare in developing countries. High-density living where multiple households share meters, wealthy households distributing consumption across multiple properties, and informal sector patterns create substantial inclusion and exclusion errors. International evidence from South Africa, Ethiopia, Peru, Spain, and other countries documents persistent leakages to non-poor populations despite various design refinements. This suggests that consumption alone provides insufficient information for accurate targeting without complementary welfare verification.

Political economy dynamics complicate reform universally. Concentrated beneficiaries who clearly understand what they receive organize to defend subsidies, while costs disperse across many consumers in small increments lacking political salience. Loss aversion makes benefit reduction particularly difficult, populations resist perceived losses more intensely than they value equivalent gains. These patterns explain why inefficient subsidies persist worldwide despite documented leakages and fiscal pressures. Successful reform experiences share common sequencing: addressing unacceptable leakages first to build credibility, improving targeting before reducing benefits to maintain political support, and framing changes positively as "better reaching those in need" rather than "cutting subsidies" to respect behavioral realities.

The fiscal sustainability time-bomb receives insufficient attention in many developing country contexts. Indonesia's energy subsidies reaching 2.8 percent of GDP demonstrate how well-intentioned programs can crowd out critical investments in education, health, and infrastructure when costs escalate without adjustment mechanisms. The contrast between proactive reform, gradual targeting improvements, phased adjustments, early action on identified inefficiencies, and reactive reform forced by fiscal crisis consistently favors early intervention. Countries delaying reform until fiscal constraints force action typically harm vulnerable populations more while generating political backlash undermining long-term program viability.

6.2. Philippine Context and Program-Specific Challenges

Philippine subsidies exhibit patterns consistent with international experience but require context-specific responses. UCME's fundamental challenge lies in definitional ambiguity enabling subsidy capture by viable areas alongside genuinely unviable populations. The subsidy's growth from Php 7 billion in 2015 to a projected Php 24 billion in 2024, more than tripling in less than a decade, reflects both expanding electrification coverage and the absence of degression mechanisms to phase out support for areas achieving viability. The inclusion of large, privately-operated islands like Palawan and Mindoro despite stable operations and relatively higher income levels represents classic subsidy leakage documented in cross-subsidy literature. Additionally, fragmented institutional responsibilities among NPC,

ERC, and PSALM create operational inefficiencies, while the cost-plus subsidy structure provides limited incentives for production efficiency.

Lifeline rates suffer from consumption-based targeting limitations identified in international evidence. Francisco's (2024) analysis reveals that more than 60 percent of households at the regional level qualify for discounts based solely on consuming 100kWh or less monthly yet cross-referencing with appliance ownership and income data exposes significant leakages to non-poor households. The 100kWh threshold ranks among the highest internationally, most countries employ 15-50 kWh cutoffs, amplifying inclusion errors. Multi-family households sharing meters exceed thresholds despite individual poverty, while wealthy households with multiple residences distribute consumption to qualify each location. The geographic dimension creates additional distortions; areas with high lifeline beneficiary concentrations face disproportionately elevated business electricity costs as commercial consumers fund larger subsidy pools, deterring investment and job creation that could lift households out of poverty.

The senior citizen discount presents unique challenges as a broader social protection policy intersecting with electricity markets. Unlike sector-specific interventions, this age-based benefit applies across multiple sectors but creates particular difficulties within electricity given consumption-based eligibility and cross-subsidy funding. The 31 percent overlap with lifeline beneficiaries generates administrative redundancy, utilities operate duplicate verification systems for overlapping populations. The recent expansion through House Bill 11400, tripling the discount to 15 percent and doubling the threshold to 200kWh, occurs without corresponding analysis of long-term fiscal sustainability. Combined with population aging and elderly households' higher consumption patterns, this creates systematic upward pressure on costs passed to non-senior consumers. Most developed countries address elderly welfare through pension systems or integrated social protection rather than sector-specific cross-subsidies, suggesting alternative approaches merit consideration.

6.3. Cross-Cutting Themes and Systemic Issues

Examining the three mechanisms reveals shared challenges transcending individual program design. All three exhibit targeting failures from reliance on single-dimension eligibility criteria without complementary welfare verification. All face escalating costs driven by beneficiary expansion, absent adjustment mechanisms, and benefit increases without corresponding targeting refinement. All suffer from institutional fragmentation creating coordination inefficiencies and administrative redundancy. All contribute to elevated electricity costs undermining economic competitiveness while serving legitimate equity objectives.

The 31 percent beneficiary overlap between lifeline and senior citizen programs represents the most direct redundancy, with households receiving dual subsidies through parallel administrative systems requiring separate applications, verification, and monitoring. Beyond this overlap, coordination gaps emerge between mechanisms; UCME provides infrastructure subsidies without affordability support for off-grid consumers, while lifeline and senior citizen programs serve only grid-connected populations. This asymmetry means off-grid low-income households may receive subsidized generation but face unaffordable tariffs, while grid-connected

areas benefit from consumption subsidies without infrastructure support. The cumulative effect, grid-connected, non-qualifying, non-senior households bearing multiple subsidy costs simultaneously, generates the Philippines' high regional electricity prices while creating geographic and demographic cost variations distorting economic decisions.

These interconnections suggest that isolated program-specific reforms may prove insufficient. UCME targeting improvements without lifeline and senior citizen refinement leave substantial inefficiency. Lifeline threshold adjustments without senior citizen program coordination perpetuate overlap. Senior citizen means-testing without parallel lifeline reforms misses optimization opportunities. Systemic issues require coordinated rather than fragmented responses, recognizing that the three mechanisms interact in ways affecting overall electricity market efficiency, fiscal sustainability, and equity outcomes.

6.4. The Philippine Advantage and Reform Opportunities

Despite these challenges, the Philippines possesses unusual advantages relative to many developing countries that attempted similar subsidy programs. Regular Family Income and Expenditure Surveys provide household welfare data that many comparable countries lack; data essential for empirically-grounded threshold setting and targeting evaluation. The Pantawid Pamilyang Pilipino Program demonstrates administrative capacity for means-tested benefit delivery at scale, operating verification systems and payment mechanisms applicable to electricity subsidy targeting. The Energy Regulatory Commission maintains technical expertise for sophisticated tariff design, with regulatory experience spanning rate-setting, cost recovery analysis, and subsidy program oversight.

However, these capabilities remain largely siloed. FIES data informs policy discussions but lacks operational integration with utility customer databases. The 4Ps database identifies welfare-qualified households but doesn't link to electricity subsidy eligibility determination. Distribution utilities maintain consumption records but cannot access welfare databases for targeting refinement. The integration challenge is primarily operational rather than foundational, technical systems exist, legal frameworks permit data sharing for program administration, and institutional capacity enables sophisticated implementation. What remains is systematic integration; linking FIES household identifiers to utility customer databases, enabling 4Ps eligibility determinations to inform electricity subsidy qualification, and automating verification processes rather than relying on manual application-based systems.

This integration would enable hybrid targeting approaches that international evidence identifies as superior to single-dimension criteria. Lifeline eligibility could combine consumption thresholds with welfare verification, substantially reducing both inclusion errors (non-poor households qualifying) and exclusion errors (poor households exceeding thresholds). Senior citizen discounts could incorporate means-testing alongside age criteria, ensuring benefits target elderly households genuinely requiring assistance. UCME could employ viability assessments using economic and demographic data, distinguishing areas requiring ongoing support from those achieving self-sufficiency. Pakistan's integration of electricity consumption

data with Proxy Means Test databases demonstrates feasibility in comparable developing country contexts.

6.5. *Recommended Reform Priorities*

Reform priorities include: data integration, addressing unacceptable inefficiencies, implementing degression mechanisms, streamlining administration, and introducing performance-based incentives. Linking FIES, 4Ps, and utility databases would enable substantial targeting improvements within existing frameworks without requiring fundamental restructuring. The technical and institutional prerequisites exist; implementation depends primarily on inter-agency coordination and political commitment. This approach respects the reality that wholesale program elimination or radical restructuring faces prohibitive political resistance, while operational improvements building on existing capacity prove more feasible.

Second, address unacceptable inefficiencies first to build reform credibility. UCME subsidies to Palawan and Mindoro, lifeline benefits to demonstrably wealthy households, and senior citizen discounts to high-income elderly represent targeting failures defensible politically as corrections benefiting genuinely vulnerable populations. These adjustments generate fiscal savings funding system improvements while demonstrating that reforms enhance rather than undermine equity objectives. International reform sequencing consistently recommends this approach, starting with obviously inappropriate benefits creates political space for broader improvements.

Third, implement degression mechanisms preventing indefinite subsidy continuation regardless of area or household development. UCME requires viability classification with graduated support reduction as areas demonstrate economic progress. Lifeline and senior citizen programs need periodic reassessment ensuring continued eligibility reflects current circumstances rather than initial determinations becoming permanent. International evidence demonstrates that subsidy systems without adjustment mechanisms face escalating costs requiring eventual intervention, proactive degression proves less disruptive than crisis-driven reform.

Fourth, streamline administrative processes reducing fragmentation and redundancy. Single-window subsidy disbursement for UCME, integrated verification for lifeline and senior citizen programs, and unified eligibility determination across mechanisms would reduce costs while improving service delivery. The 31 percent beneficiary overlap between lifeline and senior citizen programs represents clear opportunity for administrative consolidation. Current parallel systems impose unnecessary costs ultimately recovered through tariffs on all consumers, efficiency gains from integration could support enhanced targeting for genuinely vulnerable populations.

Fifth, introduce performance-based incentives addressing moral hazard in current designs. UCME's cost-plus structure shields producers from efficiency pressures; benchmark-based subsidies would create incentives for cost minimization while maintaining support for genuinely challenging operating environments. Lifeline and senior citizen programs require revenue neutrality enforcement preventing accumulated under-recoveries endangering utility financial viability. These

mechanisms balance equity objectives against efficiency and sustainability requirements.

6.6. Implementation Strategy and Political Economy Considerations

Reform implementation should follow phased sequencing recognizing political economy realities. Phase 1 (Years 1-2) establishes unified welfare verification platforms while addressing most defensible targeting failures. This foundation-building stage generates fiscal savings funding system development while demonstrating reform benefits. Phase 2 (Years 3-4) deploys integrated eligibility systems for lifeline and senior citizen programs using operational verification platforms, begins UCME degression for areas demonstrating development, and monitors targeting improvements documenting reduced leakage and enhanced equity outcomes. Phase 3 (Years 5+) completes threshold and benefit calibration using empirical evidence from improved data systems, with graduated implementation protecting existing beneficiaries facing reductions.

This sequencing improves targeting accuracy before adjusting benefit levels, demonstrating that reforms enhance equity rather than simply reducing support, managing political resistance documented in international experience. Communication should emphasize "better reaching those truly in need" rather than "cutting subsidies," respecting loss aversion dynamics while building reform coalitions. Transparency in cost analysis showing that current leakages force higher prices on the majority creates understanding of reform necessity. Phased implementation with grandfathering provisions rather than immediate disqualification respects beneficiary expectations while preventing permanent classifications.

Building political support requires creating winners from reform. Using savings from reduced leakages to either lower non-subsidized rates or increase subsidies for verified poor households demonstrates tangible benefits from improved targeting. National subsidy pooling for lifeline rates addressing geographic distortions benefits businesses in high-poverty areas currently facing elevated costs. UCME degression freeing resources for genuinely unviable areas enables expanded coverage or enhanced affordability support. These positive outcomes create constituencies supporting continued reform rather than solely defending existing arrangements.

6.7. Broader Implications and Future Research Directions

The Philippines' electricity subsidy experience offers lessons extending beyond the energy sector. The challenges identified, targeting failures from single-dimension eligibility, administrative fragmentation creating redundancy, fiscal sustainability pressures from absent adjustment mechanisms, and political economy obstacles to reform, characterize social protection systems more broadly. The recommended solutions, integrated welfare verification, hybrid targeting combining observable characteristics with means-testing, phased reform sequencing, and emphasis on operational improvements over wholesale restructuring, apply across multiple domains.

International evidence suggests that the Philippines' current position, maintaining sector-specific subsidies with overlapping beneficiaries, represents a developmental stage that typically evolves toward integration as institutional capacity strengthens. Advanced economies consolidate fragmented mechanisms into coherent social protection frameworks combining cash transfers with targeted in-kind support. Middle-income countries exhibit the pattern observed in the Philippines; multiple programs serving similar populations through parallel administrative systems. The Philippines possesses the prerequisites for evolution toward integration: established household welfare data, demonstrated capacity for means-tested benefit delivery, and technical regulatory expertise. The challenge lies in operational coordination and sustained political commitment rather than foundational capability development.

Several areas merit further research. First, rigorous impact evaluation of Philippine subsidy programs using household-level data would quantify targeting accuracy, welfare effects, and fiscal costs more precisely than currently available evidence permits. Francisco's (2024) analysis provides important insights, but comprehensive evaluation linking FIES data, utility consumption records, and 4Ps beneficiary status would enable more detailed assessment. Second, pilot testing of hybrid targeting approaches in select distribution utility areas would generate operational evidence on implementation challenges, administrative costs, and political feasibility before nationwide rollout. Third, comparative analysis of countries successfully implementing electricity subsidy reform would identify specific tactics managing political resistance and sequencing challenges. Fourth, modeling of demographic and economic scenarios projecting long-term fiscal trajectories under current policies versus reform alternatives would clarify sustainability implications informing policy debate.

6.8. Final Reflections

Electricity subsidies represent policy instruments capable of achieving important equity objectives when properly designed and implemented. International evidence demonstrates both the possibilities and pitfalls: well-targeted programs enhance affordability for vulnerable populations while maintaining fiscal sustainability and market efficiency, whereas poorly designed mechanisms generate substantial leakages, escalating costs, and economic distortions without corresponding welfare gains. The Philippines' current subsidy programs exhibit characteristics of both successful and unsuccessful implementations, serving genuine needs while suffering from targeting inefficiencies, administrative fragmentation, and absent sustainability mechanisms.

The choice facing Philippine policymakers is not between maintaining current programs unchanged or eliminating subsidies entirely. Rather, the decision involves selecting between proactive reform, gradual improvements, phased adjustments, strategic sequencing, and reactive adjustment forced by fiscal pressures or crisis. International experience consistently demonstrates that proactive approaches prove less costly politically and economically while generating superior equity outcomes. Countries delaying action until fiscal constraints force intervention typically harm vulnerable populations more while creating political backlash undermining long-term program viability.

The Philippines' current position, with identified challenges but intact institutional capacity, escalating costs but not yet crisis, documented leakages but operational programs, favors early action. UCME costs tripling in nine years, senior citizen benefits quadrupling without targeting refinement, and lifeline leakage persisting despite known inefficiencies create trajectories requiring eventual intervention. The question is whether reform occurs through planned, gradual adjustment protecting vulnerable populations, or through crisis-driven changes imposed by fiscal necessity. The experiences of Indonesia, China, Peru, South Africa, Spain, and other countries documented in international literature demonstrate both the possibilities and pitfalls of electricity subsidy reform.

With careful design drawing on international evidence, systematic implementation building on existing institutional strengths, and sustained political commitment to gradual improvement, the Philippines can achieve more effective poverty reduction, improved market efficiency, and enhanced economic competitiveness while maintaining commitments to universal access and affordability. The alternative, continued drift with escalating costs, persistent leakages, and eventual forced adjustment, serves neither equity nor efficiency objectives. The window for proactive reform remains open, but the costs of delay accumulate with each budget cycle, demographic shift, and benefit expansion. The lessons from international experience and Philippine-specific analysis point clearly toward integrated, evidence-based reform as the path forward.

7. References

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