



The Practice and Scope of Electricity Sector Regulation in Southeast Asia

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It is approaching two decades since specialist economic regulatory bodies for electricity began appearing in several countries in Southeast Asia; namely, Cambodia, Malaysia, the Philippines, Singapore, Thailand and Vietnam.

Some kind of economic regulation is usually considered necessary within the electricity sector because of its essential infrastructure and often limited space for true competition. Regulation has sought to improve performance, but there are areas that warrant continued attention. While regulatory approaches can vary depending on local circumstances, decisions and structures need to focus on delivering clear and credible outcomes.

In this edition, prepared in collaboration with John Earwaker of First Economics, we reflect on the practice and scope of economic regulation across Southeast Asia.

Key Points

- As an essential service, with complex physical infrastructure that cannot efficiently be duplicated or made effectively competitive, electricity is not easily amenable to simple forms of market-based competition. Regulation can be used to incentivise efficiency and service improvement by electricity network monopolies, and to ensure the effectiveness of competition in electricity generation and retail where applicable.
- As more private sector stakeholders become involved in the electricity sector, the more important it becomes to establish formal, independent, analysis-based regulation. Timely and least-cost participation of private sector capital depends on a transparent, stable regulatory framework with consistent administration. If the costs associated with regulated decisions are to be borne by customers through regulated charges, then arguably one should also seek to involve customers in the regulatory process. For these reasons, attention is increasingly paid to the perceived independence of the regulator, how well the regulator is resourced, and the level of stakeholder participation.
- Southeast Asia's regulators have generally adopted a building block approach, typically with a performance incentive scheme, to determine revenues that can be recovered from customers. Regulators have acted as a surrogate for competition: controlling costs while also seeking higher performance. As the region's electricity industries continue to evolve, so too will the regulatory regimes. In regulation there is no single best solution; credibility of decisions and their acceptance by stakeholders is the ultimate test.

The Role of Electricity Regulation

The nature of the electricity industry makes it peculiarly vulnerable to a particular type of monopolisation. The result is that some form of regulation is usually considered necessary. The nature of the regulatory requirement varies as one moves along the electricity value chain from generation, through transmission and distribution, to the retail activities that directly interface with end users.

The specific requirements and objectives of regulation may also depend on the extent of private sector involvement in the industry. Some functions within the electricity supply chain are tied to physical infrastructure that cannot be duplicated cost-effectively, such as electricity transmission and distribution networks. Physical infrastructure that cannot be replicated and is essential to the provision of other services is called an essential facility.¹ Control of essential facilities can confer substantial market power: the ability to set prices so as to maximise profit to the facility owner as opposed to maximising overall value to society. Consequently, some form of formal regulation of both price and service quality is required, particularly if the relevant infrastructure is owned by a private sector entity with incentives to maximise profits, but also if the relevant infrastructure is owned or operated by a government entity and deemed subject to mismanagement or inefficient operation.

In contrast, electricity generation and retail activities are potentially competitive. Competition in generation can take the form of many independently-owned generators selling electricity into a wholesale electricity market structure, such as is found in Australia, New Zealand, the Philippines, and Singapore, designed to match the requirements of buyers and sellers at efficient prices. An alternative, but less direct, form of competition may occur when different companies compete for the right to supply electricity from new generation facilities under a long-term contract, such as in the single buyer models of Malaysia or Thailand. Competition has also been introduced into the retail segment in some countries, such as the Philippines and Singapore. Retail competition means that at least some customers are deemed contestable and are eligible to choose from competing electricity suppliers. Even then, regulation often plays a critical role in preventing or mitigating problems that can arise when retail competition is insufficient or ineffective, and when some customers are contestable but others are not.

Regulatory Reform in ASEAN

The emergence of economic regulation in the ASEAN region has been a slow, somewhat episodic process over the past two decades. While the precise drivers varied from country to country, several trends combined to motivate an increased focus on the application of economic principles to the practice of regulation across the region.

For example, Singapore began pursuing electricity market reforms initially modelled around the UK's original electricity trading arrangements (known as the "Pool") with an eye to introducing a modern wholesale market and attracting more private sector expertise. Separately, for many other countries in the region, high rates of economic growth had led to electricity shortages, galvanising governments to look to the private sector as a cost-effective way to meet the growing demand for electricity.

¹ Control of centralized "dispatch" of a power system is also an essential facility, in the sense that choices of what facilities to dispatch to meet customer load can create winners and losers amongst differently-owned generating units. Consequently, market-based electricity systems need to develop additional institutions to support non-discriminatory (economically objective) use of the power grid. Sometimes similar issues arise when Independent Power Producers sell power to a Single Buyer.

Essential facilities such as electricity grids can benefit from regulation regardless of whether private or government owned.

Generation and retail activities are potentially competitive, but regulation can still be beneficial, particularly when not all customers are fully contestable.

For varied reasons, many ASEAN countries introduced regulation after 2000 in response to a growing number of private participants and increased complexity of the system.

As the number of Independent Power Producers (IPPs) grew, so, by the end of the 1990s, did the realisation that having more IPPs alone could not solve all problems. The complexity of the emerging industry, with more stakeholders and new procurement processes – some of which over-reacted to previous shortages – and the associated Power Purchase Agreements (PPA) – some of which were later deemed relatively expensive – began to lay bare the limitations of purely reactive approaches.

The success of the independent regulators that emerged in the UK in the 1980s, and that had been the norm in the US from the early 1900s, provided a supportive reform model: one that could also be championed by multilateral funding agencies such as the World Bank and Asian Development Bank as they sought to help developing countries likewise improve their economic efficiency.

The aftermath of the Asian Financial Crisis in 1997 found more of the region willing to consider the potential virtues or necessities of more fundamental sectoral reforms. The result was a burst of regulatory activity as various ASEAN countries passed legislation and established formal electricity regulators in the period 2001-7 (see Table 1).

Table 1: Electricity Regulators in ASEAN

	Country	Regulator Established	Legislative Act Including Regulation	Regulatory Body	Additional Market Structures Established
Advanced Market Structure	Philippines	2001	Electric Power Industry Reform Act (EPIRA)	Energy Regulatory Commission (ERC)	Wholesale Electricity Spot Market (WESM) Nearly complete privatisation
	Singapore	2001	Energy Market Authority of Singapore Act (Chapter 92B)	Energy Market Authority (EMA)	National Electricity Market (NEM) Substantial privatisation
Single Buyer Model	Malaysia	2001	Energy Commission Act	Energy Commission (does not cover Sarawak)	
	Thailand	2007	Energy Industry Act BE 2550	Energy Regulation Commission (ERC)	
Early Stage Reforms	Cambodia	2001	Electricity Law (Royal Decree no. NS/RKM/0201/03)	Electricity Authority of Cambodia (EAC)	
	Vietnam	2005	Electricity Law (No. 28/2004/QH11) and Decision no. 258/2005/QD-TTg	Electricity Regulatory Authority of Vietnam (ERAV)	

Source: TLG Research based on various sources

Not all countries in Southeast Asia have followed this trend. In Brunei, Indonesia, Laos, and Myanmar, regulatory control over the electricity sector has remained within the government ministry or department responsible for energy.

The Importance of Good Governance

Several studies have emphasised the importance of good governance in ensuring effective regulation.² Regulatory governance refers to “the institutional and legal design of the regulatory system and the framework within which decisions are made”.³ Concepts of good governance encompass a whole host of notions such as independence, accountability, transparency, predictability and integrity.⁴ In much the same way as these concepts deliver for corporate governance, the aim is to build a regulatory apparatus that is both robust and rigorous, by virtue of the trust and support placed in it by both industry and society at large.

Good regulatory governance can enhance the legitimacy of the regulatory system in the eyes of electricity consumers and policymakers, while at the same time clarifying the nature of risks to investors in the sector. However, the path from government control to independent regulation of the electricity sector is not always a smooth one. As countries in Southeast Asia seek to embed the culture of independent utility regulation, three areas warrant particular attention:

- **Independence of the regulatory body.** Independence, or autonomy, of the regulatory body is important in ensuring that the regulator is able to make decisions free from political interference, whether direct or indirect. Regulatory independence helps to ensure the consistency of regulatory decisions and more predictable returns for private investors in the sector, thereby reducing “regulatory risk”. Even in those countries where independent regulation has been introduced, there are varying degrees of independence, with the formal legal independence of the regulatory body, and the extent of its powers, varying from case to case.
- **Adequate regulatory capacity.** Regulators should have adequate financial and human capacity to undertake their role effectively. They must be adequately funded and staffed, particularly in cases where they are regulating private companies, which are likely to have their own well-resourced regulatory departments. The regulator needs to be able to demonstrate it has the ability to carry out credible analysis to support its decisions, ideally contributing to enhancing efficiency or reducing costs but, at a minimum, contributing to a robust perception that industry outcomes are broadly reasonable. Even where there is some independence, there may not be much budgetary support, limiting the regulator’s ability to actually be independent.
- **Transparency and public participation in regulatory processes.** The credibility and legitimacy of the regulatory system depends, in part, on it being seen to have involved all stakeholders, including electricity consumers, in the decision-making process. In more developed regulatory systems, regulators will typically hold regular consultation exercises for key issues. Such processes have naturally taken time to develop in countries in the region that do not have a tradition of publishing detailed information on the performance of electric utilities or of involving the public in decisions relating to the electricity sector.

Good regulation requires good governance in order to maintain the trust and support of multiple stakeholders. Independence, resourcing and transparency all warrant attention.

2 “Effective Regulation of Water and Energy Infrastructure Services”. Law and Policy Brief No 2. Asian Development Bank, August 2008.

3 “Handbook for Evaluating Infrastructure Regulatory Systems”, Ashley C. Brown, Jon Stern, Bernard Tenenbaum; with Defne Gencer, World Bank, 2006, page 5.

4 *ibid*, pages 59-63. The authors also identified clarity of roles, completeness and clarity in rules, proportionality, requisite powers, and appropriate institutional characteristics, as key aspects of regulatory governance.

Comparing Regulatory Styles

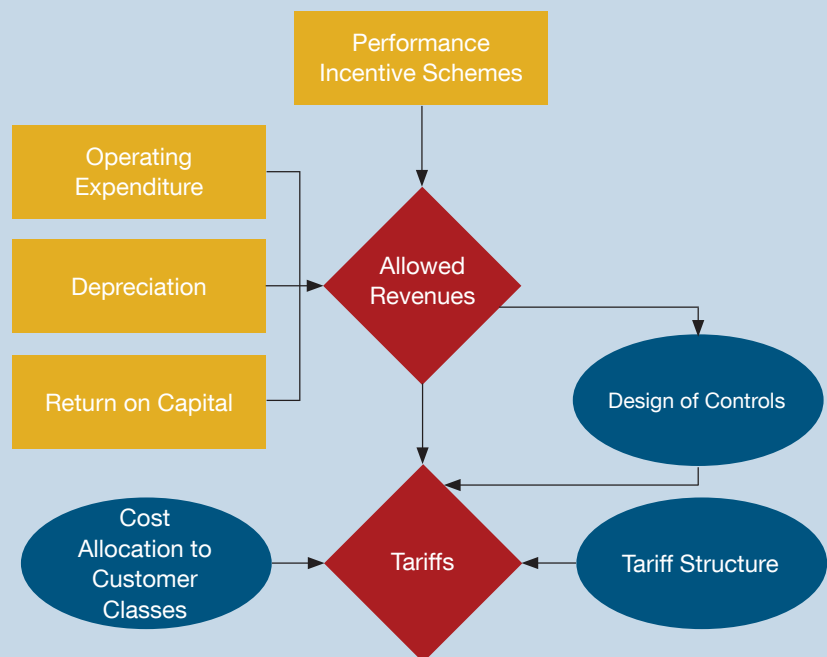
Most ASEAN regulators have been modelled on UK and US examples, using the cost-based building block approach, combined with a performance incentive scheme.

Effective economic regulation aims to be a surrogate for competition that cannot otherwise be relied on to yield acceptable outcomes. Textbook competition yields the lowest prices consistent with a sustainably profitable industry. Consequently, economic regulation seeks to balance consumer preferences for lower prices with investor needs for a sustainable business proposition. To achieve this, regulation must focus on how to ensure costs are reasonable, and that service quality is not sacrificed through inattention or mere pursuit of higher profitability.

Most regulators in the region have tried to adopt standard international regulatory practices following models initially developed in the US and UK for application to private sector utilities. These models develop regulated prices from cost-based “building blocks”.

The building blocks comprise (i) operating costs; plus (ii) return of capital invested (depreciation); and (iii) return on capital invested (“allowed profit”). Various methods are employed to calculate these so as to establish the target revenues which the regulated utility is allowed to recover. These three building blocks are combined with any associated Performance Incentive Schemes (PIS) to determine the utility’s revenue requirement: the “allowed revenues” to be recovered from customers. A simplified schema is set out in Figure 1.

Figure 1: From Costs and Incentives to Tariffs



Source: TLG Research

The precise design of the regulatory price control, and considerations as to the structure of tariffs, including how allowed costs are allocated to specific types of customers or patterns of usage, then jointly determine the electricity tariffs faced by end-users. For example, the US and UK approaches differ in several ways.

- In the US, the common approach is to develop prices based on a pro-forma or “test” year that has been scrubbed of idiosyncratic costs. Specific allowances may then be made to address known or foreseeable changes in costs. Certain types of costs, such as costs that change due to changes in fuel prices, are generally handled through automatic adjustment clauses. For everything else, the price holds until either the utility or the regulator deems it necessary to undertake a review

The US and UK systems differ in key respects, with the US approach more flexible, and the UK more explicit in its required improvements. Asian regulators combine elements from both.

Performance Incentive Schemes can help improve service quality, and have been successful in both the Philippines and Malaysia.

and reset. In effect, the utility has an incentive to minimise costs between regulatory periods while retaining an option to pursue an adjustment if circumstances require. Conversely, if profits grow to levels that the regulator deems excessive, the regulator can call for a review. The US model lacks a formal incentive period structure, but tariff review processes are intensive and detailed when they occur.

- In the UK variant, the price review process follows a more formal schedule (every five years, for example). In between the scheduled reviews, price or revenue control formulae are applied – providing certainty of necessary adjustments, while leaving the utility relatively free to manage costs so as to pursue profit while maintaining service metrics within agreed standards. The UK approach lacks the flexibility of the US approach, but historically has placed more explicit focus on what the utility is expected to achieve in terms of specific minimum efficiency improvements over time.

In Asia, it is common to find elements of each approach. Price controls are typically set for a medium term period (e.g. three to five years), in order to provide incentives for the utility to improve its efficiency. In the Philippines, the ERC developed a Performance-Based Regulation (PBR) scheme for private electricity distribution companies such as MERALCO, which supplies Metro Manila. In Malaysia, the Energy Commission has introduced a similar approach known as Incentive Based Regulation (IBR) for Tenaga Nasional Berhad (TNB), which serves Peninsular Malaysia.

Balancing Price and Quality

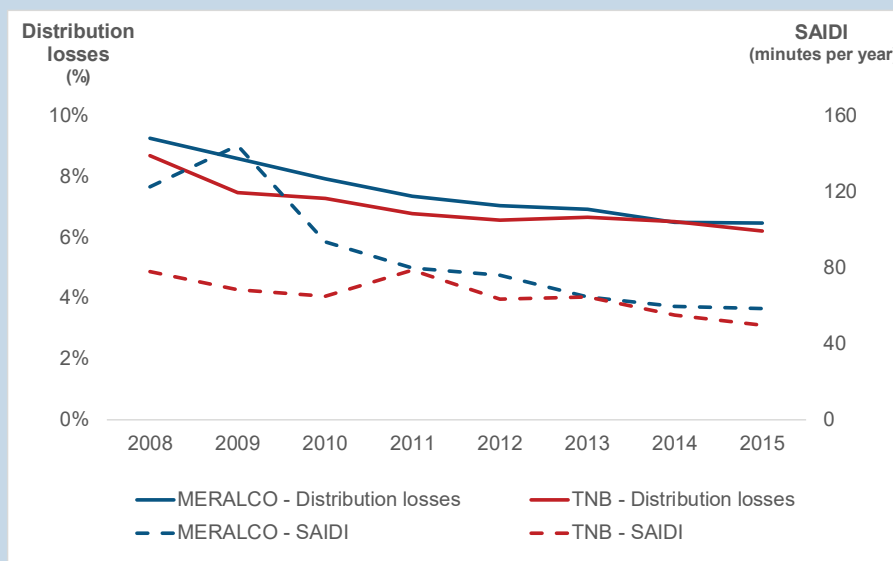
Under the incentive-based mechanisms described above, the utility can benefit in the short-term from beating the regulator's efficiency assumptions, and thus increase its profits. This is what provides the efficiency incentive. At the next price review, these efficiency improvements are then ultimately passed on to consumers in the form of lower electricity prices.

Cost efficiency is only part of the story. Regulators need to also protect quality of service and ensure that businesses do not try to increase their profits by reducing the level of service offered. To prevent this, regulators have typically introduced a PIS as a way of ensuring that the financial outcomes for the regulated entity are not independent of the quality of service which it provides. A PIS will typically give the utility financial bonuses for improvements in service quality, while financial penalties are applied for poor service.

The more developed models of economic regulation have been associated with significant improvements in the performance of regulated utilities in recent years. Figure 2 provides two examples: one from the Philippines, and one from Malaysia. The solid lines track distribution losses; the dashed lines track SAIDI.⁵ For both MERALCO and TNB, the story has been one of gradual improvement. In both cases, end users have benefited from this improved performance.

⁵ System Average Interruption Duration Index (SAIDI) is a commonly-used measure of the reliability of electricity distribution systems. It reports the duration of service interruptions experienced by the average customer over a given time period, usually a year.

Figure 2: Electricity System Performance Improvements



Source: TLG Research

Evolving Regulatory Frameworks

Effective regulation aims to solve (or prevent) problems. The problems include how to mitigate the risks and costs associated with monopolisation of essential facilities and how to establish and monitor incentives for improving performance where competition is not possible or effective. The scope of regulation is something that receives increasing attention in many markets. Should all aspects of electricity be regulated? Should some functions be subject to other approaches? Given the complexity of the overall electricity supply chain, the “best” answer to this question depends on many factors. When thinking about how to judge whether regulation is effective or sufficient, it is helpful to step back and consider whether stakeholders generally respect the decisions that are evident and the outcomes that are achieved. Credibility of the crucial decisions and acceptance of the associated outcomes constitute the ultimate litmus tests of whether further reforms merit consideration.

That said, no one regulatory solution is perfect. This is true across countries (with different regulatory regimes applying in the UK and US, for example, as well as between, say, Singapore and Thailand). It is also true across time. Countries, societies and industries are constantly changing. New challenges continually arise, be they technological, environmental, or economic. This means that the context of regulation also changes, demanding new incentives, forcing reviews of received wisdom, and always leading to refinements in, or even entirely new frameworks for, the regulatory approach.

The introduction of economic regulation into Southeast Asia has been a qualified success to date, but continuing evolution is to be expected. Whichever direction regulation takes in the future, The Lantau Group will continue to work with governments, regulators and electricity operators to develop regulatory structures that incentivise and reward efficient utility performance, while at the same time bringing benefits to electricity consumers.

Effective regulation can mitigate the risks of poor competition, but there is no one single best solution. Industries evolve, and so too will regulation.

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**With special thanks to
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