

Learning from Power Sector Reform Experiences

The Case of Vietnam

Alan David Lee

Franz Gerner



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Abstract

Vietnam's power sector has developed rapidly since the 1990s to become a top performer among developing countries. This success has occurred mostly under a state-owned utility, Electricity Vietnam. Select market-oriented reforms to date have also had some positive impact. By the late 1990s, the Government realized the need to gradually introduce competition to ensure long-term sustainability without jeopardizing security of supply for the fast-growing economy. Vietnam's 2004 Electricity Law has provided the framework to develop a competitive power market, unbundle Electricity Vietnam, set prices that better reflect costs, promote private investment, and establish a regulatory authority. Today, state-owned entities continue to

dominate the sector. Whereas the power market is partially competitive, improved operational efficiency and financial performance of generators in this market has contributed to keeping generation costs relatively low. Plans are broadly on track for further extensive reforms, including a clean energy transition. Lessons include that state-centric institutions can develop the power sector with top-level government commitment, highly-qualified staff, and consensus among sector institutions. Gradual reforms offer an opportunity to learn by doing; yet, the sequence of reforms matters. Introducing market mechanisms ahead of other elements may limit the market effectiveness and even make subsequent reform steps more difficult.

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Learning from Power Sector Reform Experiences: The Case of Vietnam

Alan David Lee and Franz Gerner¹

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Foreword

“Rethinking Power Sector Reform” is a multiyear global initiative of the Energy & Extractives Global Practice that provides an updated assessment of power sector reform experiences across the developing world. The initiative aims to revisit and refresh thinking on power sector reform approaches, in the light of accumulated evidence about the performance of countries undertaking different types of reforms. The goal is to reignite the policy debate around reform approaches by articulating a new vision that incorporates lessons learned over the past 25 years. It also reflects on how recent technological trends and business models that are disrupting the sector may call for a new thinking on reform strategies.

Since the 1990s, a standard set of policy prescriptions for power sector reform has been widely used. These include vertical and horizontal unbundling of power utilities; private sector participation; creation of an independent regulator; achievement of cost recovery pricing; and the introduction of competition in power generation. While this package of reforms was, at least partially, adopted by several developing countries, momentum and uptake slowed considerably in the 2000s. There is a need to revise approaches in the light of 25 years of experience, evidence, and technological disruptions to provide practitioners with a flexible frame of reference that can help identify the types of reforms needed to improve the power sector in different country contexts.

Supported by the World Bank’s [Energy Sector Management Assistance Program](#) (ESMAP) and the [Public–Private Infrastructure Advisory Facility](#) (PPIAF), the initiative works with different partners and experts across the World Bank Group (WBG) and beyond to generate evidence, analysis and insights on key themes of interest to power sector reform practitioners and decision makers globally: cost recovery, utility governance and restructuring, power markets, regulation, and political economy. Findings and recommendations on each of these themes will be included in a forthcoming Flagship Report.

The initiative is strongly evidence-based, grounding its research in an in-depth exploration of the 25-year power sector reform journey of 15 World Bank Group client countries that represent a wide diversity of geographies, income levels, and approaches to reform. The selected countries are Colombia, the Dominican Republic, the Arab Republic of Egypt, India, Kenya, Morocco, Pakistan, Peru, the Philippines, Senegal, Tajikistan, Tanzania, Uganda, Ukraine, and Vietnam.

An important output of the project is a series of case studies – of which this is one – that provide a narrative of the reform dynamics in each country and evaluate the impact of reforms on key dimensions of sector performance including security of supply, operational efficiency, cost recovery and energy access. For a subset of countries that pursued deeper reforms – Colombia, India, Peru and the Philippines – the project also includes a series of free-standing case studies that evaluate the experience with wholesale power markets. The purpose of the case studies is to reflect upon the experiences of individual countries with a view to extracting lessons of broader interest to the global community. It is not the role of these papers to recommend any particular way forward for the countries in question.

These case studies, which constitute companions to the synthesis of the Flagship Report, are being published in the Policy Research Working Paper series of the World Bank. As such, the case studies represent the views of the authors alone and should not be attributed to the World Bank or to any other person or institution. For more details, visit: www.esmap.org/rethinking_power_sector_reform.

1 Introduction

This case study examines Vietnam’s power sector development and reform experience from the 1990s to 2018. It explores links between country context, power sector institutions and market reform attempts, and dimensions of power sector performance. The case study is structured in three parts (after this introduction). Part 2 describes how power sector institutions have developed over time in context of the 1990s global model of market-oriented sector reforms. Part 3 focuses on sector performance in terms of four issues: security of supply; user access and affordability; supply-side efficiency and financial viability; and regulation of tariffs and other selected elements. Part 4 synthesizes the findings and reflects on lessons from Vietnam that may be relevant to other countries.

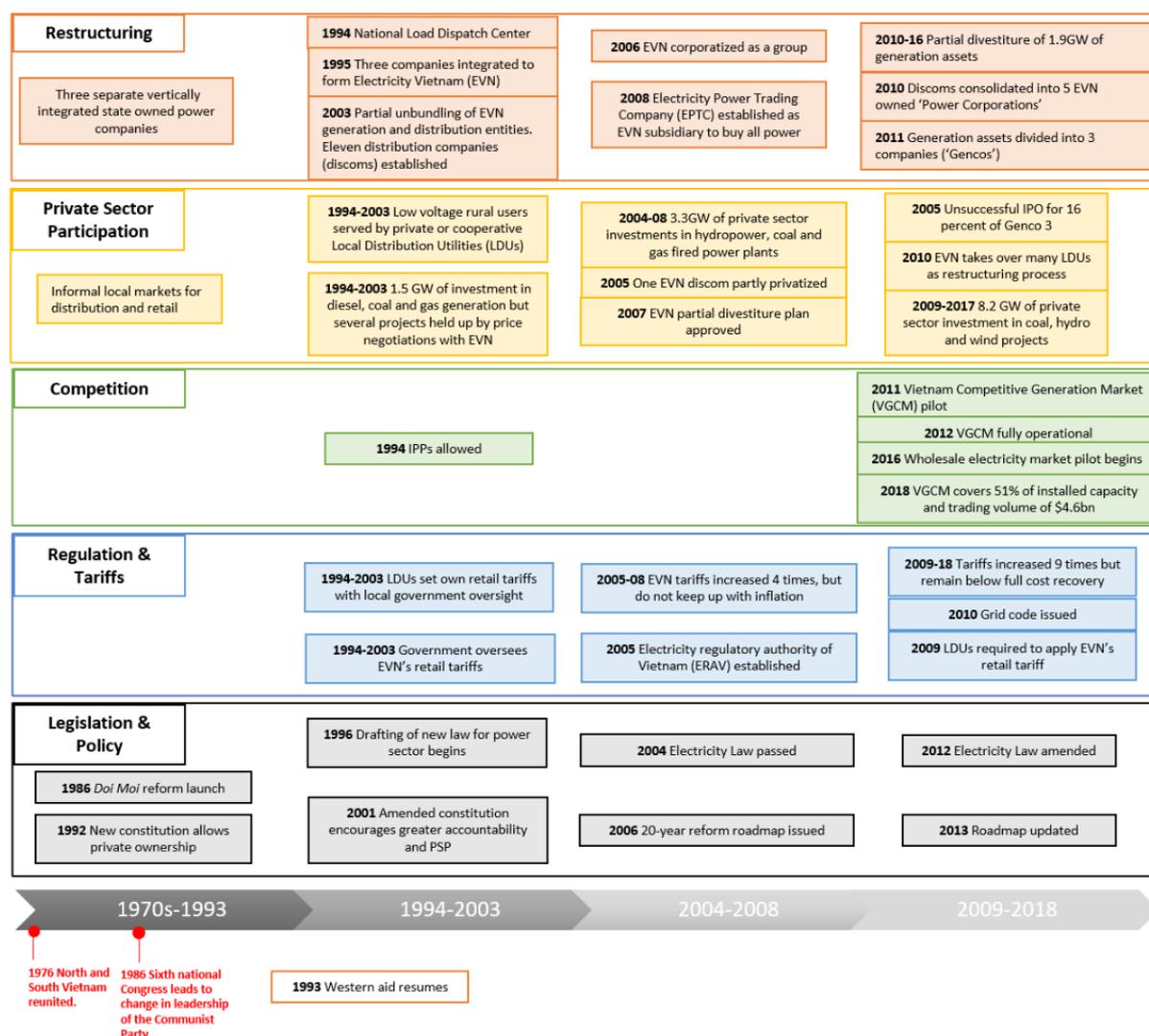
The case study employs a mixed methodology with inputs from multiple sources. It has involved a review of literature, collection of data from official sources, analysis of utility financial accounts for the period 2013 to 2017, comparison of several dozen indicators against good practice benchmarks, and 19 interviews with 25 actors including current or former government officials as well as academics and civil society representatives in Vietnam.

Vietnam has seen significant changes to its market structure, gradually moving from a vertically integrated structure to a more competitive power market. In less than two decades, the country’s power sector evolved from fragmented companies with high technical and financial losses to an integrated power system, and then to an unbundled group of stated-owned corporations with sizeable participation of domestic and international private sector actors in power generation. Vietnam has achieved rapid electrification and averted major crises of supply, thanks to technically-sound power system planning with political leadership and follow-through by national institutions. A highly dedicated and trained workforce, and a sociopolitical emphasis on ensuring consensus among key actors in the power sector at each reform step, have contributed to continuous implementation of the power sector reform agenda, albeit at a relatively slow rate of institutional reform.

2 Vietnam’s power sector reform story

Over the past few decades, Vietnam’s power sector has developed around stable state-centric institutions and companies, gradually implementing the government’s sector reform agenda. Prior to the 1990s, state institutions dominated three geographically distinct grid systems in north, central, and south Vietnam. From 1994, as a national grid developed, corresponding institutions were consolidated, just as attention was increasingly paid to “socialist market economy” reform proposals. The government’s motivations for reforming the power sector from the mid-1990s were to ensure long-term reliable power supply in a manner efficient and affordable to users and to the government, with minimal spillover effects on the macroeconomy and on the distribution of wealth across segments of society. A key means to achieve these objectives has been to move from a centrally-planned monopoly to a power market with private sector investment in power generation capacity, and with multiple competing participants buying and selling power. From 2004, following the passage of the Electricity Law, competition and new market structures have been gradually introduced. The competitive generation market began full operation in 2012 and the wholesale electricity market is planned to begin full operation by 2021. Figure 1 summarizes the timeline of key electricity sector reform elements in the context of other country-level developments.

Figure 1: Timeline of key power sector reforms in Vietnam, 1970-2018



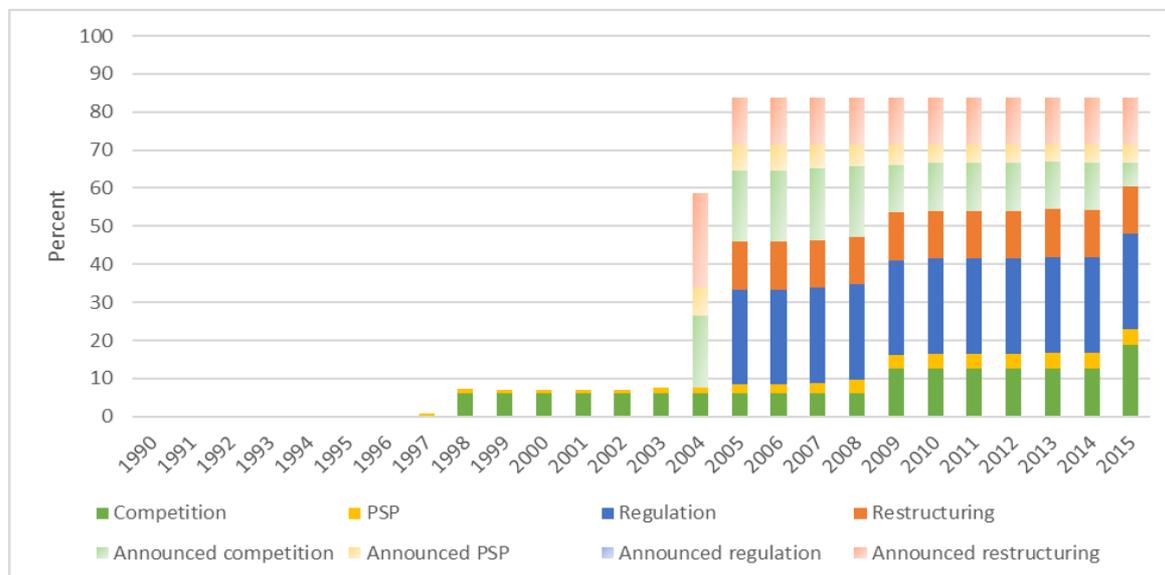
A simple index is used to assess the extent of Vietnam’s power sector reform on four dimensions: restructuring; regulation; private sector participation; and competition. These dimensions correspond to key elements of model power sector reforms advocated by the World Bank and others from around the 1990s.² This reform index does not intend to pass judgement on the value of reform, i.e. whether more reform is better or worse. Rather, the index is intended as a tool to measure the extent of reform in a standardized way to allow for comparison across countries and over time. Using this study’s index of zero (full state orientation) to 100 (full market orientation), Vietnam had a score of only 8 for implemented power sector reforms in 2003, which increased to a score of 46 in 2008. The score for announced reforms began at 59 in 2004 and increased to 84 in 2008 (Figure 2).

By 2015, the electricity sector can be described as 60 percent vertically unbundled, and 22 percent horizontally unbundled. The private sector participates in some generation but not in transmission or

² The index, developed for the Rethinking Power Sector Reform study, scores a power sector from 0 to 100 on each of the four dimensions of reform. The scores are based on giving equal weight to each step on each dimension of the reform continuum. The average of the four 0-100 scores is used to provide an overall summary of the extent of reform. See the annex for details. For a discussion of other elements associated with market reforms, and different ways to measure them, see Lee & Usman (2018).

distribution. Most corporate entities in generation, and all entities involved in transmission, system operation and distribution affiliated to the state-owned corporate group, Electricity Vietnam (EVN). While the regulator exercises certain authorities, the bargaining powers of market participants may not yet be fully equal in terms of dispatch, prices, volumes, and grid-connection conditions.

Figure 2: Index of announced and implemented power sector reforms for Vietnam 1990-2015



2.1 Pre-1990s: State-managed utilities in small, disconnected grids

For most of the twentieth century, Vietnam’s electricity industry was small and fragmented, serving a fraction of the population in urban areas. The country’s first power plants were constructed during the period of French colonial rule in the late nineteenth and early twentieth centuries. From the 1940s to 1991, development was hampered by intense local and regional conflicts tied to World War II (1939-1945) and the Vietnam War (1965-1973). Geopolitical divisions between the north and south led to separate power systems with different technical standards. The system in the north, around Hanoi, followed the standards of the Soviet Union. Meanwhile, power systems in the south, around Ho Chi Minh City (formerly Saigon) and the central city of Da Nang, followed standards of the United States. Public oversight of the various power companies (PCs) serving local areas was provided by the relevant ministry or department responsible for power, industry, coal, or irrigation. Electric power was generally unavailable to agrarian rural households, which constituted most of Vietnam’s population. In 1976, when the country was reunified as the Socialist Republic of Vietnam, only 2.5 percent of households nationwide had access to electricity.

Power sector development has occurred in the context of a highly centralized formal political system accompanied by formal networks that seek to achieve consensus. A key provision of Vietnam’s modern constitution, dating from 1980, is that the Communist Party of Vietnam (‘the Party’) is “the force that leads the State and society”.³ Party members participate in elections for the legislature, the National Assembly, which in turn elects the President, Prime Minister, and other office-holders of the executive and judiciary. Courts are subject to Party leadership and leaders hold office

³ See Article 4 of the 1980 Constitution of the Socialist Republic of Vietnam, which replaced the 1959 constitution of the former Democratic Republic of Vietnam. Subsequent versions of Vietnam’s constitution maintain an equivalent provision.

for up to two terms each of five years. From 1976 to the present, leadership transitions in Vietnam have been orderly and peaceful. Generally, Party positions provide strategic direction, which are concretized through government policy. Individual party members work to coordinate positions within and across bodies of the Party, state, and society.⁴ A norm of shared responsibilities means that no one ministry is held solely accountable for managing state assets.

From 1976 through 1994, Vietnam’s power sector featured three vertically-integrated utilities, each serving a distinct territory, under central government control. These utilities are known as the Northern Power Company (PC1), Southern Power Company (PC2), and Central Power Company (PC3). Each utility was responsible for generation, transmission, and distribution within their respective territories. No transmission infrastructure linked the systems. Each company was formally owned and managed by the central Ministry of Power and Coal, later reorganized as the Ministry of Power, then the Ministry of Energy. Sundry additional companies provided engineering, design, construction, manufacturing, and associated services, linked in various ways to the main power companies.

Informal local markets also existed for distribution and retail. These arose organically in coexistence with the state-owned enterprises, in different ways depending on the conditions of each locality, province, and region, especially in the rural electricity networks. Companies, cooperatives, and individuals would buy electricity from the power companies to sell on to end users. This ‘secondary market’ had no clear set of formal regulations, and prices were set locally.

In the 1970s and 1980s, power sector development focused on agriculture and industry, largely isolated from global market reform ideas. From 1975 to 1991, Vietnam was involved in continued regional conflict (the Third Indo-China War). Under a US-led embargo, trade and financial relations were severely restricted with many countries. The Soviet Union remained one of the few nations to continue contact with Vietnamese financial institutions during this period, though their associated aid also diminished in the late 1980s. The country’s political isolation meant that relations with many potential bilateral and multilateral donors, including the World Bank, were dormant.

Domestic political stability allowed for a focus on rebuilding national infrastructure, which was in a poor state. In the 1980s, the government started electrification schemes primarily for economic objectives by connecting hydropower resources with industries. Residential use of electricity in rural areas was largely a by-product of electrification focused on pumps to irrigate and drain farmland, especially rice fields and rural industries. By 1985, around 9 percent of all households had electricity, while average power consumption per person remained low (65 kWh/year, equivalent to little more than domestic lighting).

In response to a growing socio-economic crisis, sweeping reforms in the late 1980s and early 1990s shifted Vietnam from a centrally planned economy to a “socialist-oriented market economy”. Central planning implemented from the late 1970s to early 1980s led to hyperinflation and economic hardship, culminating in a far-reaching social and economic crisis by the mid-1980s. In 1986, a formal reform program, known as ‘Doi Moi’,⁵ was launched. It abolished key central planning structures, liberalized prices and, for the first time, officially accepted private enterprises, including foreign ones.

⁴ Vietnam’s constitution provides for promotion of “social consensus” in particular through an alliance of stakeholders called the Vietnamese Fatherland Front as the “political base of the people’s government” (1980 Constitution, Article 9). The exercise of constitutional provisions for freedom of speech, press, association, and assembly, is prescribed by law (1980 Constitution, Article 25).

⁵ The Vietnamese term *đổi mới* literally means “change (to) new” and is commonly translated as “renovation”.

State-owned enterprises were given more autonomy and output targets were at least nominally replaced with profit targets. In 1992, a new constitution abolished direct Party control of socioeconomic affairs, emphasized state-managed market mechanisms, and identified three forms of ownership: people; collective; and private. Foreign investors were granted rights to ownership and protection against nationalization. These reforms can be understood as a combination of selective responses by state leaders to various forces, some beyond their control, and not necessarily aligned with a grand design.⁶

While the Doi Moi reforms did not immediately concern the power sector, they laid the foundation for sector reforms to follow. The sector most immediately affected by the Doi Moi reforms was agriculture. This is unsurprising given it was the mainstay of Vietnam's economy at the time. One reason the 1980s reforms did not involve the power sector may be because electrification rates and consumption levels were so low at that time. Market reform ideas in the power sector did not really surface until the late 1990s, after the sector had already substantially developed.

The end of the Soviet Union in the early 1990s and resumption of economic relations with the United States in 1993 created opportunities for Western donor influence and capital market development in Vietnam. In 1993, multilateral lending resumed, though Vietnam and the World Bank had been in dialogue for some years. The absence of lending during this period has been later described as a "blessing in disguise", as knowledge could be built up and shared without any pressures to negotiate support for large infrastructure operations (Baird 2012).

In the early 1990s, the north had excess power generation capacity while the southern region suffered from serious power shortages. During the 1980s and 1990s, several large Soviet financed hydro power plants were completed in the north. As a result, the northern region began to record an excess of electricity. Several hydropower projects (e.g. Hoa Binh) and thermal power plants (e.g. Uong Bi and Pha Lai) were running below capacity due to low demand in the northern system. Meanwhile, in the south, a day of uninterrupted power would be followed by two- or three-day long outages. The government had to consider whether to sell excess power from the north to China or build a 500 kilovolt (kV) transmission line from the north to the south. Despite widespread skepticism (in and outside the country) over the feasibility, efficiency, and ambitious construction time of the project, the government approved the construction of the 500 kV line in February 1992. After 700 days of work to construct 1,500 km of cables across 14 provinces and cities, the 500 kV transmission line was inaugurated in May 1994.

2.2 1994-2003: Consolidation of state institutions with market reform debates

The development of Vietnam's national grid in 1994 shaped sector institutions and subsequently spurred rural electrification as well as massive increases in demand. The 500 kV transmission line can be considered one of Vietnam's most significant technical achievements and it has fundamentally shaped how the power sector has developed. Not only did the transmission line connect previously isolated systems, and thus improve reliability, it also created the necessary conditions for rapid expansion of rural electrification, especially in the south and central regions. The differences in grid

⁶ In different respects Doi Moi reforms were arguably "driven as much by bottom-up developments as by top-down models" (Painter 2014: 210). According to Hayton (2010: 4), leadership of reforms was "begun to protect the state sector, not to dismantle it" and the state's involvement has "remained consistently high throughout". Political elite have been selective in adoption of internationally prevalent reform ideas, and for all these reasons, reforms have had unintended effects (Gainsborough 2010, Fforde & de Vylder 1996).

technologies of north and south required a new, unified approach for the national system. To manage its operation, the National Load Dispatch Center (NLDC) was established in 1994, under the then Ministry of Energy.

In 1995, Electricity Vietnam (EVN) was established by merging the existing three regional power companies into a single national entity. At the time, EVN was owned by the state through the Ministry of Industry as the ministry then responsible for energy. In the same year, an Institute of Energy was established, as part of EVN, to be responsible for planning. EVN, the government, and the Party would maintain close interrelations, with many staff moving between the Ministry and EVN over their careers. Staff would require Party membership to reach mid-level and senior positions within EVN, and Party members would also play an active role through a coordinating committee in EVN, as is the norm for large Vietnamese organizations. These features are part of the structures by which consensus is maintained among key actors on designing and implementing sector reforms.

In 1996, work began to draft a new Electricity Law. Drafting was led by the Ministry of Industry, with a team including representatives from EVN and other ministries and government offices. Over the next eight years, some 25 versions would be prepared. Many international organizations gave technical and financial support during the drafting period. The World Bank invited international experts to share their experiences and financed visits to observe and to learn lessons from other countries, including in Europe, North America, and South America. The dialogue, as was the case for other areas of partnership at the time, involved a gulf between Vietnam's ideology and that of development partners, which led to both sides having to be flexible and open to new ideas.

In parallel to the drafting of the new law, incremental steps were taken to allow for private sector participation in generation and limited unbundling. Vietnam's first sizeable privately-owned coal-fired power plants were commissioned in 1996, totaling 720 MW of installed capacity. The next large-scale private-owned power project would not be commissioned until 2001. By 2003, the private sector invested about 1.5 GW of generation assets mostly in natural gas, diesel, and coal through private-financed build-operate-transfer (BOT) projects. Meanwhile, in 1999, the Prime Minister directed the separation of construction companies from EVN. In 2003, EVN was also restructured to prepare its generation assets for partial privatization, known as 'equitization' in the Vietnam context.

Government reluctance to accept higher market prices for new power generation hindered private sector investment. During the early 2000s, completion of some nine BOT projects was put in doubt due to protracted price negotiations. The lack of competitive bidding made negotiations challenging and time consuming. To fill the gap, the government mandated other SOEs, namely PetroVietnam (state oil and gas company) and Vinacomin (state coal company), to construct large coal- and gas-fired power plants. Around the same time, the World Bank advised the government to raise electricity tariffs to cost recovery levels, as tariffs were too low to allow EVN to buy electricity from unsubsidized suppliers. For details of tariff levels over time, see Section 3.4.

Broader economic policy ambivalence in a context of economic growth was a limiting factor on energy sector reform. Partly as a result of evolving market conditions and reforms, Vietnam experienced sustained rapid economic growth in the 1990s, driven by rapid industrialization and macroeconomic stability. The 1997 Asian Financial Crisis had little impact on Vietnam, as its financial markets were undeveloped. Notwithstanding economic growth over this period, Vietnam had a total of some 6,000 SOEs, mostly small, two-thirds of which had become unprofitable by 1997. Many relied excessively on debt, and for some SOEs, debt levels exceeded capital. Through the 1990s and early

2000s, there was deep disagreement within Vietnam's leadership as to the role of state-owned enterprises. In 2000, an Enterprise Law led to an increase in the number of private businesses. In 2002, Party members were allowed, for the first time, to engage in private business activities. Yet, official targets to partly or fully privatize 150 SOEs had made essentially no impact. The main resistance came from the SOEs themselves, reluctant to give up privileged access to credit, land, and contracts, despite benefits of flexibility from privatization.

2.3 2004-2008: Ambitious long-term reform plans take shape

The Electricity Law was passed in 2004 and set the framework for comprehensive sector reform. The law establishes market principles and requires the unbundling of EVN, diversification of generation ownership, and tariff reform, with a long-term vision of competitive markets. Some changes occurred soon after the law came into force in July 2005. In 2005, the Electricity Regulatory Authority of Vietnam (ERAV) was established, with responsibilities including to: set grid codes and standards; issue licenses and monitor compliance; review power sector plans and financing needs; advise on tariffs; and prepare and enforce regulations for competitive power markets. In 2006, by Prime Ministerial decision, EVN became a state holding company structured as a group of dependent non-revenue accounting units (cost centers) in generation and transmission, and nominally independent accounting units (profit centers) in distribution. The Electricity Power Trading Company (EPTC) was established in 2008 as a subsidiary of EVN responsible for purchasing all power.

In 2006, the Prime Minister also laid out a 20-year 'roadmap' for implementation. The roadmap sets out the gradual development of a competitive electricity market in three stages:

- *Phase 1: 2005-2014.* Competitive electricity generation market where multiple power generators compete to sell electricity to a single buyer, which on-sells to distribution companies.
- *Phase 2: 2015-2022.* Competitive electricity wholesale market to involve multiple generators selling power to multiple wholesale purchasers (i.e. distribution companies and large off-takers).
- *Phase 3: after 2022.* Permission would be granted for a competitive electricity retail market with up to 30 percent private sector participation in each distribution company.

The roadmap set out a deliberate and careful approach to rolling out reforms, designing each stage of the process as a pilot to test and refine details followed by full implementation. This approach reflects the high priority given by the government to gradual, consensus-driven change to avoid negative shocks to the economy and final consumers.

Economic turbulence affected reform progress in the short-term. Supply shortages loomed from 2005 to 2008 as demand grew at annual average rates of 12 to 15 percent. Added capacity could not keep pace with fast-growing demand. EVN's need for financial support was exacerbated by electricity tariffs that failed to cover investment costs and chronically lagged inflation, economic activity slowed markedly as Vietnam began to experience adverse effects from the global financial crisis. Amid global turmoil, Vietnam's export performance deteriorated sharply and foreign direct investment (FDI) inflows to manufacturing plunged, leading to a deceleration of output growth. The government devoted fiscal resources to stimulus measures, which further reduced the space to finance EVN. In this context, the government approved EVN's proposals for importing power from China and encouraging more foreign private investment in power generation. In addition, between 2005 and 2008, 3.3 GW of private sector financed coal, gas, and hydropower generation were commissioned, demonstrating the government's capacity to speed up private sector negotiations to meet potential supply shortages.

2.4 2009-2018: Gradual and continuous implementation of power sector reforms

Privatization plans proceeded slower than originally planned in parallel to other reform steps. In 2010, by Prime Ministerial Decision, EVN became a State-Owned Single Member Limited Liability Company. The Prime Minister set principles for unbundling generation with EVN, with the intention that most power plant companies would be privatized and become fully independent from EVN by 2014. EVN would retain ownership and operating control of three strategic multipurpose hydropower plants (SMHPs). However, from 2009 to 2010, EVN suffered financial stress, due in part to large foreign exchange losses as many power purchase contracts are denominated in US dollars and Japanese yen, and EVN was not permitted to hedge. Independence from EVN Group as the holding company was not possible without significant equity injection from the government. This led the government to defer the privatization of EVN’s three generation companies. Instead, between 2008 and 2010, several joint stock generation companies were formed with non-EVN SOE majority ownership and some with minority private participation. Meanwhile, in 2010, MOIT set the terms for standard power purchase agreements (PPAs), issued a new grid code, and moved the Institute of Energy from EVN to the Ministry.

By the end of 2018, EVN’s power plants accounted for 59 percent (28 GW) of total installed generation capacity, largely unchanged since 2010. Between 2010 and 2016, EVN partially divested 1.9 GW of thermal and hydropower generation capacity. In 2016, the government issued a policy discouraging SOEs from investing further in the power sector. In 2017, the Prime Minister approved a plan to ‘equitize’ EVN generation assets starting from 2018, with EVN holding at least 51 percent of the shares.⁷ The government would assess results after two years, with the aim of continuing to fully divest the state’s share in power generation. In February 2018, an attempted IPO for 16 percent of EVN Generation Company No. 3 was unsuccessful due to its high valuation and indebtedness. As of 2018, the three main generation companies, and SMHPs, remain fully owned by EVN, accounting for 60 percent of total domestic large-scale power generation, and other SOEs account for 13 percent (6 GW), while domestic and foreign private sector account for 27 percent (12.8 GW). See Table 1.

Table 1: Ownership of Domestic Large-Scale Power Generation in Vietnam, 2018

Owner	MW	Percent of total
EVN Corporate (strategic multipurpose hydropower plants)	8,720	18
EVN Generation Company No. 1	7,189	15
EVN Generation Company No. 2	4,495	9
EVN Generation Company No. 3	8,152	17
Vinacomin	1,715	4
PetroVietnam	4,262	9
Private and Joint Venture	8,854	19
Foreign Private Build-Own-Transfer (BOT) plants	3,976	8
TOTAL	47,363	100

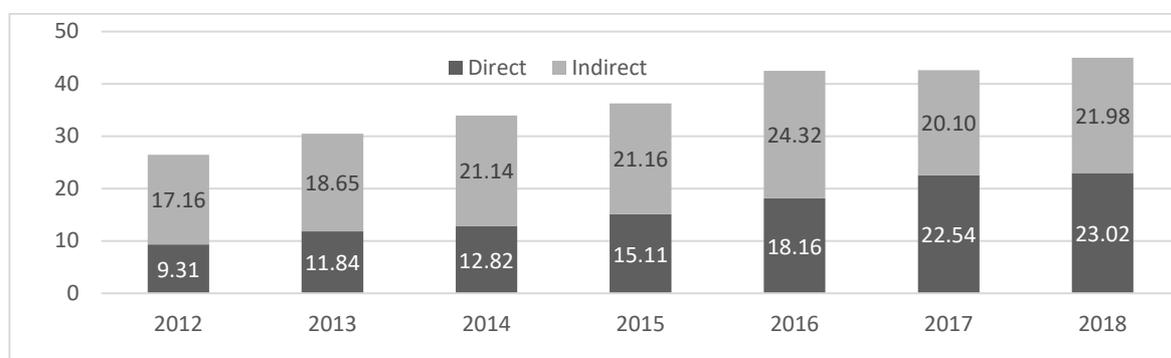
Source: NLDC. Note: Imports from China and Laos provide an additional 1,372 MW.

⁷ In 2017 the government also fully divested EVN Finance Joint Stock Company (JSC) and restructured other six specialized EVN subsidiaries for full divestment, including Thu Duc Electrical and Mechanical JSC, Dong Anh Electrical Equipment Corp., Binh Thuan Wind Power JSC, EVN Power Engineering Consulting Joint Stock Company No.3 (PECC3) and EVN PECC4.

Establishment of the Vietnam Competitive Generation Market (VCGM) occurred ahead of the planned privatization of EVN generation companies. In 2011, the VCGM was established as a pilot, followed by full operation in 2012 with direct participation of 9.3 GW installed capacity. The market design is based on an energy-only model from Australia. Market participants included EVN and locally-owned plants by other SOEs with installed capacity of 30 MW and above. Competition occurs through spot trading for the day-ahead and fixed-term contracts with the EPTC as the single-buyer. Strategic multi-purpose hydropower plants and some IPPs are ‘indirect participants’ where EPTC bids on their behalf. Indirect participants totaled 17.2 GW in 2012. Foreign-owned BOT plants have long-term power purchase agreements with EPTC and do not participate directly in the VCGM. All plants below 30 MW, mostly small hydropower plants, sell directly to distribution companies.

By 2018, direct participants in the VCGM grew to 23 GW, representing more than 50 percent of total installed capacity of large power plants in Vietnam. Figure 3 shows the growth of direct and indirect participation in the VCGM from 2012 to 2018. Excluding plants below 30 MW, a total of 149 power plants were operating in Vietnam in 2018, with a total installed capacity of 45 GW. Among these, 90 power plants with a combined capacity of 23 GW directly trade in the VCGM competing to get economically dispatched. Indirect participants totaled 22 GW. In 2018, NLDC reported that the total value of electricity traded through the spot market was US\$4.6 billion. With those generators bidding every day, every hour into a spot market competing to be dispatched has substantially improved operational efficiency of generators and their financial performance, contributing to keep generation costs lower than they would have otherwise. However, the VCGM has not yet served to set investment incentives for the private sector independent of long-term PPAs.

Figure 3: Capacity Traded in the Vietnam Competitive Generation Market (GW), 2012-2018



Source: NLDC

As the planned successor to the VCGM, the Vietnam Wholesale Electricity Market (VWEM), has been running in pilot ‘paper’ phase since 2016. In 2013, the government updated the roadmap to articulate a pilot phase of the VWEM from 2015 and full operation by 2021. Achievements to date include finalization of the market design, installation of relevant IT infrastructure for billing and settlement, and activities to build the capacity of market participants. The key feature of the VWEM is that large industrial consumers and PCs (i.e. distribution companies) can negotiate and contract directly with public and private generators. This provides further transparency in the market and stimulates competition among multiple buyers and sellers. Once the VWEM is implemented, EVN will lose its status as a single buyer. The spot market will initially operate on an hourly basis and be eventually reduced to 30-minute trading intervals. In 2018, MOIT approved the detailed VWEM market rules and key market features. These include: (i) gradual transition from cost-based to price-based pool model;

(ii) all generators larger than 30 MW must directly participate in market; (iii) BOT plants directly or indirectly (via BOT trader) participate in market; and (iv) all PCs must buy energy from the market to meet customer demand.

Distribution-level reforms have involved centralization and increased state-ownership ahead of planned future participation in markets. In 2010, EVN consolidated its 11 distribution companies into five power companies (PCs) responsible for the grid up to 110 kV across the areas of North, Central, South, Ha Noi and Ho Chi Minh City (HCMC). The aim was to create distribution companies of similar size and customer mix to be ready to become viable buyers in the wholesale market. As part of this process, EVN reversed its partial privatization of one distribution company and took control of many local distribution utilities (LDUs) that were not previously affiliated with EVN. The power sector reform roadmap updated in 2013 proposed a pilot phase of retail competition in 2021 followed by full operation by 2023. From 2021 onwards, the PCs are to conduct separate accounting for their distribution and retail businesses to prepare for retail competition.

While some reform elements have been delayed, the government's overall commitment to long-term reforms remains intact, and efforts to ensure transparent and efficient operation of power sector markets are ongoing. The main structure of Vietnam's energy sector today is depicted in Box 1, showing the overall responsibility of the Ministry and other institutions in the sector. The unitary ownership of EVN's fully-owned subsidiaries across the supply chain entails a risk of discretionary behavior towards suppliers, where priority is given to EVN's own power plants or to partners with which it has privileged relationships. Whereas the single-buyer, EPTC, remains under EVN until the wholesale market becomes operational, EVN arguably benefits from high bargaining power for prices, volumes, and grid-connection conditions. However, significant changes are planned to the power sector structure and the role of EVN to introduce efficient wholesale competition. This includes the establishment of an independent System and Market Operator (SMO), and competitive bidding for new generation. According to government plans, NLDC will function as an independent SMO and be converted to an independent accounting unit of EVN by 2021. By 2025, the SMO will be fully separated from EVN, while remaining under government control. The PCs, and the National Power Transmission Company (NPT), established in 2018 as a 'reunification' of various regional subsidiaries, PCs will remain under full public ownership. Current plans do not provide for third-party access to the transmission and distribution network. However, the Prime Minister has instructed EVN to review private sector participation opportunities in network infrastructure development.

Box 1. Vietnam's power sector institutions as of 2018

Ministry of Industry and Trade. Responsible for management of the energy sector both as line ministry and as ministry with oversight responsibility of state-owned energy enterprises.

National Load Dispatch Center (NLDC). Established 1994. Functions as market and system operator for the wholesale market. Expected to be converted to an independent accounting unit of EVN by 2021.

Electricity Vietnam (EVN). Established in 1995 as a vertically integrated state-owned corporation responsible for Vietnam's power sector. EVN now serves a holding company for the three generation companies, single buyer, system operator, transmission company, and 5 distribution companies.

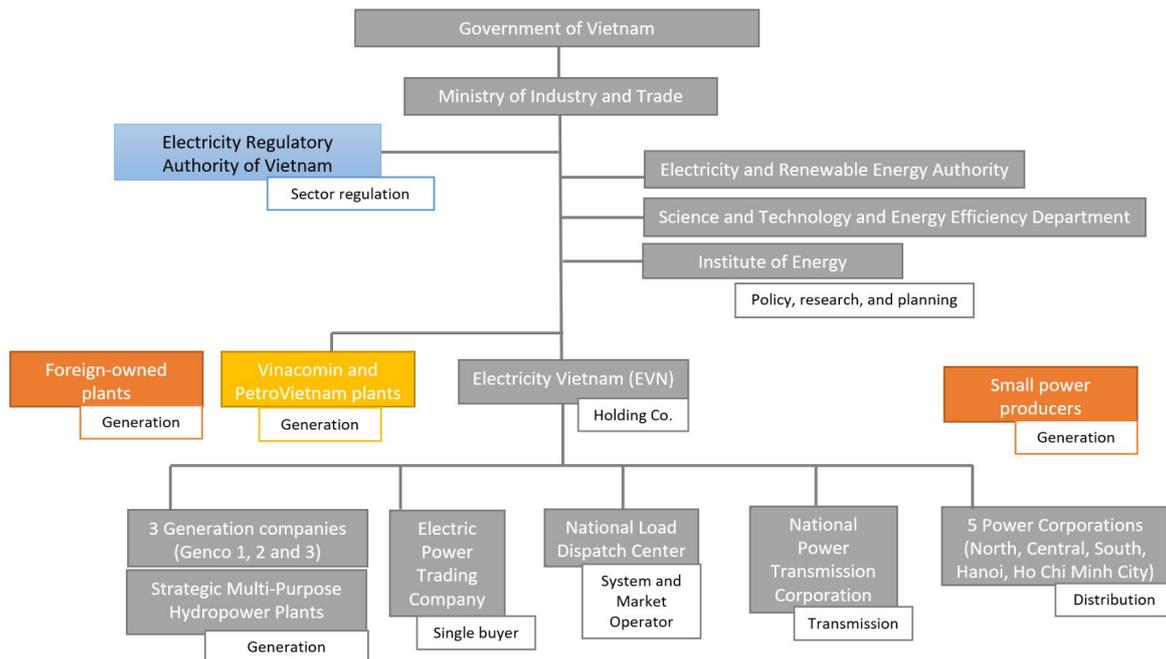
Institute of Energy. Established 1995, first as part of EVN then moved to the Ministry in 2010. Researches national energy strategies, policies, and development plans.

Electricity Regulatory Authority of Vietnam. Established 2005. Responsible for developing regulations to implement and regulate competitive power markets, as well as monitoring electricity tariff review and tariff setting.

Electric Power Trading Company (EPTC). Established in 2008 as a subsidiary of EVN responsible for purchasing all power.

Electricity and Renewable Energy Authority. Established 2017 from the former General Directorate of Energy. Responsible for energy policy development, including renewables, oil, gas and coal and power system planning.

National Power Transmission Corporation (NPT). Established in 2018 from 'reunification' of various regional EVN subsidiaries.



3 Performance and institutions of Vietnam's power sector

It is important to consider Vietnam's power sector reform experience in the context of its sector performance and institutions. This section describes how Vietnam's power sector performance changed from 1990 to 2018 in four main aspects:

- (i) security of supply;
- (ii) access and affordability;
- (iii) utility efficiency and financial viability; and
- (iv) regulation, with a focus on tariffs and cost recovery.

Each dimension of performance includes a discussion of accompanying institutions and the extent to which reforms, or lack thereof, help explain how performance has evolved.

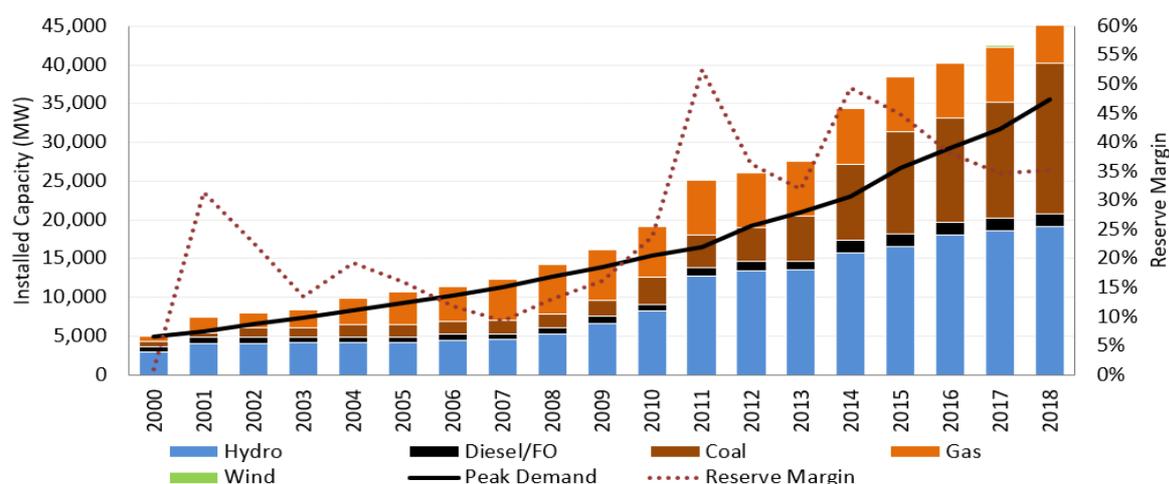
3.1 *Security of Supply*

3.1.1 *Performance*

Until recently, Vietnam was mostly self-sufficient in electricity production, drawing on domestic gas and coal fields and abundant hydropower resources. From the late 1990s, hydropower, coal- and gas-fired power generation increased rapidly to meet fast growing demand. In 2005, Vietnam became an importer of electricity, signing its first power import contract with China. Since then it has remained a net importer, despite exporting power to Cambodia since 2009. However, the amount traded is only a relatively small share of national demand. As of 2018, electricity imports from China and also from the Lao People's Democratic Republic together comprised less than 3 percent of total energy demand (Table 1, page 12). Use of renewables other than hydropower has been negligible to date. However, Vietnam is planning to rapidly build solar and wind power capacity to reach respective targets of 12 GW and 6 GW by 2030.

Vietnam has averted major, ongoing power supply crises faced by other developing countries mostly due to good power system planning and government commitment. Demand for electricity in Vietnam has grown exponentially since the 1990s, at annual rates of 12 to 17 percent up to 2010, and 10 to 12 percent since then, often higher than the economic growth rates. This has been driven largely by electrification of households as well as industrialization, with relatively little attention paid to demand side management. Vietnam has an energy-intensive economy. The main response to periodic concerns of looming shortages has been spurts of rapid capacity expansion by government approving critical generation and network investment projects and speeding up internal approval processes. From 1990 to 1997, capacity more than doubled from 2 to 4.8 GW, almost entirely led by the state. The first major private power plant was commissioned in 1996, and since then IPPs have contributed about 14 percent of total installed capacity, covering all technologies available in Vietnam from small hydro to coal. Since 2001, supply has well exceeded demand. Capacity increased to almost 20 GW by 2010, then rose precipitously to over 45 GW by 2018 (Figure 4). As demand continues to keep rapidly grow, some analysts predict a supply crunch in coming years unless planned supply projects are expedited in parallel with demand-side management.

Figure 4: Installed generation capacity and system-wide reserve margin, 2000-2018



Source: IES

Falling marginal reserves and seasonal outages contributed to the push for reforms from 2004 to 2010, while pressure waned as reserve margins increased after 2010. A key factor in the decision to import power from China in 2005 was serious shortages resulting from drought conditions in northern Vietnam, accompanied by insufficient domestic capacity in other power sources. In 2008, despite an annual average reserve margin of 25 percent, the power system was occasionally operated with an hourly operational reserve as low as zero due to tight supply.⁸ Cumulative load shedding in 2008 was equivalent to 0.9 percent of annual power consumption. The same year, a shortage of 1.2 GW was forecast for 2010, with an estimated US\$ 4-6 billion/year investment needs. Demand growth temporarily slowed to 10 percent per year in 2008 but picked up again from 2009. Drought in 2010 led to notably reduced hydropower output, compensated by an increase in output from fossil fuels. In 2010, hydrological conditions led to 181 outages, and cumulative load shedding was equivalent to 536 GWh or 0.7 percent of annual power consumption. There has been a significant increase in the reserve margin since 2010 through the commissioning of new generation plants. As of 2018, the national reserve margin was 35%, with most reserve located in the central region (Table 2). However, electricity supply and demand, especially in the south, can become tight at times due to: (i) seasonality of hydro inflows; and (ii) transmission constraints, particularly between north and central Vietnam.

Table 2: Total Installed Capacity, Peak Demand, and Reserve Margin in Vietnam by Region, 2018

Region	North	Center	South	All Vietnam
Total installed capacity (MW)	22,060	7,246	18,805	48,111
Peak demand (MW)	18,237	3,900	15,790	35,595
Reserve margin (expressed as share of peak demand)	21%	86%	19%	35%

Source: IES

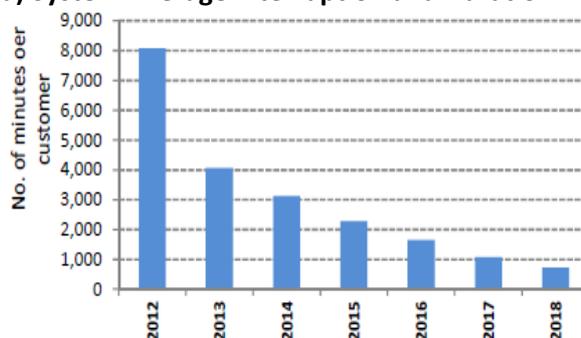
The technical performance of Vietnam’s power system has significantly improved since the 1990s. Current total transmission and distribution losses are 7.6 percent, which is low compared to similar countries and systems. This reflects the strong operational performance and capacity of EVN and its

⁸ Reserve margin refers to available generation capacity above the capacity needed to meet peak demand.

transmission and distribution subsidiaries. The quality of service in electricity supply to consumers has steadily improved with less frequent power interruptions with lower duration (Figure 5).

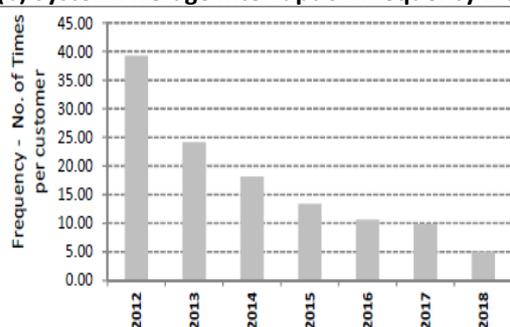
Figure 5: Improvement in power system performance

(a) System Average Interruption and Duration Index



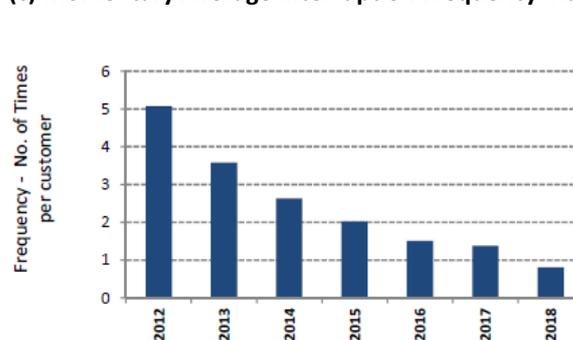
System Average Interruption and Duration Index (SAIDI) is the average outage duration per each customer served over a 1-year period, measured in number of minutes per customer

(b) System Average Interruption Frequency Index



System Average Interruption Frequency Index (SAIFI) is measured in units of power interruptions per customer (includes momentary interruptions and brownouts). It is usually measured over the course of a year

(c) Momentary Average Interruption Frequency Index



Momentary Average Interruption Frequency Index (MAIFI) is measured in units of momentary power interruptions (1 minute or less than 5 minutes) per customer. It is usually measured over the course of a year

Source: National Load Dispatch Center (NLDC), EVN

3.1.2 Institutions

Vietnam's power sector plans benefit from a strong technical planning culture, with a high degree of compliance as the plans are treated as authoritative. Using specific indices developed for this study (see Annex tables B and C), generation plans are rated 71 percent and transmission plans 100 percent in terms of good practice factors for success (Table 3). Vietnam has a clearly identified entity with functional responsibility and technical competence to produce least cost power generation master plans. Master plans for all types of energy are prepared by the Institute of Energy (from 1995-2010 under EVN, then under MOIT). EVN and its subsidiaries treat the plans as mandatory government directions for investment decisions. Plans thus lead to timely initiation of power procurement to minimize the possibility of power shortages. The plan is reviewed and revised every five years and occasionally updated.

However, the planning process has limited transparency and participation of non-government and non-energy stakeholders. Transmission planning in Vietnam is treated primarily as a technical exercise as a sequel to the generation Power Development Plan (PDP) which is, by and large, seen as mandatory. The transmission planning process is relatively open to inputs from generators, consumers, or other relevant stakeholders at least compared to generation planning. Nevertheless, generation and transmission plans are well integrated. Once the PDP is formed, the generation plan forecloses most of the options for a transmission plan. While there is no specific inter-ministerial

committee that oversees the unit responsible for the plans, the Institute of Energy draws on parallel plans for gas, coal, and industrial sectors (e.g. steel) as inputs. After internal government consultation, power system plans are formally approved by a Prime Minister Decision.

Table 3: Institutional arrangements for power sector planning and procurement in Vietnam and comparators, 2015

	Colombia	Peru	Philippines	Vietnam	International benchmark
Planning and procurement	95%	77%	59%	59%	70%
Generation planning	86%	43%	71%	71%	56%
Procurement of generation	95%	90%	100%	50%	85%
Transmission planning	100%	75%	50%	100%	72%
Transmission procurement	100%	100%	17%	17%	64%

Note: Scores based on index developed for the Rethinking Power Sector Reform Project, where 100% denotes good practice. For detailed planning and procurement index, see Annex.

Wholesale markets would change the role of generation planning. The current approach to transmission planning is expected to continue following the proposed full implementation of the competitive wholesale electricity market from 2021. The future role of generation planning following the introduction of a wholesale market at this stage is less clear. The PDP to date is based entirely on the premise of a central planner and does not conform to the view of a market. In principle, as the sector departs from the single-buyer model in the future, generators will independently contract with the PCs, not with EPTC. Furthermore, PCs decisions should be guided by current and projected wholesale market prices, which may vary from the plan. If so, the generation plan should become indicative or informative, rather than being mandatory as it has been interpreted to date.

Vietnam’s institutions for power sector procurement have been assessed as relatively weak, especially for transmission. However, this is not the case where ODA funding is concerned. In terms of procurement, generation is rated 50 percent and transmission plans 17 percent in terms of good practice factors for success (Annex Table B). Vietnam lags some countries in the creation of a specific framework for procurement of new power generation plants or new transmission lines. International competition is allowed for entry of new generation, but not public auctions or unsolicited bids (as the latter two methods have been associated with corrupt practices). All investment projects in transmission facilities are most often awarded to the incumbent transmission company as this is seen to be an efficient process particularly when the incumbents are providing satisfactory services.

3.2 User access and affordability

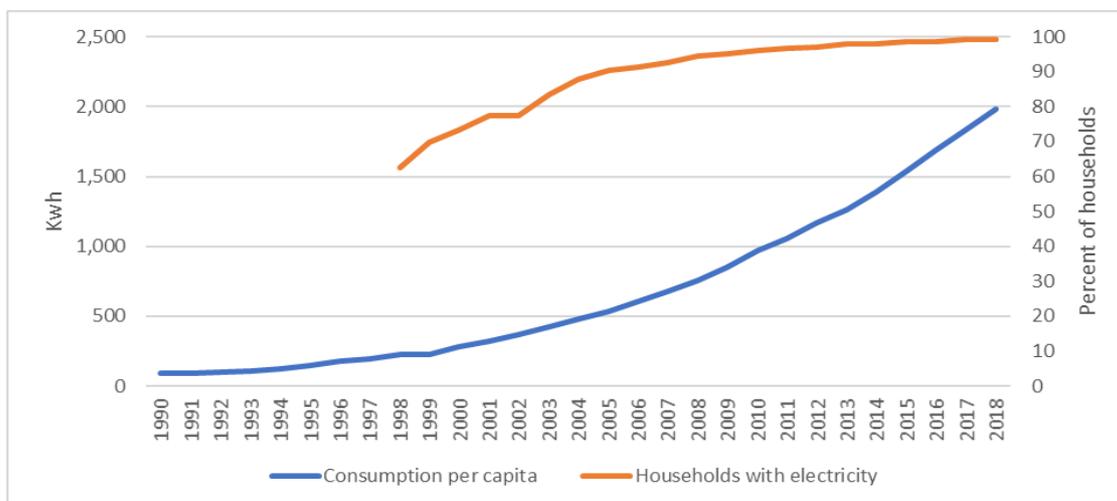
3.2.1 Performance

Vietnam achieved high rates of access to electricity, well before embarking on market reforms. In 1990, the share of households with a grid electricity connection was less than 14 percent. By 1996, the household grid electrification rate had reached 61 percent. By 2005 when the Electricity Law was promulgated, the rate was 87 percent. Universal access was reached around 2011 (Figure 6).

Electricity consumption per capita has increased rapidly. Average per capita electricity consumption in 1990 was less than 200 kWh/year, which was enough only for general lighting and a few low-power appliances. By 2015 it had reached 1400 kWh/year and by 2018 it had reached 2100 kWh/year, enough for high-power appliances such as air-conditioning units. Vietnam’s economy is energy-

intensive, with most electricity demand from industries. However, average electricity consumption per person remains relatively low (e.g. 1/3 of the level in China).

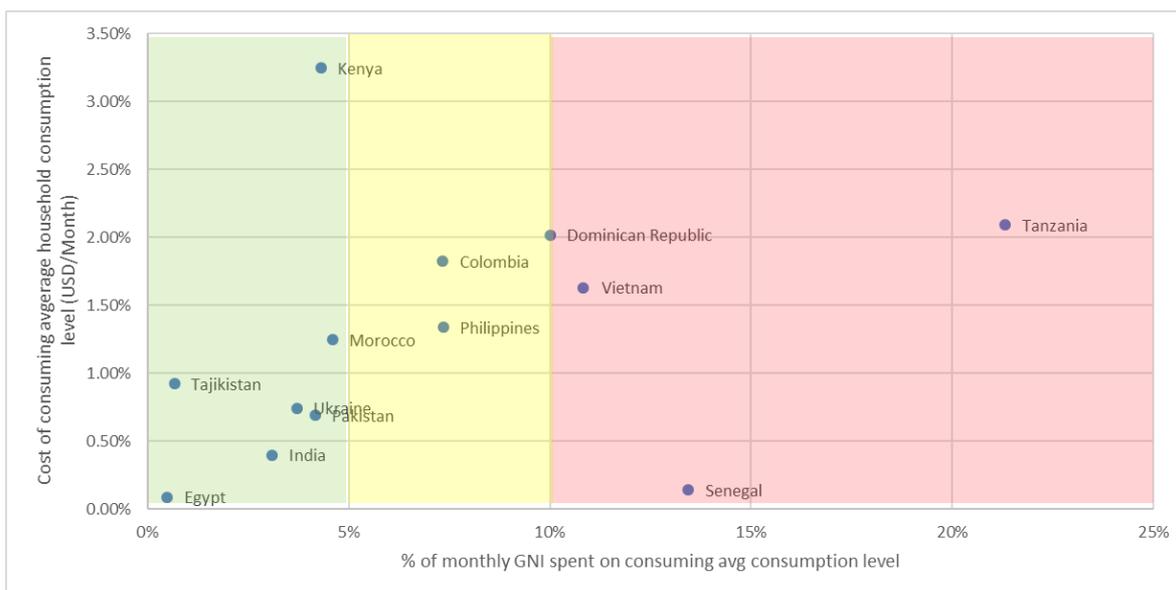
Figure 6: Vietnam electricity user access rate and consumption per person 1990-2018



Electricity has become relatively expensive for Vietnamese households, while industrial tariffs are low by regional standards. According to analysis based on 2016 data (RISE), average household consumption was 174 kWh/month, equivalent to an annual expenditure on electricity of US\$ 156. Households in the bottom 40 percent of Gross National Income had an income of US\$ 1,444, so that to purchase the national average consumption of electricity, households would need to spend 10.8 percent of their income. This is at the high end of affordability compared with international benchmarks (Figure 7). Vietnamese consumers are sensitive to electricity tariffs and increases. Industrial users, in contrast, enjoy electricity tariffs that are on average lower than households and remain at one of the lowest levels in Asia, while noting that the industrial tariff structure does differentiate peak and non-peak power.

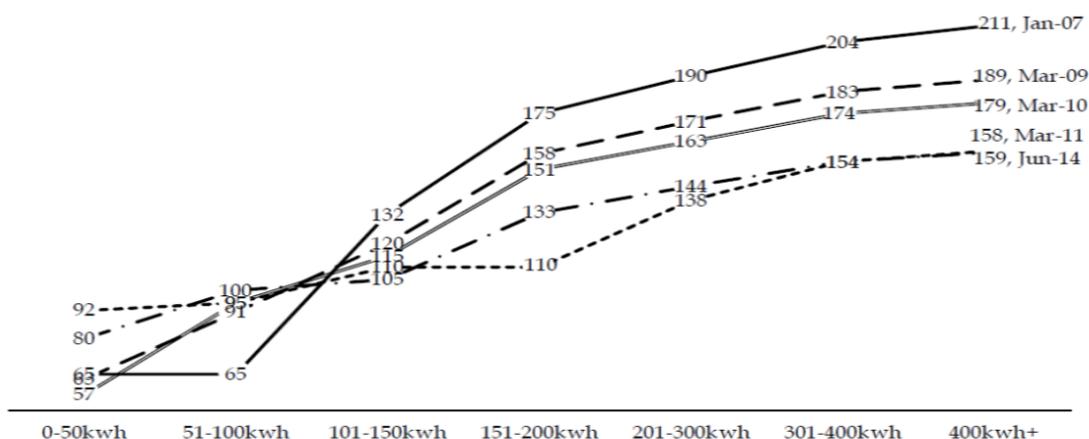
Measures to protect low-income households from high electricity costs include low base rates and cash transfer schemes, which are generally considered effective. Prior to 2014, low-income groups in grid-connected areas were charged at a low ‘lifeline’ rate for a maximum 50 kWh/month (suitable only for low-power appliances), outside the incremental block tariff design that applied to all consumers. From 2011, such users also received a monthly cash transfer of VND 30,000 (US\$ 1.5), while people in off-grid areas received cash for fuel. In 2014 the lifeline rates were eliminated, and cash transfers were increased to a sum equivalent to the cost of 30 kWh/month, and the block tariffs scheme was made considerably less progressive, as shown in Figure 8. Funds to support the cash transfers come from the State budget.

Figure 7: Affordability of average consumption level in Vietnam, 2016



Source: RISE, 2018. Two measures are used: 1) a lifeline measure used for lower income countries (bottom 40 percent households should not spend more than 5 percent of income to consume 30 kWh/month); and 2) a measure for countries in the middle-income tier (bottom 40 percent households should not spend more than 5 percent of income to consume at the national average consumption level).

Figure 8: Changes in Vietnam residential electricity incremental block tariffs, 2007-2015



Notes: Vertical axis: % of average retail tariffs

Horizontal axis: blocks of total monthly consumption with an increasing unit price

Lifeline tariffs for low-income households between March 2011 and June 2014 are not shown in this figure. For each period, they were lower than the tariffs in the 0-50kWh/month bracket

Source: Long (2017: 10)

3.2.2 Institutions

Institutional factors underpin successes and challenges associated with Vietnam’s rapid expansion of grid connections through the 1990s and 2000s. Rural electrification was initially hindered by a lack of capital and of an effective regulatory framework and technical standards. Most rural electricity distribution was carried out by commune-level electricity groups that had no legal status, minimal technical competence, and little financing. From an institutional perspective, EVN’s status as the single dominant sector entity with units in each district of the country facilitated a national approach. In 1995, when the three regional electricity companies managed by the power ministry were merged

and EVN was established, rural electrification for households became an explicit mandate of EVN with high-level backing from the government. Government saw electrification not only as a social imperative, but a means to facilitate productive activity and thereby increase the tax base. As a state-owned enterprise, EVN was able to overcome profitability barriers that may otherwise have inhibited commercial financings of rural electrification. Government supported off-grid systems such as small hydro for remote areas, tapping into the country’s abundant natural resources. The electrification program also had concerted support from local government authorities as part of a comprehensive rural development program.

Vietnamese people placed a high premium on electrification. This can be seen in terms of high willingness to pay for electricity, above that for roads, schools and health care. Household and local government contributions to electrification costs in the period 1996-2000 exceeded EVN’s contribution at a ratio of 60:40. Community support for electrification also allowed quick resolution of issues like right of way for new infrastructure.

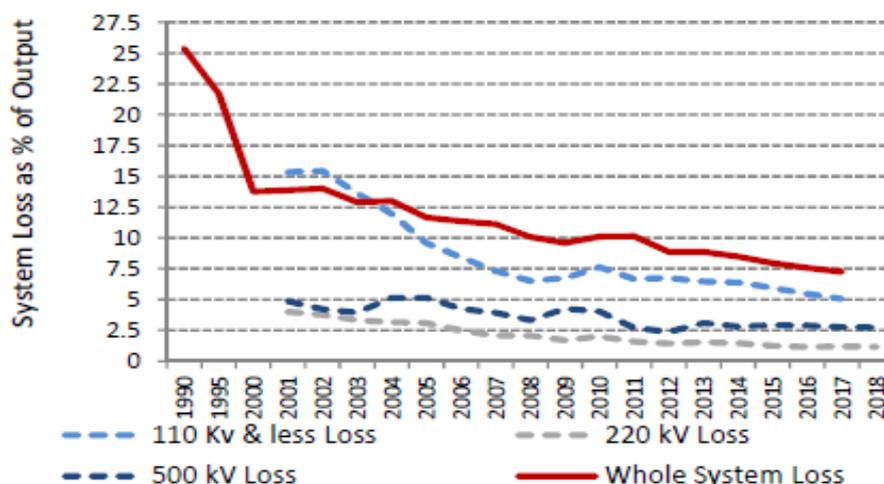
Institutional arrangements to ensure that poor households can afford electricity are characteristic of Vietnam’s planned approach. Electricity prices are decided either by the Prime Minister or MOIT. Cash transfers have been managed by the Ministry of Labour, Invalids and Social Affairs (MOLISA). EVN administers the pricing schemes and provides household electricity consumption data necessary to identify recipients of cash transfers.

3.3 Supply-side efficiency & financial viability

3.3.1 Performance

Rapid expansion of Vietnam’s power system was accompanied by significant system losses and grid constraints at different voltage levels, with varying success to reduce them over time. System energy losses (across all voltage levels) were 25 percent in 1990 and improved rapidly during the 1990s as the sector became consolidated nationally. From 2000 to 2004, loss rates stayed around 15 percent, before improving gradually to 10 percent in 2012 and 7.6 percent in 2017 (Figure 9). Most losses have occurred at distribution level (Table 4). Improvements in distribution efficiency benefited from targeted investment projects financed by various donors, including the World Bank.

Figure 9: Transmission and distribution system losses in Vietnam, 1990-2017



Source: NLDC

Table 4: Technical efficiency indicators for Vietnam’s distribution power companies, 2011 to 2017

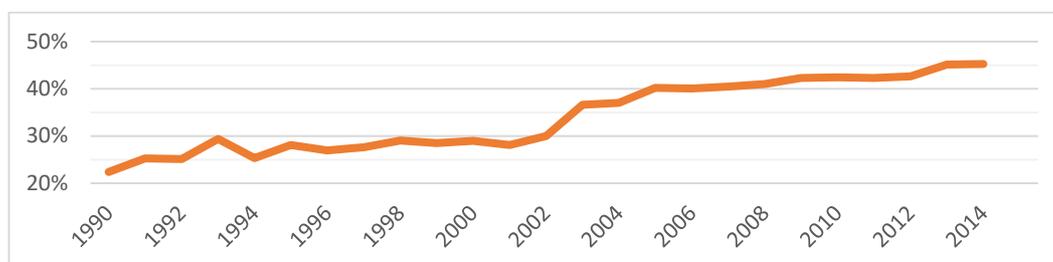
		Unit	Target Values			Values as of Dec 2017
			2011	2015	2018	
SAIDI	NPC	Minutes	5145	4947	4656	1826
	CPC		3631	3436	3234	2117
	SPC		6958	5871	5525	777
	HCMPC		1682	716	384	130
	HNPC		299	296	291	268
SAIFI	NPC	Times	19.8	19.2	18.65	14.91
	CPC		23.53	22.26	20.95	5.72
	SPC		24.3	22.9	21.6	3.235
	HCMPC		7.62	3.82	2.5	0.93
	HNPC		1.73	1.7	1.67	1.63
Voltage fluctuation*	NPC	Times/Year	60	52	40	42
	CPC		0	0	0	0
	SPC		25	10	4	4
	HCMPC		0	0	0	0
	HNPC		0	0	0	0
Distribution losses	NPC	Percentage	24.38	16.59	11.39	11.06
	CPC		13.58	11.67	10.39	4.87
	SPC		10.24	8.66	7.6	4.44
	HCMPC		7.86	6.44	5.5	3.72
	HNPC		19	14.8	12	9.9

* Voltage fluctuations outside +/-5 percent at 110 kV/MV transformers in project areas

Source: World Bank (2018).

Efficiency of thermal power plants has increased from 22 percent in 1990 to 45 percent in 2014. See Figure 10. Installed thermal capacity is only partly used to balance the variability of hydropower. Generation companies show high capacity factors but low load factors especially for coal and gas (<53 percent in 2011-2012).⁹ Suggested reasons for low load factors include low capacity in the 500 kV north-south transmission line, and high reserve generation requirements related to either security or cycling requirements. EVN expects a shift towards relatively more gas- and coal-fired generation, which would increase load factors as less reserves are needed to manage fluctuating hydrological and variable renewables conditions.

Figure 10: Thermal efficiency of fossil-fuel power plants in Vietnam, 1990-2014



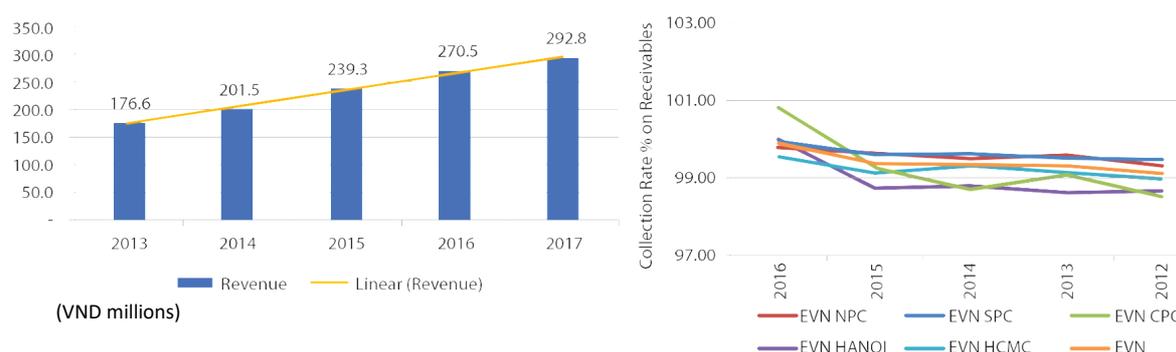
⁹ Capacity factor is total output divided maximum theoretically possible output for a given year (or other period). Load factor is average load divided by actual maximum load, for a given year (or other period).

Until NPT, PCs, and the generation companies were corporatized, the financial performance of EVN's subsidiary companies were not independent of each other or of the holding company. EVN headquarters allocated assets and liabilities to subsidiaries and managed cash flow centrally. As such, the subsidiaries operated under considerable financial constraints: tariffs were low, and the companies had limited equity. EVN charges distribution companies for bulk supply of power at a bulk supply tariff. The bulk supply tariff may be adjusted to account for differences in costs across the PCs and EVN's other subsidiaries. For example, losses originating from EVN Holding may be assigned to the PCs. As a result, the PC's financial performance is not independent of EVN and its other member companies. This approach enables the National Uniform Tariff to be maintained and equalizes key financial performance indicators of each subsidiary. This effectively means that distribution companies cross-subsidize each other. However, this practice has gradually changed and to date, EVN subsidiaries are corporatized with their own balance sheets responsible for raising financing and managing their business. However, the bulk supply tariff regime for PCs still exist and the government plans to revise it to ensure the functioning of the wholesale electricity market.

EVN's financial position has variously swung from periods of loss to profitability, based on internal and external factors. To assess the overall financial performance of EVN as a holding company, several key financial indicators are relevant, including (i) annual revenues; (ii) solvency/liquidity; (iii) profitability; and (iv) debt service. From 2008 to 2011, EVN's annual net operating margins were negative and debt grew three-fold. Positively, EVN reduced the time needed to collect revenue by around 20 percent, from 84 to 68 days. However, PCs earned barely enough revenue to cover their operating costs. In 2010 and 2011, significant financial losses occurred chiefly due to several factors. First, low rainfall caused a temporary shift away from lower cost hydro to more expensive thermal. Second, there was a substantial devaluation in the Vietnamese Dong against EVN's major borrowing currencies (Japanese yen and US\$). Tariffs were not increased in such a way as to compensate for either of these factors (see section 3.4). In 2012, good rainfall levels as well as three increases in tariffs each of 5 percent over 18 months lead to a net operating margin of 13 percent. In 2013, profitability was maintained, as tariffs increased 5 percent, and foreign exchange losses were minimal.

Since 2013, EVN's financial position has improved substantially, gradually becoming a profitable entity. EVN's annual revenues increased significantly from 2013 to 2017. Revenues, of which revenues from electricity sales accounted for 98 percent, increased between 8 to 19 percent per year (14 percent in 2014, 19 percent in 2015, 13 percent in 2016, 8 percent in 2017). Annual revenues increased from US\$ 8.4 billion (VND 177 trillion) in 2013 to US\$ 13 billion (VND 292 trillion) in 2017. Tariff as well as electricity demand increases were the major contributors for the large revenue increase. Tariff collection is one of the key credit strengths of EVN and its subsidiaries, the five power companies. Average collection rates against receivables have improved progressively from 2012 to 2016 and ranged between 98 and 100 percent for all five PCs. See Figure 11.

Figure 11: Annual revenues and collection rate for EVN, 2012-2017

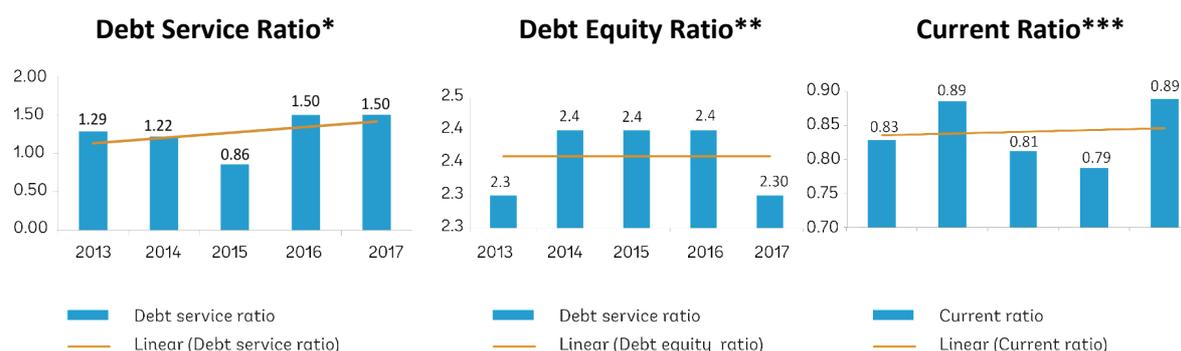


Source: EVN.

By standard measures EVN is financially solvent though EVN assets are illiquid. On solvency, EVN's debt service ratio fluctuated in the period 2013–16. Starting at 1.29 times, it sharply fell in 2015 to 0.86 times, mainly due to the impact of FOREX losses of VND 13 trillion that year, before increasing again to 1.5 times in 2016 (with FOREX losses VND 5 trillion) and continuing around this position in 2017 (while FOREX losses were VND 3 trillion). Ratios above 1 indicate that EVN earned enough income to meet the requirement of interest and principle payment, but this ratio is highly vulnerable to FOREX risk. Meanwhile, the debt equity ratio has been consistently maintained at around 2.4 times, which is an acceptable level in the energy sector. However, the current ratio, indicating EVN's liquidity, has been below 1 from 2013–17, indicating that current assets are insufficient to cover current liabilities. See Figure 12. EVN's cash flow from operating activities has been positive and increased year by year from 2013 to 2017.

EVN has been generally profitable since 2013 with some fluctuations as measured by returns on sales and gross profit margin. During the five-year period, gross profit margin recorded a peak of 18 percent in 2013 and maintained a stable level from 13 to 14 percent in 2014, 2015, 2016, and 2017, indicating the stability in the electric production process. Returns on sale, however, declined from 11 percent in 2013 to 4 percent in 2014 due to dramatical fluctuations in FOREX gains and losses as a result of the absence of suitable hedging instruments in the country. The situation became even more serious in 2015, when EVN recorded a FOREX loss of VND 13 trillion, making a total loss of VND 5 trillion. In 2016, the FOREX loss was reduced by VND 8 trillion to VND 5 trillion, and remained at VND 3 trillion in 2017, helping the entity generate a net profit after tax of VND 1.4 trillion and VND 3.7 trillion for 2016 and 2017, respectively, as well as returns on the sale of 1 percent for the last two years of the analysis period. See Figure 13.

Figure 12: Financial ratios for EVN, 2013-2017 with linear trend



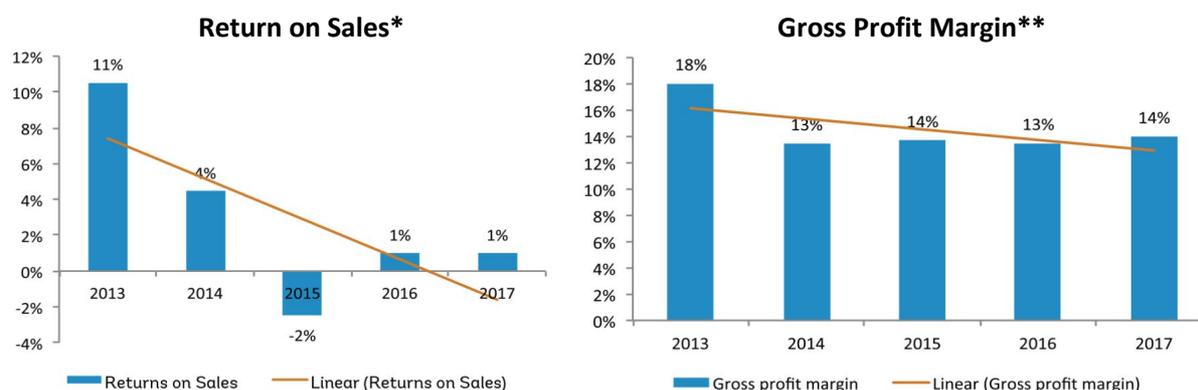
Source: EVN.

* Debt service ratio: A solvency ratio calculated as Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) divided by loan and lease principle and interest payments.

** Debt equity ratio: A solvency ratio calculated as total debt divided by total shareholders' equity.

***Current ratio: A liquidity ratio calculated as current assets divided by current liabilities.

Figure 13: Profitability for EVN, 2013-2017 with linear trend



Source: EVN.

*Return on sales: Profitability ratio calculated as net profit after tax divided by sales.

**Gross profit margin: Profitability ratio calculated as gross profit divided by sales.

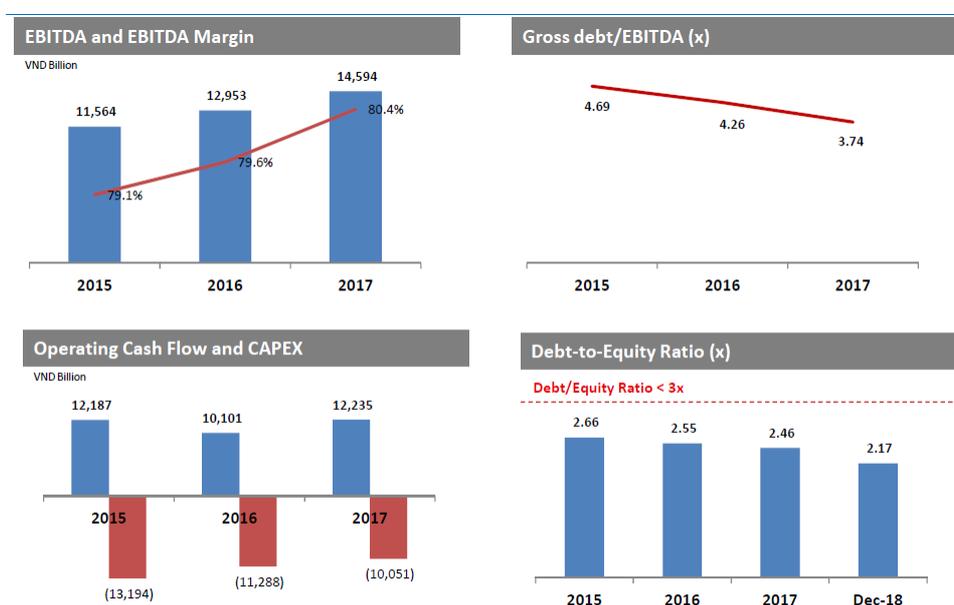
Overall, EVN has been a profitable company in recent years, with strong and growing revenues, debt equity ratios, and a stable gross profit margin. The biggest financial challenge EVN faces is how to manage its exposure to foreign exchange risks, which impact the debt service ratio as well as its bottom line. Although it would be costly for EVN to explore hedging instruments with international banks, it is a recommended solution to stabilize the foreign exchange risks for a corporation whose international borrowing is its main source of asset financing. In addition, the combination of raising generation costs and the erosion of real average electricity tariffs has put EVN in a challenging financial situation moving forward. EVN received its first credit rating in June 2018, from Fitch Ratings: 'BB' rating with a stable outlook, equal to Fitch's credit rating of Vietnam as a sovereign nation given the strong links between EVN and the state (Fitch Ratings 2018). Fitch Rating Agency upgraded both the sovereign rating as well as the EVN rating to BB with a 'positive' outlook May 2019. Overall, EVN's average borrowing rate has come down from 7.84 percent in 2010 to 4.41 percent in 2016.

The subsidiary power companies perform generally well on financial and technical indicators, with some improvement over time. EVN's subsidiaries in transmission (NPT) and distribution (PCs) have generally strong operational and technical performance and are well managed. All PCs generated

positive net cash flows from operations between 2008 and 2013, implying that revenues from electricity sales covered all cash O&M expenditures leaving a surplus for capital investment and debt repayment. Combined losses in revenue due to inefficiencies were just 0.3 percent in 2010 and 0.2 percent in 2015.

NPT’s standalone credit profile is supported by its monopoly of Vietnam’s transmission network, pooled counterparty risk and strong receivable position. As of 2018, NPT manages and operates a total of 25,000 km transmission lines, and 153 substations with total transformer capacity of 87,613 MVA. Figure 14 sets out some key financial highlights of NPT. In April 2019, Fitch Rating Agency has assigned NPT a Long-Term Foreign Currency Issuer Default Rating (IDR) of ‘BB’ with a Stable Outlook. Further, Fitch assesses NPT’s standalone credit profile at BB+ and stronger than EVN’s IDR. In May 2019, Fitch upgraded NPT’s outlook to ‘positive’

Figure 14: Financial highlights for National Power Transmission Corporation, 2015-2017



Source: NPT

The remainder of this section focuses on two distribution companies: Northern Power Company (NPC) and Ho Chi Minh Power Company (HCMCPC). NPC and HCMCPC are respectively the second and third largest of Vietnam’s five distribution companies in terms of power sales in 2014. The present analysis includes more details for NPC. Both discoms were established during the sector’s reorganization in 2010. They manage the power grid with voltage of equal to or smaller than 110 kV for their respective service areas.

The performances of NPC and HCMPC are largely comparable. At a utility level efficiency measures related to distribution and collection losses for HCMPC are NPC are shown in Figure 15. In both cases, less than 1 percent of revenues during the period 2009-2015 was lost due to insufficient collection and excessive distribution losses (above 10 percent).¹⁰ This performance is comparable to some of the best utilities across the Rethinking Power Sector Reform study. An index of average tariffs (relative to the 2009 value) in local currency and in US\$ is included as a reference. HCPC and NPC both report minimal under-collections (i.e. commercial losses) and a low level of electricity losses: around 3

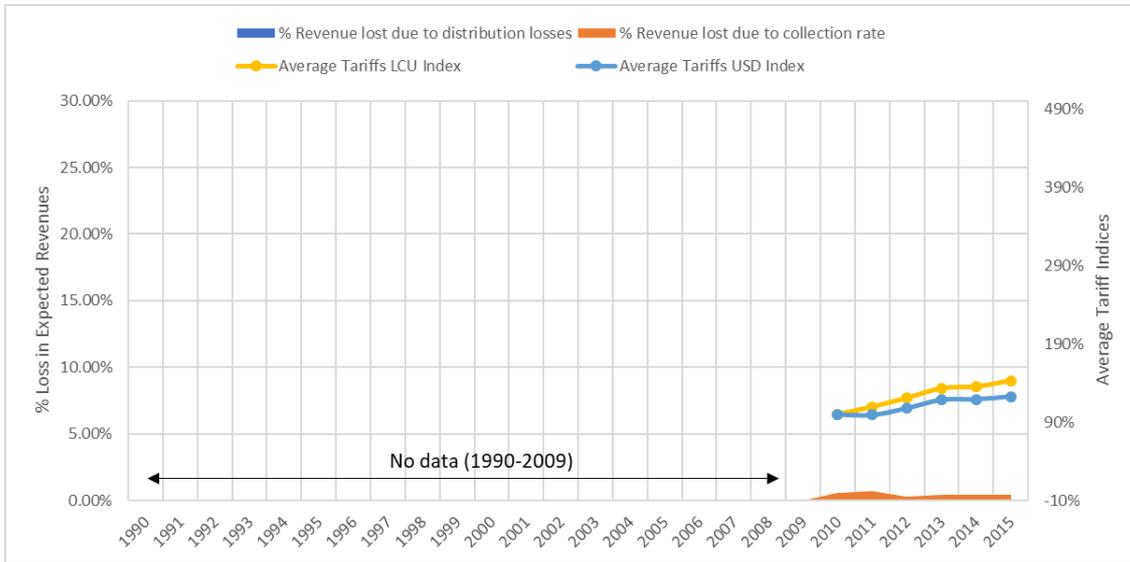
¹⁰ Collection and distribution data for years prior to 2009 are not available.

percent below the regional average of efficient losses for comparable utilities. Both companies have a strong ability to service debt and a positive profit margin in five of the last six years (Figure 16). Both made a net financial loss in 2011, when various factors contributed to poor performance. Drought meant that generation shifted from lower-cost hydropower to higher-cost fossil fuel resources, at a time when the Vietnamese currency was also substantially devalued. Also, in 2010 and 2011, system losses increased slightly as regional low-voltage rural systems were integrated into the national grid. However, system losses did not exceed target levels.

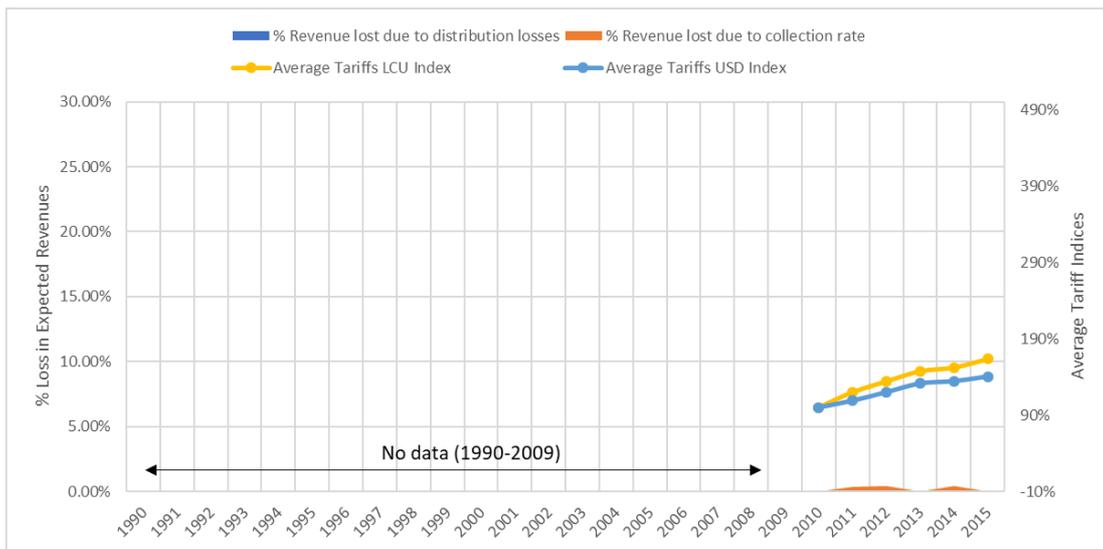
NPC is now one of the strongest performers in the sector and is fully capable of servicing its debt. Improved performance is reflected in the reduction of technical losses from 10.2 percent in 2010 to 7.7 percent in 2016. The organizational restructuring of NPC in 2011, undertaken immediately after its establishment in 2010, resulted in better financial performance. The company ultimately benefitted from streamlining and more effective management in the years following the transition. EVN revalued the assets of its transmission and distribution companies in 2012. This resulted in higher value of assets, significant additional equity on the balance sheet, and improved financial indicators. For example, the debt-to-equity ratio went from 73:27 to 45:55 for HCMPC, and from 77:23 to 59:41 for NPC. This nominal improvement in the debt-to-equity ratio did not, however, equate to additional cash for the businesses. As such, one concern is that this revaluation may give the impression of financial security that may not necessarily reflect actuality.

Figure 15: Operational efficiencies and average tariffs for HCMCPC and NPC, 2009-2015

(a) HCMCPC



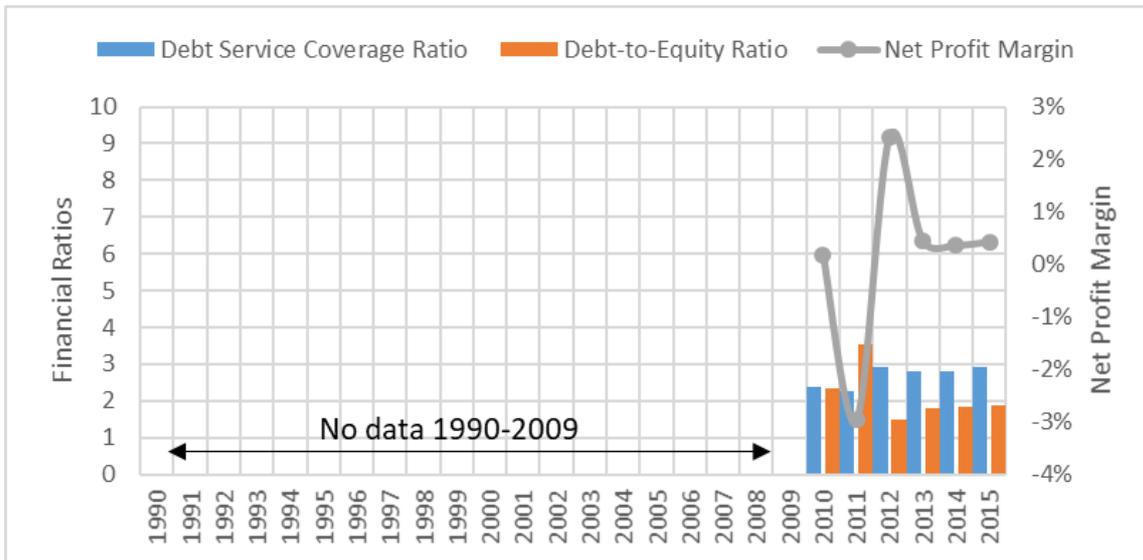
(b) NPC



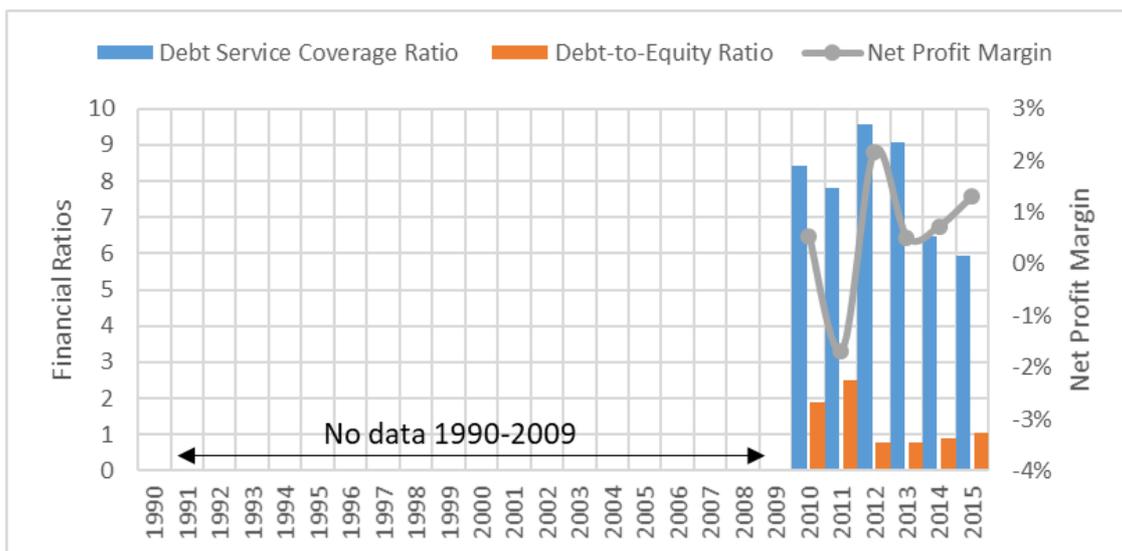
Source: World Bank staff for Rethinking Power Sector Reform project

Figure 16: Debt ratios and profit margins for NPC and HCMCPC, 2010-2015

(a) NPC



(b) HCMCPC



Source: World Bank staff for Rethinking Power Sector Reform project

NPC is making progress in securing financing for capital expenditure. NPC's recent investments have focused on the development of grid infrastructure for large industrial zones to accommodate rapidly increasing demand. Investments totaled US\$ 501 million in 2016, representing about 14 percent of revenues. NPC has had difficulty securing commercial loans and has relied more on sales revenue than on debt to fund investments in recent years (with an external financing index ratio of 0.5 in 2016).¹¹ NPC is only able to fund a portion of its capital expenditure through operating income, with a self-financing ratio of 73.2 percent in 2016. This ratio has fluctuated up and down between a minimum of

¹¹ If the ratio is greater than zero it means that the company was not able to finance its assets growth internally, whereas if the ratio was negative it means that the company generated more than enough cash to finance its assets growth.

36.2 percent and maximum of 92.4 percent over the seven years observed. EVN’s recent credit rating should enable NPC to make further progress to improve its own creditworthiness.

Table 5: Summary of Financial Indicators for Vietnam’s NPC against sample average

	NPC (Vietnam)	15 country sample average*
Net profit (loss) margin	-0.02%	-13%
Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) margin	1.5%	4%
External Financing Index Ratio	0.522	6.90
Investment as a percent of revenues	14%	18%
Average borrowing rate	4%	7%
Government transfers as percentage of utility revenue	0%	5%
Needed investments covered by operating revenue (net operating expenses)	9%	49%

*Includes select utilities from Tanzania, Senegal, Peru, Colombia, Pakistan, the Philippines, Vietnam, Kenya, Uganda, Tajikistan, the Indian states of Rajasthan, Odisha, and Andhra Pradesh, Egypt, and Ukraine

Source: World Bank staff for Rethinking Power Sector Reform project

3.3.2 Institutions

EVN and its subsidiaries maintain strong state linkages through their legal structure and corporate governance, with limited autonomy. As noted previously, EVN is as a fully state-owned enterprise group that dominates each part of the electricity sector value chain. It has a majority share of Vietnam’s power generation capacity (61 percent of capacity as of 2018). It also owns and operates the electricity transmission and distribution network through subsidiaries. The Government of Vietnam appoints EVN’s board and senior management and directs investments. PCs are organized as one-member limited liability companies wholly-owned by EVN. They have no Board of Directors, and instead have a Management Board comprising the Chief Executive Officer and four Directors-General and a full-time controller reporting directly to EVN. Members of the subsidiaries’ management boards are drawn exclusively from EVN management, with appointments made centrally. The management boards make few decisions autonomously. Rather, they carry out functions as determined and directed by EVN. As such, the current governance arrangements leave responsibility for management and control of both EVN and its subsidiaries largely in the hands of EVN headquarters.

Management practices in EVN, as for other organizations in Vietnam, have roots in specific aspects of the country’s society and culture. A thesis by Tham (2012) examines EVN’s corporate culture in the context of reforms and identifies attributes of agricultural Confucianism and Socialist central planning, with emphasis on hierarchy, stability, collectivity, and interpersonal relations. Clear superior-subordinate relationships mean that "obedience from lower levels is expected in all circumstances". Obedience may thus be a key motivation for implementing units to follow government plans. Corporate-level performance, as for other SOEs, tends to be assessed on end contract targets rather than maximizing profits or productivity. For employees, evaluation tends to be informal and at the level of teams rather than individuals, underpinned by trust developed through socialization prior to and during employment. This approach mitigates the risk of disagreements or loss of face that could result from relying on formal monitoring of with objective indicators of individual performance. A performance-based salary incentive for individuals is "not popular since it neither matches the purpose nor goal of collective orientation". When reforms create ambiguity for workers, EVN has

tended to respond by “providing greater job stability, establishing more formal rules, and rejecting nonstandard ideas and behavior”. These cultural factors contribute inertia to reform, as captured in the following quote:

“Networking seems to be the best strategy to minimize risks and uncertainty [especially during a transition period of institutional reform]. Hence it is not surprising for EVN to rely on connections with government for resources, privileged treatments over private participants and favorable policies such as delayed introduction of competitive market. Until now, this linkage proved to be among the most pivotal factors that guarantee EVN's survival and development.” (Tham: 128-9)

NPC and HCMPC score poorly against most benchmark indicators of good practice corporate governance and utility management but score highly on information technology. See the Annex for details of benchmark indicators. The utilities get top scores for use of information technology to manage quality of service, customer care, and corporate management, including smart meters, feedback mechanisms, and other technologies to monitor performance.

The financial discipline of utilities is a function of business imperatives and top-down policy objectives. The objective of Vietnam’s utilities includes to operate profitably, maintain the capital of the business, maintain reliable and safe supply of electricity, and contribute to social objectives (including the national uniform tariff) and national defense objectives. The utilities have defined public service obligations, but these are un-costed, not compensated by the government, and undisclosed. The utilities are not required to meet financial performance targets. PCs’ financial positions are assured through the approach to setting the wholesale electricity price as the retail price minus each PC's costs. However, PCs are subject to tight control by EVN through the setting of the overall spending and capex budgets for each PC. EVN also sets output, and service targets for the PCs. Audited financial statements are available from 2013 onward, however completion of audited accounts takes up to a year, which is slow by international standards. While there is a general lack of transparency, the utilities do publish an annual report that includes financial accounts to international standards audited by an external auditor.

While state support for the utilities is stable, their financial positions are most vulnerable to politically-imposed limits on electricity prices. The overall financial position of the sector has been constrained in large part by the politically-imposed limits on electricity prices, which are set below full costs. Any return on assets at the distribution company level may thus come at the expense of generation prices that are enough to recover the costs of new capacity. Sub-optimal returns are partly compensated by state support for EVN, which includes tax incentives, guarantees, loans with favorable terms from state-owned banks, and subsidies for strategic projects. EVN is not listed on a stock exchange and does not have the liberty to issue new equity. EVN is thus one of Vietnam’s key borrowers. EVN’s first credit rating, issued in 2018 at EVN’s request (with support from the World Bank), raises the potential for pursuing external financing in the future. While the government has suggested that subsidies should be eliminated, one concern is that changing electricity prices while maintaining the current structure of the sector could decrease the efficiency of performance, unless matched by other incentives to improve performance.

Human resource management in EVN has a mix of distinct features. Human resource management and industrial relations in EVN can be understood as a function of broader sociocultural practices and networks further to the context described above. EVN has more than 100,000 employees, which corresponds to a relatively high number of employees per customers compared to other countries. For NPC and HCMCPC, the number of employees has remained relatively stable over the period 2010

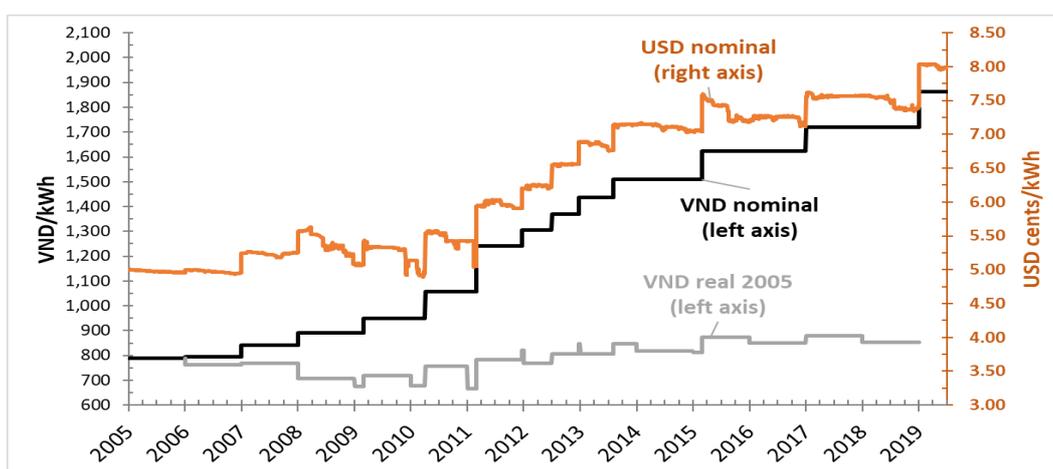
to 2015. The utilities follow pay scales and regulations for civil servants, which constraint the ability to manage staff based on business needs. Managers do not make staffing decisions autonomously, and while appointments involve short-listing, interviews and reference checks, public advertisement of positions is not common practice.¹² The overwhelming majority of EVN management are men. EVN plans to increase the share of women promoted to management level from 12.7 percent in 2015 to 14.5 percent in 2020. EVN (as for other organizations in Vietnam) has a trade union that is approved by and affiliated with the Vietnam General Confederation of Labor, which is linked to the Party. Economics reforms have not changed fundamental (socialist) aspects of trade unionism in Vietnam.

3.4 Tariffs and cost recovery

3.4.1 Performance

Average retail tariffs have increased in sporadic increments since 2005 but not kept pace with rising costs. In the period from 2005 to 2019, the nationally-determined average retail tariff (ART) was revised 13 times, at varying intervals of between 6 to 18 months, and between 0.8 percent and 17.4 percent in nominal terms compared to the previous rate (Table 6, Figure 17). Tariff increases have barely kept up with inflation. Nominal average electricity tariffs increased by 53 percent from January 2010 to January 2015, whereas cumulative inflation for the same period was around 56 percent. The Vietnamese Dong has also depreciated compared to the United States Dollar since 2007. Spikes in foreign exchange and fuel costs, resulting from increased dependence on fossil fuels to replace hydropower during droughts, have led to a significant, persistent gap between actual tariff level and the tariff level needed to achieve cost recovery. Tariff levels have, at best, allowed EVN to cover O&M costs and service debt, without covering future investments. The ART in 2019 is around 8 US cents/kWh, but to fully recover costs would need to reach 12 US cents/kWh. Furthermore, the timing and process of the application of the tariff adjustments remains difficult to predict in practice, despite elaborations of the regulatory framework for tariff determination.

Figure 17: Nationally-determined average retail tariff excluding value-added tax, 2005 to 2019



Source: Authors based on data in Table 6, with daily exchange rate from www.investing.com and real VND based on annual Consumer Price Index from data.worldbank.org up to 2018. Note: Year label marks 1st January.

¹² For staff positions to be filled by existing EVN employees, candidates are suggested by the head or leaders of a unit or department. A member of the Party Executive Committee comments on candidates prior to a vote. At least 50 percent of the leadership team must concur with an appointment before it is recommended to the hiring manager for decision. External candidates may be recruited through a recruitment consulting company or directly by the hiring unit with the recommendation of leaders.

Table 6: Nationally-determined average retail tariff (ART) excluding value-added tax, 2005-2019

Year	ART (VND/kWh), nominal increase	Notes
2004	Not available	Electricity Law passed: provides that ART should reflect costs of supply, while PM retains tariff-setting authority .
2005	789	ART is 789 VND/kWh as of January. In July, the Electricity Law took effect. Electricity Regulatory Authority of Vietnam established.
2006	795, ↑0.8%	PM (Decision 26) issued roadmap to market-based, cost-reflective tariffs that would be based on market price from 2010.
2007	842, ↑5.9%	
2008	890, ↑5.7%	Despite ART increase, EVN incurred net loss of VND 7.3 trillion due mainly to global financial crisis impact on EVN's foreign currency debt exchange rate.
2009	949, ↑6.6%	ART increase in March reflected reported supply costs for 2009. ¹³ PM (Decision 21) required ART to be updated annually and transparently, and delegated MOIT to adjust them by up to 5 percent per year above the last rate delegated to MOIT.
2010	1,058, ↑11.5%	PM increased ART in March based on a forecast of costs in 2010. Costs proved higher than expected due to drought-induced reliance on thermal generation, as well as high inflation and currency depreciation. MOIT (Circular 13) set system market operator fees.
2011	1,242, ↑17.4 1,304, ↑5.0% <i>Note: Cost recovery would have seen a rise to 1,584, ↑27.5 %</i>	MOIT proposed increase to recover 2010 actual costs and 2011 forecast costs. Due to concerns about inflation, the PM increased it in March to cover only expected costs for 2011, deferring recovery of 2010 costs and losses to future rates. In April, PM Decision 24 allows for adjustment once in three months to reflect generation cost changes, but adjustments shall be managed with a view to maintain macroeconomic stability and contain inflation . Master Plan approved by the Prime Minister in July states prices will be increased gradually to cover long-term marginal cost by 2020. In December, a second increase covered forecast costs for 2012, but not pending costs and exchange losses.
2012	1,369, ↑5.0%; 1,437, ↑5.0%	ART adjusted twice in 2012 (July and December).
2013	1,509, ↑5.0%	Amended Electricity Law (effective July) emphasizes public transparency regarding changes of component elements to retail price adjustments, formalizes role of MOF in several key aspects of the tariff framework . PM Decision sets the bracket of 1,437-1,835 VND/kWh ART adjusted in August. PM Decision 69 (December) raised the maximum that MOIT can increase tariffs to 10% but provides for ART recalculation every 6 months (instead of 3 months), with a mandatory 12-month delay for any increase over 7% .
2014	No change	Circular further defines procedures for setting ART, and calculation of distribution costs.
2015	1,622, ↑7.5%	The Prime Minister approved a bracket of 1,437-1,835 VND/kWh, equivalent to -5 percent to +22 percent from the previous average rate. ART adjusted in March 2015.
2016	No change	
2017	1,720, ↑6.0%	In June 2017, PM Decision 24 guarantees the transparency of tariff management requirements according to market rules and allows EVN to increase ART by up to 5% each 6 months subject to macroeconomic conditions. The ART increase, in November, was based on costs in 2016 and was made to avoid imbalance in EVN's finances
2019	1,864, ↑8.4%	Increase, in March, based on higher input prices from coal and gas and forex.

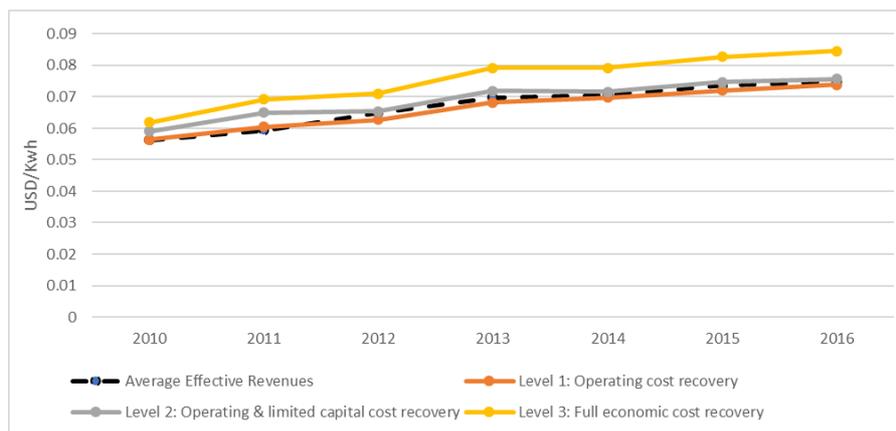
Note: **Bold red text** indicates elements less aligned with a market approach to attract new investment.

Source: Authors based on Hughes & Flochel 2016; Neefjes 2016; VNN 2017.

¹³ The 2009 tariff increase was a prior action for World Bank-supported Development Policy Operation.

Tariffs allow NPC to recover its operating costs, but not capital costs. Figure 18 shows average tariff revenues for 2010-2016 compared to the three levels of cost recovery. Since 2011, NPC’s revenues have increased to exceed operating costs. Good rainfall, and three increases in tariff levels over 18 months, each of 5 percent, improved cost recovery around the year 2012. Increases in the average tariff revenues have allowed NPC to just recover operating costs, but not capital costs, from 2012 to 2016.

Figure 18: Average revenue versus cost recovery levels per unit of energy sold for NPC, 2010-2016

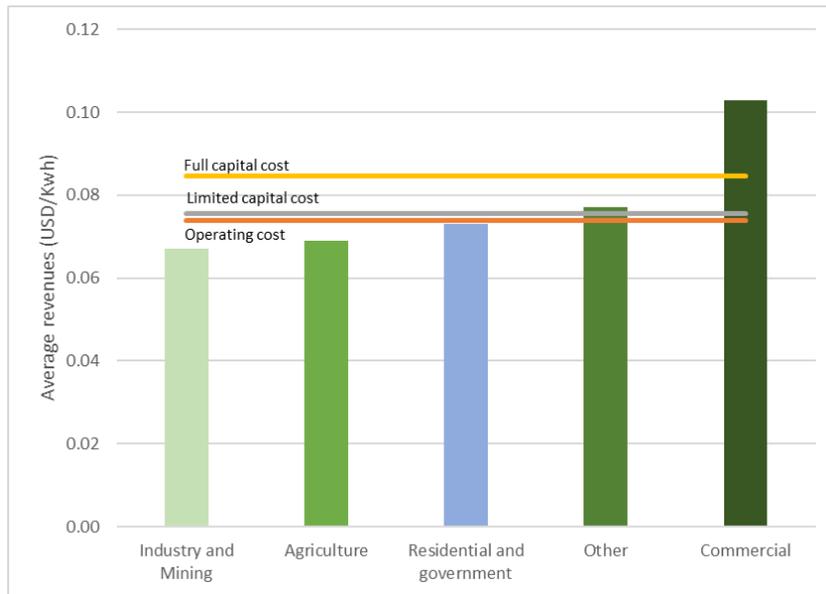


Source: Rethinking power sector reform project

Customer classes contribute revenues that closely match their share of consumption for NPC. Residential and government consumption (33 percent of total consumption) is relatively proportional to its revenues (34 percent of total revenues). Industry and mining (61 percent of consumption) account for 58 percent of total revenues. All other customer classes are less than 4 percent of total consumption and revenue. Figure 19 shows the average tariff revenue for each customer class compared to the three levels of cost-recovery (1: operating costs, 2: operating and limited capital costs; 3: full current and future costs). Figure 20 compares the percent of consumption for each customer class to the percent of revenue from that class. From 2007 to 2015, cross-subsidies from commercial and industrial to residential users were reduced 89 percent (Hughes & Flochel 2016).

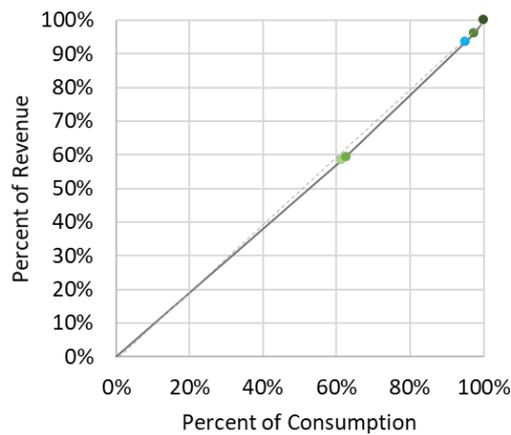
The main financial stress on Vietnam’s power utilities is that tariffs do not fully recover costs (i.e. capital expenditure). The revenue gap in a power utility can be measured using the quasi-fiscal deficit (QFD), a measure that compares the revenues that would be captured by an ‘ideal utility’ that charges cost recovery tariffs, fully collects revenues and keeps distribution losses to a technical minimum, with the revenues captured by the actual utility. This gap can be decomposed according to the portion attributable to under-recovery of costs through depressed tariffs, the portion attributable to the under-collection of revenues due to commercial inefficiencies, and the portion attributable to excessive distribution losses. The quasi-fiscal deficit attributable to NPC and HCMPC was around US\$ 500 million in 2016. Collection rates have been largely equal to 100 percent for each company since 2010, so there has been a very small deficit from uncollected revenues. Technical losses, averaging for the two utilities, were just above the benchmark (5 percent) used for the cost recovery analysis leading to a small contribution to the QFD. However, the biggest issue for the utilities was under-pricing, which contributed about 72 percent to the QFD. Nonetheless QFD remains quite low at 0.25 percent of the GDP. Figure 21 shows the quasi-fiscal deficit for each year from 2010 to 2016.

Figure 19: NPC Average revenue per unit energy billed by customer type vs. cost-recovery levels



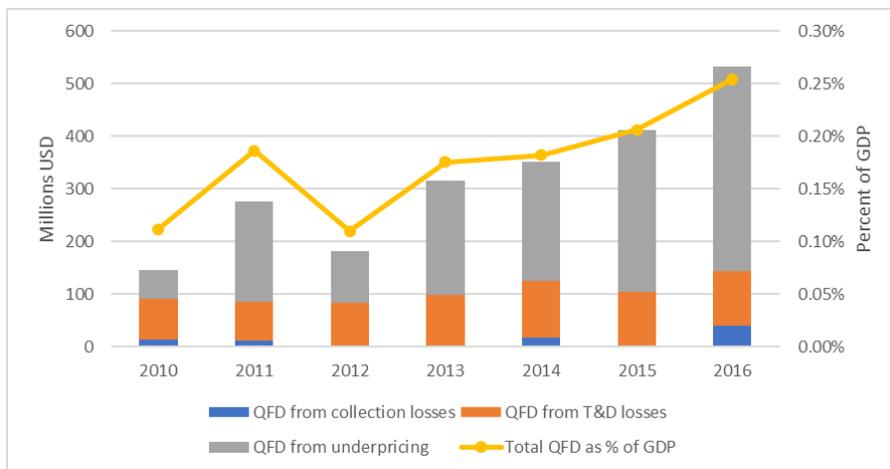
Source: Rethinking power sector reform project

Figure 20: Percent of Revenue vs. Percent of Consumption



Source: Rethinking power sector reform project

Figure 21: Elements of quasi-fiscal deficit for NPC and HCMPC, 2010-2016



Source: Rethinking power sector reform project

3.4.2 Institutions

The performance of the regulatory system is evaluated from various standpoints. Performance of regulation is assessed on: (i) regulatory governance, represented by accountability and autonomy aspects; and (ii) regulatory substance, represented by tariff regulation, quality regulation and market-entry regulation. First, an evaluation is made of the de jure performance by comparing the laws, rules, and regulations in place with various criteria that would be desirable in an ideal system. Second, a perceived evaluation based on experts' comments and perceptions of the actual performance of the various aspects of regulation. In most cases the indices are averaged to reach the high-level score, but in some cases, the indicators are multiplied. Multiplication, rather than an average, of sub-indices is used to reflect the fact that a pair of variables (i.e. autonomy and accountability, governance and substance) are only meaningful when they go together. Average of sub-indexes is adopted as aggregation method when these are largely independent from each other (i.e. tariff and entry regulation).

Many, but not all, elements of Vietnam's tariff regulation framework align with a market approach to attract new investment. Since the 2004 Electricity Law, successive instruments have elaborated and adjusted the tariff regulatory framework. Many elements of the tariff framework can be considered positive from the perspective of attracting new investment through a market approach. Tariffs can be 'automatically' adjusted (through authority delegated from the Prime Minister to the Ministry) based on increasingly detailed methodologies to reflect actual costs, within limits. Cross-subsidies between customer classes are to be gradually eliminated, and eventually the uniform national tariffs are expected to be removed for industrial and commercial customers or for specified regions. However, as highlighted in Table 6 above, some elements do not closely align with a market-based approach. The government stipulates a uniform average retail rate applicable to all customers regardless of their location in Vietnam. Adjustments above a certain percentage are recommended by MOIT and ultimately require approval by the Prime Minister. In 2011, the Prime Minister decided that adjustments shall be managed with a view to maintain macroeconomic stability and contain inflation, and the 2013 amendment to the Electricity Law formalized a role for the Ministry of Finance in defining the tariff framework. Despite various provisions for regular updates, tariffs have, in practice, been updated sporadically and have chronically lagged inflation.

Vietnam rates poorly on indicators of regulatory governance (accountability and autonomy). Notwithstanding the existence of ERAV since 2005, regulatory functions are not carried out independently of government in Vietnam. Decision powers formally reside in almost all instances with the Minister and Prime Minister, while noting the culture of consensus building among key actors as previously described. Certain stakeholders have expressed general skepticism over regulatory processes and outcomes. For example, ERAV's budget composition is unclear and the majority of ERAV's funding appears to not come from levies, which implies a structural dependence on government. Legal appeals are formally allowed. In practice, however, lack of transparency around recommendations, and lack of broad formal participation in decisions, reduces the likelihood that a wide set of stakeholders would be positioned to meaningfully engage in the regulatory process (Table 7).

Table 7: Formal regulatory governance in Vietnam and comparators, 2015¹⁴

	Colombia	Peru	Philippines	Vietnam	International benchmark
Regulatory Governance	45%	83%	48%	32%	59%
Accountability	75%	85%	95%	64%	83%
<i>Regulatory Oversight</i>	67%	67%	100%	67%	81%
<i>Legal Appeals</i>	100%	100%	100%	100%	100%
<i>Transparency</i>	57%	89%	85%	25%	67%
Autonomy	60%	98%	51%	50%	71%
<i>Decision-Making Autonomy</i>	64%	92%	79%	36%	79%
<i>Budgetary Autonomy</i>	88%	100%	50%	50%	80%
<i>Leadership Autonomy</i>	88%	100%	75%	14%	66%
<i>Managerial Autonomy</i>	0%	100%	0%	100%	59%

Note: Scores based on indices developed for the Rethinking Power Sector Reform Project, where 100% indicate 'good practice'. See Annex Tables J and K for details.

Vietnam nevertheless rates well on indicators for effective regulation of power sector tariffs. Using the study's benchmarks indicators for tariff regulation, Vietnam scores 100 percent on the overall regulatory framework and 67 percent on how tariffs are to be determined (table 10). It is notable that, while the regulator has limited independence in making decisions, in technical areas of tariff setting, quality regulation, and market entry, it performs at global average levels. The main shortcomings are that utilities are not compensated for the cost of stranded assets, and users do not bear the cost of incentive mechanisms for renewable energy generation. Some evidence suggests that ERAV does not fully enforce regulations to ensure distribution PCs and transmission NPTC receive a reasonable return.¹⁵

Table 8: Formal regulatory substance in Vietnam and comparators, 2015

	Colombia	Peru	Philippines	Vietnam	International benchmark
Regulatory Substance	81%	83%	95%	85%	76%
Tariff Regulation	92%	100%	93%	83%	77%
<i>Regulatory Framework for Tariffs</i>	100%	100%	86%	100%	90%
<i>Determination of Tariffs</i>	83%	100%	100%	67%	64%
Quality Regulation	100%	100%	92%	71%	75%
<i>Quality of Service Standards</i>	100%	100%	100%	75%	82%
<i>Quality of Service Enforcement</i>	100%	100%	83%	67%	68%
Market Entry Regulation	50%	50%	100%	100%	77%
<i>Permitting New Entrants</i>	50%	100%	100%	100%	90%
<i>PPA Approvals</i>	50%	0%	100%	NAP	57%

Note: Scores based on indices developed for the Rethinking Power Sector Reform Project, where 100% indicate 'good practice'. See Annex Tables L, M and N for details.

Vietnam rates moderate to moderately well on indicators of perceived regulatory substance service quality, and market entry regulation. Using the benchmark system developed for this study in terms of the perceived effectiveness of regulation, Vietnam scores 71 percent for service quality, and 50 percent for market entry. The major shortcoming in quality regulation are that there are no fines for failing to meet quality of service standards, no validation of utility data, and no financial incentives to

¹⁴ For the complete regulatory governance index, see the annex.

¹⁵ Mercados (2015) *Strategic Options for Enhanced Financial Performance of EVN*, cited in Hughes & Flochel (2011: 39) with reference to Circular 14/2009 on transmission tariffs, and Circular 12/2014 on bulk supply cost.

meet customer services standards. On market entry, significant shortcomings include that the regulator does not monitor compliance with the terms of licenses, and the regulator has no authority to impose penalties for violation of license or permit terms, or other contractual provisions. However, companies have been forced to relinquish licenses for a violation of license terms or contracts. Over 10 licenses were withdrawn in 2014 and 2015 due to not meeting requirements such as metering requirements or not complying with requirements to notify ERAV of relevant changes. In summary, compared to the other 14 country cases of the present study, Vietnam performs below average in governance aspects of regulation, but on or above average on substance.

Table 9: Summary of indicators of *de jure* and effective regulation in Vietnam’s power sector

Indicators	De Jure	Perceived
Overall Regulation	27%	3%
Regulatory Governance	32%	5%
Accountability	64%	31%
<i>Regulatory Oversight</i>	67%	67%
<i>Legal Appeals</i>	100%	0%
<i>Transparency</i>	25%	25%
Autonomy	50%	17%
<i>Decision-Making Autonomy</i>	36%	36%
<i>Budgetary Autonomy</i>	50%	0%
<i>Leadership Autonomy</i>	14%	14%
<i>Managerial Autonomy</i>	100%	NAV
Regulatory Substance	85%	63%
Tariff Regulation	83%	67%
<i>Regulatory Framework for Tariffs</i>	100%	83%
<i>Determination of Tariffs</i>	67%	50%
Quality Regulation	71%	71%
<i>Quality of Service Standards</i>	75%	75%
<i>Quality of Service Enforcement</i>	67%	67%
Market Entry Regulation	100%	50%
<i>Permitting New Entrants</i>	100%	50%
<i>PPA Approvals</i>	NAP	NAP

4 Conclusion

Vietnam’s power sector has developed rapidly since the 1990s to become one of the best performing power sectors of any developing country today. This success has occurred mostly under the state-owned utility, EVN. Market-oriented reforms, including to establish partial competition in generation with a single buyer, have also had some positive impact as part of long-term reform plans still underway. Between 1990 and 2018, power generation capacity increased dramatically from 2 gigawatts to over 45 gigawatts, and grid connections went from around 10 percent to over 99 percent of households. Supply-side efficiency and reliability also improved over this period. Important contributing factors include top-level government commitment, highly-qualified staff in EVN, and consensus-based decisions among sector institutions.

By the late 1990s, the government realized the need to gradually introduce competition to ensure long-term sustainability without jeopardizing security of supply for the fast-growing economy. Vietnam’s 2004 Electricity Law has provided the framework to develop a competitive power market, unbundle EVN, set prices that better reflect costs, promote private investment, and establish regulatory authority, ERAV. Today, Vietnam’s power sector continues to be dominated by state-owned entities. However, improved operational efficiency and financial performance of generators under the partly-competitive power market has contributed to keeping generation costs relatively low. The government plans further reforms to ensure effective operation of a wholesale market with

multiple buyers by 2021, and retail competition by 2023. Further steps planned include to privatize EVN's generation assets, establish competitive bidding for all generation technologies, establish an independent system and market operator, make the tariff regime more transparent, and promote clean energy sources to avoid overreliance on fossil fuels.

Findings on the performance and institutions of Vietnam's power sector with respect to power sector performance and reform are summarized below and in Table 10.

First, with respect to security of supply, Vietnam has averted major crises of supply, despite periods of low reserve margins and seasonal outages. A major contributor has been Vietnam's focus on power system plans, which have been closely implemented by the dominant state-owned utility, EVN. In times of looming power shortages, the government sped up approval processes for generation and network development. Planning and procurement processes remain largely internal to the government. While Vietnam has implemented significant market reforms, its power sector institutions continue to be state-controlled.

Second, on access and affordability, Vietnam has achieved almost universal electricity access from low rates in the early 1990s. Electrification benefited from strong sociopolitical emphasis from the highest-level down to local villages, which shared the costs of network development. Low base rates and cash transfer schemes have targeted low-income households with improved accuracy over time, albeit still with some inefficiency. To ensure social equity, a uniform national tariff regime has been adopted and is still applied such that urban and large energy consumers cross-subsidize rural households.

Third, technical performance improved substantially over the last decade. In earlier years, low technical efficiency of transmission and distribution were exacerbated by rapid grid extension outpacing investments in grid capacity. Today, network losses, collection rates, and wider system performance indicators are mostly in line with regional and international best practice, indicating the strong technical and operational capacity of EVN.

Fourth, the financial sustainability of the sector has evolved. Spikes in fuel costs and exchange rates make the utilities depend on state backing, and vulnerable to credit risk. Tariffs remain below full cost recovery levels. Some elements of Vietnam's tariff regulation framework align with a market approach to attract new investment, while other elements do not. Regulation is largely effective with respect to service quality, but mixed on market entry, and relatively weak on accountability and autonomy. De jure regulatory quality is generally higher than de facto practice. In recent years, EVN and its subsidiaries have been profitable, covering operating costs and debt service, as confirmed by the recent positive credit rating of EVN and NPT by Fitch Rating Agency. However, utilities score relatively poorly on indicators of good practice corporate governance and management. Distribution utilities are tied to the holding company EVN, which in turn has strong financial and governance links to the state.

Table 10: Summary evaluation of Vietnam’s power sector reform efforts from 1990 to 2018

Issue	Performance	Institutions
Security of supply	Vietnam has averted major crises of supply, with rapid construction of generation capacity from a total of 2.2 GW in 1990 to over 45 GW in 2018. Most of this has been public. As of 2018, 60 percent of domestic generation capacity was owned by EVN, and 27 percent was privately owned.	Plans are closely followed by the state-owned utility, EVN, which dominates the sector. An EVN subsidiary is the single buyer competitive generation market was established in 2012 with. Planning and procurement processes remain largely internal to government.
User access and affordability	The share of households with grid access increased from an estimated 14 percent in 1993 to >99 percent since 2010. Low base rates and cash transfer schemes have targeted low-income households with improved accuracy over time.	Rapid electrification was facilitated by completion in 1994 of the North-South transmission line, consolidation of national power sector institutions in the mid-1990s, and local buy-in.
Supply-side efficiency and financial viability	Technical performance has improved after years of low efficiency: from 1990 to 2017 transmission and distribution losses fell from 25 percent to 7.6 percent. Collection rates are high. Input price volatility and rigid tariffs make the utilities depend on state backing.	Utilities score poorly on indicators of good practice corporate governance and management. Distribution utilities are tied to the holding company (EVN). Improvements to grid capacity lagged the pace of grid extension but have caught up.
Regulation of tariffs and other sector elements	Sporadic increases in average retail tariffs have not covered capitals costs or inflation. Cross-subsidies from commercial to other users have decreased in recent years.	Vietnam's tariff regulation framework is a mix of elements some of which align with a market approach. Regulation is largely effective for service quality, but mixed on market entry, and poor on accountability and autonomy.

The following lessons emerge from Vietnam’s experience on power sector reform.

1. State-centric institutions can rapidly and successfully develop a power sector with concerted efforts, notwithstanding the opportunity for well-regulated competition and private sector participation to improve efficiency and financial viability. Vietnam, like many, if not all countries in the world, achieved large-scale capacity expansion and near-universal electrification led by the state in terms of planning and ownership. The case of Vietnam thus demonstrates that there are alternative institutional pathways to a well-performing power sector, beyond that provided by the 1990s market-oriented reform model, particularly in contexts of increasing demand. Vietnam’s striking success on generation capacity expansion and electrification was, however, accompanied by subsidized tariffs that resulted in a reliance on public financing and an inability to attract private investments. The latter has in the past been limited by financial creditworthiness constraints of EVN and its distribution companies, and the fact that new generation costs of IPPs were higher than allocating new power generation projects to EVN and other SOEs. Nevertheless, creditworthiness has improved in recent years.

2. Gradual reform steps offer the opportunity to build consensus each step of the way and learn by doing. This can lead to different outcomes than expected, as policy drivers evolve. Vietnam’s culture of policy-making by consensus, in combination with long-running rifts among conservative versus reformer factions within the Party, have made it difficult at times for a clear policy direction to emerge on economic policy in general. Yet, in Vietnam’s decades-long transition from socialist planning to markets, incremental reforms have largely been sustained. This is also the case in Vietnam’s power sector, where the government explicitly designed the reform process to be gradual to reduce the risk

of shocks to the economy and to consumers. Unlike other countries and sectors, there have been no 'big bang' reforms in Vietnam's power sector, but a consistent evolution towards a better performance. The Prime Minister in 2006 set out a 20-year "Roadmap" for developing a competitive electricity market with several years between key milestones and phases of market development. In practice, implementation was slower than planned. In part, this may relate to the absence of major crises in the power sector, which has given Vietnam breathing space. Tight sector finances and low power reserve margins due to demand growing at high rates for several years created pressure for reforms, yet the state also found non-market solutions to address these in the short-term.

3. The sequence of reforms matters. Introducing market mechanisms ahead of other vital elements may limit their effectiveness and make subsequent reform steps more difficult. Vietnam has been selective in its adoption of elements of the international model of power sector reform, including with respect to sequencing. Vietnam's competitive generation market began in 2012 before putting effective limits on market power concentration and on conflicts of interest among state-owned market participants, and without fully cost-reflective tariffs. As of 2015, EVN not only maintains supervision or ownership over two-thirds of generation capacity, but also the dispatch center and market operator. This setup echoes other sectors in Vietnam's economy, where commercialization preceded new governance mechanisms. A concentration of semi-independent institutional power in the sector, without a proportionately strong regulatory oversight, increases the risk of 'elite capture' such as patronage and rent-extraction, which can shape or hinder subsequent reforms. Another way to consider this is that technical progress in market reform requires matching political action, with transparency not only in the operation of the market, but also in the enactment of policy and institutional reforms. While Vietnam's overall sector plan remains in the direction of market-oriented reforms, the challenge will be to find a way to balance institutions of different strengths (i.e. EVN group vis-à-vis the regulator), among other factors.

Overall, Vietnam has developed its own unique and evidently successful path to power sector development and market reform based on its unique political and socio-economic characteristics.

Annex: Rethinking Power Sector Reform Indices

The 'Rethinking Power Sector Reform' study employs various indices to measure reforms. As the main global index, a simple Power Sector Reform Index aggregates four dimensions of power sector reform consistent with the standard package of reforms prescribed by international donors in the 1990s. These dimensions are: restructuring (vertical and horizontal unbundling of power utilities); private sector participation; creation of an independent regulator; and competition in power generation. The index gives each country a score from 0 to 100 on each of the above four dimensions of power sector reform. The scores are based on giving equal weight to each step on each dimension of the reform continuum (see tabulation below). The average of the four 0-100 scores is used to provide an overall summary of the extent of reform. *The score of 100 for the reform index is not intended to signify 'good practice' but merely alignment with the 1990s model.*

A. Global reform index

Regulation	No regulator = 0		Regulator = 100		
Restructuring	Vertically integrated = 0	Partial vertical unbundling = 33	Full vertical unbundling = 67	Vertical & horizontal unbundling = 100	
Competition	Monopoly = 0	IPPs = 25	Single Buyer Model = 50	Bilateral Contracts = 75	Competitive market = 100
Private Sector Participation	$0.5 * (\text{Percentage of generation capacity with private sector participation})$ + $0.5 * (\text{Percentage of distribution utilities with private sector participation})$				

Separately, a set of distinct indices are used to measure regulatory and governance frameworks in the power sector. The scores for Vietnam and a selection of other case study countries, are presented below. *For these scores, 100% corresponds to what can be considered 'good practice'.*

B. Generation and transmission planning index for Vietnam and comparators, 2015

	Colombia	Peru	Philippines	Vietnam	International benchmark
Planning and Procurement	95%	77%	59%	59%	70%
Generation Planning	86%	43%	71%	71%	56%
Country has a generation master plan	○	○	○	○	94%
Country has an overall energy plan	○	○	○	○	65%
Competent entity is responsible for producing the	○	●	○	○	88%
Inter-governmental committee oversees the planning	○	●	○	●	29%
Power generation system plan is mandatory	●	●	●	○	19%
Plan leads to timely initiation of procurement	○	●	●	○	38%
Planning process is transparent and participatory	○	○	○	●	59%
Transmission Planning	100%	75%	50%	100%	72%
Competent entity is responsible for producing the	○	○	○	○	100%
Explicitly linked to power generation plans	○	●	○	○	88%
Plan is mandatory	○	○	●	○	29%
Planning process is transparent and participatory	○	○	●	○	71%

C. Generation and transmission procurement index for Vietnam and comparators, 2015

	Colombia	Peru	Philippines	Vietnam	International benchmark
Procurement of Generation	95%	90%	100%	50%	85%
There is a framework for procurement	○	○	○	●	82%
Country allows International competitive bidding or public auctions for procurement	○	○	○	○	94%
Types of procurement methods allowed					
<i>Unsolicited bids</i>	○	●	●	●	29%
<i>Direct negotiation</i>	○	●	●	○	47%
<i>International competitive tendering</i>	●	○	○	○	88%
<i>Public auctions</i>	○	○	●	●	41%
<i>Stand-alone capacity market</i>	●	●	●	●	0%
Auction design score	0.86	0.71	NAP	NAP	80%
Country uses public auctions for procurement	○	○	●	●	41%
Clear and comprehensive established rules	○	○	NAP	NAP	100%
Credible penalties for violating the rules	○	○	NAP	NAP	86%
Guarantees and penalties to ensure timely completion	○	○	NAP	NAP	86%
Standard, non-negotiable contracts	○	○	NAP	NAP	86%
Stapled financing terms or risk mitigation instruments	○	●	NAP	NAP	86%
the auction	●	●	NAP	NAP	14%
Efforts to inform and attract bidders to the auction	○	○	NAP	NAP	100%
Transmission Procurement	100%	100%	17%	17%	64%
There is a framework for procurement of new transmission lines	○	○	●	●	59%
Methods used to procure new transmission-					
<i>Competitive tender</i>	○	○	●	●	65%
<i>Direct negotiation</i>	●	●	●	●	24%
All projects are awarded to the incumbent transmission company	●	●	○	○	47%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available

D. Access policy framework index for Vietnam and comparators, 2015

	Colombia	Peru	Philippines	Vietnam	International benchmark
Regulation of New Connections	68%	88%	57%	14%	65%
Roles of regulator, utility, rural electrification agency clearly defined	○	○	○	NAV	93%
Utilities have regulatory obligation to connect new customers	○	○	○	○	94%
Regulatory entity has authority to approve connection charges for new customers	○	○	○	●	71%
Connection charges are set using shallow entry	●	○	●	NAP	58%
Government provides subsidy for new connections	●	●	●	●	53%
Connection has to be provided in a specified time	○	○	○	●	94%
Regulatory entity monitors time taken to provide new connections	●	○	●	●	44%
Regulator has authority to levy penalties for not connecting customers on time	NAP	○	NAP	NAP	71%
Time taken to provide connections publicly available	○	○	●	●	24%
There are connection charges	○	○	○	NAV	94%
Customer pays limited connection charges	●	●	●	NAP	43%
Connection charge is publicly available	○	○	○	●	71%
Regulation of solar home systems	100%	50%	100%	0%	66%
Minimum technical standards and post-installation warranty requirements for solar home systems	○	○	○	●	71%
Regulator reviews and approves prices of surplus SHS sales of electricity to the grid operator	NAV	●	○	NAV	62%
Regulation of mini-grids	33%	33%	67%	NAV	44%
Privately owned mini-grids legally allowed to operate	○	○	○	NAV	81%
Clear options for mini-grid operator when the interconnected grid reaches the area, including compensation	●	●	●	NAV	7%
Subsidy or other mechanism to help mini-grid operators recover their costs	●	●	○	NAV	47%

E. Corporate governance- accountability index for Vietnam and comparators, 2015

Corporate governance	Vietnam		Philippines		Colombia		Peru		International benchmark
	NPC	HCMP	MERALCO	BENECO	EPM	CODENSA	Luz del Sur	Hidrandina	
Accountability	17%	17%	100%	67%	75%	92%	92%	58%	60%
Private or public shareholders appoint board	●	●	○	○	●	○	○	○	36%
Transparent process exists for Board selection	●	●	○	○	●	○	○	●	36%
Board members cannot be removed at will	●	●	○	●	●	○	○	●	29%
Chairperson & CEO are separate positions	●	●	○	○	○	○	○	○	75%
Function of Company Secretary exists	○	○	○	○	○	○	○	○	82%
Board Sub-Committees for different issues	●	●	○	●	○	○	●	●	68%
Audit committee of the Board	●	●	○	○	○	○	○	○	71%
Board Code of Conduct exists	●	●	○	○	○	○	○	○	64%
Requirement to declare conflicts of interest	●	●	○	○	○	○	○	○	75%
Utility has carried out any third party transactions in last five yrs	●	●	○	●	○	●	○	●	46%
Minority shareholders' rights are protected	●	●	○	●	○	○	○	●	39%
Utility publishes an Annual Report	○	○	○	○	○	○	○	○	93%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available

F. Corporate governance- autonomy index for Vietnam and comparators, 2015

Corporate governance	Vietnam		Philippines		Colombia		Peru		International benchmark
	NPC	HCMPC	MERALCO	BENECO	EPM	CODENSA	Luz del Sur	Hidrandina	
Autonomy	0%	0%	100%	100%	78%	100%	78%	22%	63%
Board is the final body to take decision on-									
<i>Defining corporate strategy</i>	NAP	NAP	○	○	○	○	○	●	96%
<i>Approving business plans</i>	NAP	NAP	○	○	○	○	○	●	96%
<i>Setting and monitoring performing objectives</i>	NAP	NAP	○	○	○	○	○	○	92%
<i>Selecting, appointing and overseeing the CEO</i>	NAP	NAP	○	○	○	○	○	●	56%
<i>Raising capital from debt</i>	NAP	NAP	○	○	○	○	○	●	68%
<i>Raising capital from equity</i>	NAP	NAP	○	○	●	○	○	●	48%
<i>Major capital expenditures</i>	NAP	NAP	○	○	○	○	○	●	88%
<i>Deciding and implementing tariff adjustments</i>	NAP	NAP	○	○	●	○	●	●	24%
<i>Human resource hiring and firing decisions</i>	NAP	NAP	○	○	○	○	●	○	72%

G. Utility management- financial discipline index for the Philippines and comparators, 2015

Utility management	Vietnam		Philippines		Colombia		Peru		International benchmark
	NPC	HCMPC	MERALCO	BENECO	EPM	CODENSA	Luz del Sur	Hidrandina	
Financial Discipline	53%	53%	71%	53%	76%	69%	86%	65%	59%
Utility has a credit rating	●	●	○	●	○	○	○	●	36%
Utility can issue new bonds	●	●	●	●	○	○	○	●	36%
Utility can issue new equity	●	●	○	●	●	NAV	○	●	26%
Utility pays dividends to shareholders	●	●	○	●	○	○	○	●	29%
Public service obligations are explicitly defined	○	○	○	○	○	○	●	○	46%
PSO is publicly disclosed	●	●	○	○	●	●	NAP	○	38%
PSOs are costed	●	●	●	●	●	●	NAP	●	0%
PSOs are compensated by government	●	●	●	●	●	●	NAP	●	0%
Utility required to meet financial performance targets	●	●	●	●	○	○	○	○	52%
System of internal financial controls exists	○	○	○	○	○	●	○	○	96%
Internal audit function exists	○	○	○	○	○	○	○	○	93%
Utility is subject to state auditing procedures	○	○	●	●	○	○	●	○	71%
Financial accounts are produced	○	○	○	○	○	○	○	○	96%
Financial accounts are audited by external auditor	○	○	○	○	○	○	○	○	93%
Financial accounts are publicly disclosed	○	○	○	○	○	○	○	○	79%
Financial accounts meet national standards	○	○	○	○	○	○	○	○	82%
Financial accounts meet international standards	○	○	○	○	○	○	○	○	57%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available

H. Utility management- human resources index for Vietnam and comparators, 2015

Utility management	Vietnam		Philippines		Colombia		Peru		International benchmark
	NPC	HCMPC	MERALCO	BENECO	EPM	CODENSA	Luz del Sur	Hidrandina	
Human Resource	50%	50%	79%	86%	86%	60%	90%	71%	62%
Annual staff performance reviews exist	○	○	○	○	○	NAV	○	○	93%
Employees receive performance related bonuses	○	○	○	○	●	NAV	○	○	70%
Employees can be fired for poor performance	○	○	○	○	○	○	○	○	79%
Government employment regulation don't apply	●	●	○	○	●	NAV	○	●	26%
Wages not based on government pay scales	●	●	○	○	○	NAV	○	●	48%
Staff training policy exists	○	○	○	○	○	○	○	○	86%
Managers are free to hire employees	●	●	●	●	○	●	NAV	●	12%
Managers are free to fire employees	●	●	●	●	○	●	NAV	●	24%
Managers can execute budget	●	●	○	○	○	●	NAV	○	60%
Managers can implement investment projects	●	●	●	○	○	●	NAV	○	44%
Recruitment involves advertisement of positions	●	●	○	○	○	○	●	○	71%
Recruitment involves short-listing candidates	○	○	○	○	○	○	○	○	89%
Recruitment involves interviewing candidates	○	○	○	○	○	○	○	○	82%
Recruitment involves reference checks	○	○	○	○	○	○	○	○	75%

I. Utility management- information & technology index for Vietnam and comparator, 2015

Utility management	Vietnam		Philippines		Colombia		Peru		International benchmark
	NPC	HCMPC	MERALCO	BENECO	EPM	CODENSA	Luz del Sur	Hidrandina	
Information and Technology	93%	93%	93%	67%	87%	0%	80%	73%	71%
SCADA system	○	○	○	○	○	NAV	○	○	93%
IT system to support incidence resolution	○	○	○	○	○	●	○	○	75%
IT system to support distribution management	○	○	○	○	○	●	○	○	79%
IT system to support energy management	○	○	●	●	○	●	○	●	64%
Geographic Information System (GIS)	○	○	○	○	○	NAV	○	○	78%
KPIs are used to monitor quality of supply	○	○	○	○	○	NAV	○	○	100%
Advanced Metering Infrastructure (AMI)	○	○	○	○	●	NAV	●	●	52%
Accurate customer database	○	○	○	○	○	NAV	○	○	96%
Call center for dealing with customer complaints	○	○	○	○	○	NAV	○	○	96%
Website for submission of customer complaints	○	○	○	●	○	NAV	○	○	85%
Customer satisfaction regularly monitored	○	○	○	○	○	NAV	○	○	59%
Commercial management system (CMS)	○	○	○	●	●	NAV	○	○	41%
Resource Management System (RMS)	●	●	○	●	○	NAV	○	○	35%
KPIs are used to monitor commercial cycle	○	○	○	○	○	●	●	●	86%
KPIs are used to monitor corporate resource management	○	○	○	●	○	●	●	●	54%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available

J. Regulatory governance- accountability index for Vietnam and comparators, 2015

Regulatory governance		Colombia	Peru	Philippines	Vietnam	International benchmark
Accountability		75%	85%	95%	64%	83%
Regulatory Oversight		67%	67%	100%	67%	81%
Regulator's objectives formally stated in law		○	○	○	○	100%
Regulator required to report on its activities		○	○	○	●	88%
Independent third party evaluations of regulator have taken place		●	●	○	○	56%
Legal Appeals		100%	100%	100%	100%	100%
Legally established process to challenge/appeal regulatory decisions		○	○	○	○	100%
Transparency		57%	89%	85%	25%	67%
Publicly available annual reports		○	○	○	○	94%
Recommendations are required to be made public		NAP	○	●	●	33%
Government body receiving recommendations required to respond publicly		NAP	●	●	●	33%
Regulator is required to publish its decisions on-	End-user tariffs	○	○	○	NAP	100%
	Licensing generation or supply	NAP	NAP	○	NAP	100%
	Wholesale or PPA prices and contract terms	○	○	○	NAP	100%
	Market design	○	NAP	○	NAP	100%
Oversight of regulated utilities		NAP	○	○	NAP	85%
Regulatory decision-making process legally requires the participation of non-government stakeholders in case of-	End-user tariffs	●	○	○	○	69%
	Licensing generation or supply	NAP	NAP	○	●	69%
	Wholesale or PPA prices and contract terms	●	○	○	●	38%
	Market design	●	NAP	○	●	30%
Oversight of regulated utilities		NAP	○	○	●	38%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available

K. Regulatory governance- autonomy index for Vietnam and comparators, 2015

Regulatory governance		Colombia	Peru	Philippines	Vietnam	International benchmark
Autonomy		60%	98%	51%	50%	71%
Decision-Making Autonomy		64%	92%	79%	36%	79%
Areas where entity has a mandate to regulate-	End-user tariffs	○	○	○	○	100%
	Quality of supply and service	○	○	○	○	100%
	Electrification or increased access to energy	●	○	●	●	53%
Decision of the regulatory entity are legally binding in the area of-	End-user tariffs	○	○	○	●	88%
	Grid access charges	○	○	○	●	87%
	PPA/wholesale prices	○	○	○	●	92%
	Quality of supply/service	○	○	○	●	87%
	Market design	○	NAP	○	●	50%
	Licensing	NAP	NAP	○	●	85%
	Utility oversight	NAP	○	●	●	71%
Government body rejecting or modifying regulatory decisions	NAP	●	●	●	17%	
Law prescribes decision making process for-	End-user tariffs	●	○	○	○	94%
	Grid access charges	●	○	○	○	81%
	Quality of supply/service	●	○	○	○	87%
Budgetary Autonomy		88%	100%	50%	50%	80%
Funding for regulator established by law		○	○	○	○	100%
Percentage of regulator's budget that comes from levies or taxes		0.752	1	0	0	59%
Leadership Autonomy		88%	100%	75%	14%	66%
Legal basis for existence is primary legislation		○	○	○	○	100%
Power to determine own organizational structure and rules		○	○	●	●	50%
Power to determine the allocation and use of budget		○	○	○	●	44%
Legal requirements or restrictions regarding professional profile leadership		○	○	○	●	94%
There is a fixed term for the leadership of the regulatory entity		○	○	○	●	88%
Legal provisions under which leadership can be removed from office		○	○	○	●	75%
Current leadership of entity connected to government or utilities		●	○	●	●	25%
Over 60% of employees are in technical positions		○	○	○	NAV	57%
Managerial Autonomy		0%	100%	0%	100%	59%
Pay scale not linked to govt pay scale or is 90% of utility pay scale		●	○	●	NAV	53%
Not required to follow govt employment regulations		●	○	●	○	63%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available

L. Regulatory substance- tariff regulation index for Vietnam and comparators, 2015

	Colombia	Peru	Philippines	Vietnam	International benchmark
Tariff Regulation	92%	100%	93%	83%	77%
Regulatory Framework for Tariffs	100%	100%	86%	100%	90%
Objectives in determining tariffs mentioned explicitly in policy or legal mandate	○	○	○	○	100%
Principles of tariff-setting clearly articulated	○	○	○	○	88%
Authority over the tariff level	○	○	○	○	94%
Clear definition of “cost recovery”	○	○	○	○	88%
Legitimacy of costs is used as a basis for tariff calculations	○	○	○	○	88%
Tariff-setting based on a clearly specified regulatory framework	○	○	○	○	88%
Frequency and schedule of revisions determined by law or regulation	○	○	●	NAP	75%
Determination of Tariffs	83%	100%	100%	67%	64%
Publicly available written formula is to be used for tariff setting and utilities are legally required to adhere to it	○	○	○	○	88%
Avoid passing-through inefficient costs to customers	○	○	○	○	76%
Requirement to submit financial information according to set standards	○	○	○	○	53%
Users bear the costs of incentive mechanisms for renewable energy generation	○	○	○	●	75%
Regulatory mechanisms to compensate generators for the provision of firm capacity or ancillary services	○	○	○	○	58%
Utilities are compensated for the costs of stranded assets	●	○	○	●	25%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available

M. Regulatory substance- quality of supply index for Vietnam and comparators, 2015

	Colombia	Peru	Philippines	Vietnam	International benchmark
Quality Regulation	100%	100%	92%	71%	75%
Quality of Service Standards	100%	100%	100%	75%	82%
Requirement to meet quality of service standards	○	○	○	○	100%
Specific quality of service standards are formally written and publicly available for- quality of the product, quality of the service and customer service	○	○	○	○	97%
Performance on quality of service standards is public	○	○	○	○	71%
Fines for failing to meet quality of service standards	○	○	○	●	59%
Quality of Service Enforcement	100%	100%	83%	67%	68%
Requirement to report technical data on a periodic basis	○	○	○	○	100%
Regulator specifies how to collect technical performance data	○	○	○	○	71%
Regulator reviews or validates technical performance data	○	○	○	●	47%
Automated information management systems are required to measure the quality or reliability of the power supply	○	○	●	○	71%
Measurements of the quality or reliability of power supply are made public	○	○	○	○	65%
Financial incentives to meet customer service standards or increase customer satisfaction	○	○	○	●	53%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available

N. Regulatory substance- market entry index for Vietnam and comparators, 2015

	Colombia	Peru	Philippines	Vietnam	International benchmark
Market Entry Regulation	50%	50%	100%	100%	77%
Permitting New Entrants	50%	100%	100%	100%	90%
Responsible for monitoring compliance with the terms of the license or permit	●	○	○	○	88%
Authority to impose penalties for violating license or permit terms	NAP	○	○	○	100%
Penalties are formally written and publicly available	NAP	○	○	○	80%
Provisions to force companies to relinquish licenses or permits for violation	○	○	○	○	100%
PPA Approvals	50%	0%	100%	NAP	57%
Legally required to approve all power sales contracts either directly or indirectly	●	●	○	●	59%
Approve or refuse a proposed PPA in a legally specified period of time	NAP	NAP	○	NAP	60%
Authority over the process by which utilities can select or procure power from IPPs	○	●	○	●	50%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available

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¹⁶ Note: This reference list retains the spellings 'Viet Nam' and 'Vietnam' per respective works' original title (both are anglicized forms of the Vietnamese language word *Việt Nam*). Author family name is denoted by use of SMALL CAPS. Author name may occur before personal name (without a comma) as it appears in each original work.

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ACRONYMS

ART	Average Retail Tariff
BOT	Built-Operate-Transfer
CPC	Central Power Company
discom	distribution company
DSM	Demand-Side Management
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
EPTC	Electricity Power Trading Company
ERAV	Electricity Regulatory Authority of Vietnam
ESMAP	Energy Sector Management Assistance Program
EVN	Electricity Vietnam
FDI	Foreign Direct Investment
FIT	Feed in Tariff
HCMCPC	Ho Chi Minh City Power Company
HNPC	Ha Noi Power Company
LDU	Local Distribution Utility
MOIT	Ministry of Industry and Trade
MOLISA	Ministry of Labour, Invalids and Social Affairs
MW	Megawatts
NLDC	National Load Dispatch Center
NLDC	National Load Dispatch Center
NPC	Northern Power Company
NPT	National Power Transmission Company
PC	Power Company (in Vietnam this refers to a vertically integrated utility pre-1995, and a distribution company after 2003)
PPA	power purchase agreement
PPIAF	Public-Private Infrastructure Advisory Facility
SMO	System and Market Operator
SOE	State-Owned Enterprises
SMHPs	strategic multipurpose hydropower plants
SPC	Southern Power Company
VAT	value-added tax
VCGM	Vietnam Competitive Generation Market
VWEM	Vietnam Wholesale Electricity Market
WBG	World Bank Group

UNITS OF MEASURE

\$	United States Dollar
k	kilo (1,000)
M	mega (1,000,000)
Wh	Watt-hour
W	Watt (Joule per second)
V	Volt