



ENERGIZING MYANMAR

Enhancing access to sustainable energy for all

POLICIES FOR SHARED PROSPERITY IN MYANMAR



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Myanmar has the opportunity to significantly enhance energy access, starting from a situation where energy consumption per capita is among the lowest in the world. Two-thirds of the population is not connected to the national electricity grid, and 84 percent of rural households lack access to electricity. The lack of affordable and reliable power is a key constraint to the delivery of vital services such as health, education and finance for rural populations, and for private sector development and job creation more broadly. Also, access to modern fuels for cooking (such as liquefied petroleum gas) is limited to urban areas. Consequently, traditional biomass (wood and animal dung) is widely used and accounts for about 70 percent of primary energy consumption. The Government's National Electrification Plan aims to electrify more than 7 million households and achieve access to electricity for 36 million people by 2030. Achieving this objective (which is also the UN SDG7 in Myanmar) is vital to poverty reduction and shared prosperity.

CONTEXT AND OPPORTUNITIES FOR REFORM

The power sector in Myanmar has the opportunity to scale-up access to affordable, reliable and sustainable electricity. In 2013, Myanmar's electricity utilities connected about 200,000 residential customers to the power grid. At this rate, it would take nearly 40 years to achieve universal access and connect 7.2 million households presently without access to affordable and reliable electricity. To achieve universal access by 2030, as stated in the National Electrification Plan (NEP), the electrification rate should increase to 500,000 new connections per year by 2020, and stay at least at that level for another ten years.

Investments in the power sector will need to more than double. The total cost of NEP, including investments in power generation, transmission and distribution required to meet new demand, is estimated at about \$10 billion over the next 15 years. Furthermore, during this period, another \$20 billion of investments in power generation will be required to meet the rapidly growing electricity demand, assuming an average real GDP growth of 7.1 percent per year. The main challenge to mobilize and finance these investments (in the order of \$2 billion per year) will be the financial viability of the power sector, which critically depends on the pricing policy.



Tariffs below cost recovery should be reviewed to overcome barriers to investment in the energy sector and disincentives to improving efficiency and productivity in the economy. Chronic underinvestment in energy infrastructure over the past decades led to shortages and deteriorating reliability of energy supply which, in turn, slowed down economic development and crippled social services including healthcare and education. Therefore, a sound energy pricing policy is not just a cornerstone of a financially viable energy sector, but a catalyst for wider economic and social development.



Ensuring that financial viability is improved and sustained over time requires a transparent, consistent and stable energy pricing policy. The main principle underpinning the pricing policy should be the full recovery of the economic cost of gas and electricity supply. This requires a regular review of underlying costs of gas and electricity supply and transparent adjustment of tariffs taking into consideration other policy objectives such as protection of the poor and vulnerable consumers. If meeting these objectives requires subsidies to consumers (direct or cross-subsidy) the subsidy should be explicit, well targeted, adequately budgeted and fiscally affordable.

Public resources – including concessional and donor support – will not be able to meet all the financing needs in the power sector. Therefore, increasing private sector participation will be essential, as well as improving sector efficiency. Myanmar already has significant experience in public private partnerships (PPPs) and direct private investments in the energy sector, such as the Independent Power Producers (IPPs). Going forward, policy makers should review this experience and study approaches used in other countries to enhance private sector participation in power sector development. Clearly, both the PPP and IPP models will be relevant in Myanmar. The PPP model (where the private sector enters into a joint ownership arrangement with the state) will be applicable across the power sector, whilst the IPP model (where a private/independent developer enters into a commercial contract with a state entity, backed by government guarantees) will be more likely in power generation.

Addressing the current fragmented institutional and regulatory framework, and low institutional capacity, should help speed up decision making and remove bottlenecks for sector development. Seven ministries are responsible for activities in the energy sector, with the Ministry of Energy (MOE) serving as the focal point for overall energy policy, and the Ministry of Electric Power (MOEP) as the lead agency for power sector development. Overlapping responsibilities for policy-making, regulation, planning and supervision across ministries hamper the operations of eight state economic enterprises (SEEs), which are directly responsible for implementation of sector activities. Furthermore, the low number of staff dedicated to energy policy, planning and regulation places severe limits on the institutional capacity of the sector.

Strategic planning and comprehensive assessment of all energy choices should help to adequately assess the significant and long-lasting economic, environmental and social impacts. Myanmar has abundant energy resources, including natural gas, hydropower, solar and other renewable energy. It is also well positioned to be a regional trading hub in natural gas and electric power. Unlocking this potential in an economically effective and environmentally and socially sustainable manner will require careful analysis of all alternatives and rigorous planning to chart a sustainable development path which will generate best economic and social results for the country and affected population. Given a difficult history of several large energy projects which caused deep grievances and impacts on affected communities, there is a need to enhance transparency and encourage public participation in formulation of energy sector development plans and preparation of specific investment projects.

RECENT DEVELOPMENTS

Several reforms have been initiated to improve the institutional and policy environment in the energy sector. To improve coordination and policy making, the National Energy Management Committee (NEMC) chaired by the Minister of Energy and co-chaired by Minister of Electric Power was established in 2013. MOE formulated a National Energy Policy (NEP) and prepared an Energy Master Plan (EMP). The NEP adopted in January 2014 a broad framework and strategic directions for electrification and sector development. MOEP developed a new Electricity Law, which established the legal basis for IPPs and PPPs and stipulated the introduction of an independent Electricity Regulatory Commission (ERC). Associated secondary legislation (rules and regulations) have not yet been adopted and the ERC has not been established yet.

Electricity tariff reforms have enabled power generators and suppliers to cover the cost of service. The devaluation of the Myanmar kyat in 2012 significantly increased the cost of electricity supply due to the higher cost of US-denominated natural gas for power generation. The Government responded by increasing electricity tariffs in 2012 and in April 2014. The new electricity tariff structure for end-users (effective from April 2014) provides three tariff blocks for residential and small consumers, and six tariff blocks for industrial and large consumers. Effectively, the residential consumers are cross-subsidized by large commercial customers. Despite the cross-subsidies, the overall tariffs have covered the cost of service (short-run marginal cost), while the investment cost remains subsidized by the Government.

Restructuring and corporatization have been initiated in the power distribution sector. To improve performance and overall efficiency in power distribution, the Government initiated corporatization of the Yangon Electricity Supply Board (YESB accounts for about half of the electricity market in Myanmar) and created the Mandalay Electricity Supply Corporation (MESB) through the restructuring of the Electricity Supply Enterprise (ESE serves all states and regions outside Yangon and Mandalay). Short-term concessions for low-voltage distribution grid in urban areas (e.g. Yangon and Mandalay) were also piloted to reduce

distribution losses through private sector participation in billing and collections. As a result, distribution losses were reduced from around 23 percent (in FY2009) to 14 percent in Mandalay and 16 percent in Yangon (in FY2014). To continue the loss reduction program will require substantial investments in expansion and modernization of overloaded and outdated distribution networks.

Private sector participation has significantly increased in power generation. The opening up of the sector to private developers (under the new Electricity Law) created a surge of unsolicited IPP and PPP proposals. It is estimated that MOEP entered into Memoranda of Understanding for several thousand Mega Watts (MW) of gas, coal and hydropower projects over the last couple of years. However, moving these proposals towards the MOA stage and signing bankable Power Purchase Agreements (PPAs) proved much more difficult. By 2015, the total installed capacity of IPPs reached about 440 MW (270 MW in gas-fired and 170 MW in hydropower plants) or about 10 percent of the total installed capacity in Myanmar. Around 260 MW of rental power plants were connected to the power grid to help alleviate acute power shortages. In April 2015, MOEP completed the first competitive bidding for the 240 MW Myingyan IPP, which resulted in a significantly lower price and better plant performance compared to unsolicited bids received earlier.

Myanmar joined the UN Sustainable Energy for All (SEFA) initiative and adopted the National Electrification Plan aiming to achieve universal access to electricity by 2030. After joining the UN SEFA initiative in 2014, Myanmar became one of the first countries in the world to develop and adopt a comprehensive NEP for universal access to electricity (UN SDG7) by 2030. To achieve this, the NEP calls for investments of \$5.8 billion in grid and off-grid solutions to connect 7.2 million households. The NEEC, chaired by the Vice President, will oversee the electrification program. The NEEC Secretariat and Program Management Offices (PMOs) were established in MOEP (for the grid extension) and the Ministry of Livestock, Fisheries and Rural Development (for off-grid electrification). Program implementation started in September 2015 with the World Bank Group support, including a \$400 million IDA credit for the National Electrification Project.

REGIONAL EXPERIENCES AND LESSONS

With sustained government commitment, a transition from low access (as in Myanmar today) to high or universal access can be made within two decades, as Lao PDR and Vietnam have recently accomplished. Lao PDR and Vietnam have increased the access to electricity from less than 20 percent in the mid-1990s to more than 90 percent (Lao PDR) and close to universal access (Vietnam) over the last two decades (Figure 1). The key element of success in both countries was long-term national commitment to electrification which was broad-based and not unduly affected by political and economic changes. Thailand, which achieved near universal access to electricity a decade earlier, consistently included rural electrification in its 5-year National Economic and Social Development Plans. A similar approach was taken in **Malaysia** throughout 1980s and 1990s following the establishment of the Rural Electrification Department in 1978.

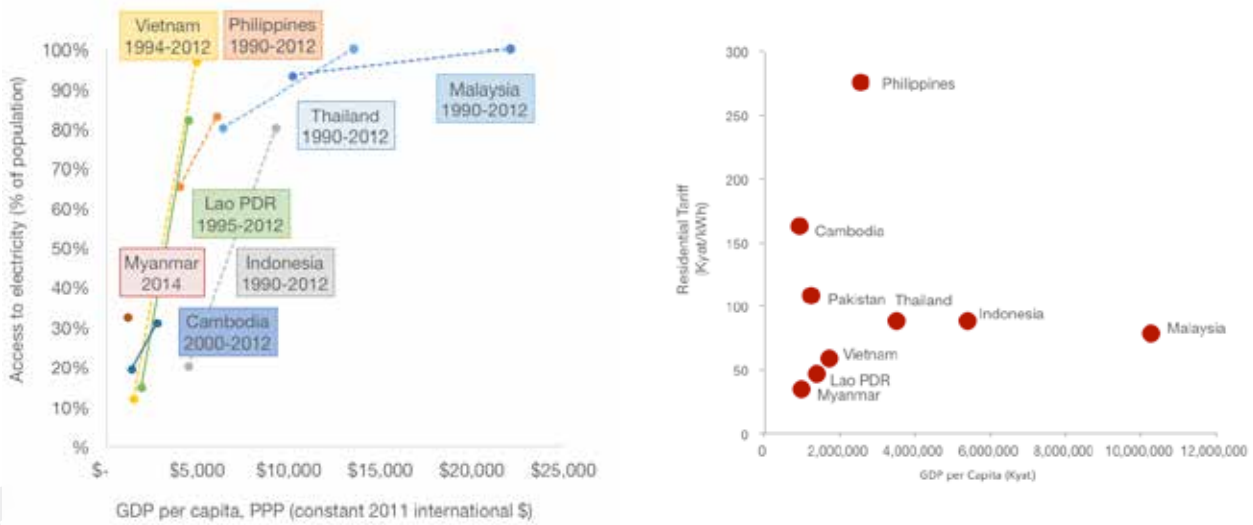
Sustained funding for upfront investments, the financial viability of the power sector, and affordability, are closely linked to successful electrification programs. Funds for capital investments in rural electrification should be available on a stable basis because a lack of predictability makes it difficult for implementing agencies to implement the program and scale-up access in a sustainable manner. In **Thailand**, PEA received low-cost, long-term loans for grid roll-out. These loans significantly reduced the costs and enabled PEA to build its revenue base before the loan repayment began. In Vietnam, the electrification program has involved a major public investment effort, matched by significant local contributions. The power utility (EVN) was able to self-finance a large portion of the capital costs necessary for rural electrification, and, in the early years, local governments and consumers also contributed significantly. In **Indonesia**, the 1997 Asian Financial Crisis badly damaged financial health of the power company (PLN) and made it difficult for the government to provide funds. As a result, the electrification program in Indonesia slowed down and it only recently regained the speed after the government secured financial viability of PLN through a subsidy scheme.

Residential tariffs in many countries in the region remain subsidized (e.g. Indonesia, Malaysia, and Vietnam) (Figure 1). This can easily undermine the financial viability of the power sector if the subsidies are not fiscally affordable and/or are not adequate to cover the revenue shortfall from tariffs below cost recovery. On the other hand, high electricity prices in Cambodia and the **Philippines**, which do not include subsidies, clearly represent a major barrier for universal access to electricity in these countries.

Adequate institutional capacity is essential for a timely and sustainable electrification program.

Planning and implementation of a national electrification program need to be comprehensive and synchronized across the country, and need to bring development partners together on a sector-wide platform of “many partners, one team and one plan”. This requires a designated implementation agency to be responsible for achieving electrification targets. For example, Thailand created the Office of Rural Electrification (ORE) under PEA, and dissolved ORE after the grid reached most villages, at which point PEA resumed responsibility for serving villages. Furthermore, building institutional capacity throughout the value chain, including the utilities and sector institutions, as well as local contractors, is critical to organize the work teams all the way to the regional, district and village levels.

Figure 1: Electricity access and price of electricity vs GDP per capita in select countries, 1990-2014



Source: “One Goal, Two Paths” The World Bank Flagship Report on Energy Access, 2011

Under the service agent model in Vietnam, local community maintained Low Voltage distribution lines, carried out simple repairs and handled collections, until EVN took over these functions after the electrification phase was completed.

Creating an independent regulatory agency is essential for balancing viability of the electrification program and protection of vulnerable consumers. Many countries around the world, including Thailand and Vietnam, established independent energy regulators to design tariffs and subsidy schemes that secure financial viability of service providers and affordability for consumers. A well designed and stable regulatory framework is essential for private sector participation, protection of consumers, and management of boundaries between grid and off-grid options for rural electrification.

Establishing appropriate technical codes and introducing recent technical innovations can lower the cost and accelerate the implementation of the electrification program. In setting up their networks, all power utilities must follow a technical code. However, codes which are designed for densely populated urban areas may not be optimal for rural electrification. In China, for example, costs were kept under control by developing two compatible national technical codes: one for high demand regions; and the other for low demand areas, with provisions for gradual transition to the more stringent code with future growth. Many countries, including Lao PDR, adopted low cost options for low demand areas, such as “single-phase supply and single-wire earth return” (SWER). Lao PDR also deployed shield wire technology with significant savings in the mountainous regions.

Recent rapid technological advances and performance improvements, particularly in renewable energy for off-grid areas, will enable Myanmar to leapfrog certain stages of electrification. One example is a synergy between the electricity and telecommunication services which can be combined in off-grid areas where standalone generator powering cell towers can provide surplus electricity to nearby villages at a relatively low cost.



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POLICY OPTIONS

The establishment of NEEC and the adoption of NEP demonstrates strong commitment and creates a sound basis for scaling-up access to electricity in both grid and off-grid areas: Maintaining NEEC and adequately staffed PMOs in MOEP and MLFRD, as well as building institutional capacity throughout the value chain (including in power distribution utilities and sector institutions at the regional/ state and district levels), will go a long way to ensure sustained government commitment and strengthened implementation of the electrification program.

Establishing a sound policy and transparent regulatory framework: The new Government should, as a matter of priority, adopt secondary legislation (rules and regulations) which is necessary to operationalize the 2014 Electricity Law. The new policy and regulatory framework should focus on the establishment of a transparent and efficient electricity market, particularly related to competitive bidding for new generation on IPP/ PPP basis. This will require adopting and maintaining a transparent pricing policy, consistent with the principles of full cost recovery, and establishing an independent Electricity Regulatory Commission, as envisaged under the 2014 Electricity Law.

Complete corporatization and foster commercialization in power generation and distribution sectors: Effective corporatization of YSEB and the creation of Mandalay Electricity Supply Corporation (MESOC), as well as establishment of Electric Power Generation Enterprise (combining all state-owned generation assets), are essential for improvement of sector performance and scaling-up access to sustainable electricity supply. Further restructuring of ESE may be a medium-term objective subject to the future market growth

and electrification rate outside Yangon and Mandalay. The Myanmar Transmission System Operator (MTSO) should be established as an independent transmission company.

Strengthen planning capacity and develop Gas Sector Master Plan and Hydropower Development Plan:

Myanmar has abundant energy resources, including natural gas, hydropower, solar and other renewable energy. It is also well positioned to be a regional trading hub in natural gas and electric power. Unlocking this potential in an economically effective and environmentally and socially sustainable manner will require careful analysis of all alternatives and rigorous planning to chart a sustainable development path which will generate best economic and social results for the country and affected population. This will require institutional development and capacity building for system planning, particularly in the natural gas and hydropower sectors, as well as strengthening of environmental and social safeguards and including public consultations in the planning process and project preparation activities.

The table on the right proposes short-term (within 1 year) and long-term (within 3-5 years) policy options for the next five years (2016-2020) to help deliver on the above objectives of increasing the rate of electrification; improving transparency and competition in the electricity market, and mobilize private sector investments, while protecting vulnerable consumers; increasing efficiency through corporatization and commercialization of enterprises in the energy and power sector; improving strategic planning capacity and mainstream principles of environmental and social sustainability in the energy and power sector planning.

OBJECTIVES	SHORT-TERM OPTIONS	LONG-TERM OPTIONS
<p>Increase the rate of electrification and reach at least 500,000 connections per year by 2020</p>	<p>Maintain the National Electrification Executive Committee (NEEC) accountable for the implementation of NEP to the country's Vice President. Ensure that Project Management Offices in MOEP and MLFRD are adequately staffed and equipped for effective coordination of electrification program across the country.</p>	<p>Improve institutional capacity throughout the value chain. Provide support for institutional capacity building to the utilities (ESE, YESC, MESC), local contractors, and sector institutions at the regional/ state and district level. Adopt grid codes and introduce modern technologies and low cost solutions for rural electrification.</p>
<p>Improve transparency and competition in the electricity market, and mobilize private sector investments, while protecting vulnerable consumers</p>	<p>Adopt secondary legislation (rules and regulations) for operationalization of the 2014 Electricity Law. Establish the Electricity Regulatory Commission. Adopt and start implementing pricing policy based on full cost recovery of the economic cost of gas and electricity supply. Ensure that subsidies to vulnerable consumers (direct or cross-subsidies) are explicit, well targeted, adequately budgeted and fiscally affordable.</p>	<p>Consolidate and strengthen institutional capacity for strategic planning and policy making by merger of Ministry of Electric Power and Ministry of Energy. Increase private sector participation and leverage public resources through transparent and competitive IPPs/ PPPs. Mobilize private resources and commercial financing to leverage public resources and donors funding (including IDA) through a competitive selection of private developers for priority investments on IPP/ PPP basis.</p>
<p>Increase efficiency through corporatization and commercialization of enterprises in the energy and power sector</p>	<p>Complete corporatization of YESC and MESC and foster their commercialization by (in the first year): appointing CEOs, adopting bylaws, and setting Key Performance Indicators for the newly established corporations. Complete restructuring of MEPE and hydropower enterprises and establish Electric Power Generation Enterprise (EPGE) Transform YESC, MESC and MEPGC into financially viable companies with sound corporate governance, clear development objectives and performance indicators (KPIs) by developing a Financial Viability Action Plan in the first year. Introduce financial auditing in line with international accounting standards.</p>	<p>Develop and start implementing divestment program in the power sector focusing on YESC and MESC. Develop and start implementing restructuring program for ESE focusing on corporatization of regional distribution companies and creation of Rural Electrification Agency under ESE. Establish Myanmar Transmission System Operator (MTSO) responsible for the high voltage transmission system.</p>
<p>Improve strategic planning capacity and mainstream principles of environmental and social sustainability in the energy and power sector planning.</p>	<p>Create a joint task force led by MOE for the review of gas sector development plans and initiate preparation of gas sector master plan. Create a joint task force led by MOEP for the review of hydropower plans and initiate preparation of hydropower development program. Establish guidelines for environmental and social safeguards and encourage public consultations in formulation of energy master plans .</p>	<p>Improve resource mapping and develop GIS based maps of renewable energy resources Carry out system studies for integration of renewable energy in the power grid Develop an integrated generation and transmission expansion plan to meet future electricity demand in affordable, reliable and sustainable manner based on master plans for gas, hydropower and renewable energy development.</p>



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REFERENCES

Castalia Strategic Advisors and Columbia University (Earth Institute, Sustainable Engineering Lab) for the Government of the Republic of the Union of Myanmar and WBG, “Myanmar National Electrification Plan.” (August, 2014)

WBG, “One goal, two paths: achieving universal access to modern energy in East Asia and the Pacific,” (2011)



“This Policy Note is part of a series entitled All Aboard! Policies for shared prosperity in Myanmar”



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