

# **Too high a price for the poor and climate?**

## **The World Bank's energy access programme in Myanmar**





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For further information on the issues raised in this report please contact:

BIC Europe

Sarphatistraat 30

1018 GL Amsterdam

The Netherlands

Email: [info@bic-europe.org](mailto:info@bic-europe.org)

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## Executive Summary

Currently at 44 percent, Myanmar has the lowest rate of access to electricity in Southeast Asia and is on the list of 20 countries with the highest energy deficits in the world. Although some progress has been made in recent years, more than 35 million people still have no access to electricity in Myanmar. The same poor communities that desperately need access to energy are also the most vulnerable to climate change impacts. For the well-being of poor communities, energy access goals and climate goals are inextricably linked.

With this in mind, the government of Myanmar and the World Bank Group (WBG) are both committed to the United Nations (UN) Sustainable Development Goal 7 (or SDG7), which includes universal access to affordable, sustainable energy and substantially increasing the share of renewables in the final global energy mix by 2030.<sup>1</sup> In addition, both Myanmar and the WBG are committed to the goals of the UN Paris Climate Agreement (December 2015), which include to limit global average temperature increase to 1.5°C and to make financial flows consistent with a pathway towards low greenhouse gas (GHG) development.

The following paper reviews the adequacy of WBG contributions towards assisting Myanmar to achieve universal sustainable energy access by 2030 and the Paris Agreement climate goals.<sup>2</sup>

### **Main Findings**

The WBG is assisting Myanmar in the first phase (2015-2019) of the country's National Electrification Plan (NEP) to achieve universal energy access by 2030. The WBG, along with the Asian Development Bank (ADB) and several bi-lateral donors, is providing significant finance and other assistance needed for the first phase of the NEP.

It is very positive that the WBG significantly ramped up its energy access assistance to Myanmar with \$400 million directed at grid extension, off-grid solutions, and electricity connections. However, there are several risks to Myanmar reaching universal access as well as important affordability and climate change concerns surrounding the WBG's approach, including:

**Connection costs remain prohibitive for poor families:** Even with WBG assistance, the cost for a new electricity connection is often unaffordable for poor households. Myanmar's Rural Development Department reports that many rural people have been unable to afford the expected installation costs for either solar home systems or mini-grids.<sup>3</sup> For conventional grid connections, households are responsible for several installation fees, including meter boxes, deposits, cabling, connection, and supervision fees.<sup>4</sup> The WBG's support of gas power generation is further contributing to affordability problems by increasing electricity costs (see below).

**Electrification rate is still inadequate to reach universal access goal:** The WBG's assistance, in conjunction with ADB, bi-lateral donors, the Myanmar government, and local community funding, expects to reach 1.2 million household connections by 2021. While a great achievement, it is 500,000 short of Myanmar's NEP target of 1.7 million by 2020.

**No commitment to sustain electrification rate:** According to the World Bank, in order for electrification programs to be implemented and sustained, finance needs to be predictable. Thus, it is troubling that the WBG has not committed sustained finance for subsequent phases of Myanmar's NEP. The WBG's Country Partnership Framework for Myanmar, which sets out the planned WBG operations for upcoming years, has not been updated since 2015. Without predictable, sustained finance, Myanmar will be unable to maintain the 500,000 annual connections necessary to reach universal access by 2030.

**Inadequate support for renewable energy:** Myanmar has significant solar and wind resources. Instead of prioritizing finance for climate friendly renewable energy, the WBG's assistance firmly places gas as the priority. First, the WBG's electrification policy options for Myanmar prioritized the development of gas and large hydropower, while designating non-hydropower renewable solutions as a long-term goal (see Appendix, Table 2A). Second, the WBG provided \$217 million for gas power generation projects, while providing less than half that amount to renewable energy (\$90 million for mini-grids and solar home systems; \$12 million advisory

services for hydropower and solar). Moreover, there is no WBG project finance for utility-scale renewable energy projects and Myanmar still does not have adequate policies for non-hydropower renewable energy.<sup>5</sup>

**Highly problematic support for gas:** WBG public finance should not be used to subsidize fossil fuels. The production, transport and burning of gas emits significant GHG emissions and is the largest global source of methane emissions. The WBG's focus on expanding gas operations in Myanmar does not address climate risks or the availability and affordability of gas, especially for the poor. Myanmar does not have enough gas resources to supply forecasted demand. As a result, WBG-supported gas power plants will mostly burn imported liquefied natural gas (LNG).<sup>6</sup> LNG is neither climate friendly nor cost effective. Converting gas into LNG is a highly energy-intensive and thus GHG-intensive process. Furthermore, the conversion process will increase electricity costs<sup>7</sup> and add to the affordability problem for the poor.

**Outdated Power Generation Plan:** All of Myanmar's power generation scenarios have substantial increases in coal and gas. The WBG should have recognized that any planned increase in coal power generation is not in alignment with the Paris Climate Agreement.<sup>8</sup> Myanmar's power generation plans are based on outdated studies and do not reflect the significant changes in the cost effectiveness and rapid technological advances (e.g., battery storage) of renewable energy sources.

**Unclear energy access outcomes and transparency concerns:** The WBG's stated expectation of 1.2 million new electricity connections stem from many different operations involving funding from several entities. However, the WBG's reporting of energy access outcomes associated with its operations does not make this clear. This may result in double counting of results as well as a misunderstanding of and addressing of potential gaps in energy access. In addition, a recent report on the WBG-supported Myingyan gas power plant revealed that citizens could not get access to the Power Purchasing Agreement signed by the government, which greatly restricts meaningful data available to the local communities to understand the public costs and implications for electricity tariffs.<sup>9</sup>

## **Recommendations**

To help Myanmar reach its SDG7 goal of universal access to affordable energy by 2030 in a way that is in line with the goals of the Paris Climate Agreement, **the WBG needs to make reducing the costs of energy for the poor and for the development of renewable energy the central focus of WBG assistance.**

Accordingly, the WBG should do the following actions:

- **Provide Grants for Installation Costs:** In order for the WBG to directly help the poor gain access to electricity, the WBG should provide adequate grant-based finance to cover the initial installation costs for poor urban and rural households.
- **Provide Adequate Funding to Sustain 500,000 Household Connections Annually:** Commit adequate International Development Association (IDA) finance to sustain an electrification rate of at least 500,000 new household connections per year for 2020-2030 and a development outcome of 76 percent electrification by 2025 and 100 percent by 2030.
- **Finance at least 5 Utility-scale Renewable Energy Projects:** From 2020-2025, the WBG should provide direct project finance for at least 5 utility-scale renewable energy projects (excluding large hydropower). In addition, the WBG should finance a fund that specifically supports on-the-ground, indigenous expertise in renewable rural electrification by offering concessional finance to local entrepreneurs (e.g. revolving funds to provide loans with longer tenure and lower interest).
- **Adopt comprehensive Renewable Energy Investment Framework:** The WBG should assist the government of Myanmar to adopt a comprehensive policy and regulatory framework for non-large hydropower renewable energy (i.e., Master Plan for Renewable Energy Development), including a plan to integrate non-large hydropower renewables and mini-grid operations into the main grid.
- **Cancel Proposed Public Finance for Ywama Gas Plant:** Limited international public finance should not be used to subsidize GHG-emitting fossil fuels. Instead of a carbon tax, such public finance provides an incentive to emit GHGs, which is inherently inconsistent with the Paris Climate Agreement. In addition, gas power generation is not a cost effective or affordable electricity option in Myanmar.

Therefore, the World Bank should terminate consideration of \$160 to \$280 million for a 300 MW Ywama gas plant.

- **Reduce Future Fossil Fuel Reliance – Update Power Generation Plan:** In order to protect the poor and the climate, the WBG should help Myanmar reduce reliance on fossil fuels instead of increasing their future dependence on coal and gas. The WBG should assist Myanmar to adopt an updated Power Generation Plan with no coal options and a significant scale up in renewable energy that reflects the changes in the cost effectiveness and rapid technological advances of non-large hydropower renewable energy sources.<sup>10</sup>
- **Improve Transparency of WBG Operations:** The WBG should adopt transparent reporting of WBG direct contributions to new electricity connections. The WBG should clearly measure outcomes against NEP targets and identify gaps. The WBG needs to be clear when expected new connections are a result of a combination of other multilateral development banks (MDB) and/or bi-lateral assistance and therefore, avoid double counting of contributions. In addition, the WBG should require the public disclosure of Power Purchase Agreements signed by the government.
- **Adopt a new Country Partnership Framework for 2020-2025 that includes the above commitments.** The Country Partnership Framework (CPF) is an important tool for the WBG's engagement in a given country. The current CPF for Myanmar covers 2015-2019. A new CPF that gives priority to renewable and delivers clean energy access for the poor needs to be adopted.



## Introduction

The government of Myanmar and the World Bank Group (WBG) are both committed to the United Nations Sustainable Development Goal 7 (or SDG7), which aims to achieve includes universal access to affordable, reliable and sustainable energy services and substantially increase the share of renewables in the final global energy mix by 2030.<sup>11</sup> The WBG states that achieving this objective is vital to poverty reduction and shared prosperity in Myanmar.<sup>12</sup> In addition, both Myanmar and the WBG are committed to the goals of the UN Paris Climate Agreement (December 2015), which includes the commitments to limit global average temperature increase to 1.5°C and to make financial flows consistent with a pathway towards low greenhouse gas (GHG) development. Reaching universal energy access by 2030 is a big challenge for Myanmar, which has the lowest rate of access to electricity in Southeast Asia.<sup>13</sup> According to the government as of May 2019, only 44 percent of the population had access to electricity – up from 34 percent in FY2015.<sup>14</sup> Although progress has been made in recent years, more than 35 million people still have no access to electricity.

**Urban vs. Rural Electrification Rates:** As reported by the Asian Development Bank (ADB) in 2016, the country's average electrification rate had grown from 26 percent in 2011 to 34 percent in 2015.<sup>15</sup> Yangon City had the highest rate of 78 percent, followed by Kayar (46 percent), Mandalay (40 percent), and Nay Pyi Taw (39 percent). The remaining rural areas continue to be poorly electrified, averaging less than 20 percent, with Kayin and Tanintharyi states under 10 percent.

In September 2017, the World Bank published a Multi-Tier Framework (MTF) survey in 15 countries, including Myanmar, which measures global progress towards the UN's SDG7 goal. The framework measures energy access using a multi-tiered-spectrum, which ranges from Tier 0 (no access) to Tier 5 (the highest level of access (i.e., 24-hour electricity). According to the World Bank's MTF 2017 survey, the electricity access of about 70 percent of households in Myanmar stands at Tier 1 (access for only around 2 hours per day).<sup>16</sup>

**Climate Change and Myanmar:** According to the World Bank, natural disasters and the impact of climate change represent major challenges for Myanmar:<sup>17</sup>

*"The country is already experiencing increased climate variability which will have a growing impact in the coming decades, especially given the importance of agriculture for livelihoods. Rising sea levels pose a substantial threat, with ten percent of the country projected to be affected by a sea-level rise of between one and five meters. Myanmar is also among the world's countries most vulnerable to natural disasters and has suffered through several devastating cyclones, including Cyclone Nargis in 2008, which killed about 140,000 people."*

In December 2015, 195 countries adopted the Paris Climate Agreement with a commitment to limit global average temperature to well below 2°C above pre-industrial levels, while pursuing efforts to limit the increase to 1.5 °C, and to make financial flows consistent with a pathway towards low greenhouse gas (GHG) development. Myanmar has ratified the Paris Climate Agreement and the WBG has committed to assisting countries to reach its goals. In April 2016, the WBG approved its Climate Change Action Plan (CCAP), which stated that the WBG would help client countries deliver affordable and reliable energy services in a manner that is consistent with the global climate goals.<sup>18</sup>

The WBG, as well as the Asian Development Bank (ADB) and several bi-lateral donors, is assisting Myanmar to increase electrification. This case study's objective is to review the WBG's approach towards reaching universal energy access by 2030, while also helping Myanmar address climate change and reaching the goals of the Paris Climate Agreement.

**Methodology of Assessment** – The assessment reviewed the WBG's energy portfolio for Myanmar, including project finance, development policy finance, technical assistance, advisory services, and the country partnership framework. In assessing the WBG Myanmar portfolio, the case study focused on reviewing:

- WBG direct contributions to new electricity connections and the pace of electrification needed to meet universal access by 2030;
- WBG direct contributions to sources of power generation;
- WBG actions addressing availability of finance for energy access; affordability of elec-

- tricity for the poor; and policy frameworks; and
- WBG dual approach to energy access and climate change goals.

It is important to note that the assessment only covered access to electricity and did not cover access to clean cooking solutions, which is also of great importance regarding energy access for the poor.

The Myanmar case study includes the following sections: Myanmar's National Electrification Plan; Sources of Power Generation; WBG Assistance for Myanmar's National Electrification Plan; WBG's Country Partnership Framework; Proposed WBG Operations; and Conclusions and Recommendations.

### **Myanmar's National Electrification Plan**

In 2014, with support from the WBG, ADB and Japan International Cooperation Agency (JICA), the government of Myanmar developed its National Electrification Plan (NEP).<sup>19</sup> The NEP puts forward a plan to achieve universal electrification in Myanmar by 2030. To reach universal access, Myanmar needs to connect roughly 36 million people or more than 7.2 million households by 2030.<sup>20</sup> To achieve this, the NEP calls for investments of \$5.8 billion in grid and off-grid solutions.

Before NEP implementation began, Myanmar's rate of electrification stood at 190,000 new connections per year, which would take 40 years to reach universal access. To achieve universal access by 2030, the NEP explains that the electrification rate needs to ramp up to over 500,000 new household connections per year by 2020, and stay at least at that level for another ten years.<sup>21</sup>

According to the NEP Road Map, during the first 5 years of the program (FY2015-2019), a total of 1.7 million new connections can be made with an estimated total financing of \$843 million.<sup>22</sup> This amount covers fixed investment in long-lived capital assets (\$819.2 million) plus Technical Assistance (\$23.8 million). Subject to the successful implementation of this plan, Myanmar can be expected to achieve approximately 47 percent electrification by 2020, 76 percent electrification by 2025, and 100 percent by 2030.

**Long-term plan mainly relies on Conventional Grid:** According to the Road Map for the NEP, the initial geospatial plan for electrification estimates that around 98 percent of the total new connections will be grid-based. Approximately 250,000 connections using "pre-electrification" solutions such as temporary mini grids or off grid solar home systems will be viable for households who can expect to be connected to the grid at the very end of the NEP least cost roll-out program [in 2030].<sup>23</sup>

### **Sources of Power Generation**

In addition to new household connections, there will also need to be new sources of power generation. For off grid solutions, the source of power generation (e.g., mini-grids based on solar or wind and solar home systems) is already incorporated in the NEP's estimated \$5.8 billion cost for new household connections. For the new grid-based connections, new power generation sources to supply the new connections represent additional costs, estimated at \$20 billion over 15 years.<sup>24</sup>

### **Coal Plans Contradict Paris Climate Agreement:**

In 2013, 27 leading climate and energy scientists from 15 countries determined that in order to remain below 2°C warming the world cannot build any "new unabated coal power plants, even highly efficient ones." Thus, any planned increase in coal power generation is not in alignment with the Paris Climate Agreement.<sup>25</sup>

According to the ADB, in mid-2016 the total installed power capacity in Myanmar was 4,764 MW, with 59.2 percent from large hydropower, 38.3 percent from gas, and 2.5 percent from coal.<sup>26</sup> Going forward, a study paid for by JICA in September 2015<sup>27</sup> posed three power generation scenarios as shown in Table 1. The JICA study favored scenario number 3, Power Resources Balance Scenario, and as such carried out further assessment on this power generation scenario for Myanmar. As of August 2018, it was reported that the government of Myanmar was aiming for the balanced energy mix scenario out to 2030.<sup>28</sup> It must be noted that this scenario is the worst for the climate with the highest reliance on both gas and especially high on coal.

**Table 1. Power Generation Scenarios**

Scenario	Large Hydro	Med. & Sm Hydro	Non-hydro Renewables	Gas	Coal
2016 Baseline	59%			38%	3%
1. Domestic Energy Consumption Scenario (Large Scale Hydro Oriented)	42%	24%	7%	17%	10%
2. Least Cost Scenario	42%	24%	7%	9%	17%
3. Power Resources Balance Scenario	6%	31%	9%	21%	33%

Source: JICA, 2015. *Myanmar: Data Collection Survey on Capacity Development of Power Sector Development Planning*. September 2015.

In addition, the NEP supported by World Bank assistance, references an electrification plan based on the “least cost scenario”. This scenario also has a significant increase in coal power generation. It should be noted that the power generation scenarios were developed with assistance from JICA, one of the world’s leading bi-lateral sources of funding for coal.<sup>29</sup> With significant increases in coal power generation under all the scenarios, none of the JICA-sponsored power generation scenarios for Myanmar are in alignment with the Paris Climate Agreement ratified by Myanmar and committed to by the WBG.

Since 2015, the government has signed many memorandums of understandings (MOUs) for gas, coal, hydropower and solar projects.<sup>30</sup> However, it has been reported that a majority of the MOUs have not made it to final investment decision or financial close for various reasons, including lacking finance and environmental/social concerns. Recent reporting points towards the government backing away from coal due to public opposition<sup>31</sup> and indicates a government intention to provide 12 percent of power through non-hydropower renewables by 2025.<sup>32, 33</sup> Reporting also indicates that there will continue to be a heavy reliance on large hydropower and gas to supply the main grid.

#### **Increasing reliance on gas is not a good option.**

Gas has significant climate, availability, and cost risks for Myanmar. The production and burning of more gas and the associated increase in GHG emissions is a significant threat to the climate. The global gas sector is the largest industrial source of methane emissions,<sup>34</sup> a potent greenhouse gas that in the first two decades has an atmospheric warming effect approximately 80 times greater than carbon dioxide.<sup>35</sup> Methane leakage is a problem across the entire value chain of gas production and distribution and thus, largely offsets the perceived climate benefits of gas relative to coal.<sup>36</sup> Global methane emissions have substantially spiked in recent years posing cata-

strophic climate impacts. In Myanmar, there are an increasing number of leakages in the gas pipeline system and it is estimated that more than 100 leaks were detected in 2013, accounting for 1.5 percent of total production and causing \$1 million in losses.<sup>37</sup>

In addition, Myanmar does not have enough gas resources to supply forecasted demand. Myanmar has gas reserves, but the country exports most of its existing offshore production to China and Thailand.<sup>38</sup> According to the ADB, when considering existing plans for expansion of gas production and demand forecasts, there are possible shortages of gas supply for domestic use.<sup>39</sup>

Lastly, the high cost of gas is a significant affordability issue for many households in Myanmar. In 2018, Myanmar’s Ministry of Energy and Electricity (MOEE) announced that it would be importing liquefied natural gas (LNG) to be converted into electricity for domestic use.<sup>40</sup> However, electricity generated from the imported LNG is expensive. According to an analyst at Wood Mackenzie, the conversion of LNG to electricity could add \$1-\$2.5 per million British Thermal Units to electricity costs, excluding import costs.<sup>41</sup> Furthermore, converting gas into LNG by cooling it to minus 160 °C for transport is a highly energy-intensive and thus GHG emitting-intensive process. LNG is neither cost effective nor climate friendly.

**Outdated Power Generation Scenarios:** As already stated, the current power generation scenarios for Myanmar are not in alignment with the Paris Climate Agreement. In addition, none of the power generation scenarios include an adequate amount of non-large hydropower renewable energy alternatives. The plans are simply outdated and the future mix of power generation sources need to be updated to reflect the significant changes in the cost effectiveness and rapid technological advances (e.g., battery storage) of non-hydropower renewable energy sources. The power generation scenarios are



outdated because they were based on earlier studies and the cost structures and technologies surrounding renewable energy have changed substantially in just the last couple years. Using updated studies would most likely have ramifications for long-term electricity access.

Furthermore, it is not clear that the NEP needs to rely on a plan to have 98 percent of new connections be grid-based. A recent assessment by Hivos found that both the NEP and the WBG-supported electrification operation focus mainly on the extension of the central grid; and largely overlook the role of and opportunities for indigenous expertise on many existing distributed renewable energy solutions (largely biomass and small hydropower mini-grids).<sup>42</sup> The Hivos assessment also points out that the NEP and WBG's provision for off-grid solutions largely supports Tier 1 energy access (i.e. in practice solar home systems or solar lanterns), which cannot power irrigation, agri-processing, and other such poverty-alleviating end uses. Its subsidy program for renewable energy mini-grids is attractive to foreign developers but not conducive for most of the long-experienced lo-

cal social entrepreneurs. Hence, Hivos recommends providing concessional finance specifically to local entrepreneurs (e.g. revolving funds to provide loans with longer tenure and lower interest).

Lastly, Myanmar needs to be cautious with a heavy reliance on large hydropower. A lack of precipitation in summer months and climate change induced unpredictable weather conditions potentially make new large hydropower an unreliable source of power for Myanmar.<sup>43</sup>

### World Bank Group Assistance for Myanmar's National Electrification Program

The following section reviews how WBG assistance is contributing to the NEP as well as addressing affordability and alignment with climate goals. Table 1 lists WBG assistance that is relevant to the energy sector from FY2014 to FY2019. The last column specifies if the assistance directly contributes to new energy connections, which is an indication of direct NEP support.

**Table 2. World Bank Group Energy Sector Assistance in Myanmar FY14-FY19**

Project / Main Actions	Amount (million US\$)	WBG Instrument	Approval Date / End Date	Direct Contribution to:	
				Power Generation	New Energy Connections
<b>Electric Power Project</b> – replacement of Thaton 51 MW open-cycle gas power plant with 106 MW combined cycle gas power plant; institutional capacity	\$140	IDA Investment Project Finance	24-Sep-13 30-Apr-19	Yes	No
<b>Myingyan IPP</b> - 250 MW CCGT gas power plant	\$2	IFC advisory services	9-Mar-14 active	Yes	No
<b>Myanmar Investment Policy</b> - new Investment Law; investor protection guarantees; redesigning new incentives policies	\$2	IFC advisory services	19-Jun-14 active	No	No
<b>Myanmar Investment Climate</b> - strengthen role of private sector in policy reform process; establish public-private dialogue platform	\$2	IFC advisory services	30-Sep-14 active	No	No
<b>Myanmar Hydro</b> - improve implementation of regulatory frameworks for hydro-power sector	\$2.8	IFC advisory services	15-Dec-15 30-Jun-19	No	No
<b>Lighting Myanmar</b> – creation of commercial market for off-grid solutions; improve policies	\$4.9	IFC advisory services	24-May-16 30-Jun-20	No	No
<b>National Electrification Project</b> – \$310 million grid extension & \$90 million off-grid solar (mini grids, solar home systems)	\$400	IDA Investment Project Finance	15-Sep-16 30-Sep-21	Yes	Yes

<b>Myingyan</b> – 250 MW CCGT gas power plant	\$75	IFC loan	8-Oct-16 active	Yes	No
<b>First Macroeconomic Stability and Fiscal Resilience Development Policy Operation</b> – addresses financial viability of energy sector (e.g., tariffs)	\$200	IDA Development Policy Finance	27-Apr-17 30-Jun-19	No	No
<b>STG Cement</b> - Shwe Taung Cement Company has mining concessions providing captive sources for limestone and coal.	\$35	IFC \$20 loan & \$15 equity	31-Jul-17 active	No	No
<b>Myanmar Power Advisory Project</b> – Improve market conditions and private investment for hydropower & solar	\$3.8	IFC advisory services	12-Dec-17 30-Jun-21	No	No
<b>E &amp; S Myanmar</b> – enhance environmental and social performance of high risk direct investment projects, including energy	\$2	IFC advisory services	09-Nov-18 30-Jun-20	No	No

Source: World Bank Group website project databases.

**WBG Project Finance:** Of WBG project finance operations, only the National Electrification Project provides direct contributions to new electricity connections. The project involves a \$400 million IDA loan approved on September 15, 2016 with an expected closure date of September 30, 2021. The project is intended to help finance and provide technical assistance for the first phase of the NEP, i.e., the ramping up of connections in the first five years (FY2015 to FY2019).

The project involves \$310 million for extension of the grid and \$90 million for the Department of Rural Development's off-grid projects, mainly solar. According to the Bank's project documents, it is expected that the grid extension will connect approximately 710,000 households and the off-grid projects will reach approximately 500,000 households by 2021 for a project total of 1.21 million new household connections.<sup>44</sup> It is important to note that the ADB and several bi-lateral donors are also providing significant assistance that appears to overlap with the Bank's assistance and therefore contributing to the same new household connections (see Appendix Table 1A).

**Gas-based Power Generation:** In addition, the WBG has two project finance operations aimed at gas-based power generation. The Electric Power Project is a \$140 million IDA project loan for expansion of the existing Thaton 51 MW open-cycle gas power plant with a 106 MW combined cycle gas power plant. The final consumers of this power are unclear. However, no new electricity connections are directly being supported. The project also includes assistance to strengthen institutional capacity of the

Ministry of Electric Power and the Myanmar Electric Power Enterprise, including transaction advisory services for the corporatization of Yangon Electricity Supply Board (Yangon Electricity Corporation since April 2015) and procurement of another gas plant, i.e., Myingyan IPP (see description below).

The second project is the International Finance Corporation (IFC) \$75 million loan for the Myingyan gas power project, which has supported construction of a greenfield 225 MW combined cycle gas turbine (CCGT) power plant in the Mandalay region (see also the Myingyan IFC advisory services below). The gas supply pipeline will connect the power plant to an existing gas receiving station located approximately 1.6 km away. A 230kV overhead transmission line, approximately 3 km in length, will connect the power plant to the upgraded Myingyan Steel Mill sub-station located within an existing adjacent steel mill complex.

A 2018 case study by BIC-Europe could find no data to support the project developer's claims that this project will increase energy access for Myanmar households or to supply electricity to nearby energy poor villages directly affected by the project.<sup>45</sup> The IFC and other multilateral funders supported the gas power plant on the promise that it would provide energy access to 5 million people.<sup>46</sup> This figure is based solely on the presumption that by supplying 225MW to the grid, energy access for millions of people will automatically result. When challenged to provide data to substantiate this claim, one of the project's other backers – the Asian Infrastructure Investment Bank – was unable to do so, and said that the figure was merely “aspirational”.<sup>47</sup> The Myingyan case

study also points to transparency concerns surrounding the cost of the electricity tariffs and the Power Purchasing Agreement signed by the government, which has not been made public even in response to requests. Lastly, the case study demonstrates that while the new gas plant is more efficient than older technologies, it will still emit nearly three quarters of a million tonnes of carbon dioxide per year - an amount deemed “significant” under IFC standards.<sup>48</sup>

The WBG’s assistance to expanding gas operations does not address significant climate risks or the availability and affordability to Myanmar’s energy consumers, especially the poor (see above discussion on gas).

## How does WBG project finance measure up to the NEP?

The WBG is playing a prominent role in assisting Myanmar to address the availability of finance for new energy connections. As shown in Table 2, the WBG is providing nearly half of the finance needed for the first phase of Myanmar’s electrification program and is expecting to accomplish over 70 percent of the targeted new connections during this phase (or 1.21 million out of 1.7 million).

**Table 3. Electrification Targets of NEP and WBG Assistance**

Year	NEP Targets			WBG Expected Results	
	Households Connected (million)	Electrification Rate	Estimated Cost (million US\$)	Households Connected (million)	Finance (million US\$)
2015 baseline		34%			
2015-2020	1.7	47%	\$843*	1.21^	\$400
2021-2025	5.5	76%	\$4,957	?	?
2026-2030		100%		?	?

Source: NEP targets taken from Castalia Strategic Advisors, 2014. Myanmar National Electrification Plan: Final Road Map and Investment Prospectus. September 2014. [https://www.seforall.org/sites/default/files/Myanmar\\_IP\\_EN\\_Released.pdf](https://www.seforall.org/sites/default/files/Myanmar_IP_EN_Released.pdf)

\*Includes \$24 million for technical assistance and other necessary funding for capacity building.

^Results also include funding and operations supported by the ADB and bi-lateral donors.

According to Table 3, the NEP estimates that grid extension for the first phase will require \$605 million and off-grid solutions will require \$190 million. The World Bank’s National Electrification Project provides \$310 million for grid extension. The finance gap of \$300 million for grid extension appears to be covered by the government of Myanmar (\$60 million according to World Bank<sup>49</sup>), the Asian Development Bank (at least \$215 million) and bi-lateral assistance (see Appendix, Table 1A).

**Table 3. Estimated Electricity Connection Costs for First Phase 2015-2019 (million US\$)**

Grid Extension	Mini-Grids	Household Solar	Pre-grid extension*	Total
\$605	\$3	\$13	\$174.4	\$795.4

Source: NEP targets taken from Castalia Strategic Advisors, 2014. Myanmar National Electrification Plan: Final Road Map and Investment Prospectus. September 2014. [https://www.seforall.org/sites/default/files/Myanmar\\_IP\\_EN\\_Released.pdf](https://www.seforall.org/sites/default/files/Myanmar_IP_EN_Released.pdf)

\*Mix of mini-grids and solar home systems

**Unclear energy connections accounting:** It is impossible to determine new connection contributions that are specifically due to the WBG-sponsored project activities. It is clear that many actors/funders and different operations are involved in reaching the 1.2 million new connections. Unclear WBG reporting, on funding amounts and new connections, makes it difficult to determine if double counting is taking place; if gaps exist, and what more needs to be done to make sure Myanmar reaches its electrification goals.

**New connections are cost prohibitive for poor rural populations:** With regards to off-grid solutions, the World Bank electrification project provides \$90 million out of the NEP-required \$190 million (see Table 3). According to the World Bank's project information, \$107 million for off-grid solutions will be financed by local rural communities.<sup>50</sup> However, these costs are proving to be unaffordable for rural communities.

According to Myanmar's Department for Rural Development (DRD) Director, U Maung Win, even with assistance from the World Bank Group, rural consumers are expected to pay 10 percent of the installation costs for solar systems. The director states that many of the rural poor still cannot afford this cost for access to electricity.<sup>51</sup> The government also states that for mini-grid systems, the DRD contributes 60 percent while community and private investors contribute 20 percent each of the total cost.<sup>52</sup> The DRD pays the total cost for public facilities.<sup>53</sup>

In addition, for both rural and urban/peri-urban communities, installation costs include fees for several items. In March 2018, the Ministry of Electricity and Energy (MOEE) reported that fees for residential electricity meter boxes were being revised downwards.<sup>54</sup> Rural users will be charged a total of MMK 35,000 (\$23) for a meter box and an extra MMK 10,000 (\$6.5) of additional fees including deposits, cabling, electricity connection and supervision.<sup>55</sup> Small-city users and big-city users will be charged a total of MMK 75,000 (\$49) and MMK 90,000 (\$59), respectively, including additional fees.<sup>56</sup> After the boxes are installed, electricity costs will vary depending on location.<sup>57</sup> It is unclear why grant funding from the WBG and other donors could not be used to cover initial installation costs for poor residents.

**Reallocation of electrification funds to address climate impacts:** In November 2017, the World Bank reallocated \$13.75 million of the National Electrification Project funds for emergency response to fund Myanmar's recovery from floods and landslides in 2015.<sup>58</sup> It is unclear what effect this will have on

funding new electricity connections.

**Unclear if necessary electrification rate will be met and maintained:** The WBG's assistance (along with government and other donor funding) expects to reach 1.2 million household connections by 2021. The NEP target is for 1.7 million new connections by 2020. The WBG's assistance seems to be behind the NEP schedule and it is unclear whether other assistance will cover the 500,000 gap in new connections. Furthermore, it is unclear whether a 500,000+ annual connection rate has been solidly established and can be maintained to reach universal access by 2030. According to the government of Myanmar, Director General Zaw, "Even after the completion of this 5-year project [i.e. World Bank National Electrification Project], nearly 17,000 villages will still have no access to electricity. So, we need to electrify an average of 1,700 villages every year over the next 10 years."<sup>59</sup>

**Inadequate support for renewable energy:** Studies show that Myanmar has huge solar potential in its central dry zone, and wind potential in Rakhine and Ayeyarwady areas.<sup>60</sup> The WBG is providing \$90 million for mini-grids and solar home systems, but is not providing any project finance for utility-scale renewable energy projects to connect to the grid. In general, the WBG has not given priority to financing the large amount of untapped non-hydropower renewable energy resources in Myanmar. Instead, the WBG has provided over \$200 million in subsidized public finance for gas power generation projects.

#### **Development Policy Finance and Technical Assistance/Advisory Services**

Many of the challenges to reaching universal energy access are related to lacking government capacity and legal frameworks. To help address these challenges, the WBG is providing development policy finance, technical assistance and advisory services. These operations are listed in Table 2 above.

**World Bank Approach Links Pricing Policy to Cost of Gas:** As mentioned above, the World Bank's National Electrification Project and Electric Power Project both provide assistance to build institutional capacity. In addition, the World Bank's \$200 million First Macroeconomic Stability and Fiscal Resilience Development Policy Operation approved in April 2017 addresses financial viability of the energy sector, including pricing policy (e.g., electricity tariffs). According to the Bank, the main principle underpinning the pricing policy should be the full recovery of the economic cost of gas and electricity supply.<sup>61</sup> The World



Bank's approach also seeks to ensure energy tariffs remain affordable for the poor through well-targeted subsidies. However, the effectiveness of the WBG's approach is unclear or if the government of Myanmar can afford/sustain such subsidies. As mentioned above, the WBG's support to expand Myanmar's reliance on gas power generation is proving not to be a very cost effective choice given the need to use imported LNG.

On the renewable energy front, the IFC is providing a few advisory service operations mainly aimed at hydropower and solar power (see Table 2). The IFC's \$4.8 million Lighting Myanmar involves advisory services to work with solar lighting product manufacturers, distributors, financial institutions, development partners, and the government in six areas, including: 1. Quality assurance. 2. Market intelligence. 4. Consumer awareness. 5. Regulatory and policy dialogue to encourage policies that are supportive of private involvement in the market; and 6. Access to finance for companies and end consumers.

While the WBG has assistance intended to target some non-hydropower renewables (mainly solar), it is unclear how comprehensive the assistance has been and what the results have been (no development results have been posted as of June 16, 2019). In the case of the energy sector, there have been fast moving significant changes to renewable energy technologies and cost structures that are critical to the approach taken to reach the development goal of universal access by 2030.

**Policies and project finance are still needed for non-hydropower renewable energy:** According to the Minister of Electricity and Energy, U Win Khine, the government is taking steps to enact a renewable energy law, including the first meeting of the National Renewable Energy Committee being held on March 1, 2019.<sup>62</sup> Meanwhile, also in March 2019, the deputy director of the Ministry of Science and Technology's Renewable Energy Research Department, Dr Thi Thi Soe, told Myanmar Times that a policy and strategy are still needed to develop and implement renewable energy projects.<sup>63</sup> There has also been some drafting on regulations for mini-grids with support from German Corporation for International Cooperation (GIZ), but it is unclear if these have been completed and/or adopted.

Myanmar has tremendous solar potential, especially in the middle of the country. The overall potential for solar power is approximately 51,973 TWh per year.<sup>64</sup> Currently, Myanmar has one solar power plant, which

started generating 40 MW power in February 2019 with a planned final output of 170 MW,<sup>65</sup> and two planned solar plants of 150 MW each.<sup>66</sup> In addition, an agreement has also been signed with China's Three Gorges Corporation to develop a 30MW wind energy power plant, which would make it the first in the country.<sup>67</sup> **Myanmar's renewable energy potential has thus far remained largely untapped and represents an area that the WBG should concentrate more direct project finance.**

With the first phase of the NEP targeted to end by 2020, it is important to understand how the WBG plans to assist implementing the next phases of the NEP and how assistance will be changing going forward. The WBG's Country Partnership Framework is an important tool to understanding the WBG's approach going forward in Myanmar.

### **WBG Country Partnership Framework**

The Country Partnership Framework (CPF) lays out the World Bank Group's current and planned program of engagement in a member country. The CPF lays out the country-specific development goals and places individual WBG activities into an overall strategic context for a country. As such, the CPF is intended to be linked to a country's national development strategy.

In consultation with country authorities and other stakeholders (including from civil society), Bank staff develops a CPF for each country normally every four years. The most recent CPF for Myanmar was published in March 2015 covering a period of three years FY2015 to FY2017.<sup>68</sup> In June 2017, the WBG and government of Myanmar agreed to extend the FY15-17 CPF for another two years (i.e., FY18-19) instead of developing a new, updated CPF.<sup>69</sup> According to the Bank, during these two years, up to \$1.2 billion in financing by the International Development Association (IDA) would be earmarked for Myanmar. As shown in Table 2 above, during FY18-19, the WBG only approved three operations related to the energy sector. The largest was \$35 million for a cement operation with associated coal mining facilities and two small advisory services. This connection to coal mining is a very concerning operation for the WBG to be supporting. None of the projects during this CPF extended time frame contributed directly to new energy connections.

To track implementation, each CPF includes a Results Framework of country-specific targets and indicators to monitor Bank Group and country performance in achieving development goals. Table 4

below provides a section of the Results Framework for the development goal of “Improved power generation and access to energy” taken from Myanmar’s CPF FY15-17.

It is noteworthy that the WBG’s specified program identified as part of the WBG’s support for NEP are two natural gas power plant projects (225 MW Myingyan plant and the Electric Power Project – 106MW

Thaton plant). This demonstrates the critical need to have an updated CPF for Myanmar as there have been fast moving significant changes to renewable energy technologies and cost structures that are critical to the approach taken to reach the development goal of universal access to affordable energy by 2030 in a way that is in line with the goals of the Paris Climate Agreement.

**Table 4. Results Framework – Myanmar Country Partnership Framework FY15-17**

Objective 1.1: Improved power generation and access to energy		
CPF Objective Indicators	Supplementary Progress Indicators	WBG Program
1. People provided with new or improved electricity service (million) Baseline: 0 (2014) Target: 3 (2017)	Thermal efficiency of energy conversion (%) Baseline: 20 (2014) Target: 48 (2017)	Ongoing: World Bank: [P143988] MM Electric Power Project; IFC: [600181] Myingyan IPP AS
2. Expanded conventional/renewable power generation (giga-watt hours, annual) Baseline: 260 (2014) Target: 660 (2017)	Investment/financing facilitated from private sector (US\$ million) Baseline: 0 (2014) Target: 300 (2017)  National electrification executive secretariat (NEES) functional Baseline: Established (2014) Target: Adequately staffed and functional (2016)	Planned: World Bank: [P152936] National Electrification Project; [P151366] Myingyan Power Project IFC: [33865] YESC, [TBD] Ayeyar-waddy, [TB] Myingyan, [TBD] Mandalay region electricity network MIGA: [TBD] Political Risk Guarantee

Expanding upon the energy objectives laid out in the CPF FY15-17, the World Bank developed the “Energizing Myanmar Report: Establishing sound policy and transparent regulatory framework” in February 2016.<sup>70</sup> This report details four main WBG objectives in the energy sector for Myanmar covering 2016 to 2020:

1. Increasing the rate of electrification and reaching at least 500,000 connections per year by 2020;
2. Improving transparency and competition in the electricity market, and mobilize private sector investments;
3. Increasing efficiency through corporatization and commercialization of enterprises in the energy sector; and
4. Improving strategic planning capacity and mainstream principles of environmental and social sustainability in the energy sector.

**Priority for gas and large hydropower over other renewable energy:** In addition to these objectives, the WBG’s Energizing Myanmar Report proposed short-term (within 1 year) and long-term (within 3-5 years) policy options for Myanmar over five years (2016-2020) (see Appendix, Table 2A). In general, the options prioritize gas and hydropower over

non-hydropower renewable options. For example, the WBG prioritized master development plans for gas and hydropower in the short-term and put off studies and plans to integrate other renewables onto the 3 to 5 year mark. Given gas is a high GHG emitter and large hydropower is potentially not a reliable power source with unpredictable precipitation, the WBG should have prioritized the development of Myanmar’s vast solar and wind resources. This also speaks to the necessity of adopting an updated CPF for Myanmar. An updated CPF needs to give proper priority to renewable energy access for the poor.

Additionally, the WBG’s Energizing Myanmar Report highlights the importance of stable, predictable finance for rural electrification. The report states the following:

*“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.”*

This further emphasizes the need for an updated CPF that commits enough finance to sustain an electrification rate of at least 500,000 new household connections per year for the next ten years until universal energy access is obtained.

### Proposed WBG operations

There are currently two proposed energy sector projects on the WBG's website, one for gas-based power generation and one for solar-hybrid distributed generation:

1. **Power System Energy Efficiency Improvement Project (Ywama Gas Plant)** – The World Bank proposes \$160 to \$280 million IDA loan to increase power generation and energy efficiency. The main component is the construction of a gas power plant, adding 300 MW combined cycle gas turbine at Ywama gas plant.
- 2.
3. **Yoma Micro Power (solar-hybrid)** - IFC proposes an investment in the form of (i) \$7 million of equity through its InfraVentures facility and (ii) a \$6 million concessional loan in its capacity as implementing entity of the Canada Climate Change Program to the project company, Yoma Micro Power Pte. Ltd., to support the construction and operation of distributed generation (DG) units, with an expected total power rating of 4MW, throughout various locations in Myanmar. The solar-hybrid DG units will provide electricity to telecommunication towers and rural communities which do not have a connection to the main grid.

Unfortunately, the WBG continues to prioritize fossil fuels over renewable energy and continues to subsidize gas. In fact, there is only a very small amount of assistance for renewable energy. Furthermore, there are no proposed projects to ensure 500,000 new household connections annually. WBG support for the implementation of Myanmar's second phase of the National Electrification Plan is completely unclear.

### Conclusions and Recommendations

It is very positive to see the WBG significantly ramp up its energy access assistance to Myanmar with \$400 million directed at new electricity connections needed for the first phase of the NEP (2015-2019). However, there are several risks to Myanmar reaching universal access as well as affordability and climate change concerns surrounding the WBG's approach, including:

**Connection costs remain prohibitive for poor families:** Even with WBG assistance, the cost for a new electricity connection is often unaffordable for poor households. Myanmar's Rural Development Department reports that many rural people have been unable to afford the expected installation costs for either solar home systems or mini-grids.<sup>71</sup> For conventional grid connections, households are responsible for several installation fees, including meter boxes, deposits, cabling, connection, and supervision fees.<sup>72</sup> The WBG's support of gas power generation is further contributing to affordability problems by increasing electricity costs (see below).

**Electrification rate is still inadequate to reach universal access goal:** The WBG's assistance, in conjunction with ADB, bi-lateral donors, the Myanmar government, and local community funding, expects to reach 1.2 million household connections by 2021. While a great achievement, it is 500,000 short of Myanmar's NEP target of 1.7 million by 2020.

**No commitment to sustain electrification rate:** According to the World Bank, in order for electrification programs to be implemented and sustained, finance needs to be predictable. Thus, it is troubling that the WBG has not committed sustained finance for subsequent phases of Myanmar's NEP. The WBG's Country Partnership Framework for Myanmar, which sets out the planned WBG operations for upcoming years, has not been updated since 2015. Without predictable, sustained finance, Myanmar will be unable to maintain the 500,000 annual connections necessary to reach universal access by 2030.

**Inadequate support for renewable energy:** Myanmar has significant solar and wind resources. Instead of prioritizing finance for climate friendly renewable energy, the WBG's assistance firmly places gas as the priority. First, the WBG's electrification policy options for Myanmar prioritized the development of gas and large hydropower, while designating non-hydropower renewable solutions as a long-term goal (see Appendix, Table 2A). Second, the WBG provided \$217 million for gas power generation projects, while providing less than half that amount to renewable energy (\$90 million for mini-grids and solar home systems; \$12 million advisory services for hydropower and solar). Moreover, there is no WBG project finance for utility-scale renewable energy projects and Myanmar still does not have adequate policies for non-hydropower renewable energy.<sup>73</sup>

**Highly problematic support for gas:** WBG public



finance should not be used to subsidize fossil fuels. The production, transport and burning of gas emits significant GHG emissions and is the largest global source of methane emissions. The WBG's focus on expanding gas operations in Myanmar does not address climate risks or the availability and affordability of gas, especially for the poor. Myanmar does not have enough gas resources to supply forecasted demand. As a result, WBG-supported gas power plants will mostly burn imported liquefied natural gas (LNG).<sup>74</sup> LNG is neither climate friendly nor cost effective. Converting gas into LNG is a highly energy-intensive and thus GHG-intensive process. Furthermore, the conversion process will increase electricity costs<sup>75</sup> and add to the affordability problem for the poor.

**Outdated Power Generation Plan:** All of Myanmar's power generation scenarios have substantial increases in coal and gas. The WBG should have recognized that any planned increase in coal power generation is not in alignment with the Paris Climate Agreement.<sup>76</sup> Myanmar's power generation plans are based on outdated studies and do not reflect the significant changes in the cost effectiveness and rapid technological advances (e.g., battery storage) of renewable energy sources.

**Unclear energy access outcomes and transparency concerns:** The WBG's stated expectation of 1.2 million new electricity connections stem from many different operations involving funding from several entities. However, the WBG's reporting of energy access outcomes associated with its operations does not make this clear. This may result in double counting of results as well as a misunderstanding of and addressing of potential gaps in energy access. In addition, a recent report on the WBG-supported Myingyan gas power plant revealed that citizens could not get access to the Power Purchasing Agreement signed by the government, which greatly restricts meaningful data available to the local communities to understand the public costs and implications for electricity tariffs.<sup>77</sup>

### **Recommendations**

To help Myanmar reach its SDG7 goal of universal access to affordable energy by 2030 in a way that is in line with the goals of the Paris Climate Agreement, **the WBG needs to make reducing the costs of energy for the poor and for the development of renewable energy the central focus of WBG assistance.**

Accordingly, the WBG should do the following actions:

- **Provide Grants for Installation Costs:** In order for the WBG to directly help the poor gain access to electricity, the WBG should provide adequate grant-based finance to cover the initial installation costs for poor urban and rural households.
- **Provide Adequate Funding to Sustain 500,000 Household Connections Annually:** Commit adequate IDA finance to sustain an electrification rate of at least 500,000 new household connections per year for 2020-2030 and a development outcome of 76 percent electrification by 2025 and 100 percent by 2030.
- **Finance at least 5 Utility-scale Renewable Energy Projects:** From 2020-2025, the WBG should provide direct project finance for at least 5 utility-scale renewable energy projects (excluding large hydropower). In addition, the WBG should finance a fund that specifically supports on-the-ground, indigenous expertise in renewable rural electrification by offering concessional finance to local entrepreneurs (e.g. revolving funds to provide loans with longer tenure and lower interest).
- **Adopt comprehensive Renewable Energy Investment Framework:** The WBG should assist the government of Myanmar to adopt a comprehensive policy and regulatory framework for non-large hydropower renewable energy (i.e., Master Plan for Renewable Energy Development), including a plan to integrate non-large hydropower renewables and mini-grid operations into the main grid.
- **Cancel Proposed Public Finance for Ywama Gas Plant:** Limited international public finance should not be used to subsidize GHG-emitting fossil fuels. Instead of a carbon tax, such public finance provides an incentive to emit GHGs, which is inherently inconsistent with the Paris Climate Agreement. In addition, gas power generation is not a cost effective or affordable electricity option in Myanmar. Therefore, the World Bank should terminate consideration of \$160 to \$280 million for a 300 MW Ywama gas plant.
- **Reduce Future Fossil Fuel Reliance – Update Power Generation Plan:** In order to protect the poor and the climate, the WBG



should help Myanmar reduce reliance on fossil fuels instead of increasing their future dependence on coal and gas. The WBG should assist Myanmar to adopt an updated Power Generation Plan with no coal options and a significant scale up in renewable energy that reflects the changes in the cost effectiveness and rapid technological advances of non-large hydropower renewable energy sources.<sup>78</sup>

- **Improve Transparency of WBG Operations:** The WBG should adopt transparent reporting of WBG direct contributions to new electricity connections. The WBG needs to be clear when expected new connections are a result of a combination of other multilateral development banks (MDB) or bi-lateral assistance and therefore, avoid double counting of contributions. In addition, the WBG should require the public disclosure of Power Purchase Agreements signed by the government.
- **Adopt a new Country Partnership Framework for 2020-2025 that includes these specific commitments.** The Country Partnership Framework (CPF) is an important tool for the WBG's engagement in a given country. The current CPF for Myanmar covers 2015-2019. A new CPF that gives priority to renewable and delivers clean energy access for the poor needs to be adopted.

## Appendix

**Additional Sources of International Assistance for NEP:** In addition to the WBG, Table 1A lists many other sources of international assistance for the NEP. The Asian Development Bank (ADB) has been supporting power sector development, including off-grid, in Myanmar with several loans beginning in 2014. In addition, bilateral assistance is being provided for many energy projects, including several mini-grids and several transmission lines (e.g., a 454-km long 500-kV transmission line from north to south). It is unclear to what extent all of the ADB and bilateral finance contributes to the new electricity connections the WBG operations are reporting.

**Table 1A. Additional Sources of International Assistance for Myanmar's NEP**

Country or Institution	Main Activity	Finance	Year Approved
Government of Serbia*	Transmission - 146 km from Meiktila to Taungoo (Phase I)	?	?
Government of the Republic of Korea*	Transmission - 188 km from Taungoo to Karmarnat (Phase II)	\$100 million	2014
Government of Japan*	Transmission - 120 km from Karmarnat to Hlaingtharyar in Yangon (Phase III)	?	?
ADB	Grid assistance: rehabilitate the distribution network in five townships in Yangon, four districts in Mandalay, five districts in Sagaing, and two townships in Magway.	\$60 million	2014
ADB	Grid substations in Yangon; strengthening the 230-kV transmission lines and substations in the Yangon area.	\$80 million	2015
ADB	Transmission and distribution	\$75 million	2016
ADB	Myingyan gas power plant – power to steel mill complex	\$260 million loan and PRG	?
Bi-lateral donors through ES-MAP and Global Partnership On Output-Based Aid	Myanmar RBF Off-grid Solar [project name]	\$3.45 million	August 2018
JICA	Power Transmission: (i) National Power Network Development 500 kV Phase I	\$250 million	
JICA	Power Transmission: National Power Network Development 500 kV Phase II	\$400 million	
JICA	Power Distribution and Electrification: (i) Power Distribution Improvement in Yangon	\$60 million	
JICA	Distribution: Rural Power Infrastructure Development Phase I	\$40 million	
JICA	Rural Power Infrastructure Development Phase II [Is this the Sunlabob project? installing 11 village mini-grids]	\$40 million	
Germany - KfW and GIZ	Rural electrification in off-grid areas and by grid expansion under the NEP for a solar home system program in southern Shan State	€2 million for TA and €5 million for investment	Grant
Germany - KfW and GIZ	program for extending the grid to rural areas in Shan State	€24 loan and €6 million grant	
Germany - KfW and GIZ	TA in rural electrification policy – drafting rules and regulations for mini-grids supposed to be completed by end of December 2018	€2 million	
Thailand	Rehabilitate distribution networks in three townships in Yangon (North Dagon, Okkakarpa, and Shwe Pauk Kan)	\$20 million	Since 2013
Norway	TA to MOEE for planning and implementation of hydropower plants, electricity law and regulations, and capacity building	\$10 million	2015

Source: ADB, Myanmar: Energy Sector Assessment, Strategy, and Road Map. Asian Development Bank (ADB), December 2016. Available at: <https://www.adb.org/sites/default/files/institutional-document/218286/mya-energy-sector-assessment.pdf>

**Table 2A. World Bank Recommended Policy Options for Myanmar (2016-2020)**

Objectives	Short-term options (within 1 year)	Long-term options (within 3-5 years)
Increase the rate of electrification and reach at least 500,000 connections per year by 2020	<p>Maintain the National Electrification Executive Committee (NEEC) accountable for the implementation of NEP to the country's Vice President.</p> <p>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.</p> <p>Provide support for institutional capacity building to the utilities (ESE, YESC, MESC), local contractors, and sector institutions at the regional/ state and district level.</p> <p>Adopt grid codes and introduce modern technologies and low cost solutions for rural electrification.</p>
Improve transparency and competition in the electricity market, and mobilize private sector investments, while protecting vulnerable consumers	<p>Adopt secondary legislation (rules and regulations) for operationalization of the 2014 Electricity Law.</p> <p>Establish the Electricity Regulatory Commission.</p> <p>Adopt and start implementing pricing policy based on full cost recovery of the economic cost of gas and electricity supply.</p> <p>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.</p> <p>Increase private sector participation and leverage public resources through transparent and competitive IPPs/ PPPs.</p> <p>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>
Increase efficiency through Corporatization and commercialization of enterprises in the energy and power sector	<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.</p> <p>Complete restructuring of MEPE and hydropower enterprises and establish Electric Power Generation Enterprise (EPGE).</p> <p>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.</p> <p>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.</p> <p>Develop and start implementing restructuring program for ESE focusing on corporatization of regional distribution companies and creation of Rural Electrification Agency under ESE.</p> <p>Establish Myanmar Transmission System Operator (MTSO) responsible for the high voltage transmission system.</p>
Improve strategic planning capacity and mainstream principles of environmental and social sustainability in the energy and power sector planning.	<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.</p> <p>Create a joint task force led by MOEP for the review of hydropower plans and initiate preparation of hydropower development program.</p> <p>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.</p> <p>Carry out system studies for integration of renewable energy in the power grid.</p> <p>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>

Source: World Bank Group, 2016. *Energizing Myanmar: Enhancing access to sustainable energy for all*. The World Bank Group, Washington, DC. February 2016. <https://openknowledge.worldbank.org/handle/10986/23759>

## Endnotes

- 1 [https://unstats.un.org/sdgs/indicators/Global%20Indicator%20Framework%20after%20refinement\\_Eng.pdf](https://unstats.un.org/sdgs/indicators/Global%20Indicator%20Framework%20after%20refinement_Eng.pdf)
- 2 This assessment reviews access to electricity and does not cover access to clean cooking solutions, which is also of great importance.
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- 4 *Myanmar Times*, 2018. MOEE lowers price of electricity meter boxes for residents. March 26, 2018. <HTTPS://WWW.MMTIMES.COM/NEWS/MOEE-LOWERS-PRICE-ELECTRICITY-METER-BOXES-RESIDENTS.HTML>
- 5 A lack of precipitation in summer months and climate change induced unpredictable weather conditions make large hydropower a potentially unreliable source of power for Myanmar.
- 6 *The Bangkok Post*, 2018. Myanmar hopes to double electricity capacity by 2021. January 31, 2018. <HTTPS://WWW.BANGKOK-POST.COM/WORLD/1405090/MYANMAR-HOPES-TO-DOUBLE-ELECTRICITY-CAPACITY-BY-2021>
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- 11 See [https://unstats.un.org/sdgs/indicators/Global%20Indicator%20Framework%20after%20refinement\\_Eng.pdf](https://unstats.un.org/sdgs/indicators/Global%20Indicator%20Framework%20after%20refinement_Eng.pdf)
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- 13 *The Irrawaddy*, 2019. Govt to buy electricity from china to cover shortfall. May 14, 2019. <https://www.irrawaddy.com/news/burma/govt-buy-electricity-china-cover-shortfall.html>
- 14 *Ibid.*
- 15 ADB, Myanmar: Energy Sector Assessment, Strategy, and Road Map. Asian Development Bank (ADB), December 2016. Available at: <https://www.adb.org/sites/default/files/institutional-document/218286/mya-energy-sector-assessment.pdf>
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- 17 World Bank Group, 2015. Myanmar Country Partnership Framework for the Period 2015-2017. World Bank Group, April 23, 2015; page 29. <http://documents.worldbank.org/curated/en/132341486543566177/pdf/112661-WP-P147364-PUBLIC-myanmar-countrypartnershipframework.pdf>
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Bank Information Center Europe  
Sarphatistraat 30  
1018GL Amsterdam  
The Netherlands  
[info@bic-europe.org](mailto:info@bic-europe.org)