ENERGY
CATALYST

Country Guide: Myanmar

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Myanmar is the largest country in the Mainland South-east Asia. It shares its border with Bangladesh and India to the northwest, China in the northeast and a 5,858 km long border with Thailand to the southeast. Myanmar is a resource rich country endowed with abundant water resources and sunshine making it ideal for hydropower and solar energy generation. The total land area of the country is 676,577 square kilometres (km), of which 48% is covered with forest area and majority of the remaining area is utilized for agriculture. The 2,832 km long coastline in the south provides Myanmar with abundant areas for development of marine ecosystems.

Figure 1: Map of Myanmar. Source: d-maps

Since February 2021, Myanmar's economic and political ecosystems remain defunct due to a military coup. According to estimates, around 1.5 million (Mn) citizens were displaced by 2022 because of the coup that originated in 2021. Economic activity has been adversely affected due to the ongoing conflict while security issues have impacted trade as well. Approved foreign direct investment (FDI) in Myanmar has approximately decreased by 83%, from USD 3,791 Mn in 2020-21 to USD 642.084 Mn in 2021-2022.

Economy

The growth in gross domestic product (GDP) of Myanmar, that showed signs of recovery after introduction of a series of reforms, has significantly decreased from 6.4% in 2016-17 to 2% in 2022. The decreased GDP growth is on account of macroeconomic volatility due to the on-going turmoil in the country. The GDP of Myanmar is estimated to grow by 2.8% in 2023. Although fiscal deficit declined to 4.7% of GDP in 2022 from 9.2% in 2021, public debt has increased to 60% of the GDP at the end of 2022.

Further, Consumer Price Index (CPI) inflation increased significantly from 3.6% in 2021 to 16% in 2022, a year-on-year increase of 350%. Cost-push factors such as input shortages, global price movements, and exchange rate depreciation were key reasons for the rise in inflation. Further, demand-pull factors such as weak private consumption and investment were partly responsible as well.

Agriculture and fishery are the primary sectors in Myanmar. The agriculture sector contributes 32% to the national GDP and employs 56% of the workforce. Growth in the agriculture sector contracted by 1% in 2021 as compared to 3.5% in 2022 due to increasing energy prices, supply disruptions and reduced access to finance. Other key sectors with investment potential include power, tourism and hospitality, infrastructure, oil and gas, manufacturing, mining, and forest-based industries.

Internal and external disruptions in Myanmar have resulted in contraction of the economy affecting business and livelihoods. Further, frequent regulatory changes, 'reform reversals' and surrender of foreign currency have adversely impacted the business environment in the country. According to the World Bank, policy uncertainties regarding access to foreign exchange and imports, lack of confidence in payment systems, and delays in customs clearance have restricted business activities. While transport, construction, merchandise, and natural gas export remain steady businesses, the manufacturing sector has contracted owing to low demands, higher prices, and recurrent electricity outages.

Table 1: Myanmar at a glance

Capital	Naypyitaw
Area	676,575 km²
Population	53.79 million (2021)
Official languages	Burmese
Rural Population	69% (2021)
GDP	US $63.99 Bn (2023)
GDP Per Capita	US $1,180 (2023)
Currency	Burmese Kyat (K)
Exchange rate 2020	1 GBP = 2,657.59 Kyat
Exchange rate 2023	1 GBP = 2,688.17 Kyat
Access to Electricity	70.4% (2020)
On grid electricity access	50% (2020)

The World Bank projections for Myanmar indicate that long-term prospects of achieving growth have been severely weakened. The business environment in the country is unlikely to improve if electricity shortages, supply chain disruptions, foreign exchange restrictions, and policy uncertainty persist.

The energy sector in Myanmar

As of 2020, the total installed capacity in Myanmar stood at 6,034 MW. Hydropower remains the biggest contributor (54%) to the installed capacity with 3,262 MW (see Figure 3), while natural gas accounts for the second-largest source (41%) of power with 2,496 MW of installed capacity. In the total electricity generation mix, the share of hydropower and natural gas remain highest (see Figure 4) as well with 52% and 45% respectively.

Access to electricity in Myanmar currently stands at 70.4%. However, access to stable and adequate electricity remains a challenge due to the on-going conflicts. Suspension of CNTIC V Power's LNG plants in Yangon along with impaired transmission lines to Baluchaung hydropower plants and depletion of water reserves have led to significant power outages. The World Bank estimates electricity loss to be 20% of monthly average generation (2022). Furthermore, several energy projects approved prior to the coup have been suspended, aggravating the existing energy crisis in the country. Rising global oil and fuel price, devaluation of Kyat, shortage of US dollars, and declining foreign investments have further added to the woes in the energy sector of Myanmar.

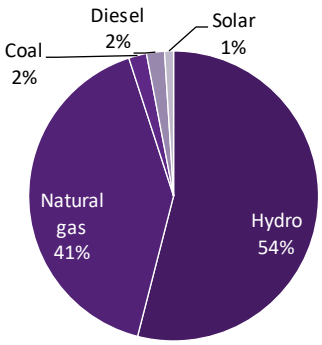

Figure 2 Installed capacity of electricity (2020), Source: Ministry of Energy and Ministry of Electric Power

In 2014, as the annual need for power consumption in Myanmar was estimated to increase in the range of 15% to 17% annually, the government planned to diversify its energy mix by including hydropower, natural gas, coal, and renewable energy. The National Electrification Plan (NEP) was laid out in 2014 with the objective of providing access to electricity to all by 2030 and achieving rural electrification rate of 33%. Further, the NEP set electrification rate milestone of 50% for 2020, 75% for 2025 and 100% for 2030. The two-pronged approach of NEP includes (i) grid extension programme and (ii) off-grid programmes mainly composed of solar home systems and mini-grids. The Asian Development Bank laid out strategies for achieving the goals of NEP by:

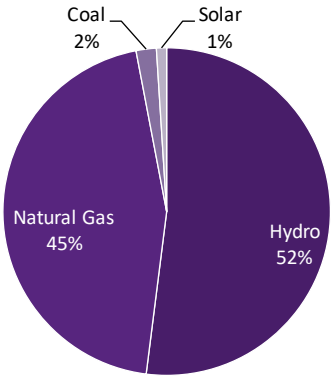

Figure 4 Generation mix of electricity (2020), Source: Ministry of Energy and Ministry Of Electric Power

i. Introduction of energy efficiency performance standards and labelling for appliances, testing and certification facilities for appliances;
ii. Introduction of incentives for energy efficiency equipment;
iii. Phasing out inefficient appliances from the market;
iv. Promotion of efficient biomass cooking stoves;
v. Increasing consumer awareness of the benefits of using liquefied petroleum gas (LPG) for cooking;
vi. Introducing an energy efficiency labelling scheme for LPG cooking stoves; and
vii. Conducting regular energy efficiency awareness campaigns in the national media

However, since the coup, the status of the progress on the NEP is unknown. Meanwhile, the structure and leadership positions at Ministry of Energy and Electricity (MOEE) have changed during the regime. The MOEE has been reconstituted into two ministries – the Ministry of Energy (MOE) and the Ministry of Electric Power (MOEP).

Table 2: Overview of the main stakeholders in the energy sector in Myanmar

Institution	Role
Ministry of Electric Power (MOEP)	Development and management of the country's electric power sector – policy formulation and planning; regulatory oversight; ensuring energy security; identifying and developing new projects; investment planning and international cooperation
Ministry of Energy (MOE)	Formulation and implementation of policies, plans, and programs for the efficient production, distribution, and consumption of energy resources
Department of Electric Power and Planning (DEPP)	Planning, coordination, and development of the electricity sector - formulating policies and plans for development of electricity sector; setting targets for electricity generation, transmission and distribution; promoting renewable energy; issuing licenses; setting technical standards conducting inspections; enforcing safety and environmental safeguards; and coordination with stakeholders
Electric Power Generation Enterprise (EPGE)	Generation and supply of electric power - electricity generation; power plant construction and operation; maintenance of power plants and, fuel procurement;
Electricity Supply Enterprise (ESE)	Distribution of electric power throughout the country; metering and billing the customers; customer services; infrastructure development; system planning and development
Department of Power Transmission and System Control (DPTSC)	Planning of the national power transmission and distribution; day-to-day operation and control of the national power transmission and distribution system; management of the national grid; setting sets technical standards for the design, construction, and operation of power transmission and distribution facilities and protecting the power transmission and distribution system from faults, outages, and other disruptions
Department of Hydropower Implementation (DHPI)	Identifying potential hydropower project sites; designing hydropower projects and overseeing their development; managing the implementation of hydropower projects and conducting environmental and social impact assessments for hydropower projects
Myanmar Engineering Society	Promotes the advancement of engineering and technology; capacity building through training, workshops, seminars, and conferences; setting technical standards and regulations for engineering practices
Ministry of Environmental Conservation and Forestry (MoECaF)	Directs environmental and sustainability initiatives; Monitors biomass and fuel wood production
Department of Rural Development (DRD)	Responsible for off-grid electrification
Ministry of Science and Technology	Leads renewable energy research, development, and deployment
Ministry of Industry	Leads electricity-related standardization; promotes the involvement of private sector in state-owned enterprises

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Renewable Energy Association Myanmar (REAM)	Promotes the use of renewable energy through dissemination of Information, education and communication to stakeholders

Hydropower

Hydropower remains the main source of electricity generation in the country with an installed capacity of 3,262 MW from 27 operating hydropower stations; accounting for 54% of the installed capacity mix. The NEP has laid out plans to triple the hydropower capacity to 9,000 MW by 2030. The earlier civilian-led government had identified locations for construction of 41 new hydropower projects. Development of small hydropower plants is an important strategy for expanding the access to electricity in the rural areas. However, lack of technical and financial capacity of key stakeholders and private investors, limited access to financing and weak regulatory and institutional framework are key challenges impeding its development.

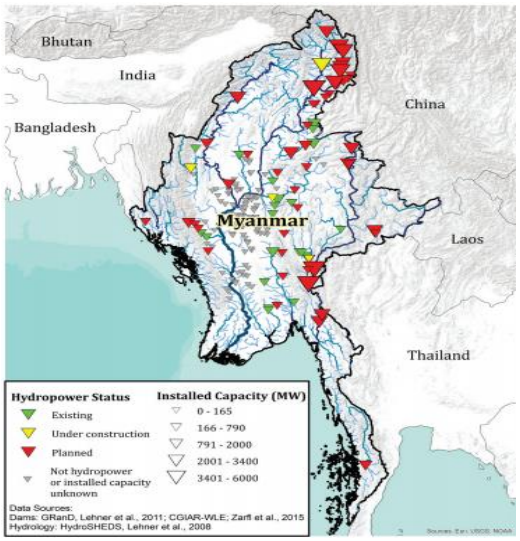

*Figure **5** Map of hydropower projects in Myanmar. Source: TNC, WWF, and the University of Manchester, 2016*

Solar power

The solar power potential of Myanmar is approximately 51,973 TWh/yr with an average solar irradiance of 4.5–5.1 kWh/m^2/day. Even with a high solar potential, solar power contributes only 1% to the total generation mix. The installed capacity of solar power in Myanmar was 80 MW, as of 2021. At present, Burma has one utility-scale solar power project, the Minbu Solar project with a capacity of 170 MW.

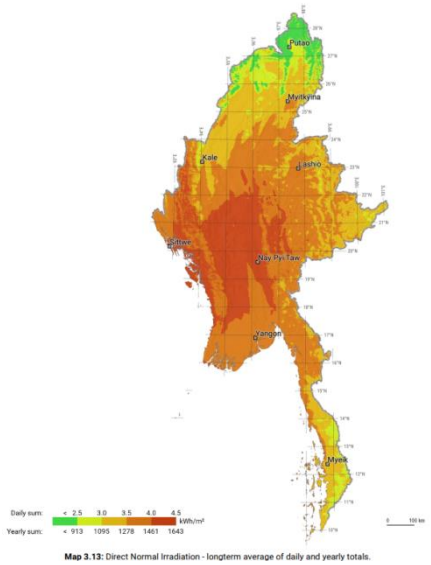

Figure 6 Solar PV potential in Myanmar. (2017 The World Bank, Source: Global Solar Atlas 2.0, Solar resource data: Solargis)

Large parts of Myanmar have optimum potential for solar power generation, predominantly in lowlands of central Myanmar, where demand for solar power is also the highest. Since 60.2% of population in the rural areas lack access to electricity, small to medium installations are feasible for the remote areas. As per the World Bank, three types of PV which include grid-connected PV plants, mini-grid-PV plants, and off-grid PV systems could be considered for Myanmar.

Even though the government has established regulatory frameworks and guidelines for the installation and operation of solar energy systems, there are several challenges in implementing solar projects in Myanmar. Major challenges include:

i. Underdeveloped grid infrastructure, predominantly in the rural areas, which disables integration of solar projects into the grid
ii. High upfront cost of setting-up solar power projects coupled with limited financing options leading to high project risks
iii. Limited technical expertise in the design, installation, and maintenance of solar energy systems, making it difficult to ensure the quality and reliability of solar projects
iv. Challenges due to complex regulatory frameworks on land use rights. According to Transfer of Immovable Property Restriction Act of 1987 (TIPRA), there are restrictions on foreign entities or individuals from owning immovable property. For renewable projects, foreign entities or individuals may enter a lease agreement twice for ten years at a time subject to endorsement or permission from Myanmar Investment Commission (MIC). Further, since a large part of the land is farmlands in Myanmar, the process of obtaining utilization rights of farmlands for energy projects is time consuming and subject to several approvals.
v. Gaps in regulatory framework and lack of standardized policies creates uncertainty amongst investors

Wind power

Myanmar holds immense potential for wind-based power, with an estimated technical potential of 4,032 MW. Wind energy projects are at an early stage of development in Myanmar. The Department of Electric Power Planning (DEPP) signed a memorandum of understanding (MOA) in March 2023 with Chinese companies - the Primus Advanced Technologies Limited, Asia Ecoenergy Development Limited, and Yunnan Machinery and Equipment Import and Export Co Ltd for implementing three wind power projects in Rakhine state– 150 MW in Ann, 100 MW in Gwa and 110 MW in Thandwe township. The projects are expected to generate power by 2025. Even though Myanmar has good potential for wind energy, there is lack of comprehensive wind resource data that can be used to accurately assess the potential for planning resource development.

Geothermal

Myanmar has significant geothermal energy potential, particularly in the central and northern regions where active volcanic areas exist. However, geothermal energy is still at a nascent stage of development in Myanmar, with no large-scale geothermal projects currently in operation. Tattapake and Maungmagan in the southern part of the Tanintharyi region, Mount Popa in the central part of Myanmar, the Kyaukse and Minbu areas in the central part of Myanmar, the Pinlaung area in the southern part of the Shan State and the Kanhla Taung area in the Sagaing region are areas with potential for geothermal energy due to the presence of several hot springs and geysers. However, more exploration and assessment are needed to determine the economic feasibility of developing geothermal power plants in these locations. The availability and quality of geothermal resource data in Myanmar is limited, which makes it challenging to accurately assess the potential for geothermal energy and design effective geothermal energy systems.

Biomass

Around 50% of Myanmar's energy needs are met through bioenergy, derived primarily from woody biomass. With 48% of geographical area covered by forests, biomass has a central role in the country's energy supply. Further, rice is the predominant agricultural commodity cultivated in Myanmar. Modern rice husk-based bioenergy demonstration projects could play an important role in augmenting biomass-based energy generation in the country. However, the accessibility of biomass feedstocks is a significant hurdle. Myanmar has ample sources of biomass, including crop residues and wood waste, but these resources face competition for use, for animal feed or as fertilizer, among other uses. Additionally, the inadequacy of current biomass processing and handling infrastructure can hinder efficient collection, transportation, and storage of biomass feedstocks. With right policies and investments in place, there is potential for growth in the sector.

Mini-grids

Mini-grids have emerged as a promising solution for off-grid remote areas in Myanmar. The Ayeyarwady, Bago, Chin, Kachin, Kayah, Kayin, Magway, Mandalay, Mon, Rakhine, Sagaing, Shan, and Tanintharyi regions in Myanmar are considered potential locations for implementing mini-grids. The primary obstacle in establishing and maintaining mini-grids is high upfront costs of building and operating mini-grids, which may not be recoverable in regions with low electricity consumption and insufficient financial resources. Furthermore, the absence of well-defined guidelines and benchmarks for mini-grids may lead to ambiguity and hinder the financing prospects for developers.

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