THE INTERNATIONAL REC STANDARD

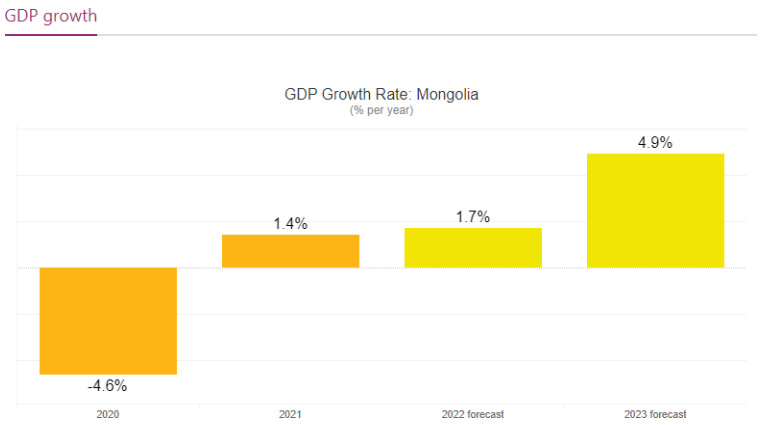
Country Assessment Report

Country/Region name :Mongolia

Mongolia is a landlocked country in eastern Central Asia between Russia and China. The land has a total area of 1,564,120 km² (603,910 mi²). Mongolia is thus one of the largest countries in Asia and the 19th biggest in the world. With 2.1 inhabitants per km² it is also the most sparsely populated country in Asia. More than half of all residents (69%) live within cities.
Mongolia lies at an average elevation of 1528 m above sea level and is therefore one of the highest countries in the world. There are direct national borders with the two neighbouring countries China and Russia (https://www.worlddata.info/asia/mongolia/index.php)

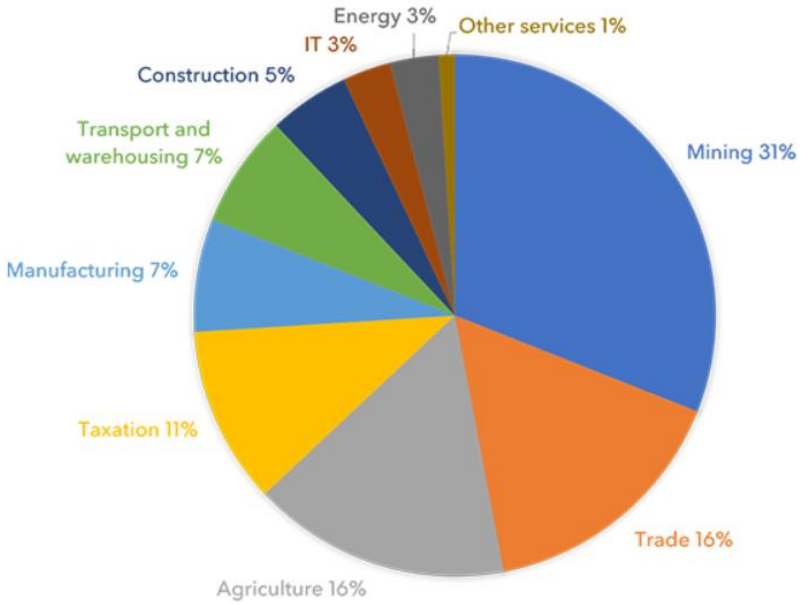
Economic structure and Activity

Over the past 30 years, Mongolia has transformed into a vibrant democracy, tripling its GDP per capita since 1991. With vast agricultural, livestock and mineral resources, and an educated population, Mongolia's development prospects look promising in the long-term assuming the continuation of structural reforms.



The analysis of the current GDP structure illustrates that the key economic drivers are mining industry and agriculture sector.

GDP structure by sector, 2019 (NSO)



The mining industry accounted for 31% of the national GDP in 2019, and composes 93% of the country's exports. The main export commodities are copper, gold and coal, and Mongolia is one of the major coal exporters to China. In order to reduce overreliance to one sector, the Government has been working to diversify its economy and support other sectors, including agriculture, infrastructure, industry, tourism. Within this objective, the country's long-term development policy **Vision-2050** was adopted in 2020 prioritizing six economic sectors for investment and development over the course of next 30 years. These include:

- Value-added mining and related infrastructure megaprojects
- Processing industry
- Energy sector
- Transport and logistics
- Tourism and related services
- Knowledgeable and productive sectors

The following box illustrates the current state and recommendations on energy demand objectives defined in the implementation phases of Vision 2050.

Vision 2050 Energy Demand Objectives

Vision-2050 Activities

3.2.2. Make construction blueprints of housing to fit the purchasing power of citizens, and improve norms, standards, relevant laws and legal environment.

3.2.12. Create a sustained system of policy and financial support for introducing green housing.

3.2.13. Use state and local budgets as well as other investment sources to provide as a priority the engineering infrastructure to common and fringe zones of ger districts, create space for the construction of new housing through direct exchange of sites with built infrastructure for state-owned or private housing in line with the will and initiatives of citizens.

4.2.41. Introduce innovation, advanced and smart technology in the energy sector and pursue the policy of financial independence, efficiency and saving.

6.4.3. Promote environmentally friendly and economical green ideas, attitudes and practices such as sustainable green cities, green buildings, green lifestyles, and resource conservation.

6.4.10. Support and develop domestic manufacturers of green and energy efficient products in the construction sector.

9.3.4. Increase the supply of various types of housing (income-based, rental, green) and implement a housing program for 150,000 households.

9.3.12. Introduce multiple and smart public transportation (such as BRT, electro-magnetic transportation).

9.3.24. Establish a network to charge vehicles with electricity and gas.

9.3.36. Implement a national energy saving program.

9.3.37. Build partial and independent heating sources with environmentally friendly and advanced technology that work during peak hours in remote areas of the capital city, connect them to the central heating supply system and increase their efficiency.

Source: Vision-2050, the long-term national development policy for Mongolia.

In alignment with Vision 2050, the Government launched so-called Revival Strategy in 2021 focusing on six areas that need "recovery": ***build ports, enhance energy sector, develop industrial sector, urban and rural areas, support green growth, and increase national productivity***. Within the scope of the ***energy sector enhancement*** the following 5 objectives were identified:

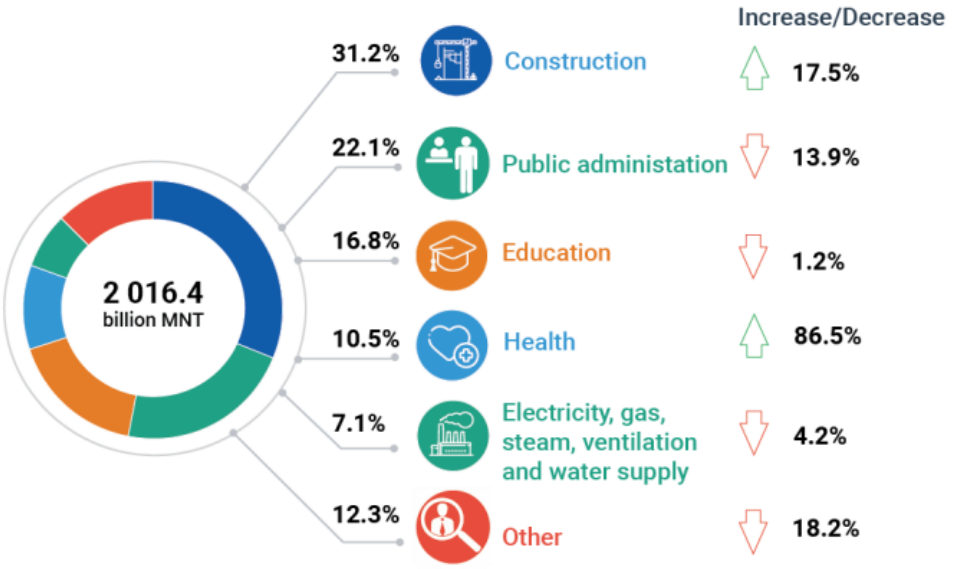
- Enhance grid network, capacity, independent energy supply
- Expand renewable energy by supporting hydro energy projects, energy storage, strengthen the stability and safety of the energy generation and supply
- Shift the energy sector toward market-based, financially self-sufficient system
- Conduct preparatory work to be connected into the North-East Asia's integrated power network with the aim to generate and export renewable energy
- Accelerate bio-gas project in collaboration with Russia and China

The Revival Strategy is the mid-term policy document to be implemented for the next 10 years starting from the 2022.

As the result of these efforts, market competition in other sectors of the economy is increasing, such as agriculture, textiles, telecommunications, construction, manufacturing, food processing, tourism, health and education.

The government investment by economic sectors, 31.2% of government investment was in construction sector, 22.1% was in public administration, 16.8% was education, 7.1% was in electricity, gas and steam, 10.5% was on health in 2021.

Government investment by sector, 2021



In terms of foreign direct investment, 76.5% was on mining and quarrying sector, 6.4% was on wholesale and retail trade, and 3.4% was on finance and insurance sector.

Foreign Direct Investment by sector, 2021

All in all, the economic growth is expected to reach to above 6% in 2024-2025 as mining production increases. Nevertheless, reforms to promote economic diversification remain critical to sustaining growth and building resilience. In 2022-2023 economic recovery is observed in sectors other than mining, in construction, agriculture, services and manufacturing.

The livestock dominates the agriculture sector, making up around 90% of its total output. Mongolia has one of the largest livestock populations globally, with over 66 million livestock.

The construction sector has been rapidly growing in response to the demand for infrastructure and housing development. It is predicted to experience an Average Annual Growth Rate (AAGR) of over 4% between the years 2023 to 2026 according to the China Brief.

The service sector predominantly focuses on the tourism. According to the World Travel and Tourism Council, the Mongolian tourism sector's direct contribution to GDP has grown by 5.5% per year, and the trend is projected to remain until 2029.

The manufacturing sector is relatively small, accounting for approximately 5% of the GDP. In

2021, the country's manufacturing output increased by 5.25% compared to the previous year.

Electricity Generation and demand: (type, MW, TWh)

In 2021, Mongolia produced 81% of its electricity while imported 19% - totaling 9,775.4 GWh electricity generation and import[1]. The domestic electricity generation of 7,913.6 GWh in Mongolia is almost entirely (89.8%) produced by a total of nine coal-fired power plants, with generation from renewable energy (10.2%) and from small diesel generating plants (0.01%, mostly in remote areas) providing the rest of the nation's supplies.

In the following Table 1, installed capacities of renewable energy facilities are listed.

Table 1. Renewables Installed Capacity in Mongolia as of 2021

Generation Unit & Capacity	***Name of Plant***	***Owner/Operator***	***Installed Capacity***
Wind (3) – 155 MW	Salkhit Wind Park	Clean Energy LLC	50 MW
	Tsetsii Wind Park	Clean Energy Asia LLC	50 MW
	Sainshand Wind Park	Sainshand Wind Farm LLC	55 MW
Solar (6) – 92.7 MW	Darkhan City Solar Plant	Sharp corporation (Japan); Solar Power International LLC (Mongolia)	10 MW
	Everyday Farm	Farmdo Co.,Ltd (Japan); Everyday Farm LLC (Mongolia)	12.7 MW
	Sumber Solar	ESB Solar Energy LLC	10 MW
	New Airport Solar	Sharp corporation (Japan); Tenuun Gerel Construction LLC (Mongolia)	15 MW
	Zamiin Uud Solar	Naranteeg LLC	15 MW
	Sainshand Solar	Desert Solar Power One LLC	30 MW
Hydro (2 year-round) – 23 MW	Taishir	Government of Mongolia	11 MW
	Durgun		12 MW
Hydro (9 seasonal) – 5 MW	Bogdiin gol		2 MW
	Tosontsengel		*375 kW*
	Erdenebulgan		*200 kW*
	Guulin		*400 kW*
	Uench		*960 kW*
	Kharkhorin		*528 kW*
	Jigj		*200 kW*
	Mankhan		*150 kW*
	Munkhkhairkhan		*150 kW*
TOTAL (RE INSTALLED CAPACITY)			**275.7 MW**

As shown in Table 1, wind and solar plants are operated by the independent power producers

[1]Statistics on Energy Performance, Energy Regulatory Commission, 2021.

those made power-purchase agreements with the Government.

An average energy consumption growth of 4.4% per annum for electricity, and 3.4% per annual for thermal energy is projected until 2030[2]. The consumption projections suggest that the installed capacity for electricity generation will need to reach 1,703 MW, and for heat 3,093 thousand Gcal by 2030, while maintaining adequate reserve margins. It further shows that Mongolia could face the shortage of electricity and thermal energy production capacity by 2023, unless new capacity/resources added to the system.

In general, the country is rich in renewables resources as projected by the National Renewable Energy Laboratory (NREL) of the United States Department of Energy that, the combined wind and solar power potential in Mongolia estimated to be equivalent to 2,600 gigawatts (GW) of installed capacity or 5,457 terawatt-hours of clean electricity generation peryear.

Climate Change

Over the last 80 years, the annual mean surface temperature in Mongolia has already increased by 2.24°C, triple the global average[3]. Climate change is already impacting Mongolia's water and forest resources as well as its soil and biodiversity. Mongolia's lakes are gradually drying up and disappearing, while many of the country's native species are losing their habitats to desertification and land degradation. According to Mongolia's Third National Communication and Forest Reference Level Report to the UNFCCC, 76.9% of Mongolian territory is affected by desertification and land degradation, and soil nutrition is lost; forests being lost and degraded emitting annually 5,213,319 tCO2-eq.; and rising temperatures and agricultural intensification are expected to exacerbate the situation (Government of Mongolia, 2018). Existing situations are increasingly putting the sustainability of Mongolia's traditional livestock husbandry at risk.

The country's GHG emission is estimated as 34.5 Mt CO2-eq. (excluding LULUCF) in 2014, out of which 50.1% came from the energy sector; and by 2030 a total GHG emissions are projected to reach 74.3 Mt CO2-eq. in a business-as-usual scenario. Considering the climate change impacts and its emitting sector, Mongolia communicated its climate specific policy and actions through Nationally Determined Contribution (NDC) to the Paris Agreement in 2020. Mongolia's NDC aims to achieve 22.7% emissions reduction by 2030[4].

[2] https://www.adb.org/sites/default/files/linked-documents/51199-001-sd-01.pdf

[3] Climate change adaptation assessment, IRIMHE, 2023

[4] Mongolia's Nationally Determined Contribution to the UNFCCC, 2020

Electrical interconnection and import/export:

Electricity Situation

The electric power network of Mongolia consists of five energy systems: Central energy system (CES), Western energy system (WES), Altai-Uliastai energy system (AUES), Eastern energy system (EES), and Southern energy system (SES), as well as other diesel plants and renewable energy sources. Mongolia's energy system is connected to the Russian and Chinese electricity systems (Figure 2).

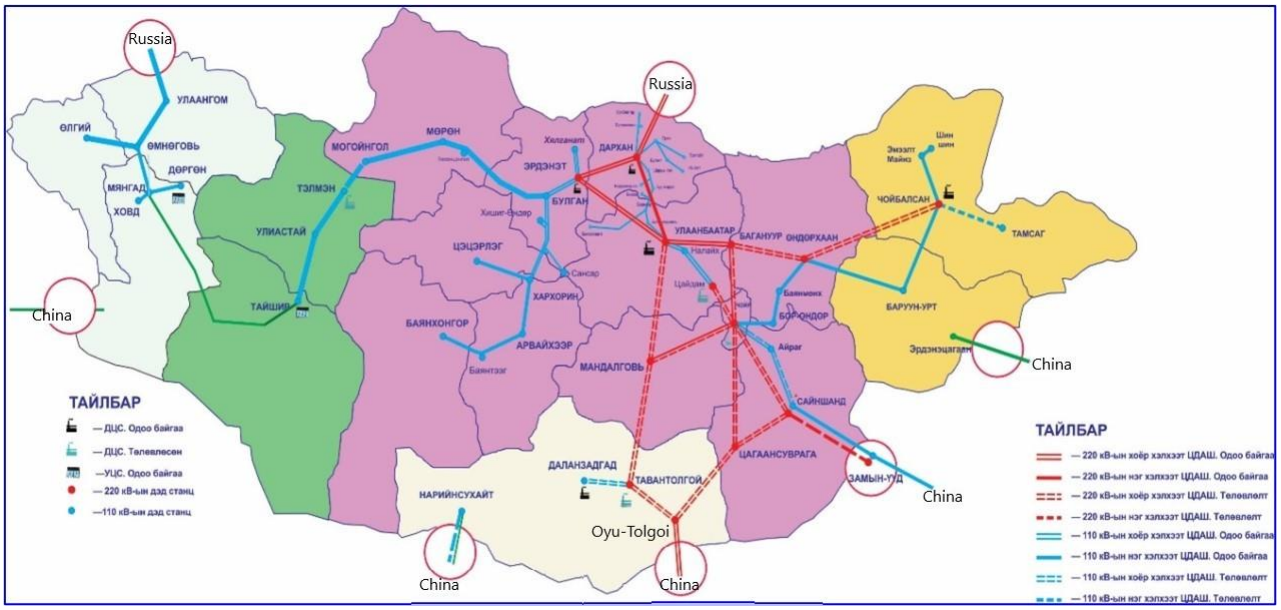


Figure 1. Energy Systems of Mongolia

WES	AUES	CES	SES	EES

In 2021, a total imported energy was 1,861.8 GWh (Figure 3) – of which approximately 461.6 GWh from Russia, the remainder 1,400 GWh was imported from China. Transmission and distribution systems are owned by Mongolian state-owned enterprises. The main consumers of imported energy from China are the mining company, "Oyu-Tolgoi" and southern part of small consumers, while imported energy from Russia is taken up by the central and western energy systems. As mentioned, most of the imported energy from China is purchased and used by the biggest mining company in Mongolia, "Oyu-Tolgoi". The energy network connects China and Oyu-Tolgoi is a separate from Mongolia's five main energy systems. Both Central and Western Energy Systems import energy from Russia. As per the Central Energy System, in 2021 it imported 332 GWh electricity from Russia, which increased to 550 GWh in 2022. This further

indicates the domestic supply of energy cannot meet its increasing demand.

The fastest growing import markets in Electricity for Mongolia between 2019 and 2020 were China($3.09M)[5]. Source (www.energy.gov.mn)

Within objectives of meeting the energy demand and enhancing the energy security, the Government of Mongolia in collaboration with the international development partners has been undertaking various studies i.e., Feasibility of Asian Super-Grid, and projects including ADB's Upscaling renewable energy sector, USAID's Mongolia Energy Governance etc. The Asian Super-Grid is the initiative to generate renewable energy in Gobi Desert of Mongolia and deliver the energy to regions with high energy demands using the power corridors connecting Russia, Mongolia, China, South Korea, and Japan. Yet, there is no clear information regards to its status and/or likelihood of implementation in the future.

Overall, transmission and distribution networks are vertically integrated, owned and operated by the state-owned enterprises, all energy producers including independent renewable energy producers must use the state transmission and distribution systems.

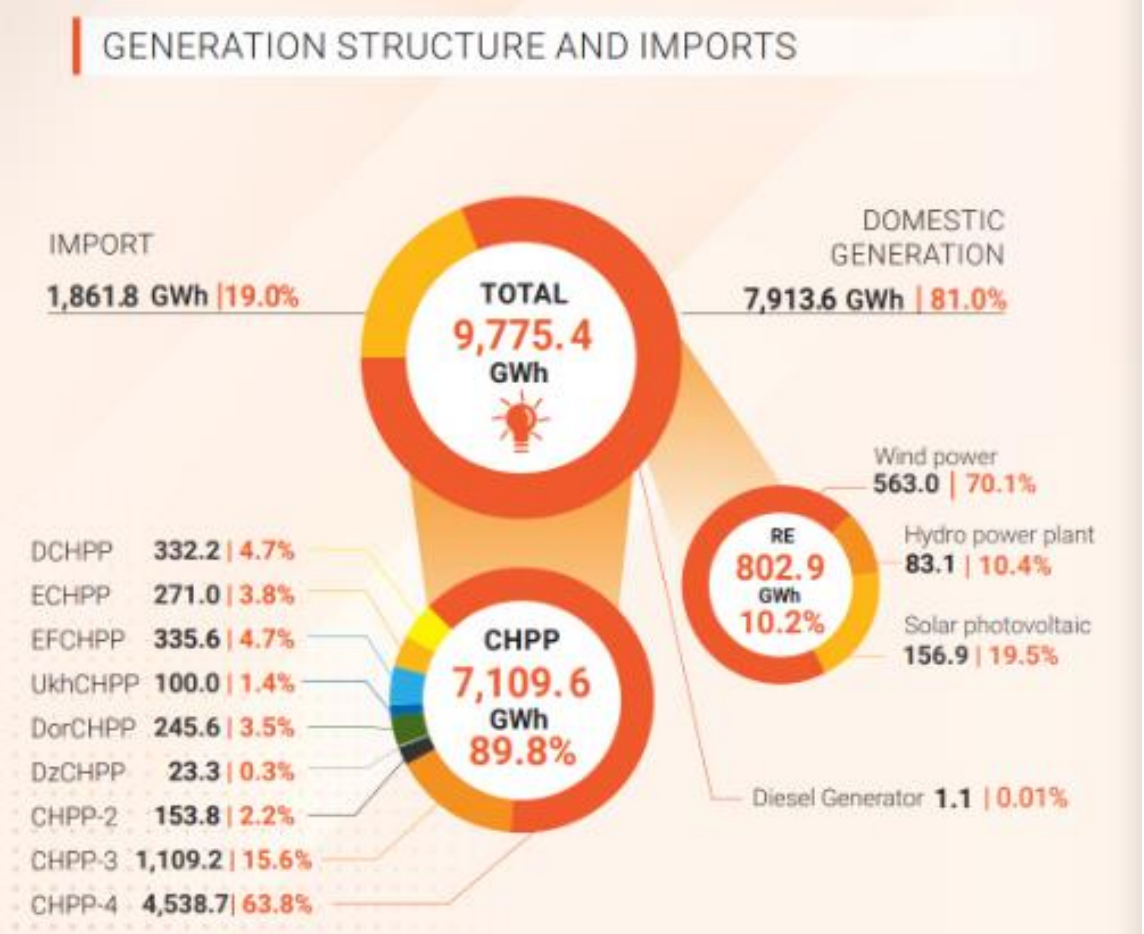


Figure 2. Energy Generation Structure and Imports. Energy Regulatory Commission (2021)

[5] www.energy.gov.mn

Historical support for development of renewables in the country/region:

Mongolia approved its Renewable Energy Law in 2007 in which, the feed-in-tariffs for wind and solar energy generations were set as 0.08-0.095 USD per grid-connected wind and 0.15-0.18 USD per 1 kWh grid-connected solar energy. With this scheme, existing 3 wind parks and 6 solar plants were installed by private companies. Upon the operationalization of these renewable plants – the amendment made in 2015 into the Renewable Energy Law adding "support tariff" to compensate the tariff difference between conventional and renewable energy resources. The supporting tariff is determined and approved by the Energy Regulatory Commission (ERC), and as lastly updated in 2019, the support tariff is 23.79 tugrik per 1 kWh renewable energy generated. As of 2020, the revenue of 122.7 billion tugrik is generated through the support tariff paid by consumers.

The Law on Renewable Energy amended in 2019, reduced the feed-in tariffs for wind and solar - up to 0.085 USD (wind), and up to 0.12 USD (solar); while the Law introduced the concept of renewable energy auctions for those projects to be connected to the national grid.

Besides the feed-in-tariff, the regulations such as the State Policy on Energy, Green Development Policy, and National Program on Renewable Energy which are all deactivated in 2020, are used to support the development of renewable energy in Mongolia with the objectives to reach the share of renewables at 20% by 2023, 30% by 2030 in the total installed energy capacity. Due to the development of Mongolia's Long-Term Policy, "Vision-2050", and revision of a Law on Development Policy Planning, and Management – the state policies and programs including the above-mentioned regulations were nulled.

Additionally, Mongolia supports and actively engages the global communities in addressing climate change. Mongolia's climate change policy and plans such as National Action Program on Climate Change (completed in 2021), Intended Nationally Determined Contributions (INDC, 2015), and Nationally Determined Contributions (NDC, 2020) include the installation of renewable energy facilities. For instance, hydro, wind, and solar energy generations will achieve 17.5% of Mongolia's NDC target of reducing its economy-wide GHG emission by 22.7% in 2030 from the business-as-usual scenario[6]. To accelerate climate actions and mobilize private sector resources, the Government of Mongolia has become the first country to join the Joint Crediting Mechanism (JCM) in 2013, led by the Government of Japan. Through Mongolia-Japan JCM scheme, 3 solar power plants total of 37.7 MW installed[7]. Similarly, with the Clean Development Mechanism under the United National Convention on Climate Change (UNFCCC), Mongolia implemented 2 hydro-plants (23 MW) and a wind park of 50 MW[8].

The existing renewable energy plants one way or another have been supported through either policy instruments, and/or financial incentives such as international concessional finance or carbon finance. Continuation and development of policies and international financial support will determine the scaling up renewables in Mongolia coming years. With the NDC in activation, the Government of Mongolia is challenged by objectives in implementing its NDC and enhancing the target in the subsequent NDCs by 2025 and every five years thereafter. That said, over the years, there is a substantial o*p*portunity for Mongolia to undertake activities that can contribute to an ambitious, enhanced NDC submission in 2025**.**

[6] NDC, Mongolia

[7] JCM

[8] CDM

Electricity market structure:

The power system of Mongolia accounts for 3% of GDP and supplies 80% of the population with electricity. The system is considered to be a major branch of the economy and infrastructure sector of Mongolia and it strongly influences the social and economic viability of the country. Approximately 80% of the consumed electricity is generated in coal-fired power plants, 4% is produced by diesel generators and 3% by renewable energy sources (mainly hydropower). The remaining 13% is imported, mainly from the Russian Federation.

The Mongolian energy supply sector is heavily dependent on coal. In 2017, 70% of the total primary energy supply was supplied by coal, followed by 26% of oil and 4% from other sources (IEA, 2019). The situation is worse when it comes to the electricity sector where coal was responsible for 89% of total electricity generation in 2017 (IEA, 2019). The high coal usage is interlinked with the domestic coal mining industry since Mongolia is a coal producer and exporter, which makes coal a readily available fuel.

As a result of the Mongolian fossil fuel dependency and economic growth, emissions have increased in the past three decades. Energy is responsible for the largest share of emissions in Mongolia currently and for some time into the future. As a result of the transition from a planned Soviet style economy in the 1990's, energy related emissions initially declined steeply from a peak in 1992. However, they started growing again in 1999 and have increased by 55% between then and 2014 (Ministry of Environment andTourism,2018). https://newclimate.org/sites/default/files/2020/03/Decarbonization_Pathways_Mongolia.pdf

The current national energy market is described as Single-Buyer Model, which was introduces in 2002. Under this model 5 power generating companies sell electricity at regulated tariffs to the National Dispatching Center (NDC), which serves as the Single Buyer. Then NDC sells the purchased electricity to ten distribution companies at wholesale prices. Distribution companies distribute electricity and supply it to the end-users at distribution prices. One of the four largest distribution companies was fully privatized in 2004; with the exception of two private distribution companies, all the rest are state joint-stock companies.

The price of electricity to be sold and the purchase price for distribution and supply is determined by Energy Regulatory Commission (ERC) according to approved methodology. The method of allocating a company's income; however, needs to be more open and transparent based on the actual performance of the companies' operation. Consequently, in this model there are no bi-lateral obligations needed between generating and distribution companies. The flow of funds under this model is implemented through a Cash Management System (CMS) under which retail customers of state owned distribution companies deposit their payments into the so-called "zero balance" accounts established by each distribution company. At the end of each day funds from these accounts are transferred into what is called "Main Zero Balance" account (MZBA), established in the Mongolian Savings Bank. Private distribution companies are not mandated to establish "zero balance" accounts and are allowed to make direct payments to the "Single Buyer". Disbursements to the market participants (distribution and generation companies) and to the dispatching entity are made from MZBA in accordance with the pre-agreed allocation formula approved by licensees at their annual meetings. All in all, the Single Buyer model, which is adopted in the frame of the Central Energy System, is regulated by an automatic cash flow mechanism. Although the NDC acts a commercial operator "single-buyer," it does not have any financial obligations to

producers and suppliers and is not required to accept responsibility for the accumulation of debt due to insufficient revenue collection in the single-buyer market, for example, leading to a large amount of inter-sector debt has no owner and is not tracked by proper documentation like invoices.

This system has advantages and disadvantages associated with the reliance by consumers on the operation of a vertically integrated utility.

The advantages of the current system are:
• Relative simplicity
• Allows easy balancing of supply and demand and settlement at deviations through the simple spot market settlement process
• Prevents misappropriation of retail revenue
• Provides financial stability to power sector entities
• Contributes to maintaining reliable power system operation under difficult local conditions.

The primary disadvantages of the current system:
• It does not foster competition
• It allows government intervention into the settlement procedure
• It doesn't promote market relationship between distribution and generation entities
• It doesn't provide non-privatized distribution companies with sufficient incentives to improve collection of retail revenue.

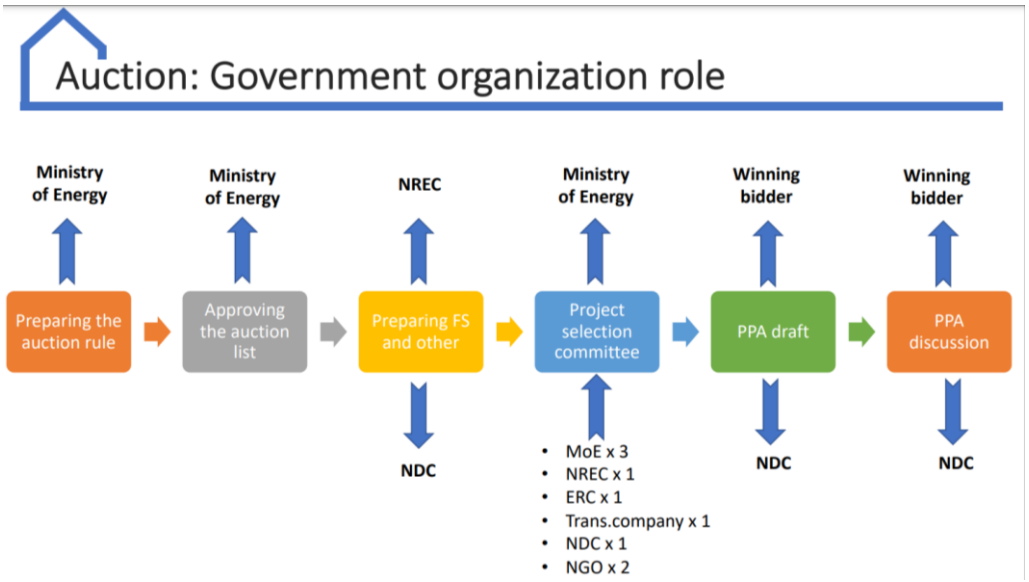
In addition to the Single Buyer market, a spot market has been operating since 2006 and an auction market has been operating since 2007.

The ***spot market's*** purpose is to settle the deviation between planned and actual generation. Only generators "participate" in this spot market. The spot market functions in the following way: The daily regime planning group of the National Dispatch Center develops generation dispatch schedules for the next "operating" day. During the "operating" day dedicated staff within this group tracks all deviations from the dispatch schedule, prices the energy deviations in accordance with the spot market rule developed by ERC staff and approved by the ERC and submits this data to the transmission company to be used subsequently for adjustments to funds distributed among generators as part of the funds allocation process. The spot market rule is somewhat simplistic and vague and doesn't take into account all possible situations. According to the rule, energy deviations should be priced at the respective energy tariffs or by combined tariff if the two-part tariff is not yet in place. That doesn't seem to be reasonable. As was noted above only generation deviation is settled through the spot market. Deviations on demand side are simply ignored. It is obvious that current spot market arrangements leave room for improvement.

According to the experiences of competitive markets, ***auction market***, in foreign countries, usually the right to supply electricity is awarded to the generator based on the lowest offered price. However, in case of Mongolia, the lowest generation tariff will not be ranked in the first place. Instead, the generators who offered to reduce their generation tariff by a higher percentage will be ranked as the first. This affords an opportunity for the power plants with significantly different tariffs to have an equal right to participate in the auction market. Due to the specific features of the electricity market of Mongolia, ERC organized the auction market only on the incremental electricity demand among generating licensees for the best price reducing percentages.

The auction market commenced operation on 1 August 2007. According to the "Electricity Auction Market Temporary Rule" approved by the ERC, the NDC developed and approved an "Auction organization rule for the electricity competitive market". In total, 4.45 million kilowatt-hours of electricity which is equal to MNT 281.7 million traded in 2011 in the auction market. Power Plants participated in the auction market decreasing their energy tariff by 0.2%. (Source: ERC) In 2020-21, Mongolia held its first renewable auction for a solar-plus-storage project funded by the Asian Development Bank.

The auction market stakeholders' roles



MoE = Ministry of Energy; NREC = National Renewable Energy Center (currently known as National Energy Center)
Source:

All things considered, the main decisions of current energy market are still made in a vertical system. Therefore, it is necessary to have market rules regulating the market, to support the element of competition, to improve the contractual responsibilities of market participants, and to make payments based on invoices. The Government has supported the competitive procurement of renewable energy in recent years. Following the implementation of laws and policy measures taken by the Government in 2007 to address growing energy consumption needs through renewable energy sources, 271.2 MW of solar, wind, and hydropower plants have been put into operation in Mongolia, making up 17.5% of the total installed power capacity of the country at end of 2021. To further benefit from lower costs of renewable energy technologies worldwide, the Renewable Energy Law in 2019 includes a mechanism for competitive selection of renewable energy projects. By selecting projects through this competitive tender (auction) mechanism, the Government hopes to see a reduction in the total cost of RE projects, as well as an overall decrease in the price of electricity sold to consumers.

The grid code, adopted in 2003, regulates functional and operational relations of the power plants and grid companies. The grid companies extend the networks at the expense of the municipal and state budgets. The payment for the connection is set by the grid enterprise. The transmission company and the Ministry are responsible for electricity transmission planning. However, the present tariff structure in Mongolia does not reflect the full cost of

service and is heavily subsidized. This lack of cost recovery has led to financial challenges that prevent much-needed investments in refurbishing infrastructure-which some estimate will require $4 to $5 billion by 2030 - in an environment that is not conducive to private investment.

In the near future, Mongolia must improve the oversight and responsibility of parties involved in the single-buyer model, ensuring that the NDC as market operator assumes financial and technical responsibility ahead of energy producers and transmission and distribution companies. In general, the energy market of Mongolia would benefit from optimizing costs, covering investment and operational costs, and better resource allocation. Also, it is necessary to improve the monitoring and evaluation of the financial reports for price and tariff setting, and to prepare the accounting of energy companies in accordance with international accounting standards (IAS) and to include it in a unified program.

Although competition increases the participation of the private sector, the enabling conditions for competition are limited by the lack of sufficient energy capacity to meet demand. Against all the challenges, however, Mongolia remains committed to the international accords to reduce greenhouse gas emissions and promote renewable energy, pledging to reduce greenhouse gas emissions by 22.7 percent by 2030. One of the key drivers of this commitment is renewable energy. So far, the country has awarded high-tariff, long-term Power Purchase Agreements (PPAs) with 271.2 MW of solar and wind power plants. At current levels, these solar and wind tariffs are relatively high compared to average consumer tariffs. The NDC is facing challenges to meet Least Cost Principles and the development of the wholesale market due to the mandatory sales conditions of the PPAs in the single-buyer model. However, by planning to introduce competitive auctions, however, the Government will strive to select competitive new energy vendors and reduce costs. At the moment, renewable energy power plants are protected from price uncertainty and risks by operating with long-term, fixed US dollar tariffs in the country.

(*Source: 1.Mongolia vision 2050 Roadmap to becoming a self-sufficient clean energy exporter, USAID, 2022; 2. Evaluation of the functioning of current "single buyer" wholesale electricity market in Mongolia, USAID, 2006; Mongolia Country Profile, EBRD, 2015*)

Description of renewables support mechanism:

Foreign capital investment into energy assets/companies is permitted. Incentives for providing opportunities for and encouragement of investments include tenders; guaranteed tariffs for renewable energy (though not yet implemented); long-term agreements on purchase of electricity; or a combination of all these options.

The Renewable Energy Law of Mongolia was adopted by the State Great Hural in January 2007 and its Article 11 on Renewable Energy Tariffs and Prices sets the guidelines for the Feed-in-Tariffs (FiT) applicable to RE generators. The law was amended seven times since and the last amendment was adopted by the Parliament in 2019.

According to the law, the ERC sets the tariffs and prices of energy generated and supplied by renewable energy power sources which are connected to transmission network. Originally the tariffs were guaranteed to investors for a limited period of ten years from the date of the law, i.e. until January 2016. The law set the following framework:

• Price of electricity supplied by a wind power source is US$ 0.08–0.095 per kWh
• Price of electricity supplied by hydropower station with capacity up to 5 MW is US$ 0.045–0.06 per kWh
• Price of electricity supplied by a solar power source is US$ 0.15–0.18 per kWh.

According to the original law, any price difference of electricity generated by a renewable energy power source, connected to a transmission network, shall be absorbed in selling prices of other generators connected to the transmission network.

The regulatory boards of aimags and the capital city can set tariffs of energy generated by stand-alone power sources within the following limits:

• US$ 0.10–0.15 per kWh of electricity by a wind power source;
• US$ 0.08–0.10 per kWh of electricity by a hydropower plant with a capacity of less than 500 kW; • US$ 0.05–0.06 per kWh of electricity by a hydropower plant with a capacity of 501–2,000 kW;
• US$ 0.045–0.05 per kWh of electricity by a hydropower plant with a capacity of 2,001–5,000 kW;
• US$ 0.2–0.3 per kWh of electricity by a solar power source.

The highlights of the key changes introduced by the Amendment are summarized below.

1. Tariff Reduction

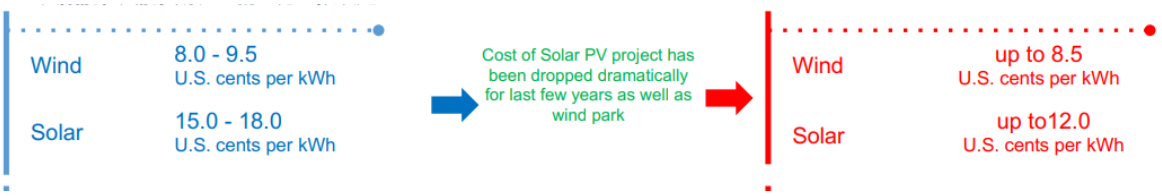
Pursuant to the Amendment, the tariff rates for grid-connected renewable energy power plants are reduced to the following capped rates:

Energy Source	**Previous Rate Range** (US$ per 1kWh)	**Capped Rate under the Amendment** (US$ per 1kWh)
Wind (grid-connected)	0.08-0.095	up to 0.085
Solar (grid-connected)	0.15-0.18	up to 0.12

The tariff rates for grid connected hydro power plants are not subject to change and remains at US$ 0.045-.06 per 1kWh. The Amendment specifies that the tariffs provided in the law shall not apply to energy exports.

Upper cap of tariffs for electricity generated by solar and wind power resources set.

New changes in RE tariffs



The Amendment further abolished the rate ranges for independent renewable power plants that are established at municipal level as those provisions are not relevant anymore. When the Renewable Energy Law was first enacted in 2007, there were many remote areas that were not connected to the national grid, whereas now almost all such areas are connected. Moreover, the Amendment introduced a possibility for end-users to offer their surplus electricity to the national grid. The tariff for such energy to be supplied to the grid would be set by ERC on an annual basis depending on the geographical location and end-user's purchase capacity.

As a result, wholesale prices for general coal generators are at 80.86 tugrik ($0.02) a kilowatt-hour, while the feed-in tariff ranges for on-grid renewables are as follows: $80-95 a megawatt-hour for wind, $45-60 a megawatt-hour for small hydro, and $150-180 a megawatt-hour for solar. This level is generally more attractive than neighboring countries such as Kazakhstan and China.

2. Introduction of renewable energy auction

The Amendment introduced the concept of renewable energy auctions, a competitive procurement mechanism, for projects that are to be connected to the national grid. The projects will be procured on the basis of technical specifications and tariff proposals. The Amendment provides that the Ministry of Energy, in charge of organizing the auctions, would pre-determine the geographical location, energy source to be procured, the capacity and amount of annual energy to be purchased in light of the state policy on renewable energy and stable operation of the national grid.

3. Project implementation guarantee

Due to an increasing interest amongst investors in the renewable energy sector in Mongolia and high demand for relevant licenses, ERC has issued licenses to projects which if built will be capable of generating 1,528.8 MW. However, the implementation of these projects has been insufficient over the years. In order to ensure the timely completion of the projects, the Amendment included a requirement to the license applicants to have project implementation guarantee. Pursuant to the Amendment, the project implementation guarantee to be made by a project developer must be in the form of bank guarantee or cash deposit at an escrow account. It further requires that all power purchase agreements to include project implementation guarantees as its condition.

4. Discrepancy in law and practice

In accordance with Article 8 of the Renewable Energy Law, a transmission licensee is responsible for bearing the cost for capacity expansion and connecting a new power plant to the grid. However, due to the transmission licensee being a state-owned entity, it does not have the financial capability to expand the capacity of substations and transmission lines for connecting new plants to the grid. In practice, power purchase agreements provide that the power producer or the seller is obliged to bear the cost of connecting the plant to the grid. In order to address this discrepancy between the legal provision and practice, the Amendment provides that the transmission licensee is no longer required to bear the cost of connecting the plant to the grid.

5. PPA to be concluded exclusively with NDC

Before the Amendment, license holders were required to conclude PPA with transmission licensee. The term "transmission licensee" is defined as legal entity with license to transmit energy to the main power grid and license holder. Traditionally, the National Power Transmission Grid SOE had the authority to conclude PPA with license holders while Articles 6.1.15 and 10.4 of the Energy Law states that NDC has the authority to conclude PPA with license holders. As a result, such loose term created a confusion amongst license holders on whom to conclude PPA with. Hence, the Amendment intends to clear out this confusion by replacing the term "transmission licensee" by NDC, making NDC as sole authority to conclude PPA with.

Also, regulations and tariffs for Distributed Renewable Energy Resource/***Net metering*** are introduced. Consequently, households and companies are now allowed to install solar PV system and wind generator at their facilities and sell excess electricity to grid at higher tariff.

Within the scope of the implementation of the law, 9 projects (6 solar, 3 wind) were completed between 2007-2019. The applied tariffs are 0.15-0.18USD/kWh for solar, 0.094-0.095USD/kWh for wind energy generation. Ultimately, the end-users pay according to the supporting tariff. No subsidies are provided by the state. In addition, although the government agreed to receive all renewable energy generated to the grid, however, there are cases that the government set limitation.

Furthermore, national energy authorities encourage and promote sustainable energy management standards including ISO 50007 and ISO 50001, which provide frameworks for establishing energy service and management best practices to help companies to improve their energy efficiency plus make a return on investment by implementing.

The Government launched Mongolian Energy Governance Activity (MEG) project in 2022 with the support and collaboration of USAID. The project will be implemented until 2027 with the purpose to promote energy self-reliance by bolstering energy sector governance. The project will promote development and strengthening of existing laws related to competitive and transparent processes to (i) incentivize private investment; (ii) boost the use of new advanced energy generation and management technologies; (iii) increase resilience to natural and human-induced shocks; and (iv) promote a secure, stable, diversified, and modern energy sector.

At national level there is no carbon crediting mechanism in place.

Responsible government department: (include key contacts)

Energy Regulatory Commission (ERC) – is an independent regulation authority operates under the Prime Minister's mandate, and self-funded by the license fees, in charge of the regulation of generation, transmission, distribution, dispatching and supply of energy (including the licensing and setting of tariffs in the electricity and heating sectors). Also, the ERC engages in dispute settlement between licensees and consumers in accordance with its jurisdiction; it is to implement the transformation of the energy sector of Mongolia into a market-oriented system.

Commissioners: [redacted], (Head); [redacted], [redacted], [redacted], and [redacted].

Director of Foreign Relations Division: [redacted].
Email: [redacted]
Contact: [redacted]

Ministry of Energy (MOE) - is a line ministry in charge of policy making for the sector. The policy areas under the Ministry of Energy include the development of energy resources, energy use, the import and export of energy, the construction of power plants, lines and networks, energy conservation, the use of renewable energy sources, the monitoring of the sector, the approval of rules and regulations for the sector and international cooperation.

Minister of Energy: [redacted]

Director of the Renewable Energy Division

National Dispatching Center (NDC) of Power Systems – is a state-owned enterprise, responsible for the safe, reliable, and efficient operation of the interconnected electric power system. The NDC's responsibility under certain network codes is to comply with dispatch arrangements for the reliable and stable operation of the network and electricity and heat supply using a least-cost principle to consumers 24 hours a day that meet the standard.

Executive Director: [redacted]

Existing/Planned energy legislation:

The main legislation in the energy sector includes Law on Energy (2001), Law on Renewable Energy (2007), and Law on Energy Conservation (2015).

The Energy Law of Mongolia is the primary governing law of the energy sector, regulating all energy generation, transmission, distribution, dispatching, supply, construction of energy facilities, and energy consumption using energy resources. Principle changes introduced during the revision of the Energy Law were: (1) the creation of legal entities or companies by unbundling the centralized structure of the energy sector; (2) issuing special licenses; and (3) establishment of the ERC to regulate the sector through license and tariff regulations. The law regulates supply of electricity, heat, and gas supply throughout integrated energy systems in Mongolia.

The Law on Renewable Energy of Mongolia was adopted in 2007. It regulates all activity related to the production and supply of energy using RE sources and supports the development of renewable energy. To support RE technologies – which were more expensive at the time the law was introduced - the Feed-In Tariff (FiT) mechanism was chosen to attract foreign investment and to create guarantees and to set maximum and minimum tariffs for electricity purchased from renewable energy projects in the integrated grid, measured in US cents and reflected in the law. As the cost of solar and wind energy technology has decreased in the world market for the last decade and reached a level whereby RE technology is able to compete with traditional energy without subsidies, the FiT mechanism has been changed and the principle of setting tariffs based on competition was introduced into the law in June 2019.

The Law on Energy Conservation was approved in 2015, promoting the efficient use of energy and more efficient equipment and technologies for both energy suppliers and consumers. Since the adoption of the law, 114 energy auditors, 314 energy managers, 14 audit organizations, and four Energy Service Companies (ESCO) have been established, and the government has provided support and advice to large energy users and 197 designated consumers whose electricity consumption exceeded over the limit set by the Government. The main implementing body of the law is the Energy Regulatory Commission (ERC).

Mongolia's Long-Term Development Plan, *"Vision-2050"* determines four pillars of objectives from the energy sector: (i) improve legal framework, (ii) define optimum energy market structure, (iii) adapt demand-side management best practices, and (iv) optimize energy mix. Within the Vision-2050, objectives such as becoming an energy self-sufficient country, energy exporter, and land of clean energy are put forward.

Throughout the years, efforts have undertaken supporting the renewable energy deployments such as the Renewable Energy and Rural Electricity Access Project (REAP) helped the government of Mongolia complete its National 100,000 Solar Ger Electrification Program, which provided over half a million nomadic herders with access to electricity through portable solar home systems. The project also helped fund improvements in soum (district) electrification, including rehabilitating mini-grids and installing renewable energy technology hybrid systems to power them.

Another noteworthy effort is Upscaling Renewable Energy Sector Project (USD 60.6M) financed by Asian Development Bank (ADB) Strategic Climate Fund, and Japan Fund for the Joint Crediting Mechanism. The project supports the establishment of a total of 40.5 MW solar and wind power in the Western and Altai-Uliastai regions; demonstration of 500 kW shallow ground heat pump in public buildings in five townships; capacity building of local utilities and the National Dispatching Center in renewable energy investment planning, renewable electricity

dispatch, grid control and protection, as well as the development of renewable energy investment plan 2023-2030 in targeted regions.

Environmental legislation for RE:

Planning Processes

The national development policies are developed and defined by the Ministry of Economy and Development (MED). The Ministry of Environment and Tourism became one of the line ministries, but remains responsible for climate change policy development and implementation in collaboration with other line ministries such as Ministry of Finance, Ministry of Energy, Ministry of Food, Agriculture and Light Industry, Ministry of Construction and Urban Development, Ministry of Road and Transport Development, Ministry of Mining and Heavy Industry and other socially inclined ministries.

The elaboration of NDC and its Action plan involved a multi-stakeholder process and consultations with key public bodies and international partners. It is largely based on existing legal frameworks and adopted policies of the Mongolian government, approved by the Parliament. Domestic legally-binding legislation already in place includes:

- Vision 2050, long-term development policy
- Revival Strategy, 2021
- Environment sector target program (under development; 10 year sectoral strategy document)
- Nationally Determined Contribution (NDC), 2019
- NDC Action Plan, 2021
- Law on energy, 2015
- Law on renewable energy, 2019

Majority of the development and climate policies cover periods up to 2025-2030. The next NDC will be submitted to the UNFCCC in 2025. Progress towards the fulfilment of the contribution will be assessed through an annual and biennial review of the implementation progress of the proposed policies and measures.

The Ministry of Environment and Tourism (MET) of Mongolia is the key ministry to develop, implement, and report climate-related policies and measures, including GHG inventory, National Communications (NCs), and Biennial Update Reports (BURs), and submitting them to the UNFCCC secretariat through the National Focal Point for the UNFCCC. To facilitate smooth implementation of commitments under UNFCCC, the MET established the Climate Change Research and Collaboration Center (CCRCC), a self-funded, state-owned enterprise to implement Mongolia's climate policies in 2020. The CCRCC is tasked with preparing reports (national communications [NCs], BURs) and conducting GHG inventories under the UNFCCC implementation process. Its inventory team of four sectoral experts (Energy, Agriculture and Waste, and LULUCF) prepares the national GHG inventory through collecting data mainly from statistical bulletins and request additional data from respective line ministries, and randomly from private sector. To enable cross-sectoral governance and decision-making on climate change policy implementation, the National Climate Committee (NCC) was reestablished in 2019. The NCC, chaired by the Deputy Prime Minister and vice-chaired by the Minister of Environment and Tourism, has 21 members who represent line President, Prime Minister's Offices, Parliament's standing committee, ministries, government agencies, academic organizations, and the national park representative.

Decarbonizing Mongolia's energy sector

The country's combined wind and solar power potential is estimated to be equivalent to 2,600 gigawatts (GW) of installed capacity or 5,457 terawatt-hours of clean electricity generation per year. The amount is enough to meet the country's energy demand (around 1.2GW as of 2018), and can meet northeast Asia's regional energy demand with a suitable transmission infrastructure.

To optimize its energy mix, the following activities are included in the Vision-2050:

- Develop energy and engineering infrastructure to support economic development
- Expand power plants, construct electricity transmission lines, sub-stations and new energy sources and become self-sufficient in electricity production
- Expand the capacity of thermal power stations engaged in ensuring energy reliability, safety and sustainability, build new power stations, ensure full supply of domestic energy needs and carry out export of electric power
- Construct aerial electricity transmission lines of Mongolia's integrated energy system's vertical and horizontal axles and establish a smart unified system based on advanced infrastructure.
- Build up a regime regulation facility of the integrated energy system and reduce dependency on imported energy.
- Bring the existing renewable energy capacity to 30 percent and use 10 percent of outgoing river flows for power production and other purposes.
- Utilize modern sources of renewable energy in the local heating supply.
- Carry out enlargement and renovation of heating sources and heating networks to improve the quality and availability of heat supply in cities, soums, and settlements.
- Use solar, wind, water, biomass, liquid and gas fuel, geothermal, fuel cell element and other new energy sources in adjustment with source strength balance.
- Implement green projects and programs to develop renewable energy, reduce greenhouse gas emissions, reduce waste, and increase efficiency of resource utilization through the United Nations Green Climate Fund and other international financial instruments.
- Develop the independent integrated energy system, shift to a smart system for the mixed use of renewable energy sources and become an energy exporter.

Supporting private sector investment in renewable energy. The government is to prepare market design and guidelines for ancillary service, utilizing regulation reserves provided by third parties, which would help the country's energy market transit from the current regulated operation to a more market-oriented operation, improving the sector efficiency.

ADB has also supported the government to improve energy sector efficiency with a separate technical assistance on smart energy systems, which covers automatic generation control and streamlined power settlement procedures, since December 2019. (https://www.adb.org/news/features/unlocking-mongolias-rich-renewable-energy-potential)

Existing/Planned energy certificate systems: (purpose, extent)

There is no such existing certificate scheme in Mongolia in present scenario.

Demand-side market potential or strategic nature of market development:

Mongolia is among the most heavily coal dependent developing country, and its energy sector is the largest contributor to its greenhouse gas (GHG) emissions, accounting for a half of the country total emissions. To decarbonize Mongolia's energy sector, the government aims to increase the country's share of renewable energy, especially wind and solar, which hold great potential for Mongolia. Yet, there is no such phase out coal plan or decarbonization plan in place – in addition to considering the high coal dependency, the country will face critical challenges in its transition towards a low-carbon economy. For the decarbonization agenda, energy efficiency and energy certificate could have significant contributions reducing the carbon footprints of coal-based industries and businesses in the country.

The financial sector as well as non-financial sector actors in Mongolia are becoming highly aware of sustainable and green business practices as it brings them the competitive advantages and accessibility to concessional finance. Mongolia's Green Taxonomy approved in 2019 and been applied by commercial banks since then; the Bank of Mongolia now regulates the green finance reporting framework. Even companies including the commercial banks started to put forward the net-zero targets indicating their commitments to reducing their environmental footprints and offsetting their emissions. Additionally, mining companies – the largest being the Oyu-Tolgoi with the equity finance of Rio-Tinto mining corporation, are interested in renewable energy installments unfortunately renewables are up to the Government, thus remains idle in their forward-looking agenda while using imported energy from China. Besides the physical renewable installments, the mining companies are keen to engage in renewables certificates or carbon markets if becomes available in the country. For instance, the Oyu-Tolgoi as a part of the global corporation with the ambition climate goals, needs to reduce their carbon footprints through renewables certificates, but there is currently no REC system to support the delivery.

Analysis of political disruptions or market risks:

Mongolia - Strategic Outlook

The amendments to the constitution of Mongolia made in 2019 provide crucial justifications for political and socioeconomic reforms. Following the amendments, the MPP reformers succeeded in gaining a broad-based consensus and getting parliamentary approval on the law on judiciary in January 2021, which introduced crucial reforms to re-establishing the independence of the judiciary and public trust in the institution. Also, parliament made improvement amendments to the law on banking that can reform the governance of the banking sector by making public listing compulsory and forcing deconcentrating of ownership.

The repeated disruption of Mongolia's mineral export during the outbreak of COVID-19 in China exposed the extreme vulnerability of Mongolia's economy. A diversified, high-income economy cannot be built without countercyclical fiscal and monetary policies and investment climate based on competitive conditions on a level playing field. Mongolia's 5% economic growth in 2017 and 2018, and its improved fiscal stability, underscore the importance of political determination and capability. However, the dramatic deterioration in the country's fiscal position in 2020 and the government's failure to prepare (institutionally and financially) for the fight against COVID-19 reveals and urgent need to implement fundamental reforms related to governance and effective economic development policies. (https://atlas.bti-project.org/1*2022*CV:CTC:SELMNG*CAT*MNG*REG:TAB)

Mechanisms in place to support the reliable verification and issuance of I-RECs: In present scenario the grid-connected power is all purchased by a single source, and there is potential for the central issuer to review settlement data for such power. However, at present there is no such local issuer present thereby the central issuer for the time being may perform verification until a suitable domestic counterpart is engaged access robust power sector data.
Local organizations of importance and their opinion on local I-REC market development: As mentioned above at present the power generation is met by conventional sources however the government committed to reduce GHG emissions by 2030 and currently in the process of updating and elaborating more ambitious targets, with a vision to mobilize increased green financial resources from climate-related funds to add to the country's economy

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