

Mongolia

Country Profile

- [1. Overview](#)
- [2. Policy and Incentives](#)
- [3. Wind](#)
- [4. Biomass](#)
- [5. Solar](#)
- [6. Geothermal](#)
- [7. Hydroelectric](#)
- [8. Links](#)
- [9. References](#)
- [10. Country Contacts](#)

Disclaimer: This information has been prepared for the European Bank for Reconstruction and Development (EBRD) by Black & Veatch (B&V) and is based on information not within the control of EBRD or B&V. References for information contained in this report are listed at the end of this document; readers should consult these references for original source material. Neither EBRD nor B&V has made an analysis, verified, or rendered an independent judgment of the validity of the information provided by others. EBRD and B&V do not guarantee the accuracy thereof. Use of this information contained shall constitute a waiver and release of B&V and the European Bank for Reconstruction and Development from and against all claims and liability, including but not limited to liability for special, incidental, indirect or consequential damages, in connection with such use.

1. Overview of Electricity Supply

The country of Mongolia has an extremely large land mass with a majority of the population living in rural areas. Renewable energy is very well suited for Mongolia's lack of centralized population centers. In fact, many homes in rural areas already use wind turbines and solar panels to power basic amenities in their home.

A majority of the electricity produced in the country is coal fired. The largest operating coal plant was commissioned in 1969. The plant, Power Plant 1-4, added coal fired units, with its last in 1989. The Power Plants 1-4 have a combined coal-fired capacity of 742 MW (UDI, 2009).

A vast majority of Mongolia is not serviced by a centralized power grid, and Mongolia's energy demand is rising by 3-5 percent every year. The Demonstration Project for Improved Electricity Services to the Low Income Communities in Rural Areas plans to construct electrical transmission and distribution networks for a maximum of nine small rural towns in Tuv, Bulgan, and Dundgobi aimags. Single-wire earth return (SWER) has been used in many developed nations with rural populations, and Mongolia plans to replicate this technology. The Ministry of Mineral Resources and Energy will begin the project in 2010 (ADB, 2009).

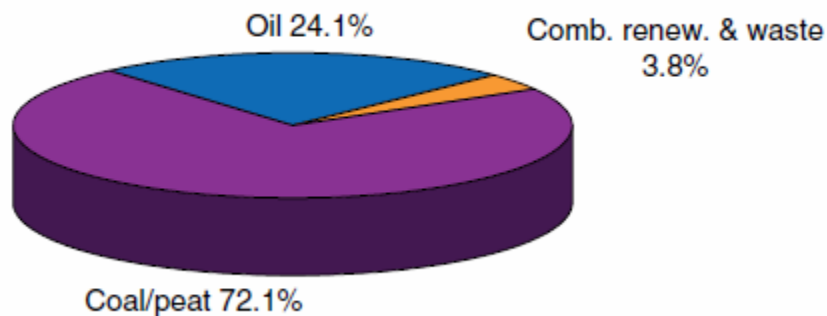
Basic information about Mongolia is summarized in the table below.

Demographical Information	
Population, millions (2009)	3.04
Land area, thousand sq km (2009)	1,560
Macroeconomic Information (2008)	
GDP, billion US\$	9.56
Real GDP growth rate, percent	8.90
Foreign direct investment (net), million US\$ (2007)	328
Electricity disposition, billion kWh (2006)	
Generation	2.93
Consumption	2.64
Exports	0.02
Imports	0.17
Generation capacity, GW (2005)	
Nuclear	0.00
Thermal	0.83
Hydro	0.00
Other renewables	0.00
Total	0.83
<i>Sources: CIA World Factbook, U.S. Energy Information Administration, United Nations Conference on Trade and Development.</i>	

Mongolia Country Summary Table

A majority of Mongolia's energy supply comes from thermal sources: coal/peat (72 percent) and oil (24 percent). Renewable resources make up 3.8 percent of the energy supply as shown in the pie chart below.

Share of Total Primary Energy Supply



[\(return to top\)](#)

2. Energy Policy, Barriers and Incentives

Mongolia's "National Renewable Energy Program (2005-2020)," passed by the Parliament of Mongolia in June 2005 plans to increase the percentage of renewable energy in the total energy supply. The program also plans to improve the structure of the energy supply and utilize renewable energy technologies in rural areas. The program has set renewable energy targets:

- Renewable energy target of 3-5 percent by the year 2010.

- Renewable energy target of 20-25 percent by the year 2020.

The National Renewable Energy Program for Mongolia also urges the development and implementation of a Master Plan to use the renewable energy sources. Air pollution in urban areas (especially Ulaanbaatar) is also of high importance in the energy program (Radii, 2008).

The "Renewable Energy Law of Mongolia," was approved by the Parliament in January 2007. The purpose of the law is to regulate relations concerning generation and distribution of electricity created by renewable energy resources. The law articulates the importance of renewable energy for Mongolia with an emphasis on wind. The law set feed-in tariffs for renewable energy power sources and set-up a renewable energy fund. The tariffs must be within the following limits (Radii, 2008):

- For electricity generated by wind power: 0.08 - 0.095 USD per kWh.
- For electricity generated by a hydropower plant with a capacity of less than 5,000 kWh: 0.045 - 0.06 USD per kWh.
- For electricity generated by solar power: 0.15 - 0.16 USD per kWh.

A majority of the assets in the country are fully privatized (Batbold, 2007).

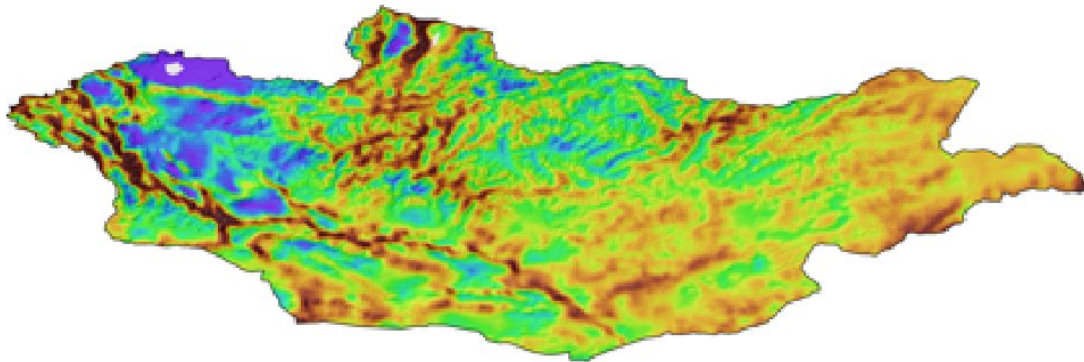
[\(return to top\)](#)

3. Wind

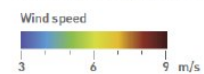
Mongolia has approximately 160,000 square kilometers of area with good wind resource. This area is in the southern and eastern desert areas of Mongolia; some parts of the area could have a wind power density of 7 MW/km².

Mongolia currently has two wind systems that are producing power: the 3 MW system, Naran, and the 5 MW system, Tsagaanchuluut (UDI, 2009). Two other wind systems, each with a capacity of 50 MW, have been planned. The planned wind farms will be the first in Mongolia to be connected to a central grid (Tudev, 2009). Also, around 4,000 portable, small wind generators (capacity between 50 Wp and 150 Wp) are used by herders for operating lights, radios, and TVs in rural areas (Radii, 2008).

Mongolia Wind Map at 80m



5km Wind Map at 80m



Copyright © 2009 3TIER Inc.

[\(return to top\)](#)

4. Biomass

The biomass potential in Mongolia is not well studied. Currently, biofuels and biomass facilities have not been built in the country. Mongolia has a very large animal production operation; the country could have great potential using animal manures for heating or producing electricity. Biomass is likely used to heat homes and water in rural areas.

Biomass resource type	Total production	Production density
Total land area covered by	(avg. 2006–2007, km ²)	(avg. 2006–2007, %)
Arable Land	8,345	1
Permanent Crops	20	0
Permanent Meadows and Pastures	1,151,814	74
Forest Area	101,281	6
Other Land	292,100	19
Inland Water	10,560	1
Primary crop production	(avg. 2006–2007, tonne)	(tonne / 100 km ²)
Total primary crops (rank among COO)	318,324 (24)	203 (15)
Top 10 primary crops		
Wheat	118,659	76
Potatoes	111,780	71
Vegetables fresh nes	23,050	15
Cabbages and other brassicas	22,850	15
Carrots and turnips	20,700	13
Barley	4,860	3
Nuts, nes	4,850	3
Cucumbers and gherkins	3,650	2
Oats	3,150	2
Onions, dry	3,000	2
Animal units, number	(avg. 2006–2007, number)	(number / 100 km ²)
Cattle	2,065,750	1,318
Poultry	30,500	19
Pigs	6,750	4
Equivalent animal units	2,068,755	1,320
Annual roundwood production	(2006–2007, m ³)	(m ³ / 100 km ²)
Total	767,500	490
Fuel	727,500	464
Industrial	40,000	26
Wood-based panels	1,600	1.0
	(2006–2007, tonne)	(tonne / 100 km ²)
Paper and paperboard	NA	NA
Recovered paper	NA	NA

Source: Food and Agriculture Organization of the United Nations

[\(return to top\)](#)

5. Solar

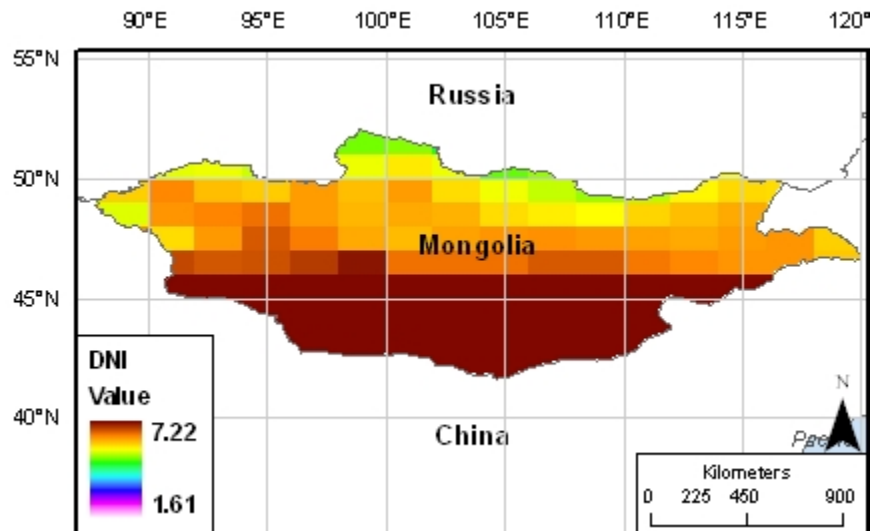
Mongolia has three different PV installations used to produce power: Naran Plant (5 kW), Noyon (200 kW), and Tsagaanchuluut (1 kW). These PV systems do not have any significant percentage of the total energy generated by Mongolia (UDI, 2009). At present it is estimated

that almost 60,000 independent solar PV systems are being utilized by herders for operating lights, radios, TVs and satellite dishes.

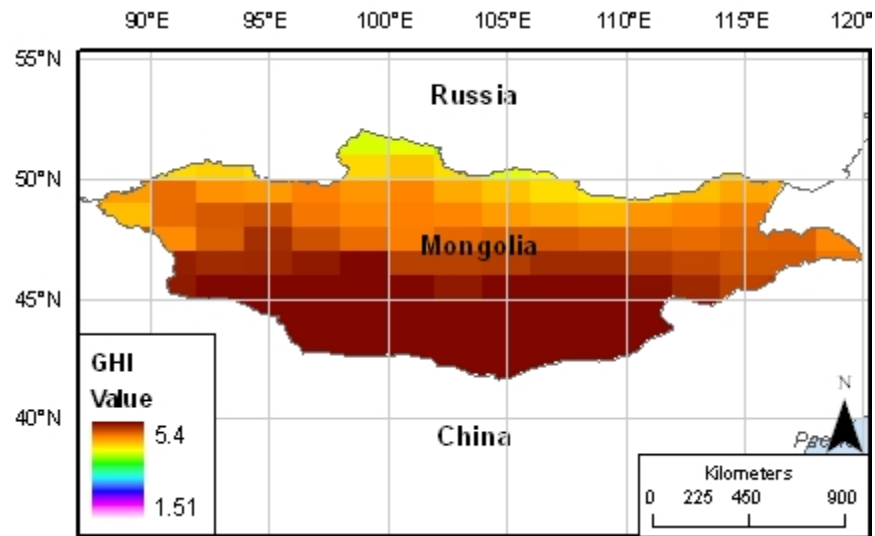
Approximately 70 percent of Mongolia has good solar resource. The northern and southern regions of the country receive annual solar radiation ranging from 1,163 kWh per square meter to 1,628 kWh per square meter, respectively. The good solar resource area has approximately 2,900 - 3,000 sunshine hours per year. A majority of this solar resource area is the Gobi desert. Studies are being proposed to assess the feasibility of constructing a large PV or concentrating solar power plant in the Gobi desert (Tudev, 2009).

Mongolia has a national program titled, "100,000 Solar Gers," plans to power over 180,000 herding households with solar power. A "Ger" (also known as a "Yurt" in other countries) is a round, tent-like, portable home used by herders throughout Mongolia. It is estimated that three-quarters of the population lives in gers (Project SafeCom, 2009). The program was first passed in 1999. One of the aims of this program is to reduce the migration the countryside to urban areas (Radii, 2008).

Mongolia Solar Direct Normal Insolation (Source: NASA)



Mongolia Solar Global Horizontal Irradiance (Source: NASA)



[\(return to top\)](#)

6. Geothermal

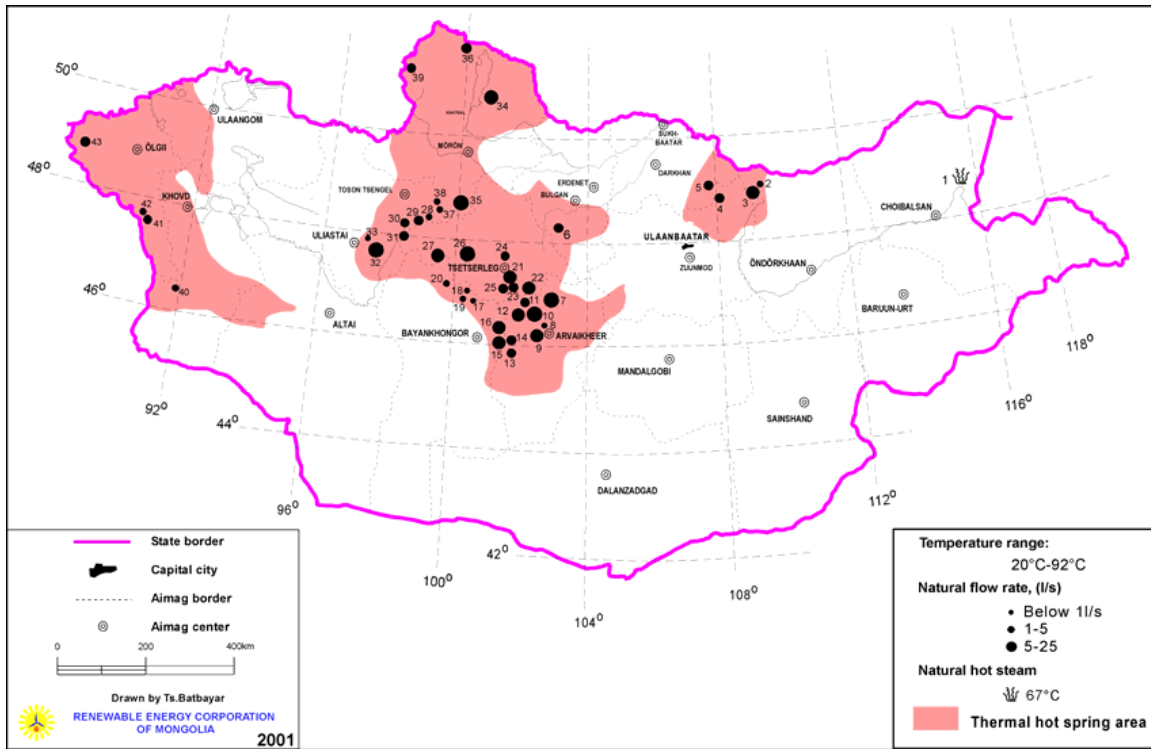
Currently, Mongolia uses 213.2 TJ/year of geothermal energy. The geothermal waters are mainly used for space heating, greenhouse heating, bathing, and swimming. Feasibility studies have been conducted to understand Mongolia's potential for geothermal power generation, but as of 2007, Mongolia has not generated power with their geothermal resources.

The Shivert area (located 20 miles northeast of Arkhangai) has measured surface temperatures of 55 °C with a flow rate of 4 l/s. In 1980, five boreholes were drilled, and temperatures higher than 70 °C were measured at a depth of 80 to 100 m.

More studies need to be completed to quantify and access Mongolia's geothermal potential.

The pink area on the map below displays the locations of the thermal hot springs in Mongolia. Site number 24 refers to the Shivert area described above.

Thermal Hot Springs of Mongolia



[\(return to top\)](#)

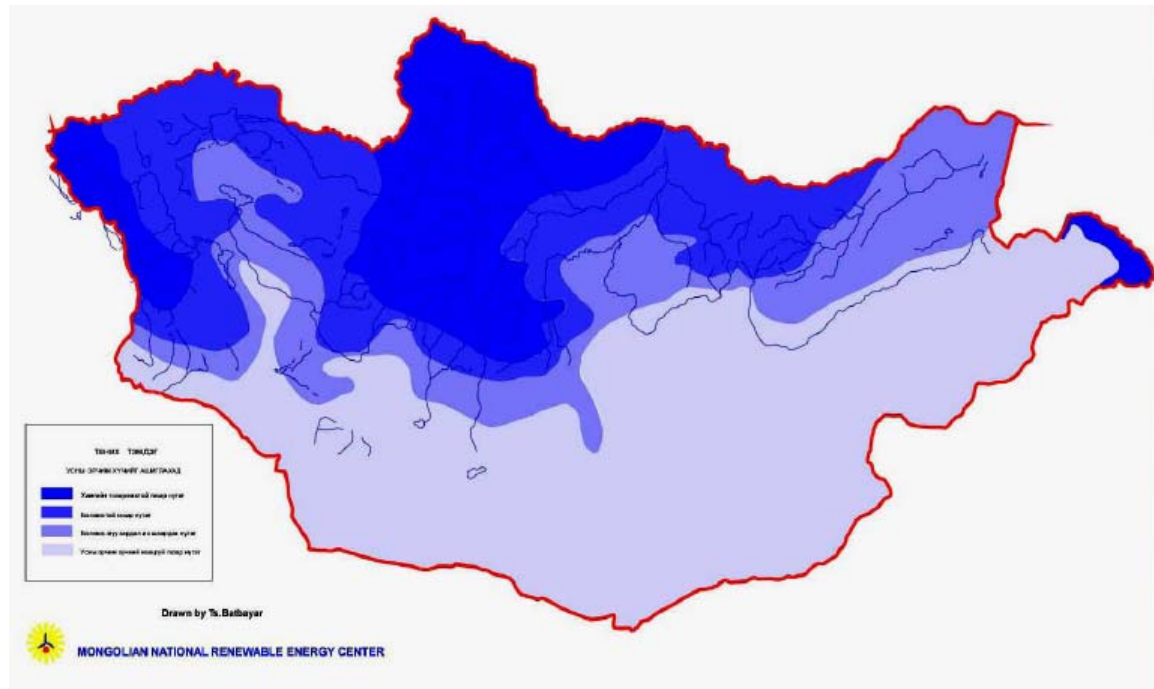
7. Hydroelectric

A total of 4,882 rivers and springs exist in Mongolia. The largest Mongolian rivers originate in the country's northern and western areas; very few streams are found in the south. The southern third of the country is covered by Gobi desert. In the north, the Selenge River and its main tributary, the Orhon River, form the country's major river system. These rivers join near the Russian border. Another large river, the Kerulen (Hereleeng), flows across northeastern Mongolia into China (Encarta, 2009).

Mongolia has approximately 12 MW of hydroelectric capacity with an additional 12 MW under construction. Another 240 MW of capacity is planned to be completed by 2013 (UDI, 2009).

It is estimated that the potential energy resource for hydroelectric power is 6300 MW, which could produce almost 6,000 kWh of electricity. The majority of the exploitable resource is located in the mountainous regions in northern and western regions of the country (Radii, 2008). See hydroelectric potential map below.

Potential Hydroelectric Regions of Mongolia (Source: Mongolian National RE Center)



[\(return to top\)](#)

8. Relevant Links

Please see webpage for relevant links.

[\(return to top\)](#)

9. References

Tudev, T. and Enebish, N., "Mongolia's Potential for Renewable Energy Development," Ministry of Mineral Resources and Energy of Mongolia, June 2009.

World News Report - Mongolian News
<http://www.einnews.com/mongolia/newsfeed-mongolia-energy>

UDI, "World Electric Power Plants Database, June 2009.

Microsoft Encarta Online Encyclopedia 2009, "Mongolia (country)." Available online:
www.encyclopedia.msm.com.

Radii, Ganjuur (Chairman of Energy Regulatory Authority of Mongolia), "Renewable Energy Resources and the Utilization in Mongolia," presented at the 4th Annual Meeting of CAREC Electricity Regulators Forum, September 2008.

Asian Development Bank (ADB), "Mongolia: Demonstration Project for Improved Electricity Services to the Low Income Communities in Rural Areas, March 2009.

Batbold, Dulguun, "Privatization in Mongolia," presentation 2007.

Project SafeCom Inc., "Yurts and Mongolian Gers." Available online:
www.safecom.org.au/yurts.htm, accessed October 2009.

[\(return to top\)](#)

10. Country Contacts

Contacts made in the preparation of this assessment are gratefully thanked for their contribution to this report. Please see webpage for contacts listing.

[\(return to top\)](#)