J. v. G. technology GmbH
The DESERT company

Mongolia Solar Report

Prepared by J.v.G. Technology GmbH

J.v.G. Technology GmbH is a German engineering company specializing in turnkey solar module production lines and manufacturing consulting, with project experience ranging from 20 MW to 500 MW per production line, including multi-line and gigafactory projects exceeding this scale.

This Solar Report is part of the **PVKnowHow** Knowledge Network.
The data, analysis, and conclusions in this document are based on real research, consulting insights, and international solar market data.

Gain comprehensive insights into the statistics and metrics surrounding the solar production industry in Mongolia

KEY POINTS

All figures have been converted into USD

Yearly sunshine (sun hours per year)

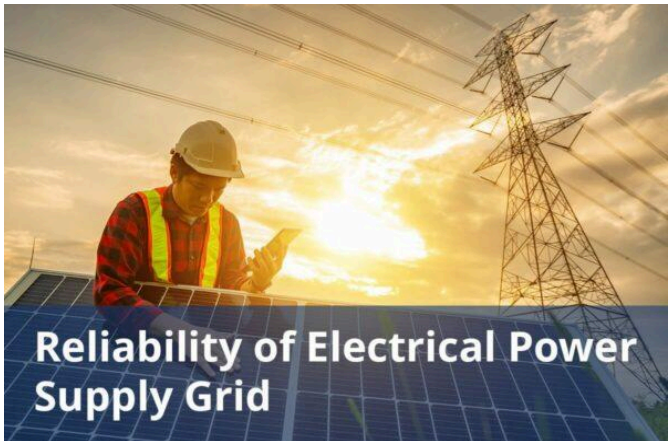
Average yearly sunshine:
- Location A: 2500 hours
- Location B: 2800 hours
- Location C: 3000 hours

kWh per kWp installed

Efficiency in kWh per kWp:
- Type A: 1200 kWh/kWp
- Type B: 1400 kWh/kWp
- Type C: 1600 kWh/kWp

Average cost per kWh from utility company

Average cost per kWh:
- Residential: $0.135/kWh
- Commercial: $0.145/kWh
- Industrial: $0.155/kWh



Reliability of electrical power supply grid

Reliability percentage:
- System A: 98%
- System B: 95%
- System C: 90%




DETAILED INFORMATION

All figures have been converted into USD

Total solar panel production capacity (installed)

Total solar panels installed:
- Residential: 50000 panels
- Commercial: 30000 panels
- Industrial: 20000 panels

Total solar panel production capacity (projected)

Projected solar panels in future:
- Year 1: 70000 panels
- Year 2: 85000 panels
- Year 3: 100000 panels

Average costs of various electricity generation sources (coal, natural gas, solar, etc)

Average installation costs:
- System A: $2000/panel
- System B: $2200/panel
- System C: $2500/panel

Percentages of various electricity generation sources (coal, natural gas, solar, etc)

Percentage of electricity from solar:
- 2021: 5%
- 2022: 10%
- 2023: 15%

Average daily availability of electricity from the national grid (measured in hours)

Daily availability of solar energy:
- Summer: 8 hours/day
- Winter: 4 hours/day
- Spring: 6 hours/day

Number of residential solar panel installations

Number of residential solar panels:
- County A: 2500 panels
- County B: 3000 panels
- County C: 4000 panels

Total number of solar farms (installed and projected)

Number of solar farms:
- Farm A: 10
- Farm B: 15
- Farm C: 20

Off-grid market demand for solar panels (current and projected)

Current Off-Grid Solar Demand in Mongolia:
- Mongolia's vast geography and nomadic lifestyle make grid-based electrification challenging, especially for the approximately 140000 herding households living in remote areas.
- The Mongolian government launched the /100000 Solar Ger Program/ to provide portable solar home systems (SHSs) to nomadic families. This initiative was later supported by the /World Bank's Renewable Energy for Rural Access Project (REAP)/, significantly expanding its reach.
- By the completion of these programs, over /100000 SHSs/ had been distributed, providing /more than 70% of nomadic herders/ with access to electricity for their yurts.
- The demand for off-grid solar solutions continues to grow as herders seek reliable power for lighting, communication, and small appliances, reducing reliance on expensive and polluting alternatives like diesel generators.

Future Off-Grid Solar Demand in Mongolia:
- Mongolia aims to increase its share of renewable energy, targeting /3% solar energy contribution by 2030 and 20% by 2050/, which will further drive off-grid solar adoption.
- The off-grid solar market is expected to grow as /solar technology becomes more affordable/ and /battery storage solutions improve/, making solar systems more viable for herders and remote communities.
- Government initiatives, along with /international support from organizations like the World Bank and UNDP/, will help scale up off-grid solar programs, ensuring broader rural electrification.
- Mongolia's harsh winters and extreme weather conditions necessitate /more durable and efficient solar solutions/, leading to research and

investment in /hybrid systems/ that combine solar, wind, and battery storage.
- As Mongolia works towards /near-universal rural electrification/, expanding microgrid solutions and innovative financing models (such as pay-as-you-go solar) will make off-grid solar /more accessible to low-income nomadic families/.

On-grid market demand for solar panels (current and projected)

Current On-Grid Solar Demand in Mongolia:
- Mongolia's electricity demand is growing due to urbanization, industrial expansion, and increased household energy consumption, particularly in /Ulaanbaatar/, where nearly /half the population/ resides.
- The country /relies heavily on coal-fired power plants/, leading to /severe air pollution and carbon emissions/, prompting a shift towards renewable energy, including grid-connected solar power.
- As of recent years, Mongolia has installed several large-scale /grid-connected solar power plants/, including the /Sainshand (30 MW), Darkhan (10 MW), and Choir (15 MW) solar plants/, contributing to the national grid.
- The government has /attracted foreign investment/ and /public-private partnerships/ to expand grid-connected solar projects, aiming to diversify the country's energy mix.
- Mongolia imports a significant share of its electricity from Russia and China, and expanding on-grid solar capacity is seen as a way to /reduce energy dependence and enhance energy security/.

Future On-Grid Solar Demand in Mongolia:
- Mongolia has set a target to generate /3% of its electricity from solar energy by 2030/ and increase this to /20% by 2050/, driving further investment in on-grid solar projects.

- The /development of large-scale solar farms/ and the integration of /renewable energy storage solutions/ will be crucial to stabilizing the grid and ensuring continuous power supply.
- The government is planning to /upgrade and expand transmission infrastructure/ to accommodate more renewable energy sources and /improve grid stability/, especially in winter when solar production fluctuates.
- International funding and partnerships with organizations like the /Asian Development Bank (ADB) and the Green Climate Fund/ are expected to support Mongolia's transition to a /low-carbon power sector/.
- Advances in /solar technology, battery storage, and smart grid systems/ will enhance the efficiency and reliability of on-grid solar, making it an /economically viable/ and /environmentally sustainable/ solution for Mongolia's growing energy needs.

Average monthly income of workers in solar industry (labor cost)

The average annual salary is about /6377 USD/, with a range from approximately /3316 USD/ to /9737 USD/.

Population of the country

The current population of Mongolia is /3502819/.

Average overhead costs of solar panel production (with a brief breakdown)

Estimate for Factory Rent:
- The average warehouse rental cost in Mongolia is approximately /14.04 USD/ per square meter per month.

Prices vary based on factors such as location, size, and building quality, with most warehouses being concentrated in /Ulaanbaatar/.

Key Components of Administrative Costs:
- Salaries and Wages:
The average annual salary is about /6377 USD/, with a range from approximately /3316 USD/ to /9737 USD/.
- Monthly Rents for Office Space:
The average office rent in Khan-Uul, Ulaanbaatar, Mongolia, is approximately /302 USD/ per month or /3630 USD/ per year, depending on location, size, and amenities.

A summary of the energy infrastructure

Electricity Generation:
- In Mongolia, coal is the dominant source of electricity generation, accounting for over /80%/ of the country's power supply and making it highly dependent on fossil fuels.
- However, there is increasing development in renewable energy sources such as solar and wind, although they currently make up a smaller share of the overall electricity mix.

Transmission & Distribution:
- In Mongolia, electricity transmission is carried out through a network divided into several distinct systems.
- The largest of these is the Central Energy System (CES), which utilizes /220kV/ transmission lines to distribute power across the country and connects to the Russian grid at the same voltage level.
- Other systems include the Western Energy System, Eastern Energy System, and Altai-Uliastai Energy System, each serving specific regions to accommodate Mongolia's vast and sparsely populated landscape.

Energy Access:
- According to recent data, Mongolia has achieved nearly /100%/ energy access.

Some of the government regulations surrounding solar panel production

Legal Basis for Solar Energy:
- Mongolia's Renewable Energy Law governs the development, production, and use of solar energy as part of the broader renewable energy sector.
It applies specifically to businesses and entities engaged in selling or purchasing electricity from solar power sources. However, it does not regulate self-consumption solar setups (e.g., home-based solar systems used without selling power to the grid).

Licensing Requirements for Solar Power Producers:
- All commercial solar energy producers in Mongolia must /obtain a generation license/ from the Energy Regulatory Authority (ERA).

Grid-Connected Solar Power Producers:
- Must sell electricity to the nearest transmission point.
- Are required to pay transmission costs for using the grid.

Off-Grid Solar Power Producers:
- Can sell electricity to local networks through /metered compensation/, allowing remote communities to benefit from solar power.

License Application Requirements:
- To obtain a license, solar energy producers must submit:
- /Land Certificates/: Proof of ownership or leasing rights for the project site.

- /Environmental Impact Study (EIA)/: Assessment of the solar project's ecological effects.
- /Equipment Compliance Documents/: Verification that solar panels, inverters, and other equipment meet Mongolia's technical standards.

Government initiatives in solar panel production (includes investments and subsidies)

Government Initiatives:
- /'100000 Solar Gers' Initiative/: Aimed at improving rural electrification by providing solar power to herder families.
- 5MW of solar PV systems were installed for herders.
- The initiative was supported by China, Japan, and the World Bank, enabling bulk procurement of solar systems at discounted prices.
- Created markets and jobs in the renewable energy sector.

Off-Grid Solar and Wind Power Plants:
- The World Bank and the Government of India supported 18 off-grid solar and wind power projects (60-200kW capacity) in various provinces.
- These projects provided valuable lessons for scaling up renewable energy deployment.

Support for Public Organizations:
- The /Energy Regulatory Commission/ and /national universities/ installed small-scale solar PV systems (16-30kW).

Local Regulations & Incentives:
- /Net Metering Regulation (August 2020)/: Allows electricity consumers to supply excess solar energy to the distribution grid.
- However, the net metering process remains complex and time-consuming, discouraging many households and businesses.

Energy Tariff Adjustments:
- In 2023, the Government of Mongolia (GoM) increased energy tariffs:
- /14%/ increase for general consumers.
- /28%/ increase for mining companies.
- This tariff hike is encouraging private sector investments in micro-grids and solar energy to reduce dependence on expensive grid electricity.

Notable solar projects in the country (installed and projected)

Current Operational Project:
- /Tsetsii Solar PV Farm – 50 MW/:
- Location: Mongolia
- Capacity: 50 MW
- Other Details:
- Developed by /Clean Energy Asia/.
- One of Mongolia's largest solar farms.
- Financed by /EBRD and JICA/.
- Investment: /120.7 million USD/.

- /Sainshand Solar PV Farm – 55 MW/:
- Location: Mongolia
- Capacity: 55 MW
- Other Details:
- Owned by /Sainshand/.
- Supported by /EIB and EBRD/.
- Investment: /121.7 million USD/.

- /Salkhin Park Solar PV Farm – 155 MW/:
- Location: Mongolia
- Capacity: 155 MW
- Other Details:

- Supported by the /Joint Crediting Mechanism/.
- One of the largest solar parks in Mongolia.
- Investment: /364.5 million USD/.

- /Nar (Darkhan) Solar PV Farm – 10 MW/:
- Location: Mongolia
- Capacity: 10 MW
- Other Details:
- Developed by /Solar Power International/.
- Supported by /JBIC/.
- Investment: /18.3 million USD/.

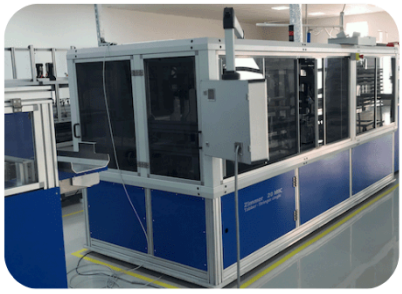
Future Projects:
- /Moron Solar PV Project – 10 MW/:
- Location: Khovsgol, Mongolia
- Capacity: 10 MW
- Date of Inauguration: Expected in 2026
- Other Details:
- Ground-mounted solar PV project.
- Expected annual electricity generation: 99000 MWh.
- Will supply power to 70000 households.
- Expected to offset 82789 tons of CO_2 emissions per year.
- Construction expected to begin in 2025.

Some of the notable solar companies (plus brief details on what they do)

/G-Power LLC/
- Website: https://g-power.mn/
- Location: Mongolia
- Products & Services:
- Engineering, Procurement, and Construction (EPC) for renewable and electrical systems

- Operation & Maintenance for on- and off-grid PV systems
- Consulting Services (techno-economic feasibility studies, energy solutions)
- Research & Development in power electronics and automation
- G-Monitoring (remote solar power system monitoring via web and app)
- Official distributor of Ningbo Deye Inverter Technology

/Sankou Solar Mongolia Co., Ltd/
- Website: www.sankousolar.com
- Email: info@sankousolar.com
- Products & Services:
- Solar trading and manufacturing
- Specializes in /solar panel production/



ABOUT THIS REPORT

This Solar Report is part of the PVKnowHow Knowledge Network, developed by J.v.G. Technology GmbH - a German engineering company, specializing in turnkey solar module production lines (ranging from 20 MW to 500 MW per production line, including multi-line and gigafactory projects exceeding this scale).

All market data, analysis, and conclusions follow JvG's internal consulting standards and international PV market research practices.

REFERENCES

All References

1. Climate.top. (n.d.). _Daylight hours in Ulan-Bator/Ulaanbaatar, Mongolia daylength._ Retrieved February 25, 2025, from <https://www.climate.top/mongolia/ulaanbaatar/sunlight/>
2. ProfileSOLAR. (n.d.). _Solar PV analysis of Ulan Bator, Mongolia._ Retrieved February 25, 2025, from <https://profilesolar.com/locations/Mongolia/Ulan-Bator/#google%5Fvignette>
3. Montsame. (2025). _New electricity tariffs set._ Retrieved February 25, 2025, from <https://montsame.mn/en/read/356054#:~:text=The%20Energy%20Regulatory%20Commission%20is,per%20kWh%20to%20MNT%20280>
4. Sinalda. (n.d.). _Voltage in Mongolia – Electricity supply and power quality overview._ Retrieved February 25, 2025, from <https://www.sinalda.com/world-voltages/asia/voltage-mongolia/>
5. International Renewable Energy Agency (IRENA). (2024, July). _Renewable energy statistics 2024._ Retrieved February 25, 2025, from <https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2024/Jul/IRENA%5FRenewable%5FEnergy%5FStatistics%5F2024.pdf>
6. Stockholm Environment Institute (SEI). (2024). _Solar and wind power in Mongolia: 2024 policy overview._ Retrieved February 25, 2025, from <https://www.sei.org/publications/solar-wind-mongolia-2024-policy/>
7. Global Climatescope. (2024). _Climatescope 2024 | Mongolia._ Retrieved February 25, 2025, from <https://www.global-climatescope.org/markets/mongolia>
8. [Country Authorisation](https://www.trackingstandard.org/wp-content/uploads/IRSFB%5FMD%5F23.19%5FMongolia-country-report%5FPublic.pdf)

(2024). _Country Assessment Report._ Retrieved February 25, 2025, from <https://www.trackingstandard.org/wp-content/uploads/IRSFB%5FMD%5F23.19%5FMongolia-country-report%5FPublic.pdf>
9. International Energy Agency (IEA). (n.d.). _Mongolia – Countries & regions._ Retrieved February 25, 2025, from <https://www.iea.org/countries/mongolia>
10. Energypedia. (n.d.). _Mongolia energy situation._ Retrieved February 25, 2025, from <https://energypedia.info/wiki/Mongolia%5FEnergy%5FSituation>
11. International Renewable Energy Agency (IRENA). (2023, August). _Renewable energy solutions for heating in Mongolia._ Retrieved February 25, 2025, from <https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2023/Aug/IRENA%5FRenewable%5Fenergy%5Fsolutions%5Fheating%5FMongolia%5F2023.pdf>
12. Matilda. (n.d.). _Mongolia's clean energy transition: A pathway to sustainable and inclusive development._ Retrieved February 25, 2025, from <https://www.undp.org/mongolia/blog/mongolias-clean-energy-transition-pathway-sustainable-and-inclusive-development>
13. PV Knowhow. (n.d.). _Mongolia's ambitions to rise in solar energy._ Retrieved February 25, 2025, from <https://www.pvknowhow.com/mongolias-ambitions-to-rise-in-solar-energy/>
14. The Reach Alliance. (n.d.). _Mongolia's renewable energy for rural access project: Providing electricity to nomadic herders._ Retrieved February 25, 2025, from <https://reachalliance.org/case-study/providing-electricity-to-nomadic-herders-mongolias-renewable-energy-for-rural-access-project/>
15. Tsolmon-Namkhainyam. (n.d.). _Renewable energy in Mongolia._ Retrieved February 25, 2025, from

<https://asiacleanenergyforum.adb.org/wp-content/uploads/2023/06/Tsolmon-Namkhainyam.pdf>
16. Asian Development Bank (ADB). (2023, October 3). _ADB launches grid-connected solar photovoltaic power plant in Altai City, Mongolia._ Retrieved February 25, 2025, from <https://www.adb.org/news/adb-launches-grid-connected-solar-photovoltaic-power-plant-altai-city-mongolia>
17. Joint SDG Fund. (2023, August 15). _Pathways to Mongolia's just energy transition._ Retrieved February 25, 2025, from <https://www.jointsdgfund.org/article/pathways-mongolias-just-energy-transition>
18. World Salaries. (2025). _Average solar energy systems engineer salary in Mongolia._ Retrieved February 25, 2025, from <https://worldsalaries.com/average-solar-energy-systems-engineer-salary-in-mongolia/>
19. Worldometer. (2025). _Mongolia population (2025)._ Retrieved February 25, 2025, from <https://www.worldometers.info/world-population/mongolia-population/>
20. RE/MAX Mongolia. (n.d.). _Songinokhairkhan, Ulaanbaatar commercial real estate & industrial for rent/lease._ Retrieved February 25, 2025, from <https://www.remax.mn/industrial/for-rent-lease/songinokhairkhan/>
21. RE/MAX Mongolia. (n.d.). _Khan-Uul, Ulaanbaatar commercial real estate & office for rent/lease._ Retrieved February 25, 2025, from <https://www.remax.mn/office/for-rent-lease/khanuul/>
22. Wikipedia. (n.d.). _Electricity sector in Mongolia._ Retrieved February 25, 2025, from <https://en.wikipedia.org/wiki/Electricity%5Fsector%5Fin%5FMongolia>
23. Trading Economics. (n.d.). _Mongolia: Access to electricity (% of population)._ Retrieved February 25, 2025, from

<https://tradingeconomics.com/mongolia/access-to-electricity-percent-of-population-wb-data.html>
24. The Observatory of Economic Complexity (OEC). (n.d.). _Mongolia – Access to electricity (% of population)._ Retrieved February 25, 2025, from <https://oec.world/en/profile/bilateral-product/electricity/reporter/mng>
25. Asia Pacific Energy Policy. (n.d.). _Law of Mongolia on renewable energy._ Retrieved February 25, 2025, from <https://policy.asiapacificenergy.org/sites/default/files/Law%20of%20Mongolia%20on%20Renewable%20Energy.pdf>
26. Power Technology. (n.d.). _Power plant profile: Moron Solar PV Project, Mongolia._ Retrieved February 25, 2025, from <https://www.power-technology.com/data-insights/power-plant-profile-moron-solar-pv-project-mongolia/>

For a detailed list of references and additional information, please visit our website with the current report at:
https://www.pvknowhow.com/solar-report/mongolia/

About J.v.G. Technology GmbH

J.v.G. Technology GmbH is a European engineering and advisory specialist for solar production lines and manufacturing equipment, supporting investors and operators with market, location and production-focused decision frameworks.
www.jvg-thoma.com

Contact & Further Information

For further discussion or clarification of manufacturing-related aspects, please contact:

J.v.G. Technology GmbH
www.jvg-thoma.com
info@jvg-thoma.com

Created with the support of
JVGLABS
AI Automation for Marketing & Sales
www.jvglabs.com