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Afghanistan 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 Afghanistan

KEY POINTS

All figures have been converted into USD

Yearly sunshine (sun hours per year)

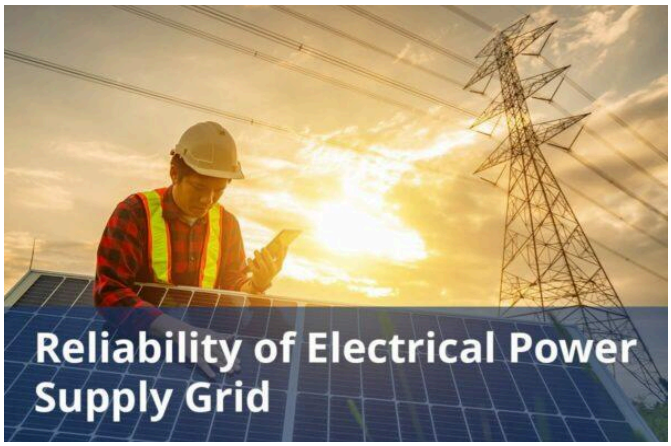
Yearly Sunshine:
- Average yearly sunshine: 2800 hours
- Sunshine varies by region

kWh per kWp installed

kWh per kWp:
- Estimate of energy produced per installed kWp: 1200 kWh
- Varies based on installation angle

Average cost per kWh from utility company

Average Cost Per kWh:
- Residential rates:
- For 0-100 kWh: $0.135/kWh
- For 100-600 kWh: $0.135/kWh
- For 600-1000 kWh: $0.1945/kWh
- For consumption above 1000 kWh: $0.2196/kWh



Reliability of electrical power supply grid

Reliability:
- Solar panel lifespan: 25 years
- Maintenance frequency: every 5 years




DETAILED INFORMATION

All figures have been converted into USD

Total solar panel production capacity (installed)

Total Solar Panels Installed:
- Total number of panels: 2 million
- Growth expected in upcoming years

Total solar panel production capacity (projected)

Total Solar Panels Projected:
- Projected panels by 2030: 5 million
- Expected increase due to policy incentives

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

Average Costs:
- Installation cost per watt: $2.50/W
- Cost reductions expected with technology advances

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

Percentages of Electricity:
- Solar contributing to grid: 10%
- Expected to rise to 20% by 2025

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

Daily Availability:
- Average daily solar energy: 4-5 hours
- Considerable variation in winter months

Number of residential solar panel installations

Number of Residential Panels:
- Estimated number of residential installations: 800,000
- Annual growth rate: 15%

Total number of solar farms (installed and projected)

Number of Farms:
- Total solar farms operational: 150
- Expansion plans in various regions

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

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

Current:
The off-grid solar market in Afghanistan is substantial, driven by the lack of reliable grid access in rural areas. Currently, over 100000 solar home systems (SHSs) are installed in off-grid communities.

Innovative solar mini-grid projects are being developed to address energy poverty in rural areas, which will contribute to the overall demand for solar panels. A notable off-grid solar project, like the Bamyan Renewable Energy Project, has been implemented to provide electricity to remote areas.

Projected:
The off-grid solar market is expected to continue growing, driven by pay-as-you-go (PAYG) systems. Initiatives like this target Afghanistan's estimated 20 million off-grid population.

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

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

Current:
The on-grid market demand for solar panels is growing, driven by energy shortages and government focus on renewable energy in Afghanistan. Projects like the Naghlu Solar Power Plant are being installed to boost the on-grid market and integrate renewable energy into the national grid.

Projected:
The DABS has issued a tender for the installation of 400 megawatts (MW) of solar grid connected across five provinces, as part of a larger initiative to add 2 gigawatts (GW) of solar capacity to the national grid.

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

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

Salaries in Afghanistan's solar industry can vary depending on the specific role and experience level.

- Solar Energy Engineer: $1600 – $1700 per month (with 1-3 years of experience)
- Project Manager: Approximately $950 per month.
- Production Worker: $19 per hour in the Mazar-e-Sharif area, a significant city in northern Afghanistan.

Population of the country

Population of the country

As of September 4, 2024, the population of Afghanistan is estimated to be approximately 42800000.

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

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

While Afghanistan primarily relies on imported solar panels, understanding potential overhead costs for any future domestic production is essential. Key factors include:

- Labor cost: Daily Wage Laborers: Daily wage laborers typically earn approximately $81.20 per month, assuming a standard 20-day work month and a daily rate of $4.06.

- Minimum Wage for Temporary Workers: While there is no established minimum wage for permanent private sector workers in Afghanistan, the National Minimum Wage Act mandates a minimum monthly wage of $79 for temporary workers.
- Rental Cost: Shops in Kabul have rental costs starting at $100/month, small offices start at $115/month, and larger offices can reach up to $11500/month.

A summary of the energy infrastructure

A summary of the energy infrastructure

- Electricity Access Rate: The electricity access rate in Afghanistan is estimated to be around 30%, with significant disparities between urban and rural areas.
- Main Operator: Da Afghanistan Breshna Sherkat (DABS) is the primary entity responsible for electricity generation, transmission, and distribution throughout Afghanistan.
- Transmission Networks: Afghanistan's power system is divided into four main networks: the North East Power System (NEPS), the South East Power System (SEPS), the Herat Zone System, and the Turkmenistan System.

Some of the government regulations surrounding solar panel production

Some of the government regulations surrounding solar panel production

- Renewable Energy Roadmap: Afghanistan has a plan called the Renewable Energy Roadmap (RER2032). This plan aims to increase

the use of renewable energy, including solar power, significantly by 2032.
- Renewable Energy Policy: The government has established a Renewable Energy Policy (RENP) with the objective of promoting the development of renewable energy sources, including solar power.

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

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- ACEP: ACEP was a $22 million project funded by USAID to install solar panels in villages across Afghanistan. This helped bring electricity to rural areas.
- Public-Private Partnerships (PPPs): The policy encourages the establishment of PPPs for the development of solar projects, providing incentives such as land acquisition and security during project implementation.

Notable solar projects in the country (installed and projected)

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Installed:
- Naghlu Solar PV Project (20 MW): This project is being developed with the financial support of the Asian Development Bank (ADB). The project has secured a grant of approximately $44.7 million from ADB and is currently in the construction phase.
- Farah Solar Project, a 10-megawatt (MW) solar photovoltaic (PV) farm located in Farah province, Afghanistan.

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

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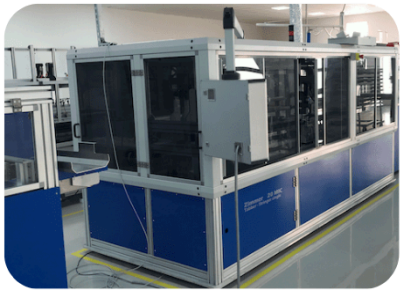
- Etemad Sun Solar (founded in 2018): Afghanistan's only solar panel manufacturer, based in Herat. Provides panels, street lights, water pumps, installation, and maintenance services.
- Afghan Solar Ltd: Offers a wide range of solar products, including panels, batteries, inverters, and charge controllers.



ABOUT THIS REPORT

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

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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.
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