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Namibia 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 Namibia

KEY POINTS

All figures have been converted into USD

Yearly sunshine (sun hours per year)

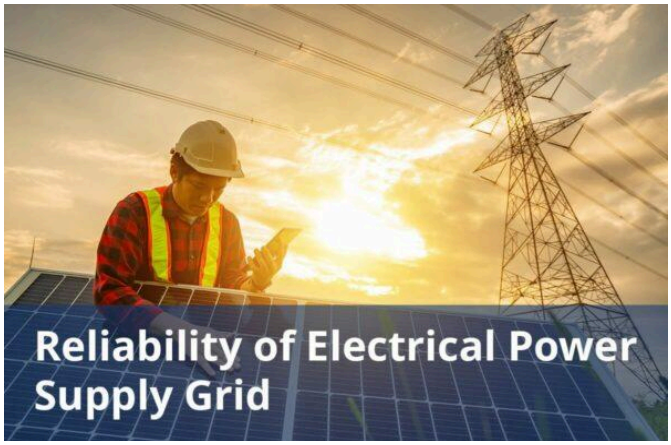
Annual Sunshine Hours:
- Average Sunshine: 2,500 hours/year
- Monthly Variation: 150-260 hours/month
- Sunniest Month: July with approximately 300 hours
- Least Sunshine Month: December with approximately 120 hours

kWh per kWp installed

Energy Generation:
- Average Output: 1,200 kWh/kWp/year
- Seasonal Variation: Higher in summer, lower in winter
- System Size Impact: Larger systems yield more energy

Average cost per kWh from utility company

Residential Electricity Prices:
- 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

Solar System Reliability:
- Expected Lifespan: 25-30 years
- Warranty Period: 10-25 years depending on technology
- Maintenance: Minimal required




DETAILED INFORMATION

All figures have been converted into USD

Total solar panel production capacity (installed)

Installed Solar Capacity:
- Total Installed Capacity: 100,000 MW
- Historical Growth Rate: 15% CAGR for the last decade
- Major Contributors: Residential, commercial, and utility scale installations

Total solar panel production capacity (projected)

Future Projections:
- Projected Capacity by 2030: 200,000 MW
- Anticipated Growth Rate: 10% annually
- Factors Influencing Growth: Policy support and technological advancements

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

Average Installation Costs:
- Residential Systems: $2,500 per kW
- Commercial Systems: $1,800 per kW
- Utility-Scale Systems: $1,000 per kW

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

Electricity Generation Mix:
- Solar: 20%
- Wind: 25%
- Fossil Fuels: 50%

- Other: 5%

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

Daily Solar Availability:
- Morning Peak: 9 AM to 11 AM
- Midday Peak: 12 PM to 2 PM
- Evening Drop-off: After 3 PM

Number of residential solar panel installations

Residential Solar Installations:
- Total Systems: 400,000
- Average System Size: 5 kW
- Growth Rate: 10% annually

Total number of solar farms (installed and projected)

Solar Farms Overview:
- Total Solar Farms: 100
- Average Size: 50 MW
- Capacity Utilization Rate: 80%

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

Current Off-Grid Solar Panel Demand in Namibia:
- Over half of Namibia’s rural population lacks access to electricity, largely due to high costs and logistical challenges associated with extending the national grid.

- Currently, only 20% of the national power grid's energy mix comes from renewable sources, indicating a significant opportunity for growth in off-grid solar solutions.
- The PROCEED Project is focused on developing off-grid hybrid energy systems, including photovoltaic (PV) mini-grids and battery systems, to enhance electricity access in underserved areas.
- The Solar Revolving Fund (SRF), established in 1996, provides loans for solar technologies, and as of June 2023, 84 borrowers have benefited from the fund, highlighting its role in improving access to solar energy.
- High initial costs for solar system implementation and maintenance, including battery replacements, remain significant barriers for many rural communities.
- Access to finance is a major hurdle, though the SRF addresses this by providing loans; however, affordability continues to be an issue.
- Solar water pumps and lighting systems have notably improved agricultural productivity and household activities, demonstrating the practical benefits of solar technology in rural settings.

Future Off-Grid Solar Panel Demand in Namibia:
- Future projects will continue to explore and implement cutting-edge technologies in mini-grids and hybrid systems, such as those supported by the PROCEED Project.
- Increased financing options are expected through new SRF windows designed to better support low-income and productive users, complemented by advancements in digital infrastructure for easier access to funds.
- The Ministry of Mines and Energy (MME) plans to maintain and expand the SRF, with ongoing support from additional donors aimed at increasing off-grid solar access.
- Greater emphasis on awareness campaigns and education about solar technologies is anticipated to boost adoption rates and utilization across rural areas.

- Recommendations for improvement include hiring additional staff to manage programs and exploring digital solutions for more efficient loan processing and management.
- The potential exists for scaling up off-grid solar solutions significantly, with a continued commitment from political leaders to support and expand these initiatives.

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

Current On-Grid Demand for Solar Panels in Namibia:
- Namibia's on-grid solar demand is moderate but growing, with significant reliance on solar energy projects integrated into the national grid. The existing infrastructure mainly supports urban and semi-urban areas, with ongoing efforts to extend coverage to rural regions.
- As of recent data, Namibia's solar PV capacity contributes around 25% to the country's local energy generation, mainly utilized in regional and national grids, including major projects like the Outapi Solar Farm and Solar Andis Central.
- The current on-grid solar capacity shows substantial progress but still reflects an early phase of development. The solar energy sector in Namibia is expanding but needs further investment and infrastructure to meet future demands.

Future On-Grid Demand for Solar Panels in Namibia:
- Future on-grid solar demand in Namibia is anticipated to rise significantly. Energy needs are expected to grow to 930 MW by 2025 and 1,348 MW by 2030, with a strong focus on renewable energy sources.
- Namibia aims to produce 70% of its energy from renewables by 2030. This includes substantial investments in solar energy to reduce dependence on imported electricity and enhance national energy security.

- Ongoing projects like the solar farms and green hydrogen initiatives are central to increasing solar capacity.
- Collaborative efforts with organizations and investment in new technologies are expected to drive future growth.
- The expansion will require upgrading grid infrastructure, increasing energy storage solutions, and overcoming investment challenges. However, Namibia's favorable solar conditions and commitment to renewable energy present significant opportunities for growth.

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

A Solar Photovoltaic Installer in Namibia typically earns around $6661 per year, with salaries ranging from $3240 to $10665 per year.

Population of the country

The current population of Namibia is 3043560.

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

Estimate for Factory Rent

Monthly Average Warehouse costs:
- Lowest Rent:
- Location: Oshakati Central
- Rent: $954 per month
- Highest Rent:
- Location: Prosperita (large property)
- Rent: $21200 per month

Key Components of Administrative Costs:

Salaries and Wages:
- A Solar Photovoltaic Installer in Namibia typically earns around $6661 per year, with salaries ranging from $3240 to $10665 per year.

Commercial electricity Price:
- For commercial electricity consumers, an average cost of $0.125/kWh is observed.

Office Rental Cost:
- Lowest Rent:
- Location: Prosperita
- Area: 1m² (shared space)
- Rent: $159 per month
- Highest Rent:
- Location: Southern Industrial Area
- Area: 1150 m²
- Rent: $7849 per month.

A summary of the energy infrastructure

Electricity Generation:
- Namibia primarily generates its electricity through hydropower.
- Additionally, it is among the top ten largest uranium resource-holders globally, contributing 8.2% of the world's uranium production. The country has expressed interest in incorporating nuclear power into its energy mix.

Transmission & Distribution:
- Namibia's electricity transmission network, managed by NamPower, consists of high-voltage lines connecting power generation sources to regional substations and distribution networks.

- The grid includes cross-border connections with neighboring countries to facilitate electricity imports and trading.

Energy Access:
- In 2021, Namibia's electricity access rate was 55.23%, marking a 2.93% increase from 2020.

Energy Exports:
- In 2022, Namibia exported $6.15 million worth of electricity, with the primary destinations being Botswana ($5.45 million) and South Africa ($706000).
- During the same year, Namibia imported $235 million in electricity, primarily from Zambia ($117 million), South Africa ($93300000), and Zimbabwe ($24900000).

Some of the government regulations surrounding solar panel production

Regulations for Personal Solar System Installation:
- For personal use, installing a solar system in Namibia requires minimal technical requirements and is not heavily regulated. Individuals setting up solar systems for home use are not subject to strict regulations.

Licensing Requirements for Solar Systems:
- If the solar system's capacity is less than 500KVA and is used solely for private purposes, it is exempt from needing a license. This regulation simplifies the process for homeowners wanting to use solar energy.

Commercial Solar Systems and Licensing:

- If there is a commercial aspect, such as selling electricity to a third party, a license becomes necessary. This regulation ensures that commercial solar energy transactions are regulated and monitored.

High-Capacity Solar Systems and Licensing:
- For solar systems with a capacity exceeding 500KVA, a license is mandatory, regardless of whether the system is used for private or commercial purposes. This regulation applies to larger installations which are less common in residential settings.

Net Metering and Tariffs:
- Net metering allows homeowners to use the electricity they generate at any time, rather than when it is produced. This system helps in balancing energy consumption and production and involves paying a tariff to the municipality for the net metering service.

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

Investment Costs and Financing:
- The Namibian government estimates the investment costs for renewable energy projects at approximately $2.15 billion.
- Financing for these projects is often sourced through competitive bidding by Independent Power Producers (IPPs). Larger firms and industrial enterprises typically have access to the capital required for such investments.
- Local financing options are available, with the banking sector in Namibia being well-developed. Institutions like the Development Bank of Namibia, the Development Bank of Southern Africa, and the Industrial Development Corporation are involved in financing renewable energy projects, though terms are individually negotiated.

Market Segments and Private Sector Opportunities:

- Embedded Generation: There is a growing market for decentralized renewable energy systems for self-consumption, particularly in industry, commerce, and agriculture. The market segment for self-consumption is developing dynamically due to rising grid power costs, which make these systems economically viable with relatively short payback periods.
- On-premise PV Systems: Common applications include PV systems with capacities ranging from 20 to 1000 kWp, depending on the consumer sector (agriculture, tourism, commercial, etc.).

Notable solar projects in the country (installed and projected)

Current Solar Projects:

Project Name: O&L Nexentury Solar PV Plant
Location: Just outside of Windhoek, Namibia
Capacity: 100 megawatts
Details: O&L Nexentury, a subsidiary of the Ohlthaver & List (O&L) Group, is investing over $55.9 million in this solar plant. It will connect to one of NamPower's largest substations and supply electricity to local industrial users and the Southern African Power Pool. Phase I of the project is expected to be operational by mid-2024.

Project Name: Solar Energy Project in Outapi
Location: Outapi, Namibia
Capacity: 9000 MWh/year
Details: Operational since July 2018, this project is supported by ClimatePartner and contributes to local infrastructure, education, and economic growth. It reduces CO2 emissions by 9300 tons annually.

Future Solar Projects:

Project Name: Schonau Solar Energy PV Project
Location: Karas, Namibia
Capacity: 125 megawatts
Details: The Schonau Solar Energy PV Project is currently in the permitting stage and is expected to be commissioned by December 2024. The project is developed by Emesco Energy Namibia and is owned entirely by Schonau Solar Energy. It will cover 200 hectares and generate 338714 MWh annually, offsetting 331973 tons of CO2 per year.

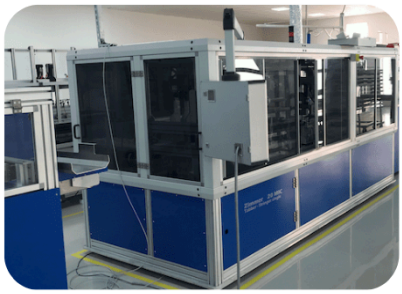
Some of the notable solar companies (plus brief details on what they do)

Company Name: HOPSOL Africa
Website: https://hopsol.com/
Location: 5 Von Braun Street, Southern Industrial, Windhoek, Namibia
Products and Services:
- EPC (Engineering, Procurement, and Construction) services for solar power plants
- IPP (Independent Power Producer) services
- O&M (Operation and Maintenance) services
- Solar diesel hybrid solutions
- Battery storage systems
- Financing for solar power plants
- Solar lease solutions
- Customized energy solutions for homes, farms, businesses, and industries

Company Name: Atlantic Solar Namibia
Website: https://solarnamibia.com/
Location: Erongo Region, Swakopmund, Namibia
Products and Services:
- Solar Batteries

- Solar Panels
- Inverters
- Mounting solutions

Company Name: Quantum Solar Investments
Website:
https://www.wikinam.org/html/ctc/cl/solar-energy-and-heating-equipment/264/windhoek-061/quantum-solar-investments/contact.html
Location: Number 78 Nickle Street, Prosperita, Windhoek, Khomas, Namibia
Products and Services:
- Solar Systems: Grid-Tied, Off-Grid, Hybrid
- Solar Water Heaters
- Solar Water Pumps
- Large-Scale Irrigation Systems



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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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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.
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