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Nigeria 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 Nigeria

KEY POINTS

All figures have been converted into USD

Yearly sunshine (sun hours per year)

Average yearly sunshine: 2700 hours

- This is a key factor in solar energy production.
- Higher sunshine hours lead to more energy generation.

kWh per kWp installed

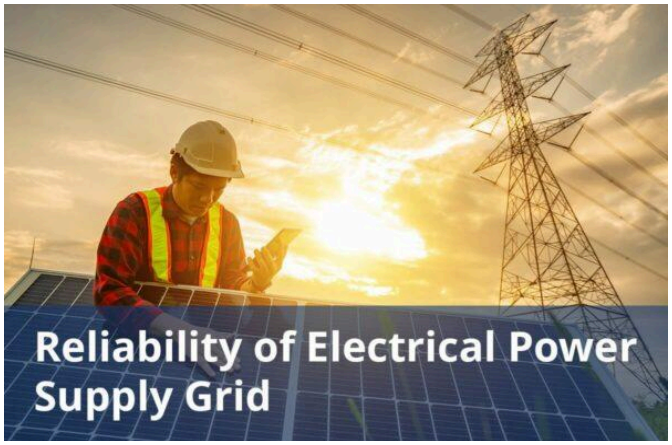
kWh per kWp: 1100 kWh/kWp

- This value indicates the efficiency of solar panels.
- It varies based on geographical and installation factors.

Average cost per kWh from utility company

Average cost per kWh: $0.14/kWh

- Costs can fluctuate based on energy market conditions.
- Consider local incentives and rebates on installations.



Reliability of electrical power supply grid

Reliability of solar energy: High

- Solar panels typically last over 25 years.
- Maintenance requirements are minimal.

DETAILED INFORMATION

All figures have been converted into USD

Total solar panel production capacity (installed)

Total installed solar panels: 2000000

- This figure represents significant growth in renewable energy.
- Reflects ongoing investment in sustainable infrastructure.

Total solar panel production capacity (projected)

Projected total solar panels by 2030: 5000000

- Anticipated increase due to technological advancements.
- Market trends suggest robust growth in deployment.

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

Average costs of installation: $2.50/W

- Costs have declined significantly over the past decade.
- Prices vary depending on the technologies used.

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

Percentage of total electricity from solar: 20%

- Indicates the increasing role of renewables in energy mix.
- Growth driven by policy reforms and incentives.

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

Daily availability of solar energy: 5 hours

- This average can differ based on seasonal changes.
- Important for calculating energy potential from solar installations.

Number of residential solar panel installations

Number of residential solar panels installed: 1500000

- This marks a significant adoption by homeowners.
- Incentives play a crucial role in this uptake.

Total number of solar farms (installed and projected)

Number of solar farms: 3000

- Solar farms contribute to large scale energy production.
- They play a pivotal role in achieving energy goals.

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

Current Market Demand:
- Nigeria has a significant unmet demand for electricity, with nearly 50% of the population lacking access to reliable grid power.
- As a result, many households and businesses rely on small-scale generators, which are costly, inefficient, and polluting.
- Nigerians and businesses currently spend about $14 billion annually on inefficient energy generation.
- The market demand for off-grid solutions including mini-grids and solar home systems, is estimated at $9.2 billion per year.
- With over 10-15 GW of energy needs being met by small-scale generators, there is already a strong demand for affordable and reliable off-grid solar solutions.

Future Market Demand:
- The potential for off-grid solar solutions in Nigeria is vast. By 2023, it is estimated that 10,000 mini-grids of 100 kW each will be installed, which still only meet 30% of the anticipated energy demand.
- There is also potential for scaling solar home systems, with millions of Nigerians, particularly in rural areas, willing to switch to more reliable and affordable alternatives.
- The Nigeria Electrification Project (NEP) plans to support the development of 1,200 mini-grids, benefiting 200,000 households and 50,000 businesses, indicating continued strong demand for solar energy solutions in the years to come.

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

Current On-Grid Solar Panel Potential in Nigeria:

- This capacity comes from a range of smaller-scale on-grid solar installations at universities and commercial facilities such as the Federal University of Agriculture, Makurdi (3.5 MW) and Tulip Cocoa Processing Ltd. (2.35 MW).
- Despite Nigeria's high solar irradiance, grid infrastructure and policy issues have limited the full potential of solar energy development.
- Current solar projects contribute to addressing energy poverty, but significant hurdles, including inadequate grid infrastructure and financing issues, remain.

Future On-Grid Solar Panel Potential in Nigeria:
- Nigeria's future potential is based on several large-scale solar projects planned or under development. Projects like the Argungu Solar PV Park (5,600 MW, expected 2027) and Jigawa Solar PV Park (1,000 MW, expected 2025) represent transformative opportunities to boost the country's solar capacity.
- However, policy uncertainty, issues with feed-in tariffs, and lack of lender trust in the grid have delayed solar investments.
- Additionally, the government's goal to generate 9 GW from renewables by 2030, including 5 GW of solar, is ambitious, but will require significant infrastructure upgrades, favorable policies, and improved financing mechanisms to ensure success.

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

A Solar Photovoltaic Installer working in Nigeria will typically earn around $5,300 USD per year, with salaries ranging from about $2,500 USD to $8,000 USD.

Population of the country

The current population of Nigeria is 233,665,496.

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

Estimate for Factory Rent
- Monthly Average Warehouse Rental Cost
- The average price of renting warehouses in Nigeria is approximately $35,000 USD per year. Prices vary based on location, size, and features, ranging from about $2,200 USD to $750,000 USD per year.

Key Components of Administrative Costs
- Salaries and Wages: A Solar Photovoltaic Installer working in Nigeria will typically earn around $5,300 USD per year, with salaries ranging from about $2,500 USD to $8,000 USD.
- Business Electricity Price
- Industrial electricity is priced at approximately 0.026 USD/kWh.

Monthly Rents for Office Space
- Office space for rent in Nigeria starting at approximately $160 USD to $630 USD per person per month.

A summary of the energy infrastructure

Electricity Generation
- Nigeria’s power generation is predominantly from natural gas and hydroelectric power plants, with natural gas being the primary source:
- Natural Gas: In 2023, natural gas contributed approximately 79.5% of Nigeria’s electricity generation. Nigeria holds the largest natural gas reserves in Africa and is among the top countries globally for proved reserves.

- Hydroelectric Power: In 2023, hydroelectric power accounted for around 20.4% of the country's power production.
- Other Sources: The remaining portion of Nigeria's power generation comes from solar, wind, and other sources like diesel and Heavy Fuel Oil (HFO).

Transmission & Distribution
- Nigeria's transmission network consists of 330 kV and 132 kV circuits and substations.
- The Transmission Company of Nigeria (TCN) oversees the management of the transmission network in Nigeria. It is a government-owned and operated entity.

Some of the government regulations surrounding solar panel production

NERC Regulations
- The Nigerian Electricity Regulatory Commission (NERC) governs aspects of power generation, transmission, distribution, and trading. It has specific regulations related to renewable energy, including:
- Feed-in Tariff (FiT) Regulation 2015: This regulation outlines the terms for purchasing and selling electricity generated from renewable sources. It includes tariff rates, contract durations, eligibility criteria, and other obligations for renewable power producers.
- Power Purchase Agreements (PPAs): NERC's regulations on PPAs cover the agreements between power producers and buyers, setting the terms for electricity sales from renewable energy projects.
- Grid Connection Requirements: These requirements specify the conditions for connecting renewable energy systems to the national grid.

Renewable Energy Policy Guidelines 2006: Issued by the Federal Ministry of Power, this policy aims to ensure a reliable electricity supply

and guides power sector projects, including those for generation, transmission, and distribution. It promotes the establishment of a competitive private sector in the electric power industry.

Environmental Impact Assessment (EIA) Act: This act mandates that renewable energy projects undergo environmental impact assessments. The assessments are crucial for identifying and mitigating potential environmental and social impacts, ensuring that projects meet environmental and sustainability standards.

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

Subsidies and Incentives:
- Customs Duty Exemptions: Imported equipment and materials used in renewable energy projects enjoy a two-year exemption from customs duties, helping to lower the initial costs of such projects.
- Tax Holidays for Manufacturers: Manufacturers of renewable energy equipment benefit from a five-year tax holiday starting from the beginning of their manufacturing activities. This reduces their tax burden in the initial years of operation.
- Tax Holidays on Dividend Incomes: Investments in domestic renewable energy projects receive a five-year tax holiday on dividend incomes, incentivizing investment in the sector.
- Soft Loans and Low-Interest Loans: The Power Sector Development Fund offers soft and low-interest loans specifically for renewable energy projects, facilitating access to affordable financing.
- Pioneer Status Incentive: Under the Industrial Development (Income Tax Relief) Act of 1971, companies involved in power generation, including renewable energy, transmission, and distribution, are eligible for a tax holiday.

- Electricity Act, 2023: This act mandates the Ministry of Finance to introduce tax incentives to promote and facilitate renewable energy generation and consumption.

Notable solar projects in the country (installed and projected)

Current Solar Projects:
- Federal University of Agriculture, Makurdi, Benue, Nigeria
- Location: Federal University of Agriculture Makurdi Solar PV Park.
- Capacity: 8.25 MW
- Details: This ground-mounted solar project, owned by Nigeria's Ministry of Power, was commissioned in October 2020. Sterling & Wilson Nigeria was the engineering procurement contractor responsible for the project.

- Bayero University, Kano
- Location: Kano, Nigeria
- Capacity: 7.1 MW
- Details: This approximately USD 7.27 off-grid solar PV-hybrid plant consists of 10,680 solar panels spread over 2 hectares. It was executed by the Rural Electrification Agency (REA) under the Energizing Education Program, with METKA West Africa Ltd as the EPC contractor.

- Tulip Cocoa Processing Ltd.
- Location: Ijebu Mushin, Ogun State, Nigeria
- Capacity: 2.35 MW
- Details: An off-grid solar PV-hybrid plant featuring 7,192 solar panels. Dutch company Alfen BV sponsored the project, with SolarCentury Ltd as the EPC contractor.

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

Company Name: Gennex Technologies
- Location: Plot 25, Adebisi Ogunnuyi Crescent, off Oladimeji Alo Street, Ikate, Lekki, Lagos, Nigeria
- Website: https://gennextechnologies.com/
- Products:
- Gennex Technologies offers a range of solar products including solar panels, hybrid inverters, deep-cycle batteries, MPPT charger controllers, online UPS systems, rechargeable fans with solar panels, multi-functional power gateways, solar street lights, rechargeable bulbs, LED bulbs, MC4 connectors, and various installation accessories.

- Services:
- Sales and Distribution of Solar Products
- On-grid/Off-grid Backup Solutions
- Solar System Design, Execution, Installation, and Maintenance
- Custom Home or Residential Solar Solutions
- Business and Commercial Solar Solutions
- Solar Maintenance Services

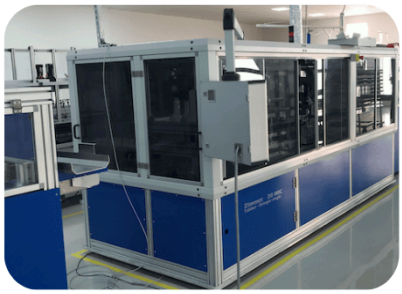
Company Name: Solynta Energy Limited
- Location: 1B Etim Iyang Close, Off Etim Iyang Crescent, Victoria Island, Lagos, Nigeria
- Website: https://solyntaenergy.com/
- Products:
- Solar Panels
- Smart Inverters
- Solar Power Systems

- Services:

- Energy Assessment
- Installation of Solar Systems
- Subscription to Power Credits via SMS

Company Name: Madecore Solar
- Location: Block A, 2nd Floor, Suite 21, Alausa Shopping Mall, Ikeja, Lagos, Nigeria
- Website: https://madecoresolar.com/
- Products:
- Solar Storage Systems
- Solar Panels

- Services:
- Customised Solar Design
- Energy Audits



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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