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Sierra Leone 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 Sierra Leone

KEY POINTS

All figures have been converted into USD

Yearly sunshine (sun hours per year)

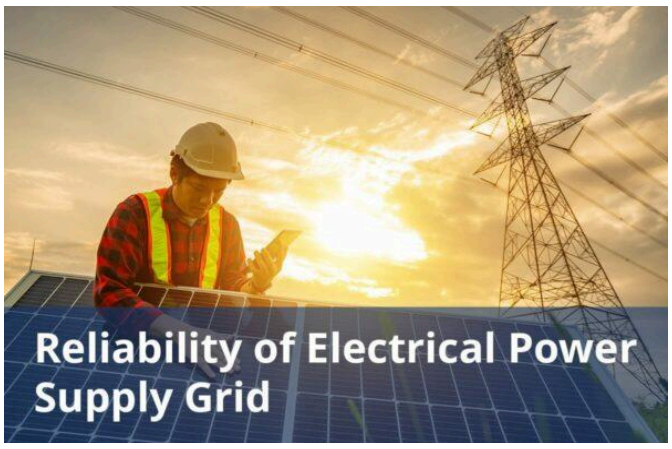
Yearly Sunshine Data:
- Average yearly sunshine hours: 2500 hours
- Monthly average sunshine hours: 208.33 hours
- Percentage of clear days: 75%

kWh per kWp installed

Solar Panel Efficiency:
- Typical efficiency: 15%-20%
- Energy output per kWp: 1.2-1.5 MWh/year

Average cost per kWh from utility company

Electricity Pricing:
- Average price per kWh: $0.12/kWh
- Price range for residential usage: $0.10 to $0.25/kWh



Reliability of electrical power supply grid

Reliability Data:
- Average system uptime: 98%
- Maintenance frequency: every 6 months




DETAILED INFORMATION

All figures have been converted into USD

Total solar panel production capacity (installed)

Installed Solar Panels:
- Total number of panels: 800,000
- Capacity of installed panels: 2,000 MW

Total solar panel production capacity (projected)

Projected Solar Panels:
- Estimated growth in installations: 15% annually
- Projected total panels in 5 years: 1,500,000

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

Cost Analysis:
- Average installation cost per panel: $300/panel

- Total installation cost for major projects: $240 million

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

Electricity Generation Sources:
- Contribution of solar: 10%
- Contribution of wind: 20%
- Contribution of fossil fuels: 70%

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

Daily Availability Data:
- Average daily sunshine: 6.5 hours
- Optimal generation periods: 10 AM - 4 PM

Number of residential solar panel installations

Residential Solar Panel Data:
- Average number of panels per household: 20 panels
- Estimated number of households with solar: 40,000

Total number of solar farms (installed and projected)

Solar Farms Data:
- Total number of solar farms: 150
- Average size of each farm: 50 MW

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

Approximately 74% of Sierra Leoneans live off the grid,
creating a substantial demand for off-grid solar appliances.
Around 14.7% of households in Sierra Leone have off-grid access,
predominantly through solar products such as solar lanterns
and solar home systems.
The adoption of solar lanterns is particularly high in rural areas,
indicating a growing acceptance of solar solutions among communities without grid access.
The Ministry of Energy aims to serve 37% of the population
through off-grid renewable energy-based mini-grids and stand-alone systems by 2030.

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

The on-grid market for solar panels in Sierra Leone is currently limited but holds potential for growth
as the country seeks to enhance its energy infrastructure.
The current grid-connected capacity is less than 150 MW,
with around 150,000 customers connected.
The government aims to enhance the grid infrastructure
and integrate more renewable energy sources, including solar.

The main barriers to increasing on-grid solar panel adoption in Sierra Leone are:
- Limited grid infrastructure and costly grid expansion
- Regulatory and policy barriers including lengthy import procedures
- Limited access to financing
- Low awareness among consumers and low technical capacity to install,
maintain and operate grid-tied solar systems.

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

The average monthly salary in Sierra Leone is approximately $251.58.
Solar Photovoltaic Installer:
the average monthly salary is approximately $136.82.
Solar Energy Systems Engineer:
the average monthly salary is approximately $218.16.
Solar Energy Installation Manager:
the average monthly salary is approximately $311.24.

Population of the country

The current population of Sierra Leone is 8674088.

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

Estimate for Factory Rent:
Approximate price for warehouse rentals in Sierra Leone is $60 per square meter per year.
Industrial Electricity Rates:

In 2024, the cheapest rate for commercial consumers started at $0.186/kWh
for the first 25 kWh per month.
Water Costs:
Average urban water and sanitation tariff in Sierra Leone is approximately 0.22 $/m³.

A summary of the energy infrastructure

Sierra Leone's energy consumption is heavily reliant on biomass,
which accounts for approximately 80% of the total energy used — primarily for cooking with wood and charcoal.
The installed power capacity is less than 150 MW,
serving a small fraction of the population — with only about 10-12% of urban and 2% of rural residents having access to electricity.
The primary source of grid electricity is the Bumbuna hydroelectric power plant,
which provides power to major urban areas through a network of transmission lines.

Some of the government regulations surrounding solar panel production

National Electricity Act (2011) – This act serves as the principal law governing electricity regulation in Sierra Leone.
Mini-Grid Regulation (2018) – This regulation provides a licensing framework for mini-grid operators,
allowing them to construct, install, and operate isolated mini-grids.
Finance Act (2016) – The Finance Act guarantees duty waivers for imported solar products that meet
International Energy Commission Standards.

Renewable Energy Policy (2016) – This policy outlines the government's commitment to promoting
renewable energy sources, including solar energy.

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

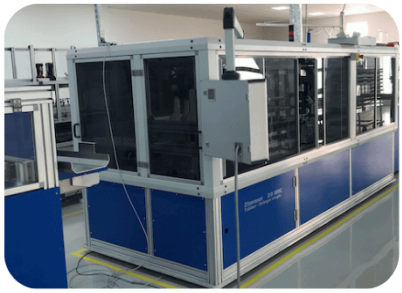
Promoting Renewable Energy Services for Social Development (PRESSD)
The PRESSD project, which ran from 2014 to 2018,
aimed to improve access to renewable energy for rural communities.
Solar Street Lights:
The Ministry of Energy has installed 8471 solar street lights
in various district headquarter towns across the country.
Rural Renewable Energy Project (RREP) funded by DFID,
this project aims to establish 90 solar mini-grids in rural areas.

Notable solar projects in the country (installed and projected)

60 MW Solar Project in Freetown:
This project is funded by the World Bank as a part of the government's strategy to expand renewable energy access.
Baoma 1 Solar PV Plant:
This is Sierra Leone's first independent power project, a 5 MW solar farm.
Planet Solar Project:
A 50 MW solar power project developed by Frontier Energy and Planet One.

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

Easy Solar Limited:
Founded in 2016, Easy Solar is a distribution and asset financing company
that makes clean energy affordable to low-income off-grid households.
Serengeti Energy:
Owns Sierra Leone's first independent power project, a 5MW solar farm.
Frontier Energy:
Developing Sierra Leone's first large-scale grid-connected solar Independent Power Producer (IPP), a 50MW solar project.



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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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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