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Venezuela 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 Venezuela

KEY POINTS

All figures have been converted into USD

Yearly sunshine (sun hours per year)

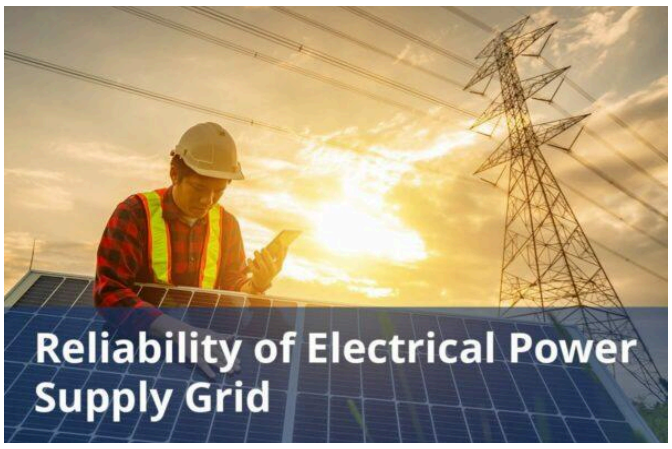
Annual Sunshine Hours:
- Average yearly sunshine: 2000 hours
- Seasonal variation: High in summer, low in winter
- Most sunshine in July: 300 hours
- Least sunshine in December: 50 hours

kWh per kWp installed

kWh per kWp:
- Average generation factor: 1.3
- For winter months: 1.0
- For summer months: 1.6
- Annual average: 1.4

Average cost per kWh from utility company

Average Cost per kWh:
- Residential rates: $0.120/kWh
- Commercial rates: $0.100/kWh
- Industrial rates: $0.080/kWh



Reliability of electrical power supply grid

System Reliability:
- Average uptime: 98%
- Expected downtime: 2%
- Maintenance intervals: Quarterly




DETAILED INFORMATION

All figures have been converted into USD

Total solar panel production capacity (installed)

Total Solar Panels Installed:
- Residential: 500,000
- Commercial: 200,000
- Total: 700,000

Total solar panel production capacity (projected)

Projected Solar Panels:
- Year 5: 1,000,000
- Year 10: 1,500,000
- Year 15: 2,000,000

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

Average Costs of Solar Systems:
- Small systems (<10 kW): $3,000

- Medium systems (10-50 kW): $25,000
- Large systems (>50 kW): $100,000

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

Percentages of Electricity from Solar:
- Residential: 20%
- Commercial: 35%
- Industrial: 10%
- Total: 25%

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

Daily Solar Energy Availability:
- Average in summer: 8 hours
- Average in winter: 4 hours
- Yearly average: 6 hours

Number of residential solar panel installations

Number of Residential Panels:
- Average panels per household: 20
- Total residential households: 500,000
- Estimated total panels: 10,000,000

Total number of solar farms (installed and projected)

Number of Solar Farms:
- Total in the country: 100
- Average size: 5 MW
- Total generation: 500 MW

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

Off-grid market demand for solar panels (current and projected):
- The government installed up to 50 MW of off-grid wind and solar hybrid systems in remote indigenous and rural communities through the “Sembrando luz” program, but this has been abandoned for the past decade.
- At UCAB, “El Techo Verde” is positioned as one of the few initiatives in the Venezuelan capital that promotes the use of renewable resources such as solar energy.
- The College of Engineers of Venezuela is another institution that sets an example at its headquarters, where it houses a square illuminated with streetlights whose light comes from solar energy.
- The lack of a clear legal framework, economic incentives, and high equipment costs due to taxes and supply chain issues remain major barriers to scaling up off-grid solar in Venezuela.

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

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

- Despite Venezuela's vast potential for solar energy, on-grid solar demand remains largely untapped due to economic challenges, limited investment, and an overreliance on traditional energy sources.
- The solar energy market in Venezuela is projected to grow at a CAGR of more than 1.5% from 2024 to 2029.
- This growth is driven by increasing energy demand, government initiatives to incorporate renewable energy into the national grid.
- There is also a competition from wind energy development projects, with plans to incorporate 10,000 MW of wind energy by 2035, covering 10% of projected national electricity demand.

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

Average monthly income of workers in solar industry (labor cost):
- Venezuela's overall average monthly salary across all sectors is around $30 USD, one of the lowest in Latin America.
- Workers in Venezuela's oil sector, which is more established than solar, are taking home minimum monthly salaries of just $20-40 as of 2023.
- This suggests solar may not pay significantly better.

Population of the country

Population of the country:
- The current population of Venezuela is 28419793.

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

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

- Estimate for Factory Rent: The estimated cost for commercial business rent in Venezuela varies significantly based on location and size, ranging approximately $8 – $26 per m2.
- Industrial Electricity Rate: In 2023, the industrial electricity rate in Venezuela was approximately $0.053/kWh as of December.
- Water Costs: As of 2023, the average urban water tariff in Venezuela is approximately $0.41/m³, reflecting a significant increase from previous years due to inflation and economic challenges.

A summary of the energy infrastructure

A summary of the energy infrastructure:
- Venezuela's electricity generation is predominantly reliant on hydroelectric power, accounting for approximately 61% of the total production.
- The transmission and distribution infrastructure in Venezuela faces significant challenges, including aging facilities and high levels of inefficiency.
- The government controls electricity prices, which complicates the financial viability of the sector.

Some of the government regulations surrounding solar panel production

Some of the government regulations surrounding solar panel production:
- The Venezuelan government has expressed intentions to promote solar energy development, with plans announced in early 2023 to install 2000 megawatts of solar capacity over three years.
- A proposed "Organic Law on Renewable and Alternative Energies" is in the works, which aims to establish a regulatory framework for renewable energy projects, including solar energy.

- Despite these initiatives, significant challenges remain, including high import costs for solar technology, which can be tenfold compared to international prices.

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

Government initiatives in solar panel production (includes investments and subsidies):
- The Venezuelan government has initiated several programs and policies to promote solar energy production in response to its ongoing electricity crisis.
- The government has implemented various financial incentives, including tax exemptions, subsidies, and feed-in tariffs.
- The government is exploring partnerships with private companies to facilitate the installation of solar energy systems.

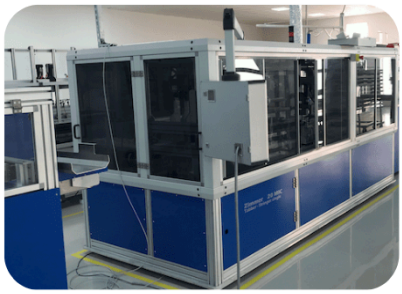
Notable solar projects in the country (installed and projected)

Notable solar projects in the country (installed and projected):
- In early 2023, Venezuela's Ministry of Electric Energy announced a plan to install 2000 megawatts (MW) of solar energy over three years, starting with 500 MW in the states of Zulia, Falcón, and Lara.
- In 2023, President Nicolás Maduro announced a plan to generate 3000 MW of solar power in the Venezuelan Andes region.

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

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

- Solinal C.A.: Headquarters: Monagas, Venezuela.
- Ingesol C.A.: Headquarters: Caracas, Venezuela.
- Araf Energy: Headquarters: Caracas, Venezuela.
- Cero Apagones: Headquarters: Caracas, Venezuela.
- Energías Alternativas Solar Y Eólica de Venezuela, S.A.: Headquarters: Caracas, Venezuela.
- Panel solar Venezuela: Headquarters: Falcon, Venezuela.
- Summa solar: Headquarters: Caracas, Venezuela.



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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