



Norway 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.

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Gain comprehensive insights into the statistics and metrics surrounding the solar production industry in Norway

KEY POINTS

All figures have been converted into USD



Yearly sunshine (sun hours per year)

Annual Average Sunshine:

- January: 5.3 hours
- February: 5.6 hours
- March: 6.0 hours
- April: 7.1 hours
- May: 7.8 hours
- June: 8.5 hours
- July: 8.9 hours
- August: 8.5 hours
- September: 7.5 hours
- October: 6.3 hours
- November: 5.4 hours
- December: 5.1 hours



kWh per kWp installed

kWh Generated per kWp:

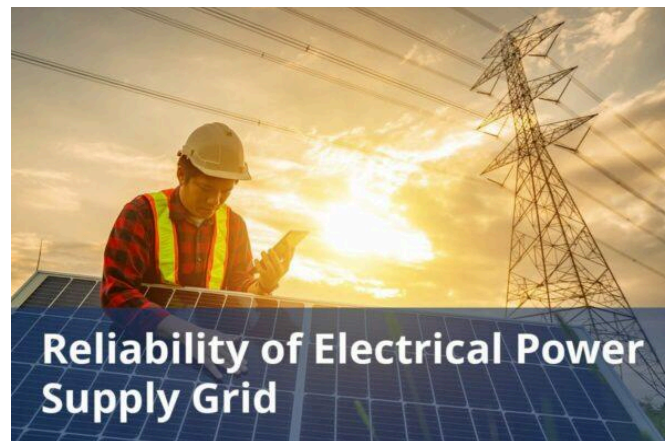
- Average Daily Production: 4.25 kWh/kWp
- Monthly Production: 127.5 kWh/kWp
- Annual Production: 1530 kWh/kWp



Average cost per kWh from utility company

Average Cost of Electricity:

- Residential Rate: \$0.135/kWh
- Commercial Rate: \$0.187/kWh
- Industrial Rate: \$0.101/kWh



Reliability of electrical power supply grid

Solar Energy Reliability:

- Capacity Factor: 20%
- Downtime for Maintenance: Average 5 Days Annually



DETAILED INFORMATION

All figures have been converted into USD

Total solar panel production capacity (installed)

Total Solar Panels Installed:

- Residential: 200,000
- Commercial: 50,000
- Utility: 10,000

Total solar panel production capacity (projected)

Projected Solar Panels by 2030:

- Goal: 500,000 Panels Installed
- Increase of 150%

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

Average Installation Costs:

- Residential: \$2.50/watt
- Commercial: \$2.00/watt
- Utility: \$1.50/watt

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

Electricity Generation by Source:

- Solar: 25%
- Wind: 15%
- Natural Gas: 40%
- Coal: 10%
- Nuclear: 10%

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

Daily Availability of Solar Energy:

- Average Daily Hours of Sunshine: 7.5 hours
- System Availability Rate: 95%

Number of residential solar panel installations

Number of Residential Solar Panels:

- Total Installed: 200,000
- Estimated Average per Home: 20 panels

Total number of solar farms (installed and projected)

Number of Solar Farms:

- Total Operating: 100
- Projected New Farms by 2025: 30

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

As of 2022, the off-grid solar PV market size in Europe which includes Norway was valued at approximately \$2.5 billion USD. By 2030, this market is projected to grow to \$4.84 billion USD with a compound annual growth rate (CAGR) of approximately 5.6%.

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

The on-grid solar market in Norway is experiencing significant growth. As of 2023, Norway had approximately 597 MW of installed solar PV capacity spread across 28170 installations with a notable portion being on-grid systems.

Projections indicate that this capacity is set to surpass 1 GW by the end of 2024 with expectations to reach around 2 GW by 2025.

This expansion is driven by favorable government policies increased electricity prices and a growing focus on renewable energy solutions.

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

The average monthly income of workers in the solar industry in Norway varies depending on specific roles and experience levels but it generally aligns with other sectors within the energy industry.

On average, workers in the electricity, gas and steam sector which includes solar energy learn around 6415 USD per month.

Population of the country

As of 2024, the population of Norway is approximately 5.5 million people.

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

Overhead cost in solar panel production typically include:

- **Factory Rent/Mortgage:** The cost of leasing or purchasing a facility can vary widely based on location and size.

On average, land prices in Norway range from \$55000 to \$800000 per acre with additional costs for construction or modification of the facility averaging \$200 to \$250 per square meter.

- **Utilities:** Utility costs including electricity and water are crucial.

For a solar manufacturing plant you can expect utility costs to be around \$20000 annually.

This includes energy and water requirements for the manufacturing process.

- **Equipment Maintenance:** Maintenance of manufacturing equipment is essential for smooth operations.

This cost typically ranges from \$50000 to \$100000 annually depending on the size and complexity of the plant.

- **Administrative Costs:** Administrative expenses including salaries for office staff, office supplies and general overhead can range from \$200000 to \$300000 annually depending on the size of the administrative team and other office-related expenses.

- **Research and Development (R&D):** Investing in R&D is vital for innovation and maintaining competitiveness.

R&D costs can vary significantly but generally range from \$100000 to \$500000 annually depending on the scale and scope of the projects.

- **Quality Control:** Ensuring the quality of solar panels involves rigorous testing and certification.

Quality control costs can range from \$50000 to \$150000 annually including the cost of equipment and personnel involved in testing.

- Regulatory Compliance: Complying with local, national and international regulations can be costly.

Costs for obtaining necessary permits and certifications can range from \$3000 to \$10000 for initial setup and \$1500 to \$20000 for ongoing compliance and certifications like UL and NEC.

A summary of the energy infrastructure

Norway's energy infrastructure is predominantly based on renewable energy, with hydropower accounting for about 90% of its electricity production.

The country has over 1600 hydropower plants with a total capacity of nearly 35 GW, making it the largest hydropower producer in Europe.

In recent years, Norway has also been expanding its wind power capacity, both onshore and offshore, contributing to a more diversified energy mix.

Domestically, Norway promotes energy efficiency and sustainability through stringent building codes and widespread adoption of electric vehicles driven by substantial government incentives.

The country's interconnected electricity grid with neighboring nations further enhances its energy security and export potential.

Some of the government regulations surrounding solar panel production

The regulations surrounding solar panel production in Norway are primarily governed by the Norwegian Water Resources and Energy Directorate (NVE) and the Energy Act.

As of February 2024, NVE proposed modifications to the regulations determining which solar power plants require a concession under the Energy Act.

According to the existing rules, solar power plants need a concession if the establishment of high-voltage facilities is necessary for power distribution to the grid.

Additionally, the Norwegian government has set stringent environmental and safety standards for the production of solar panels to ensure minimal environmental impact.

These regulations include requirements for the recycling of solar panel materials and the safe disposal of hazardous substances used in the manufacturing process.

Compliance with these regulations is monitored by the Norwegian Environment Agency which ensures that solar panel production aligns with the country's broader environmental and sustainability goals.

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

The Norwegian government has been actively investing in and promoting solar panel production through various initiatives.

- Mandate for Solar Power in Government Buildings: Starting from 2024, all new government buildings in Norway are required to have solar panels installed.

This initiative is part of a broader plan to expand the use of solar technology in the country.

- Enova Subsidies: Enova, Norway's clean energy agency, provides subsidies for residential solar installations.

As of October 2023, the subsidy includes NOK 7500 plus NOK 1250 per kW installed.

- Increased Support for Residential PV: Enova has increased the maximum PV system size eligible for rebates from 15 kW to 20 kW and

raised the maximum subsidy amount from NOK 1250 to NOK 2000 per kW installed.

- Investment in Solar and Wind Projects Abroad: Norges Bank Investment Management has invested in solar plants and onshore wind farms in Spain and Portugal, indicating a broader strategy to support renewable energy projects.

Notable solar projects in the country (installed and projected)

Notable current solar projects in Norway include the following:

- Installed: Furuseth Solkraftverk: Located in Stor-Elvdal, this is Norway's first large-scale solar power plant, 7MWp and covering around 200 hectares.

It was developed by Solgrid AS, a joint venture between Østfold Energi, Akershus Energi and the investment company Obligo.

- ASKO Midt Solar PV Plant: This solar PV project has a capacity of 1.41 MW and came online in 2017.

It is located in Trøndelag and is owned by Asko Norge.

- Unil AS Solar PV Park: Operating since 2016, this 1.32 MW solar PV project is located in Akershus and is owned by Unil AS.

- Projected: Geisli Energi AS: The projects range from 20 MW to potentially 100 MW each with a total capacity of 655 MW.

The estimated annual production is 330 GWh with the potential to increase by an additional 400 GWh per year.

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

Some of the notable solar companies in Norway include:

- REC Group (Renewable Energy Corporation): Founded in Norway in 1996, REC is a leading vertically integrated solar energy company. They handle everything from silicon production to manufacturing wafers, cells, and high-quality solar panels.

REC also provides comprehensive solar solutions globally.

- Norsk Solar: Norsk Solar, now part of Norsk Renewables AS, is a vertically integrated independent power producer.

They focus on solar, wind and storage solutions aiming to facilitate the clean energy transition in markets where they can make a significant impact.

- Scatec Solar: Scatec Solar is a leading renewable energy company that develops, builds, owns and operates solar power plants.

They have a global presence and are involved in large-scale solar projects contributing significantly to renewable energy production.

- Fusen: Fusen specializes in the installation of solar energy systems for residential, commercial and industrial clients.

They focus on providing tailored solar solutions to maximize energy efficiency and sustainability.

- Solcellespesialisten: Solcellespesialisten is one of Norway's largest solar energy companies offering a wide range of solar products and services including the installation of solar panels and energy storage systems.



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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