J. v. G. technology GmbH
The DESERT company

Lesotho 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 Lesotho

KEY POINTS

All figures have been converted into USD

Yearly sunshine (sun hours per year)

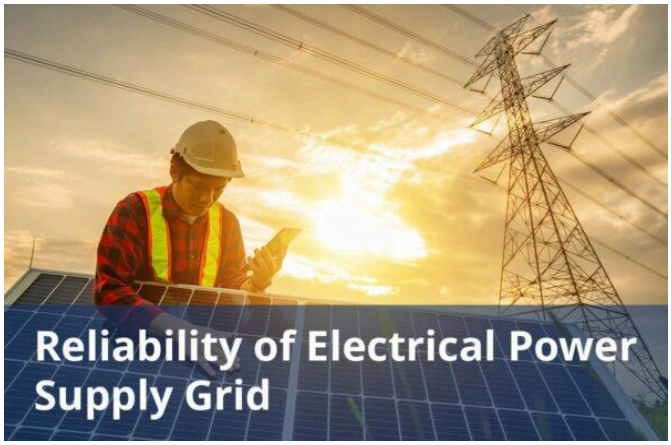
Yearly Sunshine Data:
- Average annual sunshine: 2500 hours
- Highest monthly average: 300 hours
- Lowest monthly average: 150 hours

kWh per kWp installed

kWh per kWp:
- Standard calculation: 1200 kWh/kWp
- Seasonal variations: 1500 kWh/kWp in summer

Average cost per kWh from utility company

Average Cost per kWh:
- Residential rate: $0.125/kWh
- Commercial rate: $0.095/kWh
- Industrial rate: $0.080/kWh



Reliability of electrical power supply grid

Reliability of supply:
- Average uptime: 99.9%
- Peak performance hours: 5 hours per day
- Reliability during winter: 95%




DETAILED INFORMATION

All figures have been converted into USD

Total solar panel production capacity (installed)

Total Solar Panels Installed:
- Number of panels: 500000
- Total capacity: 1500 MW

Total solar panel production capacity (projected)

Projected Solar Panel Installations:
- Estimated for next year: 100000 panels
- Long-term projection (5 years): 600000 panels

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

Average Costs of Solar Installation:
- Residential system: $2500/kW
- Commercial system: $1800/kW

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

Electricity Generation by Source:
- Solar: 20%
- Wind: 15%
- Hydro: 25%
- Fossil fuels: 40%

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

Daily Availability Data:
- Average daily availability: 5 hours
- Seasonal peaks: 8 hours in summer

Number of residential solar panel installations

Number of Residential Solar Panels:
- Total systems: 100000
- Average panels per system: 4

Total number of solar farms (installed and projected)

Number of Solar Farms:
- Total active farms: 50
- Largest farm capacity: 100 MW

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

Off-grid market demand for solar panels (current and projected):
- A 280 kW solar installation at Moshoeshoe I International Airport is used to serve the airport's demand with any excess power exported to the grid.

- There is an off-grid 2.4 kW solar installation in Roma at the National University of Lesotho.
- There are approximately 1,000,000 people living in households that may be ideally suited to solar home systems.
- There are also villages where grid-connection is probably uneconomic but which may be connectable through exploitation of renewable energy resources to establish mini-grids.

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

On-grid market demand for solar panels (current and projected):
- There is growing on-grid market demand for solar panels in Lesotho, driven by the government's renewable energy targets and the need to increase electricity access, particularly in rural areas.
- Lesotho aims to increase renewable energy use to 200 MW by 2025, which will likely involve significant investments in solar power.
- However, the market is still in its early stages and faces some regulatory challenges.
- Also, high costs of electricity connections and tariff rates make it difficult for many rural households to afford grid electricity, despite the increase in connections.

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

Average monthly income of workers in solar industry (labor cost):
- Solar Photovoltaic Installer: the average monthly salary is approximately $400.
- Solar Energy Systems Engineer: the average monthly salary is approximately $635.

- General Solar Engineer: the average monthly salary is also around $635.

Population of the country

Population of the country:
- The current population of Lesotho is 2,357,728.

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:
- Land prices for sale start as low as 2 $/m2 in some areas, indicating that rental costs may also be relatively low (specific rent costs are not available).
- Industrial Electricity Rates:
- The average wholesale electricity price in Lesotho for industrial and commercial consumers is in the range of 0.0135 to 0.0173 $/kWh, with some variation based on voltage level and consumer category.
- Water Costs:
- The cost for industrial water usage is approximately 0.30 $/m3. However, prices may fluctuate based on factors such as the volume of water used and the specific industrial sector.

A summary of the energy infrastructure

A summary of the energy infrastructure:
- Lesotho’s energy infrastructure is primarily based on hydropower, with ongoing efforts to enhance access and diversify energy sources, especially wind and solar.

- The ‘Muela Hydropower Station is the sole provider of grid electricity, generating approximately 33,000 tons of oil equivalent in 2015.
- The country has invested in projects aimed at enhancing its electricity supply, including the Renewable Lesotho initiative, which promotes the development of clean energy sources and aims to achieve energy security and independence.

Some of the government regulations surrounding solar panel production

Some of the government regulations surrounding solar panel production:
- The Lesotho government has several regulations and initiatives in place to promote the adoption of solar energy technologies:
- Renewable Energy Policy:
- The draft Renewable Energy Policy for Lesotho enlists various solar PV applications that are being encouraged, including solar home systems, PV for clinics, water pumping, and telecommunications.

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

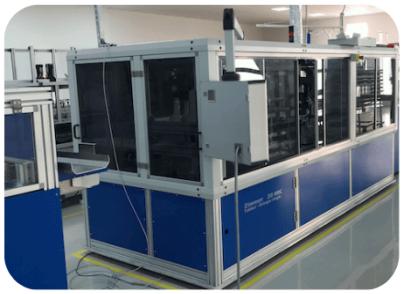
Government initiatives in solar panel production (includes investments and subsidies):
- Renewable Energy-Based Rural Electrification Project (LREBRE):
- This project aimed to increase the adoption of renewable energy technologies, including solar PV systems, particularly in rural areas.
- Scaling Renewable Energy Program (SREP):
- The SREP is designed to support the development of utility-scale solar PV and off-grid renewable energy solutions.

Notable solar projects in the country (installed and projected)

Notable solar projects in the country (installed and projected):
- Mafeteng 20 MW PV Plant:
- This project is planned to be the first utility-scale solar PV plant in Lesotho, with a capacity of 20 MW.
- Ha Makebe Solar Mini-Grid:
- A pilot project in Ha Makebe village, completed in 2021, marked the establishment of Lesotho's first private solar mini-grid.

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):
- Mahlaseli Energy:
- Website: https://mahlaselienergy.co.ls/
- Details: Mahlaseli Energy, based in Hlotse, delivers sustainable solar energy and water solutions.
- MOSCET:
- Website: https://www.moscet.co.ls/
- Details: Established in 2010, Mos-Sun Clean Energy Technologies (MOSCET), provides innovative renewable energy solutions.



ABOUT THIS REPORT

This Solar Report is part of the PVKnowHow Knowledge Network, developed by J.v.G. Technology GmbH - a German engineering company, specializing in turnkey solar module production lines (ranging from 20 MW to 500 MW per production line, including multi-line and gigafactory projects exceeding this scale).

All market data, analysis, and conclusions follow JvG's internal consulting standards and international PV market research practices.

REFERENCES

All References

1. Climate.top (n.d.). Cli Sunshine & Daylight Hours in Maseru, Lesotho. Retrieved July 23, 2024, from <https://www.climate.top/lesotho/sunlight/>
2. IRENA – International Renewable Energy Agency (2023, August 08). Energy profile Lesotho. Retrieved July 23, 2024, from <https://www.irena.org/-/media/Files/IRENA/Agency/Statistics/Statistical%5FProfiles/Africa/Lesotho%5FAfrica%5FRE%5FSP.pdf>
3. Global Petrol Prices (n.d.). Lesotho electricity prices. Retrieved July 23, 2024, from <https://www.globalpetrolprices.com/Lesotho/electricity%5Fprices/>
4. Afrobarometer (2024, June 7). AD811: Basotho say government is doing a poor job of providing a reliable electricity supply. Retrieved July 23, 2024, from <https://www.afrobarometer.org/publication/ad811-basotho-say-government-is-doing-a-poor-job-of-providing-a-reliable-electricity-supply/>
5. Get.transform (2024, July 01). Lesotho Country Window: Energy System Transformation Outlook (ESTO). Retrieved July 23, 2024, from

https://www.get-transform.eu/wp-content/uploads/2024/07/GET.transform-Lesotho-ESTO-July-2024.pdf
6. International Trade Organization (2024, February 02). Lesotho – Country Commercial Guide. Retrieved July 23, 2024, from <https://www.trade.gov/country-commercial-guides/lesotho-renewable-energy>
7. MRC Group (2018, August). Electricity Supply Cost of Service Study – LEWA Lesotho. Retrieved July 23, 2024, from <https://nul-erc.s3.amazonaws.com/public/documents/reports/cost-of-service-study-1543817960.pdf>
8. Journal of energy in Southern Africa (2021, February). Lesotho electricity demand profile from 2010 to 2030\. Retrieved July 23, 2024, from <https://scielo.org.za/scielo.php?pid=S1021-447X2021000100004&script=sci%5Farttext>
9. Statista (2023, June 20). Share of renewable energy in electricity capacity in Lesotho from 2012 to 2021\. Retrieved July 23, 2024, from
10. Statista (2024, January 31). Share of individuals with a reliable supply of electricity in Lesotho in 2020\. Retrieved July 23, 2024, from <https://www.statista.com/statistics/1316146/share-of-individuals-with-a-reliable-supply-of-electricity-in-lesotho/>
11. Power Technology (2024, May 31). Power plant profile: Lesotho Solar PV Park, Lesotho. Retrieved July 23, 2024, from https://www.power-technology.com/data-insights/power-plant-profile-lesotho-solar-pv-park-lesotho/
12. The Lesotho Electricity Generation Company (2022, November 22). 70MW Solar Power Project. Retrieved July 23, 2024, from <https://www.legco.co.ls/>
13. Eco- Business (2023, June 6). The solar kiosks powering Lesotho’s rural communities. Retrieved July 23, 2024, from <https://www.eco-business.com/news/the-solar-kiosks-powering-lesothos-rural-communities/>

14. World salaries (n.d.). Average Solar Energy Systems Engineer Salary in Lesotho for 2024\. Retrieved July 23, 2024, from <https://worldsalaries.com/average-solar-energy-systems-engineer-salary-in-lesotho/>
15. World salaries (n.d.). Average Solar Photovoltaic Installer Salary in Lesotho for 2024\. Retrieved July 23, 2024, from <https://worldsalaries.com/average-solar-photovoltaic-installer-salary-in-lesotho/>
16. Worldometer (n.d.). Lesotho Population. Retrieved July 23, 2024, from <https://www.worldometers.info/world-population/lesotho-population/>
17. African land (n.d.). Discover your next development opportunity: land for sale in Maseru, Lesotho. Retrieved July 23, 2024, from <https://african.land/blog/article/discover-your-next-development-opportunity-land-for-sale-in-maseru-lesotho-b678>
18. Lesotho Electricity and Water Authority (LEWA) (n.d.). Approved electricity tariffs & charges. Retrieved July 23, 2024, from <https://www.lewa.org.ls/approved-electricity-tariffs-charges/>
19. Lesotho Electricity and Water Authority (LEWA) (n.d.). Approved Water Tariffs & Sewerage Charges. Retrieved July 23, 2024, from <https://www.lewa.org.ls/approved-water-tariffs-sewerage-charges/>
20. Eris property group (n.d.). Retail Properties To Let in Maseru, Lesotho. Retrieved July 23, 2024, from <https://www.eris.co.za/results/retail/to-let/maseru/>
21. Statista (2024, March). Property Insurance – Lesotho. Retrieved July 23, 2024, from <https://www.statista.com/outlook/fmo/insurances/non-life-insurances/property-insurance/lesotho>
22. UN Capital Development Fund (UNCDF) (2020). The Making Access Possible Programme. Retrieved July 23, 2024, from <https://www.undp.org/sites/g/files/zskgke326/files/publications/UNDP-UNCDF-Lesotho-Energy-and-the-Poor.pdf>

23. Africa Energy Portal (n.d.). Lesotho – Profile. Retrieved July 23, 2024, from <https://africa-energy-portal.org/aep/country/lesotho>
24. Delegation of the European Union to the Kingdom of Lesotho (2024, February 14). Renewable Lesotho. Retrieved July 23, 2024, from <https://www.eeas.europa.eu/delegations/lesotho/renewable-lesotho%5Fen?s=103>
25. Map Africa (n.d.). Lesotho – Mafeteng Solar PV Project. Retrieved July 23, 2024, from <https://mapafrica.afdb.org/en/projects/46002-G-LS-FZ0-PRE-001>
26. Lesotho Renewable Energy-Based Rural Electrification Project (LREBRE) (2015). DRAFT Terminal Evaluation Report. Retrieved July 23, 2024, from <https://www.gefieo.org/sites/default/files/documents/projects/tes/1245-terminal-evaluation.pdf>
27. Document of The World Bank (2020, June 25). Lesotho scaling up renewable energy program investment plan. Retrieved July 23, 2024, from <https://documents1.worldbank.org/curated/en/973931593508357535/text/Lesotho-Scaling-Renewable-Energy-Program-SREP-Investment-Plan-IP-Project.txt>
28. Department of Energy (2024, January 19). Support to the energy sector reform in Lesotho: skills audit and developing capacity building plan for doe. Retrieved July 23, 2024, from <https://www.doe.gov.ls/post/view/59>
29. Retrieved July 23, 2024, from <https://repp.energy/project/ha-makebe-lesotho/>
30. Retrieved July 23, 2024, from <https://www.miga.org/sites/default/files/2022-07/Lesotho%20PV%20Plant%20Final%20ESIA%20Report%20updated.pdf>

For a detailed list of references and additional information, please visit our website with the current report at:
https://www.pvknowhow.com/solar-report/lesotho/

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.
www.jvg-thoma.com

Contact & Further Information

For further discussion or clarification of manufacturing-related aspects, please contact:

J.v.G. Technology GmbH
www.jvg-thoma.com
info@jvg-thoma.com

Created with the support of
JVGLABS
AI Automation for Marketing & Sales
www.jvglabs.com