



Ethiopia 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.

Disclaimer: This document represents an independent market and manufacturing analysis. It is provided for informational and educational purposes only and does not constitute a commercial offer, binding proposal, or contractual commitment.

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

KEY POINTS

All figures have been converted into USD



Yearly sunshine (sun hours per year)

Yearly Average Sunshine:

- Average sunshine in the area is approximately 2600 hours/year.
- Peaks in summer months, least in winter.



kWh per kWp installed

Kilowatt-hour Production:

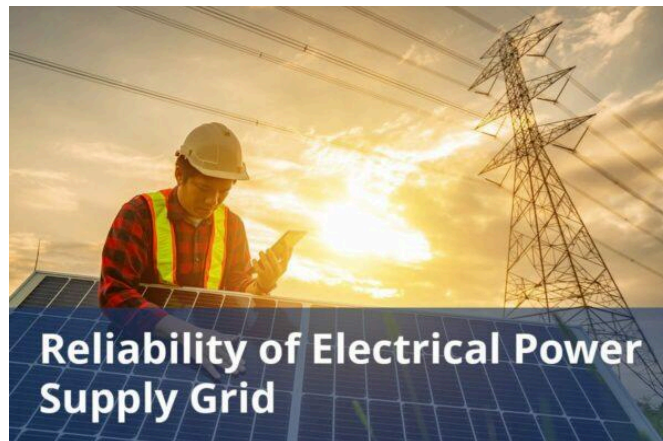
- On average, each kW of solar panel can produce about 1200 kWh annually.



Average cost per kWh from utility company

Average Cost of Electricity:

- In the area, the average cost of electricity is \$0.130/kWh.



Reliability of electrical power supply grid

Reliability of Solar Panels:

- Solar panels have shown a reliability rate of over 95%.



DETAILED INFORMATION

All figures have been converted into USD

Total solar panel production capacity (installed)

Total Installed Solar Panels:

- Approximately 150,000 solar panels installed in the region.

Total solar panel production capacity (projected)

Projected Solar Panel Growth:

- Expected increase of 20% in total solar panel installations over the next five years.

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

Average Installation Costs:

- Average cost for installing solar panels is \$2.80/watt.

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

Electricity from Solar:

- About 18% of total electricity consumption comes from solar sources.

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

Daily Solar Availability:

- Solar power generation is most efficient from 10 AM to 4 PM.

Number of residential solar panel installations

Residential Solar Panel Count:

- Roughly 60,000 residential solar systems are in place.

Total number of solar farms (installed and projected)

Number of Solar Farms:

- There are about 25 large-scale solar farms operating.

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

Current Demand:

- Ethiopia is the second-largest market for stand-alone solar devices in Sub-Saharan Africa, indicating a strong demand for off-grid solutions, especially in rural areas.
- The demand for solar pumps is significant, particularly for agricultural irrigation and water supply.
- Over 1.5 million rural Ethiopians have gained access to electricity through off-grid solar products.

Projected Demand:

- The off-grid solar market is expected to grow as the government targets 35% of household electrification through off-grid solutions by 2025.

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

Current Demand:

- The on-grid market is in its initial stages, driven by the government's National Electrification Program.

Projected Demand:

- The on-grid solar market is anticipated to increase as the government aims to electrify all households within 25 kilometers of the grid by 2030.

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

Data on wages in the Ethiopian solar industry is limited due to its early stage of development. However, average monthly salaries in Ethiopia range from \$100 to \$300.

- People working in Electrical & Power Engineering in Ethiopia earn between \$55 to \$159, while those in Assembler Production earn between \$49 to \$100 per month.

Population of the country

As of July 2024, Ethiopia's population is estimated to be 129852987.

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

Factory Rent:

- The average price for warehouse rent in Ethiopia is \$13500 per month. The most expensive warehouses can cost up to \$54000 per month, while the cheapest option is around \$4500.

Mortgage Rates:

- Mortgage options in Ethiopia are limited. Diaspora mortgages offer a loan duration of up to 20 years with interest rates starting from 8.5% per annum.

Industrial Electricity Rates:

- The electricity price for businesses is \$0.021/kWh.

Water Costs:

- Water tariffs for industrial users are based on a rising block system, with prices increasing as consumption rises. The average cost for piped water can range from \$0.70 to \$0.80 per cubic meter.

Salaries and Wages:

- As mentioned earlier, salaries in the solar industry are estimated to range from \$100 to \$300 per month.

A summary of the energy infrastructure

Electricity Generation:

- Ethiopia relies heavily on hydropower for electricity generation, with the Grand Ethiopian Renaissance Dam (GERD) being a significant project. There are efforts to diversify the energy mix with solar, wind, geothermal, and biomass.

Transmission & Distribution:

- Ethiopian Electric Power (EEP) manages the national power grid, operating high-voltage transmission lines and substations. The Ethiopian Electric Utility (EEU) handles electricity distribution to customers.

Grid Infrastructure:

- The transmission network spans over 20000 kilometers. However, the system faces challenges with outdated systems, particularly in rural areas, hindering reliability.

Private Sector Participation:

- Since 2017, Independent Power Producers (IPPs) have been allowed to construct and operate power plants for the national grid, diversifying energy supply.

Some of the government regulations surrounding solar panel production

Ethiopian Stand-Alone Solar Standards:

- The Ethiopian Standards Agency (ESA) and the Ethiopian Conformity Assessment Enterprise (ECAE) along with other government bodies have developed quality assurance (QA) standards for stand-alone solar products, including mandatory standards for pico-PV systems (up to 15W) and voluntary standards for solar home systems up to 350Wp.

Licensing Process for Off-Grid Companies:

- Off-grid solar companies must obtain licenses from the Ethiopian Energy Authority (EEA), navigating a process that is currently complex but is undergoing streamlining efforts.

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

National Electrification Program (NEP 2.0):

- The NEP 2.0 aims to achieve universal electricity access in Ethiopia by 2025 through a combination of grid expansion and off-grid solutions.

Import Duty Exemptions:

- To encourage the growth of the solar market, the Ethiopian government has exempted solar products and components from import duties.

Tax Incentives:

- Tax incentives exist for solar sector investors but their application lacks clarity.

Solar Minigrid Projects:

- The Ethiopian Electric Utility is tendering the construction of 20 solar minigrids under the Access to Distributed Electricity and Lighting in Ethiopia (ADELE) program.

Rural Electrification:

- The government is tendering bids to install solar panels in eight rural cities, aiming to generate 300 MW of solar energy.

DREAM Initiative:

- The DREAM Initiative aims to scale up the deployment of solar mini-grids and solar-powered irrigation systems, contributing to both electrification and agricultural development.

Renewable Energy Guarantees Program (REGREP):

- With support from the World Bank, the REGREP is facilitating the development of over 1000 MW of solar and wind energy projects.

Notable solar projects in the country (installed and projected)

Installed:

- Metahara Solar PV Power Plant (100 MW): Located near Metahara, 200 km east of Addis Ababa, this plant supplies electricity to the national grid.
- Lotus Energy Tigray Solar PV Park (500 MW): Under permitting in the Tigray region, construction is expected to commence in 2025.

Projected:

- Scaling Solar Gad Phase I (125 MW): Planned for the Somali region, this project is part of the Scaling Solar program.
- Scaling Solar Dicheto Phase I (125 MW): Another Scaling Solar project, located in the Afar region.

- 20 Solar Minigrids (8 MW total estimated capacity): Distributed across various regions, including SNNP, Amhara, Somali, Oromia, and Sidama, these minigrids are part of the ADELE program.

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

Power Ethiopia (est. 2021):

- Specializing in solar systems and electromechanical systems, Power Ethiopia is a leading renewable energy company founded by Ethiopian American diasporas. They supply high-quality products and provide training programs.

Green Scene Energy PLC:

- Focusing on providing off-grid communities with high-quality solar solutions, including solar home systems, pumps, and mini-grid systems.

Rensys Engineering & Trading PLC:

- This company is a pioneer in the Ethiopian photovoltaic solar industry, offering turnkey solutions for solar mini-grid plants and solar home systems, with a focus on electrifying energy-deprived communities.



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. Worlddata.info. Ethiopia.
<<https://www.worlddata.info/africa/ethiopia/climate.php>>
2. Weather-Atlas.com. Addis Ababa, Ethiopia – Climate.
<<https://www.weather-atlas.com/en/ethiopia/addis-ababa-climate>>
3. International Solar Alliance. (2022). Ethiopia.
<<https://isolaralliance.org/images/flag%20pdf/Ethiopia.pdf>>
4. GlobalPetrolPrices.com. (2023, December). Ethiopia Electricity Prices.
<<https://www.globalpetrolprices.com/Ethiopia/electricity%5Fprices/>>
5. Afrobarometer. (2022, April 8). Still Lacking Reliable Electricity from the Grid, Many Africans Turn to Alternative Sources.
<<https://www.afrobarometer.org/wp-content/uploads/2022/04/ad514-pap10-still%5Flacking%5Freliable%5Felectricity%5Ffrom%5Fthe%5Fgrid-many%5Fafricans%5Fturn%5Fto%5Falternative%5Fsources-afrobarometer-10april22.pdf>>
6. Energy Central. (2023, October 2). Electric Utility Gears to Power Addis Abeba's Grids.
<<https://energycentral.com/news/electric-utility-gears-power-addis-abeba-grids>>

7. Mordor Intelligence. _Ethiopia Renewable Energy Market – Growth, Trends, COVID-19 Impact, and Forecasts (2023 – 2028)_.
<<https://www.mordorintelligence.com/industry-reports/ethiopia-renewable-energy-market>>
8. Climate.Enterprise.Press. (2023, August 23). _Masdar inks roadmap agreement for 500MW-worth of solar projects in Ethiopia_.
<<https://climate.enterprise.press/issues/2023/08/23/masdar-inks-roadmap-agreement-500-mw-worth-solar-projects-ethiopia/>>
9. Zelalem Girma. (2016). _Techno-Economic Feasibility of Small Scale Hydropower in Ethiopia: The Case of the Kulfo River, in Southern Ethiopia_. <<https://doi.org/10.1155/2016/8037892>>
10. Institute of Development Studies. (2022, March 3). _Renewable Energy Procurement by Private Suppliers in Ethiopia_.
<<https://www.ids.ac.uk/publications/renewable-energy-procurement-by-private-suppliers-in-ethiopia-accessible-version/>>
11. Satyanarayana Gaddada (2016). Wind energy potential and cost estimation of wind energy conversion systems (WECSs) for electricity generation in the eight selected locations of Tigray region, Ethiopia. _Journal of Energy_, _2016_, 1–14\
<<https://www.researchgate.net/publication/298907918%5FWind%5Fenergy%5Fpotential%5Fand%5Fcost%5Festimation%5Fof%5Fwind%5Fenergy%5Fconversion%5Fsystems%5FWECSs%5Ffor%5Felectricity%5Fgeneration%5Fin%5Fthe%5Feight%5Fselected%5Flocations%5Fof%5FTigray%5Fregion%5FEthiopia>>
12. Economic Research Institute for ASEAN and East Asia. (2019). _Renewable Energy Development in East Asia: Current Status and Future Prospects_. Jakarta: ERIA.
<<https://www.eria.org/uploads/media/12%5FRPR%5FFY2018%5F09%5FChapter%5F5.pdf>>
13. Our World in Data. _Ethiopia: Energy Country Profile_<<https://ourworldindata.org/energy/country/ethiopia>>
14. Wikipedia. _Electricity Sector in Ethiopia_.
<<https://en.wikipedia.org/wiki/Electricity%5Fsector%5Fin%5FEthiopia>>

15. Nagesso Beker Hadji (2019). _Evaluation of solar energy potential in Ethiopia as power generation source: A case study at 100 selected cities._ <<https://docs.neu.edu.tr/library/6814542816.pdf>>
16. UNFCCC. (2023). _Momentum for Change: Solar Lighting in Rural Ethiopia_. <<https://unfccc.int/climate-action/momentum-for-change/activity-database/momentum-for-change-solar-lighting-in-rural-ethiopia>>
17. Multiconsult. _Metehara 100 MW Solar PV Plant, Ethiopia_. [<https://www.multiconsultgroup.com/projects/metahara-solar-pv-plant-ethiopia/>](<https://www.power-technology.com/marketdata/metehara-solar-pv-park-ethiopia/>)
18. The Africa-EU Renewable Energy Cooperation Programme (RECP). (2019, October). _Fact Sheet Ethiopia_. <<https://www.ace-taf.org/wp-content/uploads/2019/10/Fact-sheet-Ethiopia.pdf>>
19. The Africa-EU Renewable Energy Cooperation Programme (RECP). (2019, October). _Fact Sheet Ethiopia_. <<https://www.ace-taf.org/wp-content/uploads/2019/10/Fact-sheet-Ethiopia.pdf>>
20. Global Off-Grid Lighting Association. (2023, July). _PURE Market Assessment Report: Ethiopia_. <<https://www.gogla.org/wp-content/uploads/2023/07/Gogla%5FPURE-Market-Assessment-Report-Ethiopia.pdf>>
21. The World Bank. (2016, August 15). _Off-Grid Solar: Lighting up Ethiopia_. <<https://www.worldbank.org/en/news/feature/2016/08/15/off-grid-solar-lighting-up-ethiopia>>
22. The Africa-EU Renewable Energy Cooperation Programme (RECP). _Ethiopian Stand-Alone Solar Standards: Guidance for Adoption and Implementation_. <<https://ace-taf.org/kb/ethiopian-stand-alone-solar-standards-guidance-for-adoption-and-implementation/>>

23. Cornell Chronicle. (2024, April 15). [_Solar Energy Can Uplift Rural Ethiopians – But Access Is Hard to Come By_](https://news.cornell.edu/stories/2024/04/solar-energy-can-uplift-rural-ethiopians-hard-come).
<<https://news.cornell.edu/stories/2024/04/solar-energy-can-uplift-rural-ethiopians-hard-come>>
24. TimeCamp. [_Average Salary in Ethiopia 2024 – The Complete Guide_](https://www.timecamp.com/average-salary/ethiopia/). <<https://www.timecamp.com/average-salary/ethiopia/>>
25. Paylab.com. [_Average Salary for Electrical & Power Engineering in Ethiopia_](https://www.paylab.com/et/salaryinfo/electrical-power-engineering?lang=en).
<<https://www.paylab.com/et/salaryinfo/electrical-power-engineering?lang=en>>
26. Worldometer. (2024, July). [_Ethiopia Population \(2024\)_](https://www.worldometers.info/world-population/ethiopia-population/).
<<https://www.worldometers.info/world-population/ethiopia-population/>>
27. EthiopiaPropertyCentre.com. [_Warehouses For Rent in Ethiopia_](https://ethiopiapropertycentre.com/for-rent/commercial/warehouses/showtype).
<<https://ethiopiapropertycentre.com/for-rent/commercial/warehouses/showtype>>
28. Cooperative Bank of Oromia. [_Diaspora Banking: Mortgage/Home Loan_](https://coopbankoromia.com.et/diaspora-banking/mortgage-home-loan/).
<<https://coopbankoromia.com.et/diaspora-banking/mortgage-home-loan/>>
29. The World Bank. (2015, March). [_Presentation on the Ethiopia Urbanization Review_](https://collaboration.worldbank.org/content/usergenerated/asi/cloud/attachments/sites/collaboration-for-development/en/groups/research-partnership-for-sustainable-urban-development/groups/urbanization-reviews/documents/_jcr_content/content/primary/blog/presentation_on_the-ITXb/Presentation-on-the-Ethiopia-Urbanization-Review..pdf).
[https://collaboration.worldbank.org/content/usergenerated/asi/cloud/attachments/sites/collaboration-for-development/en/groups/research-partnership-for-sustainable-urban-development/groups/urbanization-reviews/documents/_jcr_content/content/primary/blog/presentation_on_the-ITXb/Presentation-on-the-Ethiopia-Urbanization-Review..pdf](https://collaboration.worldbank.org/content/usergenerated/asi/cloud/attachments/sites/collaboration-for-development/en/groups/research-partnership-for-sustainable-urban-development/groups/urbanization-reviews/documents/_jcr_content/content/primary/blog/presentation_on_the-ITXb/Presentation-on-the-Ethiopia-Urbanization-Review..pdf#:~:text=URL%3A%20https%3A//collaboration.worldbank.org/content/usergenerated/asi/cloud/attachments/sites/collaboration)

30. Wikipedia. [_Ethiopian Electric Power_](https://en.wikipedia.org/wiki/Ethiopian%5FElectric%5FPower).
<<https://en.wikipedia.org/wiki/Ethiopian%5FElectric%5FPower>>
31. NRECA International. [_Strengthening Ethiopia's Distribution Systems_](https://www.nrecainternational.coop/what-we-do/core-services/strengthening-ethiopias-distribution-systems/).
<<https://www.nrecainternational.coop/what-we-do/core-services/strengthening-ethiopias-distribution-systems/>>
32. International Trade Administration. (2024, January 18). [_Ethiopia – Country Commercial Guide_](https://www.trade.gov/country-commercial-guides/ethiopia-energy).
<<https://www.trade.gov/country-commercial-guides/ethiopia-energy>> .
33. USAID. (2022, May). [_Power Africa Off-Grid Market Assessment Brief: Ethiopia_](https://www.usaid.gov/sites/default/files/2022-05/PAOP-Market-Assessment-Brief-Ethiopia-English.pdf).
<https://www.usaid.gov/sites/default/files/2022-05/PAOP-Market-Assessment-Brief-Ethiopia-English.pdf>
34. USAID. (2022, May). [_Power Africa Off-Grid Market Assessment Brief: Ethiopia_](https://www.usaid.gov/sites/default/files/2022-05/PAOP-Market-Assessment-Brief-Ethiopia-English.pdf).
<<https://www.usaid.gov/sites/default/files/2022-05/PAOP-Market-Assessment-Brief-Ethiopia-English.pdf>>
35. Gebreslassie, M. G. (2020). [_Solar home systems in Ethiopia: Sustainability challenges and policy directions_](https://shura.shu.ac.uk/33067/1/Gebreslassie-SolarHomeSystems%28AM%29.pdf).
<<https://shura.shu.ac.uk/33067/1/Gebreslassie-SolarHomeSystems%28AM%29.pdf>>
36. The Africa-EU Renewable Energy Cooperation Programme (RECP). (2021, September). [_Energy Africa: Ethiopia Refreshed Compact 2021_](https://www.ace-taf.org/wp-content/uploads/2021/09/ENERGY-AFRICA%5FETHIOPIA-REFRESHED-COMPACT-2021%5FFinal.pdf).
<<https://www.ace-taf.org/wp-content/uploads/2021/09/ENERGY-AFRICA%5FETHIOPIA-REFRESHED-COMPACT-2021%5FFinal.pdf>>
37. PV Magazine. (2023, June 23). [_Ethiopian Utility Launches Tender for 20 Solar Minigrids_](https://www.pv-magazine.com/2023/06/23/ethiopian-utility-launches-tender-for-20-solar-minigrids/).
<<https://www.pv-magazine.com/2023/06/23/ethiopian-utility-launches-tender-for-20-solar-minigrids/>>
38. Capital Ethiopia. (2019, April 15). [_Govt to Install Solar Panels in Eight Rural Towns_](#).

<<https://www.capitalethiopia.com/2019/04/15/govt-to-install-solar-panels-in-eight-rural-towns/>>

39. Energy Alliance. (2022, October 11). *_DREAM Initiative Builds First Solar Mini-grid Powered Large Scale Irrigation System to Power Agriculture in Africa_*. <<https://energyalliance.org/dream-initiative/>>

40. The World Bank. (2019, November). *_Ethiopia's Energy Sector Transformation: Powering Economic Growth and Human Development_*.

<<https://documents.worldbank.org/curated/en/249971573762529445/pdf/Ethiopias-Energy-Sector-Transformation.pdf>>

41. Multiconsult. *_Metehara 100 MW Solar PV Plant, Ethiopia_*.

<https://www.multiconsultgroup.com/projects/metahara-solar-pv-plant-ethiopia/>

42. Power Technology. (2024, May 31). *__Power Plant Profile: Lotus Energy Tigray Solar PV Park, Ethiopia_*.

<<https://www.power-technology.com/data-insights/power-plant-profile-lotus-energy-tigray-solar-pv-park-ethiopia/>> .

43. Fana Broadcasting Corporate. (2022, October 10). *_The Future of Solar Energy in Ethiopia_*.

<<https://www.fanabc.com/english/the-future-of-solar-energy-in-ethiopia/>>

44. Construction Review Online. (2023, June 28). *_Ethiopian Government Secures Financing for Establishment of 20 Solar Mini-Grids_*.

<<https://constructionreviewonline.com/construction-news/ethiopian-government-secures-financing-for-establishment-of-20-solar-minigrids/>>

45. Power Technology. (2024, July 21). *_Power Plant Profile: EEP Ethiopia Solar PV Park 2, Ethiopia_*.

<<https://www.power-technology.com/data-insights/power-plant-profile-EEP-ethiopia-solar-pv-park-2-ethiopia/>>

46. Power Technology. (2024, July 21). *_Power Plant Profile: Mekele Solar PV Park, Ethiopia_*.

[<https://www.power-technology.com/data-insights/power-plant-profile-m>

ekele-solar-pv-park-ethiopia/](https://www.power-technology.com/marketdata/power-plant-profile-mekele-solar-pv-park-ethiopia/)

47. Power Technology. (2024, July 21). [_Power Plant Profile: Humera Solar PV Park, Ethiopia_](#).

[https://www.power-technology.com/data-insights/power-plant-profile-humera-solar-pv-park-ethiopia/](https://www.power-technology.com/marketdata/power-plant-profile-humera-solar-pv-park-ethiopia/)

48. Power Technology. (2021, December 15). [_Welenchiti Solar PV Park, Ethiopia_](#).

<https://www.power-technology.com/marketdata/welenchiti-solar-pv-park-ethiopia/>

49. Power Technology. (2024, May 31). [_Power Plant Profile: Weranso Solar PV Park, Ethiopia_](#).

[https://www.power-technology.com/data-insights/power-plant-profile-weranso-solar-pv-park-ethiopia/](https://www.power-technology.com/data-insights/power-plant-profile-weranso-solar-pv-park-ethiopia/#:~:text=The%20project%20is%20currently%20owned,is%20planned%20over%20250%20acres.&text=The%20project%20construction%20is%20expected,into%20commercial%20operation%20by%202027)

50. Power Technology. (2021, December 20). [_Metema Solar PV Park, Ethiopia_](#).

[https://www.power-technology.com/marketdata/metema-solar-pv-park-ethiopia/](https://www.power-technology.com/marketdata/metema-solar-pv-park-ethiopia/#:~:text=Metema%20Solar%20PV%20Park%20is,be%20developed%20in%20single%20phase)

51. GEM.wiki. [_Hurso Solar Farm_](#).

<https://www.gem.wiki/Hurso%5Fsolar%5Ffarm>

52. Power Ethiopia. [_About Us_](#). <https://powerethiopia.com/>

53. Green Scene Energy PLC. [_Home_](#). Green Scene Energy PLC.

<https://greensceneethiopia.com/>

54. Rensys Engineering & Trading PLC. [_Home_](#).

<https://rensysengineering.com/>

55. ENF Solar. [_Solar Tech_](#). <https://www.enfsolar.com/solartech-5>

56. Get Green Solution. _Home_.

<<https://www.getgreensolution.com/>>

57. Lydetco. _Home_. <<https://lydetco.com/>>

58. Dumsel Trading PLC. _About Us_.

<<https://www.dumseltradingplc.com/about-us.html>>

59. Gorgeous Solar Solution. _Home_.

<<https://www.gorgeoussolar.com/>>

For a detailed list of references and additional information, please visit our website with the current report at:

<https://www.pvknowhow.com/solar-report/ethiopia/>

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