

Our Experience in East Africa Giselle Nunes-Cordes

May 2019

We are independent experts for solar energy solutions



Established 2009 in Hamburg, Germany

International team with experienced engineers & managers from Germany, Spain, Brazil, Colombia, Honduras, Kenya, Thailand and partners in Chile, Morocco, Mexico, Southern Africa

Covering photovoltaic (PV), solar process heat, concentrating solar power (CSP), solar research, independent power producers (IPP) & utilities

Expertise: >7000 MW solar, > 100 projects, > 40 countries

Solutions for all steps of the project development chain from concepts, feasibility, project qualification, finance and investment to construction supervision





Suntrace Headquarters in Hamburg, Germany

Suntrace focus on dynamically growing, emerging solar markets



International Project Activities

Australia, Bangladesh, Brazil, Cambodia, Cameroon, Cape Verde, Chile, China, Colombia, Cyprus, Czech Republic, Egypt, Ethiopia, France, Germany, Ghana, Greece, Guadeloupe, India, Indonesia, Italy, Jordan, Kenya, Kuwait, Libya, Maldives, Mali, Mexico, Mongolia, Morocco, Namibia, Nicaragua, Portugal, United Arabic Emirates, Uzbekistan, Saudi Arabia, Slovakia, South Africa, Spain, Syria, Tanzania, Tunisia, Turkey and Vietnam

Offices, Branches and Partners

Morocco Namibia

Vietnam

Germany	Suntrace GmbH		
Spain	Suntrace Prisma S.L.		
India	Suntrace Energy India Ltd.		
South Africa	Suntrace Africa Pty.		
Chile	LAER		
Mexico	ZeroEnergyon		

MENARES Amusha Consultancy Services VATEC





From initial concept to full realisation



Now in the Dornier Group, creating a strong service provider



5

Challenges for the future





Our services: Technical Advisory



- ✓ Project Specific Engineering
- ✓ Modelling and Simulation
- ✓ Techno-Economic Optimisation



Suntrace Provides

- Independent consultancy & Owners Engineering
- Technical Advisory services from initial concept to full realisation covering the whole range of PV and CSP applications including hybrid and storage systems
- Professional simulation tools with in-house modelling solutions for performance simulation and techno-economic optimisation



How to exploit the full value of your project

Your Challenge

Solar projects are often lagging behind their full economic potential, which leads to below par returns on investment. The main challenges are:

- How to increase low project returns in highly competitive environments
- How to win highly competitive PPA bids

Our Solution

Exploit the project's full economic potential through Suntrace's step-wise optimisation approach:

- 1. Due Diligence: Identification of potential shortcomings, uncertainties and risks
- 2. Optimisation: Unleash the true value and potential of the project
- Implementation: Hands-on support towards successful implementation (transaction, development, EPC and O&M tender process)

 ✓ Project technical due diligence ✓ Reduction of uncertainties ✓ Support project transaction 		1. Due Diligence	2. Optimisation	3. Implementation
 Identification of the project's potential and possibilities to improve project returns Status and next steps Identification of the project's potential and possibilities to of plant design and project returns Status and next steps Techno-economic optimisation of project development till realisation Techno-economic optimisation of plant design and project returns Status and next steps Techno-economic optimisation of plant design and project returns Support tender process for h competitive EPC and O&M 	✓ ✓ ✓	Project technical due diligence Identification of the project's potential and possibilities to improve project returns Status and next steps	 Reduction of uncertainties Techno-economic optimisation of plant design and project performance Risk and sensitivity analysis 	 Support project transaction and project development till realisation Support tender process for highly competitive EPC and O&M

Our services: Meteorological Services



- ✓ Site Screening & Selection
- ✓ Solar Resource Assessments
- On Site Measurement Solutions



Suntrace Provides

- On site measurement solutions with HelioScale stations jointly developed by Suntrace GmbH and Wilmers Messtechnik GmbH
- Cost-effective meteorological assessments from high-level project screening to bankable expert opinions for PV and CSP projects
- Reduction of uncertainties through our step-wise solar resource assessment approach providing a trustful base for the entire project development

Our services: Investment Solutions



- ✓ Development Support
- ✓ Mandated development
- ✓ Support project acquisition



Suntrace Provides

- Advisory on solar markets & projects, business models
- Integrated approach with project development know-how for reaching bankability
- Track record for viable business models & financing solutions in dynamic market environments
 > 5 bn USD capital (debt & equity) raised for power plants in over 10 emerging markets

Our new services within the Dornier Group: Energy Islands







Why Energy Islands?

- Up to now, energy from renewable sources and its storage have been a business in a subsidized niche area. Those times are over.
- Electricity generated from wind and solar power now costs less than electricity from hard coal.
- As in many countries self-sufficient supply from renewable energy sources is exempt from all or part of the transfer payments, levies and taxes which are otherwise part of the electricity price, an autonomous supplier saves e.g. in Germany up to 40% of the electricity costs.
- Cost-effective heat supplies are also possible.





Suntrace's experience in East Africa

Tanzania – Solar Assessment and Feasibility Studies





Services provided by Suntrace:

- Solar measurement campaign including support on installation of measurement stations and quarterly data report
- Feasibility studies for potential wind farms, solar parks and solar home systems, including technical (solar), economic and financial analysis (all)
- **Risk and sensitivity analysis** of technical, economic and financial performance
- Analysis of regulatory schemes for development of wind and solar systems, recommendations and best practices from international experience
- Close collaboration with governmental entities and other stakeholders
- **Training** and capacity building on solar assessment, financial analysis and regulatory schemes

Project Consortium



- Lead of this lot is with GOPA-intec (Dr. Andreas Wiese, Dipl. Eng. Michael Herb, M.Eng. Tareq Zahw)
- Suntrace is Sub-Contractor on the topics of
 - Solar resources and solar energy (Dr. Richard Meyer, supported by M. Eng. Lukas Haack and M. Eng. Marko Schwandt)
 - **Regulatory for wind and solar** (M.A./M.Sci. Jackie Mc Kenna)
 - Financing for wind and solar (Dipl. Econ. Giselle Nunes-Cordes, seconded by Dipl. Econ./B.Eng. Carl Bohny at training)
 - Client: Revolutionary Government of Zanzibar



Project structure





Solar measurement campaign in Zanzibar



- 5 measurements masts installed in Unguja (3) und Pemba (2)
- Pyranometers installed on two measurement masts
- 1 year of solar and wind measurements 2015-2016
- No proper measurements:
 - Pyranometers installed directly at the wind mast on a boom in less than 1 m distance from the mast towards North at 4m height:
 - Shading
 - Reflections
 - Cabling, rust and screwing issues
 - Installation documentation partially missing
 - Unclear calibration data



Regulatory Analysis: Main Findings





- There are nine government organizations within four ministries and the President's Office in Zanzibar and three organizations on the mainland that directly govern policy, regulations and operation of the Zanzibar electricity sector
- In consequence, a number of procedural and legislative issues would need to be resolved before an efficient IPP process could be established.
- ZECO stated that they would prefer a deep cost approach where the developers would have to bear all the connection costs as well as any further reinforcement expenses that could arise as a consequence of integrating the generator in the electrical system

Logistics Survey



- Wind turbines are shipped on vessels. At best, they are delivered in standard containers
- Major components like gearboxes, towers or blades come in bulk and cannot be easily loaded / unloaded and trucked to the sites.
- Only special trucks can transport, using adapted roads (soil resistance, curve radius, slopes).
- Zanzibar harbour may not accept oversized or over weight shipments
- Equipment needed for installation are mostly not available in Zanzibar

Logistics Survey



The VERGNET 225 - 275 kW class III is investigated

Lightweight and can be erected without crane

That turbine can be transported in standard containers (5 x 40' containers)

Blade Length 16 m

Nacelle with rotor 9 t

Wind turbine mast 15 t



Barging Solution



Roll-On-Roll-Off

Selecting the spots near to sites for transportation must be coordinated with the project developer and accepted by the concerned authorities



Assessment of Road Transport



- The use of trunk roads is suitable for Makunduchi site
- Bridges can bear a 56-ton weight.
- The use of rural roads is obligatory for Uroa and Matemwe (sharp edges and narrow routes)





Environmental and Social Impact Assessment



Outcomes of the Ornithology Study

Potential Site Impacts	Unguja	Pemba
Potential impact to species of conservation concern	Low	Low
Potential impact to non-migratory species	Low	Moederate - High
Potential impacts to migratory species	Low	High
Potential impacts to coastal species	Unlikely	Yes
Further longitudinal research advised to allow for mitigation measure	None	Yes





Ethiopia- Technical Advisor & Solar Resource (2017 - ongoing)



IFC: Scaling Solar Program - PV



Suntrace as lead company in a consortium with Gauff Power International (GPI) is working as Technical Advisor for tendering of 2 x 100 MW utility scale PV projects in Ethiopia.

In addition to the TA Mandate, Suntrace also leads the separate solar measurement campaign funded by IFC

Both mandates support World Bank Group's IFC Scaling Solar Program with EEP Ethiopia Electric Power.

Services provided by Suntrace & GPI:

- Site screening and site selection
- Specialist studies including solar resource assessment, geological, hydrological and topographical study
- Comprehensive E&S impact analysis
- Review of grid code and grid integration study
- Preparation of technical specifications for Scaling Solar tender documents
- Technical expert during prequalification and RFP stage
- Bid evaluation and support during tender process
- 1 year solar resource measurement campaign for 3 project location, including the provision of Helioscale Measurement Systems

Namibia – Project Development Support (2014 – ongoing)



Development, Implementation & Operation Support of a 5 MW_{AC}PV plant for Ohorongo Cement





Suntrace was mandated by SunEQ to develop a 5MW PV project, after SunEQ was successfully selected as the preferred bidder in a competitive tender process conducted by the client in Namibia.

Scope of Services Provided by Suntrace:

- Site selection
- Full solar resource assessment, including installation of ground mounted solar measurement station
- Conceptualisation
- Energy yield

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- Techno-economic optimisation
- Feasibility study
- Support with permitting e.g. Generation License
- Financial modelling
- Project finance structuring: debt & equity
- EPC selection
- Transaction support
- Debt financing strategy & transaction structuring
- Negotiation process support
- Financial closing
- Construction Supervision
- Asset Management

General challenges faced during the assignments



- Communication with government institutions:
 - delays in feedbacks
 - missing information
 - change of persons in charge
- Lack of access to required information:
 - no records of substation data for the islands
 - no data base structure, assumptions had to be made
- Claims from the government institutions that were not agreed:
 - reimbursement of training participant's travel costs
 - reimbursement request for participant's per-diems

What can we do for you?

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