AFSIA
Africa Solar Industry Association

RECORDINGS

FLOATING SOLAR IN AFRICA
CHALLENGES & OPPORTUNITIES

27
OCTOBER

9am GMT / 10am WAT / 11am CAT / 12pm EAT
MEMBER'S RESOURCES AND BENEFITS

AFSIA SERVICES

COMPANIES DATABASE
B2B MATCH-MAKING
EVENTS PROMOTION AND MANAGEMENT
WHO'S WHO INTERVIEW
PROJECTS DATABASE
TENDERS DATABASE
WEBINARS & PRODUCT SHOWCASE
JOB PORTAL

AFSIA
Africa Solar Industry Association
Join US

CONTACTS & SERVICES

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**SPECIAL BENEFITS**
- Company Representative on AFSIA Board of Advisors
- Credited Contribution to Annual Solar Outlook Report
- Permission to Represent AFSIA at select events & conferences

**PRICE**
- $6,000.00
- $4,000.00
- $2,000.00
- $1,000.00
- $0.00
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FLOATING SOLAR IN AFRICA
CHALLENGES & OPPORTUNITIES

9am GMT / 10am WAT / 11am CAT / 12pm EAT
• 10+ years of professional experience in project management

• Floating PV + site characterization GIS expert for RE projects development in more than 11 countries

• Holds an MSc in Renewable Energy, an MBA in Project Management and a BSc in Civil Engineering

• Fluent in Spanish, English and German

Raúl Granados
Head of Renewable Energy Resources

Moderator
Independent Renewable Energy Advisors on Floating Photovoltaics

Dornier Suntrace GmbH

October 2022
Company and knowledge combined

We manage our business activities in five Business Units

**POWER AND HEAT**  
D. Seibt  
Dornier Power and Heat GmbH  
The energy experts

Dornier Construction and Service GmbH  
Maintenance and operational management of energy plants

Encotec Energy (India) Pvt. Ltd.  
Strong know-how from India

**MOBILITY**  
C. Gipp  
Dornier Consulting International GmbH  
Pioneers in infrastructure

**NUCLEAR SERVICES**  
A. Anthofer / G. Schreck  
VPC Nukleare Dienstleistungen GmbH  
The experts for nuclear decommissioning

**RENEWABLES**  
T. Özkarakas  
Dornier Construction and Service GmbH  
Construction and operation services for offshore wind power and solar plants

Dornier Suntrace GmbH  
Independent experts for renewable energies

**WATER**  
U. Schott  
Dornier Consulting International GmbH  
Pioneers in infrastructure
Independent experts for solar energy solutions

- Dornier Suntrace – Established 2009 in Hamburg, Germany

- International team with experienced engineers & managers from Germany, Morocco, Egypt, Rep. of Congo, Barbados, Brazil, Colombia, Honduras, Canada, India, Thailand, Turkey, Vietnam, and partners in Chile, Morocco, Mexico, Southern Africa

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

- Expertise: ≈ 10,000 MW solar, > 200 projects, > 50 countries

- Solutions for all steps of the project development chain from feasibility, project development, finance and investment to construction and operation
Focus on growing solar markets

International Project Activities
Algeria, Angola, 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, Philippines, Portugal, Russia, United Arab Emirates, Uzbekistan, Saudi Arabia, Slovakia, South Africa, Spain, Sri Lanka, Suriname, Syria, Tanzania, Tunisia, Turkey and Vietnam

Our Offices
Germany, India, South Africa, Ukraine, Kazakhstan, UAE, Saudi Arabia, Jordan, Serbia, India
Awarded footprint on the african continent

- Algeria
- Morocco
- Tunisia
- Libya
- Egypt
- Mauritania
- Mali
- Cameroon
- Angola
- Namibia
- South Africa
- Madagascar
- Tanzania
- Kenya
- Ethiopia
- Madagascar

AFSIA Solar Award 2020
Suntrace awarded “Technical Advisor of the Year”
FPV market and installed capacity

- Floating solar industry continuing to grow
- More than 3 GW installed capacity by 2021
- Planning / development / construction: approx. 200+ projects

Installed capacity exceeding 3 GW in 2021!
(REN21, 2022)

Note: *As of end Sept 2020. Data source: SERIS.
Benefits of FPV (key aspects)

- Energy yield improvement due to the cooling effect from the water.
- New opportunities for scaling up solar generating capacity, especially in countries with high population density and competing uses for available land.
- Elimination of the need for major site preparation, such as leveling or the laying of foundations, which must be done for land-based installation.
- Improvements in water quality, through decreased algae growth.
- Evaporation reduction based on technology water footprint.
- Feasible coexistence with other water-use activities.

Source: (Gadzanku et. al, 2021)
Where is floating PV heading to?

- More 100+ MW floating PV power plants to be put in operation
- Exponential grow in marine nearshore installed capacity (e.g. Seychells 5.8 MW)
- More commercial marine offshore projects
Questions?

Floating PV and site characterization

Raúl Granados
Head of Renewable Energy Resources

raul.granados@dornier-group.de

+49 40 767 9638-219
VENTURE THE IMPOSSIBLE TO ATTAIN THE BEST...

PROF. CLAUDE DORNIER
Sergio Montoro Castillo  
Head of Renewable Energy

- 7+ years of experience in the Renewable Energy
- Currently working for Globaltec, a company owning more than 50% of the floating plants in Spain
- Personal mission to export this technology to Africa which has the greatest solar potential in the world
- Master’s in Civil Engineering
Floating Solar in Africa: Opportunities & Challenges
Globaltec Desarrollos e Ingeniería, is a Spanish company created in 2007 with headquarters in Madrid (Spain), offices in Angola and Mozambique, dedicated to Management and Implementation of Turnkey Projects, with experience in development and construction projects in Renewable Energy Sector.

❖ Promotion and execution of solar projects on floating platforms, with projects already operating in Spain (6 MW) and advanced developments in Portugal, France, the Philippines and Equatorial Guinea.

❖ Photovoltaic promotion Cuamba MW 30 Mwac / 38 MWp in Mozambique, currently with a PPA and a concessional agreement ("concessional agrément") signed for Electricidade de Moçambique (EDM).

❖ Recent award by FUNAE for consulting services for the Installation of Photovoltaic Solar Mini-Grids in different locations of Mozambique.

❖ Promotion, with approval by EDM, for the development of three more photovoltaic plants with a total of 70 MW. More than 65 MW built In solar generation projects in Africa, Globaltec counts on as a strategic partner, with projects executed in Namibia, Nigeria, Kenya and Mozambique, with more than 220 MW developed.

❖ As part of construction of 29.8 km distributed in 23 urban roads in the 6 municipalities of the Province of Zaire (Angola), Globaltec carried out the installation of solar road lighting network for Provincial Government of Zaire.
WHAT IS A FLOATING PHOTOVOLTAIC SYSTEM (FPV) ?

Floating photovoltaic plants are an emerging form of photovoltaic systems that float on the surface of drinking water reservoirs, lakes, dams, irrigation canals, and waste ponds. Consist of:

- **A floating system.** It consists of a structure and a float that allows the installation of the photovoltaic module.

- **A mooring system.** Used to stop the free movement of the floating structure in the water. This allows you to adjust for fluctuations in the water level while maintaining your position in a southerly direction.

- **A Photovoltaic system:** modules and BOS.
• **Free land for energy production.** Avoid all the obstacles of land acquisition and all the concerns of land consumption.

• **Improves energy efficiency.** The floating solar panels are located close to the water, and, therefore, they are producing energy at a lower temperature which translates into an increase in efficiency. For conditions in Spain, increases in energy production efficiency of 7 to 11% are estimated.

• **Improves efficiency in the use of water.** The installation of the panels covers the surface of the water, and this allows to reduce the evaporation of the water, which can reach 80%.
  Water savings could reach 743 million m³/year, increasing annual hydro power production.

• **Quick implementation:** Since it does not have a fixed structure.

• **Reduced maintenance:** In water, the frequency of cleaning the panels is reduced, since the amount of dust that reaches them is less. In addition, it is not necessary to frequently cut the vegetation that grows from the ground.

• **Greater recyclability:** By not having a fixed structure, the use of non-recyclable materials is reduced, especially plastic, steel and aluminum.

• Decrease in the proliferation of algae, microorganisms, odors and sediments deposited on the bottom.

• **Synergy with electric infrastructure.** When combined with existing hydropower plants as it's shown in the following.
ADDED VALUE FOR AFRICA

The possibility of interconnection The Floating Photovoltaic System (FPV) with existing hydro-electric plants is an excellent opportunity, especially in this continent. Following studies from the Joint Research Center of the European Commission, concludes that, the production of FPV would be 52.9 TWh/year, which means an increase of 50% of the annual production of existing hydroelectric plants.

This hybridization solution, in addition to compensate for unstable and intermittent PV output during the wet season, it provides access to the grid due to the presence of an existing hydropower plant connecting infrastructure.

*First-ever hydropower-connected FPV operation, Montalegre, Portugal*
MAIN CHALLENGES OF THE FPV

• **Adaptability**: adaptation to the concave profile of the water surface as the water level rises or falls throughout the year. *Up to 50 m of water level variations*.

• **Installation**: Specialized and expensive technical equipment is not required. Getting your project up and running should take weeks, not months. 1MW in 15 days.

• **Maintenance**: easy and safe access for operation and maintenance equipment. The components must be resistant and have a partially flexible behavior.

• **Respectful with nature**: The system must integrate and preserve nature in places where wildlife exists.

• **Resistant to nature**: The installation must withstand mother nature. The combination of sun, wind, waves, snow, animals, salt water, algae, and fungi are elements that technology must deal with for more than 25 years. Can be designed for 280 km/h wind speeds.

• **Higher in cost than traditional PV installation**: Absorbed by:
  - Water evaporation savings. (1MW = 8.419,60 m3/year water savings in Spain)
  - Free land for energy production.
  - Savings in solar tracker system (almost 20% of the CAPEX of the traditional PV).
  - Savings in installation times. (1 MW in 15 days)
GLOBALTEC DESARROLLOS E INGENIERÍA

Calle Velázquez,10 - 3º drcha.
28001 Madrid
Tel.: +34 91 781 64 18
info@globaltecingenieria.com

www.globaltecingenieria.com
• 8 years experience within the Renewable Energy industry

• Started career with EPC companies for engineering/technical design to business development

• Recently made the switch to work with OEM company

• Holds an MBA (with Sustainable Energy) and is a certified Project Manager.
AFSIA WEBINAR

Henry Ejinwa

DATE
2022/10/26
Contents

1. About JA Solar
   • Introduction

2. 2022 Core Products

3. Floating PV - Key Points
   • 1MW FPV in West-Africa
   • Key points about FPV

4. Floating in Africa
   • Opportunities
   • Challenges
Tier 1 Manufacturer/Supplier of PV Products

Module capacity is 75 GW. Capacity of ingots, wafers and cells is 60GW each.

- **Wafers**
  - Baotou, Inner Mongolia
  - Yanjiao, Hebei Province
  - Lianyungang, Jiangsu Province
  - Xingtai, Hebei Province

- **Cells**
  - Ningjin, Hebei Province
  - Bac Giang, Vietnam
  - Qujing, Yunnan Province
  - Yangzhou, Jiangsu Province
  - Yiwu, Zhejiang Province
  - Xingtai, Hebei Province
  - Fengxian, Shanghai
  - Hefei, Anhui Province

- **Modules**
  - Penang, Malaysia

Note: As of the end of 2022
2022 Core Products

Note: blue – white module, grey – black module
First Floating Solar Project in West Africa

Current Installation: 1MWp
Proposed Final Installation: 5MWp
Location: Ghana
Supplied Module: JA SOLAR
• If 100% of each reservoir was covered with solar panels, this would yield about 2,922 gigawatts (GW) of solar added to the existing 28GW of hydropower.

• If these panels covered just 1% of reservoirs, this alone could double Africa’s hydropower capacity and increase electricity generation from dams by 50%.

• Hydro dams are the largest renewable power source in a continent, which means integrating the FPV to them stands a greater advantage.
• Reduced land usage - Pro

• Increased cost of installation (due to the specialized mounting structure) – Con

• Compensates the hydropower production when there is draughts and reduced rainfall due to climate change - Pro

• Minimized Evaporation from the default rate of at a rate of 1m³ of water for each 1m² of water surface per year – Pro

• Cost comparison for Ground Mounted vs Floating PV. Africa has arable land, as such might not be cost-effective for

• Cooling of solar cells

• Hydropower interconnection point is closer when compared to ground mounted system
Hydro Reservoirs in Africa
Harvest the Sunshine
Premium Cells, Premium Modules

www.jasolar.com
• 10+ years of experience in renewables and telecoms

• Currently the Country Manager at ecoligo in Kenya

• Track record of Project Management in FMCG and Services industries

• Holds an MBA, Strategic Management
Floating Solar
ecoligo GmbH
October, 2022
ecoligo is a **global energy-as-a-service provider**

Founded in **2016**

**Headquarter in Berlin**
Offices in Accra (Ghana), Nairobi (Kenya), San Jose (Costa Rica), Santiago (Chile), Ho Chi Minh City (Vietnam), Bangkok (Thailand)

**Regions of activity**
Sub-Saharan Africa, Southern Africa, Central America, Caribbean, South America, Southeast Asia

**30 employees** (18 nationalities, 45% female)

Track record of **102 projects with 44 MW**
INTRODUCTION

• Floating solar is a solar PV plant installed on a structure floating on water for example a sea, dam, or a lake.

• Floating solar has opened new opportunities for scaling up solar generating capacity, especially in countries with high population density and competing uses for available land

• **Advantages** of floating solar;
  - Improves efficiency,
  - Saves land space,
  - Reduced evaporation from water reservoirs, as the solar panels provide shade and limit the evaporative effects of wind
  - Improvements in water quality, through decreased algae growth
  - Reduction or elimination of the shading of panels by their surroundings
  - Elimination of the need for major site preparation, such as levelling or the laying of foundations, which must be done for land-based installations
  - Easy installation and deployment in sites with low anchoring and mooring requirements, with a high degree of modularity, leading to faster installations
FLOATING SOLAR PROVIDERS

- **NP Solar**, they install floating solar panels for their clients in UK and worldwide. They offer 25-year guarantee including U protection for the HDPE plastics float being used for their installations.
- **isigenere** (Spanish); their solar floating technology is branded ISFLOATING. They develop equipment for mounting floating solar plants.
- **Ciel & Terre**; It is a French pioneer in the floating solar market. They are present in 30 countries and have installed 350MW Floating solar.
- **SolarAnts Floating PV System**; it is a German solar floating company.
- **Swimsol**; It is based in Vienna, Austria. It is a leader in offshore PVs, island micro-grids and heavy-duty tropical solar PV systems.
- **Profloating**; It is a 100% Dutch innovation to make solar energy afloat.
- **Solarisfloat**; Protevs is their product. Made of modular floating platforms with the support of bifacial panels and with one or two-axis tracking.
- **Sun-Float**; Sunfloat BV was founded in 2013 by Tjeerd Jongsma in Denmark.
Floating solar technology has had a rapid growth in the solar markets from 2016. The first 20 plants were built between 2008 and 2014.

Floating PV Systems consist of modular floaters assembled into rows made from recyclable HDPEs. The system supports PV modules above water while withstanding long-term environmental hazards like heavy rains, wind, and snow.

The general layout of a floating solar is like that of a ground-mount other than the PV arrays are normally mounted on a floating structure.

The equipment is qualified through a technical test to make it safe and long-lasting.
➢ Technology features:

1. Extreme wind resistance; They can withstand up to 210 km/h (130 mph) winds. Projects can be specifically studied and adapted to deliver higher system wind-resistance.

2. Drinking water compliance; Systems are made with eco-friendly components preserving the original quality of the water.

3. Anti-UV Corrosion treatment; The systems are designed to be highly resistant to UV corrosion for 20+ years.

4. Safe mounting and maintenance; They are designed to be simply and quickly implemented, with an easy access to the modules for maintenance and cleaning.
This project was made possible thanks to the cooperation of various companies, agencies and private investors.

This project was implemented as part of the dena-Renewable-Energy-Solutions-Program, which was initiated by the German Energy Agency (dena) and supported by the Federal Ministry of Economics and Energy (BMWi) as part of the “Export Initiative Energy”.
• 69 kWp floating solar system was installed on a reservoir at Rift Valley Roses farm in Naivasha, Kenya, where a 75 kWp roof system has also been in operation since 2018

• Tourism and agriculture clients, such as Flower farms are perfect fit for floating systems, where
  • Water body is available
  • Cost of System is competitive with ground systems
  • Additional savings by reducing evaporation as well as algae growth.
As Floating system provider, Isigenere was responsible for:
- Design of the structure and the anchoring and mooring,
- Delivery of the materials
- Training the EPC

As Turnkey EPC partner of ecoligo, Technolectric is responsible for:
- technical planning, implementation and
- maintenance of the solar system.
Within less than 24 hours, the project was fully financed thanks to 125 crowdinvestors on the platform.

And then Covid-19 happened...

- Longer lead times
- Travel restrictions

- Importing HDPE floats to a new country
- Online training & Supervision during installation

- Modular design was the key for a smooth and quick installation.
• 69 kWp system supplies alone up to 30% of Farm's electricity demand and 60% together with roof system.
• Saving 1,355 tonnes of CO2 during system lifetime
• Floatings systems offers a unique solution for clients with water bodies and add one step further in the fight against climate change.
Together, we lead the global energy revolution
• 5+ years of experience in the solar industry

• Founder and Managing Director of Solar Energy Architects since 2015

• Has overseen 30MW of ground mount-, roof top- and floating solar PV plants and 10MWh of energy storage

• Mechanical Engineer
SOLAR ENERGY ARCHITECTS

Trusted, accurate, objective, transparent financial analysis for energy projects.

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ABOUT SEA

Solar project development

Dynamic and full of solutions, we are a leading Solar Energy Project Developer based in Cape Town, South Africa. We serve the African market with quality solar PV and energy storage projects. We are able to successfully integrate floating structures, carport structures, single axis tracking structures, rooftop mounting systems and battery energy storage systems.

We have build up an impressive project portfolio of 165 projects over the last 6 years.

SEA is proud to have developed the largest floating solar PV plant in Africa. We continue to strive to deliver unique, ground breaking projects.
Footprint across Southern Africa

We have a vast portfolio of projects across South Africa and supply design and execution services into the rest of Africa.

We are currently in the process of deploying our project development services into the rest of Africa.

View our full portfolio of projects at solarenergy.africa.
SERVICES

Full turnkey project development service

Expert energy consulting services: We consult on all matters energy related.

Concept and Viability: We do a complete energy assessment of the client’s facility to determine the most appropriate solution. We use best in class solar performance simulations to guarantee bankable solar yields.

Engineering: We have professionally registered engineers within these disciplines: Electrical, Structural, Mechanical and Geotechnical.

Procurement and Logistics: Our procurement and supply chain team ensures that the products we procure arrives on site at the correct time and in the intended condition.

Construction Management: Construction quality is carefully monitored and controlled, and safe.

Operation and Maintenance: We monitor projects remotely and perform regular maintenance to ensure optimal plant performance.

Energy use metering: Monitor your energy use with precision reporting to ensure no energy is wasted. Implement management solutions to reduce energy costs.
FINANCE

Full finance suite, tailored to the clients needs

Rent to Own: An off-balance-sheet financing solution that allows clients to take ownership of the asset at the end of the rental term.

Power Purchase Agreement (PPA): We build the system at our cost, maintain it, and insure it. The client buys the electricity used from the system from us at a reduced rate, typically 30% less than Eskom rate.

Roof rental agreement: Earn additional income from the roofs of owned buildings by renting your roof space to us.

Instalment sale: On-balance sheet finance for your projects for terms up to 10 years.
FLOATING SOLAR IN AFRICA

OPPORTUNITIES AND CHALLENGES

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CHALLENGES

LAND AVAILABILITY NOT PROBLEMATIC

FREIGHT AND LOGISTICS COSTS

EXCHANGE RATE

MINIMUM ORDER QUANTITIES

FEW LARGE, USABLE WATER BODIES

LIMITED LOCAL ADOPTION
OPPORTUNITIES

AGRICULTURE

MINE RECLAMATION

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thank you,