
RECORDINGS
AFSIA
Africa Solar Industry Association
FLOATING SOLAR IN AFRICA
CHALLENGES & OPPORTUNITIES
27
OCTOBER
ecoligo
DORNIER Group
Globaltec
solar energy ARCHITECTS
JA SOLAR
晶 澳 太 阳 能
9am GMT / 10am WAT / 11am CAT / 12pm EAT

MEMBER'S RESOURCES

AND BENEFITS

AFSIA SERVICES

AFSIA
Africa Solar Industry Association

AFSIA
Africa Solar Industry Association

AFSIA MEMBERS

FOUNDING

HUAWEI
Bboxx
CROSSBOUNDARY ENERGY
UL Solutions
akuoenergy
AIIM
AFRICAN INFRASTRUCTURE INVESTMENT MANAGERS
LONGi
Trinasolar
enea CONSULTING

PARTNER

AMT Advanced Maritime Transports
INFINITY Power A MASDAR INFINITY COMPANY
JOH
nextracker A Flex Company

STRATEGIC

AGSI Experience life living green with Renewables
ECREEE Towards Sustainable Energy
STIFTUNG SOLARENERGIE SOLAR ENERGY FOUNDATION
ACERD
ALER

CORPORATE MEMBERS

AFSIA
Africa Solar Industry Association

AfricaRen
AMMP
AptechAfrica
DAYSTAR POWER ENERGY SOLUTIONS
Drop Access for sustainable communities
Dutch&Co LED's go SOLAR
Eastman ENERGY. UNLIMITED.
ECHOSYS ADVISORY
ecoligo
EcoPhi Renewables Engineering
Empower Impact Investment
إنارة ENARA
ENGIE
gcsolar
GENIUS WATTER
Globaltec
GOODWE YOUR SOLAR ENGINE
greenyellow SHIFT TO PROFITABLE ENERGY!
GosHop power
Gridtech Infrastructure Company
InfraCo AFRICA
Ingeteam
JA SOLAR
JinkoSolar
TALESUN
JUBAILI BROS SOLAR
mashriq energy
meteocontrol
NAMENE SOLAR
NRG Systems
OFGEN energy simplified
SegenSolar (Pty) Ltd
SHARP Be Original.
SOLAKILIMO Freshness for Value
solarise africa
solar pipo
SPEG Starsight Premier Energy Group
STERLING & WILSON
STUDER
SustainSolar
THEnergy sustainable consulting
TUNUR تونور
ZUHURA SOLUTIONS Transforming People & The Environment

THE TEAM

AFSIA
Africa Solar Industry Association

INÈS	JOHN	ALINE	VESTINE	JOSÉE	EUGENIE	KERSY
TEAM MANAGER	CEO	MARKET INTELLIGENCE	RESEARCH & NEW PROGRAMS	COMMUNITY MANAGEMENT	SOCIAL MEDIA OFFICER	JUNIOR ASSISTANT MANAGER

Join US

CONTACTS & SERVICES

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Micheline Thienpont
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Phone: +250 782 204 155

MEMBERSHIP SERVICES AND PRICES

MEMBERSHIP TIERS	FOUNDING	PARTNER	CORPORATE	START-UP	START-UP ENERGY	STRATEGIC
BENEFITS						
AFSIA Solar Projects Database	✓	✓	✓	✓		
AFSIA African Solar & Related Services Companies Database	✓	✓	✓	✓		
AFSIA African Solar Tenders Database (Tenders Info Access)	✓	✓	✓	✓		
Branding Featured on AFSIA Website	✓	✓	✓	✓	✓	✓
Branding Featured in Newsletters & Marketing Material	✓	✓				✓
Membership Tier Prioritised Invitations for Company Representatives to speak at AFSIA Events	✓	✓	✓	✓	✓	✓
Membership Tier Prioritised Invitations to participate in Who's Who Interview for Company Representatives	2	1	-	-	-	-
Membership Tier Prioritised Placement of Company Press Releases & Announcements on Website, Newsletters & Social Media Channels	✓	✓	✓	✓	✓	✓
B2B Matchmaking Services	Unlimited	Unlimited	Unlimited	Unlimited		Unlimited
Routing of Product/Service Related Business Inquiries	✓	✓	✓	✓	✓	✓
Posting Vacancies to AFSIA Job Portal	✓	✓	✓	✓	✓	✓
Priority Access to Third Party Events - AFSIA Participation & Collaboration	✓	✓	✓	✓	✓	✓
Permission for use of AFISA Branding & Membership Tier on Company Marketing Material	✓	✓	✓	✓	✓	✓
Members Only Login & Access to Insights & Analysis for Company Representatives	6	4	2	1	0	
Events Access for Company Representatives to AFSIA Events: Trade Missions, Conferences, Workshops, Lectures & Briefings, Bespoke & Focused Networking	6	4	2	1	0	
Discount on Additional AFSIA Services	30%	20%	10%	10%	10%	
Showcases: 30 Minute Presentation + Q&A Session	✓					
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**	**$0.00**

AFSIA 2022 ACTIVITY

HIGHLIGHTS

AFSIA Africa Solar Industry Association

PRIME

19 JAN
Launch Annual Outlook report 2022

Africa Solar Quiz - Leg 2

Startup Energy Camp (Nairobi)

AFSIA Solar Awards 2022

AFSIA Solar Quiz – Leg 3

26-28 SEP
ARIS - Africa Renewables Investment Summit (Cape Town)

TBC
Startup Energy Camp (TBD)

4 NOV
AFSIA Solar Quiz – Leg 4

SHOWCASE

Bboxx

LONGi

Trina Solar

TDB
Eastman Global E-mobility

TDB
Eastman Global Solar storage

WEBINAR

GREEN H2 e-conference

STORAGE e-conference

Optimizing PV performance

6 Sept
LONGi

TBD
Basics of PPA

27OCT
Floating solar

4OCT
Africa Energy Startup: Made in Africa, for Africa

TBD
LONGi

TBD
Solar streetlighting

TBD
Africa Energy Startup: CAMP WINNERS

Africa Energy Startup: FINTECH

Africa Energy Startup: CAMP WINNERS

Benefits of solar thermal for industries

Africa Energy Startup: PRODUCTIVE USE

Digital solutions

JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC

EXTERNAL

17-19 JAN
World Future Energy Summit (Abu Dhabi)

16-18 FEB
Solar Power Africa (Cape Town)

22-23 FEB
Energy & Mining

1-3 MAR
Africa Energy Indaba (Cape Town)

7-9 MAR
Middle East Energy (Dubai)

10-13 MAY
InterSolar (Munich)

17-19 May
SEforALL Forum (Kigali)

7-9 JUN
ENLIT Africa (Cape Town)

21-24 JUN
Africa Energy Forum (Brussels)

5-6 JUL
International RE Conference (Luanda)

22-24 AUG
The Solar Show Africa (Jo'burg)

18-20 OCT
7th Global Off-Grid Solar Forum & Expo (Kigali)

18-21 OCT
African Energy Week (Cape Town)

7-18 NOV
COP 27 (Sharm El- Sheikh)

TBC
ALER Trade Mission Mozambique

ONLINE EVENTS
PHYSICAL EVENTS

UPDATED 25 MAY 2022

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Africa Solar Industry Association

FLOATING SOLAR IN AFRICA
CHALLENGES & OPPORTUNITIES

27 OCTOBER

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9am GMT / 10am WAT / 11am CAT / 12pm EAT

Raúl Granados

Head of Renewable Energy Resources

DORNIER Group

- 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

Moderator

AFSIA Africa Solar Industry Association

Independent Renewable Energy Advisors on Floating Photovoltaics

DORNIER Group

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

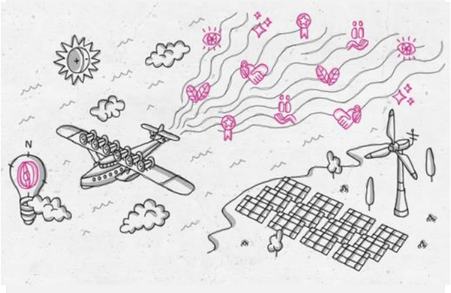
MOBILITY
C. Gipp

Dornier Consulting International GmbH
Pioneers in infrastructure

NUCLEAR SERVICES
A. Anthofer / G. Schreck

VPC Nukleare Dienstleistungen GmbH
The experts for nuclear decommissioning

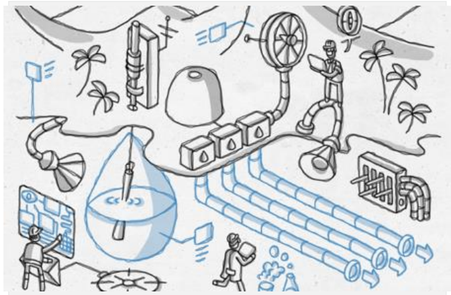
RENEWABLES
T. Özkarakas



Dornier Construction and Service GmbH
Construction and operation services for offshore wind power and solar plants

Dornier Suntrace GmbH
Independent experts for renewable energies

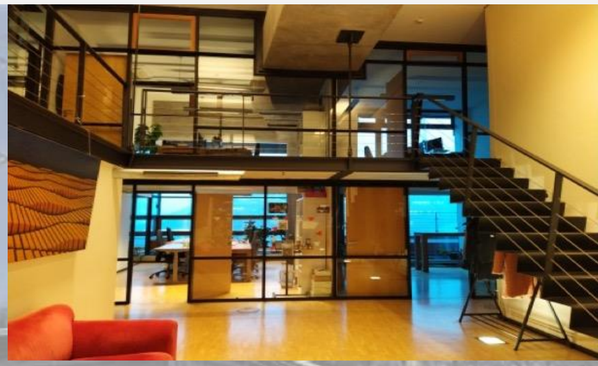
WATER
U. Schott



Dornier Consulting International GmbH
Pioneers in infrastructure

Independent experts for solar energy solutions

DORNIER Group

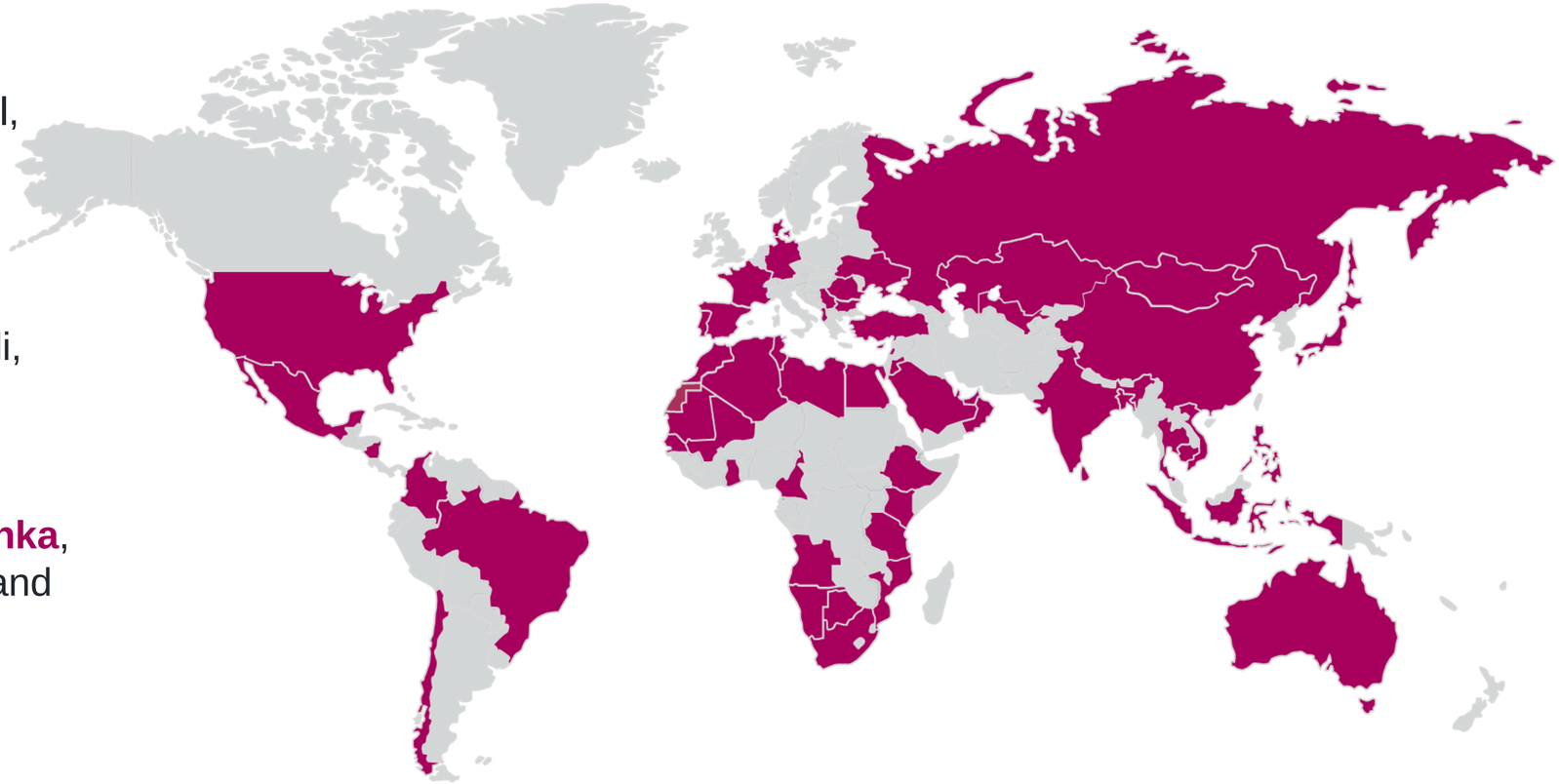


- Dornier Suntrace – Established 2009 in Hamburg, Germany
- International team with experienced engineers & managers from Germany, Morocco, Egypt, Rep. of Congo, Barbados, Brazil, Colombia, Honduras, Canada, India, Thailand, Turkey, Vietnam, and partners in Chile, Morocco, Mexico, Southern Africa
- Covering 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

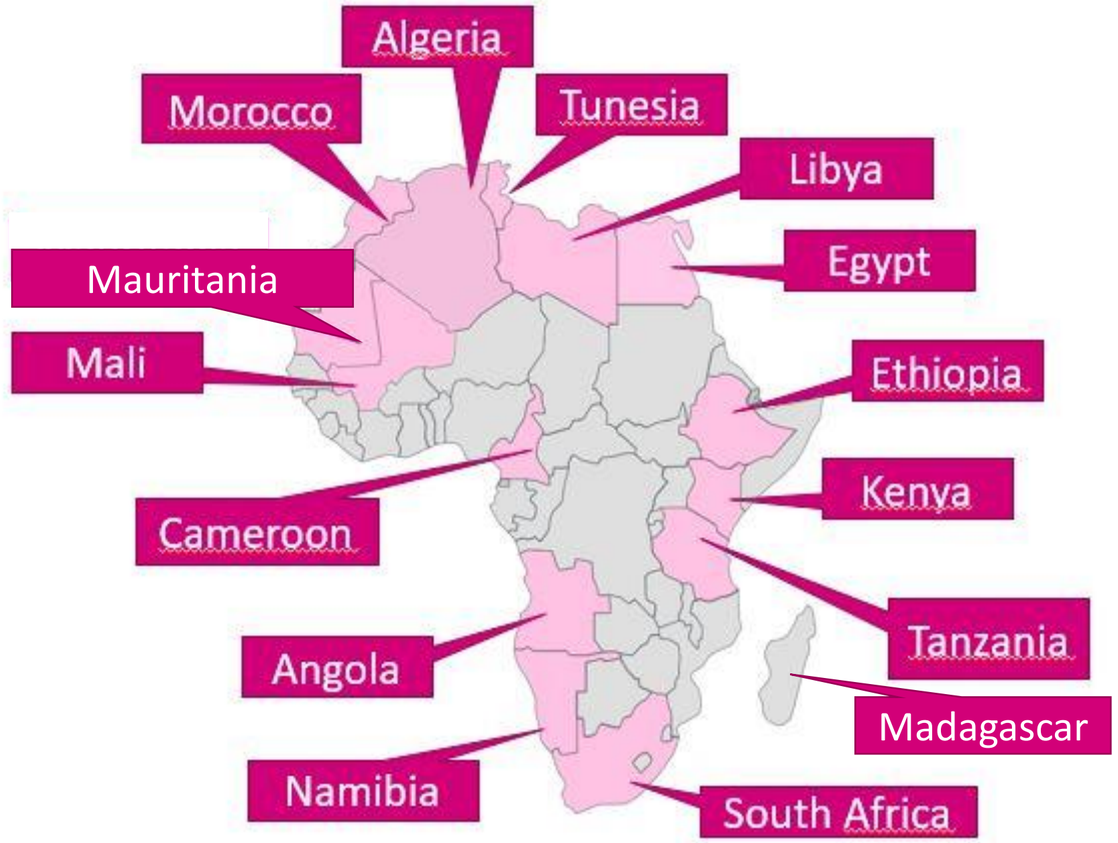
Algeria, Angola, Australia, Bangladesh, Brazil, Cambodia, Cameroon, Cape Verde, Chile, China, Colombia, Cyprus, Czech Republic, Egypt, Ethiopia, France, Germany, Ghana, Greece, Guadeloupe, India, Indonesia, Italy, Jordan, Kenya, Kuwait, Libya, **Maldives**, Mali, Mexico, Mongolia, **Morocco**, Namibia, Nicaragua, **Philippines** , Portugal, Russia, United Arabic 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



Selected Credentials in Floating PV

Morocco – Technical Advisor for Floating PV

MASEN: Technical Advisory Services for Floating PV in Morocco

Suntrace, in the consortium with Rina Consulting Ltd, was selected to provide technical advisory services for floating PV in Morocco. Under this assignment, Suntrace will conduct full feasibility studies for the plants at the selected sites and a technology overview to assess different technology configurations to develop the most economic and reliable solution for the Moroccan Floating Solar Projects.

Services:

- Technology and market overview
- Feasibility study for the plants (site assessment, conceptual design, grid impact study, economic and financial analysis and technical risk analysis)
- Tender support under EPC scheme
- Preparation of RfQ and RfP
- Negotiation and selection of preferred bidder(s)

masen Moroccan Agency for Solar Energy

Suriname – Feasibility study of floating PV (06/2022 - ongoing)

IDB: Feasibility studies of 25 MW – 75 MW floating solar photovoltaic installation in Afobaka HPP reservoir

Dornier Suntrace supported the IDB and SPCS, unit of Staatsolie, to promote the development of solar floating PV energy in Suriname, by preparing a feasibility study for a 25-75 MW floating solar PV installation integrated in the Afobaka hydropower dam. It will focus on the technical, economic, institutional, legal and environmental studies. There will be a particular attention to issues relevant to Latin-American countries LAC such as climate resilience and risk mitigation.

IDB

STAATSOLIE SPCS

Services:

- Conceptual design and suitable technological options for the plant
- Site assessment. & Technical design, including dimensioning of the key elements of the PV plant.
- Interconnection to the main grid and coordination options with the hydropower plant.
- Project's commercial design and economic and financial feasibility analysis.
- Financing arrangements and investment plan to implement the project
- Potential impacts on energy matrix of Suriname
- Environmental, social, and economic impacts.
- Implementation plan.

Sri Lanka– Feasibility study of floating PV (06/2022 - ongoing)

DAI / USAID: Feasibility studies of floating solar photovoltaic installation in Sri Lanka

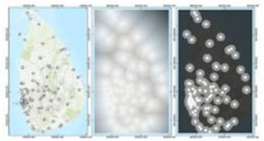
The objective of this USAID assignment is to assess the possibility of floating solar photovoltaics (PV) system installation in sites identified by Domier Suntrace, in close coordination with the SLSEA, and estimate the construction cost, transmission costs, performance, and site impacts of different PV options. The assignment identifies and shortlist prospect sites out of a pool of 200+ reservoirs to then evaluate the most suitable sites at level of pre-feasibility (6 sites), feasibility (4 sites) and ESIA (2 sites) studies.

USAID FROM THE AMERICAN PEOPLE

DAI

Services:

- Inception and site screening of reservoirs suitable for FPV development
- Pre-feasibility study for 6 prospect FPV sites
- Feasibility study and for 4 preselected FPV sites
- Environmental and social impact assessment for 2 selected FPV sites



Egypt – Evaluation of large Floating PV in Lake Nasser (03/2021 - ongoing)

Concept Study

Main goal of this concept study: substantially reduce water losses by evaporation on Lake Nasser and in parallel generated large amounts of electricity by realizing a **large-scale floating PV plant** sized approx. 4 GW_p

Services

- Market study of FPV systems with focus on systems showing large water coverage for high reduction of evaporation
- Comparing FPV power production of various FPV technologies with energy yield of similar sized conventional PV on nearby coast
- Site selection considering evaporation reduction efficiency, impact of waves and favorable bathymetry
- Connection of very large PV fields with peak production of 4 GW to the power grid at the nearby hydro power plants and optimizing operations
- Calculation of reduced water losses by less evaporation using hydrologic models
- Analyzing socio-economic benefits for the region considering local production of FPV modules and installation and maintenance works

Maldives – Consulting Services for Floating PV (03/2021 - ongoing)

World Bank: Technical Support to Developing Offshore Floating Solar PV

Suntrace with sub-contractor LOC/INNOSEA and Renewable Energy Maldives contracted by the World Bank to provide technical support in assisting the Government of the Maldives for developing marine nearshore floating solar PV (FPV). The main objective under this assignment is to support the Client as technical Consultant during the development of a general overview of the nearshore FPV potential in the greater Male region and Addu City.

WORLD BANK GROUP

Services:

The project has been divided into four main tasks

- **Task 1:** Preliminary potential of offshore FPV in the Greater Malé region and Addu City estimation.
- **Task 2:** International best practices of developing offshore FPV systems.
- **Task 3:** Technical support to the Bank during tendering process.
- **Task 4:** Deployment of long-term site-specific metocean data collection

Maldives – Technical advisory marine FPV (03/2021 – ongoing)

Asian Development Bank: Technical Assistance for Definition and Tender Preparation for Floating PV Projects in Maldives

Suntrace has been contracted by the Asian Development Bank to provide technical assistance for structuring and tendering phases of Government of the Maldives' marine floating solar PPP Projects under an IPP scheme.

ADB ASIAN DEVELOPMENT BANK

Services:

- Review and confirm suitability of the proposed project sites and finalize project technical specifications (size, scope, technical parameters and KPI's):
- Review all data received from the electric utility and provide detailed analysis of the key findings along with identification of relevant gaps.
- Oversee site surveys of proposed sites, including estimation of preliminary potential offshore floating PV in various islands.
- Confirm site suitability from a technical viability and access to grid/battery storage perspective.
- Oversee collection of data on solar resource, wind and ties, hydrography, hydrodynamics, PH, salinity, GIS, satellite data collection and analysis of lagoons.
- Work with environmental, biodiversity and social consultant to identify red flags.

Sri Lanka – Pre-feasibility Studies Floating PV in combination with hydro power plants (09/2021 - ongoing)

World Bank: Sri Lanka Floating Solar PV Development Option Study

The objective of the assignment is to advise the World Bank (WB) and other key stakeholders (i.e. Ministry of Power, the Mahaweli Authority, the Ceylon Electricity Board) in Sri Lanka on the potential of hybridising floating and/or ground mounted PV plants with 4 existing hydropower plants (HPP). The purpose is to make use of the large existing HPP potential in the country currently contributing 1/3 of the electricity and combine it with solar energy to meet rising energy demands, renewable energy targets and to decarbonize the electricity system.

WORLD BANK GROUP

Services:

- Advisory on Technical Design Option
- Preliminary Site and Permit Assessment
- Contractual and Institutional Assessment
- Economic and Financial Assessment
- Risk Analysis

Philippines – Assessment of Floating Solar Capacity on Laguna de Bay (11/2021 - ongoing)

Asian Development Bank: Strengthening Project Preparation Capacity in Asia and the Pacific - Supporting Preparation of Infrastructure Projects with Private Sector Participation in Asia Pacific - Floating Solar Project Technical Firm

The project involves site identification, technical assessment, capacity estimation, cost estimation and construction timeline projection of a 50 MW FPV plant in Laguna Lake. Suntrace provides the following services:

ADB ASIAN DEVELOPMENT BANK

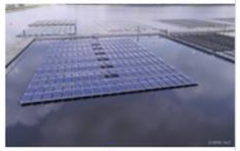
- Site Studies
  - Review of background studies
  - Bathymetry study
  - Geospatial modelation
- Technical Studies
  - Desktop technology review
  - Plant Layout / Design
  - Risk assessment
- CAPEX/OPEX estimation
- Client staff trainings

Vietnam – Floating PV Auction Advisory Service (2020)

TA-9012 VIE: Power Sector Reform Program PV1 Floating Solar Photovoltaic (PV) Auction Advisory Service

Suntrace is providing technical and commercial consultancy to the Asian Development Bank (ADB) for the floating PV in Vietnam. The project is expected to have two main components: a floating solar PV plant on a pre-identified site (capacity around 50-200 MW to be auctioned in 2020) through a competitive tendering process as independent power producer (IPP); and transmission interconnection system expansion.

ADB ASIAN DEVELOPMENT BANK



SERIS Solar Energy Research Institute of Singapore

Vatec

Services:

- Full study of project site(s)
- Cost estimate of the project
- Environment (EIA/IEE and EMP)
- Climate mitigation and adaptation
- Grievance redress mechanism
- Public consultation and disclosure
- Resettlement plan (RF & RP)
- In-depth financial analysis of the Project
- Financial model(s) in Microsoft Excel
- Project risk analysis
- Support drafting of bid documents and bid support
- Additional Support (as required by the Client)

Colombia – Floating PV Scoping Study for a Mine (2021)

Floating PV Scoping Study

including: Assessment of the technical and economic viability of a floating PV installation in the Mine's tailings pond. Evaluation of technical options in response to the expected change of water level and requirements to reallocate the FPV plant within the tailings pond over the life of the mine. This includes a preliminary assessment of the solar resource, energy yield, system cost and expected operational expenses.

Services:

- Site assessment: Analysis of the expected change of water level and development of tailings pool and tailings over the life of mine Technology assessment
- Energy yield assessment
- Cost estimates: assess initial CAPEX and OPEX for the FPV system on a high-level basis
- Economic Viability: calculating the LCOE of the project as well as amortization and NPV

Indonesia – Solar Resource Assessment for Floating PV (2019)

Solar Resource Assessment for a floating PV power plant near Jakarta

The project involves development, design, construction, testing, commissioning and operation of a Floating Photovoltaic Power Plant. Suntrace provides the following services:

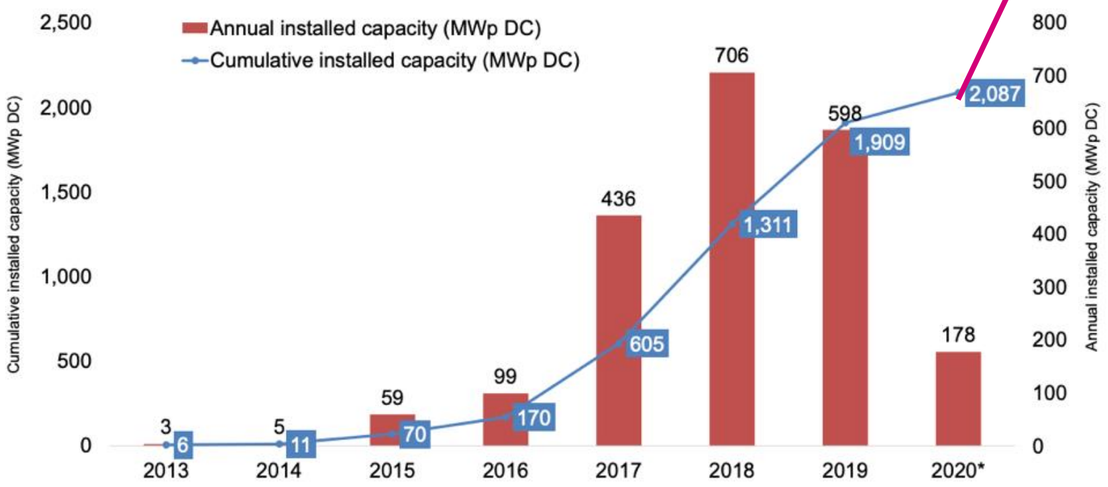
Services:

- Satellite data procurement
- Solar Resource Assessment Report
  - Site characteristics
  - Effect of water body on floating PVPP
- Generate a TMY and MY(P_{XY}) for the site coordinates
- Validation of sat-data based on existing ground measurements

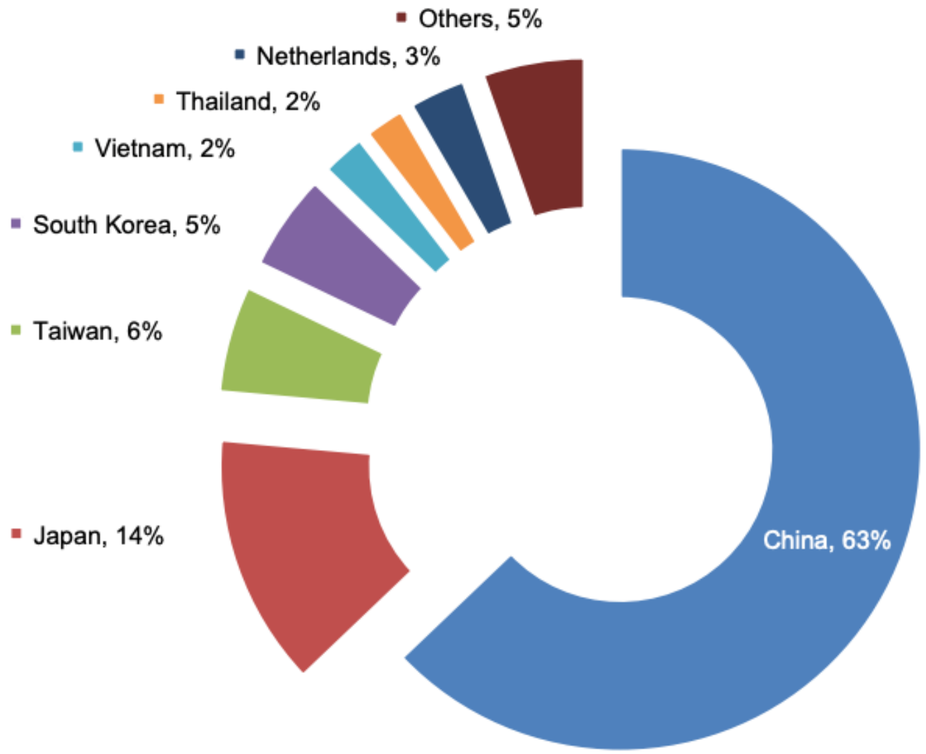
FPV market and installed capacity

- 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)



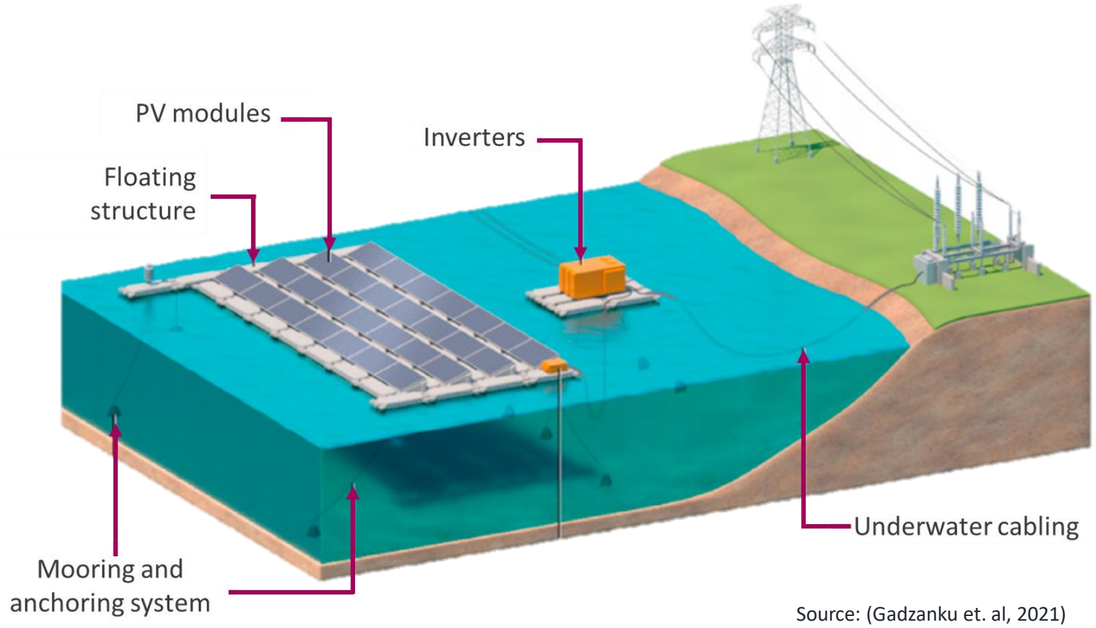
Note: *As of end Sept 2020. Data source: SERIS.



Note: *All figures 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?

Source Fred. Olsen Renewables

- 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

Offshore

1MW Pilot deployed since 2020 in the North Sea, Belgium – Ocean of Energy

65kW King Eider pilot deployment in the Netherlands, April 2021 – Solarduck

Freshwater
100+ MW

320 MW facility in Dezhou, Shandong, China (2020 & 2022) – Huaneng Power International

Nearshore (marine)

93 MW FPV in Lun Wei Dong (Taiwan)
Sungrow FPV and Chenya Energy

88 MWp Changbing project, Changhua, Taiwan Ciel&Terre

First commercial demonstrator, since 2018, Johor, Singapore (3.4~6.0 kWp) – OceanSun

Systems ranging from 12 kWp to 427 kWp, operating nearshore in Maldives – Swimsol

Questions?

Floating PV and site characterization

Raúl Granados

Head of Renewable Energy Resources

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+49 40 767 9638-219

VENTURE THE IMPOSSIBLE
TO ATTAIN THE BEST...

PROF. CLAUDE DORNIER

Sergio Montoro Castillo

Head of Renewable Energy

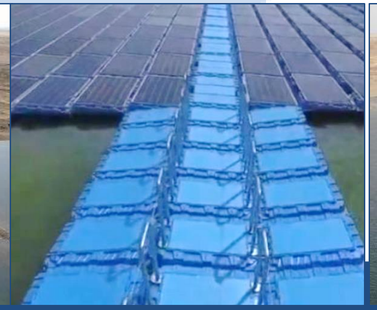
Globaltec

- 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

AFSIA
Africa Solar Industry Association

Globaltec

Floating Solar in Africa: Opportunities & Challenges


DESCRIPTION OF THE COMPANY

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 builtIn 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.

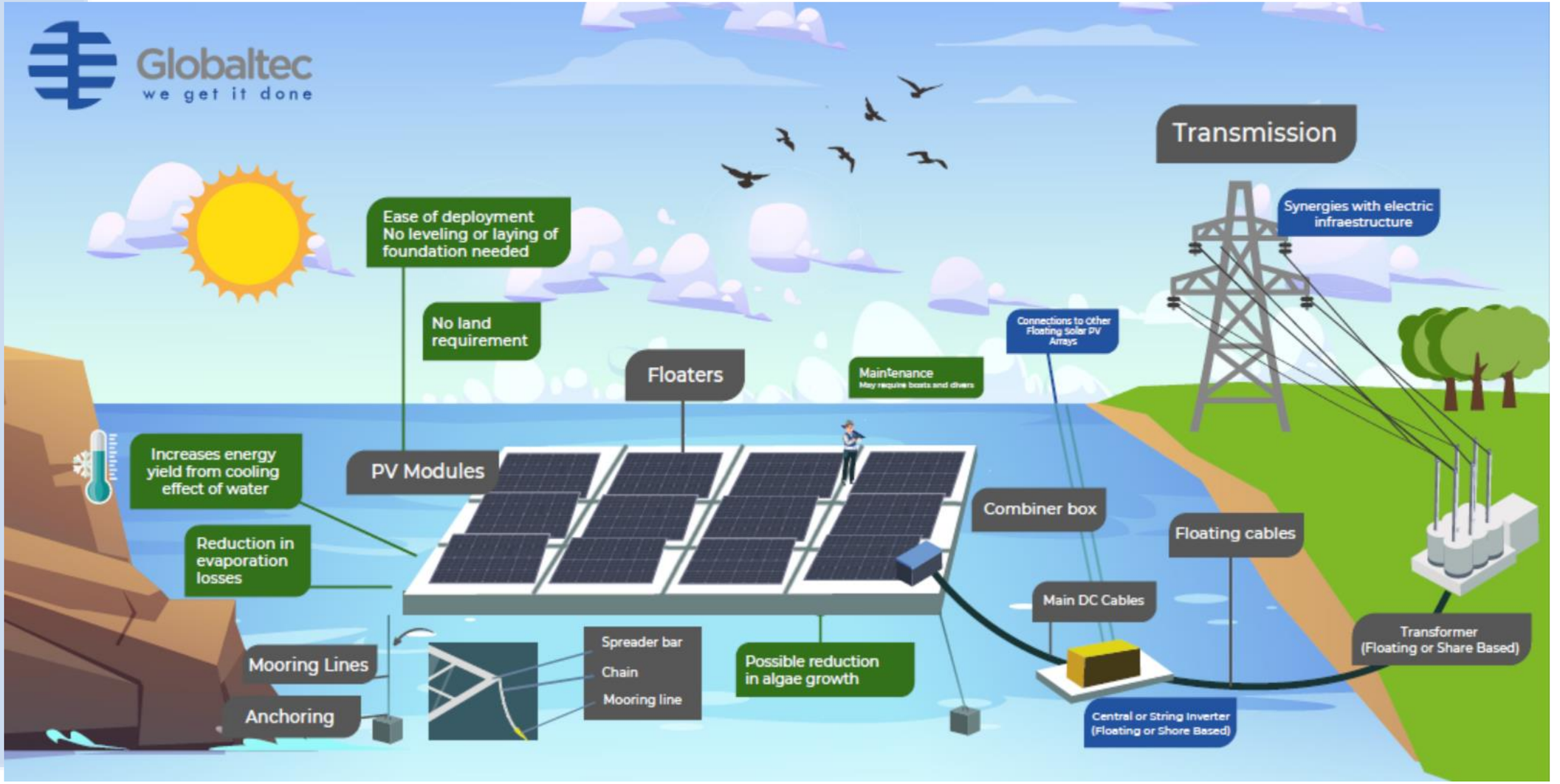
WHAT IS A FLOATING PHOTOVOLTAIC SYSTEM (FPV) ?

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.

FLOATING PHOTOVOLTAIC SYSTEM (FPV)



Globaltec

ADVANTAGES

- **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

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Henry Ejinwa

Sales Manager West & Central Africa

JA SOLAR

- 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
Africa Solar Industry Association

JA SOLAR

AFSIA WEBINAR

Henry Ejinwa

DATE
2022/10/26

WWW.JASOLAR.COM

Harvest the Sunshine
Premium Cells, Premium Modules

Contents

A Global Leading Innovator of the PV Industry

May,2005
Founded in

NASDAQ
Listed on Feb, 2007

Shenzhen
Stock Exchange
Listed on Nov. 2019

29638
Employees
(As of Q4, 2021)

¥41.3Billion
Total Revenue of 2021

103GW
Cumulative Shipments
(As of Q2, 2022)

135
Covered Countries and Regions

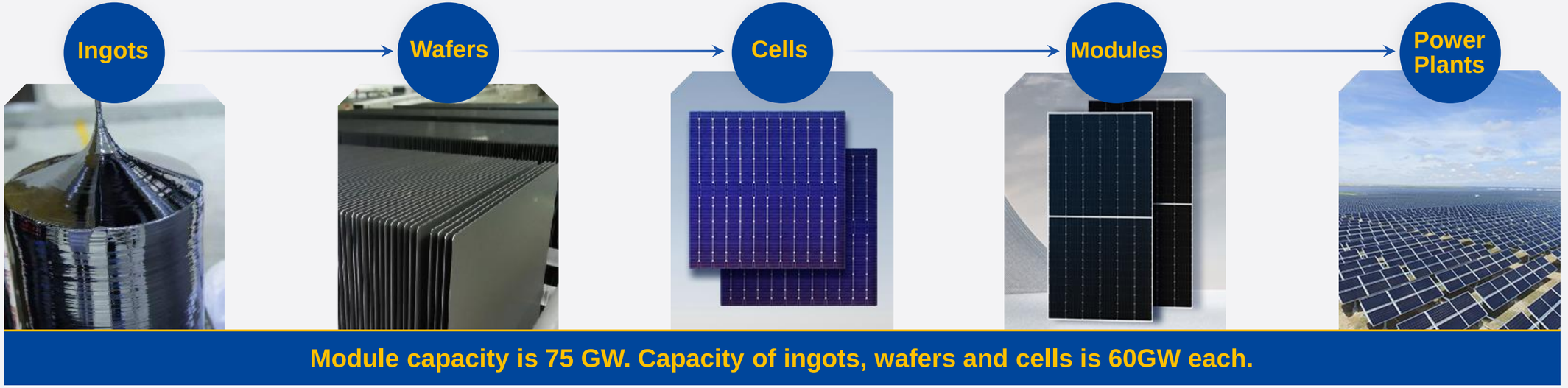
12
Global Manufacturing Bases

14%
Global Market Share
(2021，IHS Markit)

Fortune China 500
Many Consecutive Years Listed on

No.2 in global shipment ranking
Module Shipment (2021, PV InfoLink)

Tier 1 Manufacturer/Supplier of PV Products



Wafers

Baotou, Inner Mongolia
Yanjiao, Hebei Province
Lianyungang, Jiangsu Province
Xingtai, Hebei Province

Cells

Ningjin, Hebei Province

Bac Giang, Vietnam
Qujing, Yunnan Province

Penang, Malaysia

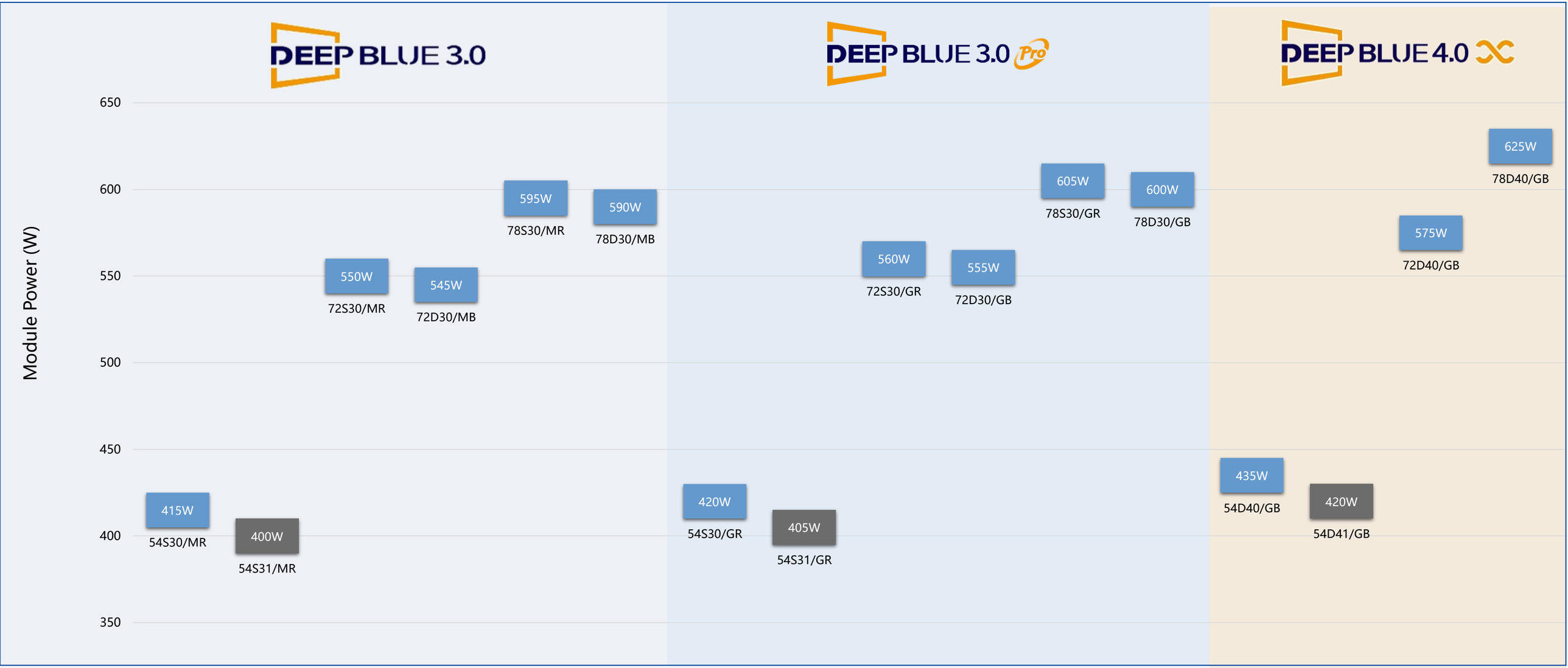
Yangzhou, Jiangsu Province
Yiwu, Zhejiang Province

Modules

Xingtai, Hebei Province
Fengxian, Shanghai
Hefei, Anhui Province

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

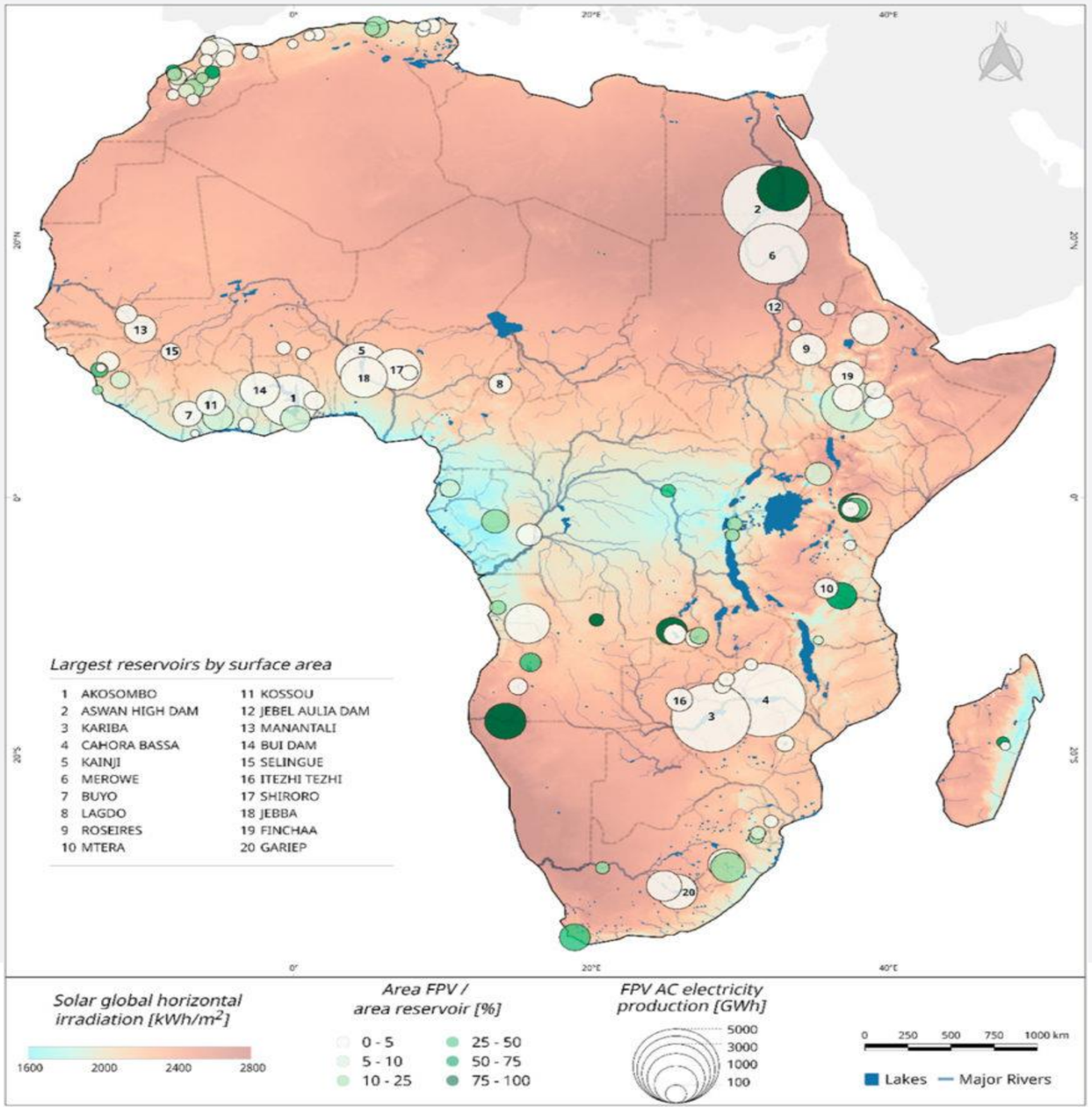
Floating Solar Project in West Africa – KEY POINTS

- 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.

PROS & CONS

- 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

Susan Kiarie

Country Manager, Kenya

ecoligo

- 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

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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-Sahara Africa, Southern Africa, Central America, Caribbean, South America, Southeast Asia

30 employees (18 nationalities, 45% female)

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

ecoligo

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,
  - Safes 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

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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

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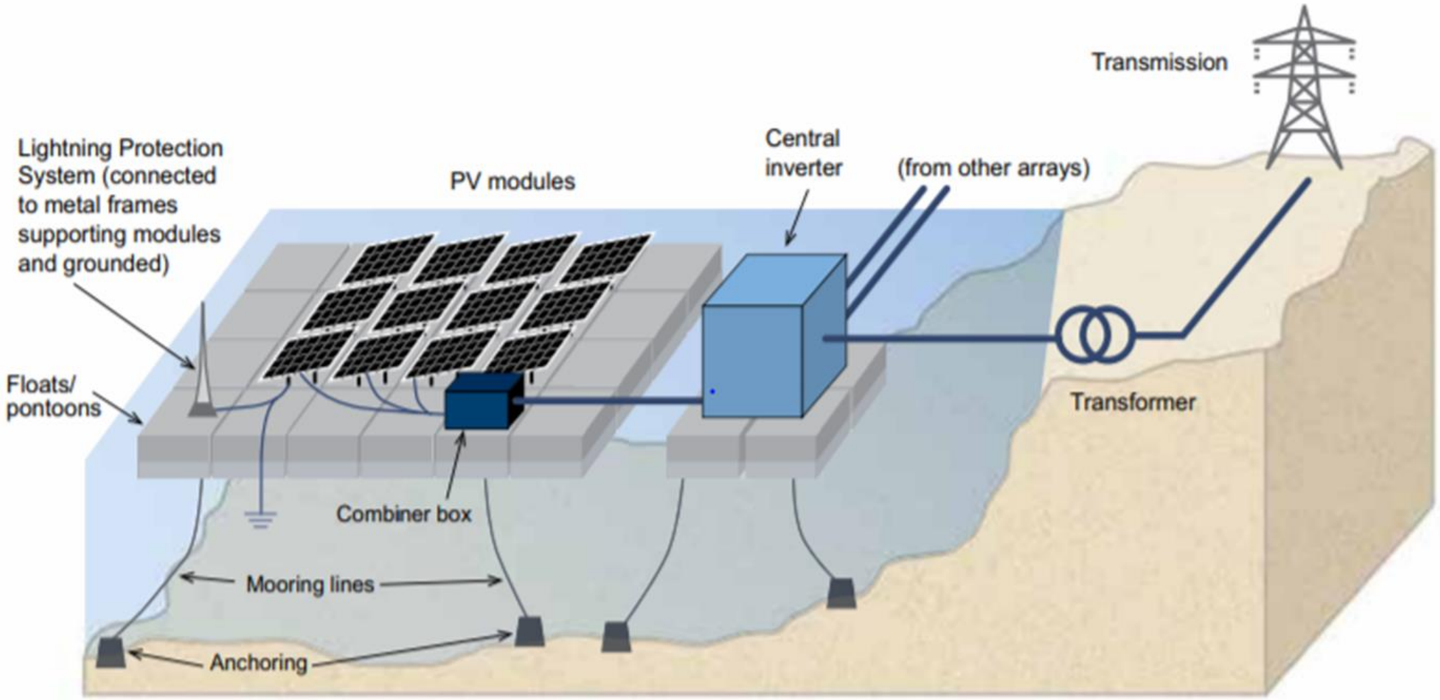
TECHNOLOGY

- Floating solar technology is produced through a blow moulding process
- The equipment is qualified through a technical test to make it safe and long-lasting
- 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

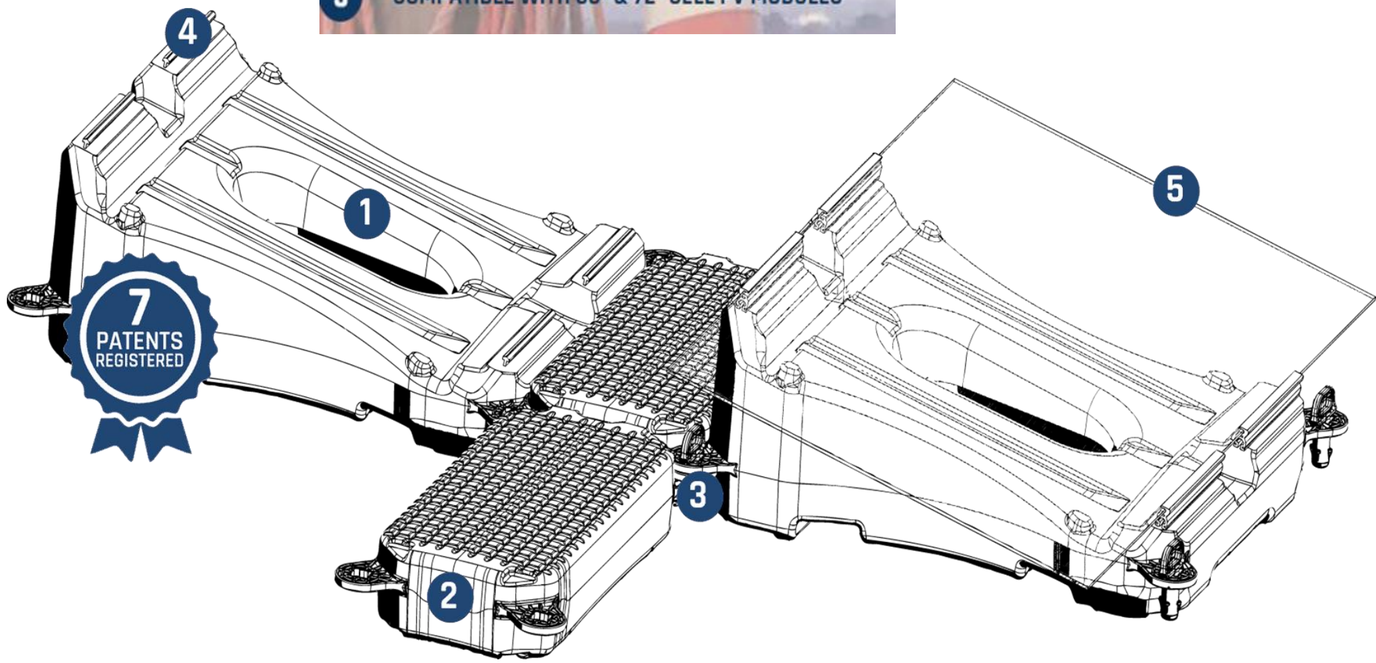
- Floating solar technology has had a rapid growth in the solar markets from 2016. The first 20 plants were built between 2008 and 2014.
- Floating PV Systems consist of modular floaters assembled into rows made from recyclable HDPEs. The system supports PV modules above water while withstanding long-term environmental hazards like heavy rains, wind, and snow.



TECHNOLOGY

- 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



69 KWP FLOATING SOLAR – RIFT VALLEY ROSES

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".

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ABOUT THE CLIENT

- 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.

RiftValleyRoses

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TECHNICAL PARTNERS

- 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.

Technolectric
ELECTRICAL POWER SOLUTIONS

isifloating by isigenere
FLOATING SOLAR SYSTEM

PROJECT IMPLEMENTATION

- 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.

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PROJECT OPERATION

- 69 kWp system supplies alone up to 30% of Farm‘s electricty 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.

ecoligo

Together, we lead the global energy revolution

hello@ecoligo.com

Paul Kotze

Founder and Managing Director

solar energy ARCHITECTS

- 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

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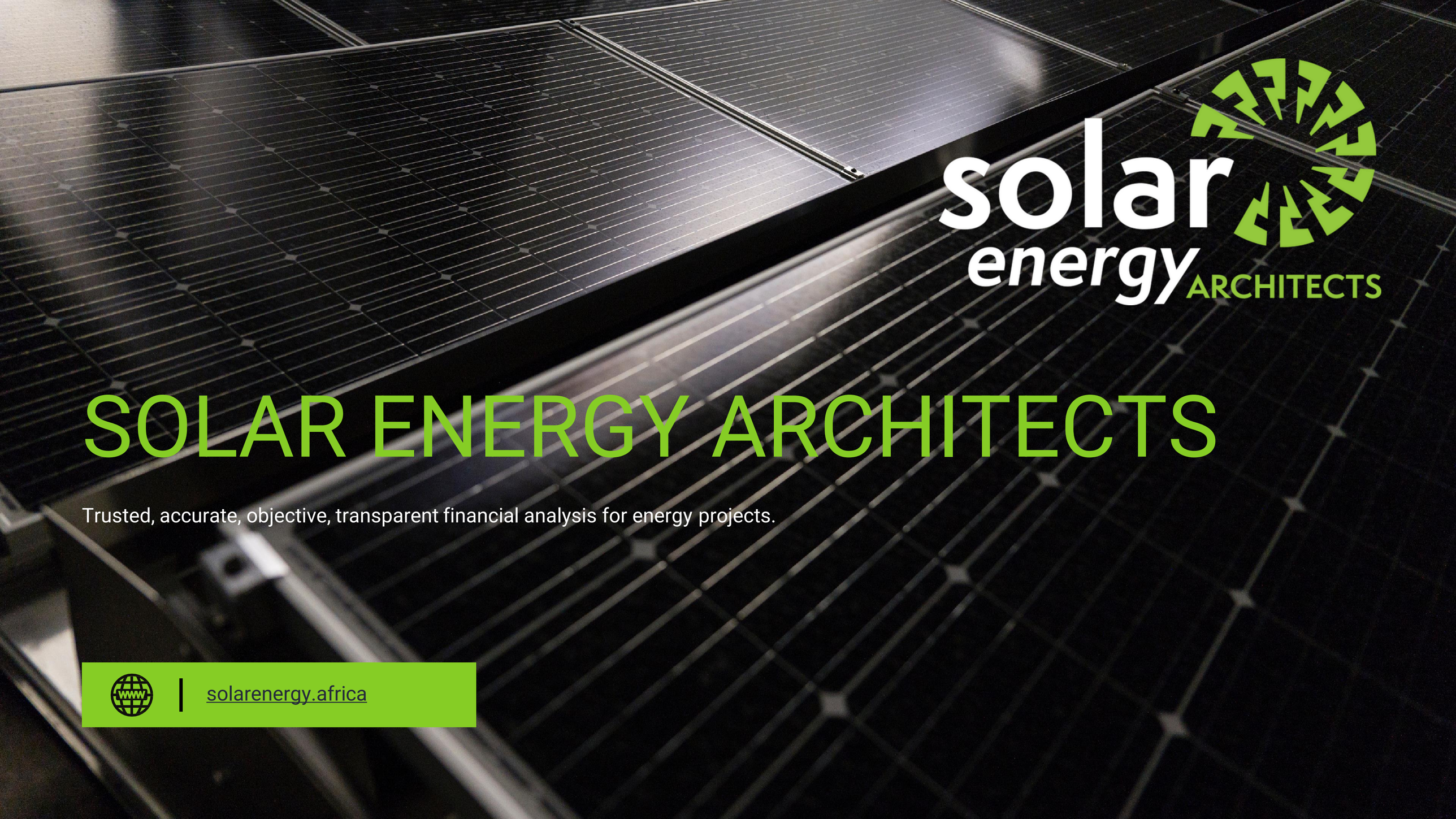


SOLAR ENERGY ARCHITECTS

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

solarenergy.africa

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.

solar energy ARCHITECTS

FOOTPRINT

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**

solar energy ARCHITECTS

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

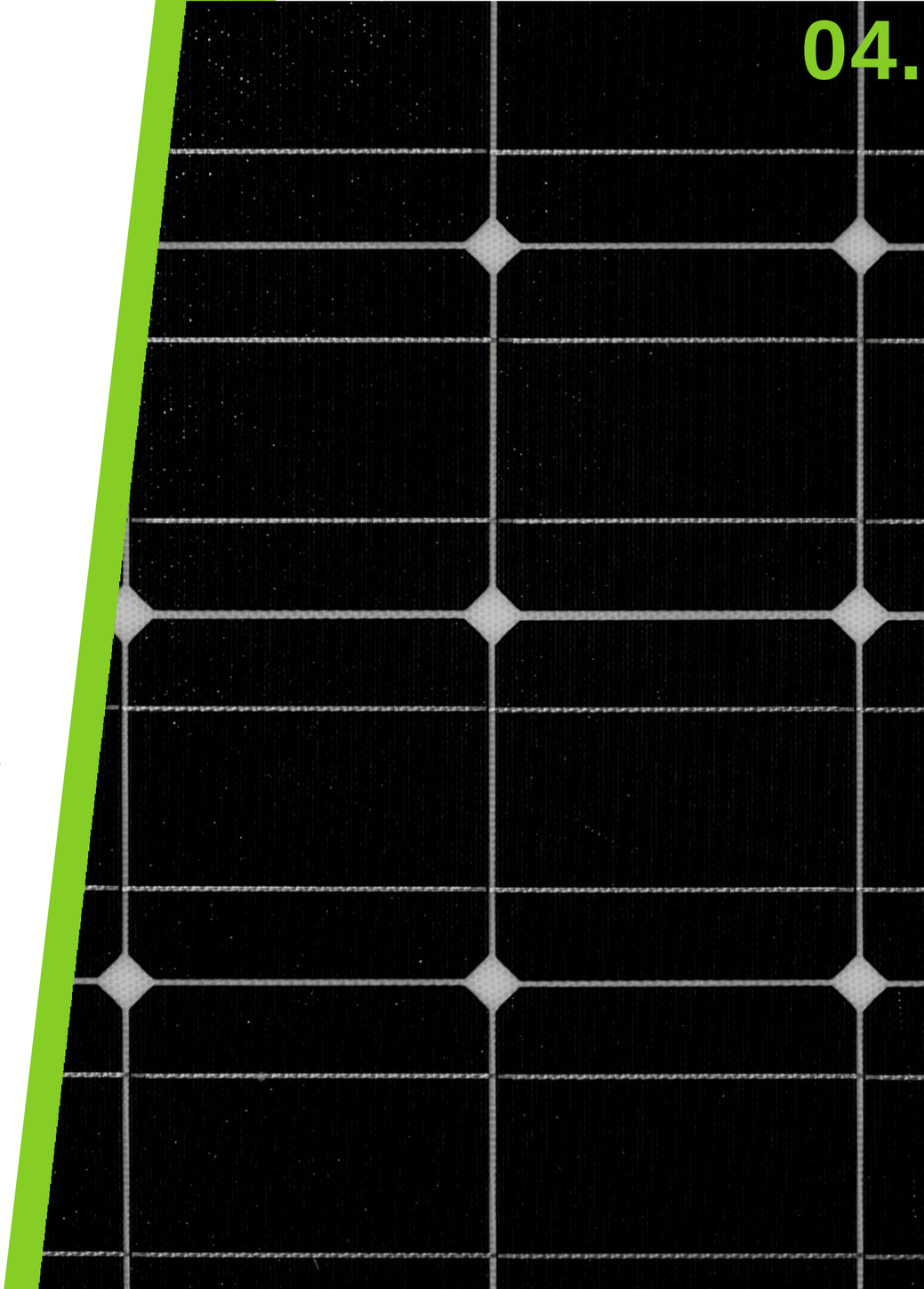
Full finance suite, tailored to the clients needs

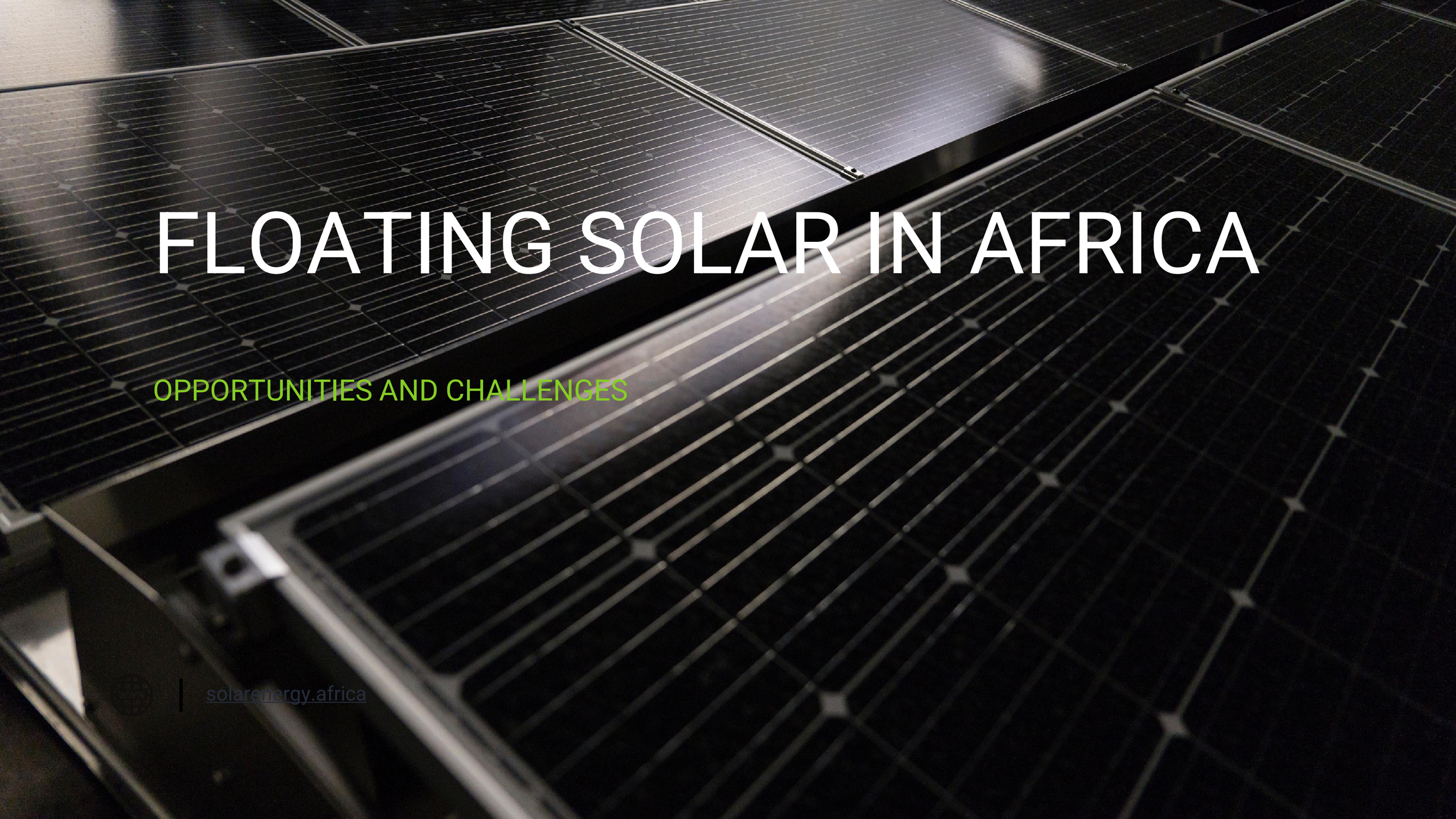
Rent to Own: An off-balance-sheet financing solution that allows clients to take ownership of the asset at the end of the rental term.

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

CHALLENGES

LAND AVAILABILITY NOT PROBLEMATIC

FREIGHT AND LOGISTICS COSTS

EXCHANGE RATE

MINIMUM ORDER QUANTITIES

FEW LARGE, USABLE WATER BODIES

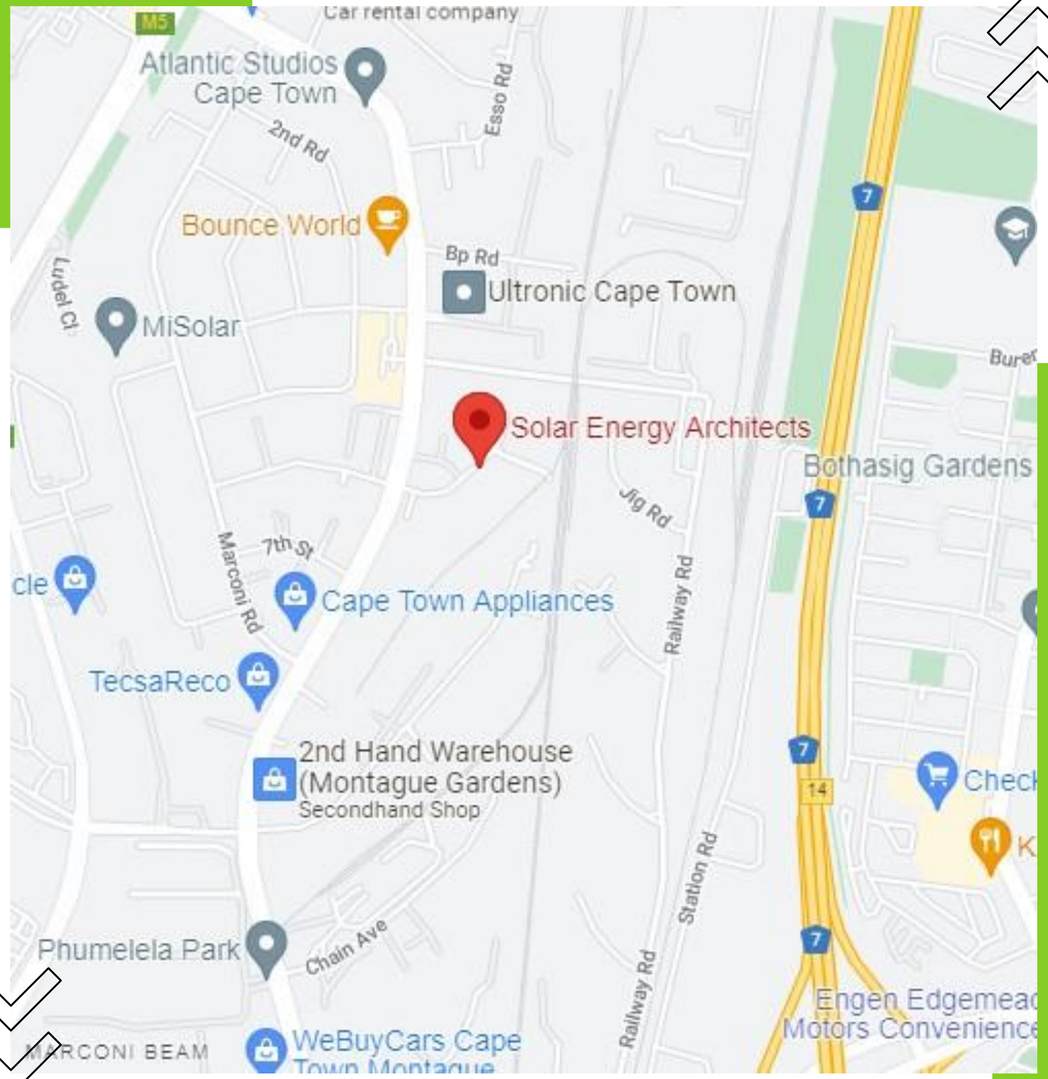
LIMITED LOCAL ADOPTION

OPPORTUNITIES

AGRICULTURE

MINE RECLAMATION

HIGH YIELDS



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thankyou,

AFSIA
Africa Solar Industry Association