



FLOATING SOLAR PV IN ASIA

WEBINAR PRESENTATION

14-July-2021

WEBINAR – FLOATING SOLAR PV IN ASIA

Agenda

1. Introduction – Floating Solar PV gaining traction in Asia
2. Market and Regulatory Review – Recent Market development, Cost & tariff trends, Key policies and Targets
3. Technical Review – Project technical components, EPC and O&M considerations
4. Project Review – Recent projects & pipeline in Asia



Speakers



Abhinav Mittal, CFA
Managing Director, YOG INFRA

Abhinav has more than 11 years of experience in Financial Advisory across infrastructure sectors in Asia, including renewable energy developments.



Jeremy Ong
Managing Director , V3 Energy

Jeremy has more than 20 years of experience in Energy and 13 years in Solar with >12GW of PV and 1.5GWh of storage projects globally.



Tanvi Garg
Associate Director , YOG INFRA

Tanvi has 10+ years of experience in strategy planning, investments, Bid Advisory, Feasibility and Due Diligence in power and renewable energy sector across India, Southeast Asia and East Africa.

ABOUT US

YOG INFRA



YOG INFRA is an infrastructure focused financial advisory firm committed to support sustainable economic growth driven through infrastructure development. We work extensively with Development Finance Institutions (DFIs), Private Sector and Government Agencies.

We have our offices in two locations – Singapore and India. We work on projects globally, and the team brings with a strong experience in development of infrastructure projects in Asia.

OUR SERVICES

YOG INFRA provides following services in infrastructure advisory:

Public Private Partnerships (PPP) Transaction Advisory

Business Plans And Market Entry Strategy

Financial Modelling And Model Reviews

Commercial And Contractual Due-diligence

Project Finance Raise

Training And Capacity Building

V3 ENERGY



V3 Energy is a renewables technical advisory company focused on solar and energy storage technology as a multidisciplinary team of global experts in the energy industry. Our clients are international developers, IPPs, Private funds who are who are looking at the APAC energy market.

We are based in Singapore but have global partners located in Europe and Asia supporting both Asian and European clients.

OUR SERVICES

V3 Energy provides following services:

Technical due diligence for green and brown field projects

Technology market strategy

Technology benchmarking

Operational Asset Performance Management Assessment

Owners Engineering and Independent Engineering

Training and capacity building for technical design and service teams



INTRODUCTION

Setting the context...

INTRODUCTION

Globally, floating solar power market is witnessing a flurry of activity



Global Floating Solar Capacity Crosses 1 GW, Has the Potential to Exceed 400 GW: Report

Floating solar technology is emerging as a panacea for densely populated countries where land is a constraint. According to a market report “where sun meets water” produced by the World ...

November 5, 2018 / Nitin Kabeer / Floating Solar, Solar

Activity heating up in India's floating solar power market

Two large-scale floating solar tenders with a total capacity of 75 MW have been issued by NHPC and NHDC

Aarushi Koundal • ETEnergyWorld • August 26, 2020, 09:39 IST

Southeast Asia to see 100-fold increase in floating solar PV plants: Rystad Energy

The firm added that this will happen as countries in the region are looking to substantially increase their share of renewable energy in the power mix

Singapore Calls Developers to Bid for 50 MW of Floating Solar Projects

Public Utilities Board of Singapore is looking for eligible bidders for a 50 MW floating solar PV project in the Tengeh Reservoir. The last date for bid submission has been ...

July 11, 2019 / Soumik Dutta / Floating Solar, Solar

INTRODUCTION

Why Floating Solar is Gaining Traction?

- FPV also known as floatovoltaics is a solar PV application in which PV panels are designed and installed to float on waterbodies such as reservoirs, hydroelectric dams, industrial ponds, water treatment ponds, mining ponds, lakes, and lagoons.



Utilization of unused space of water bodies

- One of the biggest advantages of floating solar panels is that the installations do not require valuable land space. Such projects utilize the unused space on bodies of water



Improved possible solar panel performance

- Due to high temperatures solar panels suffer from decreased power outputs. Wind circulation over the PV modules provides a cooling effect, which can improve the performance of solar photovoltaic panels depending on the site wind conditions (note: site specific).



Environmental benefits

- Floating solar panels can help reduce evaporation because of floats covering the water surface area and by limiting air circulation and direct sunlight over the water's surface. The reduction of sunlight also helps prevent algae blooms, which pollute water and raises treatment costs (note: site specific).

MARKET AND REGULATORY REVIEW

Key Policies and Targets

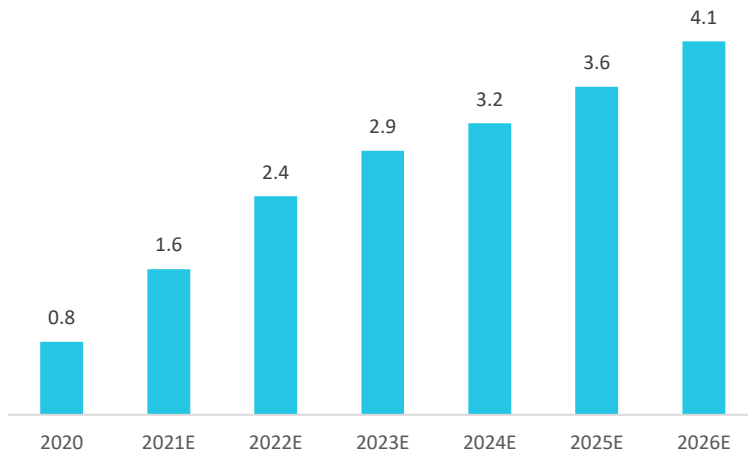


MARKET REVIEW

Global Developments in FPV

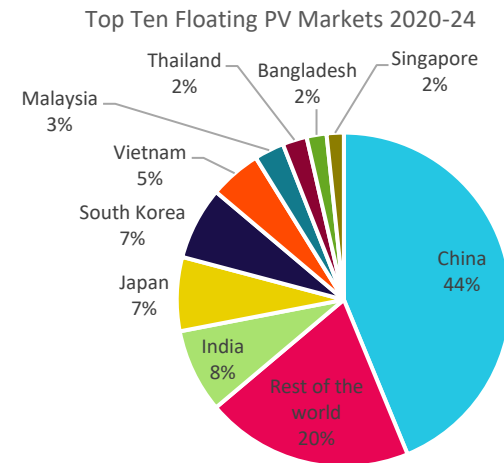
- At present, among the 60+ countries actively pursuing the deployment of FPV, and more than 35 countries are home to an estimated 350 operational FPV systems, with a cumulative capacity of approximately 1.6 GW.
- Although still considered a niche, FPV is projected to experience an average growth rate of above 20% in the coming five years.

Global Floating Solar Installations Forecast 2021-26 (in GW)



Source: WoodMac Report, YOG INFRA Analysis




- Asia is expected to account for roughly two thirds of the global demand, mostly driven by China, India, South Korea, Taiwan, Thailand and Vietnam.
- For the purposes of this webinar, we focus on key economies in South Asia and Southeast Asia.
- Covid-19 caused delays in major FPV countries including India, Japan, and Thailand.



Source: WoodMac Report, YOG INFRA Analysis

REGULATORY REVIEW



Recent Development in Policy/ Regulatory Aspects –Asia

Country	Highlight
India 	<ul style="list-style-type: none">India targeted to implement 10 GW of floating photovoltaic (FPV) systems by 2022.Given its tropical climate, India has the potential to deploy 280 GW of FPV capacity by utilizing just 30% of medium and large water bodies, amounting to an area of 18,000 km²The government of India released a series of tenders for FPV systems amounting to approximately 2 GW. Presently, around 1.7 GW are in various stages of development.Government agencies like NTPC, NHPC & SECI are implementing the program.
Malaysia 	<ul style="list-style-type: none">Malaysia targets 20% renewable energy by 2025 through use of Large-Scale Solar tenders (LSS).A 13 MW floating solar power plant under LSS has been commissioned in Malaysia making it by far the largest such project to come online in the Asian country.The project's levelized cost of energy is MYR 0.1608 (\$0.038)/kWh, while total investment in the facility was MYR 47 million (\$11.3 million)
Vietnam 	<ul style="list-style-type: none">Vietnam solar capacity target is 17 GW by 2025, (around 17% of total installed capacity), up to 20 GW in 2030 (around 14% of total installed capacity)As of 2020-21, around 16.45 GW of solar generation capacity has been installed.There is Feed-in Tariff for floating solar at 1,758 VND/kWh (0.08 US cents/kWh)A 47.5 MW FPV project is planned to be built on a man-made reservoir co-located with an existing 175 MW hydro-power plant.

Source: Publicly available information, YOG INFRA analysis

REGULATORY REVIEW

Recent Development in Policy/ Regulatory Aspects – Asia

Country	Highlight
<div>Singapore</div> <div></div>	<ul style="list-style-type: none">• Singapore aims to quadruple solar energy including Floating Solar use to approximately two percent of the nation's power needs by 2025, and to three percent by 2030 — enough to power 350,000 households per year.• A 60 MW floating solar farm was recently commissioned on Singapore's Tengeh Reservoir, over an area equivalent to 45 football fields.
<div>Thailand</div> <div></div>	<ul style="list-style-type: none">• Thailand is aiming to draw 35% of its energy from non-fossil fuels by 2037• The state-run Electricity Generation Authority of Thailand (EGAT) is touting the pilot project as one of the world's largest hybrid hydro-solar power ventures and aims to replicate it at eight more dams over the next 16 years with total target of 2.7 GW• Government of Thailand has a near-term target to develop 55 MW of floating solar projects.

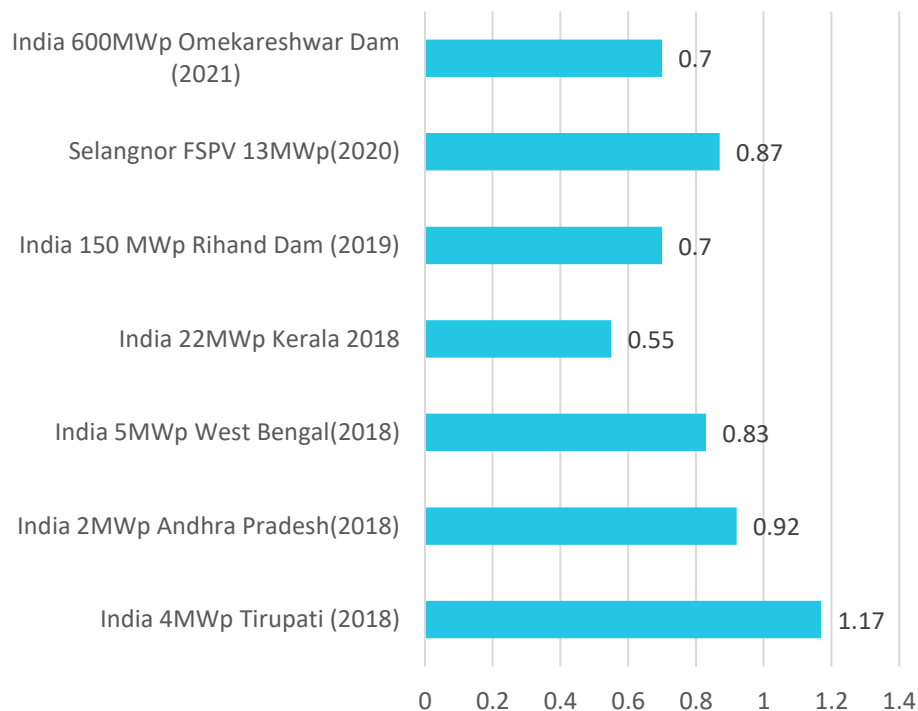
Source: Publicly available information YOG INFRA analysis

MARKET REVIEW

Declining Costs due to evolving technology

- FPV system costs are highly variable by country and within country too.
- Though with time the capital cost for the floating solar project is decreasing due to evolving technology.
- Project sizes continue to climb on average year over year
- Project sizes increasing from 1-10 MW to 50 100 MW projects.
- Larger projects can take advantage of economies of scale benefits both with material costs as well as labor costs

Capital Cost Capital cost for the recent FPV project (in USD/Wp)



Source: Publicly Available Information, YOG INFRA analysis

MARKET REVIEW

Overview of global markets all-in FPV system costs

- Asian countries such as India, China and Thailand have the lowest install costs. But have a relatively broad range from \$1.27/Wp - \$0.52/Wp.
- Some countries has to still come out with standards and safety guidelines of FPV, which can further increase the prices
- There are unique markets in Asia such as Singapore and north Asian countries where costs are high between \$0.93/Wp to \$3.02/Wp due to higher labour costs, but also higher FIT supported schemes
- Europe has a relatively close range of \$0.88/Wp - \$1.12 in all the 3 markets of Netherlands, France and Israel.

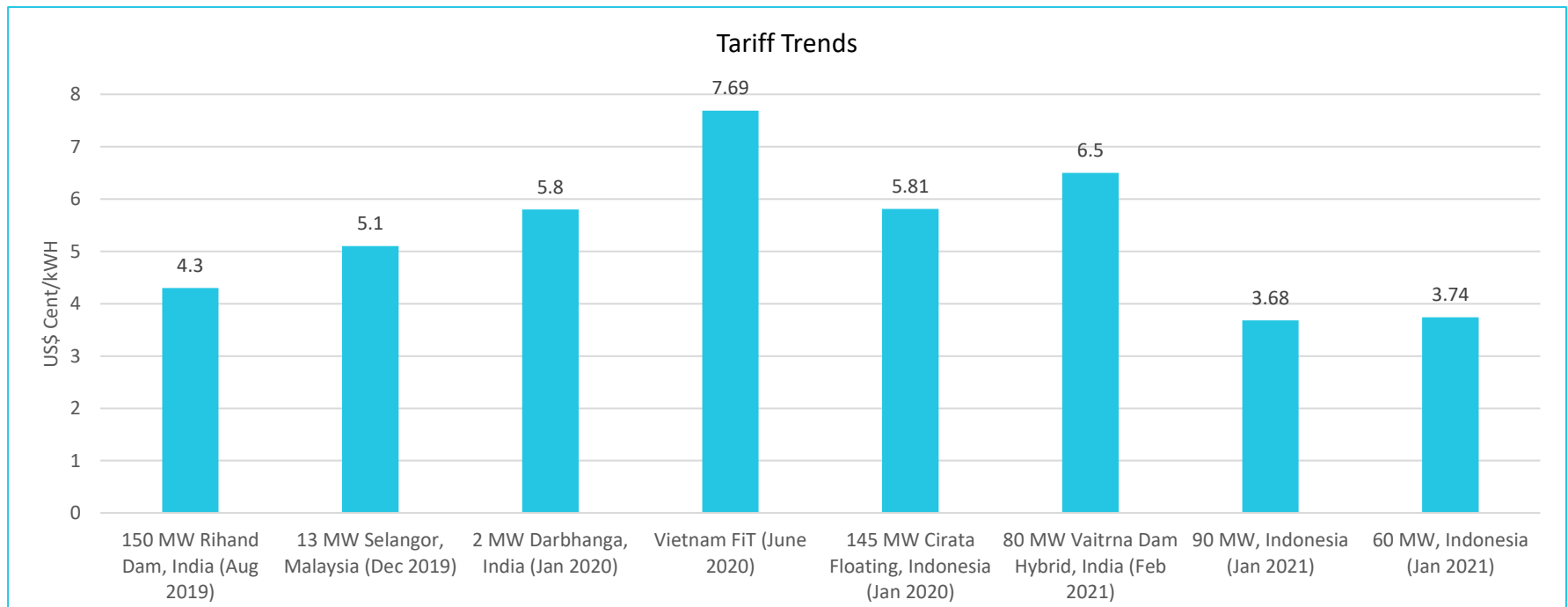
All-in FPV system costs by market in 2021 with high, average and low case (USD\$/Wdc)						
	High case		Average		Low case	
India	\$	1.06	\$	0.78	\$	0.52
China	\$	1.27	\$	0.84	\$	0.63
Thailand	\$	1.05	\$	0.85	\$	0.72
Israel	\$	1.26	\$	1.00	\$	0.93
Netherlands	\$	1.11	\$	1.00	\$	0.88
France	\$	1.12	\$	1.01	\$	0.93
Taiwan Region	\$	1.76	\$	1.39	\$	1.35
United States	\$	1.78	\$	1.49	\$	1.17
South Korea	\$	2.14	\$	1.61	\$	0.93
Singapore	\$	3.01	\$	2.37	\$	1.98
Japan	\$	3.02	\$	2.68	\$	2.42

Source: WoodMac Report, YOG INFRA Analysis

MARKET REVIEW

Tariffs Discovered for recent FPV projects

- Tariffs discovered for through bids are very country and site specific for FPV projects.
- Increased competitiveness among the EPC players and float manufacturers may help drive down costs.
- More local manufacturing of the floats and mooring and anchoring systems will help bring costs down, but levying of import duties and logistics can increase project costs.



Source: Publicly Available Information, YOG INFRA analysis



TECHNICAL REVIEW

EPC and O&M Considerations

TECHNICAL REVIEW

Key Components of a floating PV system

5MW Floating PV system



PV module



PV float



PV String / Central Inverters



DC/AC Cables



Anchoring & Mooring



MV transformer

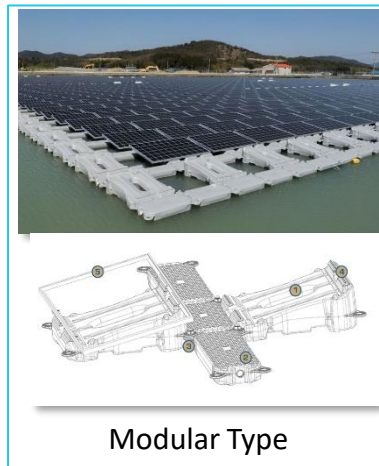
TECHNICAL REVIEW

Technology overview



Membrane Type

System with solar panels mounted on circular hydro-elastic membrane, which help cool the PV modules this is done by placing them flat directly on the membrane to provide direct contact and transmission of heat to the cooler membrane surface which helps improve the energy yield.



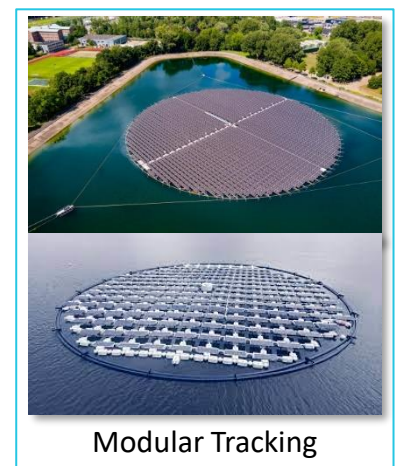
Modular Type

Modular systems usually made of blow molded HDPE plastic where individual PV modules are mounted on each float with module clamps at fixed tilt angles of 5 to 20deg. They are connected into multiple strings to form larger array systems.



Array Type

Array systems are where multiple PV modules are mounted onto a mounting rails with various tilt angles and have various floats to support them where majority are made of blow molded HDPE plastic They are similarly connected into multiple strings to form larger arrays.



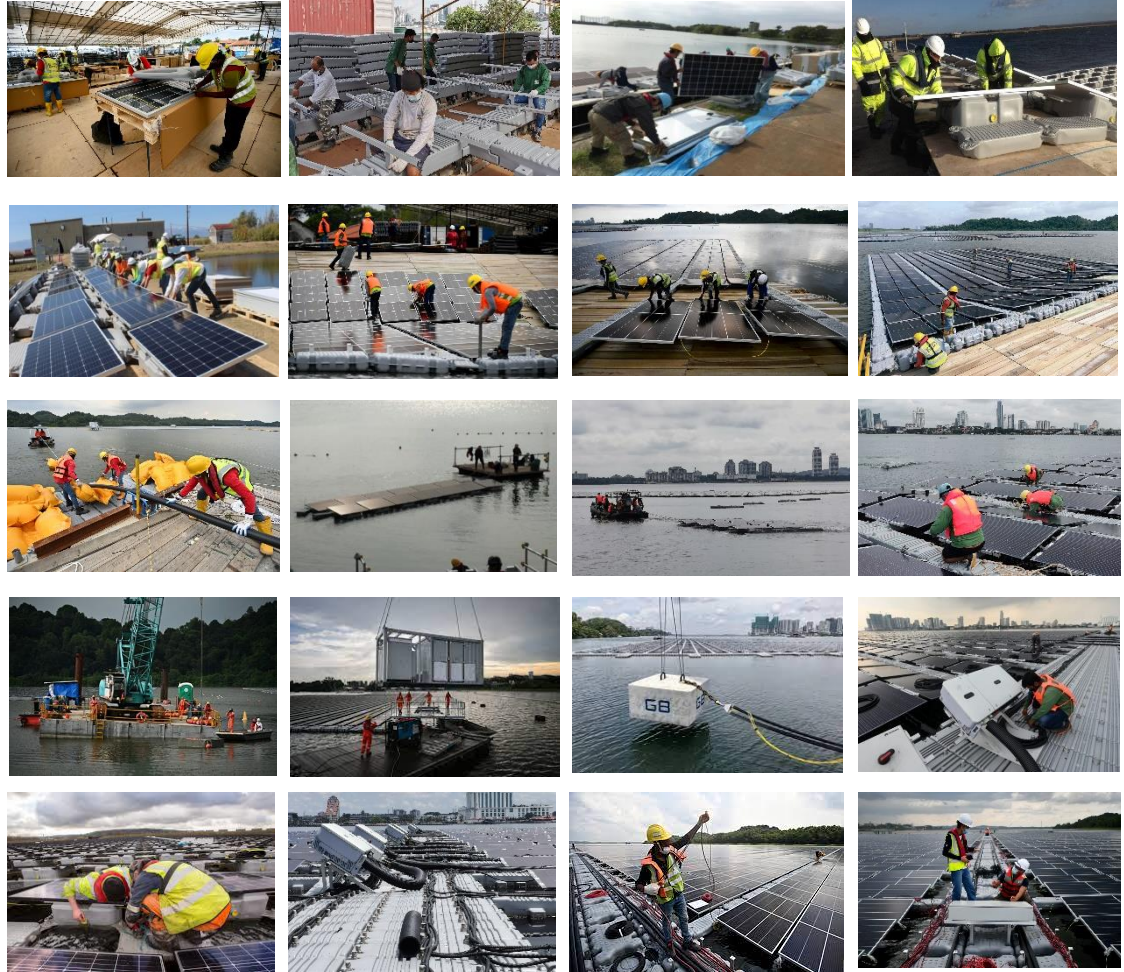
Modular Tracking

There are a few floating tracker system suppliers with either single or dual tracking capabilities where the floats are either made of HDPE blow molded floats or injection molded HDPE tubes. They have steel support structures to connect the floats and have the PV modules mounted on top.

TECHNICAL REVIEW

Floating PV Construction Challenges

- **Space limitation/difficulty to construct** – Staging, integration and launching areas
- **Float system Installation methods** - Will vary from suppliers – challenge in detailed installation documentation.
- **Integration of PV islands** –integrating smaller floating PV arrays to main PV array by boats
- **Integration of PV Inverters - string/central** – methods depend on type and design philosophy of floating system.
- **Cable management** - installation of cables and layout on the float system
- **Anchoring and mooring** - type of anchoring and mooring depends on the site conditions of the bathymetry studies, depth, terrain and type of subsea conditions.



TECHNICAL REVIEW

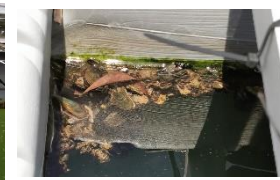
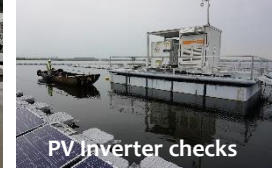
Floating O&M Challenges

Activities on site

- Access to PV array
- Module Cleaning
- PV inverter checks
- DC cable/connector checks
- Floats checks
- Anchoring and mooring periodic inspection

Impact

1. Increase in operational cost
 - Increased O&M time compared to ground systems.
2. Decrease in plant performance
 - Near shading loss
 - Soiling loss
 - Leakage current
 - Unavailability loss
3. Increased safety measures and precautions
4. Environmental site specific issues
 - Bird dropping – Soiling loss
 - Water plant growth – near shading
 - Bio fouling – increased float maintenance



TECHNICAL REVIEW

New standards, designs and technology

1. Design codes

- a) Lack of specific FPV construction and building codes

2. Standards

- a) Fire hazard
- b) UV damp heat cyclic test
- c) Tensile strength
- d) Mechanical cyclic loading
- e) Water Safe
- f) DC Cables/connectors

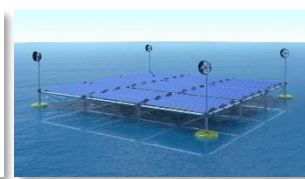
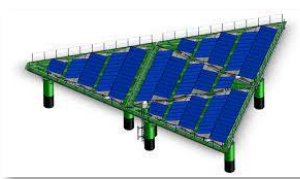
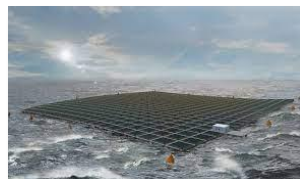
3. New FPV technology

- a) **Designs** – floats, O&M, safety, anchoring and mooring
- b) **Materials** – Metal, Ferro Concrete, Composite increased durability
- c) **Manufacturing** – Local content, manufacturing Reduced GHG
- d) **Offshore** – solutions for harsh marine environments

Japan's largest floating PV plant catches fire after Typhoon Faxai impact – 9th Sept 2019 (13.7 MW Yamakura Dam)



Fire hits BP venture's flagship floating solar plant in UK – 26th May 2020 (6.4MW Queen Elizabeth II Reservoir)



Source: Solar Power Plant Business / Nikkei Business Publications/LightsourceBP



PROJECT REVIEW

Recent and project pipeline in Asia

CASE STUDY – TENGEH RESERVOIR

60MW FPV in Singapore

Developer Name	Sembcorp Industries
Region	Tengeh Reservoir, Singapore
Energy Off Taker	Public Utilities Board (PUB), Singapore
Loan Amount	SGD 40Mn (USD 29Mn)
Financed By	DBS Bank
Size	60 MW (Occupying the space of 45 football fields)
Timeline	<ul style="list-style-type: none">• PPA Signed : May 2020• Construction : August 2020 – July 2021• Operation Period : expected 25 Year
Components Size	122000 Solar Panel on the surface of the reservoir
Expected Produce	The floating solar PV system will generate 77,259,302/kWh each year
Carbon Offset	It will offset about 57,777 tons of carbon emissions annually. The carbon saving from the reservoir are equivalent to Co2 Emission by 7000 cars on the road
Other Equipment	<ul style="list-style-type: none">• The solar farm is equipped with solar panels, PV inverter MV stations and SCADA system and 22kV transformers• PV floats are made with certified food-grade quality high-density polyethylene to minimize impact on water quality.• 3.2MW PV inverter MV stations from Sungrow• PV Modules are 490Wp MonoPERC high efficiency Vertex modules manufactured by Trina Solar



Source: Publicly Available Information, YOG INFRA analysis

PROJECT REVIEW

Completed and Under-construction Projects – Asia

Name	Capacity	Location	Project Status	Developer
<i>Selangor FPV</i>	13 MW	Selangor, Malaysia	Completed in October 2020	Solarvest Holdings Berhad , Malaysia
<i>Ratch Group's FPV</i>	2 MW	Ratch Province, Thailand	Completed in April 2021	Ratch Group , Thailand
<i>Wisewood's floating solar</i>	1.2MW	Phetchaburi , Thailand	Completed In October 2019	Wisewood Co. , Thailand
<i>The Ho Tam Bo floating</i>	35 MW	Chau Duc district, Vietnam	Completed in December 2020	TOJI Group, Vietnam
<i>Ho Gia Hoet</i>	35 MW	Chau Duc district, Vietnam	Completed in December 2020	TOJI Group, Vietnam
<i>Straits of Johor FPV</i>	5MW	Strait of Johor, Singapore	Completed in March 2021	Sunseap Group , Singapore
<i>Tengah Reservoir FPV</i>	60MW	Tengah, Singapore	Completed in July 2021	Sembcorp , Singapore
<i>RGCCPP Kayamkulam, Kerala FPV</i>	70 MW	Kerala, India	Expected to be completed in Q3 2021	NTPC, India
<i>Sirindhorn Dam FPV</i>	45MW	Ubon Ratchathani Thailand	Expected to be completed in 2021	B Grimm , Thailand

Source: Publicly available information, YOG INFRA analysis

PROJECT REVIEW

Pipeline – Asia

Name	Capacity	Location	Project Status	Developer
Omkareshwar reservoir FPV	25 MW	Madhya Pradesh, India	12 Months	Yet to be selected
Bugudanahalli Reservoir FPV	20 MW	Tumakuru, India	24 Months	Yet to be selected
Nangal pond FPV	15 MW	Bilaspur, India	18 Months	Yet to be selected
Sagardighi Thermal Power Station	10 MW	Westbengal , India	12 Months	Yet to be selected
Kalpong River FPV	4 MW	Andaman & Nicobar , India	Yet to be announced	Sunsource Energy
Omkareshwar dam	600 MW	Madhya Pradesh , India	Will Begin Operation in 2022-2023	Yet to be selected
Cirata Floating Photovoltaic Power Plant	145 MW	West Java Province Indonesia	To begin at the end of 2021 or early 2022	Masdar , UAE & PT Pembangunan Jawa Bali Investment (PJB) , Indonesia

Source: Publicly available information, YOG INFRA analysis

KEY PLAYERS

Developers



Financiers

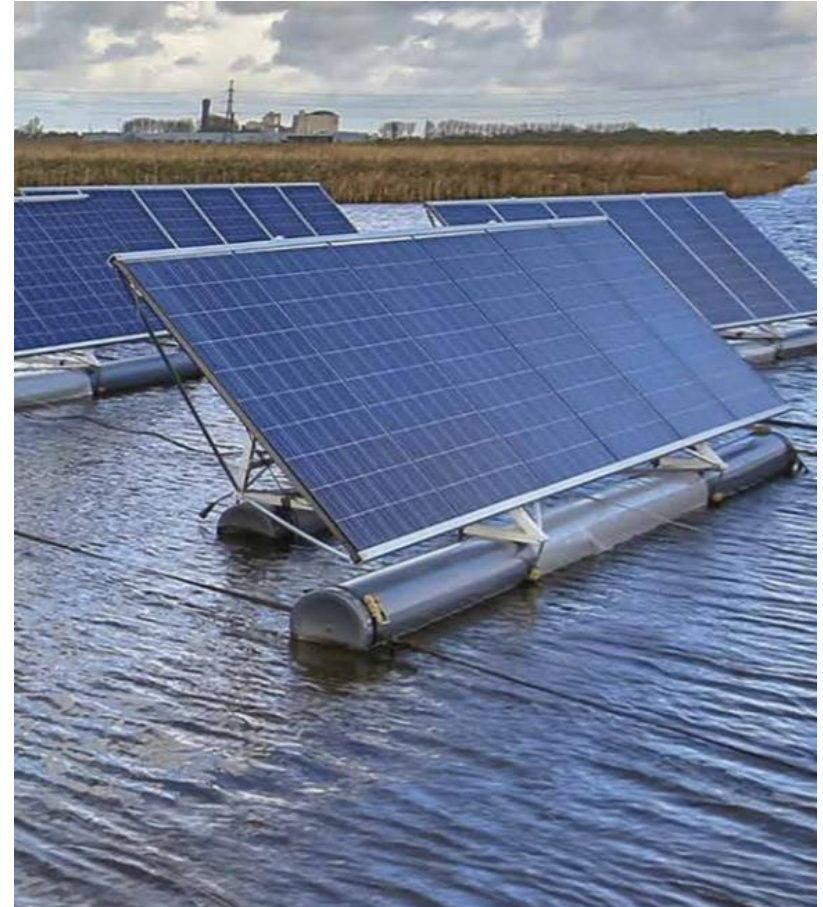


TAKE-AWAYS

FUTURE CONSIDERATIONS

FPV is a niche sector with a potential to claim unused space on water bodies...

- FPV looks promising to become a **third pillar of solar** (after Ground Mounted and Rooftop) and its market share is likely to accelerate as the technology gets mature.
- FPV implementation is driven by **unused space on water bodies**. It offers other advantages due to cooling effect, no land required etc.
- The **Asia-Pacific region dominates** the fast-emerging market in FPV and it looks set to build on that position as more nations get on board and costs fall.
- Formulation of **FPV-specific standards and project development guidelines** is of vital importance to reap the actual benefit of this technology without causing any negative impact on the local environment.
- Continued **focus must be on the viability of FPV as a technology** and not on the tariff and hence monitoring of its performance and bringing it to public domain must be encouraged.
- FPV as a technology has a **significant potential for countries with large hydro capacities** to meet their renewable energy targets.



PROJECT ECONOMICS

Financial assumptions for FPV project – Country/ Site-specific!

Capex	
Project Development costs (incl. Land, Permits, Evacuation)	USD/kW
EPC cost	USD/kW
Interest During Construction (estimated)	USD/kW
Upfront fee to banks + cost of debt (2% of debt)	USD/kW
Initial DSRA Funding	USD
Total Project Cost	USD Million/kW
Plant Details	
Plant Size AC	MW
Net PLF AC	%
DC/AC Ratio	
Auxiliaries	%
Degradation	%
Capital Structure	
% Financed w/ equity	%
% Financed w/ Debt	%
Interest rate	%
Moratorium	Months
Tenure (Door to Door)	Years
Discounting Rate	%
Interest on DSRA	%

Revenue	
Feed-In/ PPA Tariff	USD/kWh
Electricity Escalator	%
Wholesale Price of electricity	USD/kWh
Operating Costs	
O&M cost for 1st year	USD/MW
O&M cost escalation per year	%
Land Lease	USD/year
Inverter replacement Cost	USD/kW
Insurance	USD/kW
SPV Running costs of accounting, audit etc.	USD/MW
Annual Service fees	USD/MW
Taxation and Macroeconomics	
Corporate Tax Rate	%
Custom Duty/Tariff	%
Inflation/ escalation	%

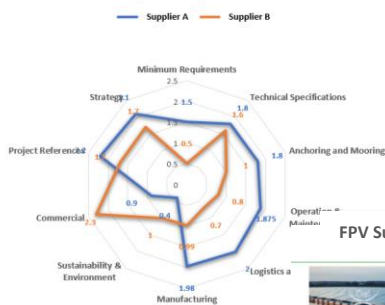
Source: Publicly Available Information, YOG INFRA analysis

FPV SUPPLIERS – DETAILED REVIEW

A peek into the “Global FPV supplier report”

2. Comparative Overview

FPV supplier comparison chart



Overview Summary

- Based on the current weightings given the overall score from Supplier A has performed better with a score of 1.5605 vs Supplier B's score of 1.274
- One main reason for the lower score is due to the fact that Sungrow had poor documentation on their float system compared to CAT that could be validated.

Supplier A's Advantage:

- Has a clear competitive advantage in their ability to strong global presence commercial partnerships and network in 25 countries. Global manufacturing presence. Many more completed projects over their active years of +200 projects and deployment strategy.

Supplier B's Advantage:

- Has a strong Asian market focus approach starting from their home base in China and using their low cost approach to target larger projects and they have a more complete turn key solution with Arrayboxes, PV Inverters, MV stations and SCADA monitoring as a complete package.
- Supplier B's Commercial strength of 2.3 is due to their more competitive pricing and payment terms.
- Success outside China market has been with the large Chinese SOE EPC firms

Section	Items	Supplier A	Supplier B	Weighting (%)
A0	Minimum Requirements	1.5	0.5	0.1
A1	Technical Specifications	1.8	1.6	0.2
	Anchoring and Mooring	1.8	1.0	0.1

FPV Supplier

Commercial in confidence

Company	Concept	No of installed projects	Installed capacity	Location Type	Salinable water depth	Salinable wave heights	Water level variation	Quality of documentation
Cat at Tern	Hydrofo	+200 projects	+500MWp	In land water bodies	Tested to 80m	Up to 1m	30m. Max Tested	Partially complete documentation provided
Advantages								
Disadvantages								
<p>Minimum requirements</p> <p>Has well defined O&M procedures and manual. Consistent track record. +400 MWp installed capacity and +200 projects worldwide. Large commercial partner network in 25 countries in 3 continents.</p> <p>Technical specifications</p> <p>Three different product lines of the Classic, Equator & ABE are available, and are based on modular HEPRE float modules. Floats with varying tilt angles available and different configured layouts. Compatible with 60-72 cells modules. Up to 1m waves, 0.36 kN/m2 snow load, 1500 N/m2 wind loading.</p> <p>Anchoring & Mooring</p> <p>Limited information provided. Anchoring and mooring is provided by third parties. No restrictive limitations on water depth (30m referenced) and water level variations (30m referenced). Connection of the float to the mooring system is not specified.</p> <p>Operations & maintenance</p> <p>CAT has a flexible scope of work, which can include O&M services on a per-project basis. Good and well structured O&M procedures, with a satisfactory focus on safety. Good quality of the provided O&M manual. Broad global network of collaborators, distributors.</p>								

11. A5 – Sustainability & environment

Section A5	Sustainability & Environment	Criteria	Supplier A	Score	Supplier B	Score
A5.1	Sustainability	Has a RE policy in place for the company on the 4 aspects (human, social, economic and environmental). In the process of developing and executing and RE policy. Has a RE policy in place but not achieving its goals and targets. Has a RE policy in place and exceeding its goals and targets.	Claimed sustainability evaluation ongoing. No documented proof of recyclable materials used. Decommissioning procedure with shredding and recycling of plastic is claimed. Compatible with drinking water.	0	Sungrow group made announcement in May 2020 that they have joined the RE100 Climate group, a group of businesses committed to the use of renewable power, to switch its electricity used globally in its manufacturing and operations to 100% renewable energy by 2025.	2
A5.2	Environmentally Safe and recyclable Materials	Able to show proof that their products are made of recyclable environmentally safe materials. 0. = 30% recycled materials. 1. min 30% recyclable material. 2. min 50% recyclable material. 3. min 75% recyclable material.	Has mentioned that they of 100% recyclable ecofriendly materials used but unable to verify.	0.5	has statement of recyclable materials used but unable to verify.	0.5
A5.3	Locally Sourced materials	Show proof of local content in various markets. 1. min 30% of float system is locally sourced in country. 2. min 75% of float system is locally sourced/manufactured in country. 3. min 90% of float system is locally sourced/manufactured in country.	They have some local content and manufacturing in countries where they manufacture but it is limited. No actual information made available.	1	They have some local content and manufacturing in countries where they manufacture but it is limited. No actual information made available.	1
A5.4	GHG emissions	Provide information of GHG emissions. 1. min 30% of float system is locally sourced in country. 2. min 75% of float system is locally sourced/manufactured in country. 3. min 90% of float system is locally sourced/manufactured in country.	Their website stated 510,000 Tons of CO2 avoided from their projects. The information cannot be validated.	0	No information or documentation provided or available publicly.	0
				1.5		3.5

Scope content overview

1. Minimum Requirements
2. Technical Specifications
3. Manufacturing
4. Logistics
5. Installation
6. Anchoring & mooring
7. Operations & Maintenance
8. Sustainability & GHG emissions
9. Warranties
10. Project References



THANK YOU

We Thank You for attending the webinar.

If you have any further questions and would like to speak to us, please send them via email to info@yoginfra.com

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APPENDIX – FIRM PROFILE

A brief firm profile of YOG INFRA with an introduction to our service offerings and geographic experience of our team members.

YOG INFRA

About Us

YOG INFRA is an infrastructure focused financial advisory firm committed to support sustainable economic growth driven through infrastructure development. We work extensively with Development Finance Institutions (DFIs), Private Sector and Government Agencies.

We have our offices in two locations – Singapore and India. We work on projects globally, and the team brings with a strong experience in development of infrastructure projects in Asia.

OUR SECTOR COVERAGE

The team members of YOG INFRA have experience in advisory services across below mentioned infrastructure sectors:



Power (Generation, Transmission, Distribution)



Renewable Energy (Solar, Wind, Hydro)



Water and Waste Management



Transport (Road, Rail, Ports, Airports)



Urban Infrastructure (Real Estate, Housing)



Social Infrastructure (Health, Education, Sports)



INTERNATIONAL EXPERIENCE

We bring international experience across Asia, Middle East and Africa, which enables us to incorporate best industry practices in our services to help clients deliver sustainable infrastructure projects.



VARIED SECTOR KNOWLEDGE

We possess working knowledge of various infrastructure sectors to deliver sectoral learnings in our service offerings to clients and meet their specific objectives.



STRONG LOCAL RELATIONSHIPS

We have developed strong relationships with local partners across Asia; which has proven valuable to get insight in the country specific context for our advisory services.



QUALIFIED PROFESSIONALS

All our team members are qualified and subject matter experts in their respective fields. We also have an expert panel with experienced professionals across multiple geographies.



ISO CERTIFICATION

We are ISO 9001:2015 certified company; an international standard that specifies requirements for a quality management system (QMS). We strive to consistently provide high quality deliverables.



VALUE-ADD SERVICES

We partner with other firms to provide complimentary value-add advisory services (technical, legal and tax) as per client requirements specific to the project/ transaction.

OUR SERVICE OFFERINGS

Infrastructure Advisory



PUBLIC PRIVATE PARTNERSHIPS (PPP)

- PPP Feasibility/ Options Assessment
- PPP Transaction Advisory



BUSINESS PLANS AND MARKET ENTRY STRATEGY

- Strategic Business Plans
- Country Assessments/ Market Entry Strategy



FINANCIAL MODELLING

- Development of Financial Models for infrastructure projects across sectors
- Model Reviews



DUE-DILIGENCE

- Commercial and Contractual due-diligence
- Review of transaction structure, project risk assessment and review of project agreements



PROJECT FINANCE

- Assessment of financing options
- Project Finance – Debt and Equity Raise for infrastructure projects



DEBT REFINANCING & RESTRUCTURING

- Debt refinancing
- Debt restructuring to improve or restore liquidity for infrastructure projects



TRAINING AND CAPACITY BUILDING

- Capacity Building for government agencies and private sector
- Training done by deal practitioners



RETAINERSHIP SERVICES

- Monthly retainer with our existing or new clients to help them meet their financial advisory needs across the board

YOG INFRA

Our Geographic Experience

The team brings project execution experience in across Asia, Middle East and Africa.



SOUTH – EAST ASIA

- Singapore
- Thailand
- Vietnam
- Philippines
- Indonesia
- Malaysia
- Myanmar



SOUTH – ASIA

- India
- Nepal
- Bangladesh



CENTRAL ASIA

- Uzbekistan



MIDDLE EAST

- Saudi Arabia
- Oman
- Qatar



EAST AFRICA

- Malawi
- Tanzania
- Kenya
- Ethiopia

CONTACT

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