

Analysis and insight on emerging renewable segments

## **FLOATING AND CANAL-BASED SOLAR PV MARKET IN INDIA**

Scope, Demand, Challenges and Prospects

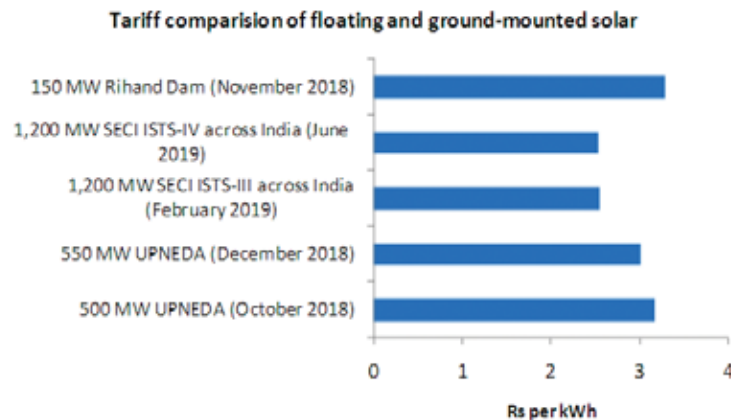
## **WIND-SOLAR HYBRID MARKET IN INDIA**

Potential, Projects, Economics and Projections

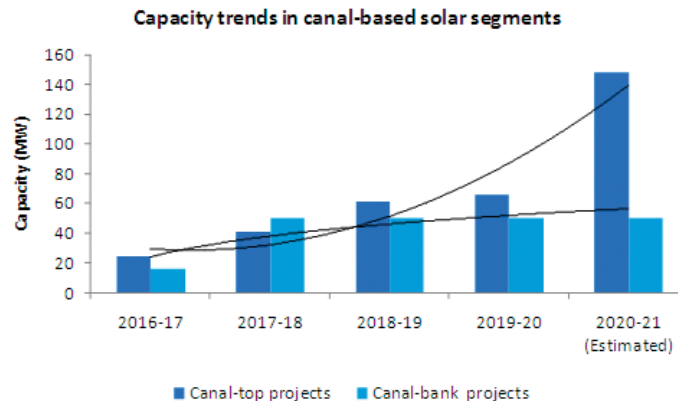
Currently considered a niche segment, the concept of floating, canal-top and canal-bank solar PV is poised for a significant breakthrough in India. These projects can be installed on canals, dams, and reservoirs used for industries, irrigation, drinking water storage and aquaculture ponds. The total potential of these segments is expected to be more than 700 GWp in India owing to a large number of dams and reservoirs for floating solar and irrigation networks for canal-based solar.

These projects are gaining traction as land is becoming scarce and more expensive day by day and developers are facing challenges in acquiring huge tracts of land for ground-mounted solar projects. While currently India has only a few megawatts of operational floating and canal-top solar projects, there are hundreds of megawatts of these projects under development while many more tenders are expected by SECI, NTPC, and other PSUs and state-level agencies.

Though the present market size for floating solar projects is quite small, this segment has a positive outlook owing to low tariffs, land scarcity for ground-mounted projects, and synergies with hydro and thermal power plants.



Meanwhile, canal-based solar projects have higher project tariffs, require extensive civil work, and involve coordination between multiple departments.



In total, these segments are projected to cross 8,029 MW by 2022-23, despite the high capital and operating costs.

The key objectives of this report are to analyse the growth trajectory and market outlook, economic viability and key emerging trends in the floating and canal-based solar markets in India. The report examines the market potential, capacity trends and the present policy and regulatory scenario for the two segments. It highlights the installed and upcoming project capacity with detailed case studies of four to five key projects in each segment.

The report also discusses the project costs, tariffs and cost economics for each of these segments and its cost-competitiveness with ground-mounted and rooftop solar power. It highlights the key technology types and suppliers of floating systems. Finally, the report presents the future growth drivers, perceived challenges and capacity, tariff and investment requirement projections up to 2022-23 for floating solar and canal-based solar segments.

## 1. Executive Summary

## 2. Potential and Overview

- ❖ Introduction
- ❖ Market Potential
- ❖ Current Capacity
- ❖ Key Benefits
- ❖ Growth Drivers
- ❖ Policy and Regulatory Scenario
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- ❖ Risks and Challenges
- ❖ Insights

## SECTION I: FLOATING SOLAR

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  - By NTPC
  - By SECI
  - By Other Agencies
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  - 500 kWp project at Banasura Sagar reservoir in Wayanad
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  - 10 MW canal-top and 5 MW canal-bank in Gujarat
  - 2.5 MW projects each on Sidhwan and Ghaggar Branch Canals in Punjab
  - 6 MW canal-top set up by Cochin International Airport Limited

### 8. Cost Economics, Tariffs and IRRs

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### 9. Outlook and Projections

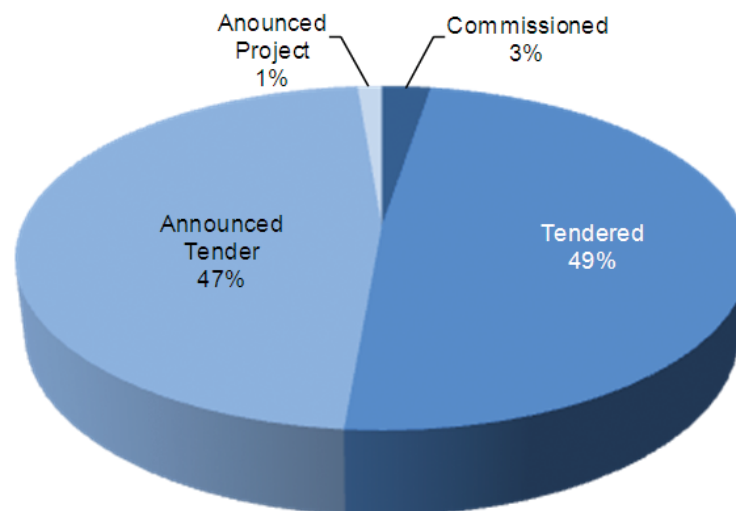
- ❖ Future Growth Drivers
- ❖ Perceived Challenges
- ❖ Projections

Hybridisation of two complementary technologies, wind and solar energy, results in an optimal use of land and reduces land wastage while enabling the reduction of gestation period of the project. Apart from transmission infrastructure, the associated infrastructure such as roads, personnel and offices help reduce project costs as well. These synergies lead to optimisation of energy price and generation mix for the hybrid power plant.

Industry estimates the wind-solar hybrid potential to be around 13,902 GW. Of this, top six states account for 11,791 GW or around 85 per cent of the total potential. These include Rajasthan, Gujarat, Goa, Andhra Pradesh, Telangana and Maharashtra. Meanwhile, the National Institute of Wind Energy estimates hybrid power generation potential in seven states, with the addition of Madhya Pradesh to the list.

To develop this potential, the Ministry of New and Renewable Energy released the National Wind-Solar Hybrid Power Policy in May 2018, setting a target of 10 GW of wind-solar hybrid capacity by 2022. The policy is aimed at the optimal utilisation of transmission infrastructure and land, to reduce the variability in renewable power generation and achieve better grid stability. So far, only two states, Andhra Pradesh and Gujarat, have released wind-solar hybrid-specific policies.

The current total wind-solar hybrid power capacity in India stands at 3,197.4 MW at various stages of development as of September 2019. Of this, only 82.4 MW has been installed. While 1,560 MW or 49 per cent of the total capacity has been tendered already, 1,514 MW of tenders have been announced. A project with 41 MW of capacity has been announced as well.



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**Contact details:**

**Sumita Kanjilal**, Information Products  
India Infrastructure Publishing Pvt. Ltd.  
B-17, Outab Institutional Area, New Delhi 110016, India  
Tel: +91-11-46560421, 41034600, 41034601 Fax: +91-11-26531196  
Mobile: +91-9958299609 , Email: sumita.kanjilal@indiainfrastructure.com