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● **SUN OVER WATER**

## Why floating solar needs government support

**SHADOWED POTENTIAL.** Despite the promise of good returns, investors remain wary



**BUOYANT ASSET.** The 278 MW floating solar park at Omkareshwar dam on the Narmada in Madhya Pradesh is collectively owned by three entities — SJVN Green Energy, NHDC, and Amp Energy

**M Ramesh**

The Omkareshwar dam on the Narmada in Madhya Pradesh creates a reservoir of about 90 sq km — roughly the size of Gurugram or Noida near Delhi, or Navi Mumbai. This picturesque sheet of placid water briefly held a unique distinction as home to the world's biggest floating solar project, until another project in China pushed it to second place. Nevertheless, with 278 MW of solar panels gently bobbing on the shimmering waters, it has its place in history as the first-of-its-size in the world, setting a template for similar projects.

The 278 MW capacity is owned by three entities — SJVN Green Energy Ltd (90 MW), NHDC (88 MW), and Amp Energy (100 MW). These capacities are alternating current (AC), which means the constructed direct current (DC) capacities will be higher. In all, the Mad-

hya Pradesh government entity Rewa Ultra Power Solar Park Ltd plans to have 600 MW (AC) on the Omkareshwar reservoir. Work is on for 300 MW more. When fully built, the solar plant (owned by multiple entities) will cover 12 sq km.

SJVN Green's ₹646-crore, 90 MW section — now three months old — was constructed by L&T, which also maintains the plant. The 2,19,000 bifacial modules, supplied by LONGi of China, sit on 4,50,000 locally made HDPE floats, moored to the reservoir bed with about 2,000 steel ropes, which can handle water level fluctuation of 3 metres. The only means to reach the solar 'island' is by boat. The modules will produce, on average, 185 million kWhr of electricity a year during the plant's 25-year lifetime. As many as 56 lightning arresters protect the plant. Four floating barges hold inverters and transformers; the inverters convert the DC current to AC, while the transformers step up the voltage from 660 V to 33,000 V, before transmitting the

power onshore, L&T project manager Lawrence Dhanaraj told *businessline*.

### MAJOR HURDLE

Some years ago, the Indian government fixed a target of 10 GW for 2020-21, against which it has today achieved about 500 MW, with another 1 GW on the anvil. The potential, however, is immense — of the order of 300 GW. So, what is holding back India's floating solar installations? Answer: Cost.

Given the cost of SJVN Green's plant, and with an inverter efficiency of 95 per cent and 108 MWDC installation, the cost per MW works out to be ₹6 crore; a typical largescale, ground-mounted plant costs about ₹4.5-5 crore. The higher cost of floating solar shows up in the tariffs. SJVN Green, NHDC and Amp Energy won their projects quoting per kWhr prices of ₹3.26, ₹3.22 and ₹3.21 respectively. Further, three companies, NTPC Renewable, SJVNGreen, and Hinduja Renewable, have won 100 MW projects each in phase-II of Omkareshwar,

quoting tariffs of ₹3.69-3.70.

Dhanaraj explained that ahead of construction, L&T had to do several studies such as bathymetry and topography to study the underwater features, apart from undertaking dredging work and removal of features such as half-submerged trees and abandoned electric poles. In some places, the reservoir bed had to be raised by dumping (dredged) material. All these add to the cost, which is partly offset by avoidance of land acquisition cost and higher electricity generation.

### SCALE FACTOR

However, the cost is expected to reduce with scale, as happened with ground-mounted solar. Vivek Agarwal, Global Policy Expert and Country Head, Tony Blair Institute for Global Change, told *businessline* that studies have shown that the levelised cost of energy for floating solar is 5-10 per cent higher compared with ground-based, but "this gap is shrinking with improvements in technology". He noted

that in regions with good sunlight and high land prices, floating solar "can deliver better returns than traditional solar farms".

He also observed that "with limited long-term data on floating solar, investors are cautious".

Other experts have said that the government should give incentives for floating solar, at least until an ecosystem develops, gathers expertise and delivers scale. As for construction, L&T and Tata Power Renewables have emerged as key players; the Hartek group and BHEL are among the others in the fray. The manufacturing ecosystem for floats and moorings will scale up with demand.

Floating solar is a low hanging fruit compared with offshore wind, for which the government has earmarked ₹7,453 crore as incentive; this money can, instead, quickly deliver a much larger floating solar capacity. "Floating solar is not just an alternative; it could become a key pillar of India's clean energy future," Agarwal said.