Case Study : West Kallada 50 MW Floating Solar Power Project, Kerala

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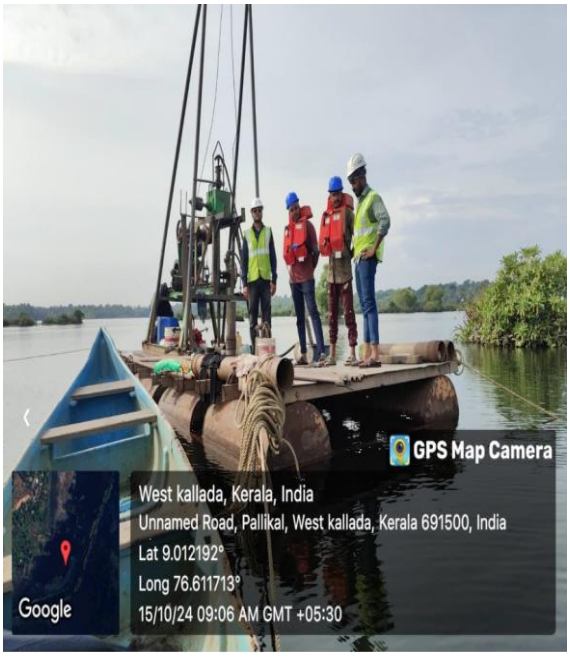

Executive Summary

The West Kallada 50 MW Floating Solar Power Project is a flagship renewable energy initiative in Kerala that demonstrates innovative land-use optimization, community participation, and regulatory-backed financial structuring. Developed by NHPC Ltd. and approved by the Kerala State Electricity Regulatory Commission (KSERC), the project converts waterlogged, unproductive paddy fields into a long-term clean energy asset aligned with the state's renewable energy and climate goals.

Background

Kerala State Electricity Board Ltd. (KSEBL) filed a petition before KSERC under Section 86 of the Electricity Act, 2003, seeking approval of a Power Purchase Agreement (PPA) with NHPC Ltd. for procurement of power from a 50 MW floating solar power plant at West Kallada in Kollam District.

The project is developed by NHPC Ltd., a Navratna public sector enterprise, in collaboration with West Kallada Non-Conventional Energy Promoters Pvt. Ltd. (WKNCEPPL), which represents local landowners. Approximately 300 acres of waterlogged, uncultivated paddy land have been leased for the project. Instead of

upfront land cost, NHPC has agreed to share 3% of project revenue with WKNCEPPL as lease compensation.

The project is approved under the MNRE Solar Park Scheme, with eligibility for central financial assistance capped at ₹20 lakh per MW, and has additionally received ₹11.83 crore as Viability Gap Funding (VGF) from the Government of Kerala.

Project Structure and Regulatory Features

- **Installed Capacity**: 50 MW
- **Project Type**: Floating Solar PV
- **Land Arrangement**: Lease model with revenue sharing
- **EPC Contractor**: Apollo Green Energy Ltd.
- **EPC Contract Value**: ₹259.72 crore
- **Grid Connectivity**: Kundara–Chavara feeder
- **Tariff (Ceiling)**: ₹3.04 per unit (inclusive of taxes and duties)

The tariff was finalized after negotiations and is comparable to or lower than similar floating solar projects approved by national and state regulators, including the NTPC Kayamkulam project.

Performance Safeguards and Incentives

KSERC-approved PPA provisions include:

- **Minimum Capacity Utilization Factor (CUF)**: 19%
    - Penalties applicable if underperformance is attributable to the developer
- **Incentive for Higher Generation**:
    - Energy generated beyond 25% CUF to be purchased at 75% of the approved tariff
- **Termination Notice Period**: Extended from 30 days to 90 days, enhancing contractual stability

These provisions ensure balanced risk-sharing between the generator and the utility.

Financial Summary

Verified Financial Parameters

Parameter	Value
Installed Capacity	50 MW
Project Area	~300 acres
EPC Contract Cost	₹259.72 crore
Tariff Approved (Ceiling)	₹3.04 per unit
Minimum CUF	19%
Revenue Sharing with Landowners	3%
State Viability Gap Funding	₹11.83 crore
MNRE CFA Eligibility	Up to ₹20 lakh/MW

Energy Generation and Revenue Analysis

Annual Energy Generation (Derived from Capacity and CUF)

CUF	Annual Generation
19%	~83.2 million units
20%	~87.6 million units
22%	~96.4 million units

Annual Gross Revenue (at ₹3.04/unit)

CUF	Revenue (₹ crore/year)
19%	~253
20%	~266
22%	~293

This represents gross operational revenue, prior to deductions such as O&M expenses and revenue sharing.

Per-Acre Energy and Revenue Contribution

The project spans approximately 300 acres, allowing land-normalized analysis.

Without Energy Storage

CUF	Units per Acre per Year	Revenue per Acre per Year
19%	~2.77 lakh units	~₹8.4 lakh
20%	~2.92 lakh units	~₹8.9 lakh
22%	~3.21 lakh units	~₹9.8 lakh

This highlights the economic value generated from land that was previously waterlogged and agriculturally unproductive.

With Energy Storage

While no storage system is currently included in the approved scope, integration of battery energy storage in future phases could:

- shift generation to peak-demand hours,
- improve grid value,
- increase realized revenue per unit.

Such enhancement would be subject to separate regulatory approval and cost-benefit assessment.

Implementation Status

- EPC contract awarded to Apollo Green Energy Ltd**.** on 26 July 2024
- Lease deed executed on 7 September 2024
- Surveys, site preparation, and engineering activities underway
- Scheduled completion within 18 months from EPC award, with expected commissioning in early 2026

Replicability Across Kerala

The West Kallada model is well suited for replication across Kerala due to:

- Availability of waterlogged and non-cultivable land
- Avoidance of land acquisition conflicts
- Community-inclusive revenue sharing mechanism
- Compatibility with irrigation reservoirs and backwater regions

Potential replication zones include Kuttanad, Kole lands, and other low-lying regions where floating solar can coexist with water management systems.

Conclusion

The West Kallada Floating Solar Project illustrates how Kerala can overcome land constraints through innovative design, regulatory discipline, and stakeholder participation. By transforming idle land into a clean energy resource without social displacement, the project establishes a scalable and policy-aligned model for renewable energy development in the state.

References

1. KSERC Information & Data Disclosure (IDD) for West Kallada Floating Solar Project
2. KSERC Petition and PPA-related filings submitted by KSEBL and NHPC Ltd.
3. Project bid and implementation documents related to West Kallada Floating Solar Project