Coastal India Green Hydrogen Project: Feasibility Assessment

Investment case for a 10MW Green Hydrogen facility powered by Hybrid Wind & Solar.

Prepared by Clean Green Energy Mission (cGEM) for Aravinthraajan Energy Systems (AESPL) | January 2026

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The project demonstrates strong financial viability with a 29.9% Equity IRR and rapid payback.

Total Capex	Equity IRR	Equity Payback	Funding Mix
₹4,840 M	**29.87%**	**3.35 Years**	**70:30**
($52.76M USD)	Project IRR: 11.45%	Rapid ROI	Debt : Equity

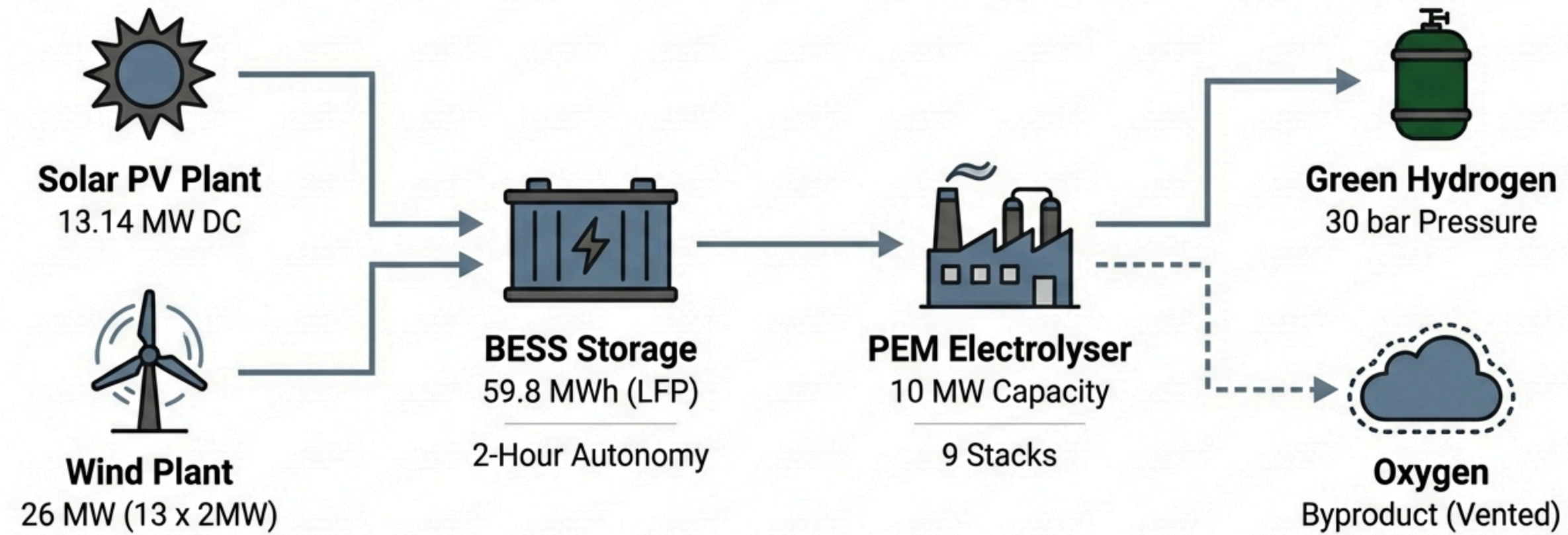
Operational Scope

- Capacity: 10MW PEM Electrolyser
- Power Source: 26MW Wind + 13MW Solar (Hybrid)
- Production: ~1,388 Tonnes Green H2 / Year
- Timeline: 9-Month Construction Period

Recommendation

Proceed to execution phase. The project leverages low-cost coastal wind resources to achieve a competitive production cost of ₹430/kg, securing a dominant market position.

A fully integrated hybrid renewable energy system designed for continuous production.



Location: Coastal India (Lat 10.23, Long 79.63) | **Total Land Use:** ~70 Acres

Project economics are driven by high renewable penetration and carbon credit revenue.

Revenue Streams

Green Hydrogen Sales: Primary revenue @ ₹425/kg (escalating 2% annually).

Excess Power Sales: 24.7 GWh/year sold to grid @ ₹7.50/kWh.

Carbon Credits: Verra VCS Standard credits generating ~₹43M/year.

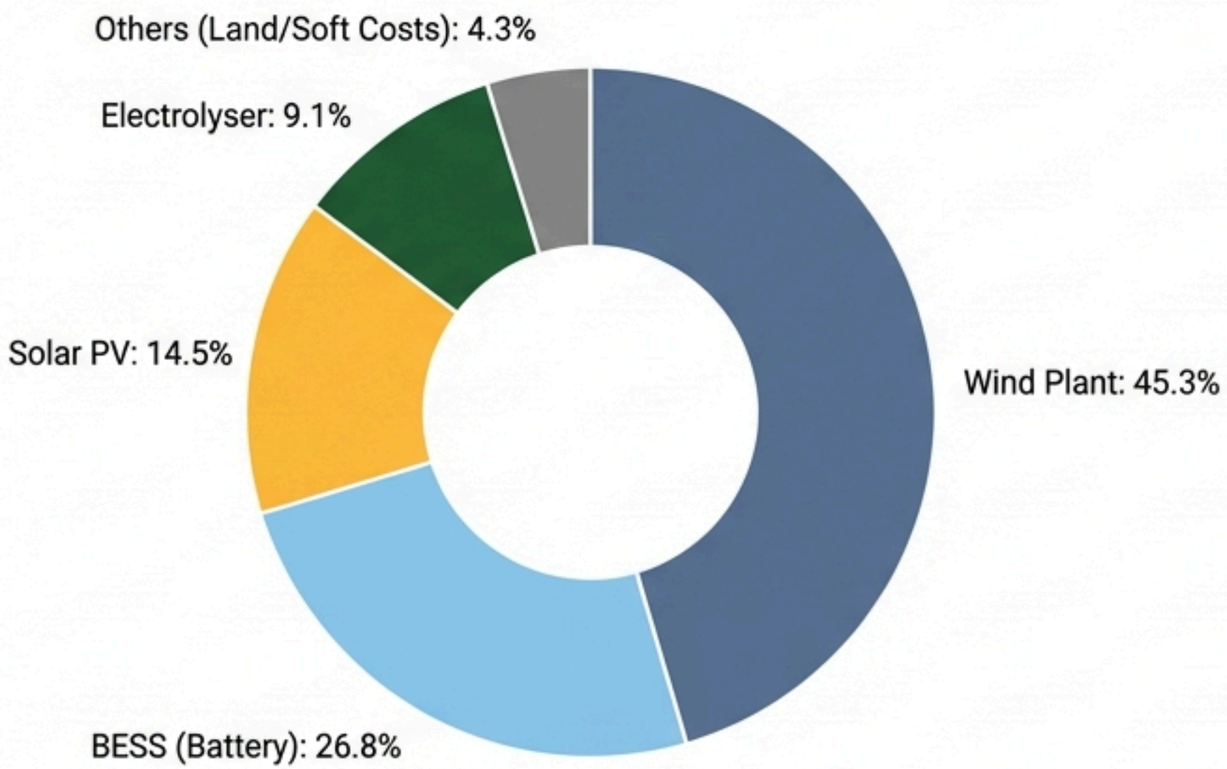
Financial Performance

Metric	Value
Project Cost	₹4,840 Million
Equity NPV	₹2,243 Million
Project NPV	₹988 Million
Debt Service Coverage (Avg DSCR)	1.28x
Minimum DSCR	0.91x (Early Years)

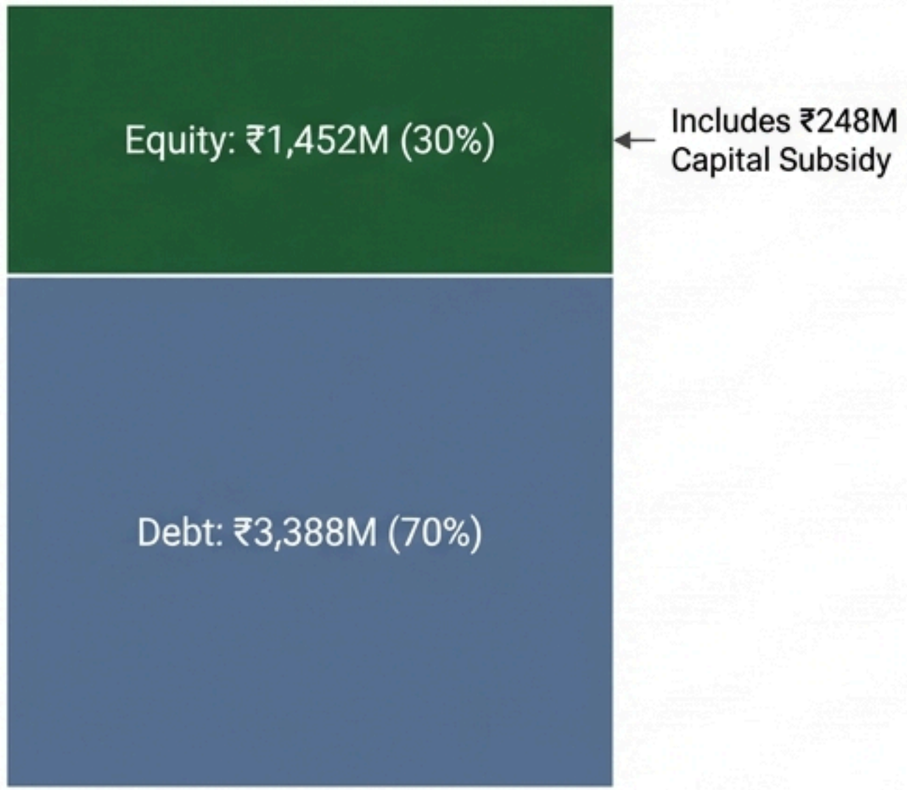
Strong cash flows ensure debt service capability even in low-wind years.

Wind generation constitutes the largest capital component (45%) to ensure utilization stability

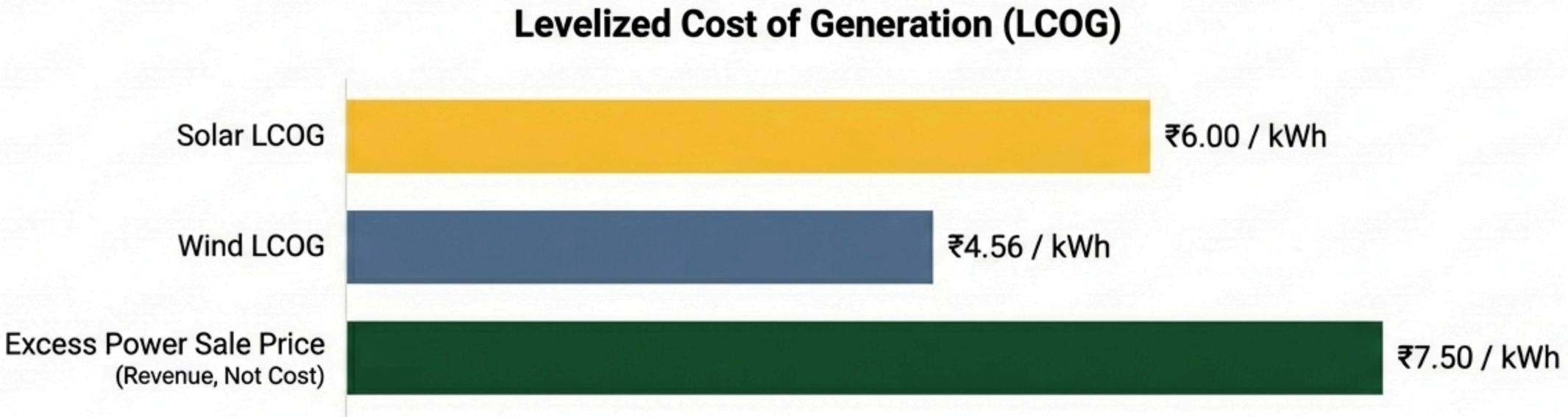
CAPEX Breakdown (Total ₹4,840M)



Funding Structure



Optimized renewable mix achieves a competitive Green H2 production cost of ₹430/kg.

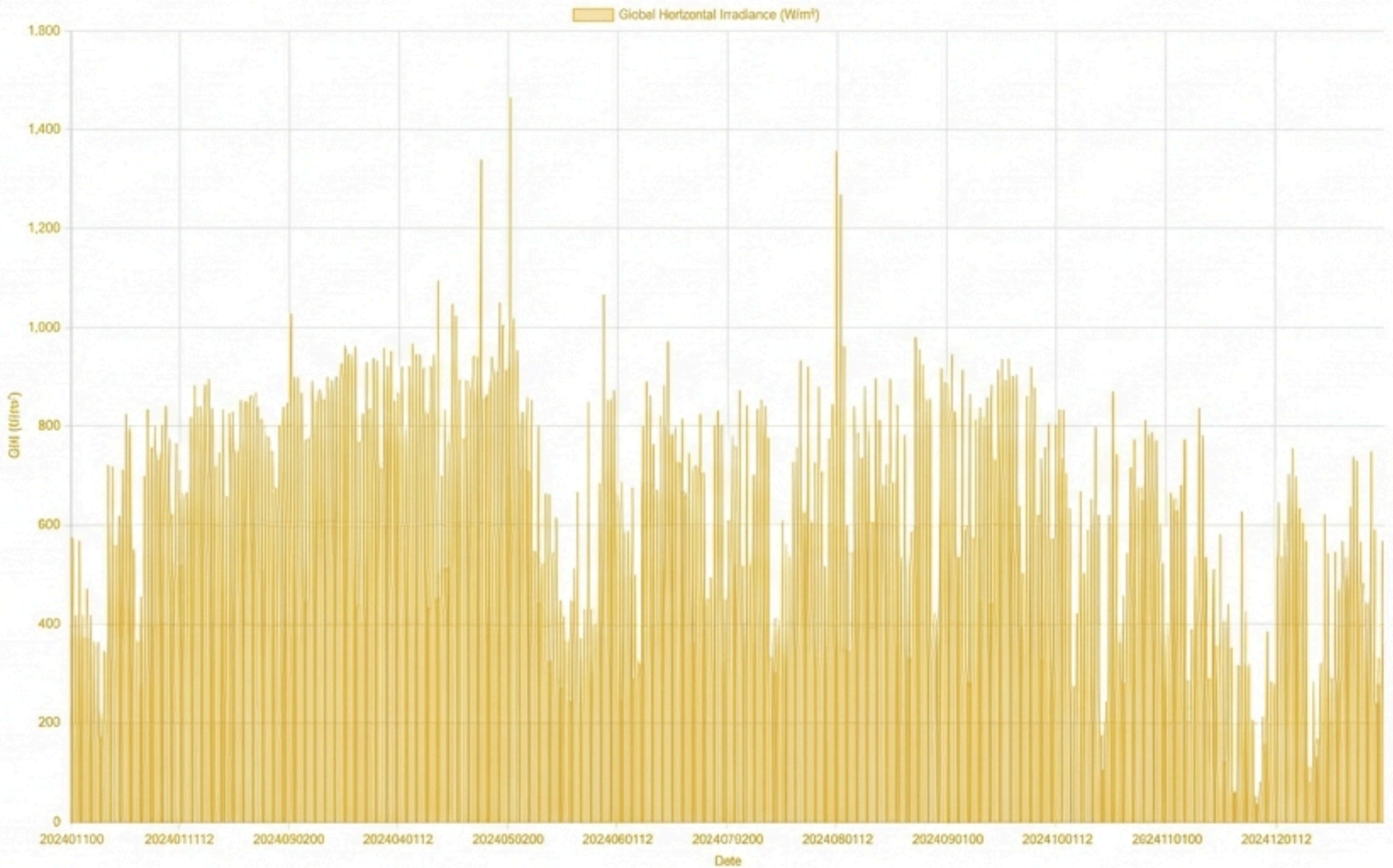


Green Hydrogen LCOG: ₹429.72 / kg ($5.16 USD)

Cross-subsidized by high-value sales of excess power.

Site solar irradiance supports consistent daytime base load generation.

Site Data	
Avg GHI	198.6 W/m²
Max GHI	1,463 W/m²
Solar Capacity	13.14 MW DC
Modules	Monocrystalline (550 Wp)
Plant Load Factor	16.91%



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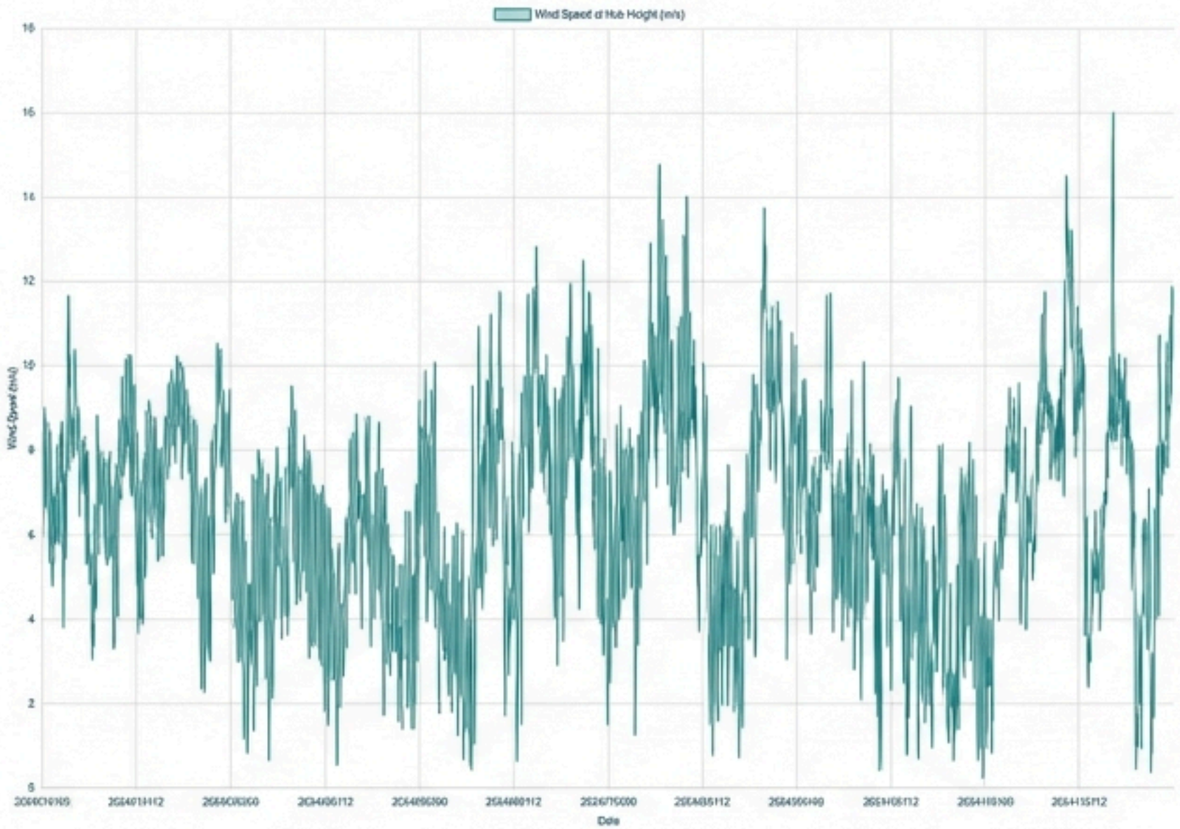
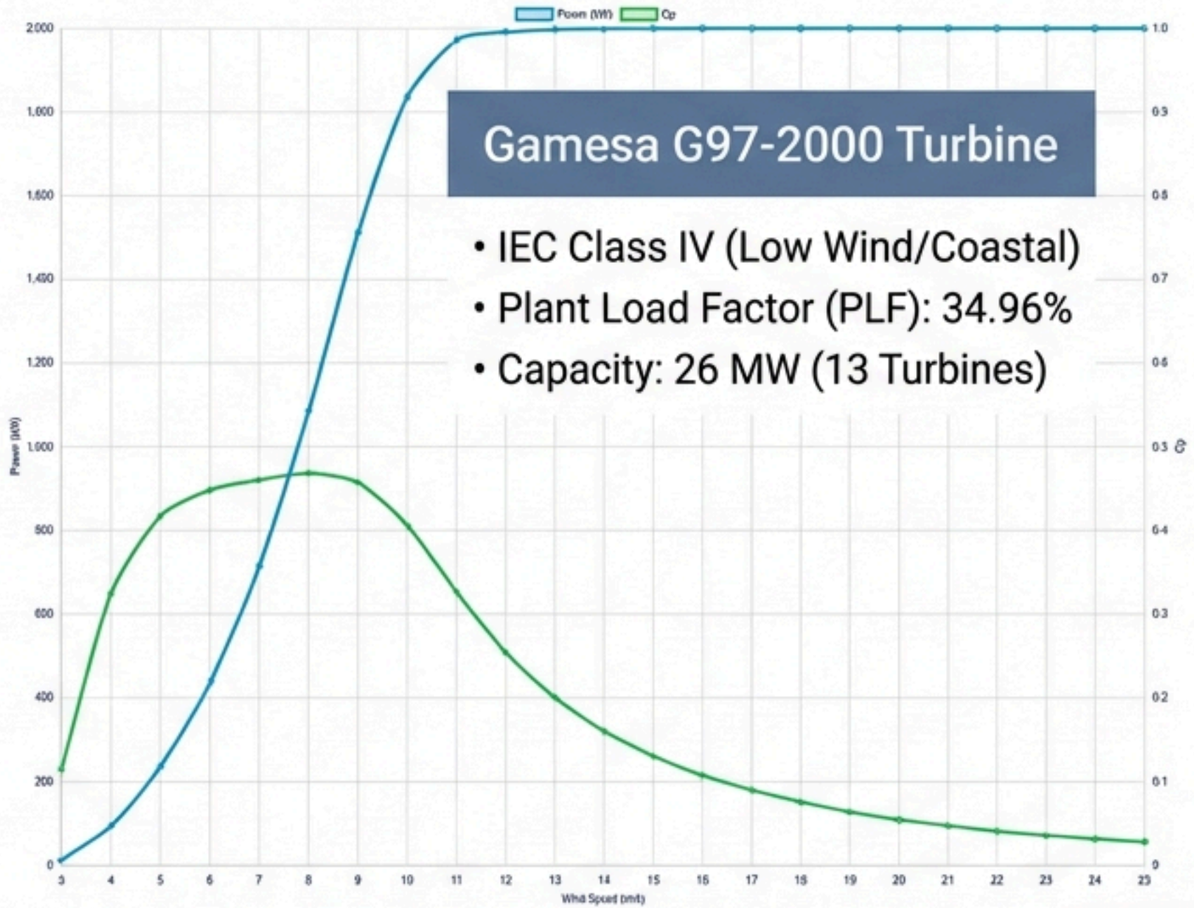
Coastal wind profile drives 80% of total green power generation.

Resource



Avg Wind Speed: 6.54 m/s @ Hub Height (104m).

Technology Match



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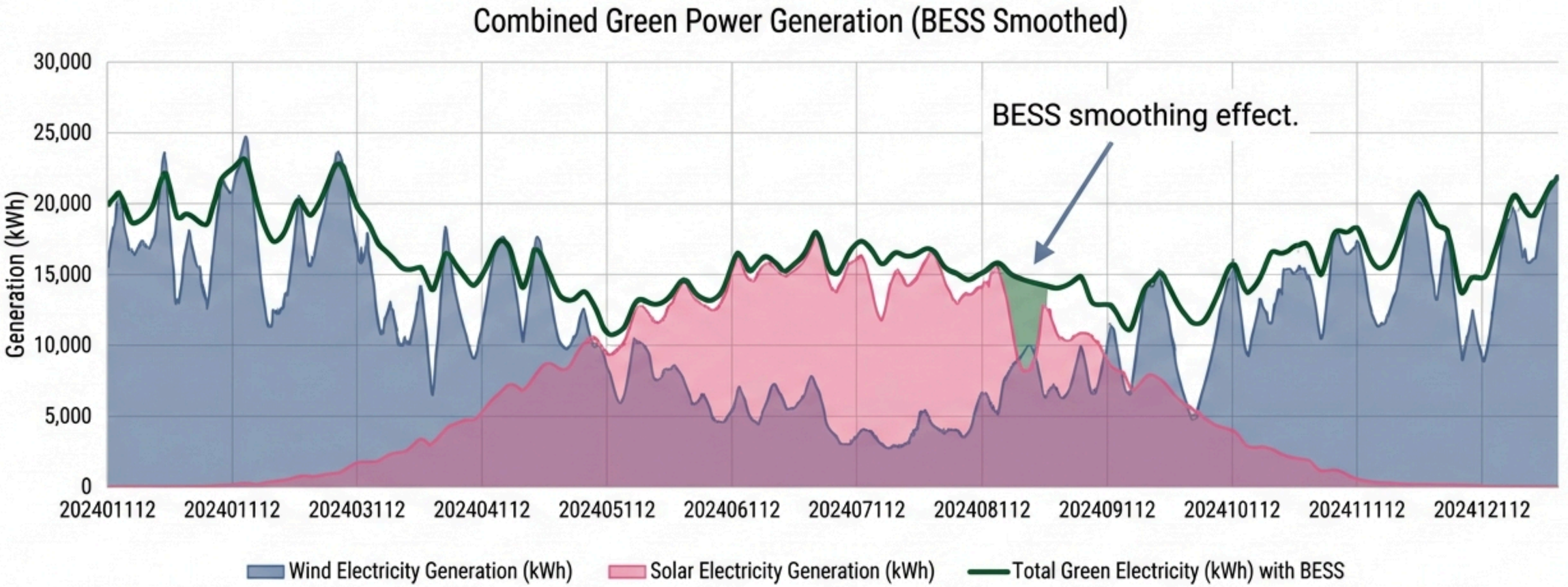
Battery storage (BESS) smooths intermittency to maximize electrolyser uptime.



Total Green Power:	Mix:	BESS:	Electrolyser Utilization:
~99.36 GWh/year	80% Wind / 20% Solar	59 MWh (2 Hours Autonomy)	76%

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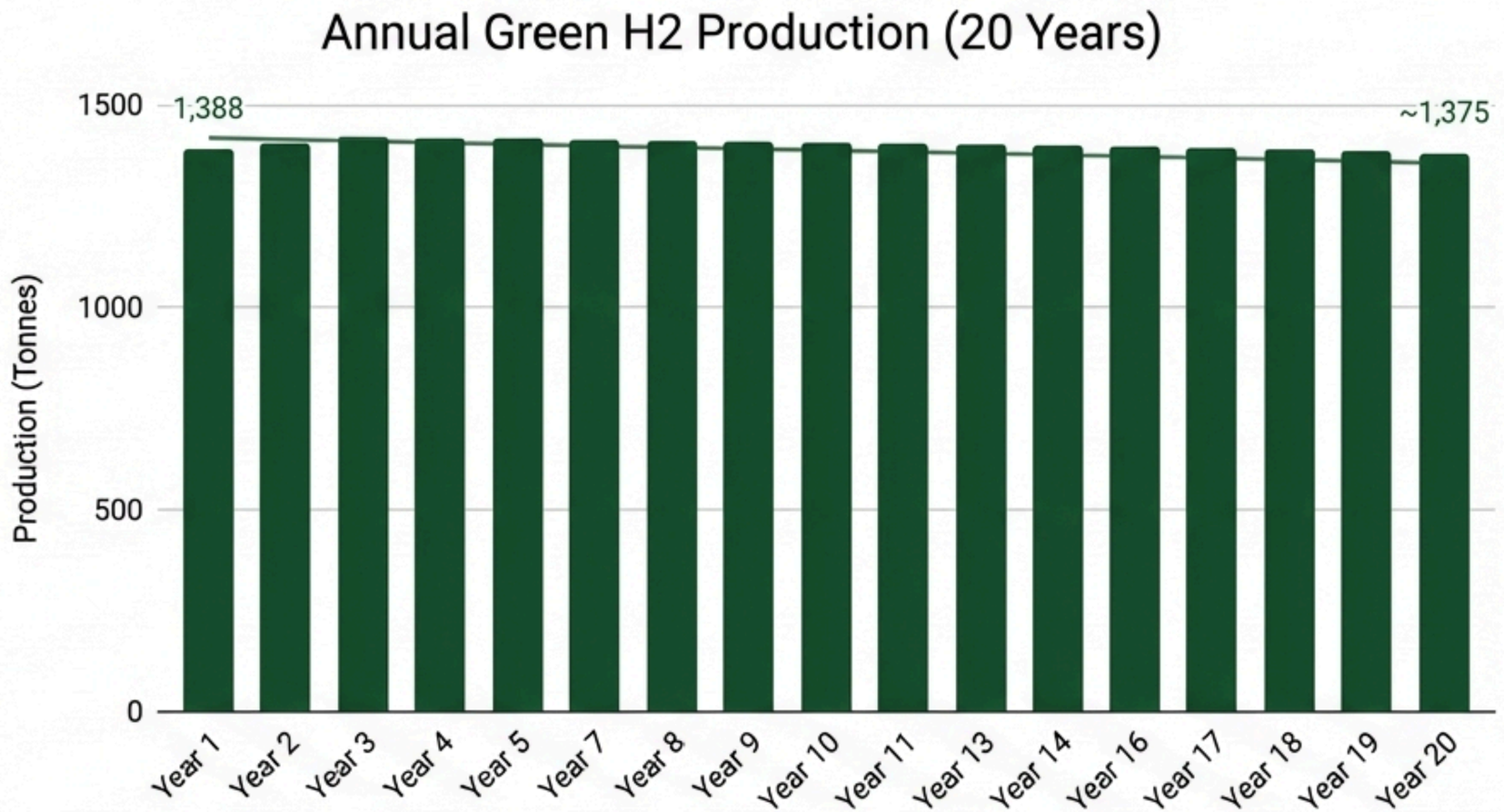
Facility is projected to produce **~1,388 tonnes** of Green Hydrogen annually.



Production Metrics

Hourly Rate: 208 kg/hour

Efficiency: 48 kWh / kg H2

Byproduct: Oxygen

- **11,108 tonnes/year** (Potential Upside)

Significant decarbonization impact aligns with global sustainability goals.

Total Emission Reduction: 23,533 tCO_2e / Year

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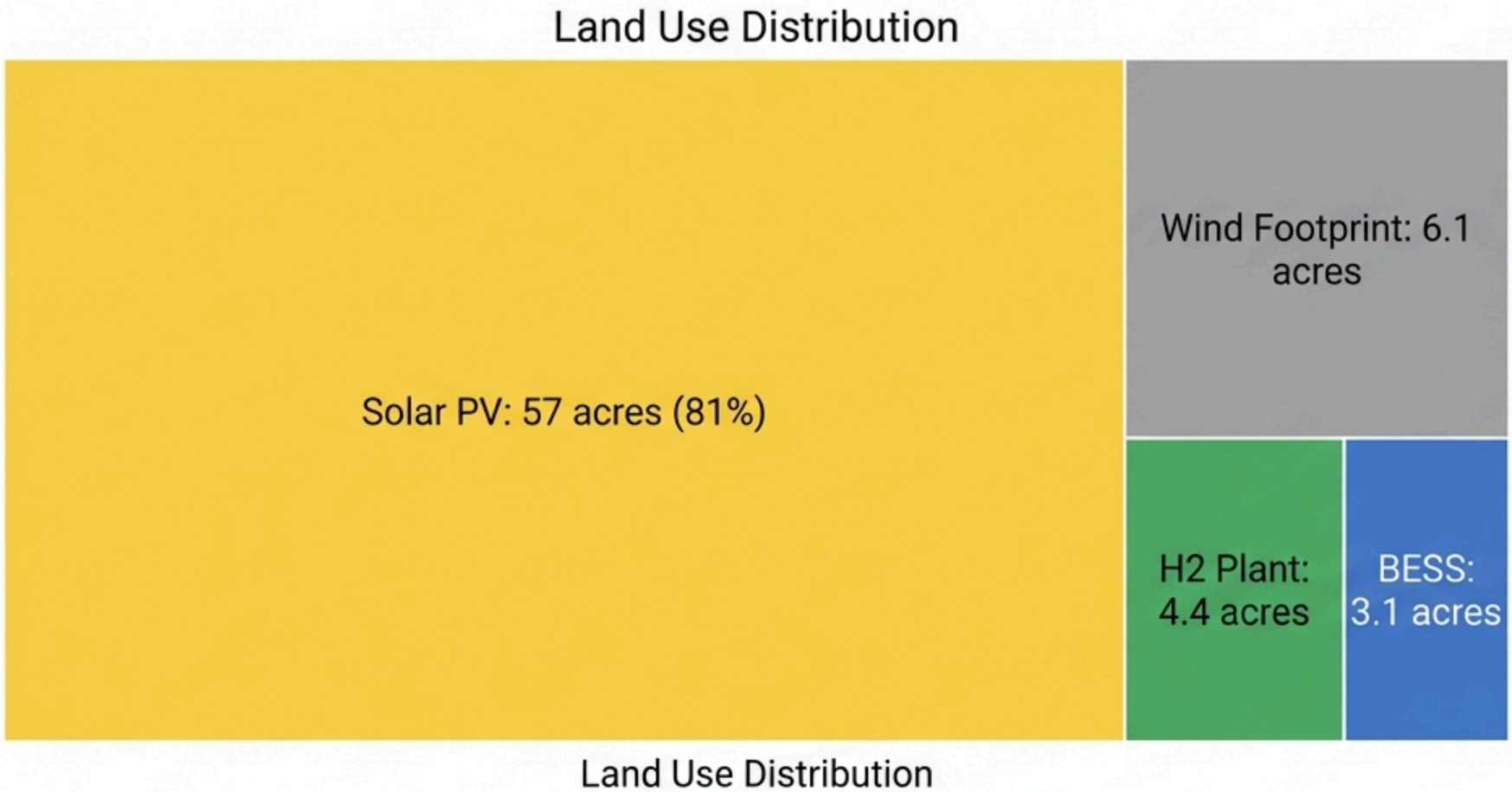
Removes 5,483 petrol cars annually

Equivalent to planting 388,000 trees

Avoids 54,000 barrels of oil

Carbon Credits verified under Verra VCS Standard (~$20/ton revenue).

70 acres of coastal land identified to house all generation and processing infrastructure



Land Economics

Total Area:
70.67 Acres

Total Land Cost:
₹8.8 Million

Status:
Identified Coastal Terrain

Selection of Tier-1 technology partners ensures reliability and efficiency

Electrolyser

- Type: PEM Technology
- Efficiency: 70%
- Configuration: 9 Stacks (1200kW ea)

Wind Turbines

- Model: Gamesa G97-2000
- Rating: 2MW
- Class: IEC Class IV (Low Wind)

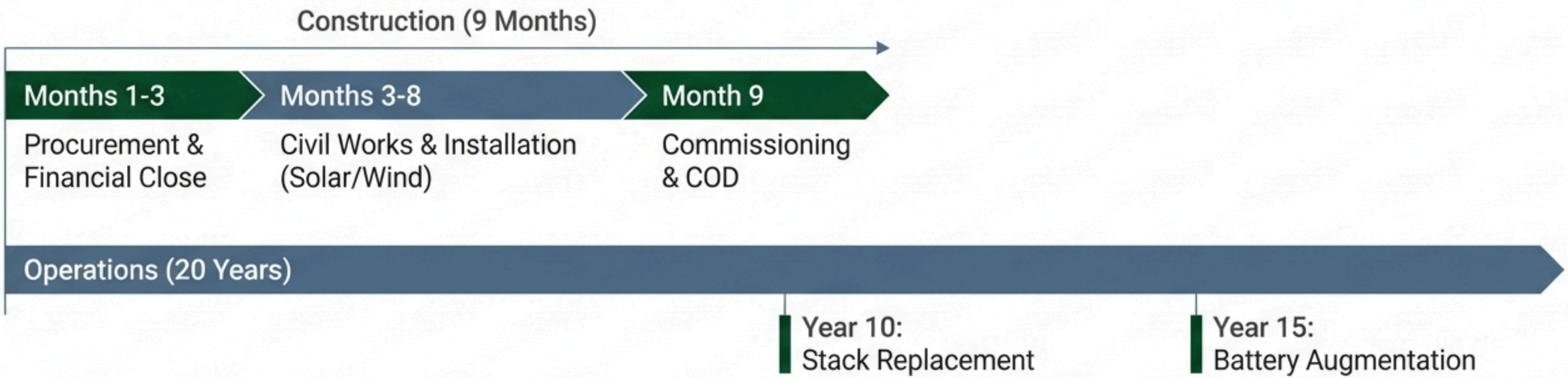
Solar Modules

- Type: Monocrystalline
- Power: 550 Wp
- Efficiency: 21.34%

BESS Storage

- Chemistry: LFP Lithium-Ion
- Life: 15 Years (Replacement planned)
- Round Trip Efficiency: 90%

Rapid 9-month construction schedule accelerates time-to-revenue



Action Title: Financial indicators and technical readiness support a clear ‘Go’ decision.

DECISION MATRIX

- ✓ Technical Feasibility Confirmed (76% Hybrid Utilization)
- ✓ High Financial Returns (<3.5 Year Payback, 29.9% IRR)
- ✓ Strategic ESG Impact (Verified Carbon Credits)

Recommended Next Steps

1. Approve Budget: ₹4,840 Million
2. Initiate EPC Contracting
3. Secure Land Rights

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