



Project EUROPE: Green Hydrogen Feasibility Assessment

Strategic Investment Proposal for Fátima, Portugal

Site Reference: P-002
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Project EUROPE offers a top-quartile 28.38% Equity IRR by leveraging optimal renewable synergy.

28.38%

Equity IRR (Leveraged)

€135.4 M

Total CAPEX

3.52 Years

Equity Payback

~2,850 MT

Annual H2 Production



Scope

Construction of a **20MW** Green Hydrogen facility in Fátima, Portugal, powered by 100% self-generated Wind (**64MW**) and Solar (**27.9MW**).



Strategic Edge

Location offers "**Very Low Wind Site IV**" consistency paired with high Summer DNI, maximizing Electrolyser Plant Load Factor (**77.89%**).



Financial Health

Optimized **70:30 Debt-Equity** structure ensures rapid capital recovery despite conservative operational modeling.



ESG Value

Avoids **~43,572 tons of CO₂e** annually, generating verified carbon credits (Verra VCS).

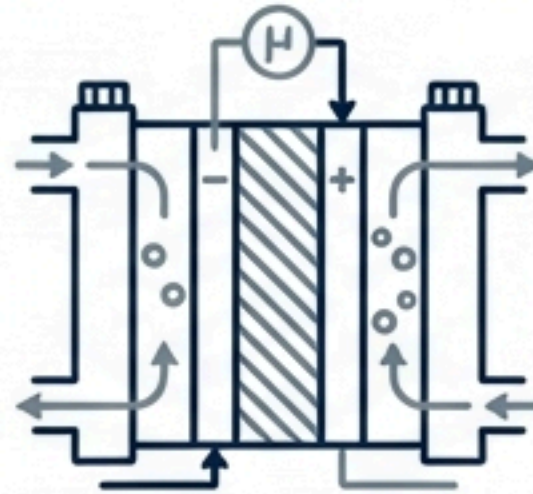
A de-risked asset built on resource complementarity, proven technology, and robust incentives

1. Resource Synergy



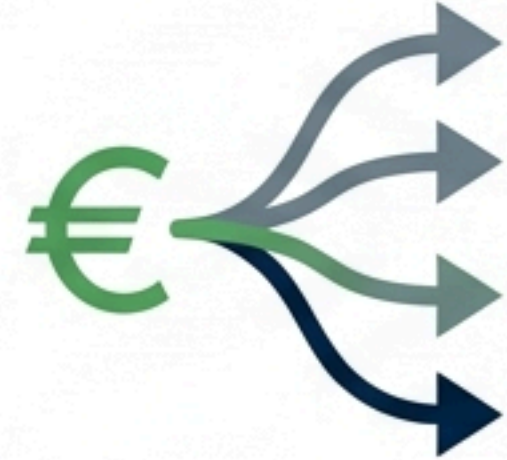
Fátima's meteorological profile (Winter/Night Wind + Summer/Day Solar) creates a "**natural baseload**," flattening the production curve without grid reliance.

2. Proven Tech Stack



Utilization of **Vestas V90 turbines** and **N-Type TOPCon Solar modules** feeding a **PEM Electrolyser** ensures **high efficiency (70%)** and **reliability**.

3. Multi-Layered Revenue



Financial resilience is secured through four distinct revenue streams: **Commodity Sales (H2)**, **Excess Power Sales**, **Government Subsidies**, and **Carbon Credits**.

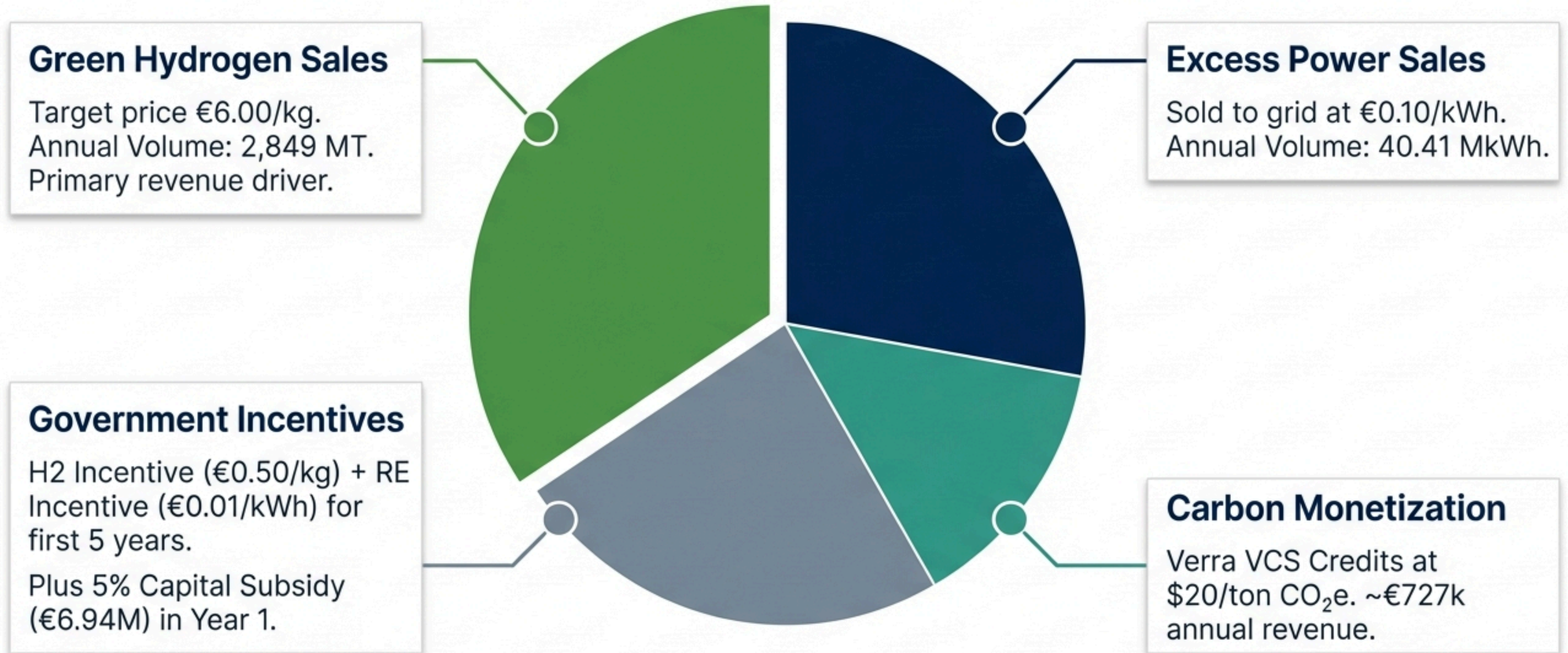
Optimized capital structure unlocks rapid payback and significant equity value.

Metric	Project Level	Equity Level (Leveraged)
IRR	10.96%	28.38%
NPV	-€6.4M	€35.1M
Payback Period	9.12 Years	3.52 Years

Debt Structuring Context

- 70% Debt financing (€94.78M) at 7% interest (10-year repayment).
- High leverage creates the bridge from from a modest Project IRR (10.96%) to attractive Equity IRR (28.38%).
- Strong debt serviceability with an Average DSCR of 1.26.

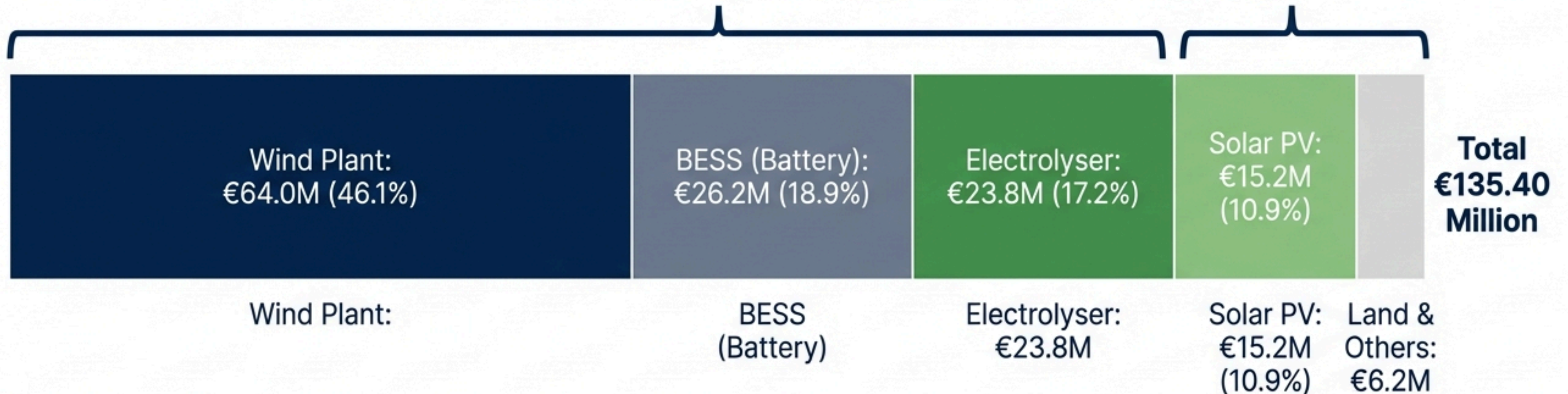
Diversified commercial strategy mitigates market risk across four revenue streams



CAPEX is dominated by power generation assets, securing low LCOE for the project lifecycle

Use of Funds

57% of CAPEX dedicated to Power Gen (locking in 20-year fuel cost)



Fátima site conditions provide a stable meteorological foundation for hydrogen production



Wind Resource

- IEC Class IV 'Very Low Wind Site'.
- Mean speed 5.5 m/s @ 50m
- Classification implies consistency over intensity.

Solar Resource

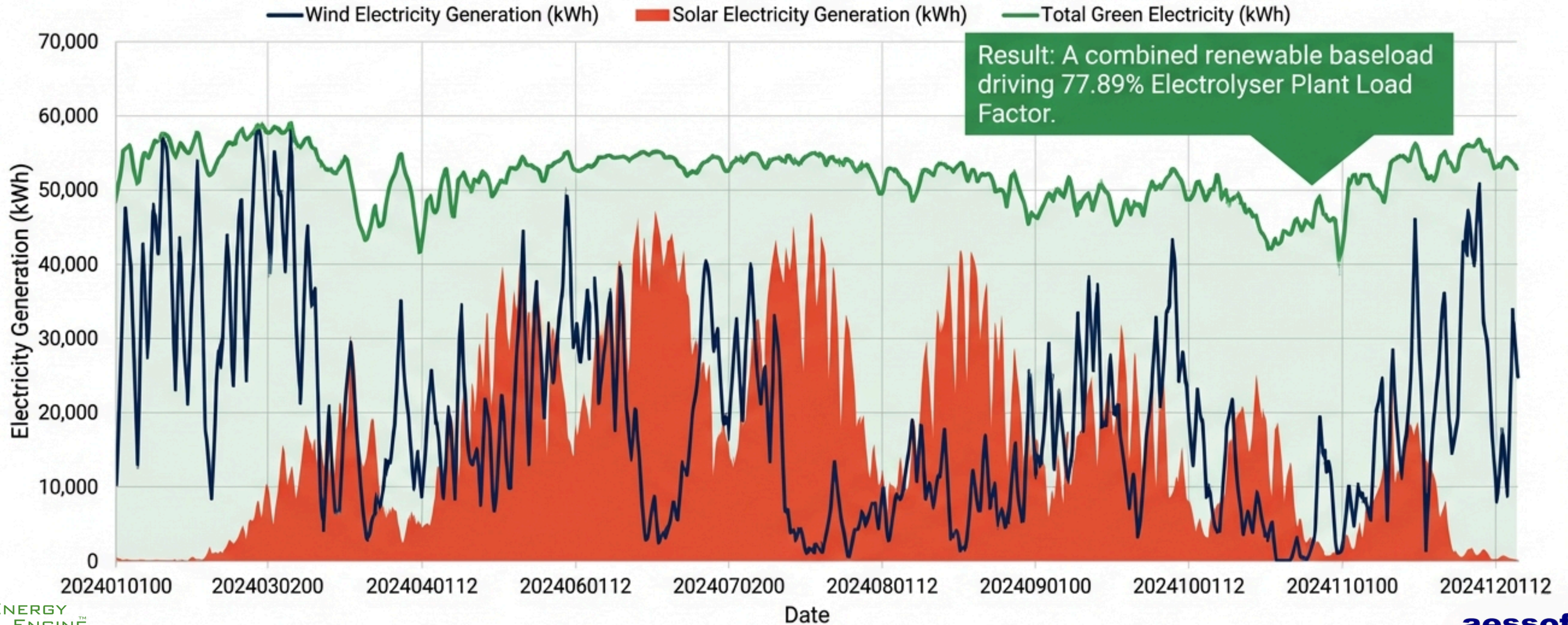
- Mean DNI 209.45 W/m² (Max 1060 W/m²)
- Strong summer irradiance complements winter wind.

Site Terrain

- Fátima, Ourém, Santarém
- Elevation 350m
- Rough/Urban terrain profile.

Complementary Wind and Solar profiles flatten the power curve, maximizing electrolyser utilization

Combined Green Electricity Generation



A fully integrated, self-contained power ecosystem.

Inputs: 100% Own Generation



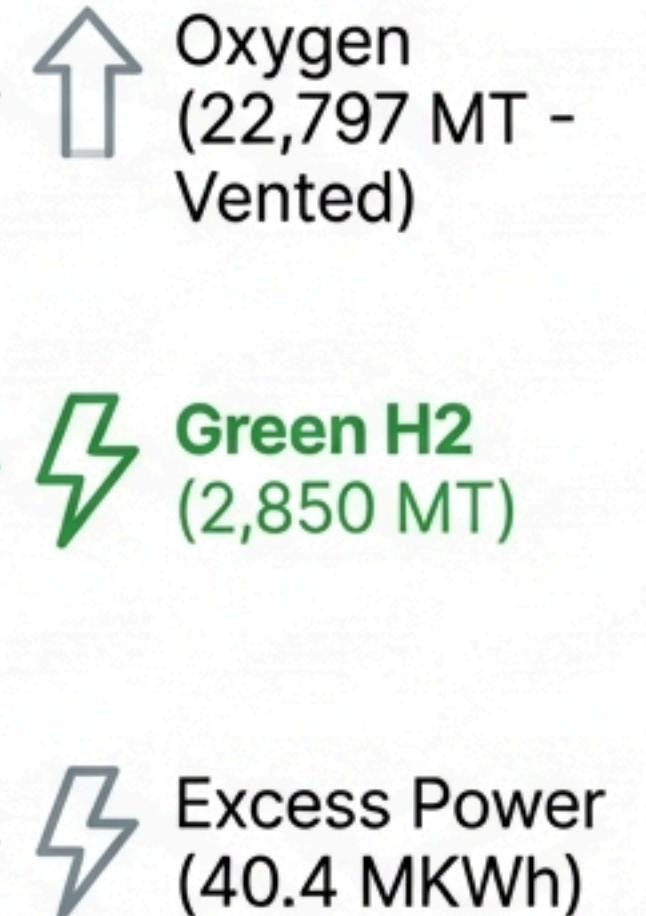
Balancing



Processing



Outputs



High-efficiency generation assets selected for reliability and yield.



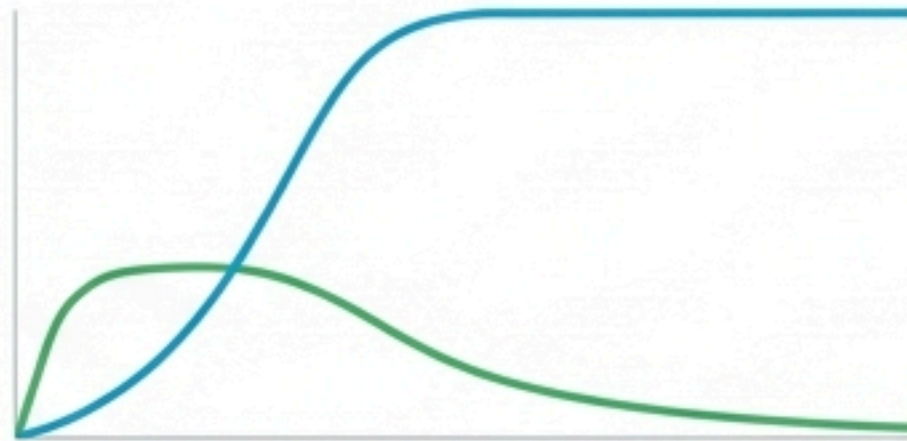
The Backbone: Wind

32x Vestas V90 2000 Turbines

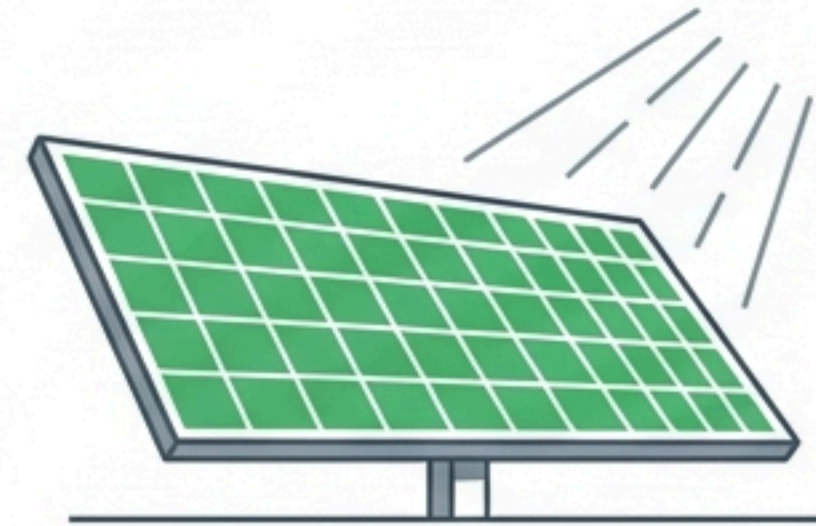
2.0 MW Rated Power

Net Generation: ~154 MKWh/year

Power Curve



The Peak Shaver: Solar



N-Type TOPCon Modules (TP SOLAR-TP550HG10TB)

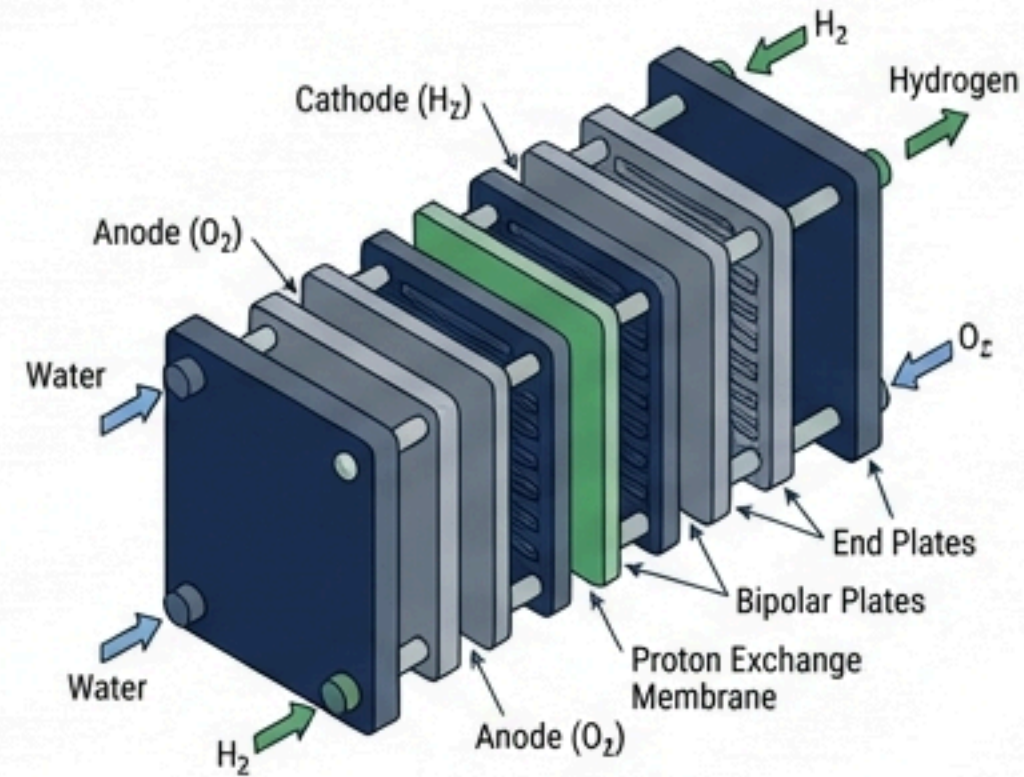
60,830 Modules @ 550 Wp

Net Generation: ~38.6 MKWh/year

PEM Technology ensures rapid response to renewable intermittency

Capacity

20.40 MW
Plant Size
(17 Stacks @
1200 kW)



Efficiency

70% Efficiency
Requires 48.02
kWh per kg of
Hydrogen

Output

Annual Production:
2,849.68 MT
Daily Capacity:
~416 kg/hour

Lifecycle: Stack replacement scheduled for Year 10 (fully budgeted in CAPEX)

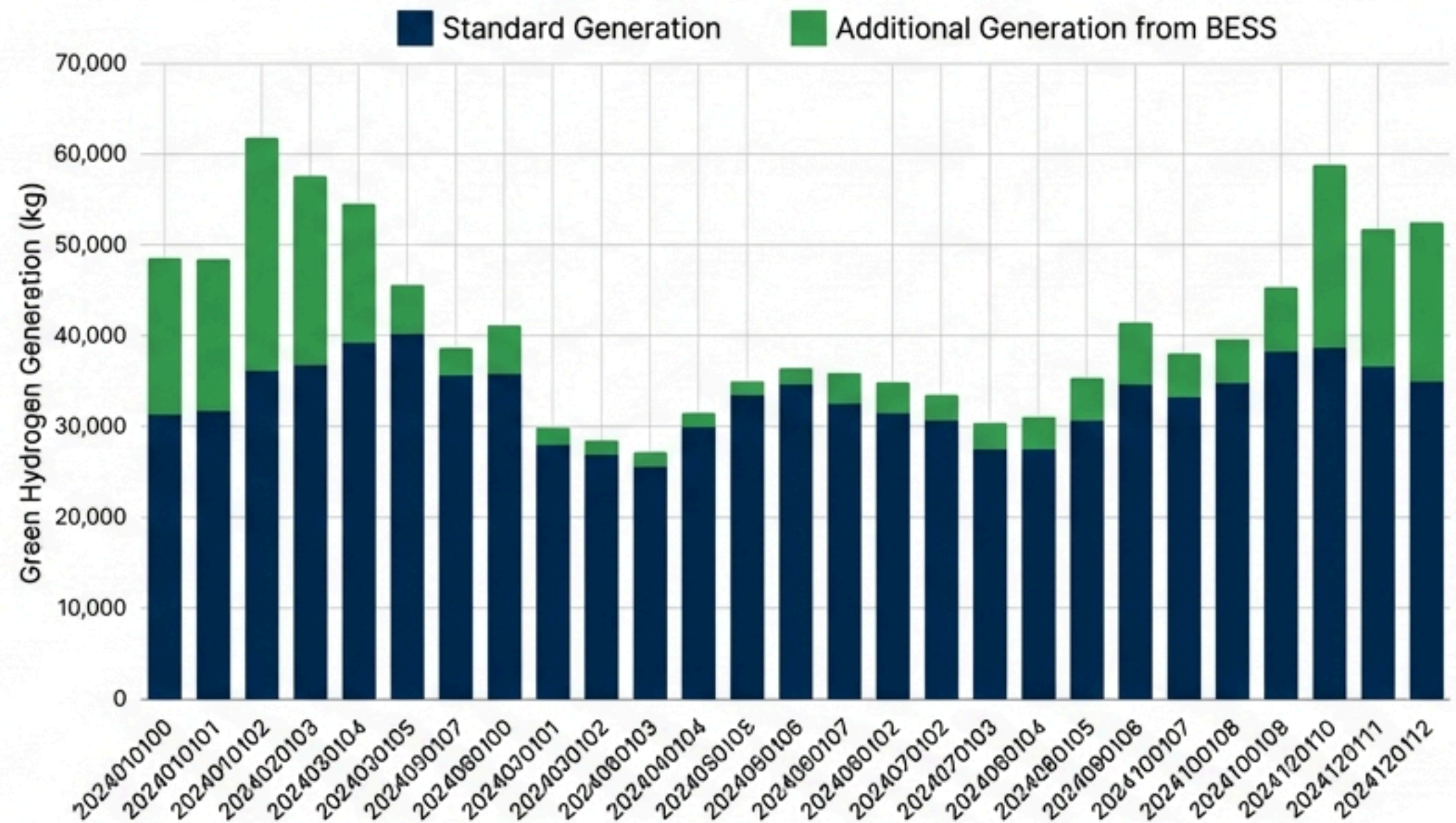
Battery Storage (BESS) captures curtailed energy to boost H₂ production

BESS Specifications

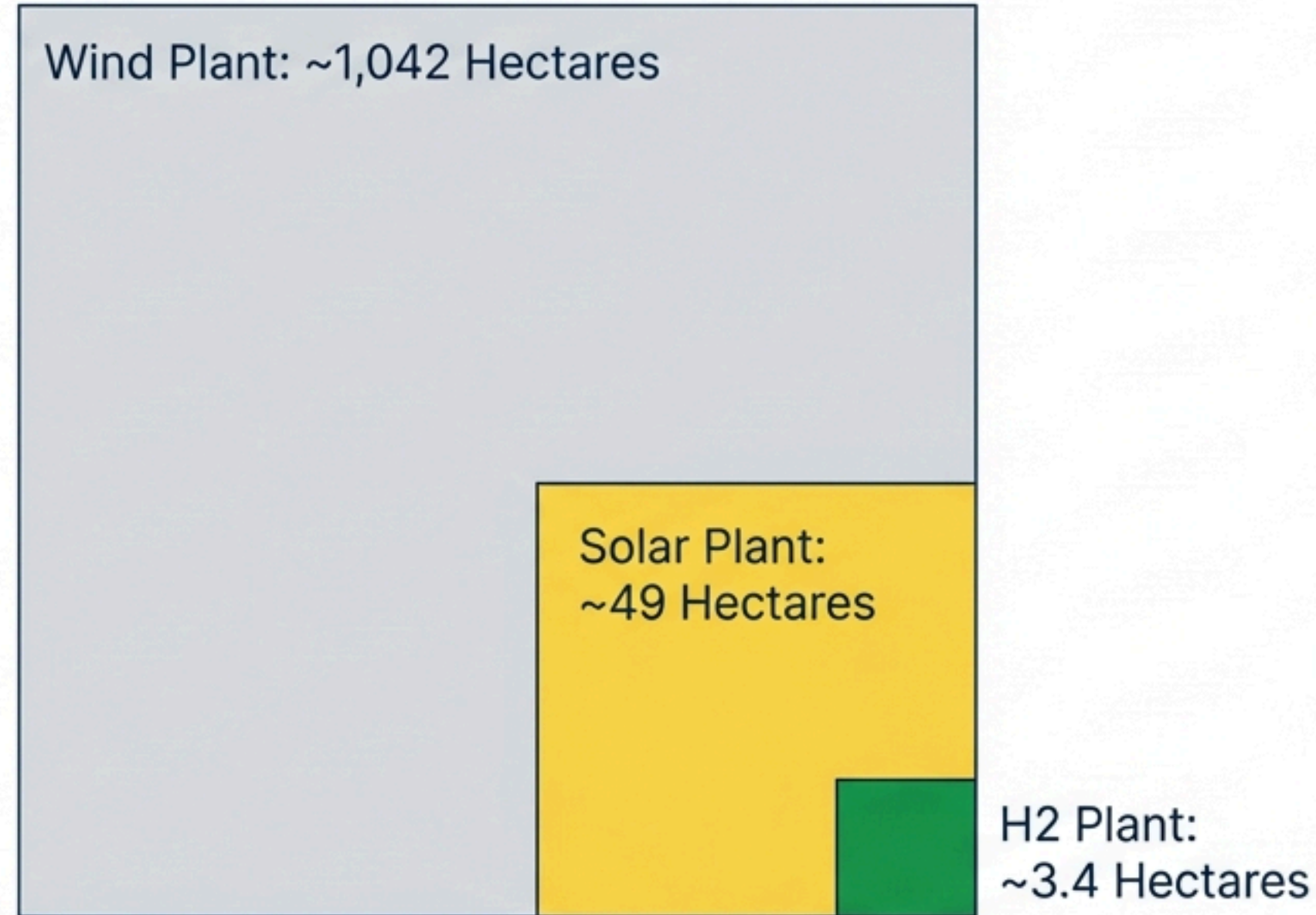


- Technology: LFP Lithium-Ion
- Capacity: 118,208 kWh (2 Hours Autonomy)
- Function: Smooths power delivery and captures energy that would otherwise be curtailed.

Green Hydrogen Generation



Project footprint and operational logistics are fully defined and costed



Operational Inputs



Water Requirement: 5.5 m³/hour treated water.

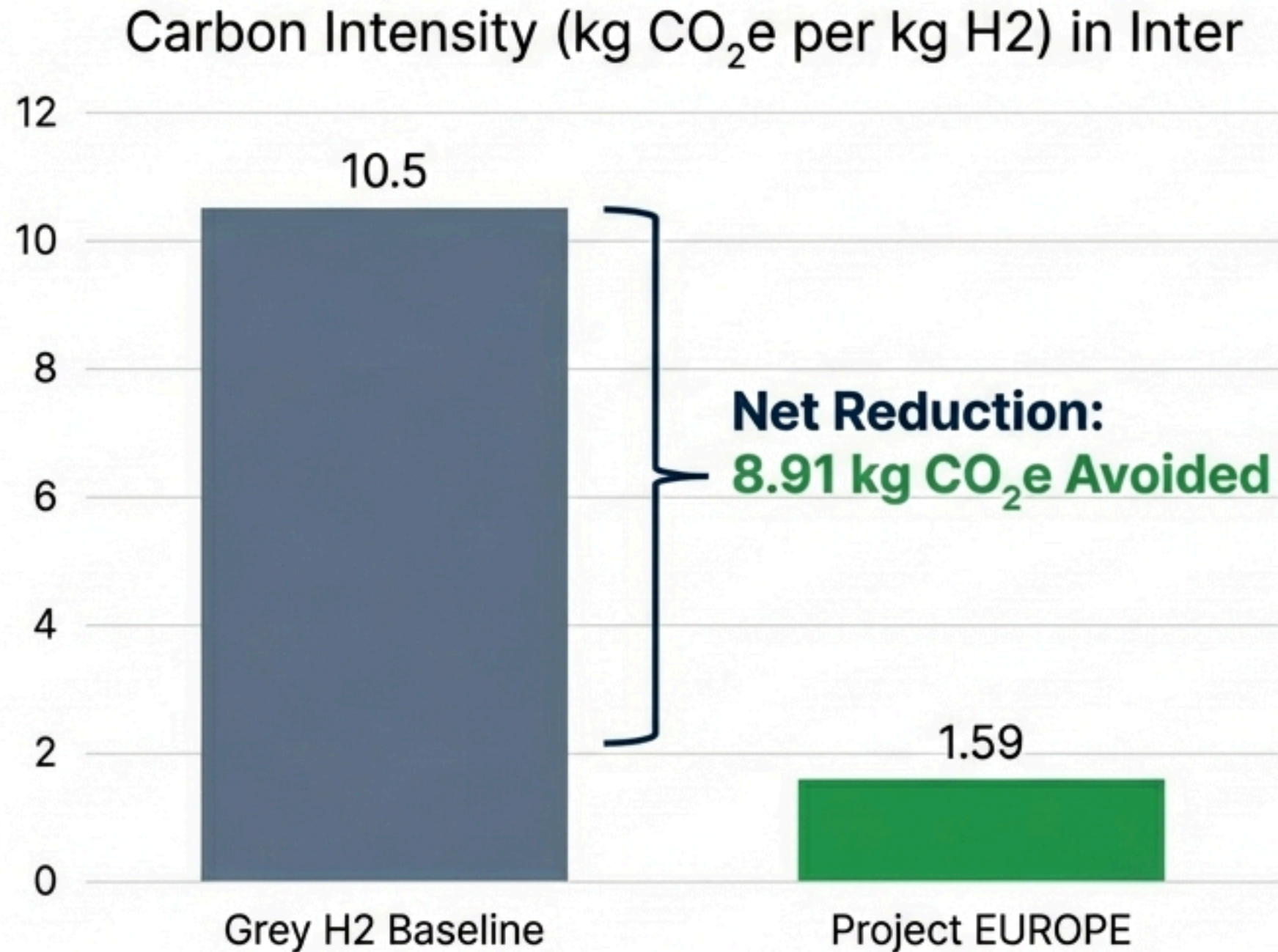


O&M Budget: 5% of CAPEX annually.



Asset Degradation: Factored into financial model (0.05% Electrolyser, 0.07% Solar).

Significant decarbonization impact drives Verified Carbon Standard (VCS) revenue.



Total Impact

43,572 tons

CO₂e Avoided Annually

€727,785

Annual Carbon Credit Revenue
@ \$20/ton

Conservative modeling leaves room for significant commercial upside

Upside Potential



The Oxygen Opportunity: Current model assumes venting of 22,797 MT of Oxygen annually.

Future sale to industrial offtakers creates unpriced revenue upside.

Risk Mitigation

- ✓ **Curtailment:** Revenue penalized with a 3% loss factor in model.
- ✓ **Replacement Costs:** Full PV of Stack (Year 10) and Battery (Year 13) replacements deducted from cash flow.
- ✓ **Inflation:** 2% cost escalation applied to all O&M lines.

Recommendation: Proceed to Final Investment Decision (FID)



Financial: Top-tier returns (28.38% Equity IRR) with rapid 3.5-year payback

Technical: Optimal location and integrated design ensure high load factors (77.89%)

Strategic: Positioned to capture growing European H2 demand with a fully decarbonized product

Next Steps: Approve €135.4M Investment Plan & Initiate Detailed Engineering

Experience Real Engineering

The Clean Green Energy Mission is more than a program – it is an ENGINEERING movement for Energy Transition!



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