NoviOcean

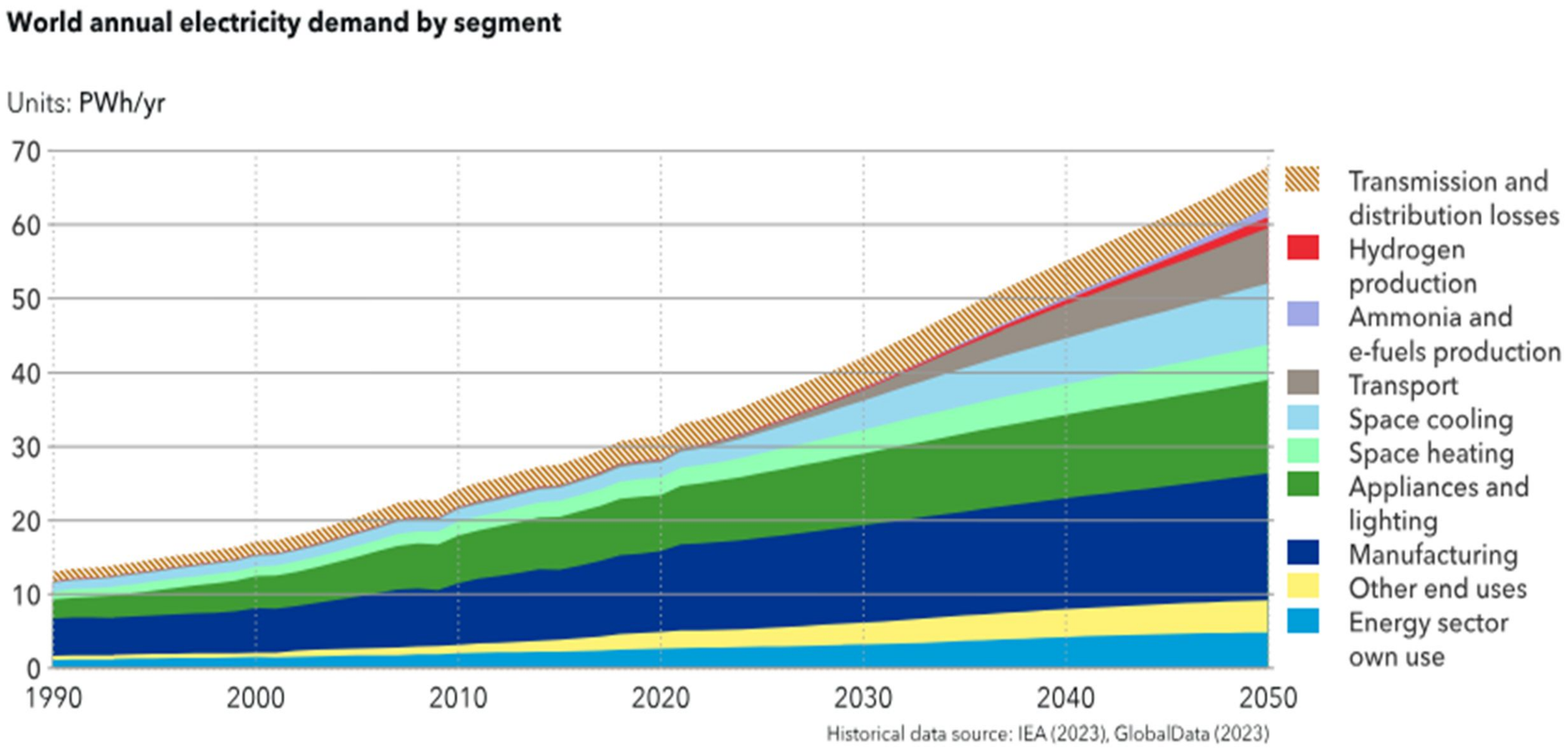
Unlocking 24/7 Renewable Power

- Through Hybrid Ocean Energy

Emerging Areas Knowledge Sharing Series

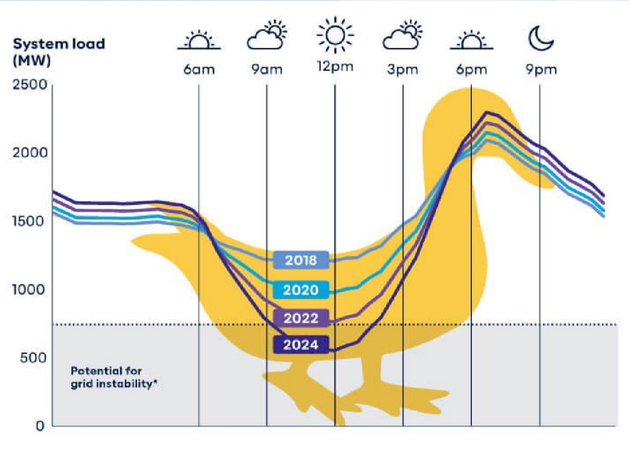
Making Waves: Unlocking Ocean Energy for a Cleaner Tomorrow 2025-09-29

The Problem 1: Energy needs are doubling in the coming 20 years



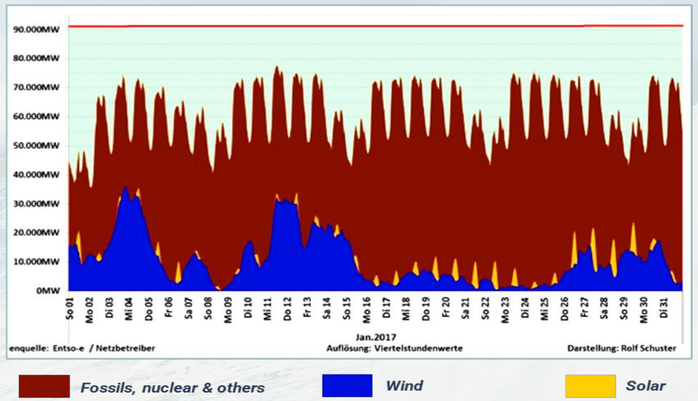
The Problem 2: Intermittency of Wind and Solar create huge grid unbalances

Grid Instability



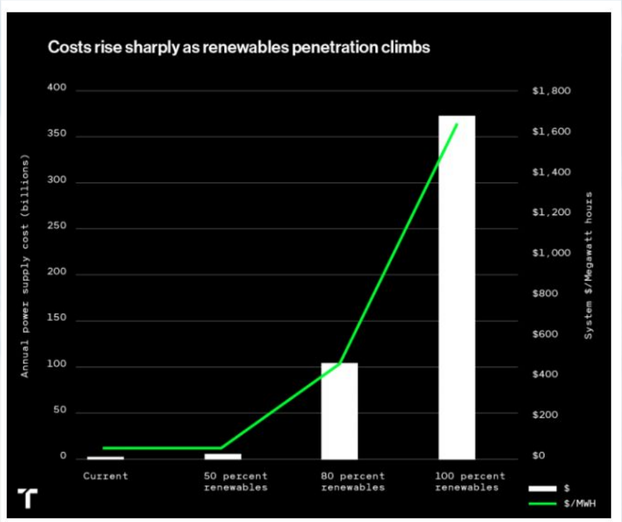
Solar power's peak production aligns with midday **when electricity demand typically dips.**

Wind and Solar vs Consumption



Wind and solar fail to deliver **40% of the time**, requiring fossil fuels to fill the gap. Energy-related CO2 emissions grew to 34.4 Gigaton in 2023.

Drives up Energy Prices



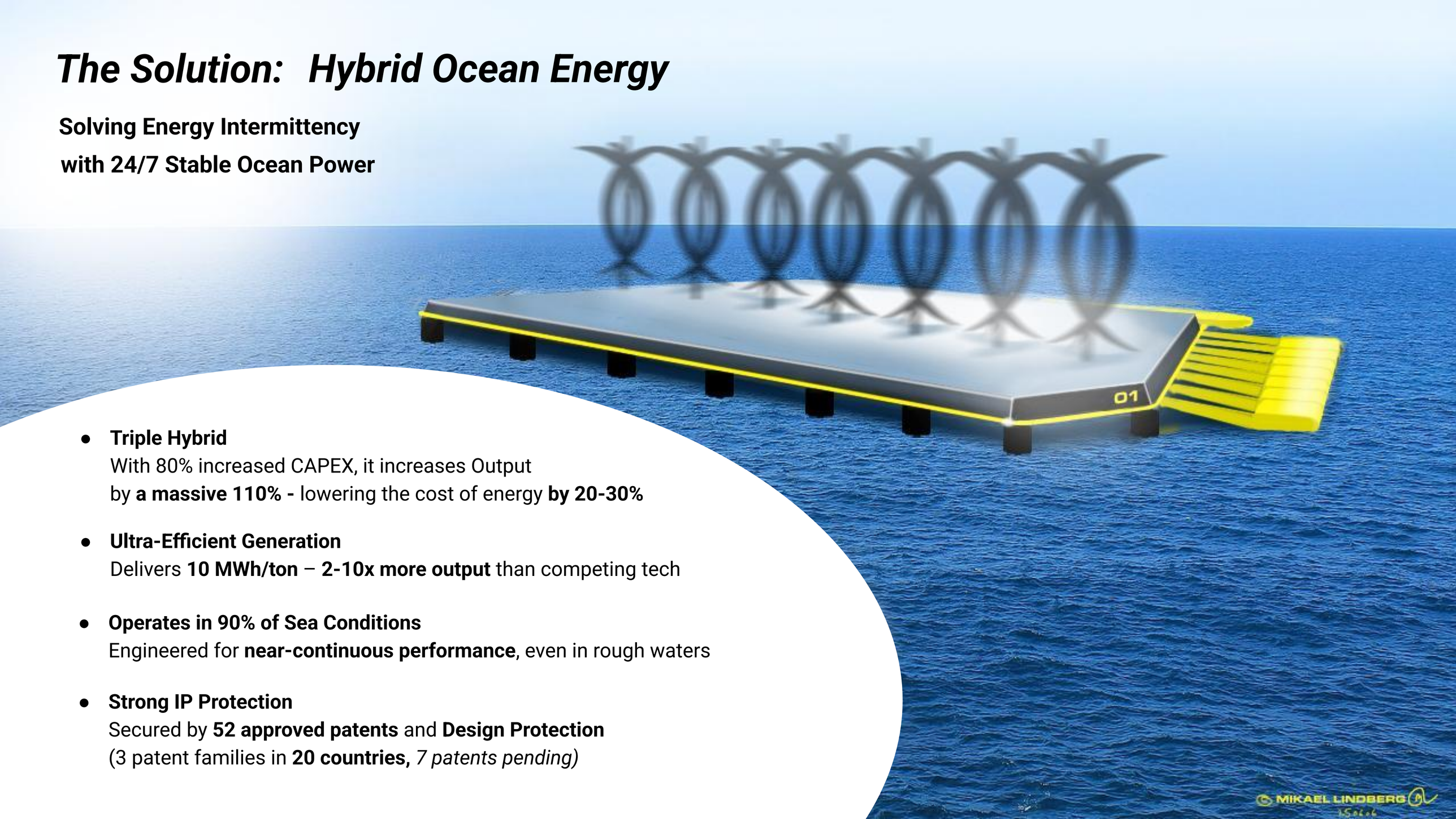
California's power system costs rise exponentially if renewables generate the bulk of electricity.
Clean Air Task Force analysis of CAISO data.

To stabilize an 80% wind & solar grid (eg in California) would require **$2.5 trillion in battery storage.**

The Result: An **unaffordable 44 cents per kWh** or f**allback to fossil fuels.**

The Solution: Hybrid Ocean Energy

Solving Energy Intermittency
with 24/7 Stable Ocean Power



- **Triple Hybrid**
  With 80% increased CAPEX, it increases Output
  by **a massive 110% -** lowering the cost of energy **by 20-30%**

- **Ultra-Efficient Generation**
  Delivers **10 MWh/ton** – **2-10x more output** than competing tech

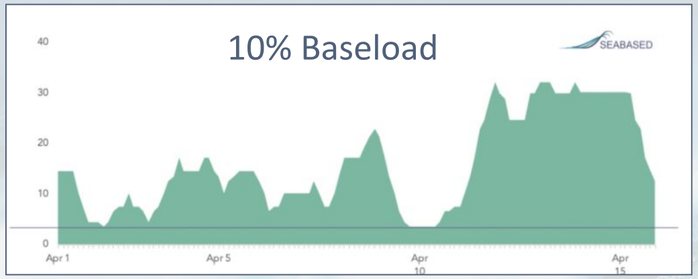
- **Operates in 90% of Sea Conditions**
  Engineered for **near-continuous performance**, even in rough waters

- **Strong IP Protection**
  Secured by **52 approved patents** and **Design Protection**
  (3 patent families in **20 countries,** *7 patents pending)*

Cutting Storage Needs = Boosts Profits

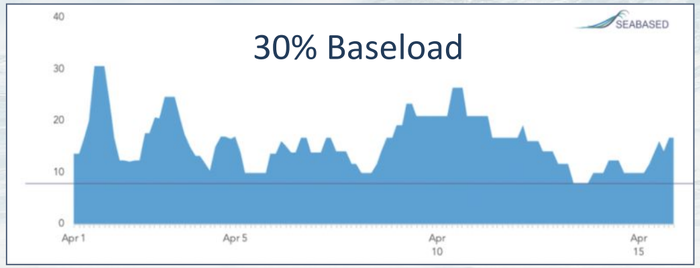
Wind Production Profile, Galway Bay, Ireland

1



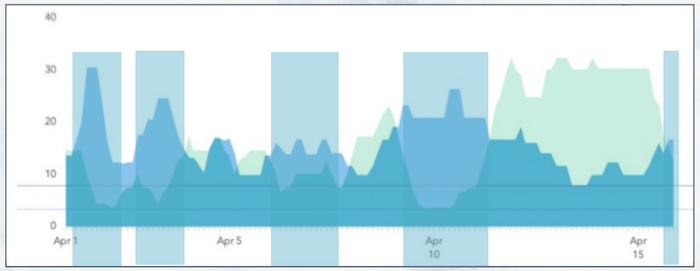
Wave Production Profile, Galway Bay, Ireland

2



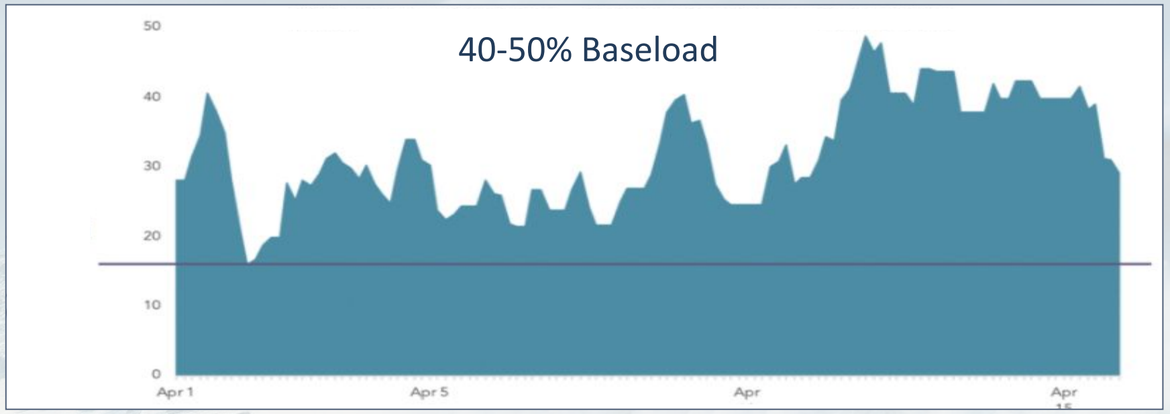
In Low Wind Conditions, Waves are at the Highest

3



The Game Changer: Combining Wind and Wave = less storage needed

4



Scaling Marine Renewables Boosts Grid Efficiency

Studies indicate that deploying offshore wind and wave at:

- just **5–9%** of grid supply may cut storage needs by **up to 37%**,
- and **50–60%** may reduce them by **up to 66%**

The Result:

- Dramatically **lower infrastructure costs** for utilities and operators
- Significantly **higher profit margins**
- A more **resilient, cost-effective energy mix**

The future of Offshore Energy will NOT be single systems, it will be hybrid!

Wave Power 300 kW

Wind Power 350 kW

Solar Power 200 kW

NoviOcean replaces today's separate and costly systems,

each needing separate Permits, Sea Areas, Central Structures, Moorings, and Cabling,

with one Single Hybrid Solution

Later targeting to produce 3, 5 and 10MW units

Cutting CAPEX and LCOE by 40–50%, boosting Output and Profits.

The Logical evolution of Offshore Energy!

Our 850-1000 kW Solutions

The **Alta Wave 1000H**

For areas with larger waves

- **650 kW Wave**
- **300 kW Wind**
- **50 kW Solar**
- **By evolution up to 3MW rated power**

L

38x9x4 meters, 140 tons, lifting 600 tons

The **Medi Wave 850H**

The exact same principles but for smaller waves

- **300 kW Wave**
- **350 kW Wind**
- **200 kW Solar**
- **By evolution 3, 5 & 10 MW rated power**

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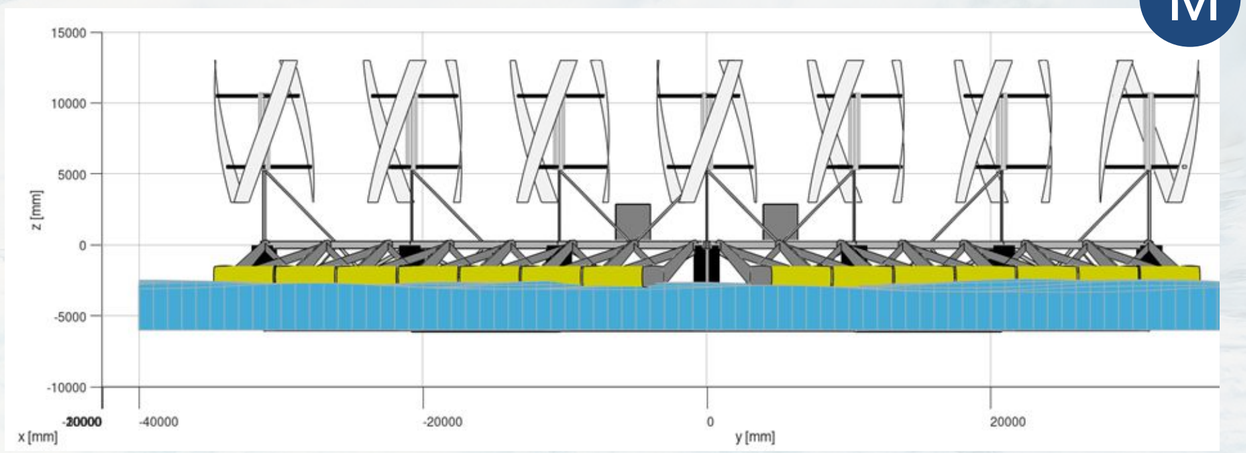

Modular Add-Ons

Desalination, up to 70 000 liters per hour

By utilizing certain aspects of our system in a highly effective way, we can offer low-cost Reverse Osmosis onboard each float. The pipeline to shore joined by the electrical cable. Alternatively, as a stand alone and highly effective Desalination system.

Battery Storage 0.6-1.2 MW

Onboard 20-feet containers, air-or liquid cooled, for marine use. As an all-in-one package for smaller grid and islands networks balancing energy supply exactly when needed

Hydrogen Production, 75 tons / year

Enabling offshore electrolysis to produce green hydrogen at sea—reducing fossil fuel dependence and supporting a sustainable energy transition for industry and transport. (For future deployments)

Optional Tidal Power (instead of Wave Power) 700 kW

Using the float as holder of submerged tidal turbines, leveraging the predictable energy of tidal currents to generate more electricity efficiently. (Only 10% global potential vs wave energy, but in relevant locations we can offer Tidal, Wind and Solar as another Triple Hybrid)

4 Lessons Learned

1. Hybridization Increases Value

- Started with wave-only (WavePower) platform
- Learning: adding wind + solar on same structure →
  - **+80% CAPEX, but +110% output**
  - **20-30% lower LCOE**
- **Lesson:** Hybridization is a game-changer in ocean energy economics.

2. Efficiency Through Buoyancy, Not Particles

- Studied dozens of wave energy concepts worldwide.
- Particle-based systems deliver **3–5% of buoyancy-based output**.
- **Lesson:** Only buoyancy-based, non-resonant systems achieve commercial viability.

3. Freshwater Closed-Loop System

- Early on, avoided using saltwater in power take-off.
- Competitors struggle with corrosion, biofouling, system degradation.
- **Lesson:** Freshwater closed-loop design ensures durability & reliability in harsh marine conditions.

4. Pelton Turbine & Generator Mastery

- 8+ years fine-tuning pressurized water → Pelton turbine → generator.
- Unique know-how in control systems & optimization.
- **Lesson:** Mastery of this approach is a critical USP, hard for others to catch up.

Overall Insight: Industry is full of concepts, but most are less efficient or unscalable. NoviOcean's hybrid buoyancy-based, closed-loop system uniquely combines efficiency, durability, and scalability.

Key Risks & How We Address Them

1. Extreme Weather (Typhoons, Hurricanes)

- **Risk**: Exposure to cyclones and typhoons in tropical regions.
- **Mitigation**: System designed to withstand up to **60 m/s winds** (hurricane category 2–3); wave unit is unsinkable; risk mainly limited to PV panels at extreme events.

2. Biofouling & Operational Durability

- **Risk: Marine growth** can r**educe efficiency** and increase **maintenance costs.**
- **Mitigation: Closed-loop freshwater system** prevents biofouling in critical components. External biofouling has minimal performance impact.

3. Sector Reputation from Past Wave Failures

- **Risk:** Previous underperforming technologies have created **investor/government skepticism.**
- **Mitigation:** Transparent **validation with data,** peer-reviewed studies, and independent reports. Proven hybrid model (wave + wind + solar) increases confidence.

4. Slow Consenting & Bureaucracy

- **Risk: Permitting takes 1-4 years,** blocking needed fast deployment to tackle the climate crisis.
- **Mitigation:** Advocate for regional ocean-use zoning and streamlined “**one-stop” consenting.**

Recommendations for the ADB & Partners

Policy

- Set **pilot zones** for marine RE
- **Fast-track permitting** with **one-stop shops** for marine RE projects
- Support **co-location rules** for **hybrids** (wave + offshore wind/PV on same mooring)

Financing

- Integrate wave/hybrid ocean energy in MAF (**Mitigation Action Facility**) & GEAP (**Green Energy Auction Program**)
- Launch a **wave energy incubator** for Asia-Pacific that provides **blended, staged funding:** initial **grants** for **feasibility studies** and **prototypes**, **de-risking** for **pilot arrays**, and **market-linked finance** for **scale-up.**
- Standard **PPAs** with **FIT, and availability-based top-ups** for early arrays

Partnerships

- Create a regional **open source info hub** for **metocean data, O&M playbooks,** and **procurement & permitting templates** to **boosts market confidence** and attract developers
- Develop regional **test hubs** (e.g., shared moorings, open-sea testbeds)
- Support **local workforce training for O&M**, **fabrication**, and **marine logistics**
- **Facilitate partnerships** between startups, **research clusters, utilities, and local governments** to create **innovation ecosystems &** to get eg **EU Grants**

Any Questions?

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MISSION INNOVATION CHAMPION

GULDSTÄNK Innovator of the year

The China Innovation Competition – Winner Sweden

Stena Line Propeller Prize 2021 Karlskrona

Startup 4Climate WINNER 2023

Startup 4Climate

SEAL OF EXCELLENCE

European Commission

Appendix

Local energy gaps and needs in the Philippines

High electricity prices & import exposure

- Household tariffs averaged **~US$0.22/kWh (2024)**, among the highest in Asia; only Singapore is comparable in ASEAN. Drivers include fuel import costs and pass-through charges
- Power mix remains **Coal-heavy (~62% in 2023)**, heightening import/price risk; policy aims to cut this reliance

Targets and market instruments

- Government targets **35% RE by 2030 and 50% by 2040**
- **Demand-push: GEOP** lets eligible users choose 100% RE suppliers
- **Supply-push: GEAP** auctions add new RE capacity

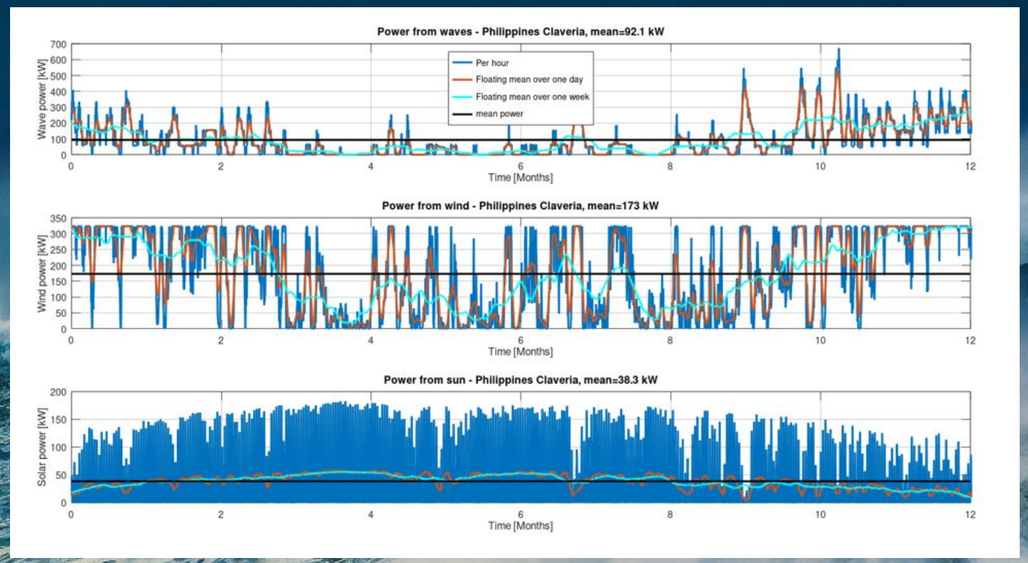
Ocean energy awareness & early stage

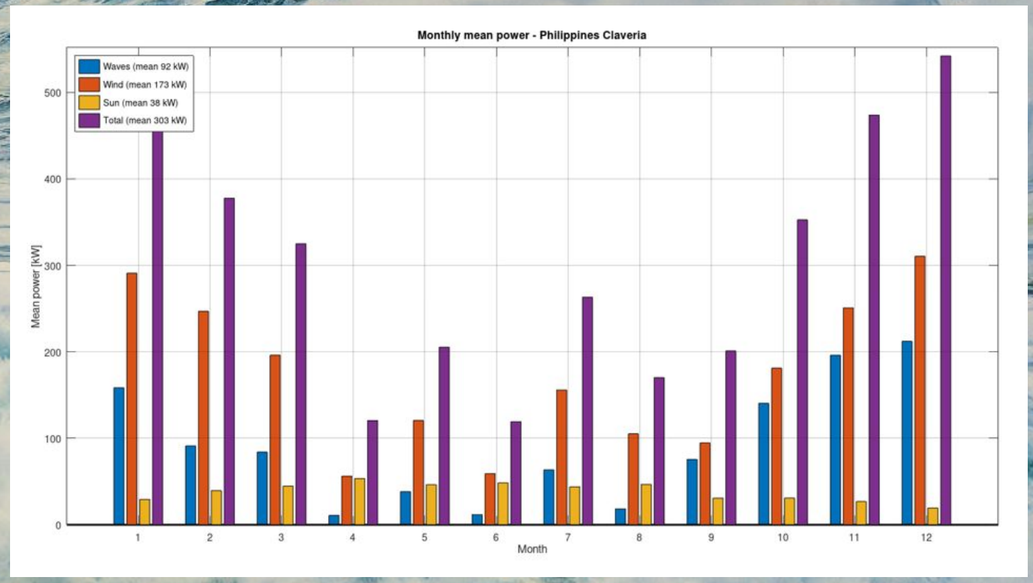
- Researches cite **~150–170 GW** theoretical ocean energy potential, but deployment remains nascent; pilots and policy visibility are needed
- Marine energy developers can help **raise awareness, provide knowledge, and co-design incentives**

We are an ocean-energy developer that invented the Hybrid Energy Converter (HEC), which smooths output, reduces battery requirements, and displaces diesel on islands and weak coastal feeders.

NoviOcean will support the 35%/50% RE targets through pilot and commercial deployments and by working with government, local developers, and suppliers to build awareness and supply-chain capability.

Philippines Claveria

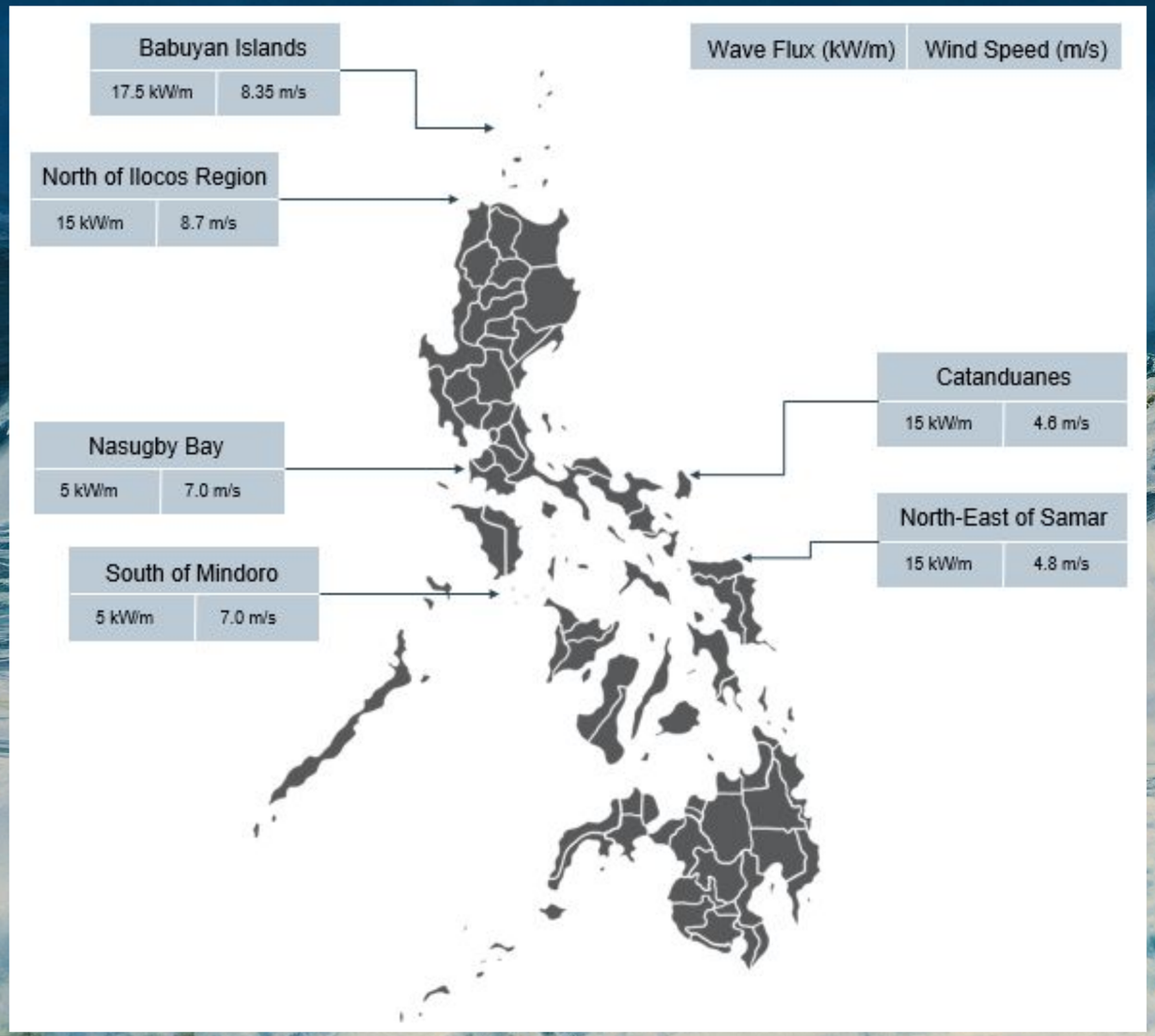




Avg. annual power output

Wave	92 kW
Wind	173 kW
Solar	38 kW
Total =	303 kW

Our Goal and Next Steps in Asia



Our Goal

- Build **first MediWave pilot in the Philippines (2026–27)**
- **Pre-commercial rollout by 2028** across Asia

Partnership Needs

- Co-funding: Grants from MAF / ADB, matched by 50% own investment
- Joint **market & project study** with DOE & ADB on:
  - Hybrid energy potential
  - Socioeconomic benefits
  - Risk mitigation

Support Requested

- Access to existing **wave condition data & site assessments**
- **Facilitation of permitting** and regulatory processes

Local Energy Gaps and Needs in the Philippines

High Electricity Prices & Import Exposure

- Household tariffs **US$ 0.22/kWh** (2024) - among **Asia's highest**
- Driven by imported fuels and transmission fees
- **Coal still ~62%** of mix

→ **Price and Supply Risks**

Ambitious Renewable Targets

- **35% RE by 2030, 50% by 2040**
- **Demand-pull:** GEOP lets eligible users choose 100% RE suppliers
- **Supply-push:** GEAP auctions add new RE capacity

Ocean Energy Potential, Still Untapped

- **150–170 GW** theoretical Ocean Energy Potential, but:
- Deployment remains nascent → **need for pilots & policy visibility**
- We can help **raise awareness, provide knowledge, and co-design incentives**

Why NoviOcean

MISSION INNOVATION
CHAMPION

GULDSTÄNK
Innovator of the year

Stena Line
Propeller
Prize 2021
Karlskrona

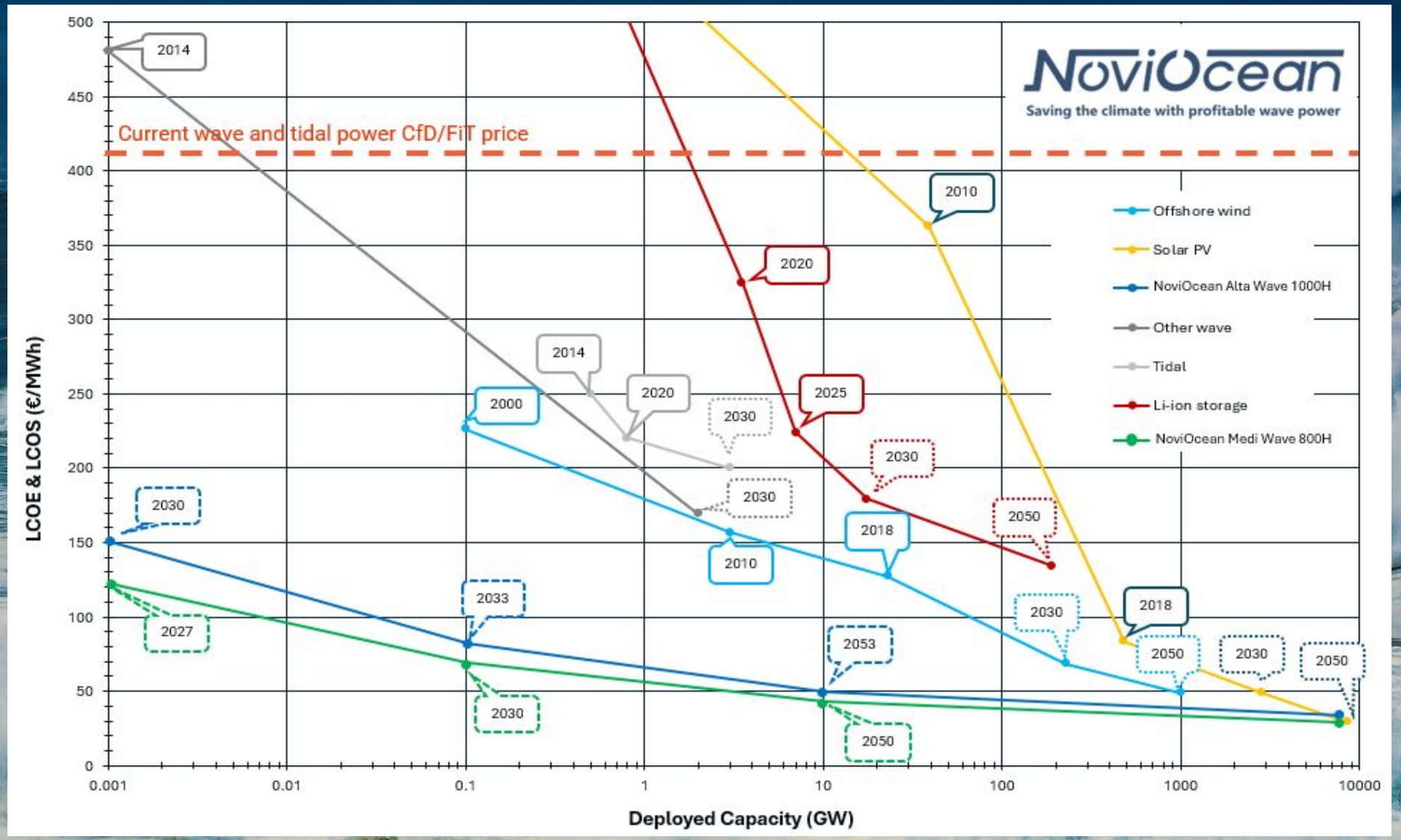
Winner of the 2024 Swedish Division

INNOVATION &
ENTREPRENEURSHIP
INTERNATIONAL
COMPETITION
Shenzhen.China

Startup
4Climate
WINNER
2023

SEAL OF
EXCELLENCE
European
Commission

LCOE Development of NoviOcean vs Alternative Renewables



Power to weight ratio

2x

vs.
floating offshore wind

LCOE

1/3

vs.
start of wind & solar

Added Values

Avoided Emissions	705 tons CO2 eq./unit/yr
LCA	6 kg CO2 eq./MWh

Avoided emissions are calculated using the EU LCA grid emission factor

Not visually or audibly disturbing

Not harming animal life

Increase Local Job & Skills

Supplier Development

Space Efficiency, Co-location with OWF

Who is behind us

Funding Partners, Incubators & Investors

Life

Energimyndigheten

VINNOVA

Swedish Scaleups

FORSK

SynerLeap Powered by ABB

almi

Region Västmanland

create Business Incubator

Academic & Knowledge Partners

WavEC Offshore Renewables

KTH Vetenskap och Konst

Your Maritime Solution Partner SSPA

MARIN

Linnæus University

Chalmers University of Technology

Uppsala Universitet

DMEC

Centrale Nantes

Industrial Partners

Clean Projects International

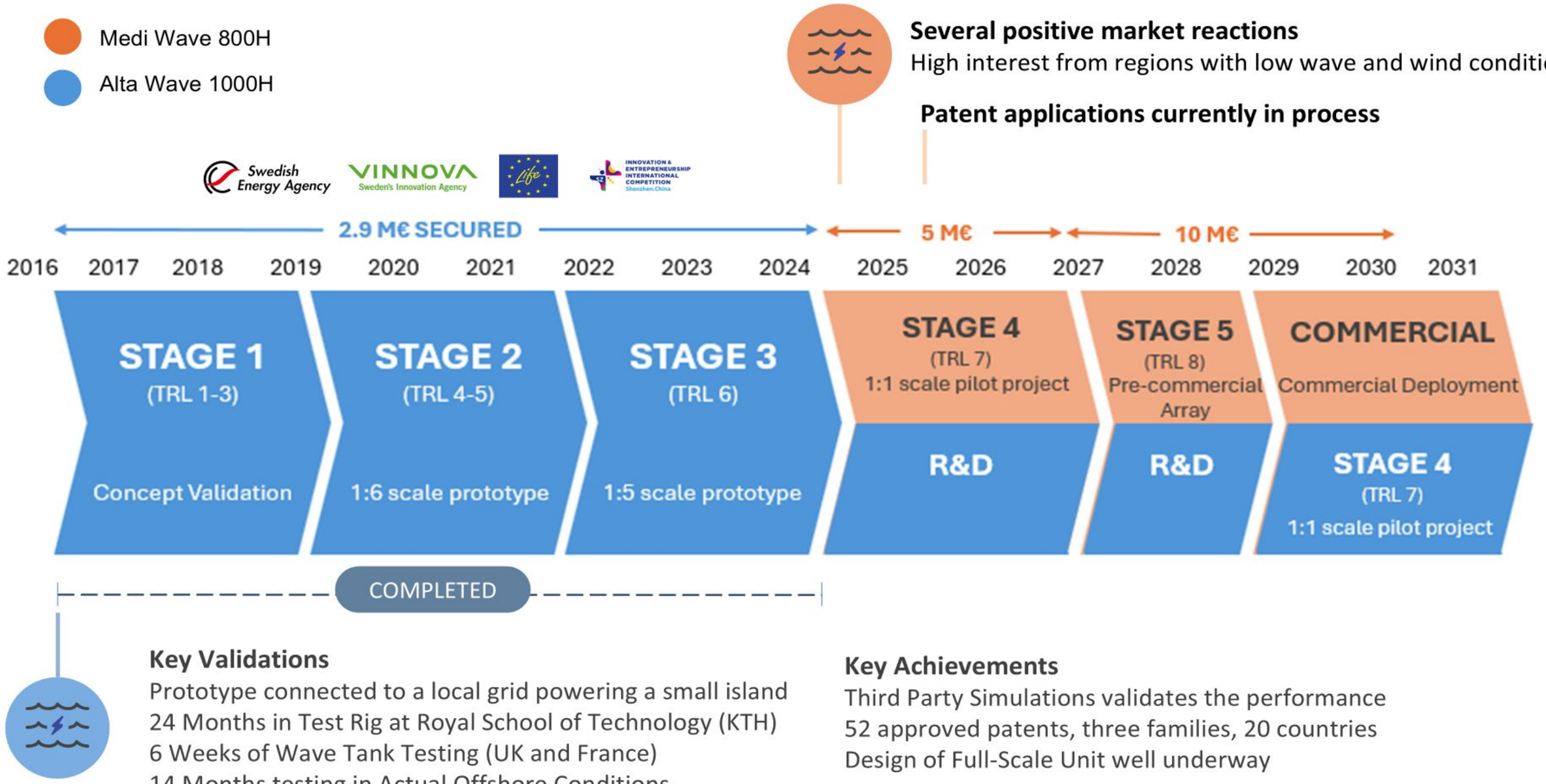
Ocean Energy Europe

hausch energy
facilitating and funding renewable and sustainable energy solutions

Seaflex

TRELLEBORG

Our Journey and Milestones



A small Team of Impact Driven Experts

Jan G. Skjoldhammer
Founder/CEO & Inventor

SAS Airline Captain & Officer in his previous life

15x in earlier Venture

Recognized as Sweden's Mission Innovation Champion (2020) and Innovator of the Year

Developed multiple inventions in youth—from ski tech to transit brake recovery systems

Built own race cars & has extensive technical hands on experiences

Former display pilot with warbirds

Cornelia Röper
Chief Operations Officer

Expert in Sustainability & Social Impact

MSc Environment, Politics & Development

Forbes 30 Under 30 Europe & Bill & Melinda Gates SDG Goalkeeper

Proven Impact Founder & Network Builder (founded the biggest online community for refugees worldwide & the biggest oecomenic startup Germany's)

Former Strategic Lead at Germany's largest climate accelerator

Stefan Björklund
Chief Technology Officer

Ph.D. in Mechanical Engineering with a focus on tribology. Worked 33 years as teacher and researcher at the Royal Institute of Technology (KTH) in Stockholm

Worked as researcher and supervisor in several wave and tidal energy projects since 2012

Close collaboration with Corpower Ocean, Minesto AB and NoviOcean AB

John Sugrue
Chief Industrial Officer

BSc. Materials & Production, Engineering Manager for process and production targets and operations in Heavy Automotive Tool Manufacture, Electronic Components manufacturer

Director level experience in Telecom large scale Project Mgt, Operations and Maintenance .Pricing, and Distribution

Technology transfer projects in US, Canada, Iraq and UK.

Variya Kietprungvej
Business Development Director

Intl. MBA & BSc. Electrical Engineering

Proven Business and Project Development professional with track record of supporting innovative energy project and helping companies expand into new and emerging markets.

Business Development across wave, offshore wind, and solar

Engineering consulting exp. in oil & gas

Jonathan Thomas Lyons
Granting and Funding Manager

Policy, Outreach, and Fundraising Strategist - BSc in Business Management | MPA in European Studies, technical focus on Climate and Energy

Erik Wedlund
Chief Mechanic

Technician in the construction industry Long Expertise in Developing High Performing Engines and Metal Constructions

Our helping Hands and Brains left and right

Mats Andersson
Board Director
MSc. Board Director
Ex.CEO of three listed companies, e.g.
Anticimex

Sara Karlin
Board Member
MSc. Chairwoman in three companies, one of which she founded and took to OMX Small cap

Ziad Jeha
Honorary Board Member
BSc. Geology, Ex. SLB Director, senior executive in global operation

Daniel Hagström
Strategic Advisor
Serial Entrepreneur, Founder and former CEO of Cabin Air, Investor

Damon Baca
Sales & Business Consultant
Co-Founder (Crossborderit, Latam Medical Networks, Import Export Logistics CHB) | Professor of International Supply Chain, University of Arizona

Anna Fägersten
PR & Comm. Manager
Business degree, marketing & sales

Tomas Carlmark
Lawyer, Contracts
Master of Laws (LL.M.)

Mikael Lindberg
External Aesthetics & Design Advisor
Ex-Koenigsegg Designer with broad design background

Sricharan Vaddiraju, Ph.D.
Hydrodynamic Specialist
Ph.D. in Ocean Engineering (IIT Madras). Expert in offshore hydrodynamics, mooring, & marine structures.

Steven Piece
VAWT specialist with 20+ patents, advising industries on wind, solar, wave, and other clean energy solutions.

Our Mission

“Saving the climate with stable and profitable ocean energy”