

Where energies make tomorrow ●

Floating Offshore Wind



TECHNIP
ENERGIES



Your partner for floating offshore wind

Technip Energies supports clients with the latest technologies, working at the forefront of marine energy R&D projects aimed at taking the industry to the next level. We are notably experienced in developing solutions to convert power from offshore wind farms into hydrogen as a readily available energy source.

We have long been a trusted partner for major national and international oil companies. We help our clients transition to low-carbon and carbon-free energy by applying our skills to deliver full-scale marine energy projects such as wind farms, carbon capture and sequestration and near-shore gas-to-power projects.

Providing end-to-end project management

Beginning with concept and design, we deliver comprehensive management expertise to optimize a project's schedule and budget. From start to finish, we apply our extensive offshore engineering and marine operations skills to deliver on time and meet all client specifications.

KEY REFERENCES IN OFFSHORE WIND PROJECTS INCLUDE:

- The world's first floating turbine (Hywind demo 2,3MW) in Norway
- The world's first floating wind turbine park (Hywind pilot - (5x6MW) in Scotland.



Technip Energies works with several proprietary floating technologies such as INO12 and VertiWind to develop innovative industrial offshore wind solutions. Leveraging unique experience and competencies within offshore floating facilities with extensive track-record, Technip Energies is applying established expertise to full-scale, carbon-free marine energy projects.



Design maturity

- Cost-competitive floater design scale-able with an in-house automated sizing tool
- Proprietary floater technology, simple and well suited for mass production
- Design validated through an Ocean basin model test as part of a 4-year JIP program.



Marine operations, logistics and commissioning

- Extensive worldwide track record with logistics, T&I, mooring & hook-up activities, offshore commissioning that will allow reduced installation and commissioning cycles.



Post-delivery/ Life of field/ Asset management and maintenance

- In-house O&M expertise (e.g. Coral FLNG), including digital twin
- Innovative monitoring and inspection solutions with Cybernetix*.



Industrialized fabrication

- Worldwide footprint with global procurement
- Strong relationship and experience with Asian fabrication yards
- Proven track record in modular design and fabrication
- Yard partnership for certainty in delivering commercial scale projects
- Digitalized suite of tools from fabrication to installation.



*Inocean and Cybernetix are Technip Energies fully owned companies

A comprehensive and competitive offering

We are a leading EPCI contractor providing solutions to meet the challenges of our clients' projects for their energy transition journey. We integrate floater technology, management of offshore projects, yard fabrication experience and a unique global footprint.

Offshore EPCI capabilities

We deliver all phases of offshore field development from early conceptual studies to EPCI. We are experts in floatover operations and one of the few energy contractor to integrate all core activities required to deliver a full offshore project while successfully managing risks and interfaces.

CONCEPT SELECTION

Through early engagement, we ensure technical feasibility studies while bringing certainty and credibility for robust execution plan towards project delivery.

RELIABLE COST ESTIMATES

During the early stages of a project, we carry out conceptual studies that evaluate technological robustness, CAPEX and environmental constraints of the various possible solutions. Leveraging our extensive FEED and EPC experience, we deliver reliable and execution oriented CAPEX estimates.

FLOATER DESIGN, INDUSTRIALIZATION

We have designed, managed and delivered floating facilities, semi-submersibles and ship-shape floaters. We offer derisked solutions leveraging our project track record and expertise, project management skills and engineering resources and construction know-how.

Relying on our know-how and our on-the-ground experience, the industrialization process is part of our best practices to simplify designs, to facilitate the fabrication, to improve the installation methods and to frame our overall execution. After delivery, we continue to provide technical support for operational flexibility enhancements, asset integrity assessments and life extension.

T&I AND LOGISTICS

Our logistics experience enabled us to ship 142 modules from Asia to Siberia for the Yamal LNG project. And as trends such as modular construction and offshore wind continue to develop, we're staying ahead of the curve. We are helping our clients to save time and money by supporting them

through modular builds and project execution planning. We bring together a team of naval engineering, marine operations and logistics experts to overcome the complex challenges of sea transportation and installation.

MARINE OPERATIONS, MAINTENANCE AND DECOMMISSIONING

We have developed a full range of services and tools to ensure smooth operations during the complete lifecycle of assets. The main areas of action are maintenance and integrity management, engineering, warehouse / workshop / procurement management, operations optimization, cybersecurity, training / simulation, staffing, monitoring and long-term sustainability.

Genesis has developed a carbon assessment tools called Gen-CAT™. The assessment includes direct and indirect emissions from procurement, construction, operations and decommissioning.

Genesis Advisory Services

Genesis has a strong track record in supporting offshore wind concepts, aided by in-house digital advancements.

From concept selection to owners engineering to special technical support, Genesis has worked with a range of clients from major energy companies to government entities to project development companies to help realise their offshore wind demands. Our services can span various stages of offshore wind projects, including various water depths and challenging areas.



How we add value

Genesis is already a major player in the offshore floating wind market and well positioned to capture this rapidly growing market in Europe, US, and APAC. Some of the services that we can provide to add value to your projects include:

- Rapid optimisation of wind power output through wind farm layout design in conceptual stages
- Integration of the wind farms with exiting power infrastructure
- Accurate wind turbine response analysis to power generation during operations

- Smart monitoring for operations and maintenance to minimise the operating cost
- Agnostic technology selection and solutions for all types of offshore wind platforms that include SPAR, Semi, TLP, Jackets, Monopiles.

- Experience supporting environmental consent applications
- Strong understanding of local regulations and working relationships in the US and Europe
- Owners engineering, technical support through third party verification, and specialised services through detail engineering to operations.

What sets us apart

Genesis pioneered floating offshore wind by utilising its extensive offshore engineering and marine operations skills:

- Concept Development Studies, including technology and systems integration and holistic understanding of project economic and risk drivers



A tailored execution to answer all project needs

Strong partnerships

POTENTIAL PARTNERS

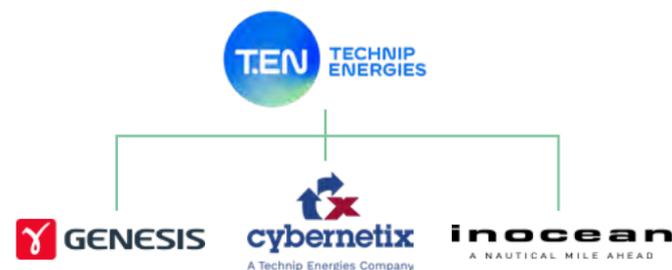
- T&I specialist
- IAC specialist (optional scope)
- Fabrication: modules or single piece
- Transportation to local yard

LOCAL YARD FOR INTEGRATION

- Integration yard management (including storage of wind turbines material)
- Wind turbine and tower integration on floater

TECHNIP ENERGIES AS A SOLUTION INTEGRATOR MANAGING RISK AND INTERFACES

- Floater and mooring design
- Overall design management: Interaction between floater, mooring, IAC, T&I, fabrication
- Mooring procurement
- Overall T&I execution: Floater + mooring + hookup



A global procurement network

Global procurement is a centralized organization regrouping the three fields of procurement: Purchasing, quality control and surveillance. We offer a worldwide procurement network of more than 2,000 professionals.

Top-ranking procurement tools

- EPC-Business E-Procurement tool for managing Inquiry Phase via the Web
- Smart Materials (SMat) Life-Cycle Material Management Application covering the entire supply chain
- IFS Jeevan managing the entire project accounting cycle from registration of PO until invoice payment approvals for material and services
- Easy Plant managing site purchasing of additional materials during construction.



Yard partnerships

Technip Energies has an extensive global track record of proven yards partnerships at some of the most complex and challenging projects.

Addressing our clients' needs

We are a partner of choice offering to our clients tailored and cost-effective solutions for the entire project life cycle of floating wind development, to achieve their energy transition journey.

Selecting the right yard for the right project

- FMECA audits
- Memorandum of agreement before subcontract award
- Construction driven engineering
- Procurement effort
- Subcontract wisely chosen

Partnership toward project delivery

- Integrated team
- Skilled supervision
- Experienced pool of resources
- Mix of nationalities
- Leveraged local personnel skills
- Engineering expertise
- Logistics scheme to optimize project resources

OFFSHORE R&D CAPABILITIES ACHIEVING COST SAVINGS

LOOKING FORWARD

We are proud of our accomplishments in the offshore floating facilities' market. And we continue to innovate for tomorrow's projects by offering our clients a wide technology portfolio that delivers real value.

PROCESS AND DIGITALIZATION

We provide proprietary technologies and know-how in HSE design, upstream processes and HP/HT. Through automation and robotics, we improve operational efficiency and reduce manual maintenance and inspection. Through advanced simulation and analysis, we reduce uncertainties and enhance confidence. And we are recognized in mastering interfaces between the floater and subsea components, i.e... top tension risers, steel catenary risers, mooring systems, etc.

Our expertise ranges from conceptual design, engineering, procurement, construction to turnkey project delivery.

- Leading engineering and Technology company for the energy transition
- 10 years' experience in floating wind market
- Dedicated Business Unit encompassing engineering, industrialization and operations capabilities
- Extensive offshore engineering and marine operations skills
- Early engagement to ensure projects predictability and affordability
- Digital design solutions
- Proprietary cost competitive and scalable floater solutions:
 - Simple (no active ballast) enabling both CAPEX and OPEX savings
 - Structure configuration well suited for mass production
 - Limited draft promoting quay-side wind turbine generator integration

- Leading-edge technologies such as mooring technology
- Global Procurement worldwide footprint
- Strong relationship & experience with fabrication yards: certainty in delivering commercial scale projects
- Marine operations and logistics expertise securing the supply chain
- Innovative monitoring & inspection solutions for O&M

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Driving the energy transition through innovating, reliable and cost-effective floating wind solutions.”



Project references

Technip Energies has successfully designed and delivered various offshore wind projects.



SCOTLAND

HYWIND PILOT PARK

- **Client:** Technip Energies formed part of the client team with Vattenfall and AREG (Aberdeen Renewable Energy Group)
- **Scope of work:** FEED Study to determine technical options. Preparing chapters of the environmental impact assessment. Involved in the development of functional specification of the wind farm turbines, towers, foundations, cabling and connection to the grid. Detailed design of the elements of wind farm and a high-level cost-benefit analysis for the proposed ocean laboratory. Permitting, definition of cable routes, procurement assistance

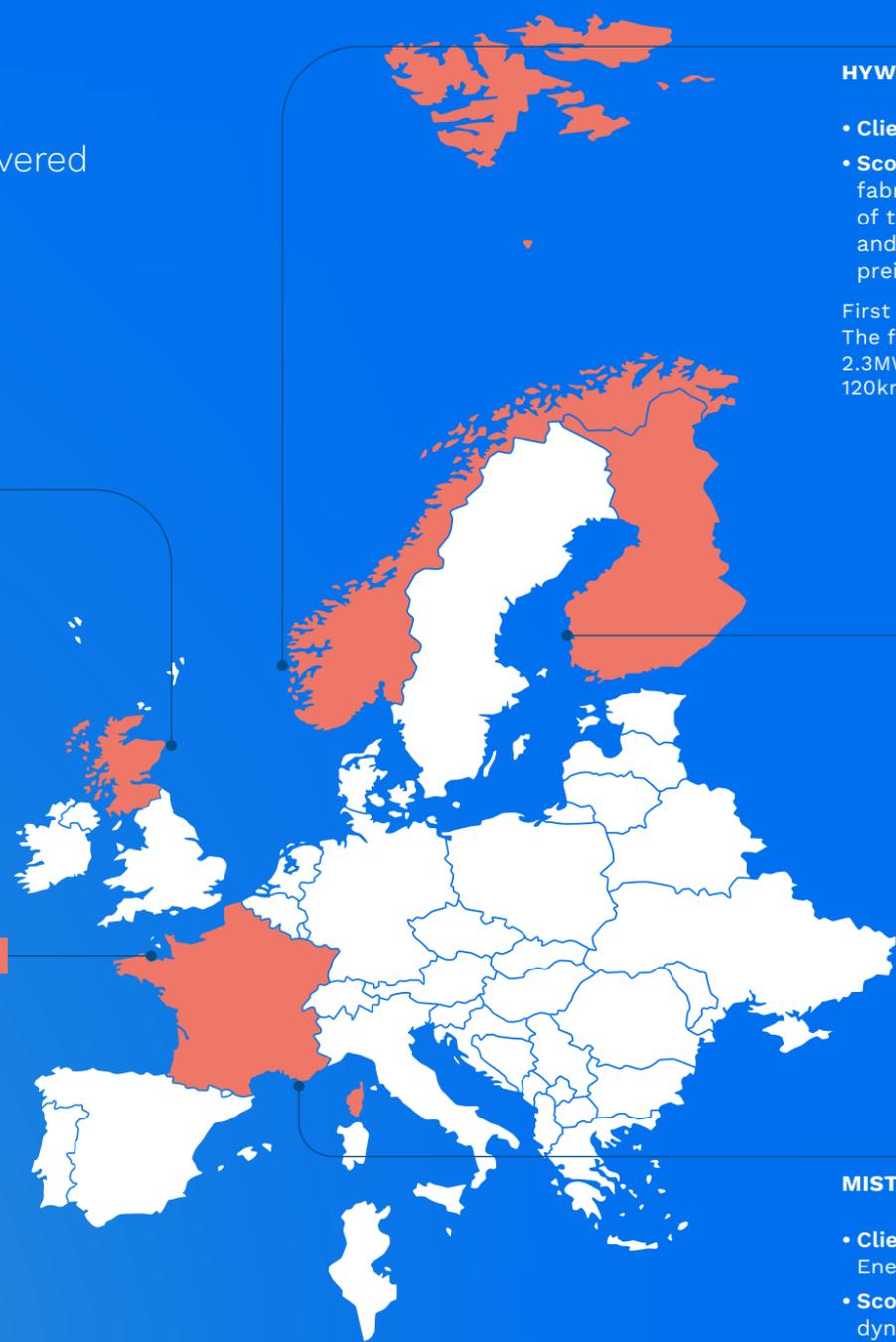
Proposed data and concept study for 11-off 5 to 7 MW turbines in up to 30m water depth.



FRANCE

SAINT-BRIEUC WINDFARM

- **Client:** Ailes Marines (Iberdrola and EOLE-RES)
- **Scope of work:** Engineering support during concept selection and definition. Technip Energies was leading the installation concept. Potential future scope: Overall project management, procurement, construction and installation of subsea cables, foundations and turbines.



HYWIND DEMO

NORWAY

- **Client:** Statoil Hydro (now Equinor)
- **Scope of work:** Detail engineering, design and fabrication of substructure. Design and procurement of the three-point mooring system. Inshore operations such as upending the spar and assembly of the wind turbine generator. Marine operations such as preinstallation of the mooring system and the final tow-out and connection.

First full-scale offshore floating wind turbine installed in 2009. The foundation is a steel spar designed and fabricated by Technip Energies. Siemens 2.3MW, 1200t foundation, water depth 220m. 100 x 5MW turbines installed on jackets, 120km cables, 70,000t foundations, one offshore AC substation.



PORI

FINLAND

- **Client:** Suomen Hyötytuuli SHT
- **Scope of work:** EPCI. Engineering and fabrication of foundation, installation of foundation, tower, nacelle and rotor.

Prototype offshore windfarm erected outside Tahkoluto Port in Pori, Finland. 2.3MW Siemens turbine, 400t foundation. Erected in August 2010. First offshore turbine in Finland. First in area with moving ice.



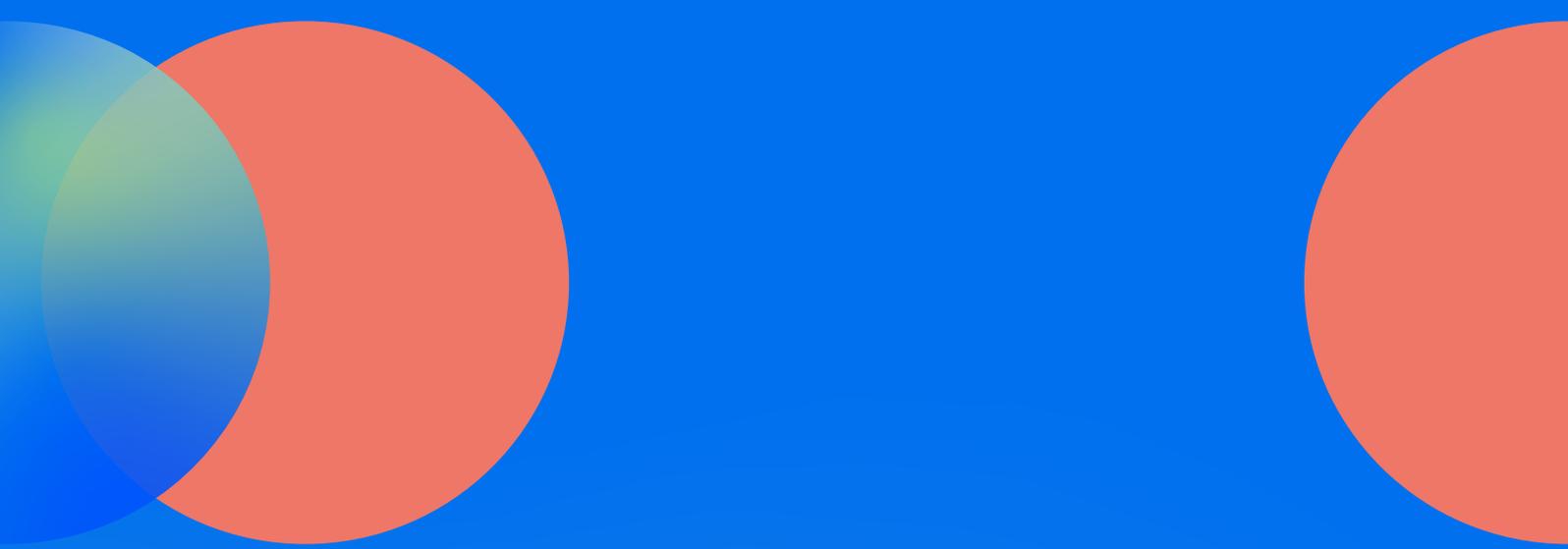
MISTRAL

FRANCE

- **Client:** Association between Technip Energies, EDF Energies Nouvelles and Nénuphar
- **Scope of work:** Design of the floater, mooring system, dynamic electrical connection cable, turbine integration, on-site installation

Mistral is a R&D program funded by ADEME for Vertiwind and by the European Commission for inflow both with Technip Energies as leader. The program was performed up to the detail engineering phase of a prototype of vertical-axis offshore floating wind turbine. Mistral was the R&D phase upstream of the Provence Grand Large commercial project by EDF Energies Nouvelles





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