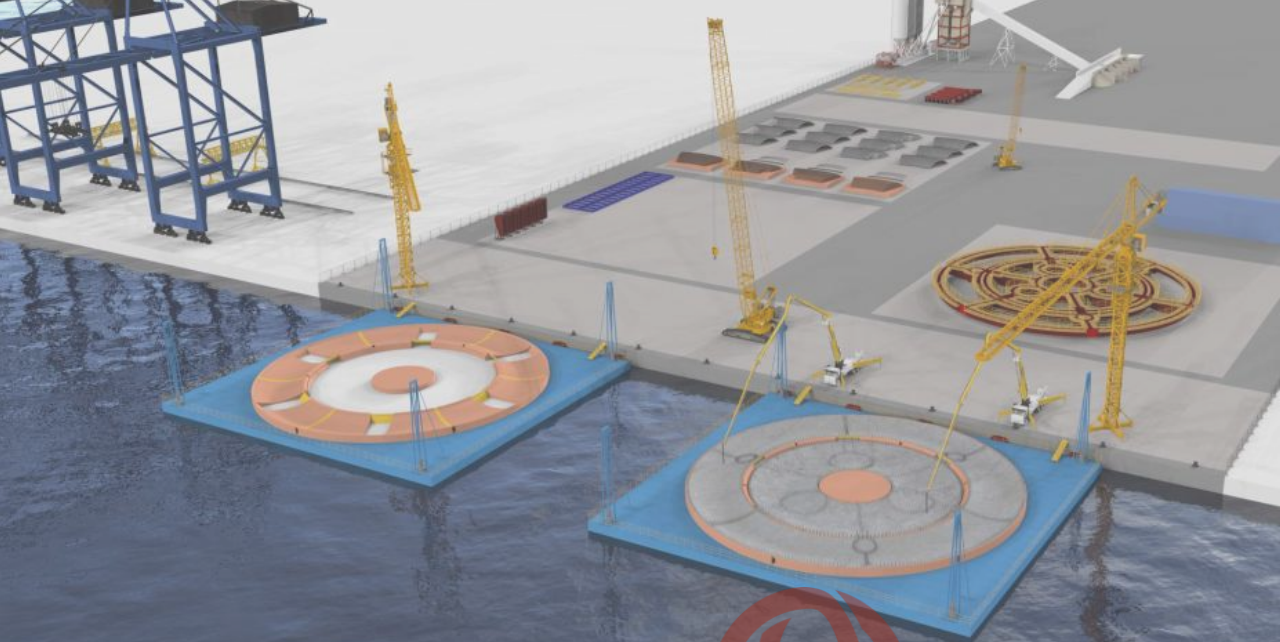


ESTEYCO OFFSHORE WIND | Portfolio of Services



ESTEYCO



01 About Esteyco

02 Offshore Engineering

03 Proprietary Technologies





ESTEYCO

01

About Esteyco





+50 years experience in engineering, architectural and energy consulting

About Esteyco

Esteyco is a consultancy firm, born in January 1970

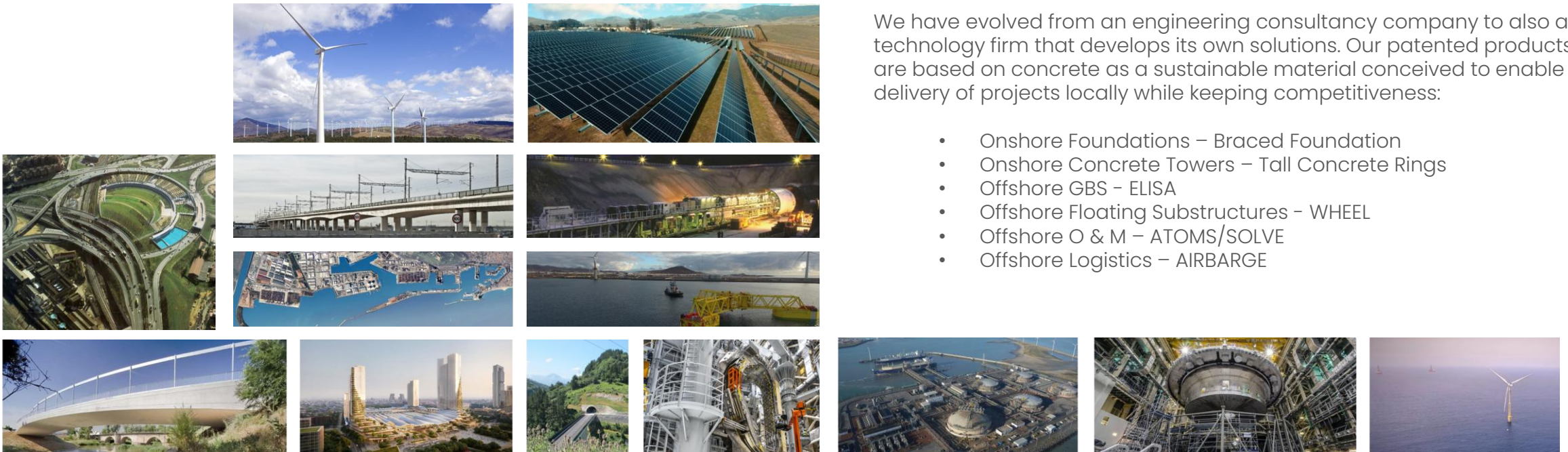
We provide independent engineering and architectural services for a sustainable future

Our strategy and global positioning allows us to offer value engineering and consultancy services along all phases of a project with a multidisciplinary team:

- Structural Engineering & Advanced Mechanics
- Balance of Plant (BOP) & Hydraulic Engineering
- Geotechnical Engineering, Campaigns & Reports
- Site Suitability, Wind Yield & Environmental Consultancy
- Electrical & Power Plant Engineering
- Marine Logistics & Naval Architecture
- Owner's Engineering and Independent Third Party Reviews
- Asset Management, End of Life Management and Decommissioning

We have evolved from an engineering consultancy company to also a technology firm that develops its own solutions. Our patented products are based on concrete as a sustainable material conceived to enable delivery of projects locally while keeping competitiveness:

- Onshore Foundations – Braced Foundation
- Onshore Concrete Towers – Tall Concrete Rings
- Offshore GBS – ELISA
- Offshore Floating Substructures – WHEEL
- Offshore O & M – ATOMS/SOLVE
- Offshore Logistics – AIRBARGE

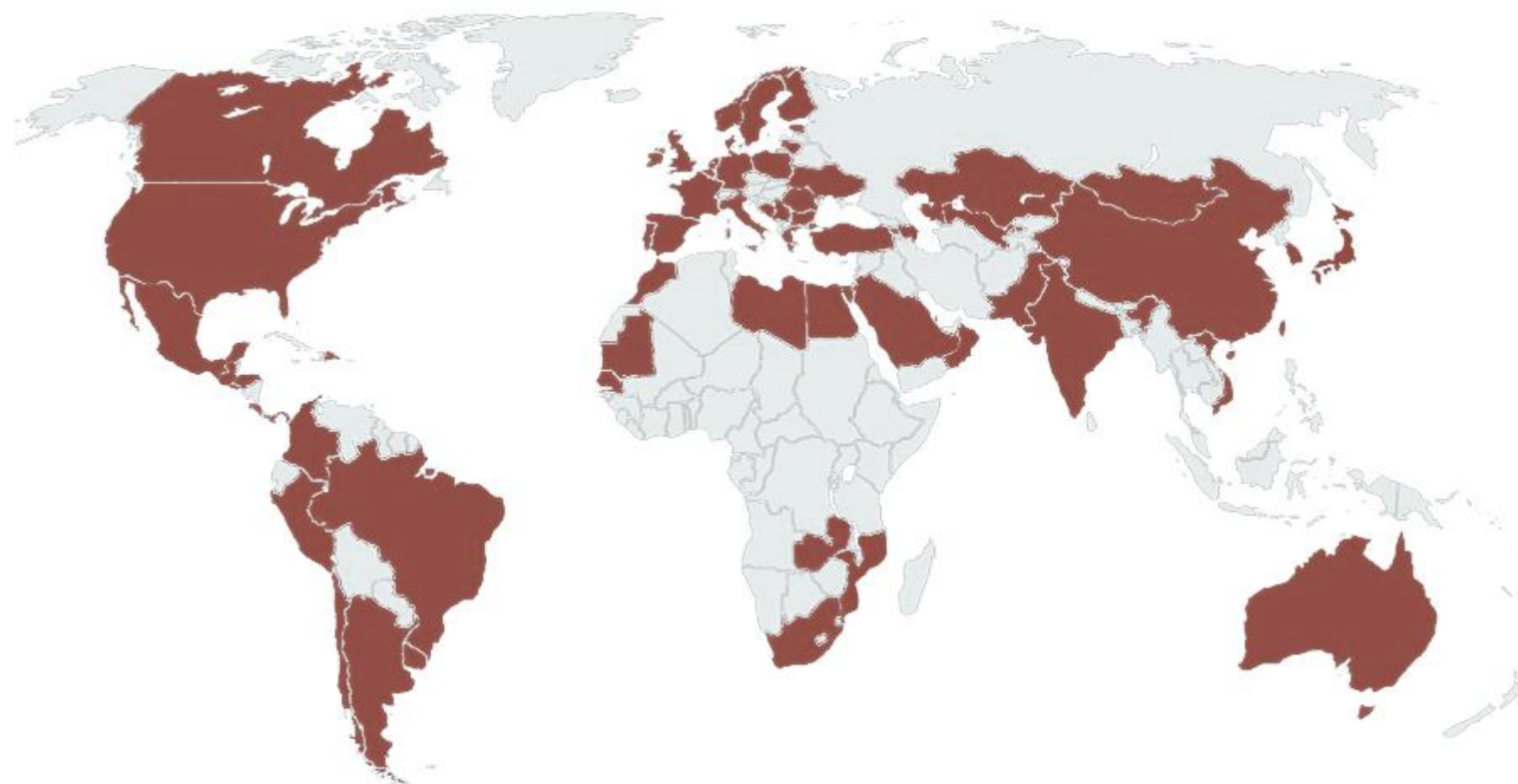




25+ years providing cutting edge solutions & value engineering for a sustainable future

Countries in which ESTEYCO has carried out renewable projects in the last years

Offices in 7 countries: **Spain – Brazil – Colombia – Chile – Mexico – Peru – U.S.A.**



+600
WIND FARMS

+75
GW

+45
COUNTRIES



+230
SOLAR
PLANTS

+25
GW

+16
COUNTRIES



+265
EMPLOYEES

+35
R&D
PROJECTS

32
GLOBAL
PATENTS



Top projects

OUTSTANDING SERVICES



ELICAN 5MW Experimental Fix-Bottom Unit

First offshore wind turbine commissioned in Spain with ELISA technology. Only bottom-fixed solution allowing installation without heavy-lift vessels.



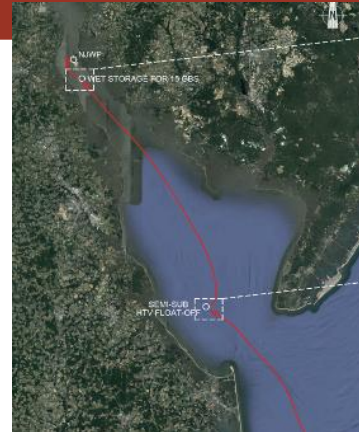
DemoWHEEL 6MW Experimental Floating Offshore Wind Unit

In construction to be the largest floating offshore wind turbine in Spain with WHEEL technology. The first spar fully commissioned in harbour and manufactured afloat.



EMPIRE WIND FEED assessment of first New York wind farm based on ELISA

FEED assessment for first and second New York windfarms (Empire 1 and Empire 2), including design, harbour upgrade, T&I, geotechnics, project execution and cost estimates.



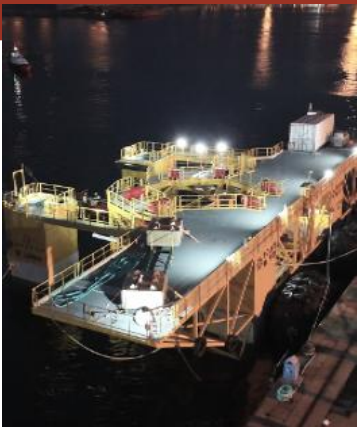
ATLANTIC SHORES New Jersey's fix-bottom wind farm

Concept Study for the ELISA technology implementation in Atlantic Shores, including basic design, manufacturing, T&I, geotechnics, execution strategies and cost estimates.



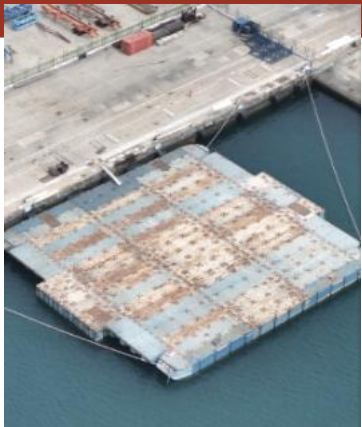
Top projects

OUTSTANDING SERVICES



ATOMS ANA
On-site Large
Corrective Maintenance
demonstrator

First Generation of ATOMS platforms, intended to service <5MW WTG onsite, lowering cost and minimizing loss of revenue due to waiting time. Opening the door for floating wind onsite MCRs.



AIRBARGE
Tailoring floating
manufacturing to fix-
bottom or floating wind

First unit retrofitted and tested in the Canary Islands, serving as base for afloat manufacturing of the DemoWHEEL project and demonstrate how modular barges can also be semisubmersible.



SCIERDE ROCKS
Beating the challenges
of rocky sea floor

Study for implementation of ELISA in the rocky conditions of Skerd Rocks, including design, manufacturing, T&I, geotechnics, project and installation execution plans and cost estimate.



FLOWIN
Assessing offshore wind in US
West Coast. Humboldt

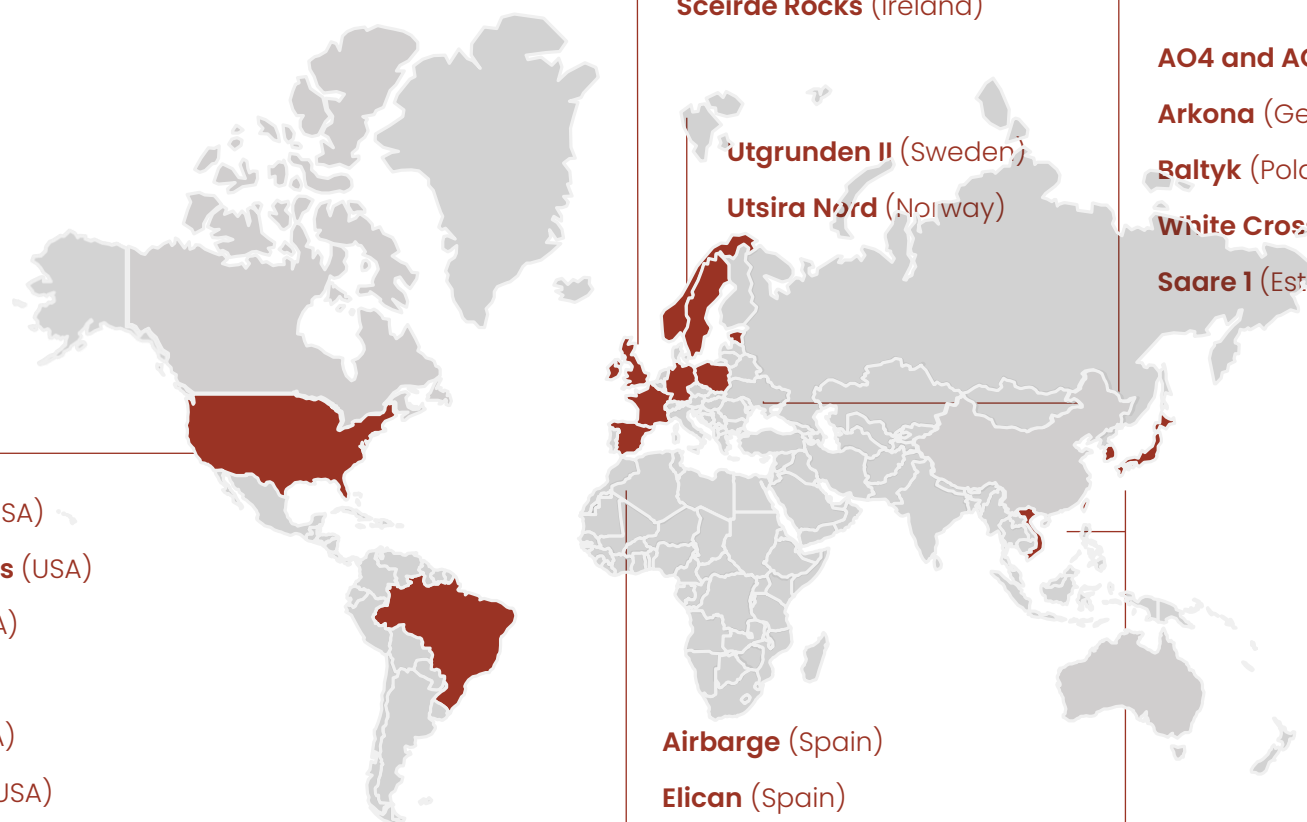
Deep assessment of WHEEL implementation in US West Coast in close collaboration with NREL. AirBarge and afloat manufacturing as key driver for West Coast offshore wind developments.



Some more key OW references

Since 2010, Esteyco provides advanced engineering services for offshore wind assets and projects. With integrated capabilities, covering structural, geotechnics, naval, coupled analysis, industrialization, logistics, ports, H&SE and risk assessment, sustainability and development consultancy.

Esteyco covers the entire project lifecycle, to assure fully integrated services that minimize CAPEX and OPEX while maximizing energy production.



Empire Wind (USA)
Atlantics Shores (USA)
Icebreaker (USA)
Beacon (USA)
Mayflower (USA)
Elisa & Wheel (USA)
Humboldt (California) – Flowin (USA)
NOWRDC (DoE)
Porto Ilha test site (Brazil)

Inch Cape (Scotland)
Kincardine (Scotland)
Moray West (Scotland)
Sceirde Rocks (Ireland)

Utgrunden II (Sweden)
Utsira Nord (Norway)

Airbarge (Spain)
Elican (Spain)
demoATOMS (Spain)
demoWHEEL (Spain)
Granadilla (Spain)

Arcwind R&D (EU)
Corewind R&D (EU)
Flotant R&D (EU)

AO4 and AO6 (France)
Arkona (Germany)
Baltyk (Poland)
White Cross (UK)
Saare I (Estonia)

Formosa III (Taiwan)
Kitichiasu (Japan)
Tra Vinh (Vietnam)



Esteyco Offshore Engineering

Working with the industry





ESTEYCO

02

Offshore Engineering

Capabilities & services

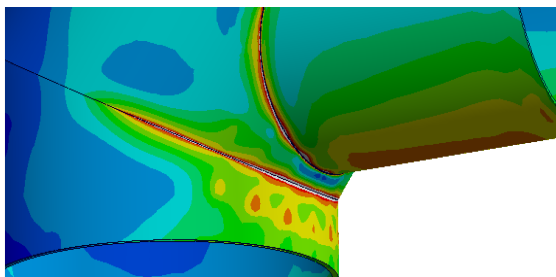




Esteyco Offshore Engineering

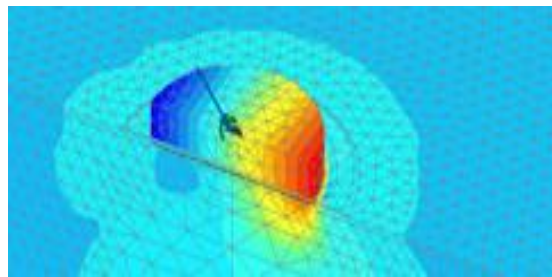
Capabilities & Services

Esteyco has been designing different concrete foundations and towers typologies for more than 20 years. Because there is no a one fits all solution.



STRUCTURAL DESIGN

- Full design, from concept to detailed
- Concrete and steel structures code-check (member of DNV-ST-0119 JIP)
- Advanced linear / non-linear FEM
- Detailed local modelled FEM
- Hydrodynamic load mapping
- Fatigue assessments
- Independent third-party validation
- Structural Health Monitoring (SHM)
- Lifetime evaluation
- Full certification process
- Owners' engineering services
- Industrialization assessment



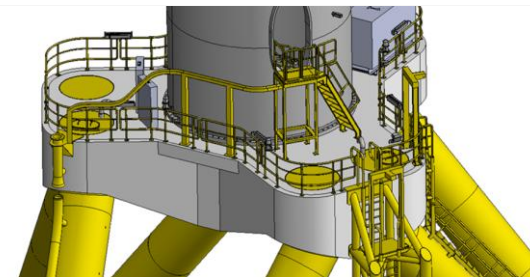
GEOTECHNICAL CONSULTANCY

- Geotechnical campaign planning and site works management
- Independent review of geotechnical data and interpretation of results
- Advanced structure-soil interaction FEM simulations
- Advanced analysis of soil cyclic response
- Scour analysis and definition of scour-protection
- Construction monitoring campaigns and assessment on executed structures
- Owners' engineering services



NAVAL ARCHITECTURE

- Naval design and verification of all types of floating or fixed structures
- Independent third-party validation
- Station Keeping System (SKS)
- Advanced hydrodynamic modelling & code check
- WTG interaction with hydrodynamics
- Scaled testing campaigns specifications and survey
- Hydrodynamic calibration based on experimental tests
- CFDs validation for complex hydrodynamic systems
- Owners' engineering services



OUTFITTING

- Detailed design of tower internals
- Detailed design of substructures secondary steel
- Independent review of secondary structures and code-check
- Detailed 3D modelling and clash detection
- Substructure and tower systems design and integration
- Access & evacuation assessment
- Corrosion protection
- Owners' engineering services
- Manufacturing process program

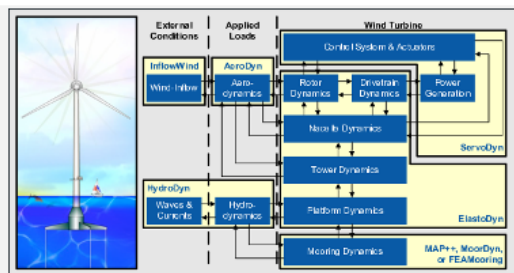
ESTEYCO HOLDS ITS OWN IP AND PROPERTY TECHNOLOGIES AS A BASELINE TO DEVELOP THE KNOW-HOW WHICH ENABLES THE CAPABILITIES TO ACCOMPLISH ANY PROJECT TO ACHIEVE A SUCCESSFUL ROUTE TO MARKET.



Esteyco Offshore Engineering

Capabilities & Services

Esteyco has been designing different concrete foundations and towers typologies for more than 20 years. Because there is no a one fits all solution.



INTEGRATED LOAD ANALYSIS

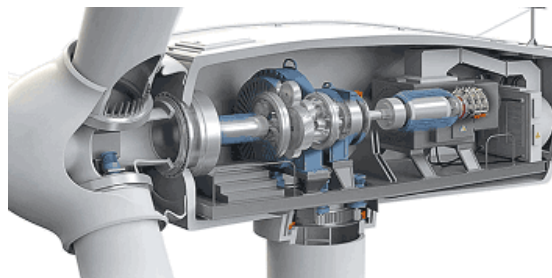
Aero-servo-hydro-elastic models in OpenFast and/or Orcaflex

Sound relationships with other specialists as NLR (former NREL) or CENER

Advanced modelling of multibody elastic structures, validated with FEM

Third-party ILA assessments and/or validation

Esteyco played an active part in the JIP which led to DNV's recommended practice for Coupled Analysis of Floating Wind Turbines (DNVGL-RP-0286)



ADVANCED MECHANICS

Analysis and design of the main mechanical components of wind turbines

Significant expertise in mechanical design and a number of high-added-value technical disciplines relevant for wind turbines

Industrial experience in design, analysis, manufacturing, assembly and testing

This service through the substructure and WTG components design, validation, optimization and certification processes



MARINE LOGISTICS

Metocean conditions analysis

Advanced marine operations modelling

Integration of real constraints and/or external controlling systems in numerical simulations

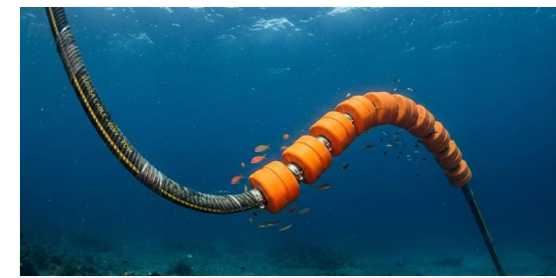
Procedures for marine operations, including contingency procedures

Marine spread planning, specification and cost analysis

Workability Assessments (weather downtime)

Capability plots.

Owners' engineering services



ELECTRICAL ENGINEERING

Engineering of cable routes, losses and overhead alignments in land

Development of clear and optimized SLDs: topology, protection philosophy, equipment and operational modes.

Detailed design of feeders, switching arrangements, protection, cables and equipment specifications tailored to local regulatory standards

Dynamic cable analysis

Instrumentation and communications

Owners' engineering

ESTEYCO HOLDS ITS OWN IP AND PROPERTY TECHNOLOGIES AS A BASELINE TO DEVELOP THE KNOW-HOW WHICH ENABLES THE CAPABILITIES TO ACCOMPLISH ANY PROJECT TO ACHIEVE A SUCCESSFUL ROUTE TO MARKET.



Esteyco Offshore Engineering

Capabilities & Services

Esteyco has been designing different concrete foundations and towers typologies for more than 20 years. Because there is no a one fits all solution.



PORT CONSULTANCY

Port selection considering permitting, fabrication, T&I inshore, cost and suitability

Definition of harbour and yard-lay outs for different construction strategies

Know-how on onshore logistics and heavy-lift equipment

Large experience on WTG assembly methods and means

Experience in soil improvement, dredging, geotechnical & structural engineering

Analysis and design/selection of load-out and float-off means

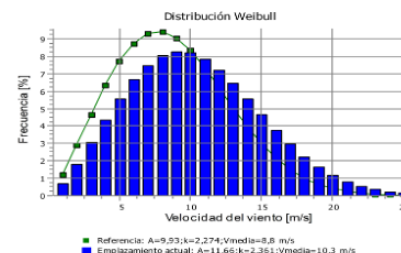


HSE & RISK

Sustainability strategies and practices to aim for a net positive environmental and social impact on projects, leading the shift from linear to circular economic practices.

Ability to develop frameworks and strategies based on ESG best practices, local requirements, OH&S, Technical Safety, Environmental and security hazard identification (HAZID) and assessment (HIRA).

Working Environment Health Risk Assessments based on Norsok S-002 Working environment (2018) and Environmental Reports, based on national and local requirements.



PERMITTING & DEVELOPMENT

Site selection and optimization, development strategy

Infrastructure assessment, project structuring, permitting and stakeholders management.

CAPEX / OPEX / DECEX preliminary assessment and estimates

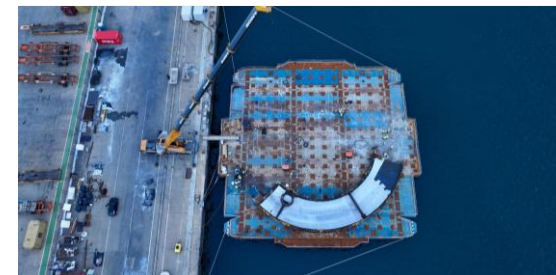
Market prospect

Wind resource & Site suitability

Environmental constraints evaluation

WTG Selection support

Grid connection agreements



CONSTRUCTION MANAGEMENT

Site Supervision & Construction method statements, Work Instruction and Technical Specifications

+15 years experience in concrete structures pre-cast for the wind industry

Experience in industrial and serial production

Large experience in costing exercises covering both CAPEX and OPEX, budget BOQ definition and large price database for key markets, including a database of dedicated quotes for renowned specialists and relevant supply chain.

ESTEYCO HOLDS ITS OWN IP AND PROPERTY TECHNOLOGIES AS A BASELINE TO DEVELOP THE KNOW-HOW WHICH ENABLES THE CAPABILITIES TO ACCOMPLISH ANY PROJECT TO ACHIEVE A SUCCESSFUL ROUTE TO MARKET.



ESTEYCO

03

Offshore Proprietary Technologies





Demonstration Projects

OW Proprietary Technologies

Esteyco has always aimed to be at the forefront of innovation and competitiveness. From this privileged position, **Esteyco** has come to understand the market's needs and respond with specific solutions to reduce energy cost and carbon footprint. These technologies are protected by multiple international patents, and **Esteyco** also holds the know-how which supports its design and construction.

**ELISA GBS technology**

First and only bottom-fixed solution with no need for heavy-lift vessels

**Full Scale
Demo 2018****ATOMS O&M System**

Solution for large corrective maintenance of bottom-fixed or floating WTGs

**Full Scale
Demo 2025**



Demonstration Projects

OW Proprietary Technologies

Esteyco has always aimed to be at the forefront of innovation and competitiveness. From this privileged position, **Esteyco** has come to understand the market's needs and respond with specific solutions to reduce energy cost and carbon footprint. These technologies are protected by multiple international patents, and **Esteyco** also holds the know-how which supports its design and construction.



AIRBARGE Construction Barge

Cost-effectively turn conventional modular pontoons into submersible barges suitable for floaters construction/assembly and float-off.



**Full Scale
Demo 2025**



WHEEL Floating evolution

Floating concept for unparalleled reduction in floater width, harbour draft, material usage and carbon footprint



**Full Scale
Demo 2026**
[under construction]



Our Gravity Base Foundation

A proven technology in operation since 2018

With three alternatives

	ELISA + telescopic tower	ELISA + steel tower	ELI
WTG assembled in harbour	✓	✓	–
Standard steel tower	–	✓	✓
Conventional WTG assembly (JUV)	–	–	✓

A competitive GBS
characterized by:

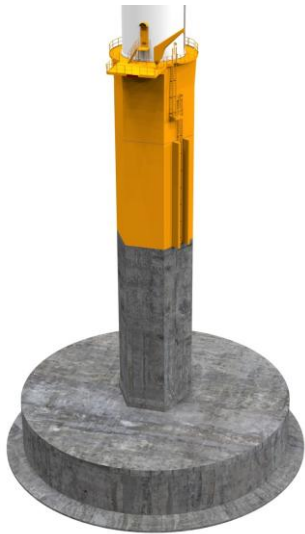
- High production rates
(4 units / month)
- No heavy lifting required
- Suitable for wet
(floating) manufacturing
- Optional jack-up vessel



Assembly:
fully assembled onshore



Installation:
with low-cost means





ATOMS
PROJECT



Digging deeper into O&M

Crushing the MCR challenges in offshore wind

- Low-cost and scalable solution for MCR of both bottom-fixed and FOW turbines
- Capacity to couple to the substructure a solidary working deck
- No need for heavy-lift vessels
- Proven commercial add-on cranes can be installed and operated
- Based on a Coupling Ring System (CRS)
- already proven (installation of GBS Elisa)
- Specific full-scale demonstration in 2024
- Applicability: for bottom-fixed and floating
- Reduce MCR cost significantly
- Specifically built and assigned to serve a given WF cluster to remain available 24/7

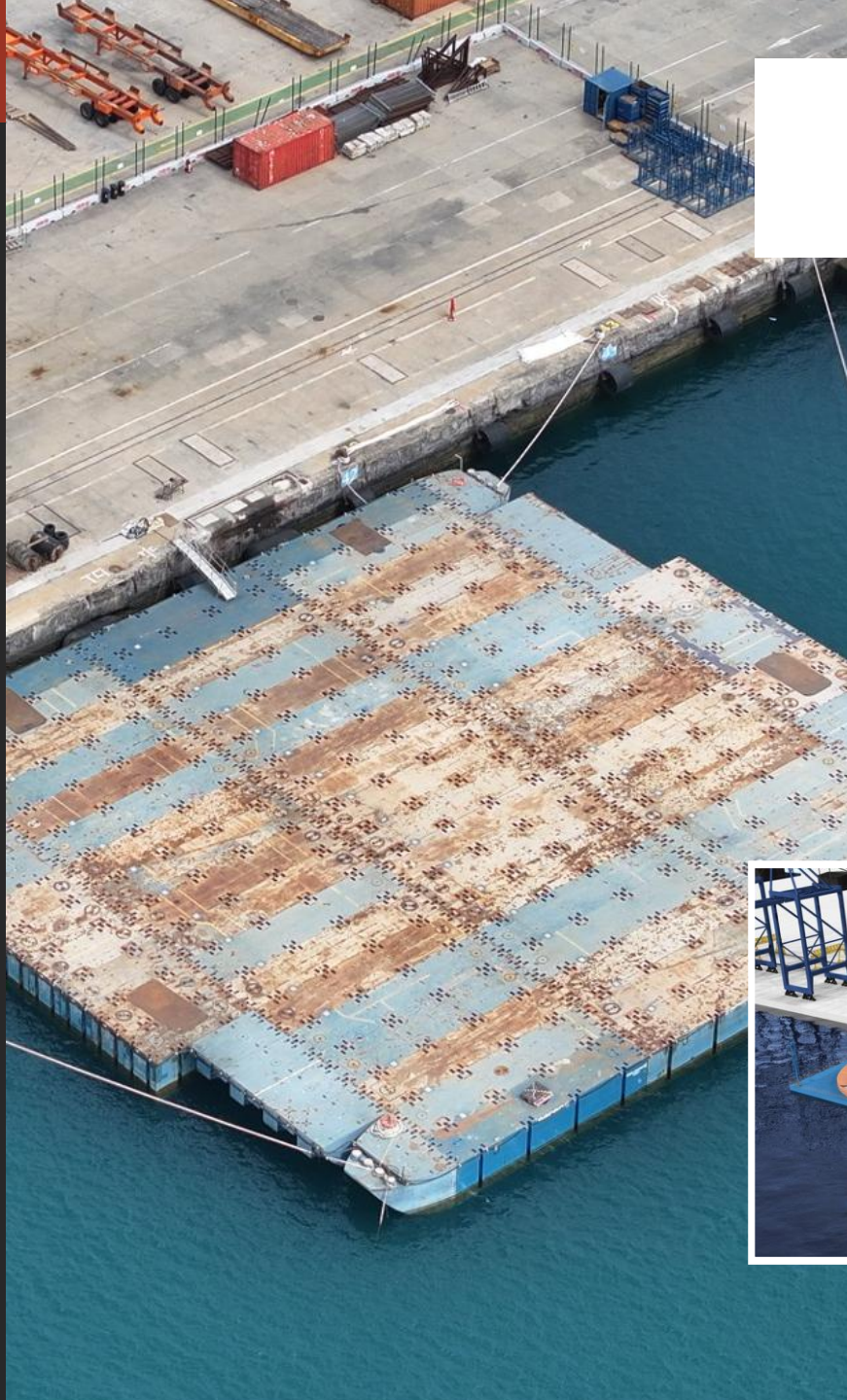


Proven CRS (TIM for ELISA)
+ working deck



Proven Add-on crane
(2000+ components replaced)

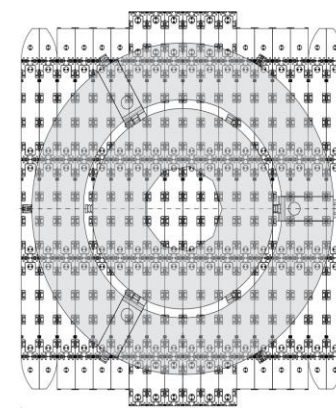
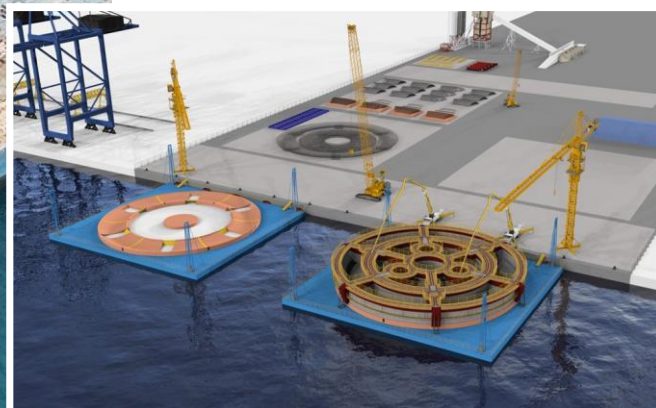




Port space constrains?

Tested semisubmersible modular pontoon

- The patented AIRBARGE technology will make it to cost-effectively turn conventional modular pontoons into submersible barges suitable for floaters construction/assembly and float-off.
- AIRBARGE proposes a simple and economic retrofit of existing modules that will allow using compressed air as means to effectively control the water ballast within each module.
- This retrofit turns them into modules that can be ballasted with water in a fully controlled manner, but with no need for any piping, valves, or water pumps.



Wet manufacturing:
port caissons technique

Low draught:
Quayside float-off

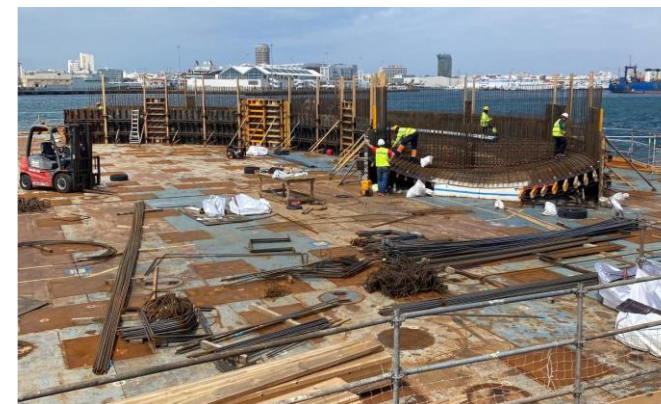
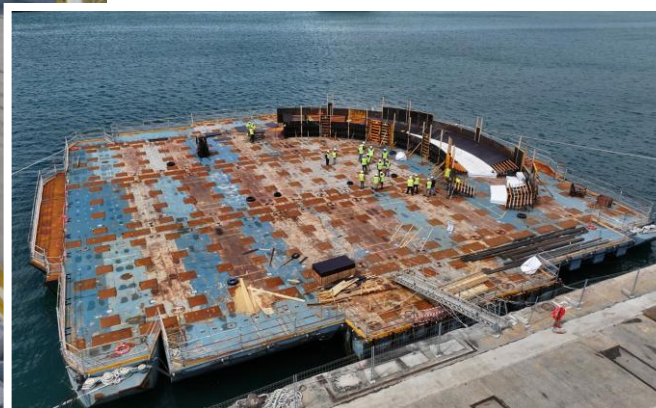


Our floating solution

Unrivalled spar performance... in any harbour

The most competitive floater characterized by:

- Barge mode in harbour > low draught
- Low width > suitable for wet manufacturing
- Unmatched material usage
- All spar benefits: Slow motions / Streamlined mooring system / High stability (no ABS needed)
- Soft-stiff tower compatible
- Tailored for ATOMS on-site LCM
- Extremely low carbon footprint



**WHEEL 6 MW Wet
manufacturing in progress**



Esteyco

Madrid

Avda. Burgos, 12B-Bajo
28036 – Madrid
Tel. +34 91 359 78 78
Fax. +34 91 359 61 72
esteyco@esteyco.com

Esteyco

Barcelona

Jardins d'Atlanta, 3
08005 – Barcelona
Tel. +34 93 224 04 30
Fax. +34 93 221 27 20
esteyco@esteyco.com

Esteyco

Bilbao

Barroeta Aldamar, 6. 5º
Derecha
48001 – Bilbao
Tel. +34 94 439 56 60
Fax. +34 94 427 86 98
esteycogernika@esteyco.com

Esteyco

Canarias

Luis Doreste Silva, 95 1ª D
Las Palmas de Gran Canaria
Tel. +34 928 29 50 68
esteycocanarias@esteyco.com

Esteyco

North America

75 Valencia Avenue,
Ste 703 Coral Gables,
FL 33134, EE.UU
esteyconorthamerica@esteyco.com



Esteyco

Colombia

Calle 100 N 19a-50 Oficina 803
Bogotá D.C.
esteycocolombia@esteyco.com

Esteyco

México

Av. Isaac Newton, N° 186,
Of. 101 Col.Chapultepec,
Morales. Del. Miguel Hidalgo
11560 – Ciudad de México
Tel. +52 1 55 86619642
esteycomexico@esteyco.com

Esteyco

Chile

Badajoz, 130. Oficina 801
Las Condes,
Santiago, Chile
Tel. +56 2 27 59 70 90
esteycochile@esteyco.com

Esteyco

Brasil

Av. Estados Unidos, 528, Sala 1107
Comercio, Salvador – BA
CEP 40.010020
Tel. +55 11 98160 1977
esteycobrasil@esteyco.com

Esteyco

Perú

Av. Paseo de la República n°
3557
Urb. Santa Cruz, Distrito de
San Isidro
Lima-Perú
esteycoperu@esteyco.com