

MEGAWIND

New solutions and technologies for monopile foundations, transition pieces and fastening solutions for 15 MW+ offshore wind turbines



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"Una manera de hacer Europa"

Eskualde Garapenerako
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"Europa egiteko modu bat"

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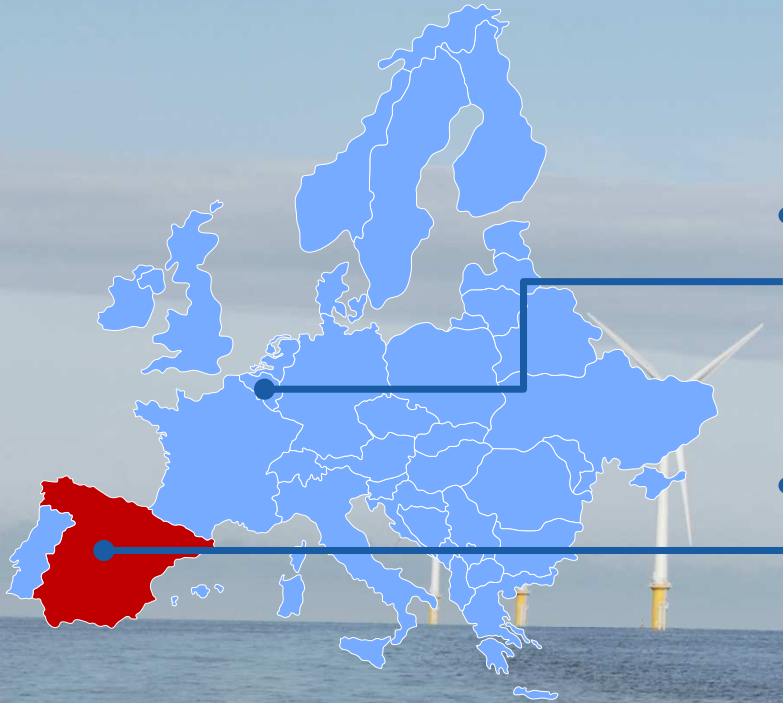
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CONTEXT



- According to IRENA, to meet the decarbonisation targets of the Paris Agreement, the global offshore wind requirement will need to be 1,000 GW by 2050 compared to 60 GW today [1].
- European Green Deal roadmap sets out 300 GW of offshore wind in the EU by 2050. According to WindEurope, in Europe alone and in this decade, this will increase from 28 GW installed by the end of 2021 to 70 GW in 2030 [2].
- At the national level, the Roadmap for Offshore Wind and Offshore Energy Development envisages offshore wind installation targets of 3 GW by 2030 [3].

[1] IRENA (2019), *Future of wind: Deployment, investment, technology, grid integration and socio-economic aspects (A Global Energy Transformation paper)*, International Renewable Energy Agency, Abu Dhabi.

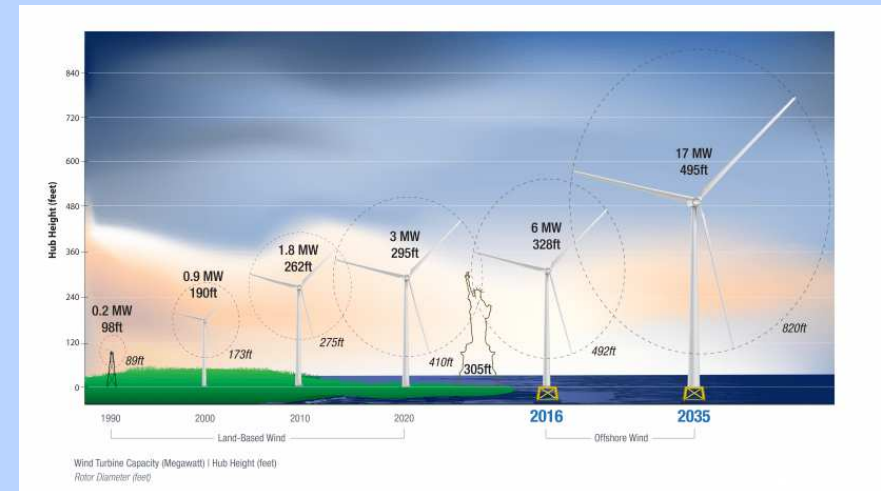
[2] WindEurope (2017), *Wind energy in Europe: Scenarios for 2030*.

[3] *Hoja de Ruta Eólica Marina y Energías del Mar en España*, Ministerio para la transición Ecológica y el Reto Demográfico, Madrid (2021).



OPPORTUNITY AND CHALLENGE

- The wind turbines to be used in offshore wind farms are becoming increasingly powerful; 15 MW will be a standard.
- The most commonly used foundation type is the monopile (accounting for over 80%). As the size of wind turbines increases, the loads on the foundations increase and, consequently, so does the size of the large structural parts that support them: the monopiles and transition pieces.



This imposes a number of challenges in the design, manufacture and installation of these components and joining systems, as well as in the treatments and coatings that are necessary for their correct operation in an offshore environment.

OBJETIVES

MEGAWIND aims to develop new solutions for monopiles which will be integrated with the new generation of large offshore wind turbines (+15 MW).

Innovation in the design and manufacture of:

- Monopile and transition piece
- Fastening solutions
- Coatings for offshore environments



ACTIVITIES TO BE CARRIED OUT BY THE CONSORTIUM

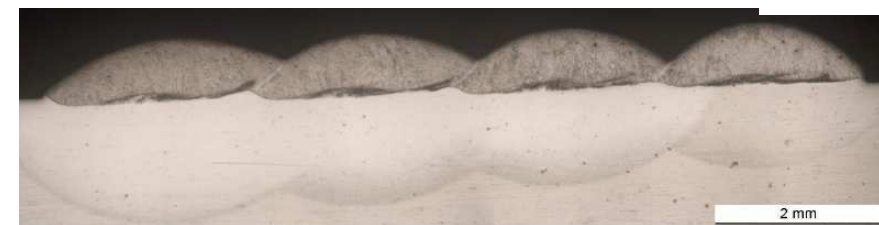
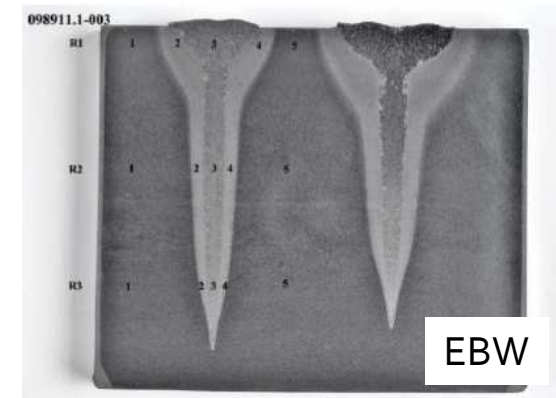
- New **electron beam welding process** for large steel structures.
- Design of **new transition pieces and flanges** adapted to XXL monopiles.
- Improved **handling, assembly and tightening of large metric bolts**; virtual sensing of bolts.
- Innovative **anti-corrosion coatings and heat treatments** for large metric bolts.



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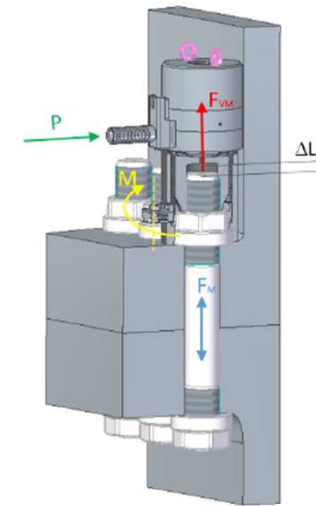
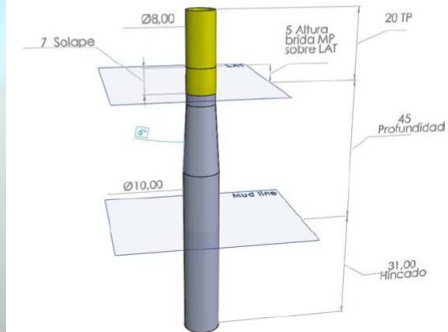
ON GOING ACTIVITIES

- Definition of design conditions of **MP** for **15Mw** wind turbines
- Definition of specifications and acceptance criteria for **Electron Beam Welding (EBW)** for MP construction and first tests
- Definition of specifications for different **heat treatment** processes.
- Definition of specifications for **anti-corrosion coatings** by **Laser Metal Deposition (LMD)** processes for large metric bolts and first tests



ON GOING ACTIVITIES

- Design of **new transition pieces and flanges** adapted to XXL monopiles.
- **TP-MP fastening** solutions for XXL monopiles
- **Heat treatment** monitoring system development
- New formulations of **top coats** for **hot dip galvanize** for large metric bolts.



MEGAWIND

Eskerrik asko !
¡Gracias!



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