



**Politecnico
di Torino**



Techno-economic modelling and optimisation of offshore renewable energy systems

Activities within the Horizon Europe project Blue-X

Recommended profile:

Doctorate in Engineering: Mechanical, Electronic, Civil, Ocean, Coastal, or related fields

Topics involved:

Dynamic numerical modelling, Techno-economic modelling, Resource assessment, Site Selection, Holistic optimisation, Earth Observation Satellites, Metocean Monitoring, Data processing and visualization

Skills required:

Matlab, Python

University Background

Politecnico di Torino was the first Italian Engineering School founded in the wave of the technical and scientific innovation that gave rise to the most prestigious European polytechnic schools in the mid-19th century. Founded as School for Engineers in 1859, it then became Regio Politecnico di Torino in 1906. Engineers, architects, designers and urban planners have been trained at Politecnico di Torino for over 160 years with rigor, integrity and high-level standards. This long ever-changing history has rated Politecnico among the top European technical Universities for education and research, with 38,700 students and a teaching staff of more than 1,000.

Within the Department of Mechanical and Aerospace Engineering of Politecnico di Torino, the Marine Offshore Renewable Energy (MOREnergy) Lab represents the result of first-hand experience gained in the field of marine energy. The Team is highly multidisciplinary and enumerates about 30 PhD students, 6 post-doctoral researchers and 2 professors. The working environment is highly motivating, informal, collaborative and experienced.

Project Background

Activities fall within the scope of the Horizon Europe Project "Blue-X: Blue Energy Offshore Installation Accelerator". Blue renewable energy sources such as offshore (floating) wind, floating solar (FPV), waves, tides and currents have a high and still unused potential to be explored. This is of particular importance in view of the current energy crisis and changing energy policy. For all offshore technologies, lengthy and expensive MetOcean, geophysical and environmental campaigns are needed, which slow

down the upscaling of offshore renewables. The BLUE-X project will contribute to the Green Deal objectives and its related policies, in particular with regard to increasing the EU's climate ambition for 2030 and 2050, supplying clean, affordable and secure energy, mitigating natural hazards and preserving and restoring ecosystems and biodiversity. BLUE-X is an innovative Copernicus based solution for optimising and accelerating decision making for blue renewable energy projects in all phases, from planning to construction, operation and decommissioning. The heart of this solution is a cloud-based IT network of relevant Earth observation and MetOcean data streams that are combined in decision support tools for each phase. As a result, the planning and construction phase can be significantly optimised, thereby reducing costs, and required time to full operation. BLUE-X will be available and showcased for all key offshore energy domains for some of the most important European offshore projects to date but can be applied anywhere.

Activity description

Starting from **March 2024** (indicative date), the MOREnergy Lab is looking for someone to be involved with the Blue-X project. The main technical activities envisioned for the MOREnergy Lab are the energy resource assessment, techno-economic modelling, evaluation and optimisation of offshore renewable energy systems, namely wave energy converters, floating offshore wind turbines, floating solar PV devices, and tidal energy converters. You will be first-hand involved in the technical implementation, leading to a portfolio of offshore renewable energy technologies to be integrated in the digital tools developed by other partners of the Blue-X project.

In addition to the activities above, you will be included in the highly motivated and multidisciplinary working environment of the MOREnergy Lab, eventually collaborating with other postdocs and PhD students on a wide range of different topics, both academic and industrial, following your inclinations and desires.

Months of contract: 12, extendable up to 24.

Net salary: it is the 4th (highest) level for a post-doctoral research fellow: **€ 2.060,91** per month.

Your activities

Most of the following activities will start from a solid know-how already present in the MOREnergy Lab. For each offshore renewable energy technology above (wave, offshore wind, floating PV, tidal):

- Resource statistical analysis and environmental contour
- Definition of technology portfolio, including available systems in the literature, as well as archetypal devices
- Numerical modelling, including realistic operational conditions (energy resource, control, physical constraints), and productivity assessment for single devices and arrays
- Parametric capital and operational cost estimation, depending on the device characteristics as well as the installation site
- Definition of an optimal technology portfolio within a Pareto front of a holistic optimisation

Your qualifications

- Doctorate in Engineering: Mechanical, Electronic, Civil, Ocean, Coastal, or related fields
- Very good publication track record
- Willingness to supervise junior researchers
- Very good knowledge (orally and in writing) of English
- Ability to work independently, as well as in a team

Application

Please apply through the following [link](https://careers.polito.it/default.aspx?id=328/2023-AR) (<https://careers.polito.it/default.aspx?id=328/2023-AR>).

Deadline for application: 23rd January 2024 at 15:00.

Contact references:

Dr. Giuseppe Giorgi (giuseppe.giorgi@polito.it)