

## TRAINING SCHOOL IA

# RESILIENCE OF MODULAR SUSTAINABLE ENERGY ISLANDS IN FACE OF CLIMATE CHANGE CHALLENGES

**Estoril, 25-28 September 2023**

**Venue:**

**Hotel Inglaterra Estoril | Rua do Porto, 1 | 2765-271 Estoril | Portugal**

<https://www.hotelinglaterra.com.pt/Portugal>



# TIMETABLE

## 1<sup>ST</sup> DAY (25 September 2023)

MORNING SESSION	
9:15-9:45	Get together & Registration
9:45-10:15	Welcome and introduction to the MODENERLANDS COST Action: Advances in Modular Sustainable Energy Artificial Islands <b>Prof Dr Carlos Rebelo, Prof Dr Charalampos Baniotopoulos and Prof. Dr. Teresa Simões</b>
10:15-11:00	Resilience Assessment for Modular Sustainable Energy Islands: Induction <b>Prof Dr Ruben Borg</b>
11:00-11:30	Break (refreshments outside the room)
11:30-13:00	Modular Energy Islands in face of Climate Change: Extreme wind and its effect on the atmospheric boundary layer/Tornados & Downburst <b>Dr Hassan Hemida</b> Machine learning for wind resources on offshore wind energy <b>Dr Asaad Famarzi &amp; Dr Moura Mehravar</b>
13:00-14:00	Lunch (LUNCH BOX INSIDE THE ROOM)
AFTERNOON SESSION	
14:00-14:45	Offshore wind energy assessment <b>Professor Dr Teresa Simões</b>
14:45-15:30	Resilience Indicators, GIS database, Analytical Hierarchy Process (AHP), Risk Assessment <b>Prof Dr Ruben Borg</b>
15:30-16:00	Break (refreshments outside the room)
16:00-17:00	Hands-on Workshop - Briefing – <b>Prof Dr Charalampos Baniotopoulos</b> 20 Trainees with Trainers in Groups with Tutors

## 2<sup>ND</sup> DAY (26 September 2023)

MORNING SESSION	
9:00-9:45	LCA in Modular Sustainable Energy Islands <b>Professor Dr Helena Gervasio</b>
9:45-10:30	Multi-Criteria Decision Method (MCDM) for Modular Sustainable Energy islands <b>Professor Dr Helena Gervasio</b>
10:30-11:00	Break (refreshments outside the room)
11:00-11:45	Grid integration <b>Prof Dr Ana Estanqueiro</b>
11:45-12:30	Dynamics of floating structures facing fatigue and extreme loads <b>Dr Enzo Marino</b>
12:30	Lunch(LUNCH BOX INSIDE THE ROOM)
13:30-22:30	Technical trip (LNEC and Principle Power Inc.) and Dinner (Portugália Belém)

### **Technical Trip by BUS (Metas Diárias) 219 205 266 / 918 105 280**

Starting: 13:30h Hotel Inglaterra Estoril Destination: LNEC | Visit ± 2 horas

Destination: Principle Power Portugal, Av. José Malhoa, 27, 12º piso, 1070-156 Lisboa | Visit ± 1 hora

Destination: Portugália Cervejaria Belém, Edifício Espelho d'Água, Av. Brasília S/N, 1400-038 Lisboa

Return 22:00h to Hotel Inglaterra Estoril

### 3<sup>RD</sup> DAY (27 September 2023)

MORNING SESSION	
9:00-9:45	Digital Twins applied on infrastructure: computational mechanics, parameter identification and machine learning <b>Prof Dr Georgios Stavroulakis</b>
9:45-10:30	- Codes for evaluation of classic or fuzzy Analytical Hierarchy Process (AHP) <b>Prof Dr Georgios Stavroulakis</b>
10:30-11:00	Break (refreshments outside the room)
11:00-12:30	Workshop (Trainees with Trainers)
12:30	Lunch(LUNCH BOX INSIDE THE ROOM)
AFTERNOON SESSION	
13:30-15:00	Workshop (Trainees with Trainers)
15:00-15:30	Break (refreshments outside the room)
15:30-17:00	Workshop (Trainees)

### 4<sup>TH</sup> DAY (28 September 2023)

MORNING SESSION	
9:00-11:00	Workshop (Trainees)
11:00-11:30	Break (refreshments outside the room)
11:30-13:00	Trainees Group Presentations to the Panel, Discussion and Feedback
13:00-14:00	Lunch (LUNCH BOX INSIDE THE ROOM)
14:00	FAIRWELL - END OF THE TRAINING SCHOOL

### Hands-on Workshop

After selection of a certain typology for the Modular Island with the respective sustainable energy systems used, and of the data related to the location and the environmental conditions, a Resilience Analysis should be performed for the project under investigation. The Trainees will be divided into 4 groups and each group should work independently from the others. Each group will be supervised by at least one Trainer. Students should have their own computers with them.

The Training School activity shall address the Resilience Assessment of Modular Floating Energy Islands through the development of a methodology for floating structures in a particular context and site. The approach is based on the development of a framework through a methodology based on Resilience Indicators.

The framework refers to multiple criteria decision methods (MCDMs). In the first stage, site specific criteria can be analysed relying on GIS database applications; acceptance and exclusion criteria need to be defined. In the second stage an analytical hierarchy process (AHP) is adopted based on technical, economic, environmental, social and governance attributes. The main objective is the assessment of the resilience of the installation of Modular floating Energy Islands based on multi-criteria analysis. A risk assessment methodology shall then be applied to define the key risk and mitigation actions. It leads to an objective overview of floating offshore modular Islands, the infrastructure and site selection and the contribution to minimize the environmental impacts, to reduce the social conflicts between stakeholders and review critical technical and engineering criteria.