

SCERIN-10 Workshop on Earth System Observations and 10th Anniversary

“Recent terrestrial ecosystems LCLU changes and driving forces –
challenges for remote sensing and sustainable management”

From land to water: the role of renewable energies in the Black Sea region for a climate-neutral Europe

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26th - 29th June 2023, Brno, Czech Republic

EU strategy on offshore renewable energy

- Published: 19 November 2020 (COM(2020)741)
- The offshore renewable energy can help reach the EU's ambitious energy and climate targets for 2030 and 2050.
- The strategy sets targets for an installed capacity of at least **60 GW** of offshore wind and **1 GW** of ocean energy by 2030, and **300 GW** and **40 GW**, respectively, by 2050.

To maximise its impact, the EU strategy on offshore renewable energy goes beyond a narrow definition of the factors of energy production and addresses broader issues, such as:

- access to sea-space
- regional and international cooperation
- industrial and employment dimensions
- the technological transfer of research projects from the laboratory into practice

Overview



MODENERLANDS

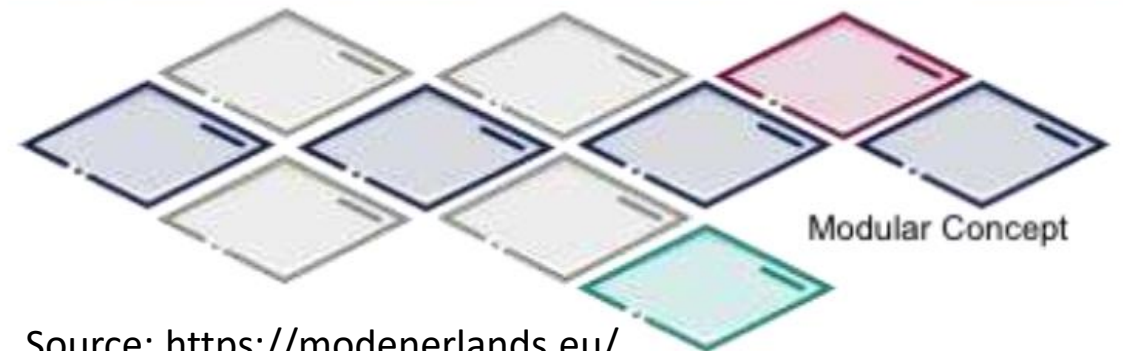
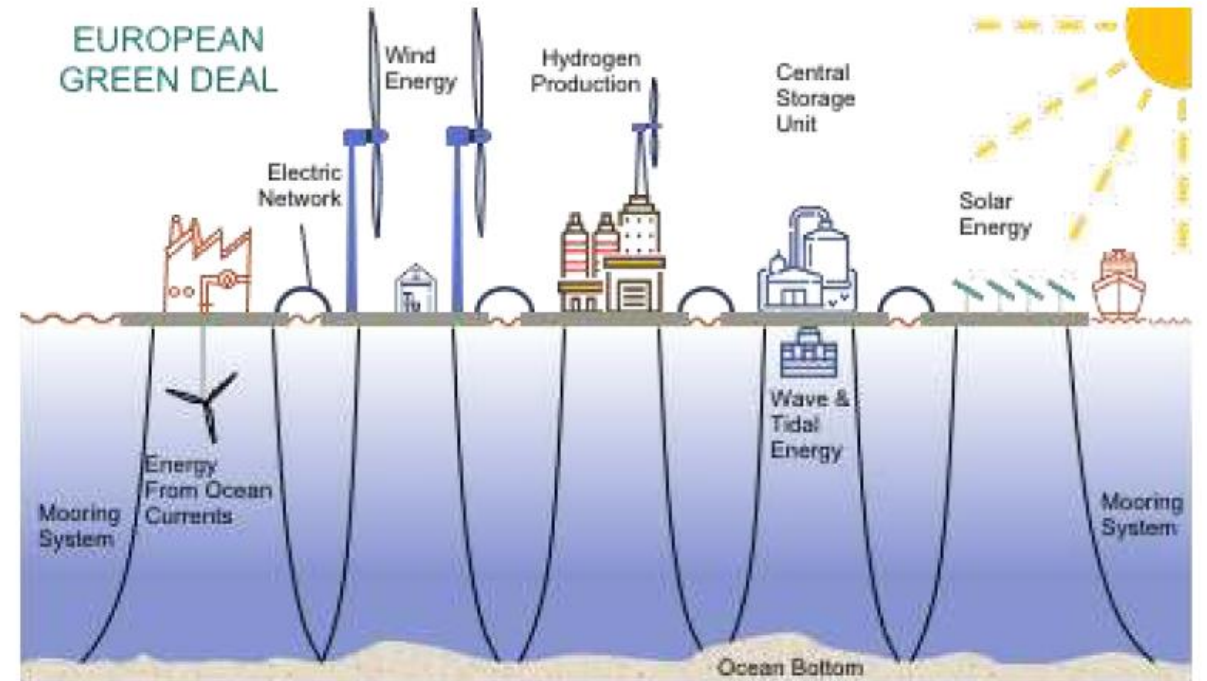
Modular Energy Islands for Sustainability and Resilience (MODENERLANDS)

- Funded under COST ACTION CA20109
- Period: 2021 – 2025
- Participants from 32 countries
- Supported by the National Science Fund at the Ministry of Education and Science of Bulgaria (Agreement № КП-06-COST-3/17.05.2022)

The concept of MODENERLANDS (MODular ENERgy isLANDS)

The diverse renewable energy sources in such Energy Islands include:

- WIND energy
- SEA CURRENT energy
- WAVE energy
- SOLAR energy



Source: <https://modenerlands.eu/>

MODENERLANDS

aims to merge and systematise the efforts of the European Research and Development (R&D) groups working on Sustainable Energy and the related technologies, in particular **wind and wave energy sources**, by proposing pathways for incorporation and by promoting the relevant synergies in Research, Education and Training in order to enhance Sustainability in the built environment



Source: <https://modenerlands.eu/>

Objectives

Research Coordination Objectives

Collection and systematisation of the existing theoretical frameworks on resources (e.g. waves, wind), the respective Climate Change impact and the respective floating Sustainable Energy Islands including their design and the respective Guidelines and Codes

Thorough discussion, scientific analysis and synthesis of the respective outcome within a techno-economic and socio-ecological framework

Study of the means and strategies to promote Sustainable Energy islands representing the most promising form of sustainable energy using high-performance technological innovations, thus leading to enhancement of the resilience characteristics of the future urban environment

Dissemination of the research results to partners, stakeholders, researchers across Europe and around the globe, **and training** of a new generation of Early Career Investigators (ECIs), engineers, scientists, technicians, territorial planners, economists, and the municipality or government officials who in the near future will find themselves in front of promising large scale similar projects and will be able to successfully treat and advance them to fulfil EU ambitious CO2 emissions minimisation.

Objectives

Capacity-building Objectives

to facilitate sharing of knowledge of new technologies and potentials related to the Modular Sustainable Energy Islands perspectives that include theoretical and technical sustainable energy aspects including socio-ecological and techno-economic issues towards the enhancement of environmental resilience, as well as the related Education.

to encourage scientific dialogue, knowledge exchange and collaboration among research centers, universities, NGOs and the Sustainable Energy related industry sectors.

to train Early Career Investigators (ECIs) to become technical and policy Experts in Floating Sustainable Energy Islands who will not only be able to lead the necessary industrial developments in the Sustainable Energy sector but also have a thorough understanding of the necessary conditions for widespread adoption of the relevant energy technology in its context that takes into account sustainability and environmental resilience criteria.

Working Groups

WG1 • *Assessment of sustainable energies resources for energy islands*

WG1 aims to promote and coordinate research activities compatible with Climate Change EU strategy concerning global resources assessment and [evaluation of climate change impacts on the size and geographic distribution of the renewable energy resources](#).

WG1 also targets to foster the concept of Energy Island and coordinate research activities concerning [assessment of offshore renewable energy sources potential in Europe focused on integration renewables into grid including storage systems and green hydrogen](#).

Working Groups

WG2 • *Modular offshore floating energy islands*

WG2 coordinates research activities addressing **integrity and sustainability of modular offshore floating platforms** suitable to receive energy islands including **conceptual innovative design, construction issues, recycling/reuse, markets and industries, and regulatory framework.**

WG2 will focus on **technological challenges and solutions**, floating systems technology development, wind/wave/current structural interaction and loading, fabrication and execution of large structures, operational functionality, structural health and condition monitoring, cost efficiency, regulatory and standardization.

Working Groups

WG3 • *Network, energy storage and resilience analysis*

WG3 aims to enact Energy Islands strategies for climate change adaptation through real-world case studies taking into consideration grid integration and techno-economic criteria.

WG3 will integrated feasibility analysis of Energy Islands projects, Risk analyses, Achievements concerning EU goals established by the European Green Deal and technology transfer.

Black Sea region

Assessment of the geographic distribution of renewable energy resources for energy islands – A review

Onea, F.; Manolache, A.I.; Ganea, D. Assessment of the Black Sea High-Altitude Wind Energy. *J. Mar. Sci. Eng.* 2022, 10, 1463. <https://doi.org/10.3390/jmse10101463>

Kucukali, S., Dinckal, C. Wind energy resource assessment of Izmit in the West Black Sea Coastal Region of Turkey. *Renewable and Sustainable Energy Reviews*, 2014, 30, <https://doi.org/10.1016/j.rser.2013.11.018>

Kustova, I., Egenhofer, C. How Black Sea offshore wind power can deliver a green deal for this EU region. CEPS Report, 2020, 25 p. Available: www.ceps.eu

Argin, M. et al. Exploring the offshore wind energy potential of Turkey based on multicriteria site selection, *Energy Strategy Reviews*, 2019, Vol. 23, pp. 33-46.

Jansen, M. et al. Offshore wind competitiveness in mature markets without subsidy. *Nature energy*, 2020, Vol. 5, pp. 614-622, <https://doi.org/10.1038/s41560-020-0661-2>

Topham, E., McMillan D. Sustainable decommissioning of an offshore wind farm, *Renewable Energy*, 2017, Vol. 102(B), pp. 470-480.

Rusu L, Ganea D, Mereuta E. A joint evaluation of wave and wind energy resources in the Black Sea based on 20-year hindcast information. *Energy Exploration & Exploitation*. 2018;36(2):335-351. doi:10.1177/0144598717736389

Bingölbalı, B., Majidi, A. G., Adem Akpınar, A. Inter- and intra-annual wave energy resource assessment in the south-western Black Sea coast. *Renewable Energy*, 2021, Vol. 169, 809-819 <https://doi.org/10.1016/j.renene.2021.01.057>

Tanase, V. M., Chiotoroiu, B. C., Vatu, N. Wave energy along the Romanian Southern Black Sea coast. *Journal of Physics: Conference Series*, 1122 (2018) 012029, doi:10.1088/1742-6596/1122/1/012029

Yeşilyurt, M. K., Öner, I. V., Ömeroğlu, G., Yılmaz, E. C. A scrutiny study on wave energy potential and policy in Turkey. *Periodicals of Engineering and Natural Sciences*, 2017, 5(3), 286-297, doi: 10.21533/pen.v5i3.108

Guillou, N., Lavidas, G., Chapalain, G. Wave Energy Resource Assessment for Exploitation—A Review. *J. Mar. Sci. Eng.* 2020, 8, 705; doi:10.3390/jmse8090705

Black Sea region

- The [western side of the Black Sea basin](#) have more significant potential for joint exploitation of the wind and wave power, therefore become interesting for the extraction of the renewable energy.
- Offshore wind plays a major role in Europe's 2050 decarbonization goals.
- The realization of the potential of offshore wind energy, according to the experts' opinion (<https://esgnews.bg/balgariya-i-rumaniya>), can be achieved through the concept of building a common Romanian-Bulgarian energy island in the Black Sea. The two countries could build **3 GW of offshore wind farms** each, with potential sites between Shabla (Bg) and Constanța (Ro) on the western side of the Black Sea basin.

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Thank you for attention

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