



A HOT START FOR THE DREAM PROJECT, MAIN ADVANCES AND CHALLENGES

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The general objective of the DREAM project (acronym from Dynamics of the REsources and technological Advance in harvesting Marine renewable energy - PN-III-P4-ID-PCE-2020-0008) is to enhance the efficiency of harvesting marine renewable energy in the European nearshore through hybrid technologies adapted to the dynamics of the environmental matrix expected in the context of the climate change. This objective is in line with the strategic energy technology (SET) plan of the European Union for a competitive low-carbon energy integrated roadmap and also with the European Green Deal https://ec.europa.eu/info/publications/communication-european-green-deal_en. Thus, development of advanced ocean energy systems joining various technologies and resources to be harvested, as well as a better understanding of their interaction with the resources in the context of the expected dynamics of the environmental matrix due to the climate changes, represent aspects of high interest. New system designs and methodologies integrating also cross-cutting issues are needed to enhance reliability and induce a step change in the sector. From this perspective, any coherent research focused on such issues should be strongly encouraged. Following this general objective, ground-breaking research and innovation actions are needed and some of them are targeted by the present project.

For the first half of the project the most relevant specific objectives have been also defined as follows: O1. Evaluation of the future expected wind power along the European coasts until the end of the 21st century considering three Representative Concentration Pathway scenarios (RCPs) 2.6, 4.5 and 8.5, respectively. O2. Design the future expected wind conditions for the target areas considered corresponding for two different time intervals of 40 years extension, each. These are: NF (near future, the interval 2021-2060) and DF (distant future, the interval 2061-2100). Three large European geographical coastal areas are mainly targeted by the present project and they are illustrated in Figure 1. The first, (TA1) is represented by the Baltic and North Seas. These two seas are very representative for the offshore wind energy, since more than 60 farms are currently operating there (about 40 farms in the North Sea and other 20 in the Baltic Sea). The first offshore wind farm (Vindeby) was installed in 1991 in the Baltic Sea by Denmark. Furthermore, a high development of the offshore wind sector is expected in these areas. The second area, (denoted as TA2) includes Ireland and the western sides of the French and Iberian coastal environments (the emphasis will be put on the Iberian nearshore). Due to the high waves that are characteristic in these environments, these areas can be considered as having the highest potential in Europe in relationship with the joint marine energy resources. Finally the third target area (TA3) is represented by the Black Sea, focused on its western side. O3. Evaluation of the historical wave and solar energy conditions corresponding to the three target areas. This will include hindcast models, but also in situ and



remotely sensed measurements. O4. Evaluation of the existent wind technologies in the three coastal environments targeted considering the conditions expected in NF and DF time intervals under RCPs 2.6, 4.5 and 8.5. This will be focused on two important issues, wind turbines and floating platform designs. The structure proposed for the DREAM project unfolding including the target areas, the Work Packages and the main tasks and objectives associated are illustrated schematically in Figure 1.

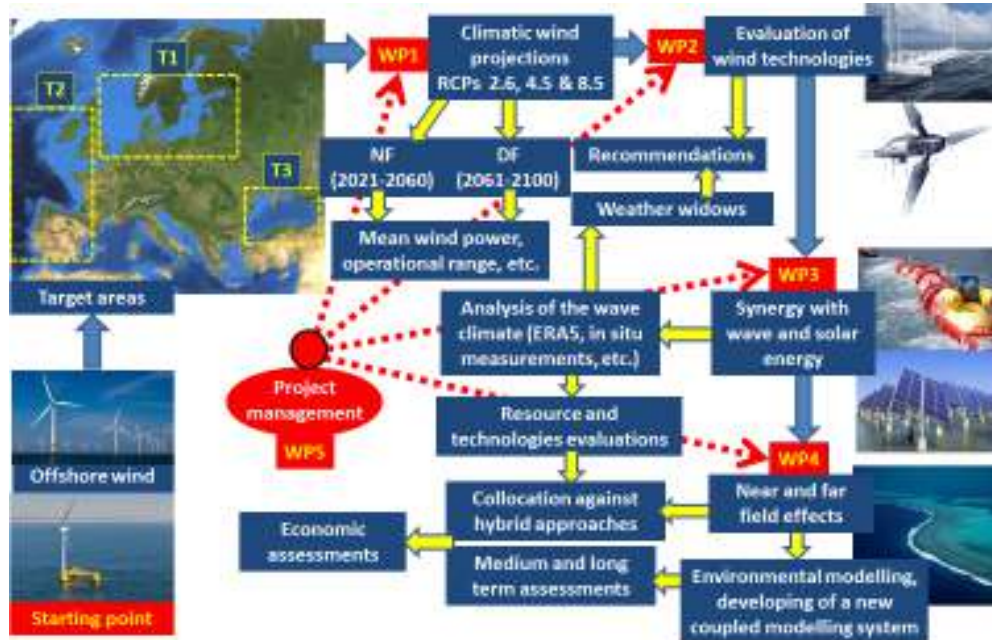


Figure 1: The structure proposed for the DREAM project indicating the target areas, the Work Packages and the main tasks and objectives associated to them.

From this perspective, following the specific objectives and the work plan of the DREAM project, together with the activities directly related to the implementation of the DREAM project and accomplishing the main scientific targets, significant dissemination activities have been also started. These include publications in relevant journals (as for example Journal of Marine Science and Engineering, IF=2.033 Q2, Applied Sciences, IF=2.474 Q2 and Energies, IF=2.702) and participation to important scientific conferences, such as the 6th International Conference on Advances on Clean Energy Research (ICACER 2021) that will be held in Barcelona, Spain on April 15-17 <http://www.icacer.com/index.html>, where the DREAM project participated with several works, all of them accepted for further publication in the Elsevier journal Energy Reports (IF=3.595) <https://www.journals.elsevier.com/energy-reports>. Furthermore the project leader was program co-chair in this conferences while the team member Liliana Rusu was invited speaker. Another conference with important participations on behalf of the DREAM project is the 9th edition of the Scientific Conference organized by the Doctoral Schools of “Dunărea de Jos” University of Galati (SCDS-UDJG), on 10th and 11th of June 2021, in Galati, Romania <http://www.cssd-udjg.ugal.ro/>. Other two conferences where the team members of the DREAM project will participate with 2 works at each are the 17th International Conference on Environmental Science and Technology CEST2021, 1-4 September 2021, Athens, Greece, <https://www.cest2021.gnest.org/>, and the 16th Conference on Sustainable Development of Energy, Water and Environment Systems (SDEWES2021) October 10-15, 2021, Dubrovnik Croatia, <https://www.dubrovnik2021.sdewes.org/>. Finally, another significant



work was accepted for presentation and publication to the thirty-first (2021) International Ocean and Polar Engineering Conference (ISOPE) – Rodos, Greece, June 20-25, 2021, <https://www.isopec.org/conferences-symposia-and-workshops/>, while other two works were accepted at the 5th International Conference on Renewable Energy and Environment (ICREE 2021) which will be held in Yildiz Technical University, Istanbul, Turkey on Oct. 21-23, 2021, <http://icree.org/index.html> and , International Conference on Applied Sciences ICAS2021, May 12-14, 2021, Hunedoara, Romania, <http://icas.science/>.

Furthermore on 24 February 2021 the project leader made in the context of the DREAM project work the presentation with the title ‘*Renewable energy from the marine environment in the context of the climate changes*’ <https://www.tuiasi.ro/noutati/fermele-marine-captarea-valurilor-vanturilor-si-curentilor-din-oceane-fundamentele-primeii-conferinta-stiintifice-a-anului-2021-din-seria-mostenirea-lui-asachi/>. This event was organised by the Iasi Branch of the Romanian Academy at the Technical University of Iasi ‘*Gheorghe Asachi*’, opening the 2021 cycle of the scientifically and cultural series of conferences entitled ‘*Inheritance of Asachi*’. Another invited presentation was made by the project leader at the 9th edition of the Scientific Conference organized by the Doctoral Schools of “Dunărea de Jos” University of Galati (SCDS-UDJG), Romania. The title of this invited presentation is European Green Deal and the transition to a low carbon future through marine renewable energy. Besides this, several others scientific works made in the framework of the DREAM project have been presented at this conference.

The list of the most relevant scientific works and conference presentations made in the context of the DREAM project is provided at the section of references and all the works have included in the text the Acknowledgement of the project as given below.

Finally, it has to be also highlighted that the project website has been designed in both English and Romanian languages and this is available at the link given below. Besides an executive summary, the web page of the DREAM project presents the objectives, the results, the team and the works published in the framework of the project. The web page will be updated twice in each year of the project unfolding, www.dream.ugal.ro .

Keywords: marine renewable energy, targets, advances, challenges, DREAM project, KPIs

Acknowledgment: This work was carried out in the framework of the research project DREAM (Dynamics of the REsources and technological Advance in harvesting Marine renewable energy), supported by the Romanian Executive Agency for Higher Education, Research, Development and Innovation Funding – UEFISCDI, grant number PN-III-P4-ID-PCE-2020-0008.

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