WECANet: An open pan-European Network for Marine Renewable Energy with a focus on wave energy – European COST Action CA17105

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Growing energy demand has increased interest in marine renewable energy resources, i.a. wave energy which is harvested through Wave Energy Converter (WEC) Arrays.

However, the wave energy industry is currently at a **significant juncture in its development**, facing a number of challenges which require that research re-focusses onto a holistic **techno-economic perspective**, where economics consider the full life-cycle costs of the technology. It also requires development of WECs suitable for **niche markets**, because in Europe there are inequalities regarding wave energy resources, wave energy companies, national programmes and investments. As a result, in Europe there are **leading** and **non-leading** countries in wave energy technology. The sector also needs to increase confidence of potential investors by **reducing (non-)technological risks.** This can be achieved through an **interdisciplinary approach** by involving engineers, economists, environmental scientists, legislation, governmental bodies

and policy experts. Consequently, the wave energy sector needs to receive the **necessary attention** compared to other more advanced and commercial ocean energy technologies (e.g. offshore wind).

The formation of the **first open pan-European Network** on an interdisciplinary approach will contribute to large-scale **WEC A**rray deployment by dealing with the current bottlenecks. The **WECANet** EU COST Action, presented in this paper, aims at a collaborative and inclusive approach, as it provides a strong networking platform that also creates the space for dialogue between all stakeholders in wave energy. An important characteristic of the Action is that participation is open to all parties interested and active in the development of wave energy. Previous activities organised by WECANet core group members have resulted in a number of joint European projects and scientific publications ([1]-[3]). WECANet's main target is the equal research, training, networking, collaboration and funding opportunities for all researchers and professionals, regardless of age, gender and country in order to obtain understanding in the main challenges governing the development of the wave energy sector.

In Belgium, WECANet is coordinated by the Coastal Engineering Research Group of Ghent University (UGent-CERG, http://awww.ugent.be) and is actively supported by activities of the Flanders Marine Institute (VLIZ, http://www.vliz.be), the Marine@UGent cluster and the Provincial Development Agency West-Flanders (POM). UGent-CERG has a large experience in the fields of coastal and offshore engineering and marine renewable energy, and performs integrated research using physical and numerical modelling and field measurement campaigns. The main infrastructure and know-how include prototype field measurements, wave flumes and wave basins for physical scale modelling, and numerical tools. The specialized staff members of the research group are involved in national and international projects on coastal defense, ocean energy conversion and offshore structures. UGent-CERG has established experimental facilities, and currently the new Coastal & Ocean wave Basin (COB, web link: http://COB.ugent.be) is being constructed. These facilities enable physical modelling for research purposes, for the government and for the industry. VLIZ promotes accumulation of marine knowledge and excellence in marine research in Flanders, targeting the marine research community as well as educational institutions, the general public, policymakers and the industry (within the scope of the blue economy). VLIZ is also participating in the Management Committee of WECANet. Marine@UGent GOBlue (www.marineatugent.be/) is an initiative of the UGent Marine Sciences Centre of Excellence which promotes and facilitates interdisciplinary cooperation for Blue Growth activities. POM is responsible for the implementation of the social economic policy of the Province of West Flanders and is supporting developments in the blue energy field, promoting the development of ocean energy technology by the academic sector and private companies. Factory of the Future "Blue Energy" (www.fabriekenvoordetoekomst.be) is the action plan of POM, which also has introduced TUA West, an agency that acts as a liaison between partners from various industries and civil society, supporting the triple helix model of establishing links between companies, knowledge institutions and governments.

References

[1] Stratigaki, V., Troch, P., Stallard, T., Forehand, D., Kofoed, J. P., Folley, M., Benoit, M., Babarit, A., Kirkegaard, J. (2014). Wave basin experiments with large wave energy converter arrays to study interactions between the converters and effects on other users in the sea and the coastal area. *ENERGIES*, *7*(2), 701–734. doi:10.3390/en7020701.

[2] *Numerical modelling of wave energy converters: state-of-the-art techniques for single devices and arrays*, (2016). M. Foley (Ed.). Book Contributors: M. Alves, D. Causon, B. Child, J. Davidson, B. Elsäßer, C.B. Ferreira, C.J. Fitzgerald, M. Folley, D. Forehand, S. Giorgi, J.P. Kofoed, L. Kregting, C. Mingham, L. Qian, P. Ricci, J.V. Ringwood, V. Stratigaki, P. Troch, & S. Vaughan. ISBN: 978-0-12-803210-7, Elsevier.

[3] Folley, M., Babarit, A., Child, B., Forehand, D., O'Boyle, L., Silverthorne, K., Spinneken, J., Stratigaki, V., and Troch, P. (2013). A review of numerical modelling of WEC arrays. Proceedings of ASME 31st International Conference on Ocean, Offshore and Arctic Engineering (Vol.7, pp. 535–545). http://dx.doi.org/10.1115/omae2012-83807 .

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