Joint Workshop on R&I needs for co-location of offshore wind and ocean energy

WIND ENERGY PERSPECTIVE

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1. EDF Renewables Offshore wind activities in a nutshell

EDF's objectives : double capacity by 2030 **28GW > 60GW**

Suitable, consistent and respectful of human activity

FLOATING OFFSHORE WIND

Although floating offshore wind turbines are a less mature solution often associated with pilot projects, they are growing in popularity. Suitable for water depths of greater than 50-60 metres, they significantly increase the potential for offshore wind development.

FIXED OFFSHORE WIND

Fixed offshore wind turbines can be used to develop large-scale wind power projects suitable for water depths of less than 50-60 metres. The type of foundation used depends on seabed conditions.

OUR EXPERTISE IN OFFSHORE WIND

DEVELOPING WELL-MANAGED RENEWABLE ENERGY PROJECTS IN HARMONY WITH THEIR SURROUNDINGS

MANAGING OFFSHORE WIND FARM OPERATIONS AND MAINTENANCE

BUILDING PROJECTS WHILE STRUCTURING AN INDUSTRIAL SECTOR

2. Wave Energy survey by EDF :

Marine energy, and wave energy in particular, will be needed to meet the Net Zero Emissions by 2050 scenario in a sustainable manner. The global resource potential for wave energy in Europe is around 5,000 TWh, which is over 20% of the total world-wide electricity consumption in 2019

LCOE still very high but target for wave energy of 100 EUR/MWh could be met in 2035

Scientific, technical, economical and environmental challenges to overcome :

Design uncertainties : floatting, membrane, ...
Extrem event robustness
Capacity factor
Vessel Installation and costs
High uncertainties on yearly production, installation procedure, failure rate
Necessity to reduce maintenance costs: vessel size, maintenance strategy

> Nevertheless : promising sector with major progress to derisk technology in the next 2/3 years

2. Wave Energy survey by EDF

Impacts of the Ecosystem on the installation

- Corrosion, Algae, Marine growth
- Cyclic stress of waves : need for mecanic resilience and flexible infrastructure (cables)

Impacts of the installation on the Ecosystem

- Possible impact on biodiversity : during anchoring/mooring installation or operation (fauna & flora and incl. cables frictions on sediments etc.)
- Materials loss, degradation and propagation in the marin waters

> Needs for in situ measures and physical and biogeochemicals models (Concentration plankton, evolution of the populations etc.)

3. Colocation Wind/Wave : What still needs to be addressed

Colocation : 2 sources of renewable energy sharing the same location

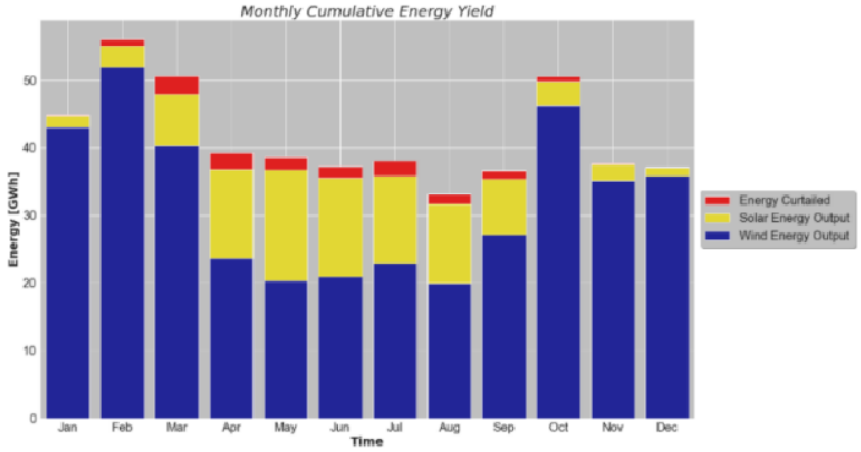
Needs for studies :

Spatial complementarity : theoretically land use compatibility

Production complementarity :
x% (generation) Curtailment
Grid saturation
> Promising heavy sweel / strong wind conditions

Logistics and maintenance complementarity
Theoretical : Mutualisation of technical teams and skills, optimization of equipment/boats for maintenance etc.
> Great opportunity to optimize huge installation costs of wave energy systems

E.G off Wind/off solar colocation



Study realized in 2020, *https://euscores.eu/*

3. Colocation Wind/Wave : The challenges to overcome :

Land challenge : Compatible conditions (depth, extreme conditions etc.) and compatibility with existing human activity :
e. g In France, synergies between offshore wind and fishing complexifying the possibility of integration of a third activity like wave.

Cables overloading and Grid connexions : need for anticipation
Capacity (taking into account the curtailment), Grid forming, Scenarios of connexions : wave to wind or directly to substation ?
Impact of the Network of Subsea Cables : mechanical, electrical and environmental impact

Contractual complexity wave and wind : taking into account risks and impacts on both installations

Cost / LCOE : Emerging but promising > Need for more information on roadmaps

Environmental impacts : Need for in situ measures and physical and biogeochemicals models

Need to validate > 5MW pilots to convince authorities to launch call for tenders

Other types of colocations :
Tidal + offshore wind
Aquaculture + offshore wind
Offshore Solar + offshore Wind

THANK YOU

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