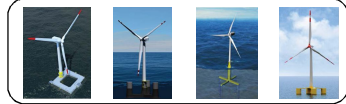


Benveniste, G; Lerch, M; De Prada, M; Catalonia Institute for Energy Research (IREC)

WP2 Introduction

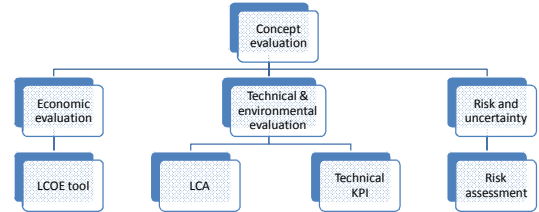
LIFES 50+ project focuses on offshore wind energy and in particular on innovative **floating substructure concepts for offshore wind turbines in water depths greater than 50 meters**. The concepts will be designed to support wind turbines in the scale of 10 MW. In order to evaluate the four designed concepts integrated in wind farm scheme from a holistic perspective, a specific work package (WP2) for **technical, economic,**

environmental and risk assessment has been dedicated, led by IREC. The objective of this abstract is to present briefly the procedures and standardized tools that will be developed for the concepts evaluation and identify challenges for the project targets achievement.



Objectives

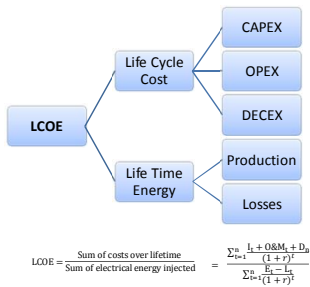
- The aim of WP2 is the **technical and economic evaluation** of the floating substructure designs developed during the project.
- The **quantification of risk and uncertainties** will also be considered.



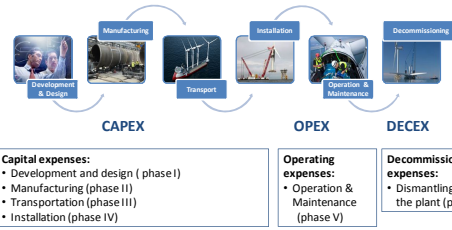
Methodology

Economic evaluation

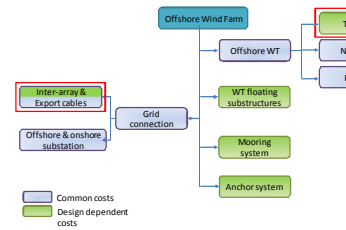
LCOE calculation:



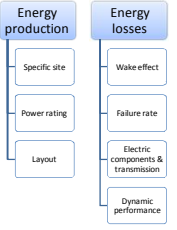
Life cycle cost consideration:



Cost components of an offshore wind farm



Life Time Energy



Technical and environmental evaluation

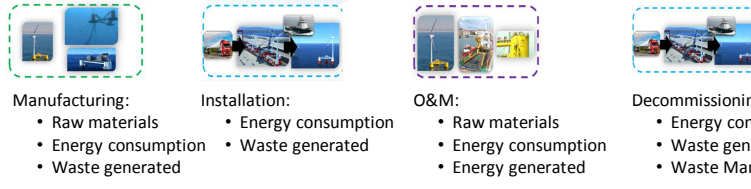
Life Cycle Assessment (LCA)

Methodology used to quantify environmental impacts of electricity generated by the floating substructures in terms of energy balance and CO₂ emissions.

Impact categories and technical KPIs:

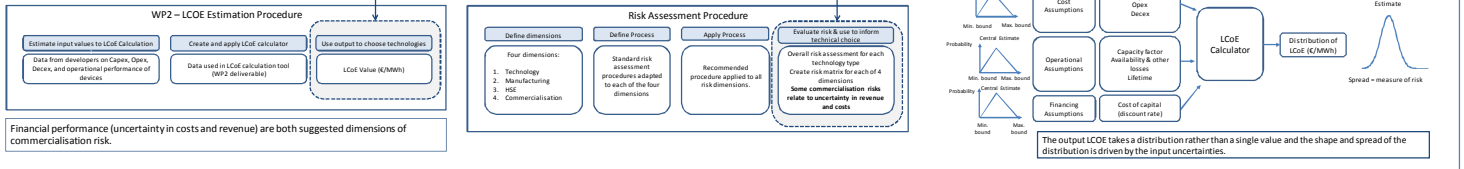
- Global Warming Potential in CO₂ equivalents
- Consumption of non-renewable resources
- Energy Payback time
- Technical robustness and feasibility

LCA Steps



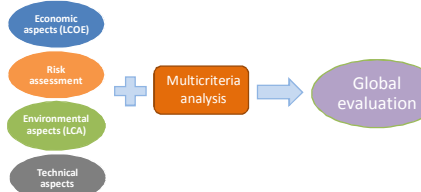
Life Cycle Inventory
Data collection by questionnaire

Risk and uncertainty



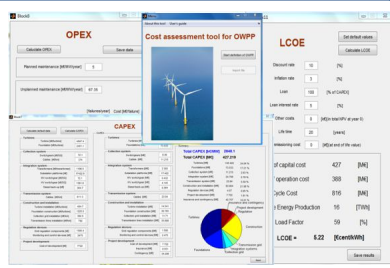
Expected output

4 categories: Each category contains parameters or KPI's



Assessment Tool

- LCOE Calculation
- Technical & Environmental KPIs
- Risk Assessment
- Tool will be developed in MATLAB
- Graphical User Interface
- Data collection in Excel
- Life-Cycle Perspective
- Graphical presentation of results



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