



## FLOATING WIND TURBINES: A COMPARATIVE LIFE CYCLE ANALYSIS

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### ABSTRACT

The intensive increase of global warming every year strongly affects our world negatively. The use of renewable energy sources has gained importance to reduce and eliminate the effect of global warming. To this end, new technologies are developed to facilitate the use of these resources. One of these technological developments is the floating wind turbines. In order to evaluate the respective environmental footprint of these systems, a Life Cycle Analysis (LCA) is herein applied. In this study, the environmental impact of floating wind turbines is investigated using a Life Cycle Analysis approach and comparing the results with the respective ones of onshore and fixed foundation offshore wind turbines of same power capacity. The studied floating wind turbine has a square foundation that is open in its center and is connected to the seabed with a synthetic fibre-nylon anchorage system. The environmental impact of all life cycle of such a structure, i.e. the manufacture, the operation, the disposal and the recycling stages of the wind turbines has been evaluated. For these floating wind turbines, it has been found that the greatest environmental impact corresponds to the manufacturing stage, whilst the global warming potential and the energy payback time of a 2MW floating wind turbine of a barge-type platform is higher than that of the onshore, the fixed foundation offshore (2MW) and the floating (5MW) wind turbines on sway floating platform.

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