Carbo4Power

New generation of offshore turbine blades with intelligent architectures of hybrid, nano-enabled multi-materials via advanced manufacturing

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Carbo4Power Project

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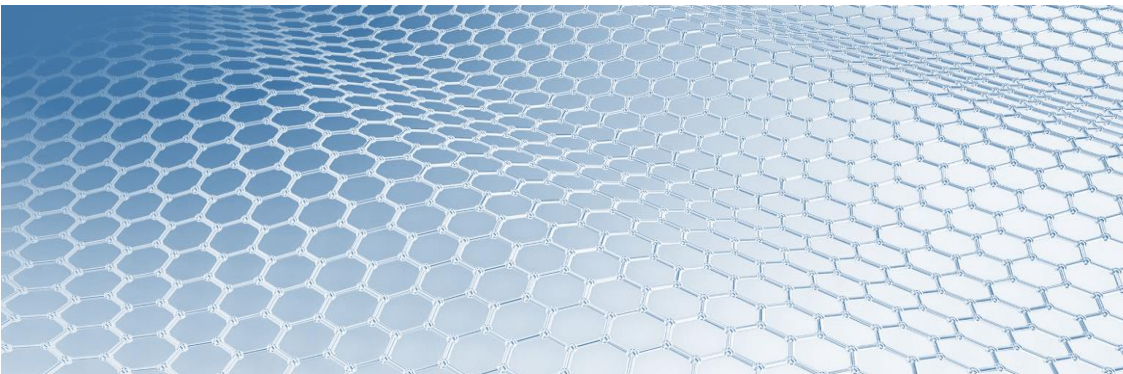
The Carbo4Power is a 4-year project, which started in November 2020 and it is led by the National Technical University of Athens (NTUA). This project is funded by the H2020-EU.2.1.3. – INDUSTRIAL LEADERSHIP – Leadership in enabling and industrial technologies – Advanced materials Programme (€ 7 8 million – Grant Agreement 953192). Carbo4Power will develop a new generation of lightweight, high strength, multifunctional, digitalized multi-materials for offshore wind and tidal turbine rotor blades that will increase their operational performance and durability while reducing the cost of energy production (bellow 10 ct€/ kWh for wind turbines and 15ct€/kWh for tidal), maintenance and their environmental impact. The innovative concept is based on nano-engineered hybrid (multi)materials and their intelligent architectures which breaks down as follows:

i) Nanocomposites based on dynamic thermosets with inherent recyclability and repairability and tailored nano-reinforcements to enhance mechanical properties.
ii) Multifunctional nano-enabled coatings to improve turbine protection (e.g., against lightning and biofouling (e.g. 50% fouling release).
iii) Blade segments will be designed and fabricated by advanced net-shape automated multi-material composite technologies that will allow ca. 20% scrap reduction.
iv) The approach for WTB is to deliver innovative design of modular rotor blade, while the approach for TTB is aimed towards an optimal design for 'one-shot' manufacture.
v) Recycling of blade materials will be increased up to 95% due to the advanced functionalities of 3R resins and adhesives with debonding on demand properties.



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