

Environmental Life Cycle Assessment of Two Technologic Scenario of Wind Turbine Blades Composition for an Optimized Wind Turbine Design Using the Impact 2002+ Method and Using 15 Environmental Impact Indicators

Authors : A. Jarrou, A. Iranzo, C. Nana

Abstract : The rapid development of the onshore/offshore wind industry and the continuous, strong, and long-term support from governments have made it possible to create factories specializing in the manufacture of the different parts of wind turbines, but in the literature, Life Cycle Assessment (LCA) analyzes consider the wind turbine as a whole and do not allow the allocation of impacts to the different components of the wind turbine. Here we propose to treat each part of the wind turbine as a system in its own right. This is more in line with the current production system. Environmental Life Cycle Assessment of two technological scenarios of wind turbine blades composition for an optimized wind turbine design using the impact 2002+ method and using 15 environmental impact indicators. This article aims to assess the environmental impacts associated with 1 kg of wind turbine blades. In order to carry out a realistic and precise study, the different stages of the life cycle of a wind turbine installation are included in the study (manufacture, installation, use, maintenance, dismantling, and waste treatment). The Impact 2002+ method used makes it possible to assess 15 impact indicators (human toxicity, terrestrial and aquatic ecotoxicity, climate change, land use, etc.). Finally, a sensitivity study is carried out to analyze the different types of uncertainties in the data collected.

Keywords : life cycle assessment, wind turbine, turbine blade, environmental impact

Conference Title : ICLCA 2022 : International Conference on Life Cycle Assessment

Conference Location : Vancouver, Canada

Conference Dates : September 22-23, 2022