Karlsruhe Institute of Technology

Institute for Industrial Production (IIP)
Chair of Business Administration,
Production and Operations Management
Prof. Dr. Frank Schultmann

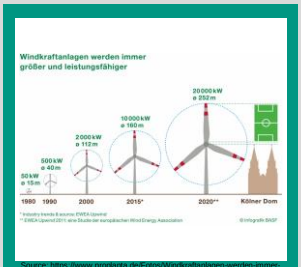
Masterthesis

At the Chair of Business Administration in the research group: „Project and Resource Management in the built environment" the following final thesis is offered:

Development of a techno-economic and ecological assessment model of fibre-reinforced plastic (FRP) recycling from wind turbine rotor blades

Background

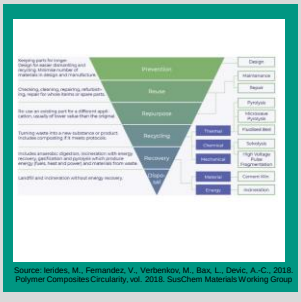
Due to their special material properties, fibre-reinforced plastic composites (FRP) have a broad and growing field of application. At the end of the use stage, the handling of FRP poses a great challenge. There are hardly any established and high-quality recycling/utilization and disposal paths. In the context of the circular economy and the waste hierarchy, techno-economic as well as ecological assessments play an important role in the development of possible end-of-life (EoL) options. However, there exist only a few approaches to this in the field of FRP so far. In order to ensure a holistic and complete assessment of EoL options, an evaluation from an economic and an ecological perspective is required.



Source: https://www.proplanta.de/Fotos/Windkraftanlagen-werden-immer-groesser-und-leistungsfaehiger_Bild1415187000.html

Source: https://www.basf.com/global/documents/de/news-and-media/science-around-us/how-rotor-blades-defy-the-forces-of-nature/BASF_Wissenschaft_populaer_Windkraft.pdf


Source: https://dragonplate.com/why-is-carbon-fiber-preferred-for-aircraft-bodies; http://www.3mb.asia/composite-materials-in-the-automotive-industry/



Source: Ierides, M., Fernandez, V., Verbenkov, M., Bax, L., Devic, A.-C., 2018. Polymer Composites Circularity, vol. 2018. SusChem Materials Working Group

Contents of the work

The aim of this work is to develop a model for the techno-economic and ecological analysis of possible EoL options for fibre-reinforced composites (FRP) from rotor blade waste in Germany. As a further component of this thesis, the developed model for evaluation is to be implemented as a tool in a computer program, e.g.: Excel®.

Based on a structured research on existing approaches of the holistic evaluation of FRP EoL options, an own model for the considered example will be developed. In addition to the wind energy sector other industries in the transport sector also represent large sources of FRP waste. One focus of the research is to examine the model for inter-industry linkages, as well as the possible applicability in other sectors, such as aviation and the automotive industry.

Requirements

Good English language skills as well as computer program skills to create a tool e.g.: Excel® are required. Special programming skills are an advantage, but not mandatory. The offer is mainly aimed at students of industrial engineering, but also at students of other disciplines.

Contact

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