



Project title: How2MultiWind - Development of a technical and economic design instrument for sustainable multifilament wound composite pressure vessels

Partner: Institut für Textiltechnik (ITA)
Institut für Unternehmenskybernetik (IfU)

Duration: 01/2019 – 12/2020

Funding Agency: AiF - Industrielle Gemeinschaftsforschung aus Mitteln der Energieforschung des BMWi

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07.01.2019

Mission Statement

The development of alternative drive concepts in the transport sector, such as hydrogen fuel cells, makes a decisive contribution to the implementation of the energy revolution. Current research projects focus on fiber composite hydrogen tanks as storage tanks. In addition to their low weight, these offer mechanical properties that can be adapted to the application. Due to high cycle times, the established wet winding process does not meet the requirements of series production. A new multifilament winding process (MFW) offers an alternative that can process a large number of fiber rovings simultaneously and thus reduces cycle times. Due to this market innovation, however, there is a lack of instruments for technical design, material characteristics and models that are necessary for economically and socio-ecologically sustainable production.

The aim of the project is to ensure the economical and sustainable production of pressure vessels for the transport industry in SMEs.

Approach

In order to enable the serial use of the MFW procedure, the limits and potentials of the technology and its interrelationships are systematically recorded and made usable. For this purpose, an economic-technical design instrument is being developed which, on the one hand, uses the technical effects and machine parameters as a basis for calculation and, on the other hand, enables systemic analysis and evaluation of economic and sustainability factors. A component demonstrator (composite pressure vessel) manufactured using the MFW process is used to verify the suitability of the system. Ultimately, SME-specific business models will be developed that ena-

ble the transfer of research results to the economy. Figure 1 provides an overview of the project steps.

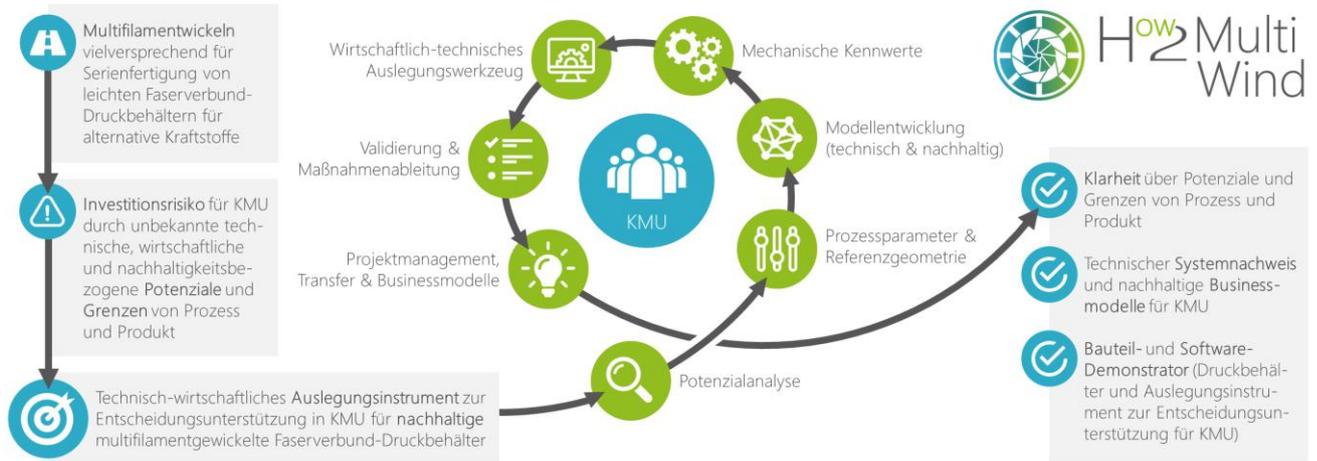


Figure 1: Overview of the project

As a result of the research project, SMEs have a design tool as a basis for calculation, including technical effects and machine parameters, as well as for the analysis and evaluation of economic and socio-ecological factors.

Acknowledgement

We would like to thank the AiF for funding the research project from BMWi energy research funds within the framework of the programme for the promotion of joint industrial research and development (IGF).

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