Project idea - **H_2Pipeline**

Development of an integral concept and prototype system for the design and integration of composite piplines into existing infrastructure for transportation of green hydrogen

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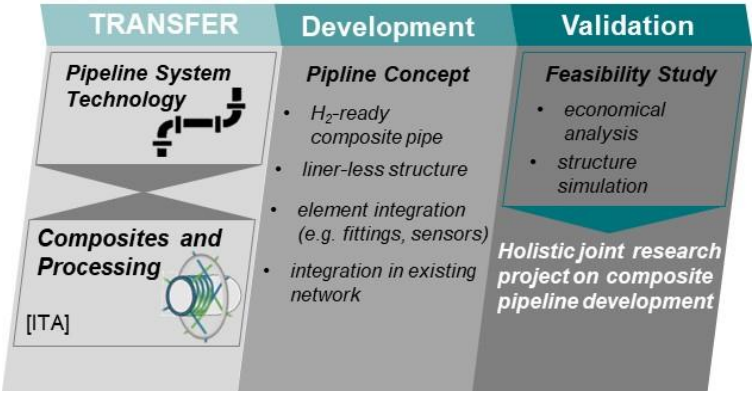

Partner
- Institut für Textiltechnik of RWTH Aachen University (ITA)
- …?
- …?

Duration 06/2022 - 05/2025 (3 years)

Introduction

The European Union and Canada are both determined to reduce their carbon emissions to net zero by 2050. One of the most important elements to achieve this goal of greenhouse gas neutrality will be the success of their national hydrogen strategies. The idea of this research promotion is to combine the technological developments of these countries and collaborate in order to increase the transformation from a fossil fuel-based energy supply to a renewable energy supply. Renewable energy sources such as wind and solar are highly fluctuating regarding their availability and thus need to be stored. The transformation of renewable energies into hydrogen is the key to both store and transport large amounts of the renewable energy and therefore provides a constant and reliable source of emission free energy.

Problem definition

Hydrogen has a very low volume-related energy density (3.0 kWh/Nm^3). At standard temperature and pressure, huge volume of hydrogen is required for a decent amount of energy storage. Pressurized storage is a proven technique to mitigate this challenge, but it is highly inefficient to transport huge quantities of hydrogen in pressurized tanks over long distances. Therefore, pipelines would be a proper alternative. However, currently available gas transmission pipelines made of steel are costly, require complex installation with a huge impact on the environment and are suitable to transport a maximum of 10-15 % of the hydrogen mixture before it leads to hydrogen embrittlement of the pipes.

Project idea

The idea of this research project is to develop a cost-efficient pipeline system for long distances and largescale transportation of hydrogen using the latest technology developments in the field of fiber-reinforced composites including sensor integration for surveillance and pipeline hauling systems. Together the institutes will develop a hydrogen transport system with FRP-pipelines. Within this three-year project, workshops will be used to transfer knowledge to each other and thus develop a prototype system (TRL 6) including a feasibility study for a newly developed cost-efficient FRP-pipeline for hydrogen transport.