

Project title: **HyInnoNets** – Capability of transmission networks for H₂-operation

Partner:

- Lehrstuhl für Digital Additive Production (DAP)
- HD Sonderoptiken
- PPS Pipelinesystems GmbH
- Kümpers GmbH & Co.KG
- VOSS Fluid GmbH
- Oerlikon AM GmbH
- Neuman & Esser GmbH
- Regionetz GmbH
- LSN Engineering GmbH

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Mission Statement

A promising approach to achieving greenhouse gas neutrality is the use of hydrogen (H₂) as an emission-free energy carrier across sectors in industry, mobility and the private sector. In order for H₂ to be made available over a large area and in large volumes, hydrogen must be transported and distributed from the place of production to the consumer. For this, a pipeline infrastructure is the most economical method, especially if the existing natural gas pipeline network can be converted to transport H₂. The existing infrastructure system of natural gas distribution in the transmission network is mainly made of manganese steels, which have limited corrosion resistance to H₂. The reduced ductility and load-bearing capacity due to hydrogen embrittlement can lead to cracking and brittle fractures below the expected yield and yield strength of the material when pressure fluctuates in the pipeline. In this research project, an internal coating to protect pipe-lines from H₂ corrosion is being developed using Extreme High Speed Laser Cladding (EHLA). In addition to the EHLA coating developed for steel pipes, this coating concept will be transferred to composite pipes made of fibre-reinforced plastic (FRP) in order to combine the advantages of fibre-reinforced plastics with a metal coating. Such a pipeline system made of FRP is characterized by low weight and low material costs and is therefore suitable for the construction of new pipelines that are needed for the future transformation to a hydrogen-

based energy economy. For the pipeline system made of FRP, the system is being developed as a whole for the transport of hydrogen in addition to the EHLA coating.

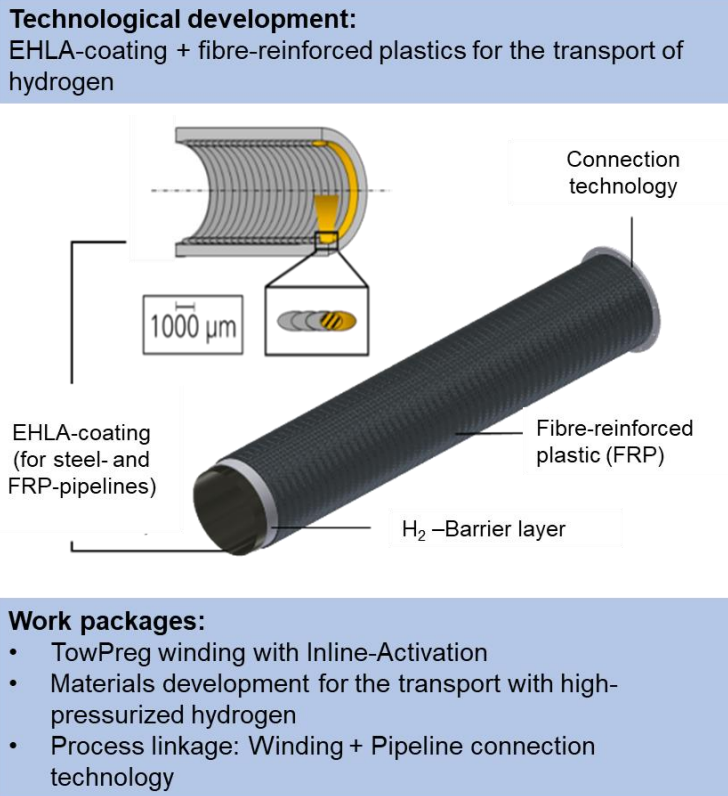


Figure 1: Mission picture of the HyInnoNets project

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