

PEM Circle

Product Evaluation & Management regarding Circular Innovations in Resource Conservation and Lifecycle Efficiency for PEM Cell-technology

Projektbeginn:

February 2026

Informationen zum Projekt

In the project PEM Circle digital solutions are being developed to remove barriers to the circular economy. The use case here is the proton exchange membrane electrolysis stack (PEM EL stack) product, which is used for hydrogen production. The aim is to enable a direct, ecologically and economically sound basis for decision-making on repair, remanufacturing and recycling. In order to develop a sound basis for decision-making, the missing data must be determined using new sensor technology (electrochemical impedance spectroscopy – EIS), smart software for the interface between the sensor technology and the residual life prediction tool must be coordinated, and sustainability information must be added at a further level. Thanks to sophisticated sensor technology, component-specific condition monitoring can be carried out which, supported by digital twins, forms the basis for comprehensive repair management. Complete software development is also a goal of PEM Circle in order to realise the interaction of control via digital twins, prediction tools and sensor hardware. A further goal is the standardisation of interfaces and the development of digitally controlled, holistic utilisation paths for R strategies, so that implementation for other applications can be simplified.

Katja Wendler -425

Ramona Simon -624