PRESS RELEASE

Seizing the opportunities of the circular economy: making hydrogen technologies more sustainable

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A new impulse paper from DIN, DKE and VDI shows how the concept of the circular economy can be applied to the expansion of hydrogen technologies and what role norms and standards play. The aim is to reduce the huge demand for raw materials and to consider recyclability at an early stage.

Berlin, March 18, 2024. Hydrogen is considered a key element of the energy transition, but the new technologies usually require the extraction of critical raw materials such as platinum or iridium. Large quantities of greenhouse gases are released in the process. The concept of the circular economy uses materials that are already in the value creation cycle and therefore offers great potential for reducing emissions.

In the new impulse paper “How can a circular economy make the use of hydrogen technologies material- and resource-efficient?” (German version), DIN, DKE and VDI now show how the two topics can be linked and how norms and standards can support this.

Material efficiency and environmentally friendly product design

The impulse paper provides an overview of existing standards for the environmentally friendly design of products (Design4Circularity) and for increasing material efficiency, which can be used and adapted for hydrogen technologies. The experts involved in developing the roadmaps were able to draw on findings from work on two standardization roadmaps: the standardization roadmap for the circular economy was published at the beginning of 2023 and the standardization roadmap for hydrogen technologies is currently under development. Experts from the Fraunhofer-Gesellschaft, universities and manufacturers of fuel cells and electrolysers have also been involved.

Recycling critical raw materials

If circular economy strategies are used in the development of hydrogen technologies, critical raw materials can be recycled to the greatest possible extent and a more stable supply of raw materials can be achieved through closed value-added cycles.

Dr. Tim Brückmann, environment and sustainability coordinator at DKE, states: “We are at a very early stage in making the circular economy approaches usable for our work on hydrogen technologies. There are great opportunities to be found here if we succeed in incorporating the knowledge gained from pilot projects and research into standardization

and creating a close relationship with industry. This would enable us to meet the existing need for standardization and update standards in a rapid development cycle."

"We now have the opportunity to integrate circular economy strategies into the standardization of hydrogen technologies at an early stage. This makes it possible to strengthen resource independence in the future hydrogen energy system and, above all, to use critical raw materials more efficiently," says Kevin Hares, project manager at VDI.

Alexandra Engelt, Head of Strategic Development Circular Economy at DIN adds: "Considering a circular economy is particularly useful in growing fields of technology, such as hydrogen, so that recyclable products can be brought to market. Existing circular design standards should therefore be considered now or new standards should be developed."

Norms and standards for a sustainable hydrogen economy

In addition to existing standards that are already applicable, the impulse paper also provides an overview of research projects that are developing new approaches and can form a basis for future standards. These include the Clean Hydrogen Partnership with the BEST4Hy project, which is funding the development of new recycling processes for fuel cells. Another example is the Federal Ministry of Education and Research's ReNaRe project, which is part of the H2Giga technology platform. In the ReNaRe consortium, 13 partners are working on recycling and recovery strategies to close material cycles for critical raw materials. This shows how important norms and standards are for implementing the principles of the circular economy. They make it possible to achieve compatibility between individual products and components and provide methods for testing the safety and functionality of used parts.