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Data instead of documents

The demand for hydrogen electrolyzers and H_2-ready plants currently far outstrips the capacities of E & C firms. Consistent data centering for more efficient, modular engineering processes can significantly reduce the gap between supply and demand.

Hydrogen pipelines. Hydrogen is recognized as the foundational element of heavy-industry decarbonization *Picture: Wikimedia*

In theory, everything is clear. But in practice, there is a problem. In hydrogen networks, in mobile fuel cells and H_2-capable systems, but above all there is a lack of sufficient green hydrogen, because: “There is still far too little electrolysis capacity on the market for the necessary quantities,” says Reinhard Knapp, Head of the Global Strategies with AUCOTEC GmbH, based in Isernhagen near Hanover, Germany. That is why the software vendor has made it its mission to enable electrolysis plant manufacturers to increase their capacities much more quickly.

In addition to improvements in electrolysis technology, optimized engineering processes for the associated systems can also make a decisive contribution. And it’s urgent. “We are being contacted by interested parties who want to have their production capacity multiplied as soon as possible in order to be able to deliver more electrolyzers for significantly more megawatts of output every year,” says Mr Knapp. His answer to this is the data-centric collaboration platform Engineering Base (EB) with its object-oriented data model as the foundation for significantly more efficient, agile system development and exceptionally clear modular engineering.

Cross-discipline safe, simultaneous, agile

Contemporary engineering, as AUCOTEC understands it, is based on a central data model. All disciplines involved work together and simultaneously – from the first system concept to commissioning. Every change or addition, no matter where it is made, is immediately visible and traceable in all other representations of the planning object for everyone involved. EB’s consistently end-to-end model of devices, functions, and its complete network of relationships through to automation offers an optimal basis for efficient teamwork. “Because error-prone data transmissions or double entries as well as time-consuming coordination processes are no longer necessary,” emphasizes Mr Knapp. And not only users can always rely on the data quality. For example, EB offers project managers the opportunity to call up the current status of their projects at any time, even without in-depth knowledge of the system.

The comprehensive data centering also benefits modular engineering — an important point for electrolysis plant planners. They tend to assign their projects to the product world and want to work with highly standardized modules that can be ‘clicked together’ like building blocks. Unlike chemical plants, they cannot simply design a reactor larger in order to produce more. Instead, they scale plants and output by multiplying the modules.

Weeks instead of months

EB has ‘learned’ a lot about modularity in the automotive industry, as well as in power distribution, where the platform has been at home for decades. There is also a suitable version for process technology, which is used by many large EPCs and owner/operators. One of them is Topsoe, a company that is also a sought-after electrolysis expert. The Danes attest that, with EB, some work only takes six weeks instead of six months, mainly thanks to the overarching single-source-of-truth (centralized data repository) in the platform.

For working in modules, two aspects are fundamental: On the one hand, the creation of the individual modules and their availability, and on the other hand, their assembly and networking to form a system unit. In the past, when module documentation was reused, a large number of papers, in the best case PDFs, had to be collected from various discipline-specific tools, copied and edited. Then the component identification alone was tedious and error-prone because it had to be changed by hand. Instead of project-related documents from various tools, EB’s database contains the complete digital data models of tested modules with all electrical, process, and automation technology information. Variants with the feasible options are also stored, they can be conveniently configured and adopted via the Typical Manager function.

Faster H2-ready with digital twin

Modular design is less helpful to consumers of H_2 as an energy source for their systems. However, operators are facing extensive conversions. It is essential to have reliable as-built documentation, ideally a directly editable, interdisciplinary plant model, i.e. a digital twin. EB makes this available, either developed directly in the system or by migrating old data, with an interface digitally processing and upgrading the existing information. The system also makes it easier to keep the data up to date with its maintenance app. Because its value is determined by the reliability and currency of the data. The usual plans in their discipline-specific data silos, which are often changed by red entries, are anything but helpful. Then it’s better to stay up to date with the data model.

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Reinhard Knapp,
Head of Global Strategies, AUCOTEC