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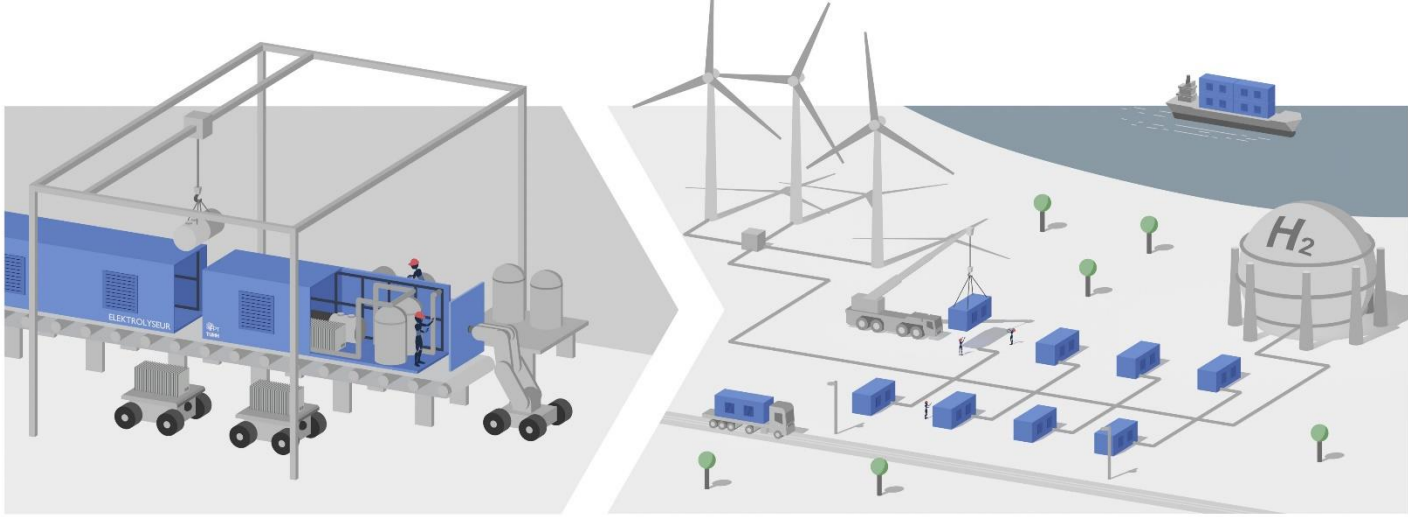
Development of a demonstrator for automated, transparent documentation using the AML data standard in combination with blockchain technologies for a hydrogen leakage test

In the course of the energy transition, there is a great demand for green hydrogen, which is created from renewable energies by a process known as electrolysis. For this reason, it is important to install large electrolyzer systems as rapidly as possible and to be able to operate them efficiently. Hydrogen-carrying systems must be checked for leaks both during commissioning and on a regular basis during operation. The most common process is to check all sealing surfaces using a manually guided measuring device. In the case of hydrogen-carrying systems in particular, there are also special legal regulations and documentation requirements that must be fulfilled. Manual documentation of this kind is time-consuming and error-prone, especially in the case of large and complex electrolyzer systems.

Accompanying the use of fully automated or digitally supported manual measurement processes, digitally captured data can be stored centrally in a cloud environment with automatic documentation. This not only significantly reduces the documentation effort, but these data can also be made available for further processes (e.g. for central data analysis). The AML standard (IEC 62714) is suitable as a generic data exchange format because it is system- and process-unspecific and offers many possibilities for adaptation.

For external inspection authorities and legal acceptance processes, a certain degree of counterfeit protection is important in addition to a transparent representation of a proper execution of the measurement process (in AML format). Blockchain technologies offer the possibility to store data in a traceable and decentralized manner.

If you are interested please contact :
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A concept is to be developed and implemented as an example, allowing the process of leakage testing to be documented fully automatically using the AML format in a cloud-based manner. In addition, the link between generated sensor data and blockchain technologies is to be explored in order to ensure forgery-proof documentation. The necessary data acquisition is carried out under the premise of a digitized measurement process, which is not developed separately in this work and is only considered model-based. Finally, a software demonstrator with respective interfaces is to be created, in which the data of a simulated inspection process is stored automatically in an AML file and is linked automatically to a blockchain.

Your subtasks

- Analysis of the documentation requirements
 - Legal inspection and documentation requirements
 - Inspection process for leakage testing including data interfaces
 - Analysis of AML standard
- Analysis and selection of blockchain and data storage (e.g. cloud) technologies
- Modeling of the data structure in AML for the inspection process
- Concept development of the necessary automated data interfaces
- Implementation in a softwaredemonstrator for an automated AML data storage and blockchain link using a Python script

Your profile

- You study mechatronics, computer science or a comparable subject
- You have knowledge in programming with Python and data interfaces (e.g. OPC UA)
- Initial experience in dealing with IoT databases and generic exchange formats
- Initial experience in dealing with cloud and blockchain technologies

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