

Project TwoPager | EuroTeQathon III

Our third EuroTeQathon will be hosted in Prague (CTU) from Saturday June 10th until Monday June 12th 2023. In preparation of this event every (selected) Collider project is asked to submit a TwoPager on their project according to the locally communicated deadline and procedure. This document will be used by the jury to complement the final presentation on Monday and have a good overview of all the different projects

PROJEC DETAILS

Challenge Collaborator: Siemens AG

Team name: X-to-the-power

Team slogan: Power to the people

Team members (full name | study program | university)

Mikkel Drejer	BEng - Chemical & Bio Engineering	DTU
Erik Paulli Sparholt	BEng – Electrical Engineering	DTU
Kimberly Tu Chi Szabo	BEng – Chemical & Bio Engineering	DTU
Villads Østergaard Nilausen	BEng – Civil Engineering	DTU
Jonas Vestergaard Kristensen	BEng – Chemical Engineering & International Business	DTU

What is the target problem for your project (in one sentence)?

How can Power-to-X be scaled down to private customers?

How do you solve it (in max. three sentences)?

Excess power from either solar panels or wind turbine in a private home is used to produce hydrogen via electrolysis and stored in the home, which can be converted back to electricity via a fuel cell system. This can be used when the panels or turbine is not producing enough electricity to power your home.

Potential for impact

How does it contribute to a more sustainable future from an environmental, social and/or economic perspective? On what scale and what range of the population could your project have an impact? (regional, national, European, only a small group of people, a wide range of the population etc.)

With this solution, all electricity produced in the home will be from sustainable sources. It will also make the home completely independent of external forces, affecting the energy availability and price, such as the high energy prices and inflation seen in 2022. At the same time, you sometimes must pay a fee to send out excess energy to the power grid, which can be avoided if you store the energy in you home. With the current technology, this will be a solution primarily for high income groups interested in getting solar panels for their house, that wouldn't mind spending extra on a storage system. However, on the long term with large scale production and further technology developments, the solution should be a lot cheaper, so middle income groups will also be able to buy this solution.

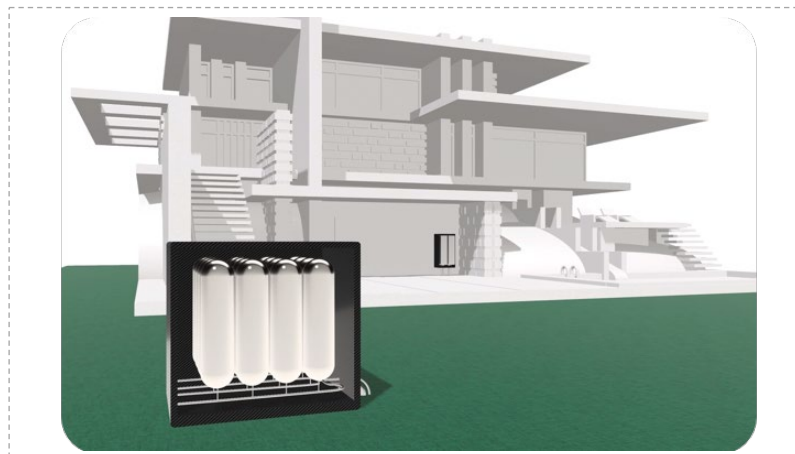
Innovation

How is the solution innovative comparing to existing ones (if exist) from an application area, business model, technological and/or customer experience perspective? Who are the main competitors?

At the moment, storing hydrogen in your home is not an available solution. Some companies like Australian LAVO have made a prototype. But that solution is storing hydrogen via lithium hydrides. In this solution hydrogen will be stored in tanks. The main competitors are companies making lithium batteries to store excess energy, which is right now a cheaper solution. However, lithium is a limited resource, and in the future, producing hydrogen via water will be more sustainable.

Feasibility

Right now, the technology is available to realize this solution. However, it is still very expensive as no large scale production of fuel cell systems exists at the moment. But with a large scale production, the price should be significantly lower, and as technology constantly develops, price and lifetime of the systems should also fall, so it might be able to compete with lithium batteries on the long term.



Inclusivity

Are the stakeholders (industry partners, governmental bodies, societal stakeholders, potential users, etc.) involved in the process of the solution development? How did you take them and their feedback into account? What disciplines (engineering perspective, sociological perspective, etc.) are taken into consideration in the development of the solution?

At the moment, only our contact at Siemens have been involved. Since this project is at a very early idea stage. But to realize this solution. This will be done if further development of this idea should be realized.