

## Reflection

### *Topic*

The research is focused on hydrogen as a carrier of renewable energy. Hydrogen and energy storage are in basis not a part of the Building Technology track, but are based on chemical processes. However, the application of hydrogen as seasonal buffer in the built environment very much aligns with the topic of the studio: sustainable design, specifically the department of climate design.

### *Graduation process*

The approach of basing the design on research has lead to several models and calculation methods. The outcome of these calculations are validated, but did not always turn out as expected. Especially in the end, it has become clear that the used model did not have the output necessary to come to an optimized design. A lot of research is done into system components and alternatives. Reflection on the research period, it has now become clear that the definition of the model should have been done at an earlier stage. This way, the lack of output information would have been come to attention sooner.

During the calculation phase it sometimes seemed like the system would have such a low efficiency that the research seemed less relevant. Solutions to enhance the efficiency of the system were sought for and partially found. This improved the prospects and so the research was again aimed at doing research for a good design instead of trying to force the topic of the graduation.

### *Societal impact*

The applied technology has been proven to work, but it has not yet been applied on this scale. The system components can be configured in such a way that the system will work. However, because of the low efficiency of the system it can be argued that, with the technological state of the art of hydrogen, alternatives should be applied.

On the other hand, the case study is very suitable for displaying technologies, so it is a great opportunity to aid in the advancement of hydrogen as carrier of renewable energy in the built environment. The newly developed neighborhood that is part of the case study offers a stage for innovation, so the research perfectly fits in with the sustainability principles of the case study. Hydrogen is an essential part of the energy transition, so the quicker the technology advances, the sooner it becomes feasible. And by becoming feasible sooner, it can speed up the energy transition. It has not yet been applied in the built environment, so this project can set an example by placing an energy producing power plant that emits nothing but water and oxygen in a residential area.