

Elbert Huijzer | Liander Innovation | 16 June 2022 | HIPS-net

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EUROPESE UNIE

Europees Fonds voor Regionale Ontwikkeling Mede gefinancierd in het kader van de respons van de Unie op de COVID-19-pandemie.







Lochem: Monumental residential buildings



Initiative from the neighbourhood itself. Ten private houses will be included in the pilot project





Goals:

- To show that hydrogen is a valid option for older residential buildings, using the existing infrastructure;
- To speed up the learnings about practical consequences;
- Changing from natural gas to hydrogen with as little modifications as safely possible.

Planning:

• Go life in October 2022 for a duration of 3 years.

Choices in lay-out and safety



- Hydrogen is delivered on site by tube trailers (no production facilities)
- Hydrogen is odorised with THT, similar to natural gas.
- The existing gas pipes are used for hydrogen. A new parallel pipe is built for the natural gas customers in the residential area.

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- As little changes in the infrastructure as safely possible. Cast iron is replaced because we will never use that for hydrogen. Some valves added to make small sectors.
- Participants have to take all energy measures to bring the natural gas use back to 3500 m³. Only a heating boiler, no cooking or anything else.
- All piping in the houses is checked by installer.

Knowledge development





Hydrogen grid The Green Village

Alliander knowledge team





Many small experiments



Reports and

work instructions





Close cooperation with KIWA



Demonstration and training



Knowledge sharing with other grid operators and the governance

CFD modeling

Meter cabinet







6 CFD simulations performed by Demcon Multiphysics

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CFD modeling

Demonstration & Test House (at Kiwa premises)





Ignition of hydrogen at low percentages

Up to 10% the flame speed and ignition energy are comparable for natural gas and hydrogen





8 Tests performed by Kiwa; technology@kiwa.com

Ignition of hydrogen at low percentages

A low percentage hydrogen flame develops only upwards beacuse of low heat transfer





Ignition of hydrogen at low percentages

Because of the low heat content, cotton is only lightly scorched in a 10% hydrogen flame, while in 6% methane, the fibres burn.







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Actual additional safety measures



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