



Field Test of Hydrogen in the Natural Gas Grid



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Outline:

- **Background**
- **Test set up**
- **Results**
- **Participants**





Background

How to implement the Hydrogen Society?

Transport of hydrogen in the existing natural gas grid may be a shot cut, why this option has been investigated under real conditions.

The purpose of the test was to investigate the possibilities for hydrogen transport in the existing Danish natural gas grid.



Test set up

Grid facilities for distribution of hydrogen; test of gas meters, and systems for control, regulation and monitoring of the test facility were developed by DGC.

Steel and plastic pipes from the existing gas distribution grid have been adapted for a small standalone gas grid, constructed according to existing standards and authority regulations by the Greater Copenhagen Natural Gas Company (HNG).



Test set up

Tests were made for a total of 340 operation days.

Leaks were detected after hydrogen filling; otherwise at months' interval.

Components such as pipes, valves and filters were taken apart for investigation after the test period.

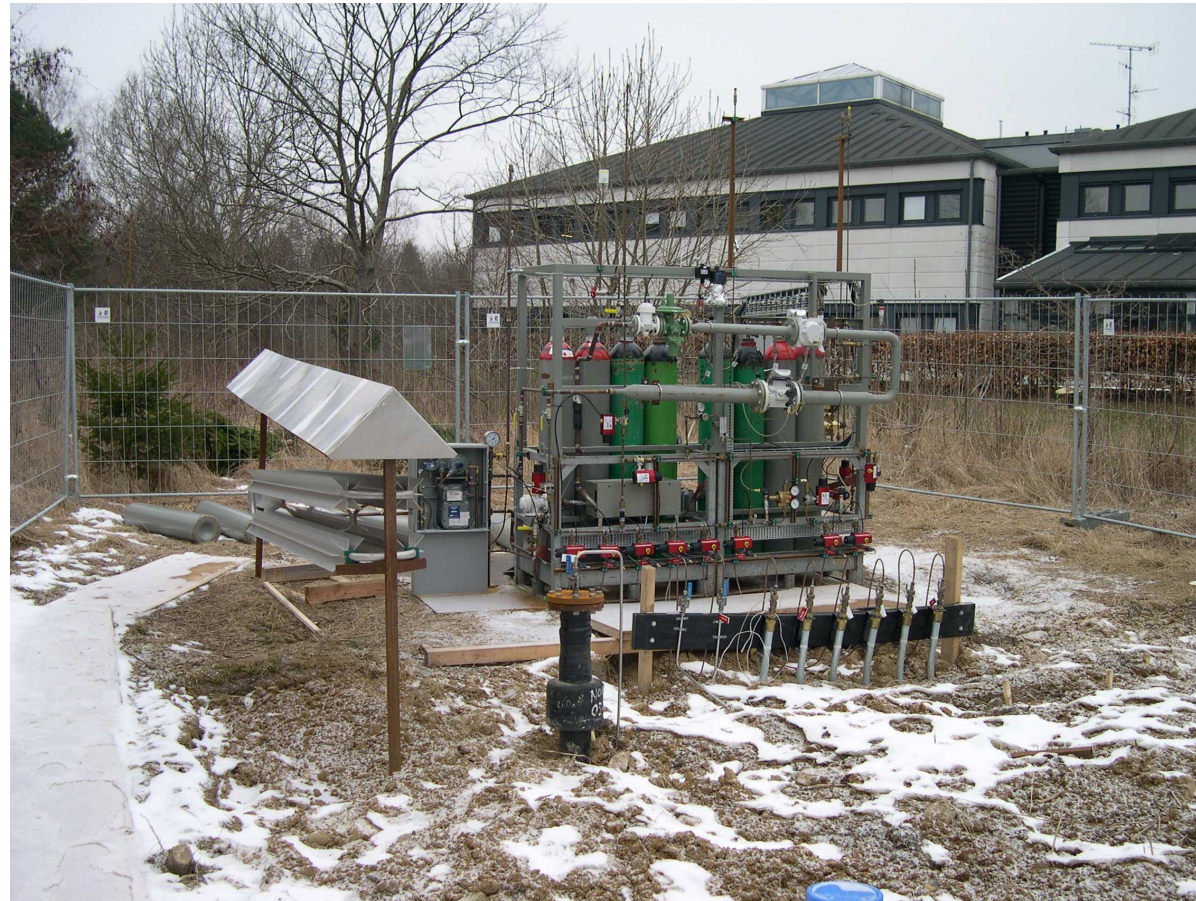


Test set up



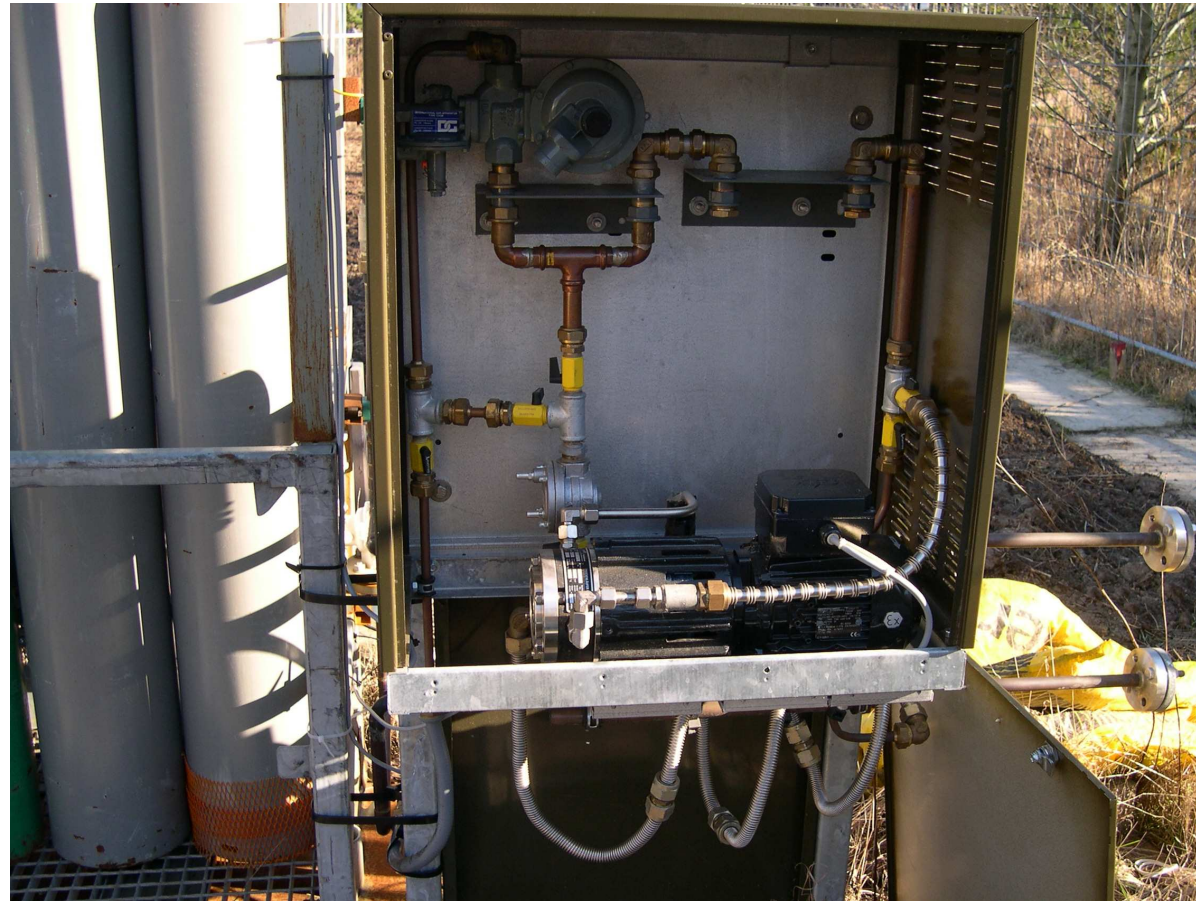


Test set up

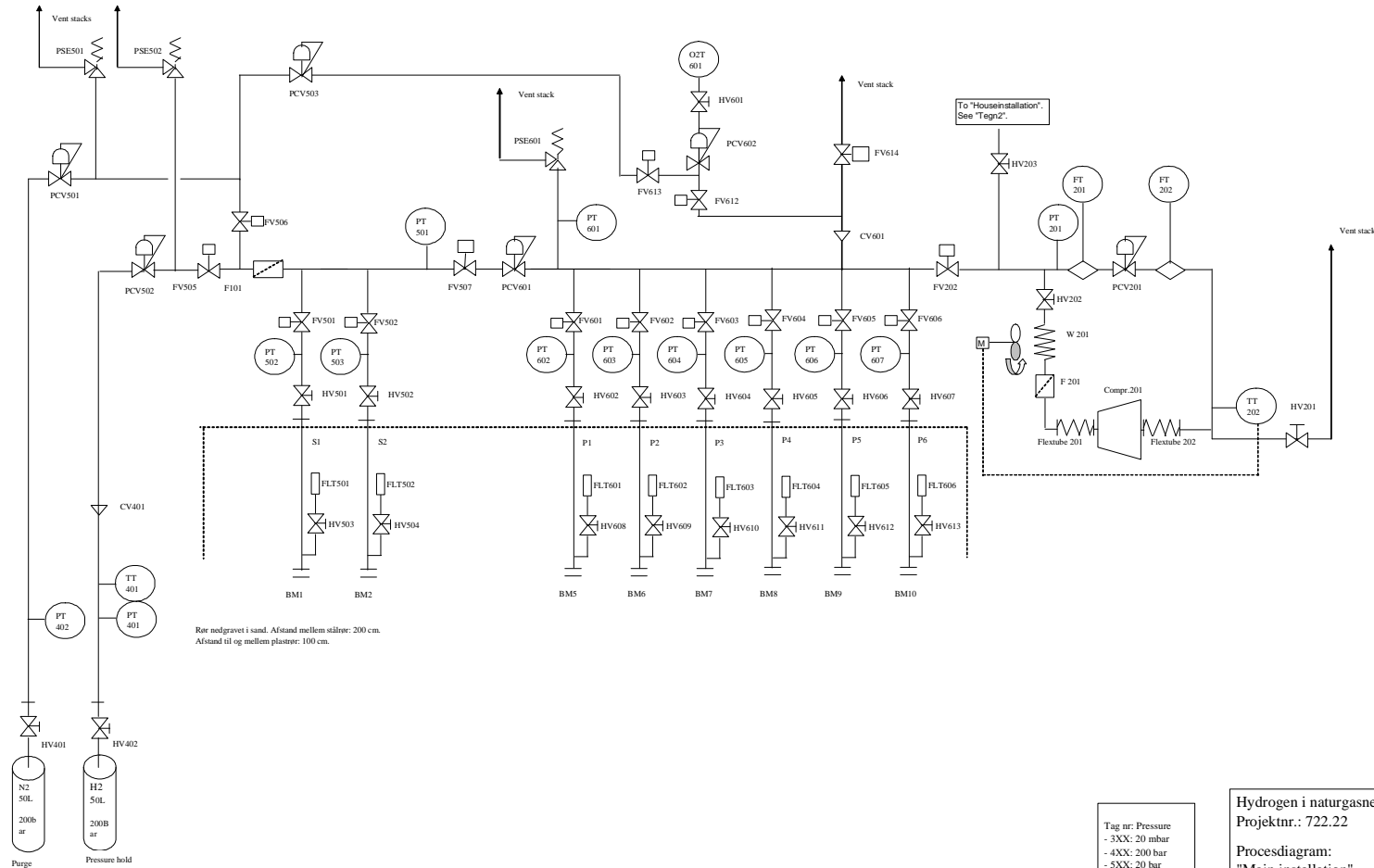




Test set up



Test set up



Tag nr: Pressure
 - 3XX: 20 mbar
 - 4XX: 200 bar
 - 5XX: 20 bar
 - 6XX: 4 bar

Hydrogen i naturgasnet
 Projekt nr.: 722.22
 Procestdiagram:
 "Main installation"

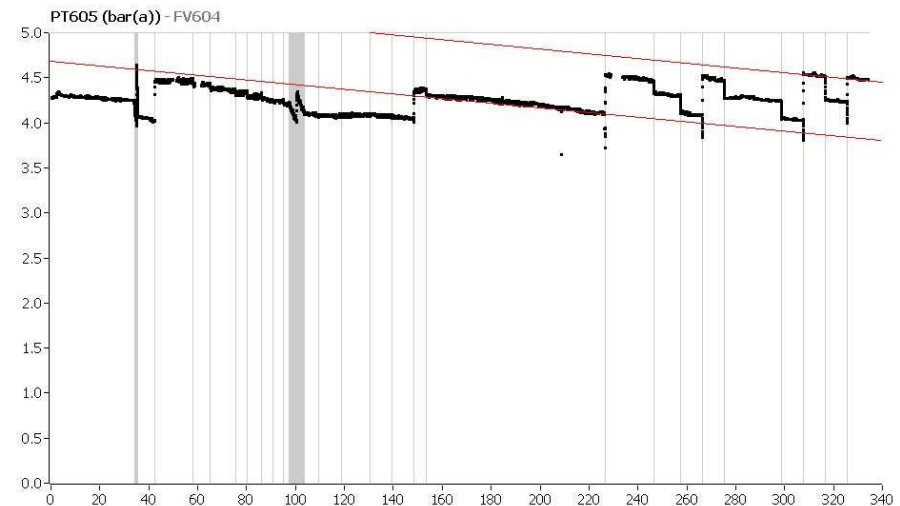


Results

The tests showed that all joints, components and fixtures of the gas grid should be checked for leakages at regular intervals.

Certain components should be modified in order to be hydrogen tight.

Leakages from 4 bar PE pipes



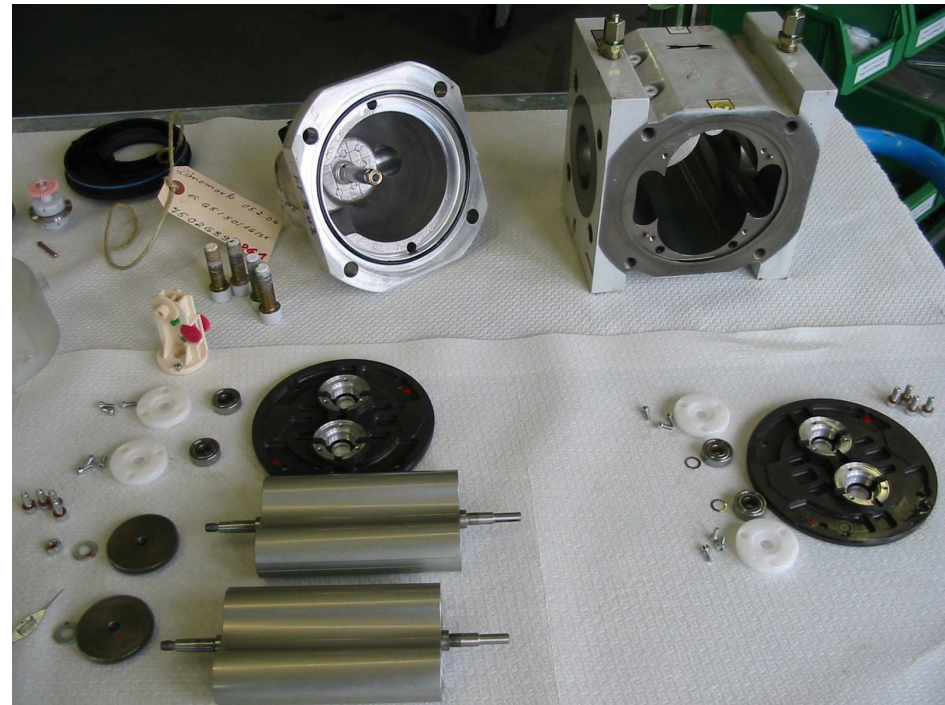


Results

The results indicate possibilities for hydrogen transportation via the 19 bar steel distribution grid as well as via the 4 bar plastic distribution grid.

The plastic grid requires additional (on going) investigations of the tendency towards changes in melting index and reduced resistance against oxidation after hydrogen exposure.

Inspection of flowmeter





Project partners and financial support

Partners in the project were:

- Danish Gas Technology Centre
- HNG (Greater Copenhagen Natural Gas)
- Swedish Gas Technology Centre
- Norsk Hydro

Together with the Danish Energy Authority, these partners financed the project.

Main supplier of components for the project was Strandmoellen Industrigas A/S, a Danish manufacturer of technical gasses and distributions systems, who is very experienced in hydrogen engineering.



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Thank you