

EUROPEAN COMMISSION

SEVENTH FRAMEWORK PROGRAMME  
FUEL CELLS AND HYDROGEN JOINT UNDERTAKING (FCH JU)  
THEME SP1-JTI-FCH.2013.3.5  
Field demonstration of large scale stationary power  
and CHP fuel cell system

GA No. 621256



**Demonstration of a combined heat and power 2MWe PEM  
fuel cell generator and integration  
into an existing chlorine production plant**

Deliverable no.	D4.5	
Deliverable title	Report on the functioning of the PEM generator	
Dissemination level	Confidential	
Written by	Jan ten Have (MTSA), Jorg Coolegem (Nedstack)	15-6-2018
Checked by	Loek van Veggel (MTSA)	28-6-2018
Approved by	Ton Pichel (ANIC)	29-6-2018
Issue date	29-6-2018	

## Publishable summary

The deliverable concerns the report on the system performance of the 2 MWe PEM fuel cell generator during the demonstrations period at the site of the user, Ynnovate (Yingkou, province Liaoning, China).

This report handles about the functioning of the Balance Of Plant (BOP) of the 2 MW PEM Power Plant. The functioning of the fuel cells during the demonstration period are reported in a separate Nedstack deliverable: D7.2 Report on stack performance.

The information in this report concerns the experience at the beginning of the operational period in till mid-2018.

After the Site Acceptance Test, performed mid-September 2016, the 2 MWe PEM fuel cell generator was put into operation.

The operation is performed by the client. MTSA and Nedstack supported Ynnovate in the operation by remote advice and also by means of a number of local visits.

In the first period of operation the client obtained practical experience with the installation. A number of small technical optimizations, based on the practical experience on full scale, were performed by MTSA and Nedstack in the first months after SAT. After a learning period by the client, approximately 4 months, the requested support decreased to a low level.

During the demonstration period, the system proved to be capable to function well under the varying ambient conditions, ranging from above 30°C in the summer to below -15°C in the winter, both in operational and idle mode. The installation proved to be capable to function in full service at the nominal capacity of 2 MWe. In the first year of operation, the output capacity was frequently restricted due to OSBL limitations, such as insufficient hydrogen feed from the chlorine plant or feed capacity restrictions to the local grid. Since the middle of 2017, an increasing uptime has been achieved, reaching above 95% towards the end of the year. In the design phase safety aspects were an important topic. No safety incidents with the installation are known.

In general the functioning of the BOP in this industrial application can be considered as more than satisfactory. Only relatively small failures can be reported. a learning period the client was able to operate and maintain the installation.

During the demonstration period a more than average, mostly reversible stack degradation has been observed. The root cause of this is still under investigation but was demonstrated to be related to the local feed streams. Contaminants in the hydrogen, air and/or demin water feed are under investigation.

## 9 Acknowledgement

This project is co-funded by the 7th FP (Seventh Framework Programme) – Fuel Cells and Hydrogen Joint Undertaking

<http://www.fch-ju.eu/>

<http://ec.europa.eu>



### Disclaimer

The FP7 project has been made possible by a financial contribution by the European Commission under Framework Programme 7. The Publication as provided reflects only the author's view.

Every effort has been made to ensure complete and accurate information concerning this document. However, the author(s) and members of the consortium cannot be held legally responsible for any mistake in printing or faulty instructions. The authors and consortium members retrieve the right not to be responsible for the topicality, correctness, completeness or quality of the information provided. Liability claims regarding damage caused by the use of any information provided, including any kind of information that is incomplete or incorrect, will therefore be rejected. The information contained on this website is based on author's experience and on information received from the project partners.