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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

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Publishable summary

This report is dedicated to the setup and validation of the simulation model developed for the DEMCOPEM-2MW PEM plant. The model is developed within Work package 3 of the project, dedicated essentially to modelling of the process taking place in the 2 MW PEM plant as well as to measurements evaluation and validation. Within WP3, the first two tasks are 3.1 “Development of process simulation of the PEM generator unit” and 3.2 “Computer code validation”.

The model calculates the mass and energy balance for the plant considered in this project, including the PEM and its main balance of plant components (heat exchangers, blowers, pumps). The model has been developed with ASPEN Plus®, with particular attention to modelling PEMFC performances through a specific custom model depending on the operating and stream conditions (temperature, pressure and composition of inlet streams, current density). Then the simulation has been calibrated and validated based on the layout and performances of the PEM plants of Solvay in Lillo (1 MW plant) and of the Akzonobel in Delfzijl (70 kW plant), using information on plant layout and cell behavior (voltage, temperatures, reactant flow rates and compositions) provided by NFCT and based on information about the 2 MW plant expected layout provided by MTSA.

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