EUROPEAN COMMISSION

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FUEL CELLS AND HYDROGEN JOINT UNDERTAKING (FCH JU)
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Field demonstration of large scale stationary power and CHP fuel cell system

GA No. 621256

DEMCOPEM 2MW

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

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Written By	Paddy Hayes (JMFC)	December 2018/Jan 2019
Checked by	Jorg Coolegem (NFCT)	Feb 2019
Approved by	Ton Pichel (Nouryon)	Feb 2019
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Publishable summary

Johnson Matthey Fuel Cells delivered 27,000 MEAs to equip the 2MWe DEMCOPEM power plant at the Ynnovate chlor-alkali plant in Yingkou, China.

This report describes the completion of Task 6.4, *MEA failure causes with recommendations for future product and process improvements*. MEAs returned from the Yingkou power plant were tested, examined and analysed to assess reversible and irreversible decay mechanisms. The report concludes that several separate degradation mechanisms are operating, with some influence from entrained contaminants from the chlor-alkali plant and neighbouring industries, alongside cathode catalyst dissolution and redeposition, leading to surface area loss. These degradation mechanisms could be mitigated by filtering and scrubbing reactants and coolants, and measures to limit the time the cathode spends at high potential.

In parallel with these efforts, several prototypes of improved MEAs were tested for their potential to reduce the total cost of fuel cell power plant ownership. Two designs were produced on high-volume production equipment to provide quantities sufficient for stack testing by Nedstack FCT in WP7; these consisted of a MEA with the same electrodes as the DEMCOPEM-2MW MEAs with a next generation 30µm membrane electrolyte, and a catalyst coated membrane-type MEA with a reduced platinum content and the same new membrane electrolyte. Testing has shown that the next generation membrane electrolyte is significantly more durable to common fuel cell degradation mechanisms.