



PEM ELECTROLYSERS FOR OPERATION WITH
OFFGRID RENEWABLE INSTALLATIONS

Second project report (technical and financial)

Deliverable 1.5



GRANT AGREEMENT
700359



D1.5 Second Project Report

Grant agreement	Fuel Cells and Hydrogen 2 Joint Undertaking
Project no.	700359
Project full title	PEM ElectroLYsers FOR operation with OFFgrid renewable facilities
Project acronym	ELY4OFF
Deliverable no.	1.5
Title of deliverable	Second Project Report (technical and financial)
Contractual date of delivery	M36 (March 19)
Actual date of delivery	M40 (July 19)
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Participant(s)	
Work Package contributing to the deliverable (WPx)	WP1
Dissemination level (PU/CO/CI)	PU
Type (R/DEM/DEC/OTHER)	R
Version	1
Total number of pages	3

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The outcomes achieved during the reporting period n°2 (October 2017 to March 2019) can be summarized as follows:

- Demonstration period started on 11 March 2019. 24 kg of green hydrogen produced until end of March 2019.
- Study covering specific national requirements and how to overcome barriers in four different countries (Denmark, Scotland, Sweden, France) has been elaborated.
- A detailed Life Cycle Assessment (LCA) has been developed in order to estimate the potential environmental impacts associated to the project compared to two alternative scenarios (wind energy and electricity from the grid)
- Steady-state and dynamic testing of the down-selected MEA and stack components at large-scale has been completed. Based on these results the MEA was considered suitable for use in the PEMWE stack of the demonstration system
- The required 13 units of novel DC/DC converters has been built, assembled and delivered on time. They fulfil the required operation specifications: the maximum temperature limit, the minimum efficiency, and the required MPPT strategy.
- The final configuration of the Hybrid Storage System is composed by: 36 kWh lead acid batteries (between 20 to 36 hours of autonomy depending on the season), 4.5 kW stationary low temperature PEM fuel cell to cover safety loads when the lead acid batteries are discharged, and a H₂ capacity of 7 kg at low pressure tank (20 bar), and 23 kg at high pressure tank (350 bar).
- Several energy storage and management architectures are being assessed.
- The overarching control and communication system (C&CS) which governs the microgrid allows a safe, reliable, robust and energy efficient operation of the PEMWE, PE and peripherals.
- User-friendly SCADA interface design which allows access to every subsystem to see status.
- An assessment of potential target markets has been accomplished
- Three main Business Cases were modelled and simulated: Isolated site electrification in Tenerife (Spain) and Edinburgh (Scotland), gas grid injection in Millau (France) and Shetland Islands (Scotland) and mobility application in Miallau (France) and Hofn (Iceland).
- 4 open access publications have been launched, one of them peer-reviewed.
- 10 participations in conferences and workshops.