VOLTA CHEM

Electrification of the Chemical Industry

NextGenP2H2

Cost reduction industrial PEM electrolyzers

Objective

The main goal is to develop cost efficient robust performing electrolyzer systems for P2X applications in energy intensive industrial fuel and chemicals production and large scale energy storage.

Key targets are:

- Cost efficient electrolyzer system with a CAPEX target of < 1000 €/kWe;
- Flexible operation electrolyzer system;
- Scale-up to large capacity (> MWe) electrolyzer system;
- NL-industry as electrolyzer component supplier.

Motivation

- The production of hydrogen by means of electrolysis offers an alternative for current energy-intensive hydrogen production processes.
- The chemical industry is very interested in sustainable hydrogen to replace “fossil” hydrogen and production of intermediates from sustainable hydrogen.
- For large scale sustainable hydrogen production, electrolyzers must be scaled-up, the cost must be drastically reduced and the technology more flexible to accommodate intermittent supply of renewable electricity.

Project scope

Phase 1	Phase 2	Phase 3
Electre: Lifetime test infrastructure, accelerated stress test protocols, stack platform for lifetime testing FlexP2G: 50 kWe PEMWE stack & prototype system	Cost efficient robust MEA Cost efficient 50 kWe stack 50 kWe electrolyzer system demonstration Design large scale	Cost-efficient robust green hydrogen production for P2X applications at industrial site
TRL 3/4	TRL 5/6	TRL 7/8
2015-2017	2018 – 2019	2020 – 2022
	Scope NextGenP2H2	To be prepared during Phase 2

Applicability

PEM water electrolyzer technology is multi-versatile and can be successfully applied in:

- Onsite H_2 production for refuelling stations;
- Onsite H_2 production for industrial processes;
- H_2 production for grid services / energy storage systems (Power-to-Gas).

Results

The main deliverables for the project are:

- An optimised 50 kW PEMWE stack & system;
- A conceptual design for 1 MW hydrogen production system;
- Development of a demonstration project including location selection and business case;
- Knowledge and infrastructure to conduct life-time testing of electrolyzer components available for Dutch companies.

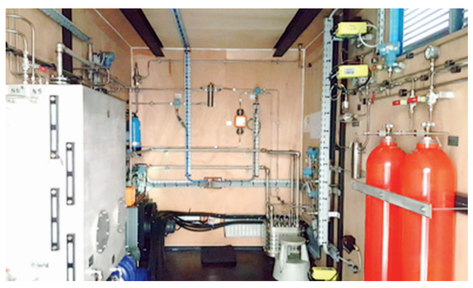

Figure: Prototype 50 kWe PEMWE stack and system

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