Elyntegration Project
(Grant Agreement n° 671458)

elyntegration

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Workshop:
Harmonization of testing protocols for electrolysis applications within FCH JU projects
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www.elyntegration.eu

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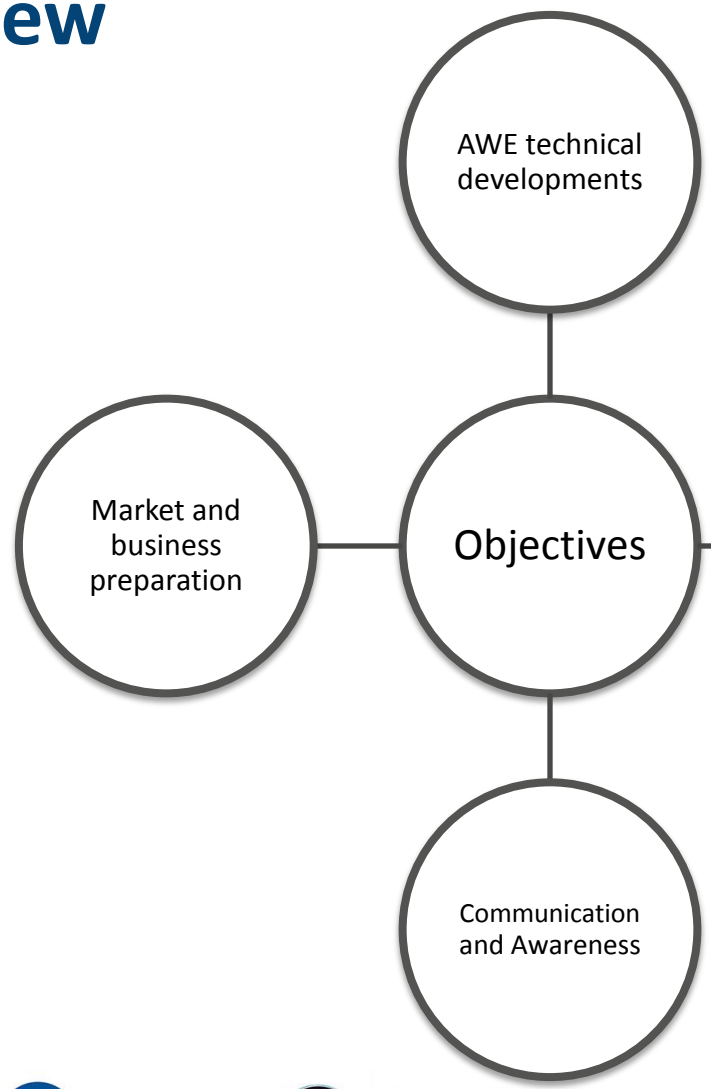
The Project

- Started: September 2015
- Duration 36 months (September 2018)
- Funded under FCH 2 JU – H2020 research and innovation
- The strategic goal of ELYNTEGRATION is the design and engineering of a
  - robust, flexible and cost competitive
  - multi Megawatt alkaline water electrolyser
  - capable of producing - with a single stack - up to 4.5 ton H2/day for energy applications.

The Consortium

- FHA (Fundación Hidrógeno Aragón, Coordinator, ES)
- IHT (CH)
- VITO (BE)
- Fraunhofer-IFAM (DE)
- Inycom (ES)
- IAEW-RWTH Aachen (DE)

Overview


AWE technical developments
Market and business preparation
Objectives
Testing
Communication and Awareness

Alkaline Water Electrolysis

- Cell design and improvements at stack level → high performance in a broad range of the electrolyser load.
  - materials development (electrodes , membranes)
  - Cell topology and assembly of the final stack solutions
- Definition and design of an optimized balance of plant (BoP) for the dynamic operation.
  - analysis of the BoP components and streams which could derive in lower costs of the system
  - participation of industrial and technological partners
- Advanced communication and control system
  - requirements of end-users
  - enhance the flexibility of the electrolyser providing grid services
  - coupled with the definition of the services and requirements.

Market and business preparation

- Feasibility study and market potential assessment
  - determine the best possible markets, sectors and countries for the final product
- The market study will focus on the national policies towards renewable energy and energy storage, with special attention to electricity prices in the power market and the provision of grid services to minimize the price of the hydrogen production.
- Exploitation strategy and business plan: After the results of the demonstration activities, the conclusions of the market study and the analysis of different business cases
- The exploitation strategy and business model for the ELYntegration final product will be presented to the hydrogen community of the EU and different stakeholders like TSOs, DSOs, utilities, grid operators, etc. in workshops and events during the project progress.

Communication and Awareness

- Activities complementary to the exploitation strategy and business plan.
- Targets: policy makers, local authorities, technology providers, general public.
- The final goal is to develop awareness of the services and technology to be demonstrated in the project at each level, including energy transition problematic, grid flexibility and environmental aspects.
- Channels: website, leaflets, participation in specialized conferences and fairs.
- Public deliverables will be also published and available in the project's webpage.

Testing

- Tested step by step and continuously during the project:
  - from ex-situ characterization at laboratory level
  - to in-situ testing at different scales (micro pilot to industrial size)
- The most promising results obtained in the project will be included in a final demonstration electrolyser working in an operational environment.
- Once validated and demonstrated at prototype level, the advanced constructive features will be integrated in the design of a multi-MW single stack alkaline electrolyser.

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Testing (2)

- For harmonization purposes:
  - Data to be gathered based on annual data reporting (temonas)
  - @ demo level
- Baseline? → data to be coherent btw testing elements and projects
- Additional capabilities? → cold/hot start, dynamic
- In any case, keeping in mind:
  - Safety
  - Original response (baseline)
  - What happens with degradation? → what about lifetime?

Testing (3)

- Open for discussion:
  - Protocols shall be defined taking into account whole system, only subsystems could lead to biased info … but…
  - How?
    - Applications, end-uses, "sizes",… → How to find consistent protocols?
  - For additional services (e.g. grid services) → coherent with the service to provide
  - Different "sizes" (kW/XXkW/XXMW)
  - Keep open the Definition of "additional control points"?
  - From chemical processing plant to "end-user experience"

Testing (4)

- Open for discussion:
  - "Electrochemical plant"
    - 94/9/EC, 99/92 EC (ATEX) and harmonised standards…
    - 97/23/EC (PED) and harmonised standards…
    - 2004/108/EC (EMC) and harmonised standards…
    - 2006/42/EC (MD) and harmonised standards…
    - 2006/95/EC (LVD) and harmonised standards…
    - ISO 14687-1:1999 ...
    - ISO 14687-2:2012...
    - ISO 15916:2004,...
    - ISO 22734-1:2008,...
  - "What is the footprint?"
  - → Power Quality → e.g. VFD? Filters, Power electronics, …
  - Control points and information to establish a complete analysis
  - Additional requirements: System integrated within operators system:
    - Communication protocols, validation tests required → Other stakeholders in the picture
    - "Establishing test protocols …" 2016
  - How to adapt the testing site to the protocols and requirements?

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