



RESEARCH ON FUEL CELLS & HYDROGEN

European Research Roadmap for FCH

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President

N.ENERGHY is the research partner of the FCH JU

Fuel Cells & Hydrogen Joint Undertaking



Industry Grouping
Hydrogen Europe
105 members



European Union represented
by the European Commission



RESEARCH ON FUEL CELLS & HYDROGEN
Research Grouping
N.ENERGHY
65 members



The Joint Undertaking is managed by a Governing Board composed of representatives of all three partners and lead by the Industry.

*A portfolio of
clean, efficient
and competitive
solutions based on
fuel cells and
hydrogen
technologies in
energy and
transport*

1. Role and Impact of N.ERGHY

- European Energy Union priorities are security of energy supply, energy efficiency, competitiveness
 - Success will be based on science and technology innovations
 - Accelerated Innovation is the ultimate solution to climate change

- **N.ERGHY**
 - **Mission** is to **promote, support and accelerate** the deployment of H2&FC technology by **aligning the European R&D** community and providing a stronghold for cooperation with industry increasing the impact of research
 - **Address critical technical** barriers to foster Hydrogen & Fuel Cell technologies to achieve commercialization (TRL 3-6)
This activity is done in close collaboration with Hydrogen Europe.
 - **Propose clear R&I targets** for the future (TRL 1-3)
This activity is done in close collaboration with the EERA Joint Program on FC&H2.

1. Role and Impact of N.ERGHY

- **N.ERGHY coordinates H2&FC R&I efforts in Europe since 2008**
 - Close cooperation with EERA Joint Program on FC&H2 (national R&D monitoring, low TRL proposals). More than 80% of the EERA JP members are today member of N.ERGHY
 - Stakeholder of SET Plan actions

- **N.ERGHY will continue to contribute to the FCH JU public-private partnership**
 - Deployment of commercial products:
 - European Hydrogen Refilling Station and Electrolyzer manufacturers
 - European fuel cell stack manufacturing
 - European fuel cell vehicles

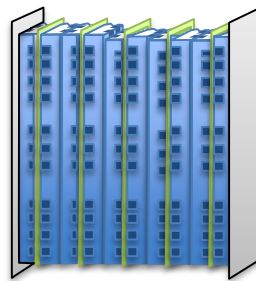
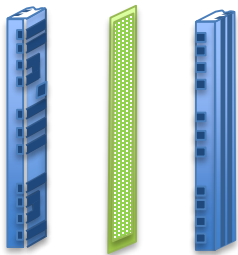
 - Active participation of Europe in international **Regulation, Codes & Standards** activities

1. Role and Impact of N.ERGHY

More than 500 publications since 2008

FC Components (11 projects)

- Membranes: +25% in performance
- GDL: +12% in performance & 7% cost savings
- BPP: Improved corrosion coatings; stable >6,000hrs

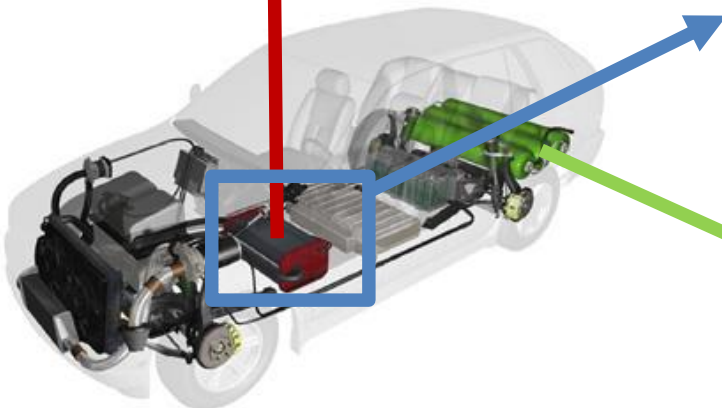


FC Stacks (6 projects)

- Good performance in gen 1 (2.8kW/l)
- 4.1 kW/l in gen 2
- Cost: <50€/kW @30,000units/yr

H2 Storage (1 project)

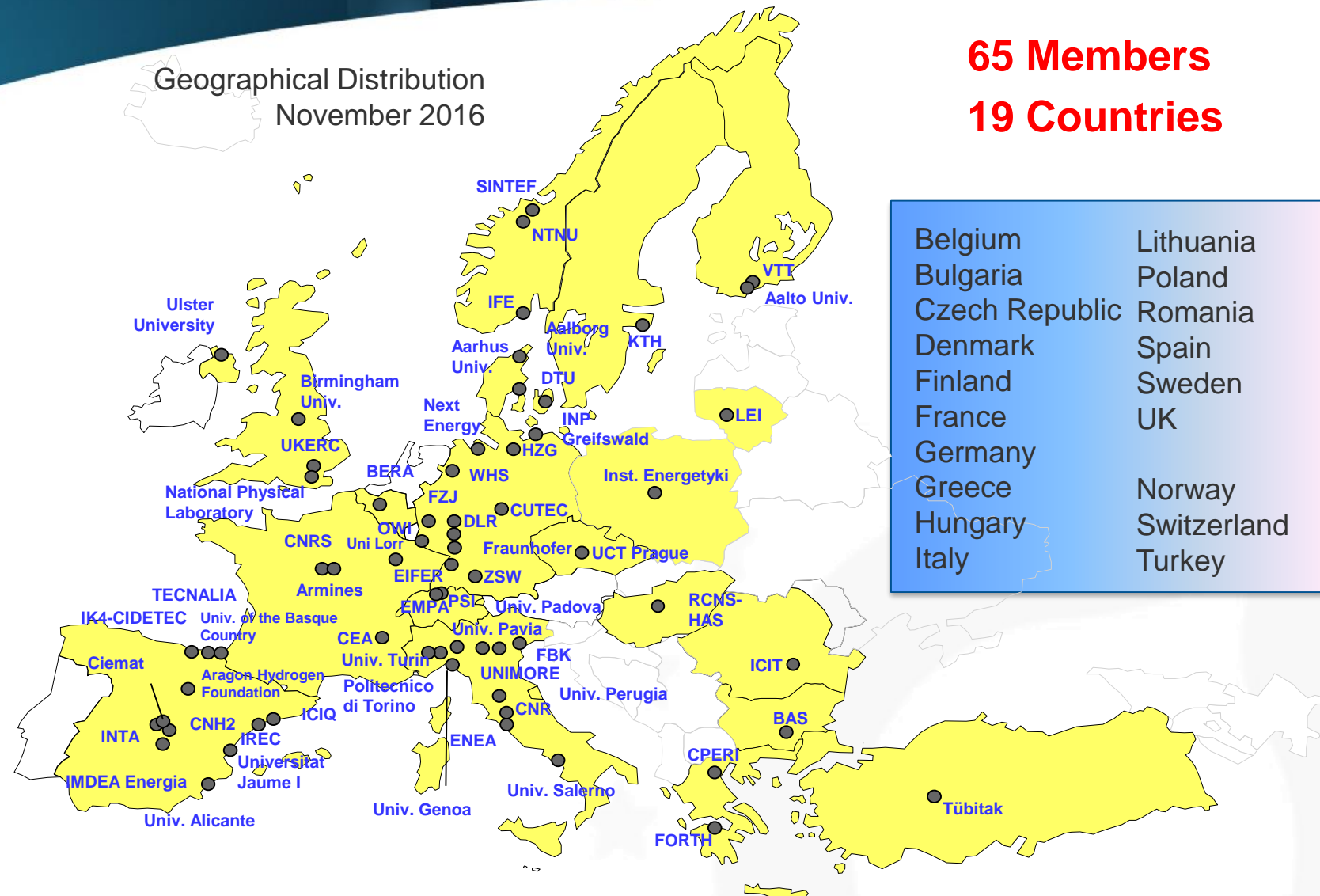
- +22% gravimetric density
- -55% cost savings



2. ROADMAP

- Take advantage of world R&I activities (USA, Japan, Korea and now CHINA) and focus on European industry needs
- Contribute to build the Multi Annual Working Plan (MAWP) and the Strategic Reference Document (SRD)
- Some examples
 - Energy storage
 - Flexible low and high temperature electrolysis
 - PGM free catalysts
 - Stack architectures
 - On-board tanks
 - Hydrogen compressors
 - ...

3. N.ERGHY actions are based on regional cooperation all over Europe



3. N.ERGHY is integrated in regional ecosystems

- Universities, laboratories, research institutes have strong links with
 - local industries,
 - local authorities,
 - attracting young people in their scientific and technical educations.
- **Education** is of utmost importance to train engineers, technicians and engineers and to ensure a **qualified manpower** the Hydrogen and Fuel Cells industry will need. Integrate H2&FC specialities in the generic cursus.

Conclusions

- N.ERGHY has succeeded in FCH JU to coordinate and focus all over Europe the technological research
- N.ERGHY has identified potential breakthroughs for next generation of products
- N.ERGHY is integrated in regional ecosystems and will contribute to educate qualified manpower that Hydrogen and Fuel Cells industry will need
- Strong, competitive Research and Innovation in close collaboration with European Industry is essential to foster commercialization
- Progress in Research & Innovation is worldwide.
All the strength of European Research & Innovation is needed.
A sustainable European support is crucial to keep Europe in the top players.



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