The European Commission’s science and knowledge service

Joint Research Centre
EU Country Overview

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6th Int. Hydrogen Infrastructure Workshop
Boston, September 11-12, 2018
OUTLINE

- EU Policy Initiatives relevant to Hydrogen Infrastructure and Transportation
- Hydrogen Vehicles and Infrastructure deployment at the EU
- EU Research and Innovation Activities
The transition to low-emission mobility requires deployment and market acceptance of alternative fuel-powered vehicles.”

...“Journeys across Europe in electric vehicles should be straightforward: this means electric charging must be as easy as filling the tank.”

...“The Commission is actively encouraging electric mobility through legislation (e.g. EU-wide technical specifications) and investment.”

The 2nd Mobility Package ‘Clean Mobility’ (8th November 2017), presents an European Low-emission mobility strategy

- **Alternative Fuels Infrastructure Action Plan** and Assessment of the Member States National Policy Frameworks


The 3rd Mobility Package 'Safe, Connected Clean Mobility'\(^1\) (18 May 2018)

- New road safety policy framework (2020-2030) with two legislative initiatives on vehicle and pedestrian safety and on infrastructure safety management;
- Legislative initiatives on CO2 standards for heavy-duty vehicles, on their aerodynamic and on tyre labelling;
- Proposal for a regulation on a common methodology for fuels price comparison;
- Strategic Action Plan for the Development and Manufacturing of Batteries in Europe;
- A EU strategy on connected and automated mobility.

\(^1\)https://ec.europa.eu/transport/modes/road/news/2018-05-17-europe-on-the-move-3_en

✔ Instead of setting targets to the Member States member states for electric, natural gas and hydrogen infrastructure to ensure a minimum EU-wide coverage for vehicles, the directive requests them to submit their National Policy Frameworks.
✔ The NPFs shall outline National Targets and Objectives, and Supporting Actions for the development of the market as regards alternative fuels, including the deployment of the necessary infrastructure.
✔ Member States shall notify their NPFs to the Commission by 18 November 2016.

☞ Detailed Assessment of NPFs, taking into account the objectives of EU-wide mobility, reduction of oil dependence, economic growth, and greenhouse gas emissions: SWD(2017) 365 final. Detailed Assessment of the National Policy Framework.
☞ Commission has set the Strategic Transport Forum for exchange of good practices, high-level policy conclusions on state of play and future needs.
☞ In 2019 the Commission will start to evaluate Directive 2014/94;
☞ Member states shall submit to the Commission a report on the implementation of its National Policy Framework by 18 November 2019, and every three years thereafter;

15 Member states have addressed targets for Hydrogen

At the moment refuelling stations are on main agglomerations

Refuelling stations planned for 2025 on TNT-Core Networks

Foreseen stations have been assumed to be equally distributed along the corridors.
Action plan on Alternative Fuels Infrastructure

The Commission Analysis of the NPFs under Directive 2014/94/EU results in the following estimates of infrastructure investment needs by Member States, including the TEN-T core network corridors:

- **Electricity**: up to EUR 904 million by 2020.
- **CNG**: up to EUR 357 million by 2020 and up to EUR 600 million by 2025 for CNG road vehicles.
- **LNG**: up to EUR 257 million by 2025 for LNG road vehicles. For LNG for waterborne transport, up to EUR 945 million in the TEN-T Core Network Corridor seaports by 2025 and up to EUR 1 billion in the TEN-T Core Network Corridor inland ports by 2030.
- **Hydrogen**: up to EUR 707 million by 2025.

These proposals build on existing EU policies and funding opportunities such as:

- Research, development and innovation projects under the **Horizon 2020 Programme**
- Ongoing EU-financed investment programmes, for example the **Connecting Europe Facility**
- the **European Energy Programme for Recovery** and other **European Structural Investment Funds** (ESIF)
- as well as funding through the **European Fund for Strategic Investments** (EFSI), where there are more projects related to energy than any other sector.

Co-financed programs - Connecting Europe facility

**CEF Blending call 2017**

- Innovation and new technologies priority
  - 10 Alternative fuel projects selected.
- Total investment +/- €626 million
  - Total CEF support +/- €120 million

**Nb of fuelling stations**

- **CNG**: 15, €2,727,500
- **LPG**: 0
- **EV**: 660, €80,753,315
- **H2**: 20, €10,131,800
- **LNG**: 29, €12,165,744
Co-funded RD&D programs - CEF

Evolution of a European hydrogen refuelling station network by mobilizing the local demand and value chains

The focus is on market-sided innovation by real-life deployment and processes to boost market introduction

- Cooperation to connect HRS on North Sea - Baltic and Scandinavian - Mediterranean core network corridors;
- Mobilise local and regional actors across the value chain to drive the business case;
- Ensure a growing demand for hydrogen fuel by engaging organisations and individuals to become users;
- Procure and operate public transport units powered by fuel cells and other FCEVs for real life tests;
- Provide locally produced renewable hydrogen for the real life tests;
- Cooperation with Government Support Group for alternative fuels.

H2Nodes Action looks into planning and realizing a chain of HRS and boosting demand for fuel cell electric vehicle FCEV along the North Sea - Baltic core network corridor
Deploying Hydrogen for Transport in EU: Hydrogen platforms

Germany: [http://h2-mobility.de/en/](http://h2-mobility.de/en/)

Italy: [https://www.mobilitah2.it/en](https://www.mobilitah2.it/en)

Netherlands: [https://opwegmetwaterstof.nl/](https://opwegmetwaterstof.nl/)

Flanders (Belgium) and the Netherlands: [https://www.waterstofnet.eu/nl](https://www.waterstofnet.eu/nl)

United Kingdom: [http://www.ukh2mobility.co.uk/](http://www.ukh2mobility.co.uk/)

Hydrogen, fuel cells and electro-mobility in European regions [http://hyer.eu/](http://hyer.eu/)
Co-funded RD&D programs - FCH-JU

**FCH JU HRS objectives**

- Reduce CAPEX & OPEX
- Reduce refueling time
- Increase reliability, safety and availability
- Facilitate the emergence of standards and protocols

**DEMO PROJECTS**

- 25 projects
- 655 M€ (253M€ public contribution, 402 M€ private)
- 70 (+20) HRSs serving ~ 2,000 FCEVs

**RESEARCH PROJECTS**

- 4 projects
- 18 M€ (14 M€ public contribution, 4 M€ private)
- Focus: HRS components
Increasing the HRS network density

HRS demo projects overview

- 13 countries involved in HRS deployment
- 8 cars projects:
  - FCEVS: 1850
  - HRS: 67
- 6 bus projects:
  - FCEBs: 360
  - HRS: 26
- 4 MHVs projects
  - MHVs: 280
  - HRS: 10

Achievements

- >57,000 refueling operations in 2017
- > 120 tn H2 dispensed
- >70% renewable H2

Product ready for commercialization

- Refilling:
  - < 5 min for cars
  - < 10 min for buses
- >95 % average availability (82-99%)
- 70m2 for 200kg/day stations
Improve HRS performance

Focus

Components:
- Innovative compressor technology;
- Modular design

Goals

- Energy efficiency;
- System cost;
- Modularity;
- Increased capacity
Improved customer experience

**HRS AVAILABILITY SYSTEM**

Development of a system for HRS availability in the EU.

[Diagram showing the process of signal input, real-time data, data storage & processing, and signal output to mobile apps, websites, and car navigation.]

[Map showing the geographical location of various HRS availability points across the EU.]

[Link: https://h2-map.eu/]
Other FCH-JU relevant activities

- **Fuel cells and hydrogen market and policy observatory**
  Establishment of an observatory with the aim of becoming a reference point for information about fuel cells and hydrogen technologies and applications.

- **Project CERTIFHY**
  Develop a common European-wide definition of green hydrogen, develop a hydrogen GO scheme deployable across Europe and a roadmap for its implementation.
Other: Relevant EU research

**EU harmonised terminology for low temperature electrolysis**

- JRC and 21 contributors from industry, academia and research organisations;
- Provides definitions of various “efficiency” terms (p.20): energy efficiency, current efficiency, water electrolysis efficiency, combined fuel cell and stack, and a detailed methodology of the derivation of the relevant efficiency equations;
- Submitted for FCH2JU consultation in spring 2018.


**Hydrogen Safety Research Priority Workshop** (IA HySafe, US-DoE and JRC)

19-20 September, 2018

International experts from research and industry elaborate on R&D advancements of the last 2 years and identify gaps to be covered.
Thanks
Any questions?
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