Hydrogen and fuel cell technology are an essential element for transforming to a smart, low carbon and secure EU energy system.

Brussels, 31 January 2011

Dear Madam, Sir,

The European fuel cells and hydrogen sector, represented by the subscribing organisations, shares the vision of the European Council presented in the non-papers on Energy and R&D&I of October 2010 prepared by the Belgian Presidency. **A sound innovative energy policy is central to the EU 2020 strategy for smart, sustainable and inclusive growth**. Actions taken in relation to decarbonising the transport and energy sector will be leading factors for ensuring long term sustainability.

Shifting towards an efficient, secure and low carbon economy requires targeted investment in the development and market deployment of innovative and low carbon technologies in future transport and energy systems. Hydrogen and fuel cell technology have clear and mutually enforcing benefits for both anchors of sustainable growth. Given the short term investments required to enable medium to longer term results, we are pleased that the European Council is discussing the themes of Energy and Innovation together.

In view of the thematic European Council of 4 February on Energy and Innovation, this letter provides a view on the significant and broad role fuel cell and hydrogen technology play in the EU's shift towards an efficient low carbon economy.

Hydrogen can be a key vector in a new low carbon economy. It can be produced from all primary energy sources and generates no CO_2 when used to produce power in a fuel cell. **Hydrogen can decouple the link between the geo-politics of oil-supply and the EU's energy needs.**

Fuel cells represent a versatile, clean and highly efficient power source applicable across a wide range of industries - from automobiles to large scale back-up power systems and from decentralised power generation in buildings to portable electronics.

Over the last 5 years significant technology breakthroughs have been achieved to remove the main technical barriers for the market introduction of hydrogen, as a clean and safe energy carrier and fuel cells, as highly efficient (decentralised) power systems used in stationary and portable applications and also for CO_2 capture. **Various applications are already becoming cost-competitive and many will be reaching commercial status this decade.** Fuel cell vehicles for example can be cost-competitive with conventional internal combustion engine cars as early as 2025, provided the right incentives are in place and an appropriate refueling infrastructure is built (see the report "A portfolio of power-trains for Europe: a fact-based analysis", published in Nov 2010[1]).

Similar outlooks are applicable to fuel cell buses and light commercial vehicles. In the logistics sector fuel cell powered fork lift trucks and other material handling equipment powered by fuel cells are increasingly being used in warehouses and industrial sites.

Fuel cell based combined heat and power (CHP) applications, both at domestic and industrial level, and fuel cell powered back up power systems for telecommunications sites are already commercially available and used today. Finally, fuel cells used as a CO_2 capture device are considered as a promising component for the second generation carbon capture and storage (CCS) systems, which are expected to be commercialised, by 2020.

Fuel cell and hydrogen are connected to the four large scale initiatives announced in the EU Energy 2020 Communication - Smart Grids, Energy Storage, Large scale biofuel production, Smart Cities- in the following ways:

[1] A copy of this report is available at www.zeroemissionvehicles.eu

1. Smart Grids

Power distribution based on today's centralised grid structure results in poor efficiency and high emissions (40% of global CO_2 emissions) as a result of conversion and power-line losses and mainly fossil-based primary sources. Furthermore the European grid is not equipped to accommodate the anticipated growth of electricity-demand. Huge investments are needed and distributed energy generation is seen by many as the best means of meeting such increased demand while simultaneously increasing efficiency, reducing emissions and reducing the burden on the existing grid. Fuel cell systems are emerging as one of the main drivers of CHP and have an additional benefit of generating power in a near silent manner. Already today a CO_2 reduction of 30% can be achieved compared to conventional heat and electric generation systems. Furthermore, fuel cells can be applied as a device to concentrate and capture CO_2 (in second generation CCS systems) and at the same time, increase the power production of any plant fed by fossil fuels.

- **Fuel cells and hydrogen play an important role in managing supply and demand of smart grids.** Fuel cells, in combination with hydrogen or as part of a combined heat and power system, play an important role in optimizing smart grid efficiency and reducing emissions. They allow end-users to generate their own electricity at the place where it is needed and/or reduce CO_2 emissions from existing plants. Further, hydrogen as a storage medium can increase grid efficiency by balancing intermittent renewable energy supply, and enabling peak power demand when for example, charging battery electric vehicles.

- **Hydrogen and fuel cells enhance the security of supply.** Hydrogen, as an energy carrier like electricity, can be sustainably produced from all primary energy sources, including through renewable or decarbonised pathways, making the European economy less vulnerable to external supply issues.

2. Energy Storage

Technologies to efficiently store energy will be a key aspect of successfully matching renewable energy sources to the electricity grids. Hydrogen offers a good solution for both short and long-term storage needs.

When supply exceeds demand, hydrogen can be produced from all primary sources and safely stored in bulk or smaller quantities. When demand increases, it can be used to generate power via fuel cells, through large gas-turbines or traded as a commodity itself, allowing export potential of excess renewable power.

> **Hydrogen is an efficient energy storage mechanism and can be easily transported.** Hydrogen, produced from any primary source, can be safely stored in gas or liquid form, both in industrial and domestic environments. The storage capacity of hydrogen is virtually unlimited, offering stored energy up to the terawatt hour level which remains available for extended periods, as opposed for example, to storage in batteries. Hydrogen can be transported by many different modes of transport, including pipelines, trucks and ships, allowing a choice for the most cost-efficient option. **Hydrogen has an important role to play in closing the loop between energy generation, distribution and demand.**

3. Large Scale biofuel production

For the reasons set out above and hereafter, hydrogen is a key enabler for maximising large scale biofuels production.

- Fuel Cells can be powered by various biofuels, as one of the most efficient power systems they make the best use of any feedstock.
- Hydrogen can be produced from biomass and easily stored and transported. Hydrogen production companies are exploring various biomass production pathways via sewage plants to produce **methane, waste management and bio-gasification.**

4. Smart Cities

Reducing energy-consumption in urban areas is an important pillar for achieving the low carbon aspirations across the EU member states and increasing energy efficiency in buildings is one of the main drivers. Decarbonisation of urban transport is the other main driver. Fuel cell systems and hydrogen are an indispensable part of the solution for structural reduction of CO_2 and other polluting emissions.

- **Fuel cell systems are part of the solution for saving energy in buildings and transport in urban areas**. Residential buildings and urban transport are responsible for most of urban CO_2 emissions. Small scale fuel cell powered distributed generation units are already available and can be implemented as part of an urban smart grid roll out. Wider deployment of fuel cells and hydrogen technology in public transport (passenger, public, light commercial, maritime etc.), including the application of larger stationary fuel cell-based charging stations to provide electrical energy to electric vehicles with a low CO_2 source, contributes to the optimisation of the technology and economies of scale and will have a positive impact on reducing the unit costs.

To unlock the vast potential of fuel cell and hydrogen technology continuous investments are needed in Research, Development and Demonstration (RD&D) and market deployment. The Joint Undertaking for Fuel Cell and Hydrogen Technology (FCH JU), set up as the first European Industrial Initiative (EII) under the EU Strategic Energy Technology Plan (SET Plan) in 2007, covers only part of this RD&D need and for a limited time frame (up to 2013).
In view of the commercialisation of fuel cell and hydrogen applications over the next decade, the integration of hydrogen and fuel cell activities in current and future EU energy and transport financing schemes, foreseen in FP 8, TEN T, Structural Funds and the Innovation Union, is crucial to avoid costly “make-overs” later when applications are coming to market.

As the first block-funded EII of the EU SET-plan, the FCH JU has links with all the energy technologies of the other EII’s inaugurated last year. More leveraging of funding between these EII’s is needed to allow for larger scale demonstration projects that facilitate intelligent deployment of several SET Plan Technologies (for example with regards to Energy storage, CCS, Solar, Smart grids, Wind). The fuel cell and hydrogen sector therefore welcomes the call of the European Council for “concrete measures to maximize the use of existing funds to better leverage capital” and a for “a long term framework to attract the necessary public/private investments in innovation, and large scale demonstration and market deployment”.

EU Member States are encouraged to take a true European approach and cooperate to invest in clean technologies to maintain Europe's industries' leading role in this field. Joining forces in this respect, both in financial and innovation terms is essential for remaining competitive with other geographies like the US, China, India and Japan.

We look forward to further engaging in the debate and are available to take any questions you may have.

Yours sincerely,
On behalf of the EU fuel cell and hydrogen sector,

Fuel Cells and Hydrogen Joint Undertaking
Name: Bert De Colvenaer, Executive Director
http://ec.europa.eu/research/fch/index_en.cfm

Industry Grouping for Fuels Cells and Hydrogen Technology (NEW-IG)
Name: Gijs van Breda Vriesman
Chairman of the NEW-IG Board
www.fchindustry-jti.eu

Research Grouping for Fuels Cells and Hydrogen Technology
Name: Paul Lucchese
Chairman of the N.ERGHY Board
http://www.nerghy.eu/index.php

European Hydrogen Association, EHA
Name: Marieke Reijalt, executive director
www.h2euro.org

Fuel Cell Europe
Name: Anthony Brenninkmeijer - Director
www.fuelcelleurope.org

The European Regions and Municipalites Partnership for hydrogen and fuel cells

HyRaMP

Name: Andreas Ziolek

Chairman of the HyRaMP Board

www.hy-ramp.eu

Subscribing organizations:

European Hydrogen Association, EHA

Representing 19 national associations and the main hydrogen infrastructure development companies, the EHA is promoting the integration of hydrogen as a clean energy carrier in Europe's energy and transport systems.

NEW-IG

NEW-IG is the industry group of a public-private partnership built to implement a target-oriented R&D programme to support the broad market introduction of fuel cells and hydrogen technologies.

N.ERGHY

The N.ERGHY association is representing the interests of over 60 European universities and research institutes active in the field of Fuel Cell and Hydrogen technology development. The objective of the Association is to promote, support and accelerate the deployment of these technologies by aligning the European R&D community and by strengthening the close collaboration between academia and industry.

Fuel Cell Europe

Fuel Cell Europe's mission is to: "Accelerate the research and deployment of world-class fuel cell technologies for applications in transport, stationary and portable power." As the European association serving fuel cell and hydrogen industries, Fuel Cell Europe's members gather around 70 organizations from 10 European countries. These include industrial, academic, research institutions and other developers of these energy devices.

HyRaMP

The European Regions and Municipalites Partneship for hydrogen and fuel cells represents 30 regions and cities (among which London, Hamburg and Madrid). HyRaMP's objective is to foster the adoption of fuel cell and hydrogen technologies in Europe.

Fuel Cells and Hydrogen Joint Undertaking (FCH JU)

FCH JU is the public private partnership supporting research, technological development and demonstration (RTD) activities in fuel cell and hydrogen energy technologies in Europe. Its aim is to accelerate the market introduction of these technologies, realising their potential as an instrument in achieving a carbon-lean energy system.