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Community Research

European Commission Statement

**IPHE Steering Committee
Beijing, 27th May 2004**

**European Commission
DG Research – RTD/J-2**





Overview of Presentation

- ✓ **The EU vision for hydrogen, overall energy context and policy objectives**
- ✓ **The EU Framework Programmes for Research and Technology Development**
- ✓ **Driving forward the vision: European Hydrogen and Fuel Cell Technology Platform**
- ✓ **Next steps: Seventh Framework Programme for Research, Growth Initiative and Quickstart H2 projects**
- ✓ **EU vision for IPHE and actions for achieving vision**



The Commission's Vision

European Hydrogen and Fuel Cell Technology Platform,

General Assembly Meeting, Brussels, 20th January 2004



- × President Romano Prodi: “....our objective is to realise a step-by-step shift, towards a fully integrated hydrogen economy, based on renewable energy sources, by the middle of the century. We must focus on technologies that can sustain economic growth, neutralise the debate on climate change and eliminate harmful pollution forever..... In achieving this goal we shall contribute to quality of life, peace and stability the world over”.



- × Vice President L. De Palacio: “Hydrogen as a potential new universal energy carrier has attracted our special attention. An integrated development for energy and transport sectors is particularly important to take full profit of common technologies. Hydrogen also can break the monopoly of oil in the transport sector and give it access to all energy resources”.

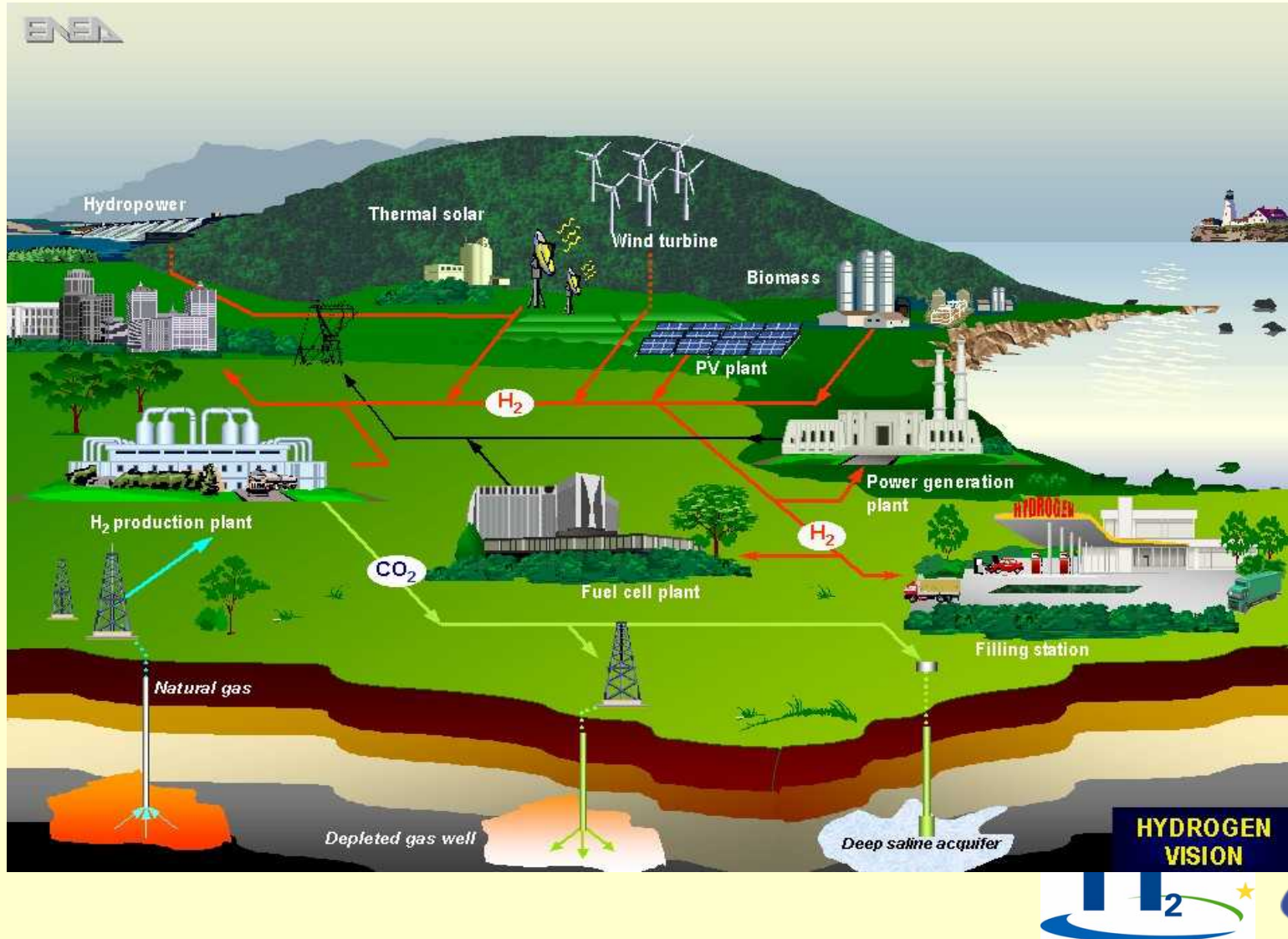


- × P. Busquin, Commissioner for Research: “The implications of climate change go way beyond our lifetimes and what we choose to do now will have dramatic consequences for many generations to come. It is therefore imperative that we start now to develop experience of implementing these sustainable energy systems”

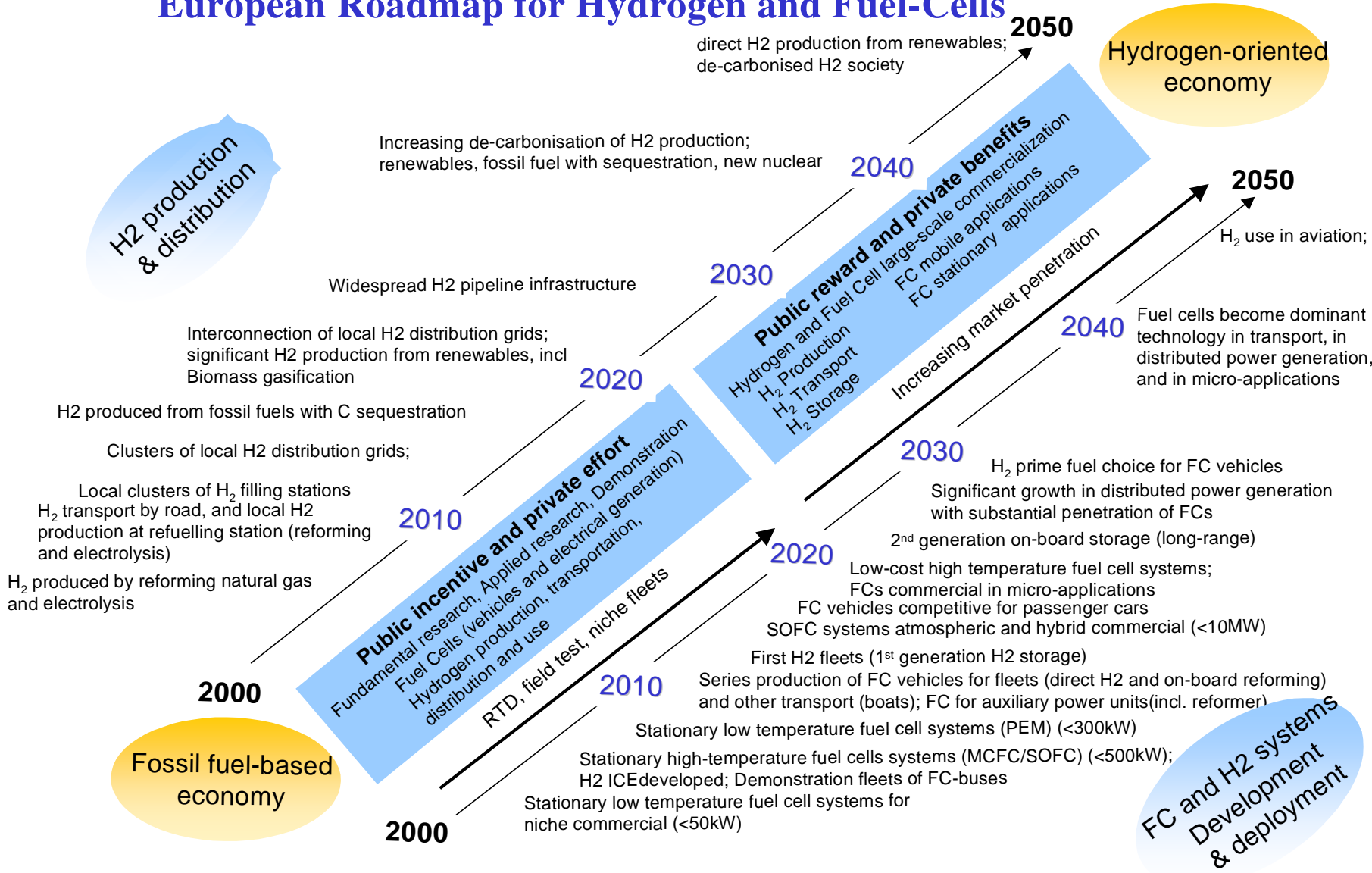




High Level Group : A visionary energy outlook



European Roadmap for Hydrogen and Fuel-Cells





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EU ENERGY CONTEXT AND POLICY OBJECTIVES



EU Policy Objectives

✓ Meeting EU Kyoto Commitments

8% CO₂ reduction by 2008-12 compared to 1990

Much deeper reductions required by 2015-2025...

✓ Maintaining Security of Supply

Green Paper of Nov. 2000 launched debate on a future EU energy strategy addressing both demand and supply sides

✓ Promoting Industrial Competitiveness

Hydrogen and fuel cell technologies forecast as paradigm shift in way we produce and use energy





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EU Sixth Framework Programme for Research and Technological Development



Sixth Framework Programme: New H₂/Fuel Cell Projects (2004)

Hydrogen : 6 Integrated Projects, 3 Specific Targeted Research Projects, 1 Network of Excellence, 3 Specific Support Actions, 1 Co-ordinating action:

total of 66 m€ EU support :

- **Hydrogen Roadmap, Production, distribution and storage**
- **Hydrogen Safety**

Fuel Cells: 3 Integrated Projects, 3 Specific Targeted Research Projects,

total of 30m€ EU support

- **SOFC, PEM for stationary and transport applications**
- **DMFC for portable applications**

Total value of contracts : ~200 m€



FP6: Next Calls for Proposals

- ✓ Eol exercised closed on March 2004: more than 100 Eols on H2 and Fuel Cells received
- ✓ Workprogramme being revised
- ✓ Main topics: nano-technologies, materials and production technologies for FCs, H2 storage and production, systems integration;
- ✓ Applications: small and large stationary FC systems, automotive, aeronautics, marine,
- ✓ Next Call closing in December 2004
- ✓ Expected total investment ~150-200m€
- ✓ International Collaboration encouraged – IPHE, etc..





Driving the EU vision forward:

*The European Hydrogen and Fuel Cell
Technology Platform*

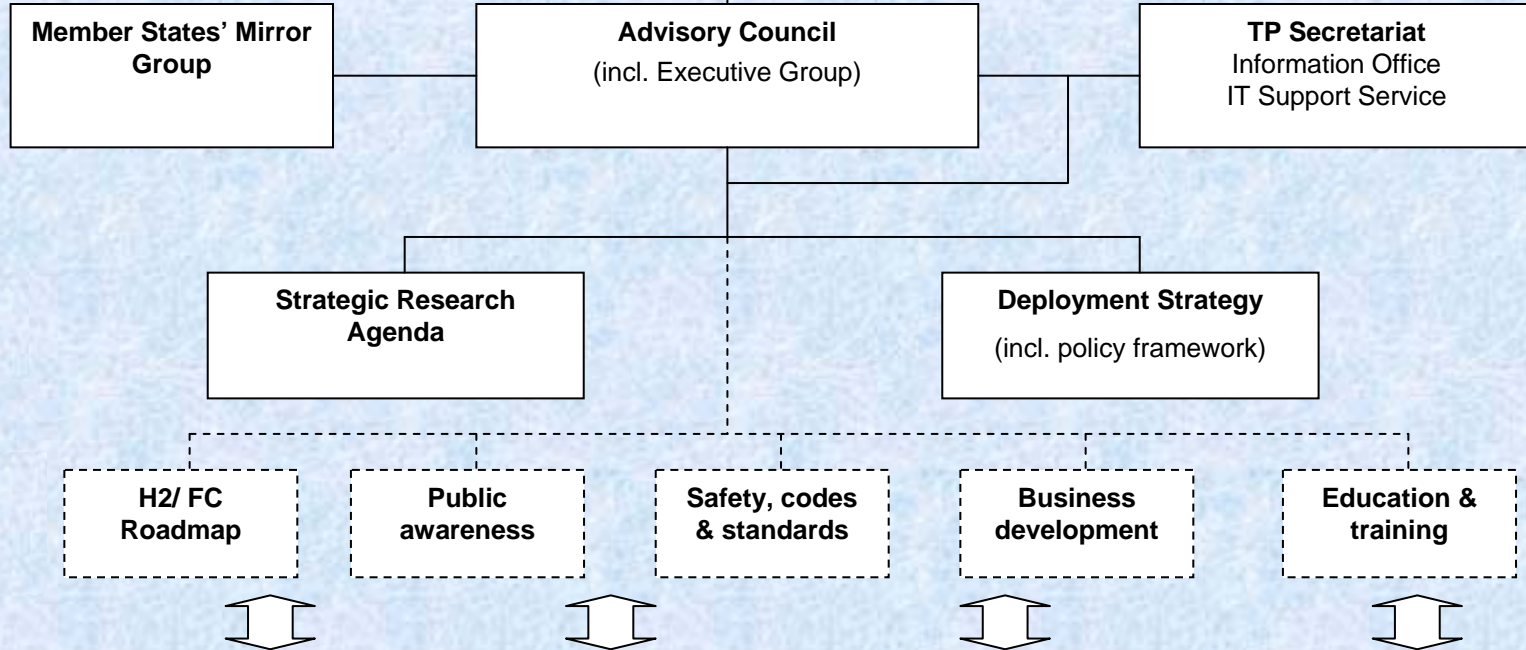
A major asset, facilitating EU contribution to IPHE



HLG Vision

Commission H/FC Project Team
(Inter-service Group)

H2/ FC TECHNOLOGY PLATFORM



Steering Panels :

(possible) Initiative Groups :

PLATFORM OPERATIONS

New and on-going projects and initiatives (EC + MS national, regional and local)

GENERAL ASSEMBLY

(Bi-)annual Technology Platform Forum



Role of Main Platform Bodies

- × **Platform Advisory Council:** (~ 50% industrial participation) responsible for advancing overall vision and strategy,
- × **Member States' Mirror Group:** deepen co-operation on RTD and demonstration; framework for policy orientation and development;
- × **Steering Panels:** to propose
 - *Strategic Research Agenda:* RTD priorities, targets timelines, instruments;
 - *Deployment Strategy:* implementation targets, “lighthouse” demonstrations, public-private partnerships, favourable commercial and political environment,





The H₂/FC Technology Platform: Current Status

- × **Advisory Council established;**
- × **Member States' Mirror Group established;**
- × **Steering panels for research and deployment established;**
- × **Initiative groups on Finance and Business Development, Education and Training, Public Awareness, Regulations and standards proceeding**
- × **Secretariat appointed**
- × **Initiatives progressing on deepening RTD co-operation between EU members;**

Deliver by end of 2004:

- × **Strategic Research Agenda**
- × **Deployment Strategy**

Inputs to Growth Initiative and Seventh Framework Programme



European Initiative for Growth H2 “Quick-Start” Projects

- × The European Initiative for Growth aims to boost EU economy. It includes a “Quick Start Programme” comprising projects with public / private investment in infrastructure, networks and knowledge.
- × It was endorsed by the EU Summit of December 2003 and encourages creation of public/private partnerships and co-operation with the European Investment Bank (EIB) in order to leverage finance.
- × Hydrogen Quick start: two major 10-year projects (2005-2015) for hydrogen-related research, production and use:
 - ✓ **HYPOGEN: First large facility generating H₂ and Electricity from Fossil Fuels with Sequestration of the CO₂**
Estimated Budget: 1.3 B€
 - ✓ **HYCOM: Realisation of Hydrogen communities, demonstrating the generation (from Renewable Sources) and utilisation of H₂ in stationary (CHP) and vehicle applications**
Estimated budget: 1.5 B€





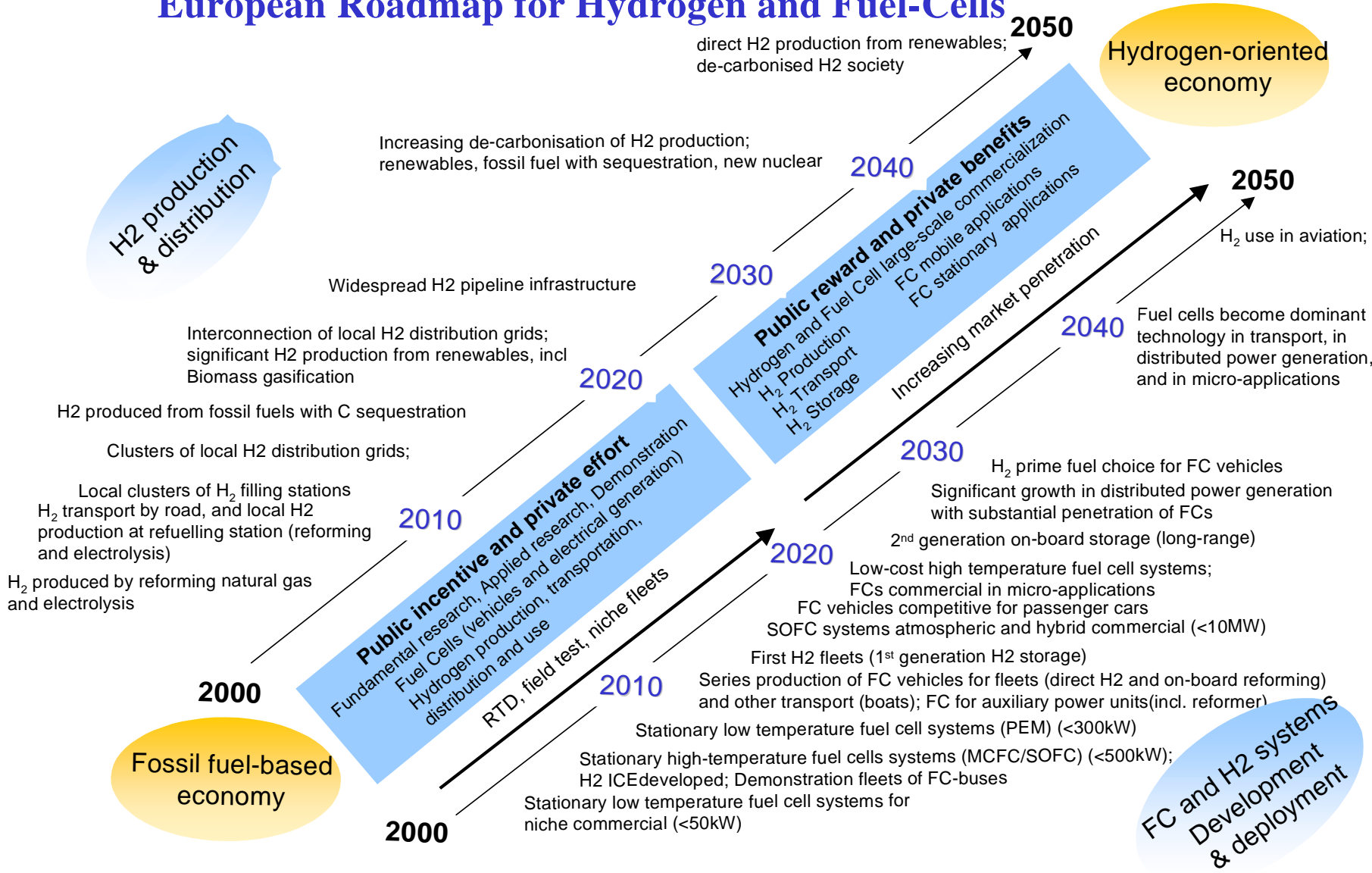
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European Union Concepts of the Hydrogen Economy



European Roadmap for Hydrogen and Fuel-Cells



Hydrogen Production : Main Sources

- × Current energy mix varies considerably within EU – transition and long term strategies will differ regionally and nationally
- × Different timelines and levels of maturity for available technologies.
- × Currently large scale **methane steam reforming** is the most competitive technology; transition technology; resolving CO₂ sequestration will strongly influence its long term potential beyond 2010-2015.
- × Large scale de-carbonized H₂ will be important by 2020-2030: EU interest in **hydrogen from RES** (i.e. wind, solar, biomass); strong public support; need cost reductions – transition and longer term prospects.
- × Long term technologies (2040 -):
 - ✓ High Temperature **thermochemical cycles** for large scale carbon-free hydrogen; but capital intensive and depends on other developments (e.g. High Temperature Reactors).
 - ✓ Novel “**Biohydrogen**” routes (i.e. photobiological processes) seem theoretically attractive; demonstration will require big efforts;

Main Methods for distributing Hydrogen

- × For early **wide scale distribution**, use **NG pipelines** to transport H₂/NG mixtures; feasibility now under investigation in EC project “NATURALHY” ; widespread H₂ distribution pipelines unlikely before 2025
- × Nearer term (2010 horizon) :**on site production** either via electrolyzers or compact fuel reforming. Both available, but have significant challenges: “**energy equation**” for the electrolyzers and **CO₂ issues** for compact reformers;
- × Clusters of local hydrogen distribution grids (eg remote communities) 2010-2015
- × **BUT: Community acceptance** is key to locating infrastructure like hydrogen fuelling stations and pipelines – “Not in my back yard!”
- × Distribution medium is linked to storage (e.g. liquid or compressed gaseous hydrogen for vehicles);
- × storage is a key **enabling technology** for hydrogen economy; next generation “conventional” **on-board storage** systems addressed in EC “StorHy” project.
- × Solid storage addressed in EC projects : emphasis on **metal hydrides**. Substantial challenges still remain Basic research needed;





Major Users of Hydrogen

- × Fuel cells for CHP (and cold) and hydrogen combustion engines (ICEs, turbines)
- × Transport: post 2015 : Automotive, buses, delivery vehicles, taxis, scooters, short sea shipping, possibly aircraft in long term
- × Stationary :
 - ✓ remote communities with RES;
 - ✓ large (MW) scale CHP linked with C-capture and sequestration
 - ✓ Small domestic and medium scale distributed FC generation will use NG initially, or linked to local hydrogen communities



International co-operation

http://europa.eu.int/comm/research/fp6/pdf/how-to-participate_en.pdf

Cordis FP6 Service

<http://www.cordis.lu/fp6/>

Energy Research at Europa

http://europa.eu.int/comm/research/energy/index_en.html

Energy research/technology platform

http://europa.eu.int/comm/research/energy/nn/nn_rt_htp1_en.html

CIRCA website – download presentations and documents

<http://forum.europa.eu.int/Public/irc/rtd/eurhydrofuelcellplat/library>





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Thank you!

