INTRODUCTION

- Project Partners
- Key project parameters
- Hydrogen regulations
- Project work packages

EIHP2 Project Partners

Air Liquide, France

Air Products, UK

BMW, Germany

BP International, UK

Commissariat a l'Energie Atomique (CEA), France

DaimlerChrysler, Germany

Det Norske Veritas (DNV), Norway

EC-Joint Research Centre (EC-JRC), Italy

Ford, Germany

Forschungszentrum Karlsruhe (FZK), Germany

Instituto Nacional de Técnica Aeroespacial (INTA), Spain

L-B-Systemtechnik (LBST), Germany

Messer Griesheim, Germany

National Centre for Scientific Research (NCSRD), Greece

Norsk Hydro, Norway

Opel, Germany

Raufoss, Norway

Shell Research, UK

Vandenborre Technologies, Belgium

Volvo Group, Sweden

EIHP2 - Key Project Features http://www.eihp.org

Objective: **Initiate and provide inputs for regulations on an EU and global level for the approval of hydrogen fuelled road vehicles, hydrogen refuelling infrastructure and the relevant interfaces.**

Project Duration: 36 Months [01FEB2001 - 31JAN2004]

Project Budget: 4.935 MEuro

EU Funding: 50%

Partners:

B	Vandenborre Technologies
D	BMW, DC, Ford, FZK, LBST, Messer, Opel
E	INTA
F	Air Liquid, CEA
GB	Air Products, BP, Shell
GR	NCSR-Demokritos
NL	EC-Joint Research Centre
N	Det Norske Veritas, Norsk Hydro, Raufoss
S	Volvo

Work Packages:

WP1	WP2	WP3	WP4	WP5	WP6
Overall Coordination	Refuelling Station	Refuelling Interface	Vehicles	Safety	Links "EU-USA", Cluster Activities

Growing Hydrogen Vehicle Fleets between Now and 2010

Fleet of 15 LH_2 Small SeriesBMW
ICE Vehicles since 2000 - Series by 2005

DaimlerChrysler
CUTE FC City Bus
with CGH_2
30 Buses 2002-2005
Series before 2010

DaimlerChrysler
NECAR IV A
FCV with CGH_2
Fleet < 100 vehicles
in preparation

Ford
Focus
CGH_2

Opel
HydroGen 1
LH_2-
Experimental FC
Vehicle
HydroGen 2 and
3 to follow
Series by 2010

Reasons for Developing Harmonised Regulations

- Some 47 directives have to be applied in order to receive an approval for a road vehicle in Europe. If a vehicle is successfully tested according to these 47 directives it has to be approved. The result is a Whole Vehicle Type Approval.
- If approval is sought for a hydrogen fuel cell vehicle, emissions, fuel consumption and engine power cannot be tested according to the existing directives. The reason is mainly the absence of a standardised reference fuel or the absence of a procedure for testing the engine power.
- Some other directives can be fulfilled formally, but from the technical point of view they should be revised for hydrogen vehicles.
- Some requirements regarding the safety of the hydrogen on-board storage systems are missing in the existing directives.

Is it Possible to Approve a Hydrogen Vehicle in Europe Today ?

Council Directive No 98/14/EC

of 6 February 1998

(amending Directive 70/156/EEC)

on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers.

Article 8 (par.2c): "Exemptions and alternative procedures"

"Each Member State may, at the request of the manufacturer, exempt from one or more of the provisions of one or more of the separate Directives,
vehicles, components or separate technical units incorporating technologies or concepts which cannot, due to their specific nature, comply with one or more of the requirements of one or more of the separate Directives"

Legal Situation in Europe

Sound Level **Emissions** **Fuel tanks/rear protective device** Rear registration plate space Steering effort Door latches and hinges Audible Warning

Rear visibility

Braking

Suppression (radio)

Diesel smoke

Interior fittings

Anti theft and immobiliser

Protective steering

Seat strength

Exterior projections

Speedometer and reverse gear

Plates (statutory)

Seat belt anchorages

Installation of lighting and
Light signalling device

Masses and dimensions Safety glass Tyres Couplings **Frontal impact** **Side impact**

Parking lamps

Seat belts

Forward vision

Identification of controls

Defrost/demist

Wash/wipe

Heating systems

Wheel guards

Head restraints

Fuel consumption

Engine power

Diesel emissions

Reversing lamps

Reflex reflectors Position lamps Direction indicators Rear registration plate lamps Head lamps Front fog lamps Towing hooks Rear fog lamps

US Requirements for Hydrogen

Why Develop a New Draft Regulation for Hydrogen Vehicles ?

The path of Council Directive No 98/14/EC, article 8(2)c,

to approve hydrogen fuelled vehicles:

↓

✓ Excessive amount of time required

✓ Uncertainty of the outcome of the process up until the very end

↓

☞ **A draft regulation for hydrogen vehicles should be developed**

Two Drafts for ECE Regulations

Liquid Hydrogen (LH_2) Vehicle

PROPOSAL FOR A NEW DRAFT REGULATION

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF:

I. SPECIFIC COMPONENTS OF MOTOR VEHICLES USING LIQUID HYDROGEN;

II. VEHICLES WITH REGARD TO THE INSTALLATION OF SPECIFIC COMPONENTS FOR THE USE OF LIQUID HYDROGEN

Compressed Gaseous Hydrogen (CGH_2) Vehicle

PROPOSAL FOR A NEW DRAFT REGULATION

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF:

I. SPECIFIC COMPONENTS OF MOTOR VEHICLES USING COMPRESSED GASEOUS HYDROGEN;

II. VEHICLES WITH REGARD TO THE INSTALLATION OF SPECIFIC COMPONENTS FOR THE USE OF COMPRESSED GASEOUS HYDROGEN

EIHP2 - WP1: Overall Coordination

- Partner: LBST
- Objectives:
  - Host meetings, coordinate efforts
  - Liaison with EC
  - Communication with public
  - Compile reports

EIHP2 - WP2: Refueling Station

- Partners: Air Liquide, Air Products, BP, Det Norske Veritas, Norsk Hydro, Shell, Vandenborre Technologies
- Objectives:
  - Develop hydrogen specific industrial codes of practice for acceptance by European authorities
  - Identify refueling station components which should be standardised

EIHP2 - WP3: Refueling Interface

- Partners: Air Liquide, Air Products, BMW, CEA, DaimlerChrysler, INTA, Messer, Norsk Hydro, Opel, Raufoss, Shell, Volvo
- Objectives:
  - Identify optimum storage pressure for compressed hydrogen
  - Seek approval of liquid and compressed hydrogen connectors/refuelling interface
  - Develop refueling procedures
  - Seek standardisation of hydrogen connectors/ refuelling interface

EIHP2 - WP4: Vehicle

- Partners: Air Liquide, BMW, CEA, DaimlerChrysler, Ford, INTA, Messer, Opel, Raufoss, Vandenborre Technologies Volvo
- Objectives:
  - Monitor existing draft regulations for hydrogen road vehicles
  - Develop global harmonised regulations for hydrogen road vehicles
  - Develop procedures for vehicle inspections
  - Validate existing draft regulations by licensing vehicles

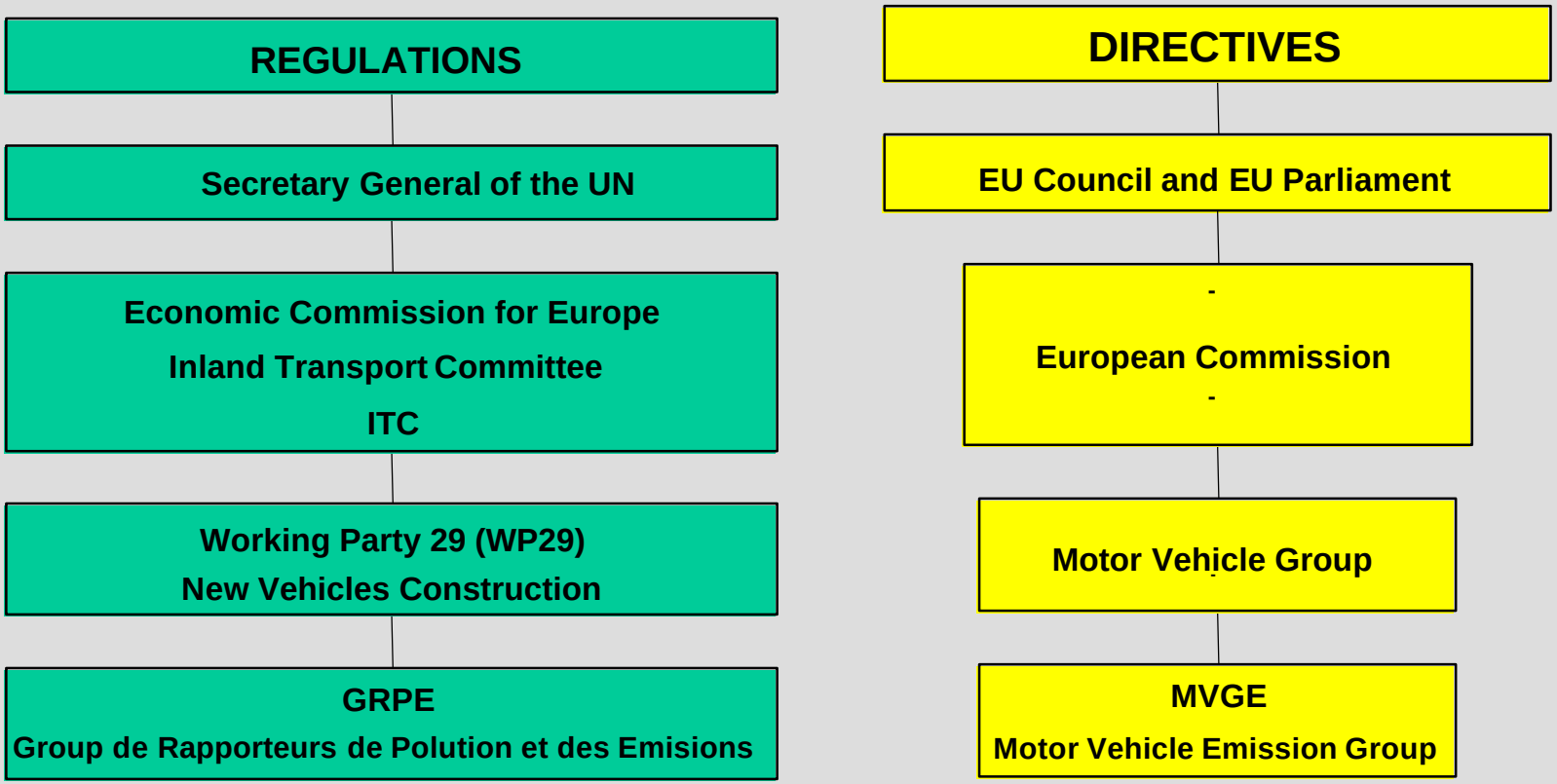
EIHP2 - WP5: Safety

- Partners: Air Products, DNV, EC-JRC, FZK, NCSRD, Norsk Hydro, Raufoss, Shell, Volvo
- Objectives:
  - Risk assessment of hydrogen in vehicles and infrastructure
  - Comparative study of hydrogen vs. other fuels
  - Support safety aspects of WP2, WP3 and WP4

EIHP2 - WP6: Links to other activities

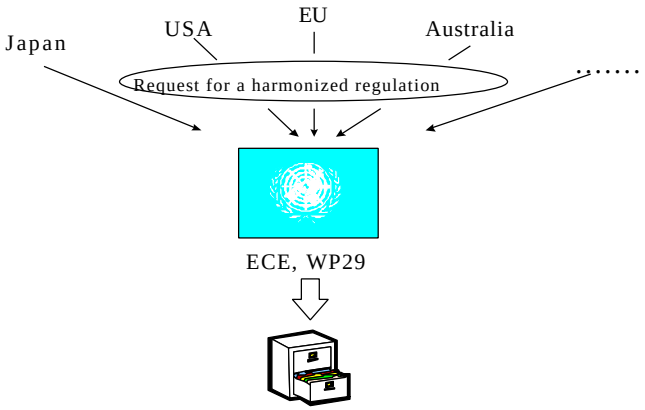
- Partners: BP, CEA, DaimlerChrysler, Ford, Shell
- Objectives:
  - Link to California Fuel Cell Partnership, National Hydrogen Association, US Department of Energy
  - Link to other EU cluster activities
  - Identify comparable initiatives in Japan
  - Disseminate results to interested experts

Two Pathways to Present a Proposal for a Regulation

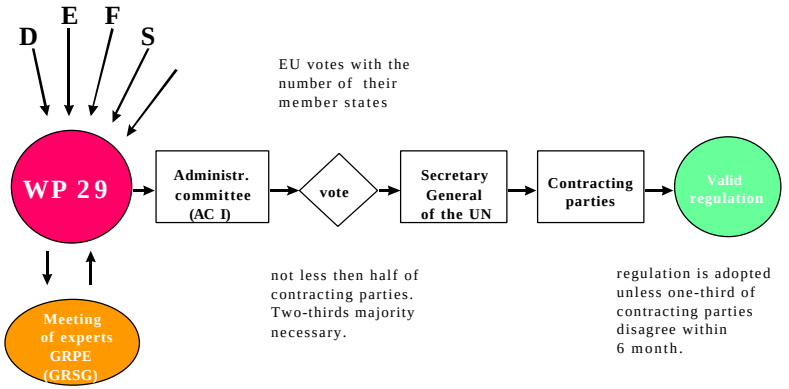


Harmonisation of Regulations for Hydrogen Fueled Vehicles

Platform for Global Harmonisation



Application for an ECE Regulation



Expected Benefits from Harmonised European Regulations

- Vehicles with identical technical level will become feasible all over Europe, harmonised conditions for licensing will be created in Europe (legal certainty) and the efforts (time and expenses) for licensing and approval of hydrogen vehicles will be reduced in general
- The administration guarantees that a commercial product in the market (hydrogen fuelled vehicle) can be used by the citizens under safe conditions (increased safety of hydrogen vehicles comparable to the level of existing fuels and propulsion technologies)
- The main potential application of such harmonised legislation is to provide a tool with which the international administration bodies can offer to society an improvement of the quality of life.
- The vehicle manufacturing industry will also benefit because administration barriers can be removed for marketing a technology that will soon be available.
- At the same time, the societal acceptance of such a product will be advanced.