

European Integrated Hydrogen Project - Phase II

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on behalf of the EIHP Consortium

presentation for download at:
<http://www.eihp.org>



Output From EIHP2

- **Vehicle:** **Proposal for a Global Technical Regulation Delivered to UNECE WP.29** (The World Forum for Global Harmonization of Legal Requirements for Road Vehicles)
- **Refueling Station and Interface:** **Proposal for Standards Made to Standardization Organizations (e.g. ISO)**



EIHP - Hydrogen Fuelled Vehicles - Challenges to be Resolved



Reasons for Developing European Harmonised Legal Requirements

- 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 EC directives or equivalent ECE regulations it has to be approved. The result is a Whole Vehicle Type Approval.
- If approval is sought for a hydrogen vehicle, emissions, fuel consumption and engine power cannot be tested according to the existing directives/ regulations. The reason is mainly the absence of a standardised reference fuel or the absence of a test procedure and the absence of corresponding EC directives respectively ECE regulations.
- 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.



Why Develop a New Regulation for Hydrogen Road 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**



US Regulations Applicable to Hydrogen Fueled Road Vehicles



European Integrated Hydrogen Project - Objectives

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

Phase 1: 1998 – 2000

- **Main focus on hydrogen fueled vehicles**
- **Vehicle - development of drafts for UNECE regulations**
- **Infrastructure - only very limited analysis**
- **Safety studies and limited computer simulations**

Phase 2: 2001 - 2004

- **Enhanced focus on hydrogen vehicle refueling infrastructure**
- **Vehicle - efforts for licensing and approval of hydrogen vehicles on a global level (GTR)**
- **Infrastructure - refueling stations and fueling interface - EU and North America**
- **Safety studies, computer simulations and first limited safety tests**



EIHP Phase II - Key Project Parameters [Contract N° ENK6-CT2000-00442]

Project Duration: 3 Years [01FEB2001 - 31JAN2004]

Project Budget: 5 MEuro

EU Funding: 50%

Partners:



Work Packages:

WP1 Overall Coordination	WP2 Refuelling Station	WP3 Refuelling Interface	WP4 Vehicles	WP5 Safety	WP6 Links "EU- USA", Cluster Activities
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EIHP2 - Work Package Objectives

WP2: Refueling Station

Develop hydrogen specific industrial codes of practice for Europe
Identify refueling station components that need to be standardized

WP3: Refueling Interface

Identify optimum CGH_2 storage pressure/ Propose suitable designs and perform filling tests of LH_2 and CGH_2 connectors for approval/ Develop refueling procedures/ Propose requirements for standardization

WP4: Vehicles

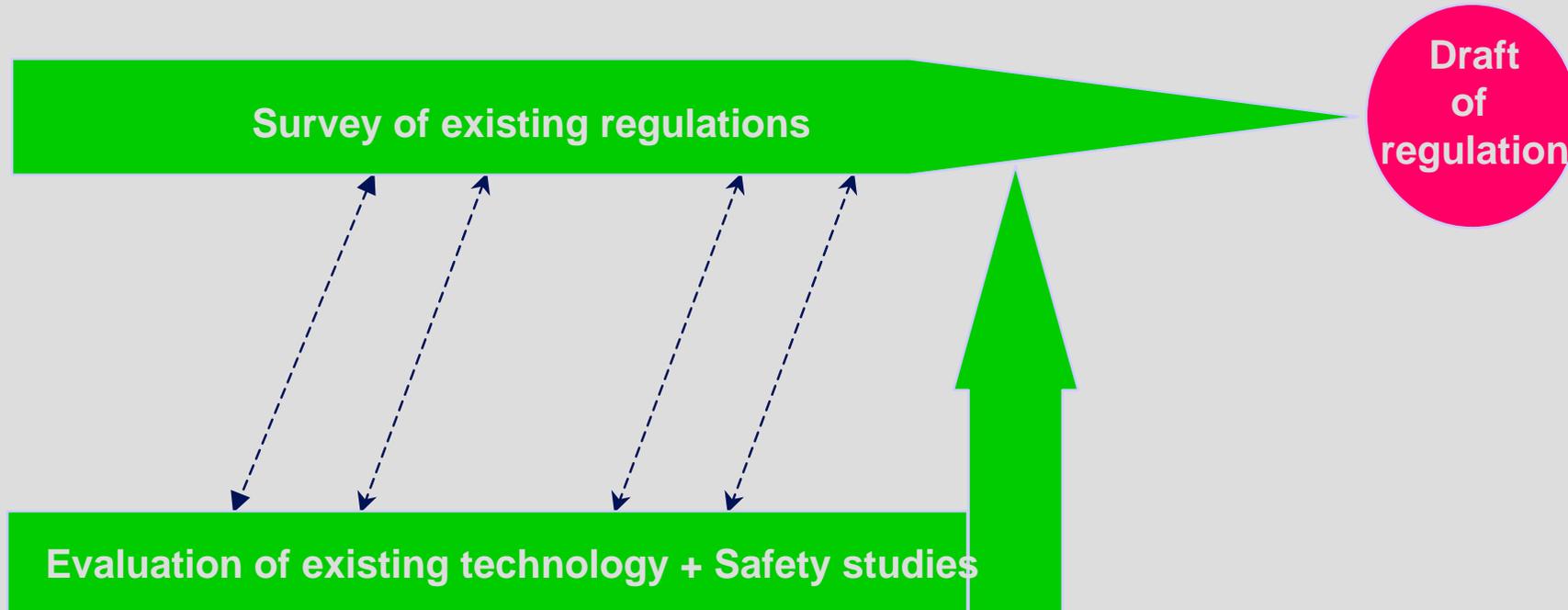
Monitor and validate existing draft ECE regulations/ Develop Global Technical Regulations for H_2 road vehicles/ Develop procedures for periodic vehicle inspections + develop proposals to update existing EC directives and ECE regulations for H_2 road vehicles

WP5: Safety

Risk assessment of H_2 vehicles and infrastructure/ Comparative study of hydrogen and other fuels/ Support safety aspects of WP2, WP3 and WP4



EIHP - Dual Strategy



EIHP2 - H₂ Regulations & Standards for Road Vehicles

APPROVAL OF ROAD VEHICLES

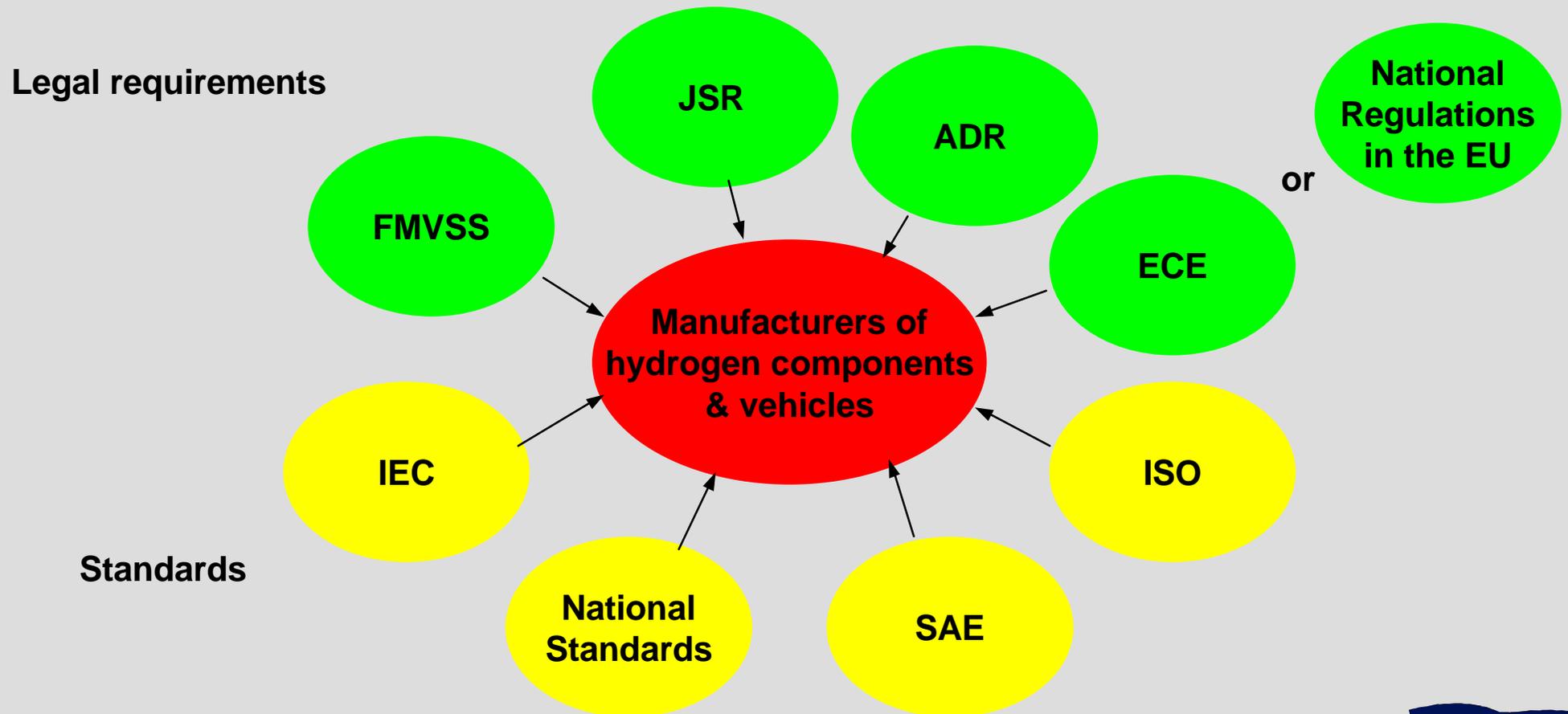
- Vehicle manufacturer's in both Europe and the USA must meet legal requirements before a vehicle can be approved and registered for use.
- Vehicle manufacturer's need uniform legal requirements throughout the world to speed development and reduce costs.

	<u>Approval procedures</u>	<u>Legal Requirements</u>	<u>Goal for Future Legal Requirements</u>
Europe:	Type approval	ECE regulations or EC directives or	Global Technical Regulation
USA:	Self-certification	FMVSS	



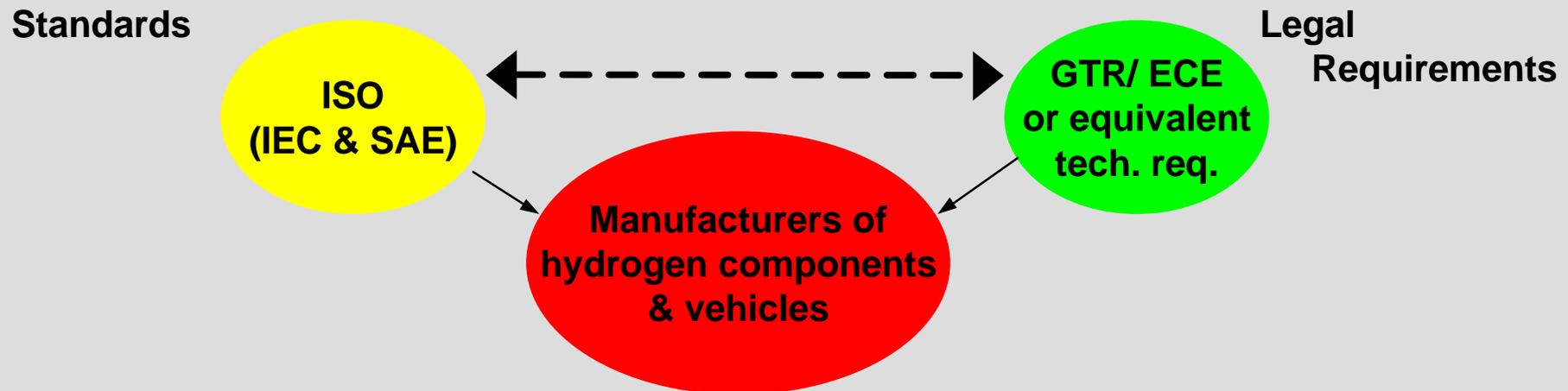
EIHP2 - H₂ Regulations & Standards for Road Vehicles

Undesirable Future Scenario



EIHP2 - H₂ Regulations & Standards for Road Vehicles

Desirable Future Scenario For Regulations & Standards



- Legal requirements should be created only where necessary
- No standards should be created for subjects where legal requirements are necessary
- Standards are necessary for communication between industries
- Standards are not required for the whole vehicle
 - What would be the benefit of such standards?
 - Why should such standards be created only for hydrogen vehicles?

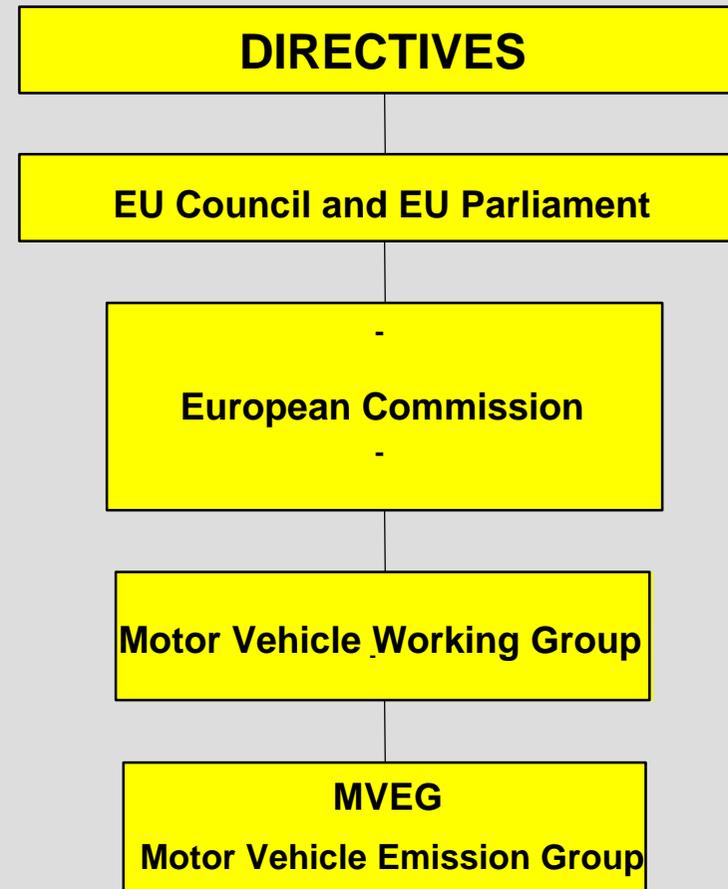


Two Pathways to Present a Proposal for a Regulation

UN-ECE

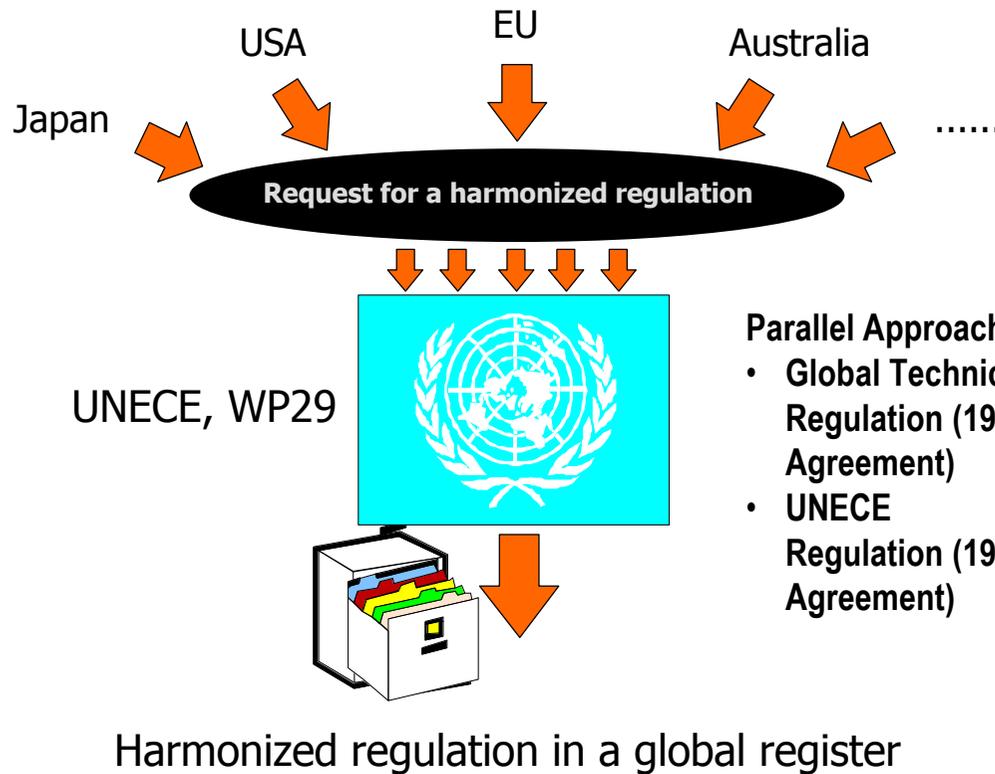


EC



UNECE Platform for Globally Harmonized Regulation for H₂ Vehicles

UNECE WP29 - Global Platform for Harmonisation of Legal Requirements for Road Vehicles



- In Europe, vehicles receive Whole Vehicle Type Approval on the basis of a regulation (legal requirement) and not on the basis of standards
- In the EU every member state has different regulations and standards concerning H₂ - need for EU-wide harmonization is necessary
- UNECE WP29 was identified by EIHP1 as platform for EU-wide harmonization with the possibility for later global harmonization of regulations as it is the recognized World Forum
- EIHP1 developed proposals for draft regulations for CGH₂ and LH₂ road vehicles
- UNECE suggested to develop Global Technical Regulation (GTR) as a priority and in parallel continue to develop UNECE draft regulations in order to bring vehicles on European roads in time

UNECE : Economic Commission for Europe, United Nations, Geneva



EIHP2 - H₂ Regulations & Standards for Road Vehicles

WHAT DO WE NEED TO ACHIEVE THIS GOAL?

- Vehicles:** Uniform technical requirements for hydrogen vehicles in all markets or preferably Global Technical Regulations (GTR)
- Refueling Interface:** One standardized refueling interface each and appropriate refueling procedures for LH₂ and CGH₂ at a global level, e.g. ISO standards. (uniform global requirements - ISO)
- Refueling Infrastructure:** Standardized requirements for LH₂ and CGH₂ refueling stations based on global standards and an industry code of practice (uniform global requirements - ISO)



EIHP1 - UNECE Draft Proposal Document for H₂ Road Vehicles



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**



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 - Drafts of ECE Regulations for H₂ Road Vehicle - Current State

- **42nd Session of ECE-GRPE, 29.05.2001 – 1.06.2001 - EIHP approach was presented and an ECE GRPE ad hoc working group „Hydrogen vehicles – onboard storage systems“ was formed**

**Participants: Canada, France, Germany (chairmanship), Italy, Netherlands, Russian Federation, United Kingdom, USA,
NGO's: CLEPA, ENGVA, ISO, JASIC (Japan), OICA**

- **124th session of ECE WP.29, 26.6.2001 – 29.6.2001 - Approach was confirmed**
- **1st meeting of ECE-GRPE ad hoc working group, 29.11.2001**
- **43rd Session of ECE-GRPE, 15.01.2002 – 18.01.2002 - the development of a GTR was proposed**
- **2nd meeting of ECE-GRPE ad hoc working group, Munich 19.02.2002**
- **3rd meeting of ECE-GRPE ad hoc working group, Nabern 04. & 05.06.2002**
- **Global Cooperation Group meetings EIHP, ISO, SAE, USFCC, 20.03.2002 (Sacramento) and 12.06.2002 (Montréal) add. Invited: GRPE, NHA, IEC, JASIC, NREL, JEMA, JEVA**



EIHP2 - Complementary Development of Legislation & Standards

- SAE, ISO, EIHP2, JASIC & UN-ECE WP.29 GRPE have agreed to focus on the ultimate goal of a GTR
- EIHP2, ISO, IEC, JASIC & SAE are not rival activities
- EIHP2, ISO, IEC, JASIC & SAE are complementary activities



EIHP2 - Networking Process Codes & Standards + Intl. Links

Cluster Activity	Standardisation Activity
<i>California Fuel Cell Partnership (CaFCP)</i>	<i>UN ECE WP.29 GRPE - Ad hoc group hydrogen</i>
<i>Clean Energy Partnership Berlin (CEP)</i>	<i>National Hydrogen Association (NHA), USA</i>
<i>Transport Energy Strategy</i>	<i>SAE Fuel Cell Standards Committee, USA</i>
<i>Western Australian Department of Transport</i>	<i>CEN</i>
<i>International Hydrogen Infrastructure Steering Committee, USA</i>	<i>ISO TC 197 - Hydrogen Technologies</i>
<i>Cluster 'Land Transport by Fuel Cell Technology'</i>	<i>ISO TC 22 - Road Vehicles</i>
<i>Canadian Fuel Cell Alliance</i>	<i>International Electrotechnical Commission (IEC) TC 105</i>
<i>Clean Urban Transport for Europe (CUTE)</i>	<i>International Electrotechnical Commission (IEC) TC 22</i>
<i>Icelandic New Energy Ltd.</i>	<i>International Code Council (ICC)</i>
<i>National Evaluation Service, Inc., USA</i>	<i>EIGA European Industrial Gas Association</i>
<i>Fuel Cell Commercialization Conference of Japan (FCCJ) {Kyogikai}</i>	<i>U.S. Fuel Cell Council</i>
<i>Blueprint for Hydrogen Fuel Infrastructure Development, DoE</i>	<i>World Fuel Cell Council</i>
<i>NEDO & WE-NET</i>	<i>Japan Gas Association (JGA)</i>
<i>H₂ Joint Working Group of the Americas and the Pacific Rim (HJWG)</i>	<i>Japanese Electrical Vehicle Association (JEVA)</i>



EIHP2 - Summary



- A legal framework must lead to planning reliability for car manufacturers and industries as soon as possible
- Legal requirements and standards should be on a global basis
i.e. GTR's and ISO



EIHP2 - Communication Efforts and Efficient Use of Resources

- **The EIHP2 budget for communication to the public is extremely limited**
- **EIHP2 has been running for only one year (out of 3) and thus has not yet generated substantial project results especially in the stationary sector**
- **What EIHP2 can make publicly available is posted on the project website [www.eihp.org] - especially the progress on the discussion of hydrogen vehicle regulation drafts in the UNECE Adhoc Working Group section**
- **EIHP2 makes maximum use of the potential of its multi-national partners' (e.g. DC, Ford, GM, APCI, BP, Shell) in-company contacts and resources in the different markets and their standards and regulatory related activities (e.g. UNECEC WP.29 GRPE, ISO, IEC, SAE, ICC, USFCC, NHA, JASIC, JEMA, FCCJ, etc.)**
- **EIHP tries to ensure that specialists of each sector (e.g. automotive, infrastructure) talk to each other**



EIHP2 - UNECE Agreements 1958 and 1998 - Signatories

MEMBERS OF THE 1958 AGREEMENT: [(E/ECE/324-E/ECE/TRANS/505/Rev.2)]

GERMANY, FRANCE, ITALY, NETHERLANDS, SWEDEN, BELGIUM, HUNGARY, CZECH REPUBLIC, SPAIN, YUGOSLAVIA, UNITED KINGDOM, AUSTRIA, LUXEMBOURG, SWITZERLAND, NORWAY, FINLAND, DENMARK, ROMANIA, POLAND, PORTUGAL, RUSSIAN FEDERATION, GREECE, IRELAND, CROATIA, SLOVENIA, SLOVAKIA, BELARUS, ESTONIA, BOSNIA AND HERZEGOVINA, LATVIA, BULGARIA, TURKEY , THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA, EUROPEAN COMMUNITY, JAPAN, AUSTRALIA, UKRAINE, REPUBLIC OF SOUTH AFRICA

MEMBERS OF THE 1998 AGREEMENT: [(E/ECE/TRANS/132 AND Corr.1)]

CANADA, UNITED STATES OF AMERICA, JAPAN, FRANCE, UNITED KINGDOM, EUROPEAN COMMUNITY, GERMANY, RUSSIAN FEDERATION, PEOPLE'S REPUBLIC OF CHINA, REPUBLIC OF KOREA, ITALY, REPUBLIC OF SOUTH AFRICA, SPAIN

