

# 2002 CleanEnergy Seminar, Sacramento



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Enabling Hydrogen – Technology  
- Codes and Standards, EIHP in Europe

**BMW Group**



# Enabling Hydrogen Technology

## - Codes and Standards, EIHP in Europe

### Content:

- Legal Situation in Europe
- EIHP approach
- Current status of draft regulations
- Summary

# Hydrogen Vehicles

## 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

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

Braking

Parking lamps

Suppression (radio)

Seat belts

**Diesel smoke**

Forward vision

Interior fittings

**Identification of controls**

Anti theft and immobiliser

**Defrost/demist**

Protective steering

Wash/wipe

Seat strength

Heating systems

Exterior projections

Wheel guards

Speedometer and reverse gear

Head restraints

Plates (statutory)

**Fuel consumption**

Seat belt anchorages

**Engine power**

Installation of lighting and  
Light signalling device

**Diesel emissions**

Reversing lamps

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



# Legal Situation in Europe

## List of Directives/Regulations To Be Amended

Subject	EEC-Directive/ECE-Regulation
1. Emissions	70/220/EEC incl. latest amendment & ECE R83
2. Fuel tanks/rear protective device	70/221/EEC incl. latest amendment & ECE R34/58
3. Diesel smoke	72/306/EEC incl. latest amendment & ECE R24
4. Identification of controls	78/316/EEC incl. latest amendment
5. Fuel consumption	80/1268/EEC incl. latest amendment & ECE R 101
6. Engine Power	80/1269/EEC incl. latest amendment & ECE R84
7. Diesel emissions	88/77/EEC & ECE R49
8. Side impact	96/27/EC & ECE R95
9. Frontal impact	96/79/EC & ECE R94
10. Roadworthiness tests	96/96/EC & PTI
11. CO2 labeling	99/94/EC
12. Base Directive	70/156/EEC incl. latest amendment
13. Electric Vehicles	NEW EC Directive & ECE R100
14. Defrost/Demist	78/317/EWG (already under progress)

# European Integrated Hydrogen Project - EIHP

## Objective and Partnership

**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.

**Phase 1:** 1998 – 2000

**Partner:**

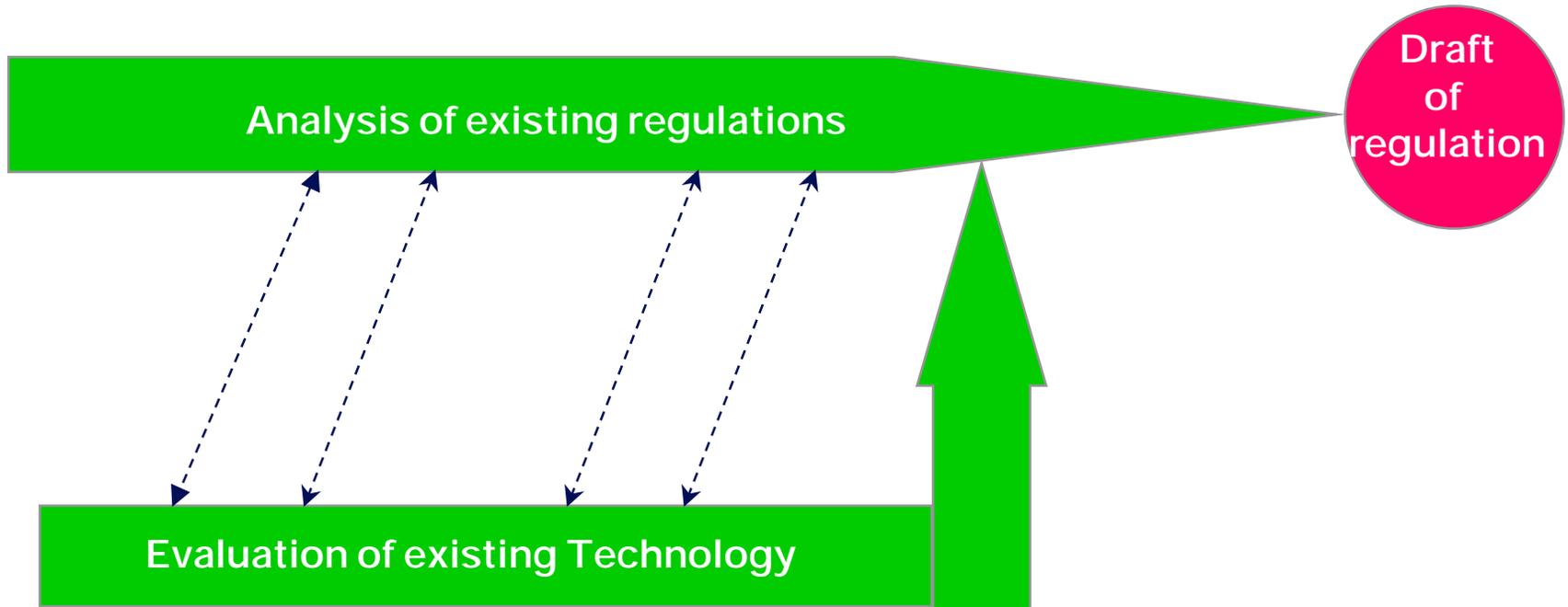
B	Vandenborre Technologies
D	BMW, HEW, LBST, Messer
ES	INTA
F	Air Liquide SA, Renault
GR	NCSRDemokritos
I	EC-Joint Research Centre
S	Volvo

**Phase 2:** 01FEB2001 - 31JAN2004

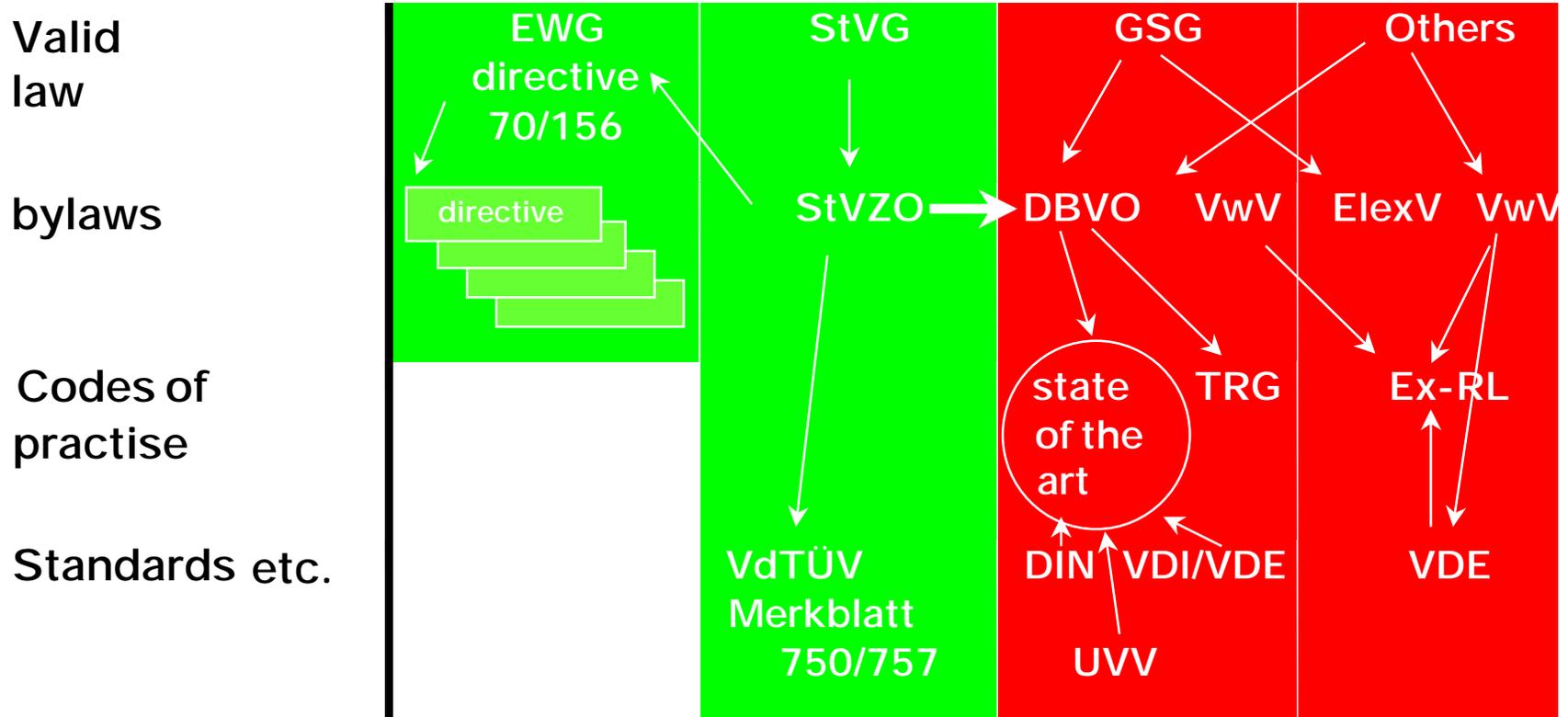
**Partner:**

B	Vandenborre Technologies
D	BMW, DC, Ford, FZK, LBST, Messer, Opel
ES	INTA
F	Air Liquide SA, Commissariat à l'Énergie Atomique
GB	Air Products, BP, Shell
GR	NCSRDemokritos
NL	EC-Joint Research Centre
N	Det Norske Veritas, Norsk Hydro ASA, Raufoss ASA
S	Volvo

# EIHP Dual Strategy



# National Codes and Standards Germany



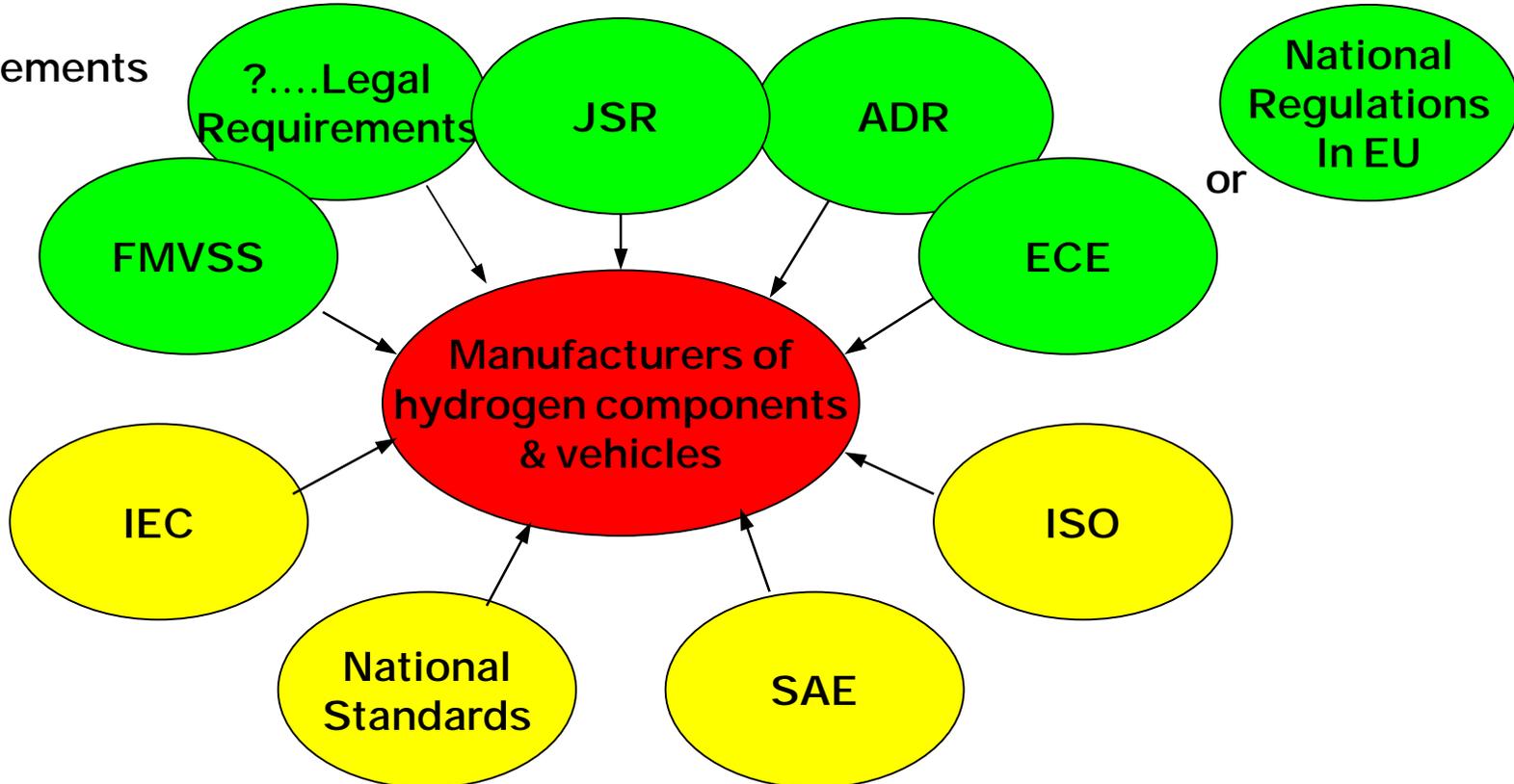
# National Codes and Standards USA



# Codes and Standards

## Undesirable Situation

Legal Requirements



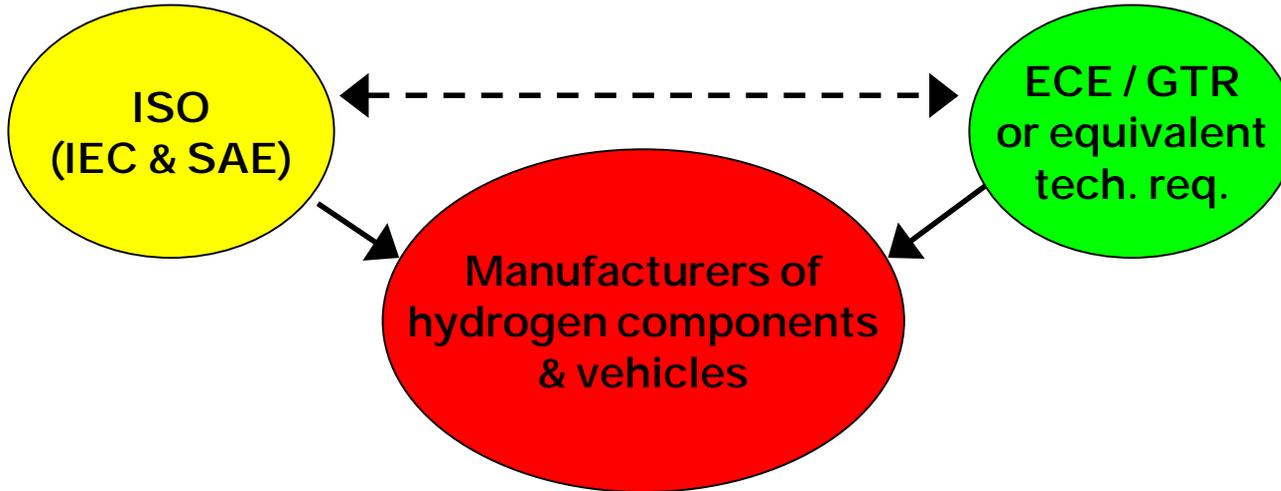
Standards

# Codes and Standards

## Desirable Situation

Standards

Legal  
Requirements



# EIHP

## Deliverables

1. Code of practice for refuelling station
2. Recommendation of requirements for the interface to standardisation committees
3. Drafts for ECE Regulations or GTR's for the Hydrogen onboard storage system of the vehicle
4. Proposals for amendments of affected directives/regulations
5. Proposal of a procedure for periodic vehicle inspections (roadworthiness)
6. Assessment of the safety of hydrogen as a fuel when used in vehicles

### LH<sub>2</sub> vehicles

### CGH<sub>2</sub> vehicles

#### Proposal for a new draft regulation (Rev.11)

#### Proposal for a new draft regulation (Rev.8)

##### 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

##### 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

# Drafts for ECE-Regulations

## Current Status

- 42nd Session of ECE-GRPE, 29.5.2001 – 1.6.2001  
EIHP approach was presented  
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, 15.1.2002 – 18.1.2002  
the development of a GTR was proposed
- 2nd meeting of ECE-GRPE ad hoc working group, 19.2.2002  
Discussion of LH2 technique  
Discussion of the draft for LH2 storage  
Definition of further proceeding

# Enabling Hydrogen Technology

## Summary



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