GLOBAL HARMONIZATION of GASEOUS FUELS for TRANSPORT:
PAVING THE PATHWAY for COMMERCIALISATION
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United Nations WP29
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REALITY & VISIONS

NGVs & H2Vs
WORLDWIDE NGV MARKETS ARE GROWING

- ~3.1 million NGVs
- Argentina leads the world
  - 1.1 million
  - 30,000 conversions per month
- N.America = 150,000
- Asia-Pacific = 700,000
WORLDWIDE NGV MARKETS ARE GROWING

- Europe 514,000 NGVs: 1550 fuel stations
  - Italy = 400,000+ & 400+ fuelling stations
  - Germany, Italy, France have public/private agreements and strategies

- European Commission Transport Policy: target NGVs to replace 10% of transport sector petrol/diesel by 2020
EUROPEAN ALTERNATIVE FUELS POLICY

% Fuel Replacement, Transport Sector, 15 EU Countries by 2020
[ ] = Optimistic

<table>
<thead>
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<th>Year</th>
<th>Biofuel</th>
<th>CH4</th>
<th>H2</th>
<th>Total %</th>
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<td>[7]</td>
<td>5</td>
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<td>2020</td>
<td>[8]</td>
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“Natural gas is the only alternative fuel with the potential for significant market share well above 5% by 2020 which could potentially compete with conventional fuels in terms of economics of supply in a mature market scenario.”

Main driving force for the large-scale introduction of natural gas as a motor fuel is concern for the security of supply.
“HYDROGEN IS A POLITICAL PRIORITY”*

- Production from renewable sources foreseen.... in the future
- Significant government funding
  - U.S. ~$1.7 billion FY 04–08
  - Japan ~$250 mil FY 03-07
  - Europe ~€900 mil... ‘into the future’
- H2 & fuel cells have sex appeal (like electric cars in the 1980s)

*Bernard Gauvin, GRPE meeting, 15 January 2004
THERE ARE FUNDAMENTAL LINKS BETWEEN NGVs & H2Vs

- Natural gas (CH4) is the principle source of hydrogen for the foreseeable future
- CNG fuelling stations likely will be the pathway to the H2 fuel infrastructure in the future
- Many equipment manufacturers are the same: vehicle systems & fuelling
  - Compression: CNG & C-H2
  - Liquefaction: LNG & L-H2
  - (Biogas….Renewable source H2)
THERE ARE FUNDAMENTAL LINKS BETWEEN NGVs & H2Vs

The market introduction & commercialisation of both fuels and the vehicle technologies are (and) will be affected by the complexity and pace of the standards and codes process... (but the goals are important & necessary)
NGV Standards Universe
From City Gate to Tailpipe
STANDARDS & CODES ARE AT THE HEART OF VEHICLE (& TECHNOLOGY) COMMERCIALISATION

- Facilitates development of equipment
  - Should be same for different [all?] markets
- Facilitates country certification
  - Vehicle homologation/type approval
  - Equipment certification/patent protection(?)
- Speeds market entry
- Costs to ultimate consumer is less
- Promotes uniformity… & safety
LEVELS OF CODES & STANDARDS
(The Patchwork Quilt)

International Bodies
- Global
  - United Nations
- Regional (EC)
  - Countries
  - Cylinders
    - National Standards Institutions
  - Meters
    - Specialty Standards Organisations
  - NGOs & Associations
    - Private Sector Participants

STANDARDS
- International Standards Organisation (ISO)
- Committee for European Normalisation (CEN)

E X P E R T S
NGV STANDARDS DEVELOPMENT (European view)

- European Commission
- United Nations
- Working Party 29
- Group of experts on Pollution and Energy
- Committee for European Normalisation
- Motor Vehicle Emissions Group
- TC326: Gas supply for natural gas vehicles
  - Operational conditions
  - NGV filling stations
  - NGV fuel systems
- TC 282: Small scale LNG storage systems
- TC 58 SC 3: Road vehicle cylinders
- TC 22 SC 25: Design & installation vehicle fuel systems
- TC 193: NGV fuel system components
- TC 282: Refuelling connector

International Organisation of Legal Metrology (OIML)

Apologies for inaccuracies & omissions
WORLD-WIDE STANDARDS HARMONIZATION: THE OBJECTIVES

- Produce new and additional standards (NGV & H2) as required (but avoid international overlap/duplication)
- Harmonize existing standards
- Expedite H2 & H2V standard development
- Facilitate codification of standards (codes & codes of practices)
DIFFUSION of HARMONIZATION LEADERSHIP
2004(?)

- GRPE Roadmap for hydrogen and H2Vs (2003 & beyond)...but U.S. & Japan also moving forward
- ISO 15869 Joint H2 working group
- New CEN BT 149 on Harmonisation of Alternative (gaseous/liquid) Fuels
- But...who is harmonizing the harmonizers?
WORLD-WIDE STANDARDS HARMONIZATION PROCESS

OVERVIEW

• Bring together representatives of all standards/code institutions
• Identify the structure of the standards institutions ...internationally & nationally
• Identify the substance: what exists and what is still needed
• Attempt to assign institutional responsibility (tough job)
• Identify the expertise & experts needed
World Conference on Harmonization of Standards for Gaseous Fuels for Transport

- Objectives of conference
  - Develop strategy for harmonization
  - Assess need for new standards
  - Establish “permanent” Coordination Committee
  - Develop guidelines for action

- Attendance
  - Representatives from each standards organisation
THE STRATEGIC HARMONIZATION PROCESS
(Action Plan)

- For each topic (e.g. vehicles) create a small task force with a representative from each major standards working group
  - Compare existing standards
  - Define issues/problems raised by comparison
  - Develop strategy to resolve issues
  - Recommend actions by each standards working group
THE NEW STANDARDS DEVELOPMENT PROCESS

(Action Plan)

- Standards Coordination Committee
  (same as Harmonization Coordination Committee?)
  - Assess need for new standards
  - Agree which standards working group & who does the work
  - Ensure liaison back to various working groups
WHAT CAN BE EXPECTED, REASONABLY
(Pick the ‘easier’ things 1st)

- Standard fuel connectors: facilitate international vehicle travel (& equipment sales)
- Cylinder performance, testing, & lifetime

......then...

- Vehicle Systems
- Fuelling Stations
HOW THE HARMONIZATION PROCESS MIGHT WORK

World Conference on Harmonization

GRPE
ISO
CEN
ANSI etc

Recommendations to working groups

Strategy and Guidelines

Coordination Committee

Task Force 1 Fuel Storage

Task Force 2 Nozzles

Work item
WHO TAKES RESPONSIBILITY FOR LEADERSHIP?

- United Nations? (WP29..most likely?)
- Support required from regional/national governments & standards institutions
- *Funding* for private industry participation required
- International/Regional Associations & NGOs provide support
WE CAN BE HOPEFUL ABOUT WORLDWIDE HARMONIZATION

CAN WE BE OPTIMISTIC?
(Good Question!)
A LOT OF WORK TO BE DONE!!
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