4 October 2006
Brussels, Belgium

HarmonHy Final Conference

Codes and Standards Activities in Hydrogen and Fuel Cells

Prepared by:
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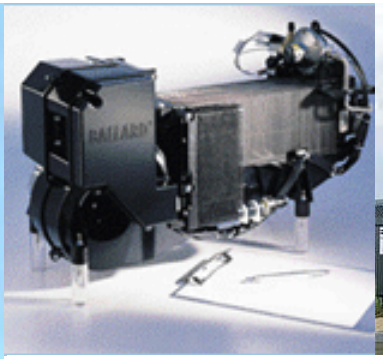


Agenda of the presentation

- Introduction
- ISO/TC197 activities
- IEC/TC 105 activities
- ISO Round Table
- Link to Regulations

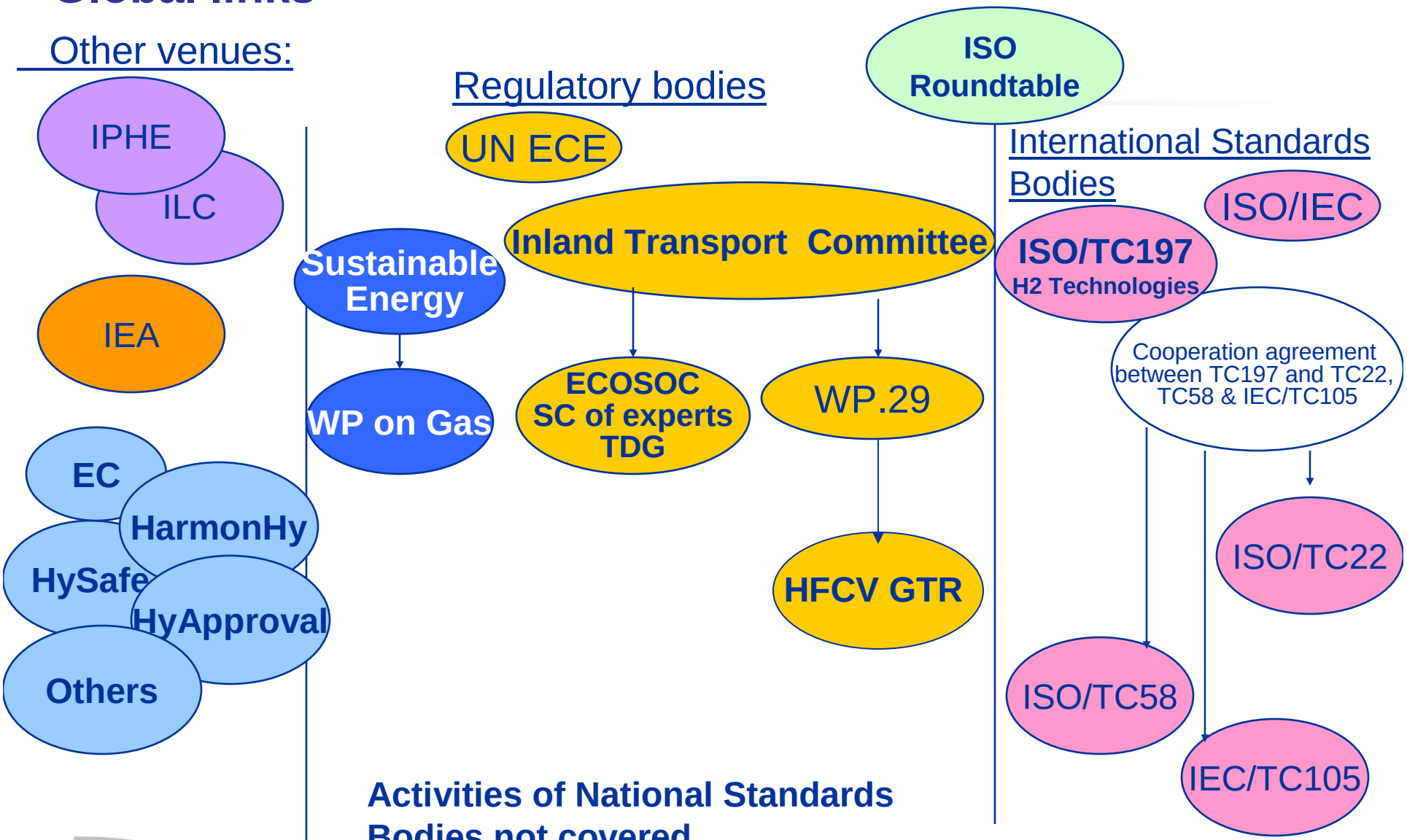
Introduction

- **The CCS Global Group – Established in Canada in 1977**
- **Provide expertise to governments and industry in**
  - **Strategy Consulting**
  - **Regulations, Codes & Standards activities**
    - **Development and Harmonization**
    - **Compliance**

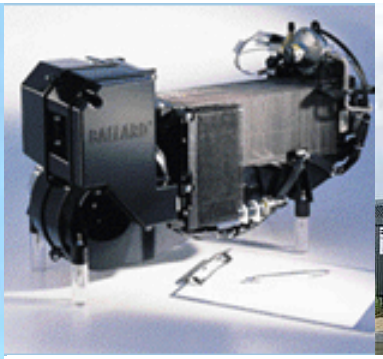
Introduction – RCS Activities

- ISO/TC 197 Hydrogen technologies
- IEC/TC 105 Fuel Cell technologies
- United Nations
  - Vehicle regulations (Work Forum for Harmonization of Vehicle Regulations - WP.29)
  - Transport of Dangerous Goods (SCETDG)
  - Sustainable Energy Division
- ISO Round Table on Global Harmonization of Regulations, Codes and Standards for Gaseous Fuels and Vehicles

Global links



Activities of National Standards Bodies not covered.



ISO/TC 197 activities

ISO/TC 197 Hydrogen technologies

International Organization for Standardization

ISO/TC197

- **Scope:** Standardization in the field of systems and devices for the production, storage, transport, measurement and use of hydrogen
- Full **work programme** covers infrastructure, automotive and transportable applications
- **20 participating countries**

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ISO/TC 197 Published standards

International Organization for Standardization

ISO/TC197

- **ISO 13984: 1999** Liquid hydrogen – Land vehicle fuelling system interface
- **ISO 14687:1999/Cor. 2001** Hydrogen fuel – Product specification
- **ISO/TR 15916:2004** Basic considerations for the safety of hydrogen systems
- **ISO/PAS 15594:2004** Airport hydrogen fuelling facility
- **ISO 17268:2006** Compressed hydrogen surface vehicle refuelling connection devices

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ISO/TC 197 Work Programme

ISO/TC197

- **WG 1** Liquid hydrogen — Land vehicle fuel tanks (ISO/FDIS 13985)
  - FDIS was approved, publication underway
- **WG 5** Compressed hydrogen surface vehicle refuelling connection devices (ISO/WD 17268)
  - CD expected in December 2006
- **WG 6** Gaseous hydrogen and hydrogen blends — Land vehicle fuel tanks (ISO/DIS 15869)
  - DIS2 being circulated for approval until 1 November 2006

ISO/TC 197 Work Programme

International Organization for Standardization

ISO/TC197

- **WG 8** Hydrogen generators using water electrolysis process
  - Part 1: Industrial and commercial applications (ISO/DIS 22734-1)
    - approved DIS, FDIS expected in January 2007
  - Part 2: Residential applications (ISO/CD 22734-2)
    - Comments on CD are being addressed, DIS expected in Jan. 2007
- **WG 9** Hydrogen generators using fuel processing technologies
  - Part 1: Safety (ISO/DIS 16110-1)
    - approved DIS, FDIS expected in Sept. 2006
  - Part 2: Test methods for performance Safety (ISO/CD 16110-2)
    - CD being circulated for comments until 4 October 2006

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ISO/TC 197 Work Programme

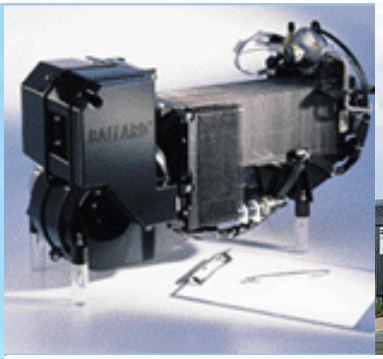
ISO/TC197

- **WG 10** Transportable gas storage devices — Hydrogen absorbed in reversible metal hydrides (ISO/DTS 16111)
  - DTS was approved, publication underway
  - DIS expected in March 2007
- **WG 11** Gaseous hydrogen — Fuelling stations (ISO/WD 20012)
  - DTS expected in February 2007
- **WG 12** Hydrogen Fuel — Product Specification — Part 2: PEM fuel cell applications for road vehicles (ISO/DTS 14687-2)
  - ISO/DTS 14687-2 being circulated for approval until 1 December 2006
  - 5 year plan towards International Standards – in conjunction with Research

ISO/TC 197 Work Programme

ISO/TC197

- **WG 13** Hydrogen detectors (ISO/WD 22734)
  - CD expected in November 2006
- **Ad hoc group on hydrogen components**
  - Examples: Dispensers, break away devices, compressors, pressure relief devices, shut-off valves
  - Next meeting: Oct./Nov. 2006

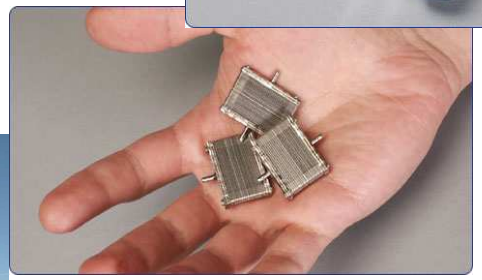


IEC/TC 105 activities

IEC/TC 105 Fuel cell technologies

IEC/TC 105

- **Scope :** To prepare international standards regarding fuel cell (FC) technologies for all FC applications
  - Stationary applications
  - Transportation (propulsion systems and auxiliary power units)
  - Portable FC and micro applications
- **15 Participating countries**



IEC/TC 105 - Published standards

- **IEC/TS 62282-1:2005** Fuel cell technologies — Part 1: Terminology
- **IEC 62282-1:2004** Fuel cell technologies — Fuel cell modules
- **IEC 66282-3-2:2006** Stationary fuel cell power plants — Test methods for the performance
- **IEC/PAS 62282-6-1:2006** Fuel cell technologies — Micro Fuel Cell Power Systems — Safety

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IEC/TC 105 - Work programme

• **WG 2**	Fuel cell modules	IEC/CDV 62282-1
• **WG 3**	Stationary fuel cell power plants – Safety	IEC/CDV 66282-3-1
• **WG 5**	Stationary fuel cell power plants – Installation	IEC/CDV 66282-3-3
• **WG 6**	Fuel cell system for propulsion and auxiliary power units	IEC/PWI 66282-4
• **WG 7**	Portable fuel cell appliances – Safety	IEC/CDV 66282-5-1
• **WG 8**	Micro Fuel Cell Power Systems - Safety	IEC/CD 66282-6-1
• **WG 9**	Micro Fuel Cell Power Systems - Performance	IEC/CDV 66282-6-2
• **WG10**	Micro Fuel Cell Power Systems - Interchangeability	IEC/WD 66282-6-3

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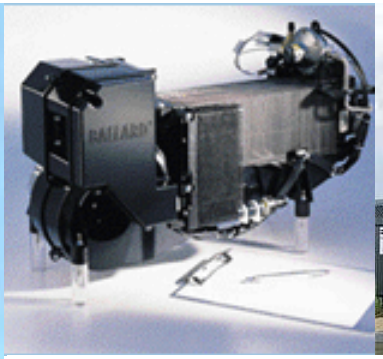

ISO Round Table

ISO Round Table on Global Harmonization of RCS for Gaseous Fuels and Vehicles

- **Date:** 10 January 2007 in Geneva
- **Scope:** The Round Table will cover the topic of global harmonization of regulations, codes and standards for gaseous fuels, infrastructure as well as road and off-road vehicles that use these fuels
- **Participants:** High level policy makers from:
  - Governments, Global Automotive, Energy, Infrastructure and related companies, NGO's, United Nations, ISO/IEC

ISO Round Table on Global Harmonization of RCS for Gaseous Fuels and Vehicles

- **Purpose:** Get policy makers from governments and industry to:
  - understand the challenges facing harmonization of codes and standards
  - support the harmonization effort more efficiently in the future so that globally harmonized regulations, codes and standards are ready when the market is
  - support the UNECE in the preparation of the Global Technical Regulation

International Organization for Standardization

ISO Round Table on Global Harmonization of RCS for Gaseous Fuels and Vehicles

Agenda

- Harmonization perspective
- Highlights of the survey
- Harmonization Opportunities
- Industry panels (Automotive, Energy & Infrastructure)
- Potential pathways and solutions – Facilitated session
- Harmonization – Action plan – Facilitated session

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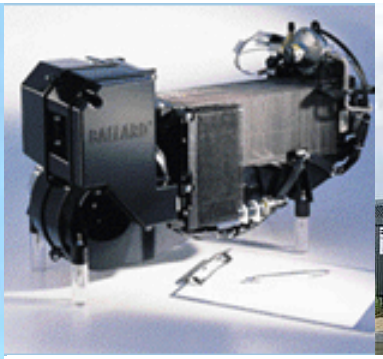
International Organization for Standardization

ISO Round Table on Global Harmonization of RCS for Gaseous Fuels and Vehicles

- **Future steps**
  - Implementation of the Harmonization Action Plan
  - Global Gap Analysis - regulations, codes and standards
  - Conference of Experts - regulations, codes and standards



Link to Regulations

United Nations - World Forum for Harmonization of Vehicle Regulations (WP.29)

- To work on Global Technical Regulations (GTR) for hydrogen and fuel cell vehicles (HFCV)
- Co-sponsors: Germany, Japan and the USA
- GTR Roadmap is under development

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United Nations - World Forum for Harmonization of Vehicle Regulations (WP.29)

- Decision made by WP.29 in November 2003 to rely more broadly on international standards by simply quoting the references and publication dates of standards rather than reproducing them extenso
- ISO & IEC will contribute to the technical content of the GTR

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Thank you.

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