The Current International Status of Codes and Standards Development in Fuel Cell Technology

FCTESTNET International Cooperation Workshop
LEYSIN, 27 February 2004

Presentation supplied by: Andreas Piepereit, DaimlerChrysler Secretary IEC TC 105 fuel cell technology
Overview

Content of presentation:
1. Standardization
2. IEC/TC 105
3. National/regional standardization activities
4. Landscape – fuel cell vehicles
5. Regulations
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1. **Standardization**
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Dasa-Airbus estimated the price ratio between customized and standardized components as being 15:1, with half of the customized components being suitable for standardization. By switching to standardized components the company could reduce its purchases by 10%.
Standardization undesirable situation

Legal Requirements
- FMVSS
- JSR
- ADR
- ECE
- National Regulations In EU

Manufacturers of hydrogen components & road vehicles

Standards
- IEC
- National Standards
- ISO
- SAE

Federal motor vehicle safety standards
Standardization desirable situation

Standards

IEC/ISO (SAE) ← Manufacturers of hydrogen components & vehicles → Legal Requirements

GTR / ECE or equivalent tech. req.
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The International Electrotechnical Commission (www.iec.ch) is the international standards and conformity assessment body for all fields of electrotechnology.

Scope of IEC TC 105 (established in October 1999)
To prepare international standards regarding fuel cell (FC) technologies for all FC applications such as stationary FC power plants, FC for transportation such as FC propulsion systems and auxiliary power units and portable FC power generation systems.
IEC/TC105: countries represented

- **15 participating countries**
  - Australia, Canada, China, Denmark, Finland, France, Germany, Italy, Japan, Republic of Korea, Netherlands, Spain, Switzerland, United Kingdom, United States of America

- **7 observer countries**
  - Austria, Egypt, Norway, Poland, Portugal, Sweden, Yugoslavia
IEC/TC105: current structure

IEC TC 105
Chair: John Bossert, CA
Secretary: Andreas Pieper, DE

Definitions
WG 1
IEC 62282-1

FC Module
WG 2
IEC 62282-2

Stationary
FC System

FC System in Transp.
WG 6
IEC 62282-5

Portable
FC System
WG 7
IEC 62282-5

RFCS
Planned

Micro
FC System
adhoc WG 8

Safety
WG 3
IEC 62282-3-1

Performance
WG 4
IEC 62282-3-2

Installation
WG 5
IEC 62282-3-3

FC System for
Propulsion
Planned

Auxiliary
Power
Unit
Planned

FC System
Integration
into Road
Vehicles
IEC/TC105: progress of work

- ∑ 8 standards under development

- The technical content of the FC module standard has been defined and approved!

- 2 Committee drafts have entered the public enquiry stage.

- 5 standards at the working group stage.

- standard development process: see www.iec.ch, „Directives“ for details
IEC/TC105: Joint Working Groups & Liaisons

Cooperations
Established close collaboration with other organizations to address fuel infrastructure application system and national / regional activities.

- **Joint Co-ordination Group** JCG TC82/TC21/TC88/(TC105) Decentralised Renewable Energy Systems
- Liaisons with...
  - ISO/TC197 (Hydrogen)
  - ISO/TC22/SC 21 (Electric Road Vehicles)
  - SAE International (FC Committee)
  - IEC/TC31 (Electric Apparatus in Explosive Atmospheres, informal)
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Other national/regional standardization activities (excerpt)

- Europe
  - CEN: fuel cell gas appliances
  - CENELEC: BTTF 109-3 (IEC/TC 105 link to CEN)
  - COGEN (The European Association for the Promotion of Cogeneration)
  - EIHIP II (European Integrated Hydrogen Project, Phase II)
  - VDI (German Association of Engineers): network for creation of pre-standards for fuel cells
  - VDE (German Association of Electrotechnical Engineers): committee 1.5 - fuel cell systems
Other national/regional standardization activities (excerpt)

- **Japan**
  - Jeva (Japanese Electrical Vehicle Association)
- **US**
  - SAE: fuel cell standards committee
  - NFPA 853 (installation of stationary FC power plants)
  - ASME PTC 50 (performance test code for FC power system performance)
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Landscape of the FCV Industry in 2000

ISO/TC 197 Infrastructure

Suppliers Industry

IEC/TC 105 Fuel Cell Industry

Road Vehicle Industry

SAE Fuel Cell Committee

ISO/TC 22 SC 21

Car Manufacturers, Energy Suppliers of Fuel Cell Powered Road Vehicles

Joint scope of work:
- safety
- performance
- energy consumption
- emissions

Accepted:
- safety strategy as a guideline for international standards
- qualified for type approval
Landscape of the FCV Industry in 2003

Suppliers Industry & Road Vehicle Industry

Current Situation:
- duplication of the work in ISO/TC22 SC 21 and IEC/TC 105 WG6 have created redundant efforts in regards to road vehicles
- the experts actively participating in WG6 meetings are mainly from SC21
- the WG6 experts and their companies agree that this is unsatisfactory

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Regulations (Hydrogen/Fuel Cell Vehicles) LH$_2$ vehicles

Finalized draft regulation (Rev.13)

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

*The document was transmitted as informal document No. 3 to 45th GRPE.*)
Finalized draft regulation (Rev.12)

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

(The document was transmitted as informal document No. 12 to 46th GRPE.)
Additional Information
Provided by W. Winkler
VDI-GET WG “Standardisation of fuel cells” stated in 1999:
Existing codes and standards are applicable for fuel cells with minor changes

In 2000 IEC TC 105 “fuel cell technology” was founded with international support and started an ambitious standardisation programme
Search Engine: Standard

USA: NIST

Japan: METI

EU: EU
Statement of
Raymond G. Kammer
Director
National Institute of Standards and Technology
Technology Administration
Department of Commerce

Before the
House Committee on Science
Subcommittee on Technology

September 13, 2000

“The Role of Standards in Today’s Society and in the Future”
Evolution of the Strategy

Europe has had a standards strategy in place for some time and it is running at full throttle. It is fair to say that European governments and industries believe that they can meet domestic needs and also create a competitive advantage in world markets by strongly influencing the content of international standards.

Shared goals and principles embodied in the National Standards Strategy provide motivation and direction. They establish a basis for collective action so that members of the U.S. standards community will work cooperatively to develop sound policies in support of global trade. Our mutual goals oblige us to work proactively with our trading partners to further shared technical interests.
On the bright side, consider, for example, the Internet and e-commerce applications, where U.S. technologies are setting the standards for the rest of the world.

On the dark side, consider the much more rapid diffusion of digital wireless phone and mobile-commerce—or m-commerce—applications in Europe and Japan. The market for m-commerce technology is in its very early stages. But a recent study estimates that Europe’s mobile phone systems are 18 to 22 months ahead of ours. It attributes Europe’s fast start, at least in part, to the adoption of common standards.
Conclusion

„As the National Standards Strategy indicates, the challenge for the **United States** in the 21st century is to turn its capabilities and achievements toward **greater leadership** in developing the standards and operational structures needed by the **global market**. Meeting this challenge requires coordinated policy development among U.S. industry, U.S. government agencies, and U.S. voluntary standards bodies. It requires developing **strategic alliances** with our counterparts around the world to develop standards that reflect **Asian, European, Latin American, African and North American interests**.......

Achieving this bright future, however, means effective **implementation** of the National Standards Strategy. **NIST** is committed to continue to work aggressively with **ANSI** and its members, including other federal agencies, to build on the great beginning we have made in developing a sound and effective National Standards Strategy. **A first step is to raise national awareness of the importance of the strategy for our economy.**“
National Strategies for Industrial Technology

(Provisional Translation)

April 10, 2000

Industrial Technology Division, Industrial Policy Bureau

(Study Committee on Strategies for National Industrial Technology)
* In biotechnology, IT, and other high-tech fields, Japan seldom plays a leading role in determining such matters as intellectual property rights and international standards, which are crucial for companies if they hope to survive future international competition.

To break through this isolation, Japan must abandon its piecemeal, vertically oriented approach and support university-led basic research, which will provide the foundation for long-term, continuous technical innovation. At the same time, it must rebuild and totally revamp the overall tri-sector (industry-government-academia) system as it relates to technical innovation.
[2] Actively Establishing Standards to Maximize the Use and Dissemination of the Results of Technical Development

To actively promote standardization, the following steps should be taken.
* R&D should be undertaken while keeping the issue of standardization clearly in mind.
* R&D should be implemented with the aim of standardizing testing and evaluation methods, which play a role as a public asset.
* When new, advanced technologies give rise to new standards, new approaches to standardization must be adopted.

It is necessary for both the government and private sectors to fully recognize that we live in an era in which whoever sets international standards also controls the market. ......
Brussels, 24 July 1996
COM (96) 359
COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE PARLIAMENT ON "STANDARDIZATION AND THE GLOBAL INFORMATION SOCIETY: THE EUROPEAN APPROACH"

European Parliament resolution on the Commission communication to the Council and the European Parliament on the European Community's Development Policy
Thursday 1 March 2001

REPORT ON UNITED STATES BARRIERS TO TRADE AND INVESTMENT 2001
EUROPEAN COMMISSION
Brussels, July 2001
Standards .... determine the technology that will implement the Information Society, .... play an important role in co-operation and competition between companies, are a key element for the effectiveness of the Single Market and are essential for the competitiveness of European industry......

European industry and services providers need to seek proximity to world leaders; without participation in the global strategic process they cannot achieve world-class status. Therefore, they should be encouraged to participate in the international fora that define strategies for ICT standardization at the world level. European companies should be at the forefront of the strategic process in order to reap the full benefits from the ICT market. .... Publicly Available Specifications.....
12. Development policy
A5-0059/2001
Thursday 1 March 2001

41. Stresses the importance of revising WTO rules and standards to take account of the interests of sustainable development and the problems of the developing countries;

43. Stresses the need to support the development of the southern partners’ capacity, with a view to promoting and qualifying them for participation in international political processes and negotiations; calls on the Commission to contribute substantial economic and technical assistance to ensure that such a development of capacity takes place, so that the developing countries can take part on an equal footing in the activities of the WTO, standard-setting bodies and future multilateral world negotiations.
Possible Impact of International Standards

- WTO Agreement
- EU Regulations
- IEC Standard

State of the art
Avoiding barriers

Safety regulations
Consumer protection

no impact