

Ministério de
Minas e Energia



Brazil's Current Status in Hydrogen Technologies

IPHE – Steering Committee Meeting

Paris, France

January, 2005

Maurício Tiomno Tolmasquim

Deputy Minister

Ministry of Mines and Energy - Brazil

- **Ministry of Mines and Energy**

- Hydrogen Economy Program:
 - Applications
 - Market and commercialization
 - Demand for R&D&D



- **Ministry of Science and Technology**

- Fuel Cell Program:
 - Basic and applied R&D program
 - Financial resources to support R&D&D



BRAZIL H2 ROADMAP

MAIN OBJECTIVE CONCERNING HYDROGEN ECONOMY

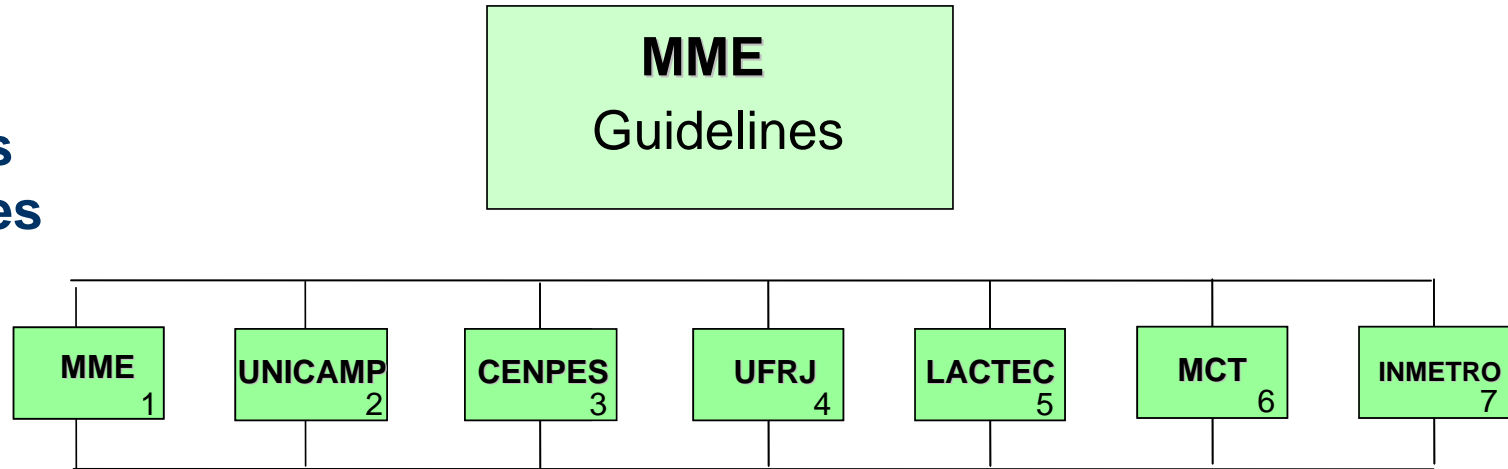
Description

- Led by Ministry of Mines and Energy
- Activities
 - Permanent involvement of Ministry of Science and Technology
 - Participation of national and foreign companies
 - Universities and R&D Institutes (over 100 researchers from Brazil and abroad)
 - National regulation agencies and metrology institutions
- First version available since January 2005

BRAZIL H2 ROADMAP

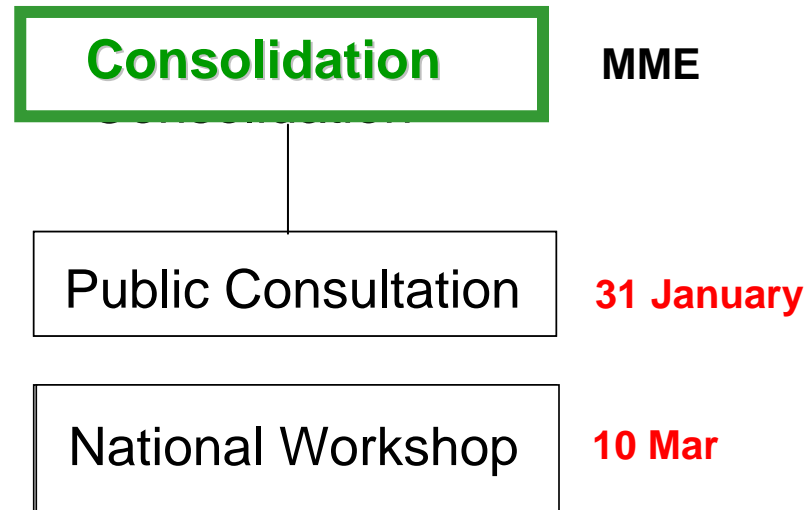
Institutions:

- Ministry staff
- Universities
- Research Centers
- Energy Companies
- Gov. agencies



Issues:

- 1 - Market development
- 2 - Hydrogen production
- 3 - Hydrogen logistics
- 4 - Conversion systems
- 5 - Applications
- 6 - R&D and Human Resources
- 7 - Codes and standards



Roadmap Chapters

- Introduction of hydrogen and fuel cells into the market
- Technology pathway for hydrogen production
 - Focus on ethanol, hydropower and natural gas
- Logistics and infrastructure
 - Storing, transportation and distribution infrastructure needs and actions
- Conversion Systems: fuel cells and H₂ combustion
 - Actions and needs for local technology development

Roadmap Chapters

- H₂ application:
 - Distributed generation, H₂ buses and heavy duty vehicles
 - Isolated communities, by use of local energy resources
- Technology and Human Resources
 - Strategy for collaboration between Universities/R&D Centers and fuel cell companies
 - R&D funding requirements
- Metrology, codes, technical regulation and homologation
 - Regulation as a tool for commercialization
 - Brazil will develop its own standards



THE BRAZILIAN FUEL CELL PROGRAM

ONE OF THE PROGRAMS UNDER DEVELOPMENT

Program Description

- Led and operated by Ministry of Science and Technology
- Launched August 2004
- US\$ 2.6 million for R&D activities for FY 2005
- Main Activities:
 - Ethanol reforming
 - R&D Infrastructure
 - Human resources
 - R&D Networks



THE BRAZILIAN FUEL CELL PROGRAM

ONE OF THE PROGRAMS UNDER DEVELOPMENT

Program Activities

- Ethanol reforming
 - Reformer for 5 kW PEMFC
 - Target: local technology development
 - Funding (2005): US\$ 560,000
- Laboratory Infrastructure
 - FC and H₂ R&D resources
 - 36 R&D groups, based in 20 Universities and R&D Centers
 - Funding (2005): US\$ 930,000



THE BRAZILIAN FUEL CELL PROGRAM

ONE OF THE PROGRAMS UNDER DEVELOPMENT

Program Activities

- Human Resources
 - 34 MSc and 14 PhD
 - Funding (2005-2008): US\$ 740,000
- R&D Networks Creation
 - PEMFC, SOFC, H₂ production
 - Funding (2005): US\$ 370,000

Main Activities

- Distributed Generation
 - Utility funded projects on PEMFC and PAFC power plants
 - NG and compressed H₂; from 5 kW to 200 kW
- Urban Hydrogen Buses
 - Partnership: MME, FINEP, GEF/UNDP, EMTU, Petrobras
 - Technology: PEMFC, hydrogen from grid electrolysis
- Hydrogen Buses
 - Partnership: FINEP, UFRJ/COPPE, LACTEC, Petrobras, Eletra, Caio
 - Technology: hybrid bus (PEMFC+batteries); reformed NG

2nd WICaC International Fuel Cells Workshop

- Held at Campinas, SP, on October 2004
- Participation:
 - Brazilian MME and MCT, Universities and Companies
 - USDOE / EERE
 - R&D Institutions: Portugal, Denmark, US
 - Canada Hydrogen Association
 - Companies: Nuvera, Anuvu, QuestAir

BRAZIL HYDROGEN PRIORITY

Thank you