



IPHE Country Update

The IPHE Secretariat requests each IPHE member submit a one-page narrative update on hydrogen and fuel cell activities. Please, complete the information requested in this form and send the electronic file to iphe@ee.doe.gov by 30 August 2006.

Member	Brazil
Name	João José de Nora Souto and Symone Christine Araújo
Contact Information	joaosouto@mme.gov.br ; symone.araujo@mme.gov.br + 55 61 33195511
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1. New Policy Initiatives on Hydrogen and Fuel Cell

- Brazilian Hydrogen Roadmap was published in March of 2005. The aim is to plan and develop actions that may lead to hydrogen use by 2020 as a complement to primarily renewable Brazilian Energy Mix. The Brazilian Roadmap construction allowed to the elaboration of diagnosis of the sector hydrogen in the Brazil. This Roadmap and meets in the site www.mme.gov.br, available for download.
- The PRO H2 – R&D Program for the Hydrogen Economy: promotes cooperation and integrated activities to develop fuel cells and hydrogen production technologies in Brazil. The program is based on network projects in five areas: (i) hydrogen production and storage; (ii) PEM fuel cells; (iii) SOFC fuel cells; (iv) system integration; (v) codes and standards establishment.

2. Hydrogen and Fuel Cell R&D Update

R&D projects have mainly been focusing on following items:

- **Ethanol Reforming for Hydrogen Production**

Partners: INT, IPEN, CEPTEL/Eletrabras

Funding: energy public funds

Objectives: development of a fuel processor to hydrogen production from ethanol to a 5kW PEM fuel cell.

Status: The following activities are under way: development of catalysts for autothermal reforming, shift and preferential oxidation of CO reaction; determination of kinetics parameters; reactor design, construction, operation and evaluation of a fuel processor to hydrogen production to 5 kW PEM fuel cell.

- **Hydrogen Production through ethanol reforming in a membrane reactor**

Partners: CEPTEL/Eletrabras, INT, IPEN

Funding: CHESF

Objectives: development of a membrane reactor to hydrogen production from ethanol to a 5kW PEM fuel cell.

Status: Study of ethanol reaction and determination of kinetics on the membrane reactor.

- **Reactor project for Hydrogen Production through partial oxidation of ethanol**

Partners: INT, UFF, Petrobras

Funding: Petrobras and Energy Public Fund

Objectives: catalyst development and reactor design optimization to a 0.5kW PEM fuel cell.

Status: determination of kinetics and reactor project.

- **Stationary fuel cell (1 kW PEMFC) for electricity generation based on ethanol reforming**

Partners: UNICAMP, Petrobras

Funding: Petrobras and Energy public fund

Objectives: catalyst development and reactor design optimization to a 0.5kW PEM fuel cell.

Status: determination of kinetics and reactor project.

- **New Catalysts development for ethanol reforming**

Partners: IPEN, Petrobras

Funding: Petrobras and Energy public fund

Objectives: new catalyst development.

Status: catalyst screening

- **Methane Plasma Pyrolysis for Hydrogen Production**

Partners: COPPE/UFRJ, Petrobras

Funding: Petrobras

Objectives: New CO₂-free hydrogen production technology.

Status: Pre-pilot stage

- **Carbon Nano-Structured Materials for Hydrogen Storage**

Partners: Petrobras, UFRGS

Funding: Petrobras and Energy public fund

Objectives: Development and evaluation of carbon nano materials

Status: Hydrogen absorption capacity evaluation

3. Demonstration Projects Update

3.1- Stationary

- Petrobras: 200 kW PAFC – 1 system
- COPEL: 200 kW PAFC – 3 systems
- CEPEL: 5 kW PEMFC + NG fuel processor
- IPEN: 50 kW PEMFC
- CEMIG: 1 kW PEMFC

3.2- Transportation

- Hydrogen Fuel Cell Buses for Urban transport in Brazil (Sao Paulo); 5 buses and a hydrogen fueling station based on water electrolysis
- Design and fabrication of a urban hydrogen bus prototype and a hydrogen fueling station based on NG and Ethanol reforming in Rio de Janeiro

4. Events and Solicitation

- 1st Brazilian Meeting on the Hydrogen Energy (Rio de Janeiro / Sao Paulo; 28 August – 1st September, 2006)
- 3rd International workshop on Fuel Cell (Campinas; 18 – 19 October, 2006)
- 4th SOFC Network – Rede PaCOS - Seminar (Sao Paulo; April, 2006)
- 7th IPHE SC Meeting (Sao Paulo; April, 2006)

5. Government Hydrogen and Fuel Cell R,D&D Funding

The total funding (government, state companies) for the next three years is estimated in U\$22 millions.