

8th IPHE Implementation-Liaison Committee Meeting



International Partnership
for the Hydrogen Economy

11–14 June, 2007 Seoul, Republic of Korea

Brazilian Technology Hydrogen Fuel Cell Urban Bus

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Objectives



To design and to develop hydrogen and conventional technologies to manufacture a hydrogen fuel cell bus for urban use in the city of Rio de Janeiro, creating the basis for the vehicle industrialization and commercialization.



PETROBRAS

To build a hydrogen fueling station at the UFRJ University City to supply hydrogen.



About the Project

- Since 1999 the Hydrogen Laboratory at the UFRJ makes incremental developments of parts and systems;
- On Dec. 2004 the present project was launched;
- On Dec. 2007 the first prototype will be operational;
- Business Plan for industrialization and commercialization within 10 years is being developed.

Project Partnership

Accomplishment:



Including the Engineering Departments of Metallurgy and Materials, Transportation, Mechanic, Systems, Electric and Production.

Financial Support



Partners:



Drive train design concepts:

- Hybrid system, for which the fuel cell is not directly subjected to the transients imposed by the electric motor;
- To operate the fuel cell in a narrower range between the minimum and the maximum allowable powers and to limit start/stop operations, to impede deleterious effects on lifetime.

Upon following those drive train project design concepts:

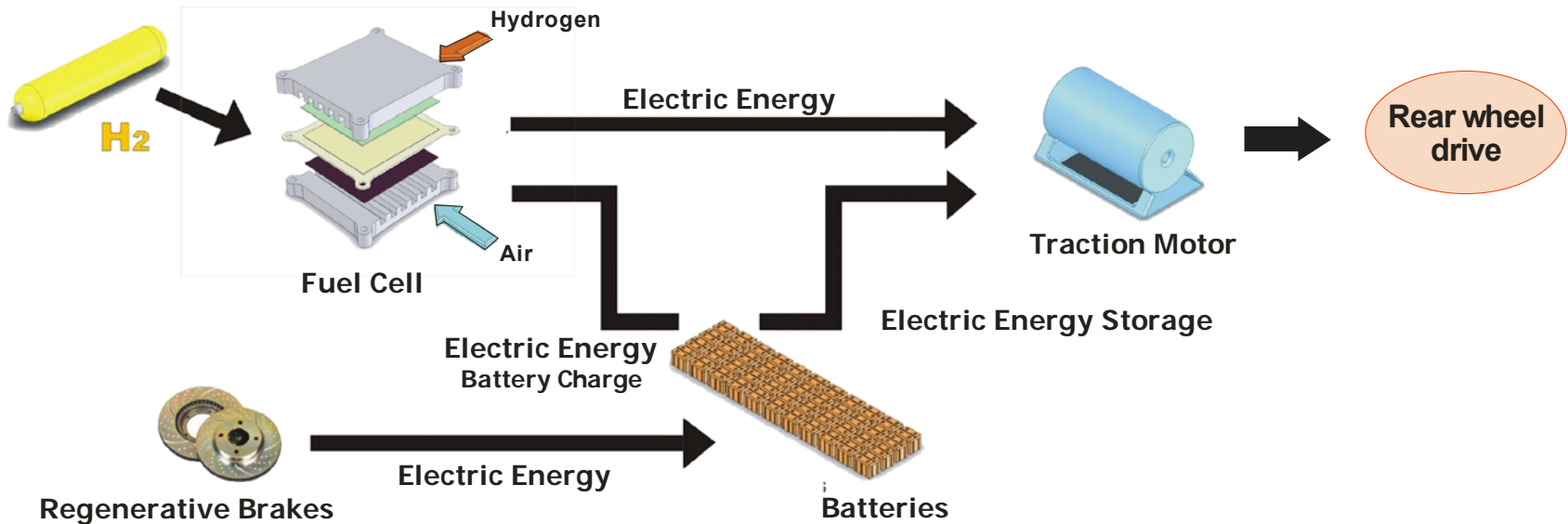
- The fuel cell operates in a stationary-like mode;
- The fuel cell and the energy delivered by the regenerative breaks charge the battery bank, which feeds the electric traction motor and the auxiliary system components. Eventually the fuel cell also supplies electric energy to the traction motor;
- The drive train control system emphasizes operating the fuel cell in optimum conditions and regenerating kinetic energy;
- The hydrogen consumption is smaller.

BUS CHARACTERISTICS

- Size: 12 m length - 03 doors;
- Capacity: 100 passengers;
- Low-floor;
- Range: 300 km;
- Air conditioning;
- Rear wheel drive;
- Ion-lithium batteries;
- Double-deck structure;
- Body is painted white to be enveloped
- 04 cylinders - 350 bar compressed Hydrogen 28.8 kg H₂



Energy Hybridization Engineering



PROJECT STATUS

Prototype Performance Testing on December 2007

- Hydrogen cylinders, purchased;
- Traction batteries, purchased;
- body, under construction;
- Chassis, built;
- Main control, developed;
- Hybrid system, being evaluated;
- Performance testing established;
- “Gases systems” designed and pre-assembled;
- Design of the “envelope” under contest (EBA/UFRJ)
- Traction motor, inverter & auxiliary devices fabricated



Performance testing routes

First Step



Second Step



CO₂ mitigation considering the whole fleet in Rio de Janeiro: 550.000 ton CO₂/year



Ministério da Ciência e Tecnologia



FINEP



Laboratório de Hidrogênio
COPPE / UFRJ



Looking Foward to Drive you Through Rio



Thank you!