



# Ônibus Brasileiro Movido a HIDROGÊNIO

Uma nova tecnologia para o mundo.

## Hydrogen Production and Fueling Station

The "Brazilian Fuel Cell Bus" project demonstrates the potential synergy between the Brazilian integrated hydroelectric system and the urban mass transportation system, based on which the use of clean fuel Hydrogen, produced from hydroelectricity, can eliminate CO<sub>2</sub> emissions to the atmosphere. The project includes the installation of a hydrogen production and fueling station in São Bernardo do Campo (SP), at the Concessionária Metra garage, who is the bus operator of the metropolitan Corridor ABD (São Mateus - Jabaquara). The location of the hydrogen fueling station is the EMTU/SP – São Paulo Metropolitan Urban Transport Company, which is national coordinator of the project and controls the bus operation on the Corridor.

The fueling station, to be integrated by BR Distribuidora, with technical support from Petrobras, Hydrogenics and AES Eletropaulo, will enable a safe and non-polluting, completely CO<sub>2</sub> emissions-free operation. In addition, it has the potential to support replacement of conventional buses with fuel cell buses running on hydrogen produced by water electrolysis at low cost. The two elements for clean fuel (hydrogen) production, water and hydroelectricity, are readily available in Brazil.



## Production Process

This station uses electricity to separate incoming water molecules into oxygen and hydrogen gas through the process of electrolysis. The oxygen molecules will be released to the atmosphere and the hydrogen will be compressed to fuel the bus.

AES Eletropaulo

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See the drawing below:

## PROCESSO DE PRODUÇÃO E ABASTECIMENTO DE HIDROGÊNIO (BASEADO EM ELETRÓLISE)



Incoming water will be purified via a reverse osmosis system. 50% of the water will be of high enough quality to be used in the hydrogen and oxygen production process. The remaining water, with high mineral content, is not suitable for drinking, but it will be used to water the gardens and clean the buses.

### Equipment

The equipment for the hydrogen station, supplied by Hydrogenics, was received by EMTU/SP in 2007.

### Electrolyser

Made in Belgium by Hydrogenics, the electrolyser is capable of producing 120 kg/day of fuel cell grade hydrogen at 10 barg pressure. The unit was assembled inside a 12 m container, where the hydrogen will be produced when receiving electricity and water.

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## Hydrogen Compressor

Made in USA and integrated onto an open frame in Canada by Hydrogenics, along with the balance of plant, the compressor compresses the gas to storage at 430 barg.

## Storage Unit composed of horizontal cylinders

The storage system, consisting of 6 ASME (American Society of Mechanical Engineers), certified vessels, configured in a three bank cascade system has the capacity to store 72 kg hydrogen at 430 bar pressure. This is where the compressed hydrogen will be stored before fueling the bus.

## Dispenser

Made in Canada by Hydrogenics, the hydrogen dispenser is similar to a natural gas dispenser. It has similar dimensions and safety protection equipment and like a natural gas dispenser, it shows the quantity of fuel delivered to the bus. The dispenser is capable of providing fast fills to buses and automatically terminating the fill based on the target pressure in the gas tank.

## **Civil work**

When the public tender is completed, a company will be contracted to execute the civil work for the hydrogen fueling station infrastructure. After the civil infrastructure work is done, the equipment will be installed by BR Distribuidora, AES Eletropaulo (responsible for the electrical installation of the hydrogen station power supply) and Hydrogenics (the equipment manufacturer and supplier). The hydrogen station will be operational in 2009.

In the meantime, the tests with the bus on the Metropolitan Corridor ABD will be performed using trucked hydrogen from RPBC Refinery (Petrobras).

## **Press Office**

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