
VII.4 International Projects

Catherine E. Grégoire Padró

Institute for Hydrogen and Fuel Cell Research
Los Alamos National Laboratory
Los Alamos, NM 87545
Phone: 505-667-5539; Fax: 505-665-4292
E-mail: padro@lanl.gov

DOE Technology Development Manager:

Pat Davis

Phone: (202) 586-8061; Fax: (202) 586-9811
E-mail: Patrick.Davis@ee.doe.gov

Start Date: September 2003

Projected End Date: Project continuation and direction determined annually by DOE

Objectives

- Support the multi-agency cooperative effort to provide expertise to China in their efforts to “green” the 2008 Summer Olympic Games in Beijing through participation in a renewable hydrogen production and delivery system for five hydrogen-compressed natural gas (HCNG) buses in revenue service by monitoring technical performance, as well as coordinating technical interactions with the Chinese team from Tsinghua University and SinoHytec.
- Support and facilitate development of Global Technical Regulations (GTR) for hydrogen vehicle systems under the United Nations Economic Commission for Europe, World Forum for Harmonization of Vehicle Regulations, and Working Party on Pollution and Energy Program (ECE-WP29/GRPE) by working with DOT/NHTSA and EPA to coordinate the U.S. position on the development of international hydrogen/fuel cell codes, standards, and regulations that are performance-based.

Technical Barriers

The Olympics project, part of the Transportation Partnership Beijing 2008, supports the Energy Secretary’s commitment, through the International Partnership for the Hydrogen Economy (IPHE), to accelerate the development of hydrogen and fuel cell technologies to improve energy security, environmental security and economic security.

The GTR project addresses the following technical barriers from the Codes and Standards section (3.6.4.2) of the Hydrogen, Fuel Cells and Infrastructure

Technologies Program Multi-Year Research, Development and Demonstration Plan:

- (F) Limited DOE Role in the Development of International Standards
- (G) Inadequate Representation at International Forums
- (H) International Competitiveness
- (I) Conflicts between Domestic and International Standards
- (J) Lack of National Consensus on Codes and Standards
- (K) Lack of Sustained Domestic Industry Support at International Technical Committees

Accomplishments

- Solicitation for industry cost-shared efforts in support of the Olympics Project was issued.
- Review of Japanese comprehensive regulations for hydrogen vehicles and infrastructure was initiated.

Introduction

Olympics Project

In 2004, the U.S. Department of Energy joined the Hydrogen Transportation Partnership Beijing 2008 (“Partnership”). The Partnership was formed to demonstrate hydrogen-based transportation technologies for the 2008 Olympic Games. The Partnership is a public/private collaborative organization that is working together to advance the research, development, and demonstration of fuel cell vehicles and hydrogen fueling infrastructure. In addition to the U.S. and Chinese governments, the Partnership includes international participants from the automotive, energy, and technology sectors. The participants are working together to build the Beijing Hydrogen Transportation Park.

Located in the Yongfeng Hi-Tech Industrial Development Park in northwest Beijing, the Hydrogen Transportation Park will occupy 13,400 m². Plans call for a refueling station with hydrogen production via electrolysis (using renewable and grid electricity) and steam methane reforming, hydrogen dispensing, hydrogen and hydrogen/natural gas blended fuel dispensing, garages and maintenance workshops, and a Hydrogen Education Center (see Figure 1 for draft Park layout). The Fleet Demonstration Route is designed to transport athletes and visitors to and from the Beijing Olympic Park, approximately 15 km to the southeast. The Park is managed and operated by SinoHytec, and

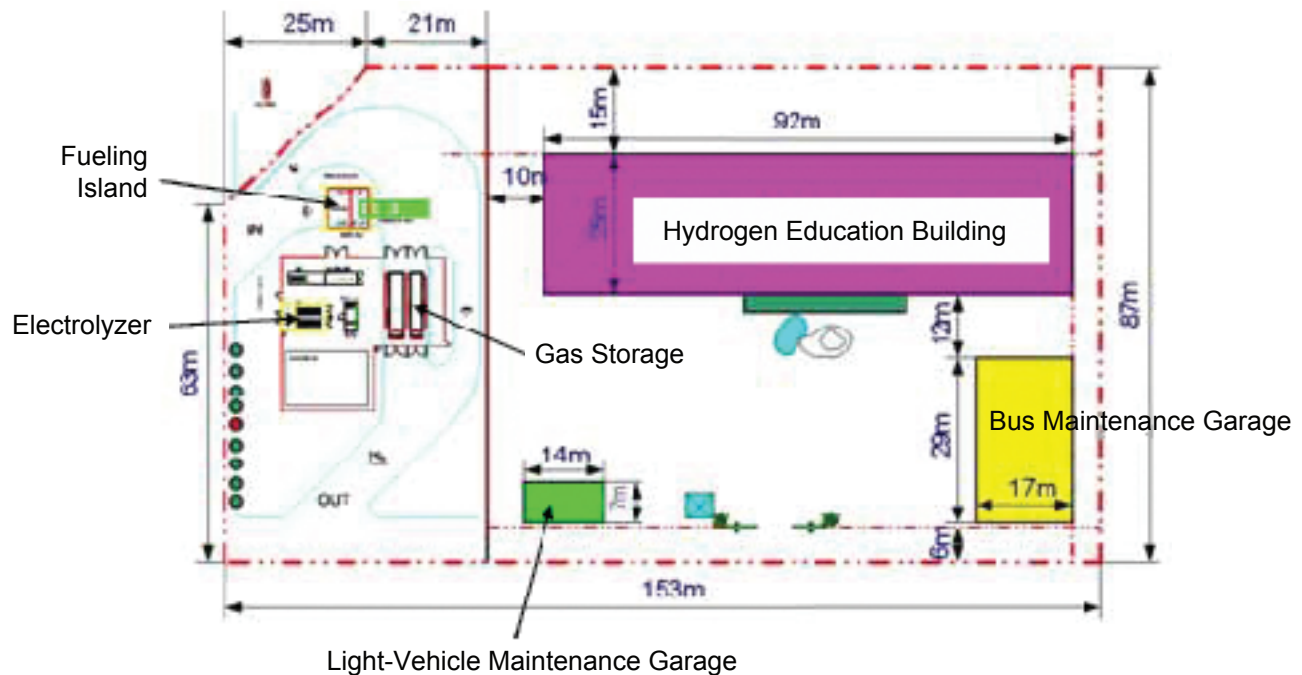


FIGURE 1. Planned Park Layout – Project will integrate with the BP Hydrogen Fueling Station shown on the left. Renewable equipment may be integrated into the areas adjacent to the education and maintenance buildings or into the buildings themselves.

SinoHytec personnel will be responsible for the Park operations throughout the project.

Global Technical Regulations

The development of performance-based and harmonized international codes, standards and regulations is critical to fair and open competition in worldwide markets for hydrogen and fuel cell vehicles. Teaming with the Department of Transportation, the Department of Energy is an active participant in the United Nations/Economic Commission for Europe (UN/ECE) World Harmonization of Vehicle Regulations (referred to as WP.29) and its efforts on hydrogen and fuel cell vehicle regulations.

Approach

Olympics Project

Installation and commissioning of the renewable hydrogen production project into the Beijing Hydrogen Transportation Park will include coordination with site owners and operators to permit renewable power generation equipment, natural gas clean-up system, and compressed gas storage systems. The following safety principles have been incorporated in the work:

- **Facilities Design and Construction:** New facilities and modifications to existing facilities will be designed, procured, constructed and commissioned

to enable safe, secure, healthy and environmentally sound performance throughout their operational life, by using recognized standards, procedures and management systems.

- **Operations and Maintenance:** Facilities will be operated and maintained within the current design envelope to ensure safe, secure, healthy and environmentally sound performance.
- **Management of Change:** All temporary and permanent changes to organization, personnel, systems, procedures, equipment, products, materials or substances will be evaluated and managed to ensure that health, safety and environmental (HSE) risks arising from these changes remain at an acceptable level. Changes to laws and regulations will be complied with and new scientific evidence relating to HSE effects will be taken into account.

GTR Project

In 2005, the U.S., in collaboration with representatives from Europe (primarily Germany) and Japan, developed a roadmap to a global technical regulation (GTR) for hydrogen fuel cell vehicles (HFCVs). This year, a proposal was developed to implement the roadmap, including a revised management structure (Figure 2).

The two co-chairs and the project manager will work with the Working Party on Passive Safety (GRSP) and the Working Party on Pollution and Energy

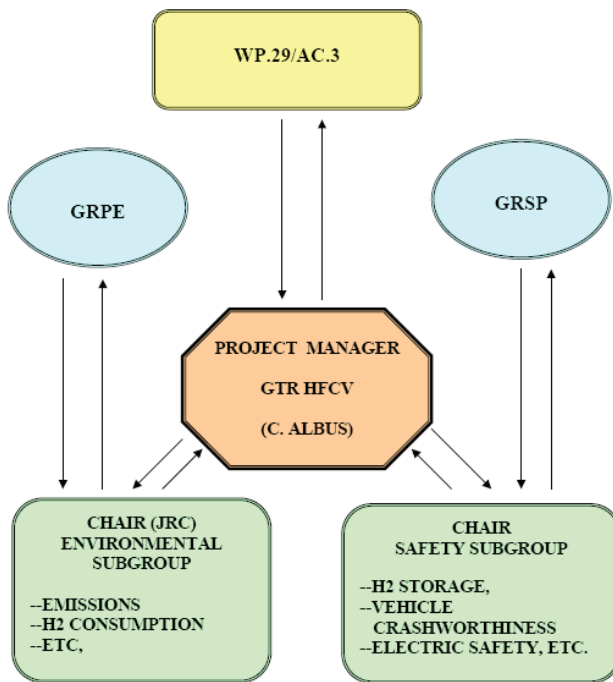


FIGURE 2. Management Structure for the Implementation of a Roadmap for a GTR on HFCVs.

(GRPE) on the development of the GTR, ensuring that milestones are met within the agreed timelines, once established.

Results

Olympics Project

A solicitation was issued for two cost-shared projects related to the Partnership. Selections are expected to be announced by mid-2006. A delegation of Chinese participants in the effort visited the U.S. to discuss the project, and to visit a number of hydrogen

demonstration facilities throughout the U.S. The delegation included Jianya Wu (General Manager, Beijing SinoHytec Co., Ltd.), Qingyun Meng (Project Manager, Beijing SinoHytec Co., Ltd.), Xihao Li (Senior Engineer, Tsinghua University), Zhang Junzhi (Associate Professor, Tsinghua University), and Ma Fanhua (Associate Professor, Tsinghua University).

GTR Project

A comprehensive GTR development process is needed to address the environmental and safety concerns, including crashworthiness considerations, of HFCVs. In order for the safety and environmental provisions to be adequately addressed, the GRSP and GRPE will need to be fully engaged. To accomplish this, two subgroups have been formed under the HFCV: the Safety HFCV SubGroup, comprised of safety and crashworthiness experts, and the Environment HFCV SubGroup, comprised of environmental experts. Input from researchers is vital in order to provide the supporting science for the GTR.

In October 2005, Japan hosted a meeting to present their comprehensive regulation for hydrogen vehicles and refueling infrastructure. Since Japan uses a type-approval process (as do the Europeans) and they used a systems approach (favored by the U.S.) in developing the regulation, this comprehensive regulation may serve as the basis for a whole-vehicle GTR.

Conclusions and Future Directions

Once the project selections are made and contracts negotiated by the DOE Golden Field Office, it is expected that our emphasis will shift to technical liaison for the Olympics Project.

Careful study of the Japanese regulation, and evaluation of the supporting data, will be essential to the rapid and appropriate development of a GTR for hydrogen and fuel cell vehicles.