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Multi-Stakeholder Hydrogen Demonstration Projects in Canada



**International Partnership for the
Hydrogen Economy (IPHE)**

3rd Steering Committee Meeting

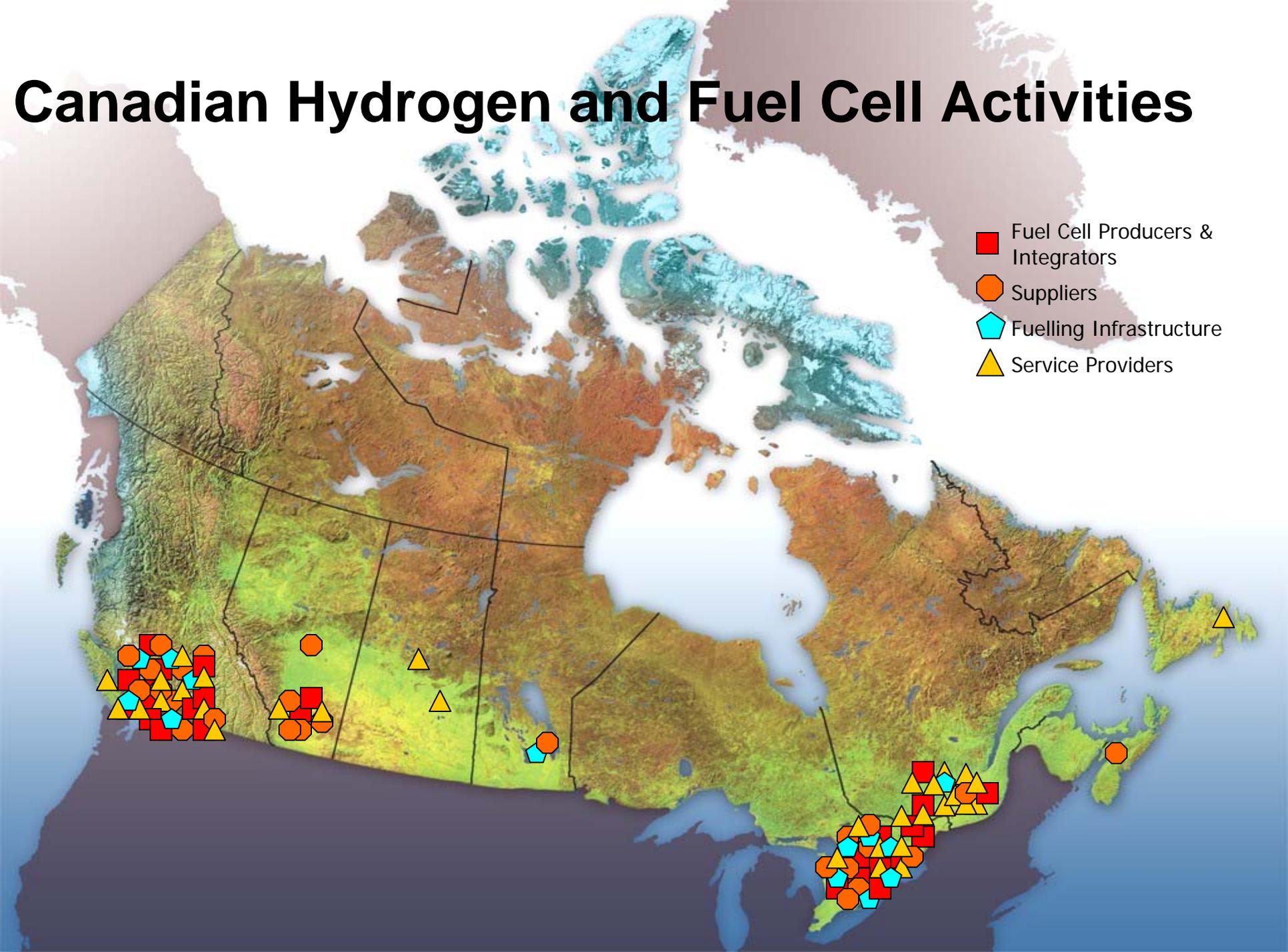
**Graham Campbell
Natural Resources Canada**

28 January 2005

Canada

Canadian Hydrogen and Fuel Cell Activities

-  Fuel Cell Producers & Integrators
-  Suppliers
-  Fuelling Infrastructure
-  Service Providers



Three Multi-Stakeholder Projects

- The Hydrogen Highway™ in the Province of British Columbia
- The Hydrogen Village™ in the Province of Ontario
- The Fuel Cell Vehicle Program in the City of Vancouver





Common Objectives of the Projects

- Showcase Canada`s world-leading technologies and move them to commercialization
- Gain experience from operating in “real world” conditions
- Demonstrate totally integrated systems comprising fuelling, vehicles, power supply, regulatory approval and monitoring of performance
- Increase public’s awareness, interest and comfort
- Input to the development of codes, standards, regulations and safe operating practices
- Maximizing the social, economic and environmental benefits of these technologies for all Canadians

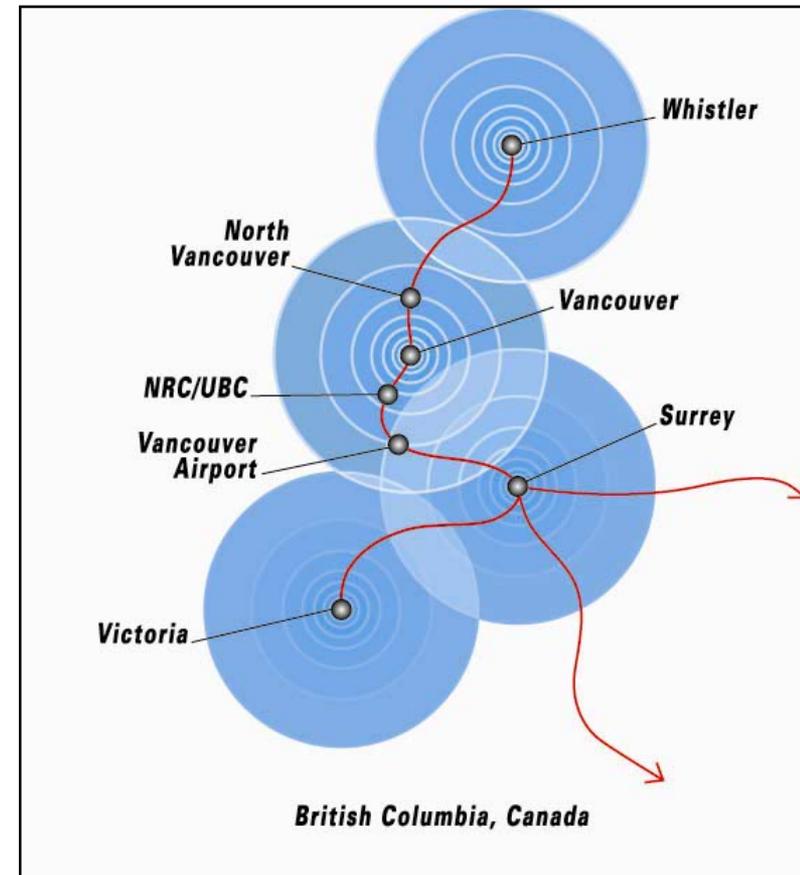
British Columbia's Hydrogen Highway™

- Vancouver and Whistler hosting the 2010 Winter Olympic and Paralympic Games - the Hydrogen Highway™ will be a centre piece among the other “green” technologies
- Eventually, the British Columbia Hydrogen Highway™ will link with other Canadian projects and with the United States West Coast Hydrogen Highway™ networks



British Columbia's Hydrogen Highway™

- An integrated and advanced hydrogen and fuel cell technology demonstration program
- Starting in 2004, a network of at least seven hydrogen fuelling stations will be established linking communities in British Columbia by 2008
- Each of the stations will be unique
- Requires demonstration of applications to use the fuel



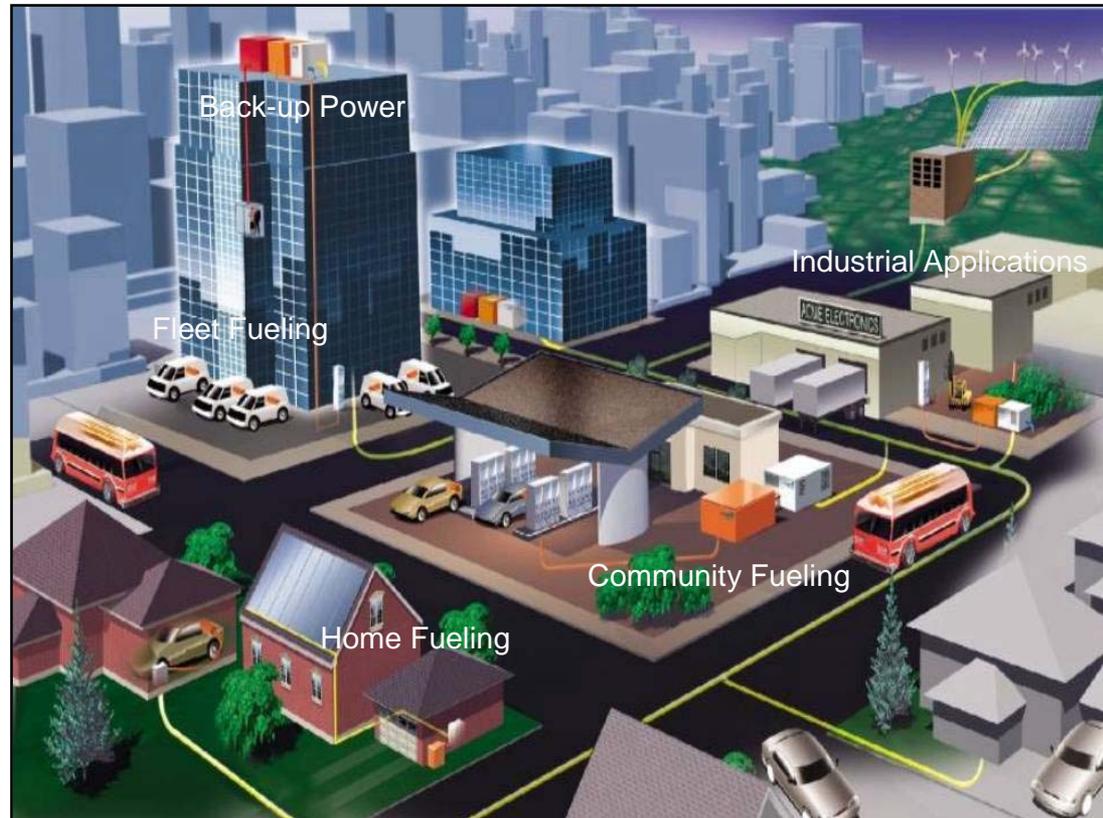
Status of British Columbia's Hydrogen Highway™

- The Surrey station is operational, the University of British Columbia – National Research Council (UBC-NRC) station (on University of BC campus) will be operational in February 2005
- Preliminary engineering for the North Vancouver station is completed and construction is expected to begin in the Spring of 2005
- System options are being evaluated for the stations at Whistler, Vancouver, Vancouver Int'l Airport and Victoria



Ontario's Hydrogen Village™

- Started in 2004 in the Greater Toronto Area in the Province of Ontario
- A collaborative public-private partnership of 41 organizations, companies, governments and institutions
- Committed to accelerating the commercialization of hydrogen and fuel cell technologies through early deployment



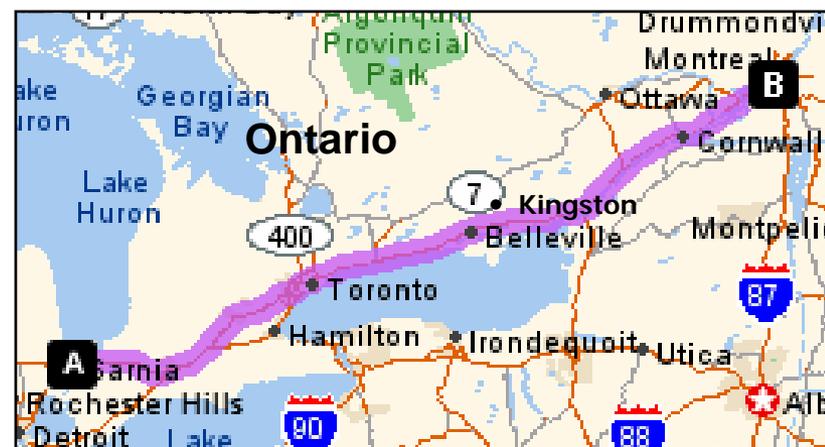
Ontario's Hydrogen Village™ Status

- Two fuelling stations are currently operational, two others will be operational in mid-2005
- In 2005
 - Hydrogen fuel cell delivery van
 - HFC lift trucks
 - Solid oxide residential heat and power system
 - HFC back-up power system
- Several other projects are under development



The Hydrogen Village™ and the Hydrogen Corridor

- Eastern Canadian Hydrogen Corridor is a recent concept linking communities developing significant hydrogen and fuel cell activities in the Provinces of Ontario and Quebec
- Hydrogen Corridor would initially stretch from Sarnia, Ontario in the west, to Montreal, Quebec in the east, a distance of about 900 km and would include the Hydrogen Village™ in Toronto
- Initial plans are for the installation of hydrogen fuelling stations at least every 150 km



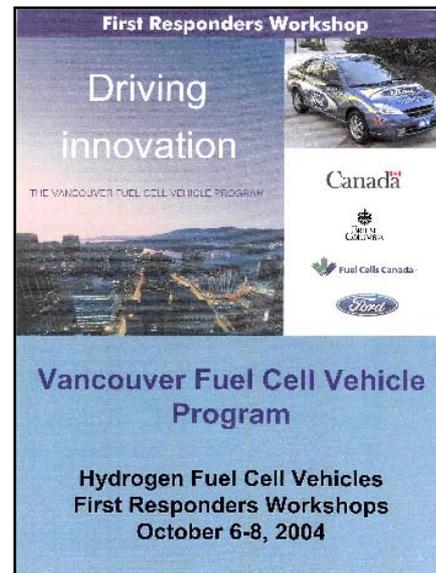
Vancouver Fuel Cell Vehicle Program

- Five year program to evaluate four Ford Focus production fuel cell vehicles under “real world” conditions in and around the Vancouver area
- Will demonstrate Canadian leadership in sustainable transportation
- Will test, evaluate and refine Canadian made hydrogen and fuel cell technologies



Vancouver Fuel Cell Vehicle Program Status

- Vehicle delivery to Vancouver in February 2005
- Fuelling primarily at the UBC-NRC station
- New vehicle maintenance facility at the NRC-IFCI (National Research Council Institute for Fuel Cell Innovation)
- Vehicle maintenance by Ford trained technicians
- Three different users for the four cars
- Each car will be driven about 15,000 km/year
- Drivers will be trained by Ford, including refuelling
- Emergency response training underway





Multi-Stakeholder Project Partners

- 5 Universities/Colleges
- 6 Provincial/Municipal Governments
- 4 Fuel Cell Providers
- 12 Suppliers
- 10 Fuelling Infrastructure
- 17 Service Providers



Our Experience To Date

- Very strong private sector interest and participation in these projects
- Project management requires detailed “hands-on” involvement and is a complex full-time job - project manager for each
- Experience to date has been positive, has led to developing a body of knowledge related to practical issues such as liability insurance and fuel quality assurance
- Strong international interest in the programs, primarily from the United States, but elsewhere as well

Relevance to the IPHE

- The Hydrogen Highway™ is a proposed candidate for a collaborative IPHE project, others could follow
- Selected fuelling stations could be candidates for the IEA Annex 18: Evaluation of Hydrogen Demonstration Projects, for standardized operational data collection
- Canadian codes and standards activities, such as the Canadian Hydrogen Installation Code, can add to the IPHE body of knowledge





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