



Canada's Fuel Cell Story—Taking Off



Canadian Hydrogen
and Fuel Cell Association

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Welcome to Canada: A World Leader in Hydrogen & Fuel Cells Technologies



- A World leader in critical fuel cell and hydrogen technologies— “cradle of fuel cell development” and now a major exporter to China, Korea, Japan, Europe and US
- Nearly \$200 million in annual sector revenue, 2,000 clean, high-paying tech jobs
- Significant increased export activity and increasing domestic opportunities
- Producing fuel cells for Auto OEMs such as Mercedes/Daimler, Engineering Services for Volkswagen and other OEMs
- Domestic Opportunity: Increase adoption of clean gas technologies for energy storage, zero-emission power generation, cleaner oil refining and electricity conservation in material handling and telecom sectors, OEM supply chain



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Automotive Commercialization and R&D



- Employing 225 people, Automotive Fuel Cell Cooperation (AFCC) remains the largest fuel cell automaker R&D centre in Canada, as a joint effort between Daimler and Ford .
- Daimler's \$70+ million investment establishes world's 1st automated fuel cell manufacturing plant.
- Ballard has signed a major 5 year engineering services deal with Volkswagen which will extend to \$100 million; also signed huge deals for 300 plus buses in China and train sets and new joint venture for \$150 m
- Hyundai—the first automaker to offer the Canadian public access to FCEVs in the Vancouver BC area. Other OEMs looking closely at the Canadian Market
- New fueling infrastructure funding promised by Canada and Provinces, new fueling station underway in Vancouver
- Greenlight Innovation—(completed their 200th Automotive Fuel Cell Test Station)—has announced that they have expanded their product offerings to include fueling dispensers and testing equipment for electrolyzers
- Government of British Columbia announced incentives for FCEV consumers (\$6,000 CAD credit)



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Canadian Product Leadership: Transit Bus Technologies



- Canadian companies like Hydrogenics and Ballard signed bus technologies agreements in multiple international markets in 2015-16 : Hydrogenics sold 2,000 fuel cell units worth \$100 million for installation in hydrogen fuel cell buses in China and 200 units for trains with Alstom in France, while Ballard will supply units for 300 fuel cell buses in China and \$150 million joint venture
- Canadian-made fuel cell stacks for bus applications are featured in transit fleets in Germany, USA, UK, Brazil, and China. Major new Europe and US orders expected this year.



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Canadian Product Leadership: Heavy Duty Vehicles



- Loop Energy from Vancouver has been awarded a \$7.5 million grant from SDTC to develop a fuel cell powertrain for heavy duty trucks
- Loop Energy announced an agreement with CRRC (China Railway Rolling Stock Corporation) in May 2016 to develop and supply fuel cell power systems for heavy duty transportation applications
- University of British Columbia embarking on heavy duty truck project



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Leadership in Hydrogen Fueling Infrastructure



- Canadian firms including Powertech Labs, HTEC, Hydrogenics, Greenlight Innovation and others have solid experience in the area of Hydrogen Fueling Infrastructure.
- Powertech has designed and constructed modular compressed hydrogen fueling stations. These stations are able to fill 700 bar (70 MPa) fuel cell vehicles.
- BC's second public station will be opening in the spring of 2017, with the capability of servicing a fleet of 300 FCEVs. The station is supported by CHFCA, The BC Ministry of Energy & Mines, LGM Financial, Hyundai, Toyota, AFCC, and HTEC.



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New Canadian Hydrogen Infrastructure Initiative (CHII)

- Participants include OEMs, Federal and Provincial Government and Local Government representation, plus CHFCA, fuelling companies, hydrogen suppliers and even investors
- Undertaking planning for key infrastructure investments, but even more importantly, working collaboratively with all stakeholders to ensure regulatory and programmatic support for FCVs at federal, provincial and local levels
- Industry prepared to invest time and money into this initiative
- Revised Road Map for Canada currently in development, reflecting better visibility of OEM deployment plans and retail customer interest alignment
- Sponsored by CHFCA



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New Federal and Provincial Government Supportive

- Major commitments to Clean Energy and Clean Technology by New Liberal Government. \$65 million in new ZEV funding.
- Already increased Industrial Research Assistance Program (NRC-IRAP) by \$100 million, which is of great help to the fuel cell sector
- New Green Infrastructure and Transit Announcements announced over \$40 billion over 5 years
- Renewed funding for Research and Development by Universities and Research Institutes expected, some funding is already being put into fuel cell research by new government
- BC Government to distribute \$10.6 million over next 3 years for hydrogen fueling and charging infrastructure, commercial fleet purchases of clean energy vehicles research, training, and public outreach
- Quebec government mandating 15% zero emission vehicles; Ontario reviewing
- BC Government also offering incentive of up to \$6,000 for the purchase or lease of new HFC vehicles as part of Clean Energy Vehicle (CEV) Program



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Challenges Facing Commercialization Are Common To All



Technical

- Costs for Fuel Cells Remain High, although reducing rapidly. Stations too expensive and costs staying high
- Manufacturing Challenges in high-volume production of Fuel Cells

Markets

- Delayed Market Development—little national effort to educate and incent so far
- Incentives and Regulations inconsistent or lacking—Canada competing for FCVs
- Ongoing Attachment to ICE's, Incumbent Technology Advances (Diesel, Hybrids)

Infrastructure

- Fueling Infrastructure —Canada a huge country—5000km wide
- Canada lacking consistent national incentives to deploy infrastructure



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Conclusions



Worldwide

- Commercialization has started, but limited FCVs available from OEMs
- Key barriers are identical everywhere— costs of infrastructure, delayed market development of FCVs, infrastructure deployment (zoning, education of city staff)



Canada

Huge country to deploy FCVs and Infrastructure—costs are high

- Canada must compete with regulated minimum ZEV markets like California, and huge incentive markets like some Scandinavian countries
- Strong incumbent technology in ICEs, natural gas tough competitor
- Some government fatigue from FCV promises not materializing
- Supply of hydrogen still not primarily renewable
- Many opportunities exist for Israel-Canada commercial partnering—supply chain, R&D, joint ventures, not just in transport but in whole fuel cell and hydrogen sector



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Hydrogen + Fuel Cells 2017 Summit (June 5-6, 2017)



- Organized by CHFCA and the Government of Canada, HFC2017 is an upcoming international summit of hydrogen and fuel cell executives, government leaders and world-class researchers discussing the latest commercial advances in hydrogen and fuel cell technology
- Date: June 5th – 6th, 2017
- Location: Terminal City Club
937 West Hastings St, Vancouver BC
- Dates: June 5th – 6th, 2017
- For inquiries, please contact Carolyn Bailey-Ling (CHFCA) at cbailey@chfca.ca



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Thank you!

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