

EXHIBITION PLACE

April 17, 2003

To: The Board of Governors of Exhibition Place

From: Dianne Young
General Manager & CEO

Subject: Fuel Cell Demonstration Project Update

Recommendation(s):

It is recommended that the Board receive this report for its information.

Background:

At its meeting of January, 2003, the Board approved of entering into a host agreement with the City of Toronto to the be location of a Fuel Cell Demonstration Project.

Discussion:

At its meeting of April 14, 15 and 16, 2003, City Council approved of Clause No. 20 of Report No. 3 of the Works Committee which recommended that the City enter into an agreement with Hydrogenics Corporation for the development and implementation of a fuel cell demonstration project to be located on the grounds of Exhibition Place. As outlined in my report to the Board in January, 2003, the timeframe for implementation of the first phase of this project is the Summer, 2003.

Conclusion:

This report updates the Board with respect to the implementation of the fuel cell project that it approved at the Board meeting of January, 2003.

Contact:

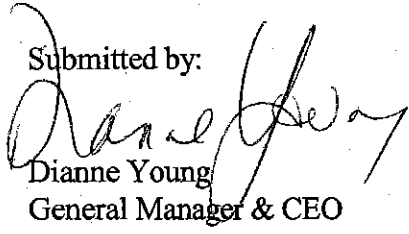
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Fuel Cell Demonstration Project at Exhibition Place

The Works Committee recommends the adoption of the recommendations of the Administration Committee contained in the following communication (March 25, 2003) from the City Clerk:

Recommendations:

The Administration Committee on March 25, 2003, recommended to the Works Committee and Council:

- (1) the adoption of the joint report (March 10, 2003) from the Commissioner of Works and Emergency Services and the Commissioner of Corporate Services entitled "Fuel Cell Demonstration Project at Exhibition Place (All Wards)"; and
- (2) that a copy of the aforementioned joint report be forwarded to the Toronto Transit Commission with a request that the TTC report to the Administration Committee on opportunities available to the TTC regarding the fuel cell powered 40 foot passenger buses.

(Joint report dated March 10, 2003, from the Commissioner of Works and Emergency Services and the Commissioner of Corporate Services addressed to the Administration Committee and the Works Committee)

Purpose:

The purpose of the report is to seek authority to enter into an agreement with Hydrogenics Corporation and the Board of Governors of Exhibition Place for the development and implementation of a fuel cell demonstration project at Exhibition Place over the period 2003-2005.

Financial Implications and Impact Statement:

There are no financial implications associated with the approval of this report.

Recommendations:

It is recommended that:

- (1) the Commissioner of Works and Emergency Services and the Commissioner of Corporate Services be authorized to jointly develop and implement a fuel cell demonstration project in co-operation with Hydrogenics Corporation, the provider of the fuel cell and its related components;

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For City Council Consideration on April 14, 2003

- (2) the City of Toronto enter into an agreement with Hydrogenics Corporation for the provision of the necessary technology, project management and expertise in fuel cells to successfully complete the demonstration project, based on the Letter of Intent between the City and Hydrogenics Corporation dated January 7, 2003, and to the satisfaction of the Commissioner of Works and Emergency Services, the Commissioner of Corporate Services and the City Solicitor;
- (3) the City of Toronto enter into an arrangement with the Board of Governors of Exhibition Place to utilize Exhibition Place as the host location for the proposed fuel cell demonstration project, on terms and conditions that are satisfactory to Exhibition Place and the City;
- (4) the City of Toronto enter into such agreement or agreements with Toronto Hydro-Electric System Limited, or third parties, as may be required to facilitate and expedite the connection of the fuel cell demonstration within the timing requirements of the installation set out in this report;
- (5) Hydrogenics Corporation be required to dismantle and remove the fuel cells and all related equipment from Exhibition Place at the conclusion of the demonstration project, at no cost to the City of Toronto and Exhibition Place;
- (6) the City of Toronto provide the essential in-kind project facilitation services including: application for available grants, communication services and educational support services as outlined in this report, consistent with the report dated January 17, 2003, from the Board of Governors of Exhibition Place entitled "Fuel Cell Demonstration Project";
- (7) the Administration Committee forward their recommendations to the Works Committee; and
- (8) the appropriate City officials be authorized and directed to take the necessary action to give effect thereto.

Background:

On December 16 and 17, 1998, the Council adopted a city-wide target for the City of Toronto to reduce carbon dioxide emissions by 20 percent relative to the 1990 levels by 2005. The sustainable energy actions proposed to achieve this include the expeditious development of renewable energy projects.

In a letter to Fuel Cells Canada dated September 27, 2001, Fleet Services Division of Corporate Services expressed an interest to participate in a demonstration project under the Fuel Cells Canada program to gain a greater understanding of fuel cell technology and potential sustainability of this emerging technology (Appendix A). As a result, Hydrogenics Corporation, a fuel cell developer located in the Greater Toronto Area and a leading demonstrator of the fuel cell technology in Canada and the United States, contacted the City of Toronto on July 31, 2002, through Works and Emergency Services with a proposal to locate a fuel cell demonstration project at Exhibition Place.

The initial description of the project and the expected roles and commitments from a preliminary list of parties provided were outlined in a letter to Works and Emergency Services by Hydrogenics (Appendix B). A Letter of Intent (Appendix C) was later developed and executed by the Commissioner of Works and Emergency Services, Commissioner of Corporate Services and Hydrogenics Corporation on January 7, 2003, specifying the terms and conditions of the proposed demonstration project.

Subsequently, a similar report consistent with the terms and conditions of the above noted Letter of Intent was approved by the Board of Governors of Exhibition Place which recommended the hosting of this fuel cell demonstration project at Exhibition Place. The Board approval was granted on the condition that the project would be implemented at no cost to Exhibition Place. The report also authorized the Board to enter into a host agreement with the City of Toronto on terms and conditions satisfactory to the General Manager and Chief Executive Officer of Exhibition Place and the City Solicitor.

Comments:

Fuel cells can contribute to the City's goal to reduce carbon dioxide emissions by 20 percent relative to 1990 levels by year 2005.

Fuel cells are electrochemical devices that convert the energy of a chemical reaction between oxygen and hydrogen directly into electricity. The oxygen required by the fuel cell comes from the air while the hydrogen is typically produced either by electrolysis of water or by reforming hydrocarbon or alcohol fuels such as natural gas, methanol or methane. Fuel cell generated electricity has the potential for zero emissions such that the only by-products are water and heat. The technology is currently undergoing intensive research and development and is considered by many to become commercially viable within 10 years. The technology has certain niche applications today, such as in the space program, where the current high costs of the technology can be justified.

As an alternative renewable energy source, fuel cells are already being used in some cities in the United States, Japan and Europe for both building and transportation applications. In June 2002, fuel cell development in the Province of British Columbia received close to \$5.2 million in federal and provincial funding to test and demonstrate a variety of fuel cell applications such as a prototype of a fuel cell powered industrial truck, small-scale hydrogen generator unit, multi-fuel warehouse, integrated fuel-based system to generate electricity, hydrogen fuelling station for fuel cell vehicles and a 1.2-kilowatt utility standby fuel cell system.

As the emerging fuel cell industry is beginning to gain ground internationally with Canada currently a leading developer of fuel cell technology, a major city such as Toronto can benefit tremendously from showcasing the technology through demonstrations and actual applications. The fuel cell industry has the potential to be a \$10-\$15 billion industry for Canada in less than ten years. A move towards a fuel cell economy is not only a move to a cleaner and sustainable environment but a prosperous and vibrant City as well.

Description of the Fuel Cell Demonstration Project:

The proposed fuel cell demonstration project at Exhibition Place is focussed on demonstrating the potential of zero emissions fuel cell technology for applications to City facilities and transportation. Hydrogenics Corporation, the recipient of \$2 million funding from Natural Resources Canada in 2001 for a 50kW stationary fuel cell power generator, will provide the equipment, hardware and software of the technology for demonstration purposes at no cost to the City. In return, the City will facilitate the provision of a location for the project at Exhibition Place and provide the essential in-kind project facilitation services including: application for available grants, communication services and educational support services.

The demonstration project has three phases and a duration of up to three years. Hydrogenics Corporation will provide the following fuel cell equipment at no cost to the City or Exhibition Place:

- (a) 50kW HySTAT Fuel Cell Stationary Generator - to be connected to the electricity grid and will produce peak shaving distributed generation power in 2003 and continuous power in 2004-2005;
- (b) Fuel cell powered John Deere commercial work vehicle for a limited demonstration period during the 2003 CNE;
- (c) Hydrogen refueling for the commercial work vehicle provided by the HySTAT's 50kW Reformer - to convert natural gas to hydrogen;
- (d) Fuel cell powered 40-foot passenger bus (slated for 2005); and
- (e) Hydrogen Refueling Station using Hydrogenics' electrolyzer technology (also for 2005). In the final year of operation, this electrolyzer station is expected to use wind turbine generated power in the production of hydrogen, achieving the envisioned zero emission in the generation of power.

Roles and Commitments:

- (1) Hydrogenics Corporation is expected to:
 - (a) provide all of the necessary equipment, hardware and software for the fuel cell demonstration project at no cost to the City;
 - (b) install the fuel cell equipment upon receipt of written consent from the City and Exhibition Place; and
 - (c) cover the costs of removal of the equipment and reinstatement to its original condition of any lands of the City and/or Exhibition Place utilized for the demonstration project at the end of the demonstration period.

- (2) The City, during the development phase of the demonstration project, shall.
 - (a) assist Hydrogenics to obtain the co-operation of the necessary third parties;
 - (b) assist Exhibition Place in the demonstration project;
 - (c) assist in the development of an information and education component for the demonstration project; and
 - (d) prepare and execute a formal agreement.

The City's involvement is managed through the Technical Services Division of Works and Emergency Services with support from Fleet Services Division of Corporate Services. Other divisions and departments may be asked to provide support and be involved at various stages of the demonstration project. During the project implementation phases, the City will maintain close contact with all the parties involved to ensure the successful completion of the demonstration project.

- (3) Exhibition Place is an essential third party to the proposed formal agreement for the project and will act as the host site for the demonstration project. Other partners will be invited to participate in order to expedite this project and take advantage of the education and communication benefits. For example, the Toronto Atmospheric Fund will be requested to join the project and to participate in the information, education and communication aspects of the project. The federal and provincial governments and their associated organizations will be informed of the project and requested to assume a role.

Conclusions:

The City of Toronto's goal to reduce carbon dioxide emissions by 20 percent relative to the 1990 levels by the year 2005 can be supported by developing sustainable energy projects such as fuel cells. This project will demonstrate that electricity can be generated and transportation may be powered without the harmful emissions currently produced in the combustion of fossil fuels. It will also help to identify City infrastructure development, community planning, by-law and fire code implications related to the use of hydrogen fuels for both stationary and mobile applications. The City, Exhibition Place and Hydrogenics Corporation will achieve a high level of public awareness resulting from this fuel cell demonstration project.

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List of Attachments:

Appendix A - Letter to Chris Curtis, Fuel Cells Canada from Chris Chiaravallotti dated September 27, 2001.

Appendix B* - Letter from Hydrogenics Re: Proposal for a Fuel Cell Demonstration at Exhibition Place.

Appendix C - Letter of Intent: Fuel Cell Demonstration at Exhibition Place.

*Appendix B was deemed confidential at the time of writing. However, as of March 7, 2003, this restriction no longer applies.

(A copy of the attachments to the foregoing report was forwarded to all Members of Council with the agenda for the Works Committee meeting of March 26, 2003, and a copy is on file in the office of the City Clerk, City Hall.)