

# *National Arena Census*

**May 2005 – December 2005**



**Natural Resources  
Canada**

CANMET Energy Technology  
Centre - Varennes

**Ressources naturelles  
Canada**

Centre de la technologie de l'énergie  
de CANMET - Varennes



## Executive Summary

### Preamble:

The Canadian Recreation Facilities Council (CRFC) is a not for profit, nationally recognized volunteer council who's member associations and associates have a common interest in providing sustainable sport and recreation facilities in Canada. The membership of the CRFC consists of Provincial/Territorial associations, and nationally recognized not for profit and government affiliated organizations who have interests similar to the CRFC.

Hockey Canada is the sole governing body for amateur hockey in Canada following the merger in July 1994 of the Canadian Amateur Hockey Association and Hockey Canada. Hockey Canada operates national programming in cooperation with 13 Branch Associations, the Canadian Hockey League and the Canadian Inter-University Sports. Hockey Canada oversees the management of hockey programming in Canada from the entry level of the game to participation in international competition, including World Championships, the World Cup of Hockey and Olympic Games.

Through the officers, branch presidents and council directors, Hockey Canada provides leadership to its members by establishing the by-laws and regulations, rules of the game and direction of its development programs.

The CANMET Energy Technology Centre - Varennes (CETC-Varennes) is one of three research and innovation centres, managed by the CANMET Energy Technology Branch of Natural Resources Canada (NRCan). Established in 1992 under the name of *CANMET Energy Diversification Research Laboratory (CEDRL)*, CETC-Varennes' mission is to encourage targeted sectors of the Canadian economy to reduce their greenhouse gas (GHG) emissions, use energy more sustainably, and improve their innovation capabilities. CETC-Varennes designs and implements technological solutions and as well gathers and disseminates knowledge in order to produce and use energy in ways that are more efficient and sustainable, which in turn aids in stimulating the health of the Canadian economy.

In 2002 Hockey Canada (HC) and provincial/territorial member associations of CRFC saw a need to create a database which contained information specific to hockey arenas in Canada.

The purpose of the 2005 **National Arena Census** is to update the existing database, identify a more accurate number of arenas and to bring to the forefront data to help identify issues and challenges facing owner/operators of arenas across Canada. One of these challenges is the escalating energy costs and the reduction of green house gas emissions. Natural Resources Canada, CETC Varennes identified that hockey arena refrigeration processes represent over 50% of the energy bills in these facilities.

In addition, the intensive integration of new heating, ventilation, air-conditioning and refrigeration (HVAC&R) technologies in an arena can result in energy savings of up to 60% compared to a standard arena setup. The introduction of new refrigeration practices and technologies can help reduce this consumption by up to 40%.

A majority of the arenas in the census are reaching the age of 30 to 35 years. The life expectancy of an ice arena is 32 years based on a study done by Manitoba Culture, Heritage Recreation and Citizenship, 1995/6. With increasing utility costs, the operating costs of these arenas have risen to the point where they are no longer sustainable without retrofits or replacement to provide energy efficiencies to assist in reducing overall operating costs. Canadian Recreation Facilities Council joined forces with Hockey Canada with financial assistance from Natural Resources Canada, CTEC Varennes to conduct a **National Arena Census**. The Census

is a 16-question survey distributed to arenas across Canada. The census was also advertised by the 13 provincial/territorial member associations and other national partners from June to December of 2005 and was circulated to over 5000 practitioners in the recreation facility operation field. The information collected provides information on the state and needs of each facility while updating the existing arena information in the National Arena Database that was created in 2002.

### **Communications:**

There were four major communication channels used to collect the data from across Canada. The survey was mailed out initially as a paper document to 2841 rinks across Canada and was also available on the web in an electronic format. Surveys were also sent by e-mail and fax with the majority of responses received by fax. Identified duplications were deleted from the database, and new or missing ice arenas were added, resulting in a final total of 2,486 ice arenas.

### **Survey Responses:**

The overall response rate for this survey was 48.11%. Interestingly through follow up phone calls it was determined that some owner/operators of ice arenas chose to partially reply to the survey and only filled out basic information. They felt that they did not want the cost of operating their arenas made public because if the information was used for individual comparison of ice arenas they felt their arena would not measure up to what the national standard may be. They felt they could be scrutinized for this. 7% of arenas responding provided only partial information. 1% of arenas responding refused to provide any information. 51.89% chose not to respond at all for other reasons such as a lack of time, a lack of resources and inaccessibility to the information that was asked in the survey.

### **Analysis and Generalizations based on surveys received:**

- The largest construction boom in Canada occurred throughout the 1970's with 756 arenas built in the early 1970's. Of 1,857 arenas that supplied construction dates 1,350 arenas were constructed before 1980; this translates to 47% of arenas being over 26 years of age. 594 arenas were constructed before 1960; this translates into 32% of arenas being over 36 years old. The oldest arena was constructed in 1921.
- 86% of ice arenas in Canada are municipally owned and operated.
- Only 886 surveys were completed that included complete energy costs. Of those the combined energy costs varied from a low of \$42,130 for a 20,000 sq ft single sheet ice arena to a high of \$310,929 for a 100,000 sq ft complex.
- 65% of ice arenas use ammonia as the primary refrigerant, 25% use freon as the primary refrigerant and 10% have natural ice. Primary heating fuels are natural gas with electricity being the second largest.
- Energy efficiencies that are already in place in some ice arenas include low emissive ceilings, hot water heat recovery, space heat recovery, brine pump scheduling and brine ice temperature scheduling.
- 134 respondents indicated they had planned major renovations to their refrigeration system of \$50,000 or more. 74% plan renovations between 2006 and 2008, 14% plan renovations between 2009 and 2012, 5% plan renovations between 2013 and 2015 and 7% plan renovations after 2015. The value of these renovations nationally is in excess of \$335,000,000.
- 169 respondents indicated they had planned major renovations to the building of \$100,000 to in excess of several million dollars. 48% plan renovations in 2006, 21% plan renovations in 2007, 15% plan renovations in 2008, 4% plan renovations in 2009 and 12% plan renovations beyond 2010. The value of these planned renovations nationally is in excess of \$530,000,000.

- Even though in excess of \$835,000,000 in renovations are planned over the next 10 years this only applies to 303 respondents which represents only 12% of the 2,486 arenas nationally. If this number is applied to 1,350 of the 2486 arenas listed which are reaching 26 to 36 years of age that renovation value is in excess of \$3.7 billion.

**Conclusions:**

Although the National Arena Census fell short of the anticipated 80% return rate, the 48.11% received provides a very usable cross section of information. This information shows that Arena infrastructure is at a point in its lifecycle where within the next few years massive amounts of funding will be required both to maintain and sustain this infrastructure. The burden of this funding will lay with municipal governments, as they are the owners of 86% of the infrastructure.