

The information contained in this appendix referring to heat recovery from refrigeration systems has copyright protection. The copyrights are with the Canadian Energy Technology Centre (CETC), Varennes, Quebec, Natural Resources Canada. We thank them for allowing their information to be published in this manual.

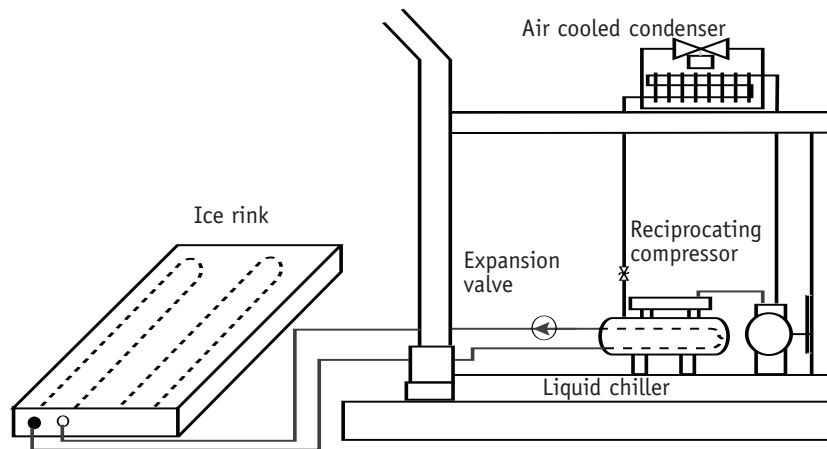
Heat recovery from refrigeration systems - CETC

The amount of heat wasted from refrigeration units is substantial. Much of that heat can be recovered and used to replace other heating requirements in your arena or curling rink.

SaskPower strongly advises each community planning to capture waste heat from your refrigeration system to work closely with your refrigeration plant installer and maintenance provider during the planning and installation stages of heat recovery equipment.

The following information on heat recovery from ice plants was taken from a presentation given by representatives of the Canadian Energy Technology Centre in the fall of 2005.

Figure vi.1 - Traditional refrigeration unit

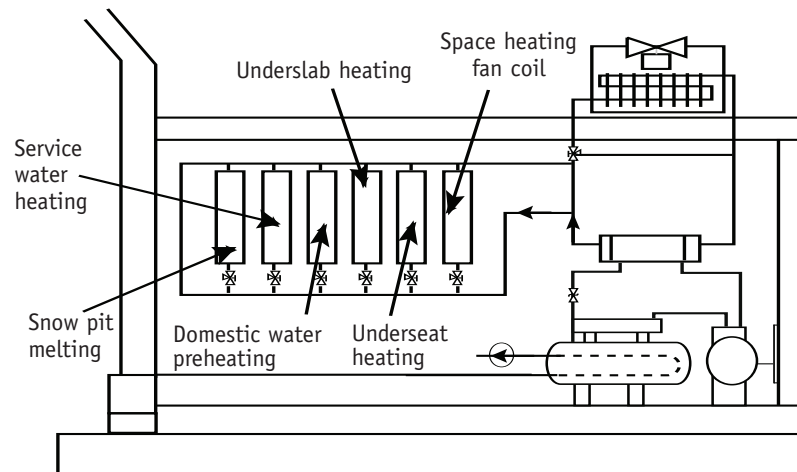


The traditional refrigeration unit expels heat from the condenser unit that is approximately equal to three times the energy consumed by the compressor. This waste heat could have several different uses in your facility.

Applications for recovered heat

Waste heat can be captured by installing a heat recovery unit on the line to the condenser unit. Note the uses for waste heat as shown in Figure vi.2 below. In order to achieve an acceptable payback for installing the retrofits, the arena or rink should operate for at least six months each year. Most of the calculations CETC has used are based on an eight month operating year.

Figure vi.2 - Applications for recovered waste heat



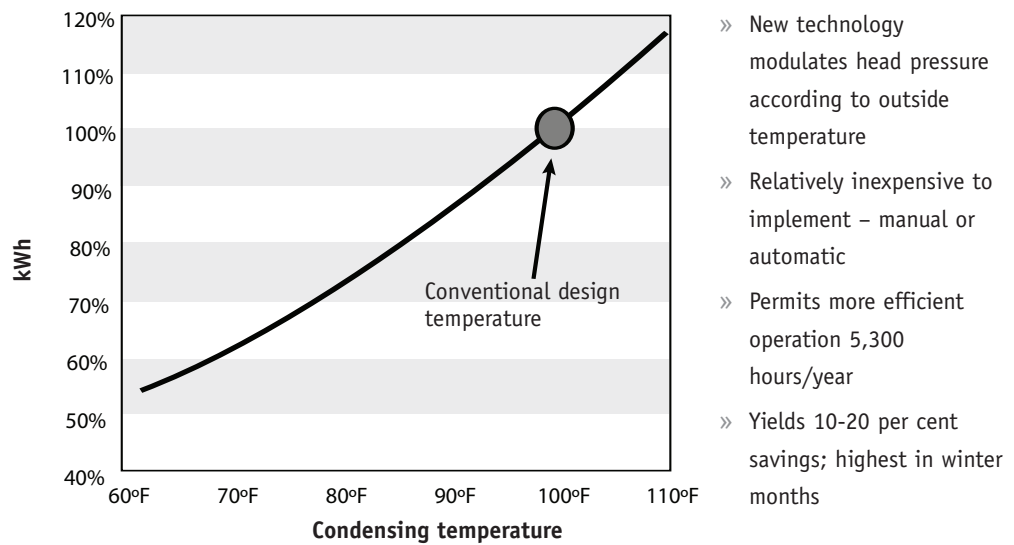
Head pressure control

Another option to save energy is to reduce the head pressure on the compressor.

A traditional refrigeration system uses a fixed and pre-set head pressure. High head pressure causes high condensing temperatures, resulting in high power consumption. Traditional head pressure settings are adjusted for outside design conditions of 86°F (30 C). For year-round rink operation in Canada, design conditions may occur for less than 100 hours per year.

If you modulate the head pressure according to outside air temperature, up to 25 per cent of the energy normally required could be saved and the life expectancy of the compressor would be increased. This should only be attempted with the approval and assistance of the refrigeration unit supplier and maintenance representative.

Figure vi.3 - Condensing temperature savings



A more efficient approach is to have the head pressure correspond with the cooling needed according to the outside temperature. As the outside temperature falls, the compressor does not work as hard to provide cooling. The supplier of your refrigeration equipment should be aware of new technology which will integrate head pressure and the outside temperature.

Financial assistance for commercial, institutional and municipal buildings

Your community project may qualify for financial incentives from different levels of government and supporting organizations. This section has been added to help direct you to proper locations to obtain further information on what assistance is available.

Federation of Canadian Municipalities - Green Municipal Fund

<http://www.fcm.ca/english/gmf/gmf.html>

Municipal governments and their partners can apply for funding for sustainable community planning and infrastructure projects from the Federation of Canadian Municipalities (FCM).

Office of Energy Conservation – Saskatchewan

<http://www.oec.ca/html/funding/Commercial/index.cfm>

The Office of Energy Conservation is a resource for information on cost-effective energy conservation initiatives and practices for Saskatchewan. For more ideas on saving money through energy efficiency, visit the OEC web site at www.oec.ca or call the OEC Hotline at 1-800-668-4636.

Natural Resources Canada

Incentives and Rebates: <http://www.oee.nrcan.gc.ca/corporate/incentives.cfm>

Existing Buildings:

<http://www.oee.nrcan.gc.ca/commercial/financial-assistance/existing/retrofits/index.cfm>

Natural Resources Canada's Office of Energy Efficiency (OEE) wants to help improve energy efficiency in municipal, institutional and commercial buildings. EnerGuide for Existing Buildings (EEB), formerly known as the Energy Innovators Initiative, works with a network of partners and service providers across Canada to provide financial assistance, publications, training and tools for commercial business, public institutions and other eligible organizations. After joining EEB, members can access EEB retrofit incentives, including the new Communities and Institutional Buildings Program.

Eligible organizations:

Commercial Sector (Examples)

- » Retail
- » Hotels
- » Restaurants
- » Office buildings
- » Multi-unit residential buildings
- » Warehouses without manufacturing

Institutional Sector (Examples)

- » School boards
- » Colleges and universities
- » Health care
- » Non-profit
- » Provincial and municipal governments

New Buildings

<http://www.oeenrcan.gc.ca/commercial/financial-assistance/new-buildings/index.cfm>

Energy-efficient designs of new facilities may qualify for the Commercial Building Incentive Program (CBIP).

Regional Incentives

<http://www.oeenrcan.gc.ca/commercial/financial-assistance/existing/retrofits/complementary.cfm>

Some utilities and provincial governments offer incentives and rebates that can be combined with Natural Resources Canada funding.

Renewable Energy

<http://www2.nrcan.gc.ca/es/erb/reed/redi/index.asp>

Visit the Renewable Energy Deployment Initiative (REDI) web site for information on funding for solar heating or biomass systems.

Other Financial Information

<http://www.oeenrcan.gc.ca/commercial/financial-assistance/other-information.cfm>

Understand payback, arrange financing and track your savings.

Cross-Canada Database

http://www.oeenrcan.gc.ca/corporate/statistics/neud/dpa/policy_e/programs.cfm

Search for financial and other initiatives from governments and utilities with the Directory of Energy Efficiency and Alternative Energy Programs.

Buildings, Industry and Equipment

<http://www.oeenrcan.gc.ca/commercial/buildings.cfm>

Quick links to initiatives and incentives.

Tax Incentives

<http://www2.nrcan.gc.ca/es/erb/erb/english/View.asp?x=68>

Visit the Renewable and Electrical Energy Web site for information on tax benefits for large-scale investments in energy efficiency.

Environment Canada

Community Programs, Prairie and Northern Region

EcoAction

The EcoAction Community Funding Program is an Environment Canada program that provides financial support to community groups for projects that have measurable, positive impacts on the environment. EcoAction encourages projects that protect, rehabilitate or enhance the natural environment and build the capacity of communities to sustain these activities into the future.

Saskatchewan Contact(s):

EcoAction

Environment Canada

<http://www.ec.gc.ca/envhome.html>

Room 150

123 Main Street

Winnipeg, Manitoba R3C 4W2

Telephone: (204) 984-5952

Fax: (204) 983-0964

Toll-free (information): 1-800-567-1570

E-mail: ecoaction.pnr@ec.gc.ca

Inquiry Centre

http://www.ec.gc.ca/inqry_e.html

For general information on the programs, services and publications of Environment Canada:

Inquiry Centre

70 Crémazie St.

Gatineau, Quebec K1A 0H3

Telephone: 819-997-2800 or 1-800-668-6767

Fax: 819-994-1412

TTY: 819-994-0736 (Teletype for the hearing impaired)

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