

Solar Water Heating

Fort Providence Seniors' Centre

System Overview:

In August 2008 a Solar Water Heating (SWH) System was installed at the Fort Providence Seniors' Centre. The system was installed by the Northwest Territories Housing Corporation (NWT HC). The SWH consists of four arrays of 30 Evacuated Cylinder Solar Energy Collectors produced by Mazdon, this totals 120 Tubes. Storage for the system is provided by two 115 US Gallon (435L) tanks.

The SWH System is not designed to completely heat the water to the desired use temperature of 60°C. Instead, the system is designed to use the energy from the sun to heat the water as it travels through the evacuated cylinders. The water is heated to a higher temperature in summer on a sunny day than it is in winter on a cloudy day. In order to get the water to the desired temperature of 60°C, the water runs through an oil heater before arriving at the Seniors' Centre faucets.

During the summer the maximum temperature reached within the tanks on a sunny day was 54°C, and at night the tanks generally cooled to 25-30°C. During the winter months the majority of the water heating is provided by the oil heater.

The SWH system has successfully reduced both the cost of heating water at the Seniors' Centre and their greenhouse gas emissions. The system has operated to date without any significant problems.



Figure 1 – SWH Tubes at Fort Providence

Technical Data:

The installed system consisted of the following main components:

Solar Collector Tubes	Mazdon Solar Collector tubes, 4 Arrays of 30 tubes (120 total)
Water Tanks	2 - 115 Gallon(US) tanks (435L)

Figure 2 - Technical Data

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Detailed Performance Data:

The following data was recorded between May 1st and August 31st, 2009. It shows the energy captured by the solar tubes over the four month period. From that value, the amount of heating oil that would have otherwise been required to produce the same amount of heat was calculated. The money saved and the avoided greenhouse gas emissions were also calculated.

		Units
Energy Captured	50.1	GJ
Litres of Fuel Displaced	1,293	L
Savings	1,282	\$
Greenhouse Gas Reduction	3.49	Tonne CO ₂

Figure 3 - System Data

Data was obtained by use of a *DATASTORE Thermomax SMT400* data logger that tracks the solar energy production on a daily basis. The following graph shows the daily energy production between May and August 2009 (line) and the estimated monthly savings (bar) compared to if the system was operating entirely on heating oil.

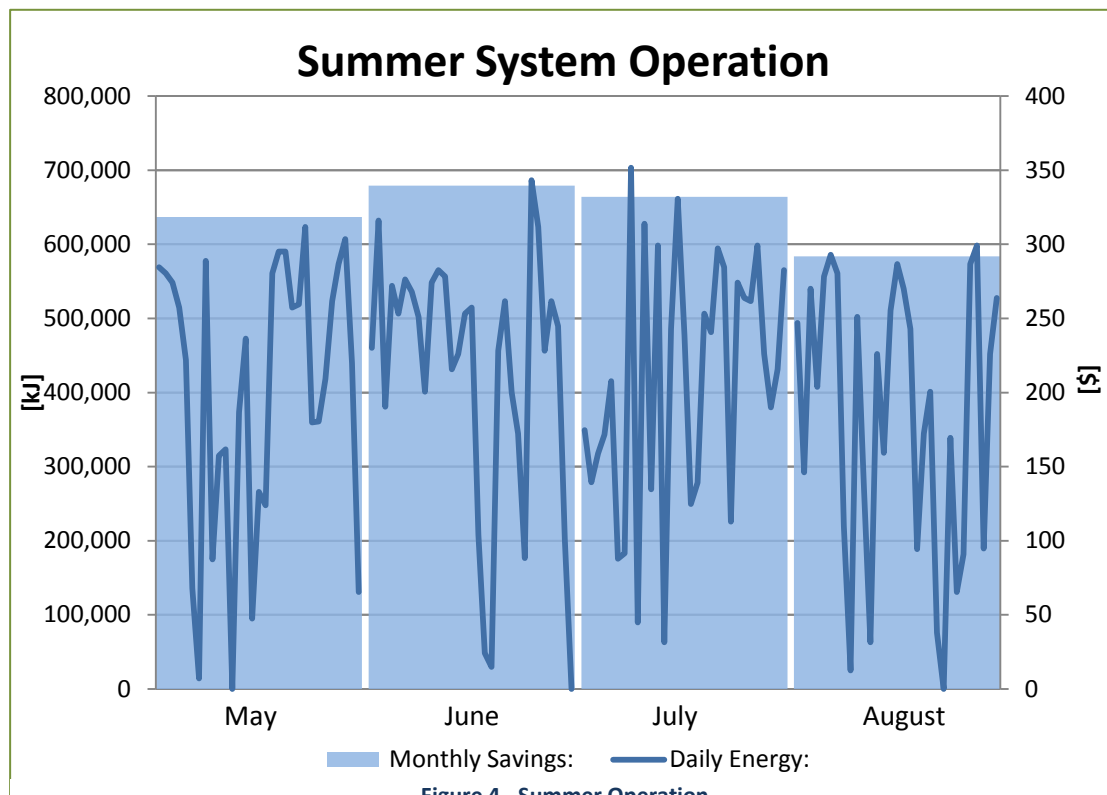


Figure 4 - Summer Operation