

Canadian Solar Community Hits 100% Solar Heating

The Drake Landing Solar Community in Okotoks, Alberta hit a new solar performance milestone record – 100% solar space heating for the 2015-2016 heating season. This is the first community in the world to accomplish this feat. The community of 52 energy efficient homes is heated by a solar district heating system combined with a borehole seasonal heat storage designed to store abundant solar energy underground during the sunny summer months and recover this heat for space heating during the cold winter months. This is the first system of this type designed to supply more than 90% of the space heating with solar energy and the first operating in such a cold climate (winter -38°C and summer 28.3°C).

The system was originally designed to achieve 92-93% solar space heating fraction in a typical year. System improvements over the years including lower heat delivery temperature to the homes, enhanced thermal stratification through reduced flow rates, and more efficient and timely transfer of heat from long term storage in anticipation of a cold front, have led to an improved performance. In the last five years the system has consistently exceeded original expectations with an average solar heating fraction of 96%. Whereas 100% solar fraction was originally expected to be a rare event (in fact in the original system simulations using 50 years of real weather data 100% was not achieved until year 34!) we now expect this to be a relatively common occurrence.

It is also noteworthy that this high solar heating performance has been achieved with very low electricity usage, with a coefficient of performance above 30. This means that for every kWh of electricity used by the pumps, the system delivers more than 30 kWh of heat, 8-10 times more efficient than heat pumps. As a result, this technology offers significant potential to minimize the impact on the electrical grid with the trend towards electrification of heating loads.

Natural Resources Canada initiated the Drake Landing Solar Community project in 2007 and remains the central coordinator for this first-of-a-kind renewable energy project. For additional information on the Drake Landing Solar Community please visit www.dlsc.ca.

