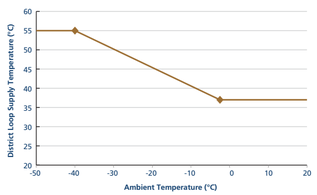
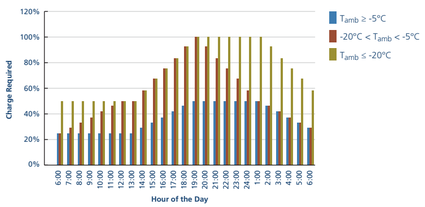
DRAKE LANDING SOLAR COMMUNITY OKOTOKS

System Control, Emergency Power and Building on Success

District Loop Set Point Temperature



Hourly Profiles for the STTS "Percent Charge Required"



Emergency Power System

- The emergency power system is used to ensure that critical functions are maintained during a power failure. This prevents the collector loop glycol from being overheated and damaged
- The control system, back-up collector loop pumps and fluid cooler fans are critical
- Photovoltaic (PV) emergency power eliminates the need to have a standby generator available
- The emergency power system has sufficient capacity to keep critical systems operating for an indefinite period and the batteries are large enough to bridge between sunny periods
- During normal operation, the PV array makes a significant contribution to the electricity consumed by the Energy Centre pumps and controls

Key Specifications

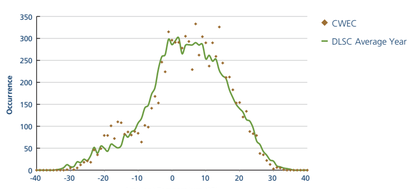
PV Array Peak Capacity	21 kW
Design Annual Output	77 GJ
Battery Bank (48 volt)	22 kWh

Planning for a 1000+ Home Solar Community

The proposed community includes commercial space, parkland and 1054 living units:

- 382 single-detached
- 272 multi unit attached
- 400 apartment units

Air Temperature Frequency of Occurrence (hours/year)



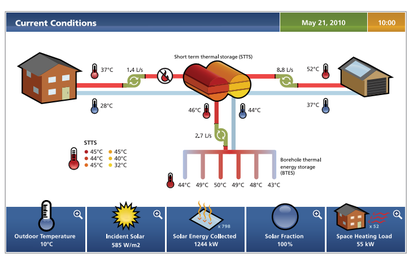
Borehole Thermal Energy Storage (BTES) Controls

- Charging and Discharging the BTES use opposite water flow directions to develop and maintain radial temperature stratification in the ground; the water flows from the centre to the outer edge during charging and from the outer edge to the centre during discharging
- The control decision to charge, discharge or remain idle is based on a comparison of the charge level in the Short Term Thermal Storage (STTS) called "STTS % Charge" and the calculated desirable level of charge in STTS called "STTS % Charge Required"
- "STTS % Charge" is based on the temperature distribution in STTS and the minimum temperature required for useful heating
- "STTS % Charge Required" is based on the current outdoor temperature and the time of day, to estimate future load (see Graph)
- "STTS % Charge" is increased with input from the solar collectors, and decreased by demand from the district loop
- A surplus of energy in STTS causes the BTES to charge and a deficit of energy in STTS causes the BTES to discharge
- Different criteria are used in Winter and Summer to determine whether there is an excess or deficit of energy in the STTS
- The control system uses water temperatures instead of soil temperature measurements for reliability
- Pumps P-6.1 and P-6.2 alternate every 500 hours of operation

Drake Landing Solar Community Key Specifications

- 52 Homes built to the R-2000 energy-efficiency specification
- 798 solar collector modules (2293 m² gross area)
- 240 m³ of water for short-term heat storage
- 34,000 m³ of earth for seasonal heat storage (144 – 35 m boreholes)
- Greenhouse gas emission reduction of 5 tonnes per house per year

Visit dlsc.ca for current performance



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