Hopital Cité de la Santé, Laval
Central geothermal system lowers energy costs, reduces greenhouse gas emissions, helps achieve LEED certification • Quebec, Canada

The Laval Health and Social Services Centre (CSSS Laval) was created in 2004 as part of a government reform that brought together hospitals, local community services centers and residential care facilities in ninety-five territories in Quebec. With eighteen facilities located across Île Jésus, the CSSS Laval is the largest in Quebec. It includes one hospital with an integrated cancer center, four local community services centers (CLSCs), five residential care centers and an integrated first line care center. The CSSS Laval works in cooperation with Laval’s medical clinics and public and private partners to facilitate access to healthcare services, while also promoting energy performance in its facilities.

Challenge
As the Hopital Cité de la Santé, Laval, made plans for an extension to its existing hospital building, facility managers outlined their criteria for a new HVAC system. To reduce energy consumption and carbon emissions, a geothermal system was specified. The hospital also required a boiler, for redundancy and back up, due to the critical nature of the facility’s operation.

Solution
Having good knowledge of geothermal systems, but without similar installation in their other facilities, it was critical for the hospital to select a knowledgeable systems supplier. The job was bid to established manufacturers with geothermal experience. Based on the best product performance with the geothermal application, the company’s reputation for service excellence and a previous successful relationship, Trane was selected as the hospital’s project supplier. Trane worked with the engineers to select a system that would provide the cold evaporator temperatures required for the application.

Central geothermal system offers energy efficiency
Geothermal systems use the earth’s renewable thermal energy for heating and cooling. These systems can generate significant operating cost savings and reduce carbon emissions. The Trane central geothermal system, designed for the hospital, combines the energy efficiency of geothermal...
Chillers provide high-performance and heat recovery
After reviewing a variety of options, two Trane low-temperature Series R™ Helical Rotary Water-Cooled Chillers (RTWD), with water-to-water heat pump controls and heat recovery capability, were installed. The proven reliability and flexible design of the Trane rotary chiller makes it a perfect match for high-performance applications, such as the hospital’s geothermal system.

With fewer moving parts and a low-speed/direct drive compressor, the advanced helical rotary chiller improves energy efficiency and requires less maintenance. The chiller also provides consistent performance to enable the hospital’s mission critical operations.

The RTWD is engineered to maintain tight tolerances for precise temperature control. The chillers can be configured to produce leaving-evaporator solution temperatures as low as 10°F (-12°C), making it ideal for the geothermal application. The RTWD is also well suited for energy-saving heat recovery.

Control application enables optimal system performance
A Trane® Tracer Summit™ building automation system (BAS) provides integrated control, allowing the building operator to perform daily tasks, such as responding to alarms, viewing reports and trends, and custom programming. Facility managers use the Chiller Plant Control application to commission an extensive sequence of operations to achieve the highest level of system performance and ensure optimal energy management. Trane-provided training on the operation and programming of the BAS enables operators to take advantage of their control system’s full capabilities.

Service keeps systems running at their best
The geothermal chillers include a five-year parts and labor warranty, and a service contract. Under the agreement, factory authorized technicians perform periodic maintenance needed to keep the systems running at their best, eliminating unplanned downtime for the critical hospital operations and helping to avoid costly emergency service calls.

Results
The Trane central geothermal system installed for the extension of the Hopital Cité de la Santé, Laval, is keeping patients, staff and visitors comfortable, while helping the CSSS Laval achieve its energy performance and sustainability objectives. The system has lowered energy costs and reduced greenhouse gas emissions, achieving points for LEED certification. The efficient geothermal system has operated without failure, making use of the hospital’s backup system unnecessary, even at temperatures as low as -28°C (-18°F) in the Montreal Region.

Able to maintain tight tolerances and produce low leaving evaporator solution temperatures, the Trane Series R™ Helical Rotary Water-Cooled Chillers are well-suited for the hospital’s geothermal application.