STANDBY POWER

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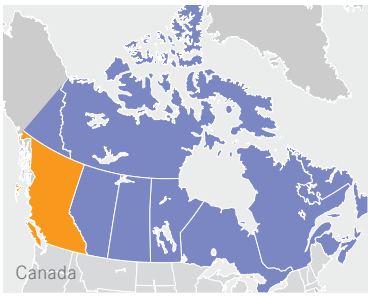
mtu onsite energy

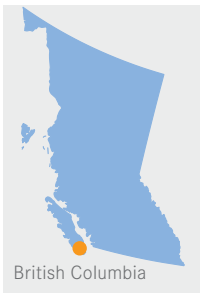
// **Who:** Royal Jubilee Hospital

// **What:** Two MTU Onsite Energy 3,000 kW emergency standby generator sets installed in the hospital's new energy center building

// **Why:** Low emissions and proven reliability in mission-critical applications

// **Where:** Victoria, British Columbia





When British Columbia's Minister of Health ceremonially switched on the power to Royal Jubilee Hospital's new Patient Care Center last May, it marked more than a major milestone in the construction of the largest single healthcare project on Vancouver Island.

It also activated a new and highly sophisticated hospital energy center engineered for unprecedented reliability and environmentally friendly efficiency. Royal Jubilee's choice of standby power generator sets for this critical project? MTU Onsite Energy, which supplied two 3,000 kW, 12.47 kV generators. Powered by 4,678 hp MTU Series 4000 diesel engines, the two 60 Hz units generate 50 percent more power with better fuel economy, fewer emissions and lower decibel output than the four generator sets they replaced.

Royal Jubilee owner Vancouver Island Health Authority (VIHA) says the 412,000-square-foot, 500-bed Patient Care Center (PCC) opened in March 2011, replacing older inpatient facilities on the Victoria campus. Described by VIHA officials as "elder friendly," 85 percent of the rooms in the PCC will be single-bed patient rooms with private bathrooms, allowing for family visits and stays, and designed to reduce hospital-acquired infection rates. The spacious rooms will be adaptable to different levels of care, decreasing the need to move patients.

"We are building better patient care for residents and visitors to southern Vancouver Island with the construction of the Patient Care Center at Royal Jubilee and the newly opened emergency department at Victoria General Hospital," said MLA Ida Chong, a member of the Legislative Assembly of British Columbia. "The new hospital is a visible demonstration of our commitment to providing patients with the best healthcare possible."

The $350 million Patient Care Center is Canada's first "Pacific Green" hospital, a designation reflecting a commitment to environmental sustainability through the efficient use of energy, focus on water conservation and the use of building materials said to minimize impact on

One of two MTU Onsite Energy generator sets powered by MTU 20V4000 engines is craned into place at Victoria's (B.C.) Royal Jubilee Patient Care Center.

natural resources. The certification by the Pacific Green Energy Initiative (PGEI) also recognizes VIHA's focus on overall health outcomes of patients and the work environment of healthcare providers – who will benefit from the PCC's increased use of green space, access to natural light, natural ventilation and the availability of alternative modes of transportation to and from the healthcare campus.

In that context, the VIHA's selection of energy-efficient MTU Onsite Energy generator sets for emergency standby power in the PCC's energy center is significant for several reasons. First, the generator sets, accompanying switchgear and energy distribution components were designed as an integral part of the overall electrical power system, a testimony to the confidence of VIHA and project design consultant Genivar (Vancouver, B.C.) in the generator sets' performance and reliability under the most critical conditions. In addition, the $4 million generator set purchase was awarded to MTU Onsite Energy distributor Cullen Diesel Power Ltd. (Surrey, B.C.), whose winning tender offer capitalized on expertise gained over dozens of genset sales and installations in healthcare facilities all over British Columbia.

"The new power system enables us to continue providing excellent healthcare, even in the most extreme situations."

/ // / Jac Kreut, board chair of VIHA

"Cullen Diesel Power has been consistently successful in supplying MTU powered generator sets to the regional healthcare market," notes Brian Davis, who specializes in generator sales for Cullen. Over the past five years, Cullen has provided MTU Onsite Energy gensets ranging from 50 to 3,000 kW to acute care and specialty hospitals throughout the province. According to Davis, the Royal Jubilee Hospital energy center installation was one of the largest and most complex projects to date.

"The project specifications included two gensets with provisions for a third to be added in the future if needed, paralleling and distribution switchgear, 2 x 6 MVA transformers and more, all of which required comprehensive engineering and a full 24-hour shop test that we conducted at Cullen Diesel Power prior to delivery," he explains.

The demands on two generator sets operating in parallel in a hospital application are understandably extreme. Power outages or variations in power quality can wreak havoc in the high-pressure, high-stakes world of healthcare providers. The new MTU Onsite Energy generators meet the challenge with the capacity to start, accelerate and parallel connect onto the hospital's emergency power generation bus in less than ten seconds for the first genset and within ten seconds for the second. Additionally, the gensets must automatically share steady state loads and transient step loads over the full range of power within 0.1 +/- 5% of rated kWe. The generator sets are UL recognized and CSA certified.

Full-load generator testing at least once per year for two hours per generator is a mandatory requirement for hospitals. According to Genivar's head project consultant Randy Arnett, the system's design incorporated innovative features that allow the hospital to conduct these routine test cycles on each generator set without having to connect them to an external load bank, thus saving fuel and without risking a power interruption. To accomplish this, the generator control system integrates a "closed transition transfer" automatic transfer switch, which permits the generators to pick up the hospital load without interruption by paralleling its output to the local utility provider, while transferring the load from utility source to the generators. Once the generators are carrying the hospital load, the control system allows one of the two generators to operate at a fixed load adjustable up to its full load rating, while the other generator set carries the balance of the hospital load.

Arnett explains that another positive feature of the new MTU generator sets is their seismic rating, confirmed by independent testing in accordance with International Building Code requirements. This rating was particularly important to Royal Jubilee, given its location in a seismically active area of Canada. "Following an earthquake, emergency power is considered to be a critical service for a hospital to continue to function and service the needs of the community," he notes.

The view from inside Royal Jubilee Hospital's new energy center, where standby power is provided by these two MTU Onsite Energy 3,000 kW generator sets.

The heart of each of the 28,000 kg (60,000 lb.) MTU model 3000LXC6DT2 generators is the mighty MTU 20V4000 diesel engine. Certified to U.S. Environmental Protection Agency (EPA) Tier 2 emissions standards, the engine produces fewer NOx pollutants than any engine in its class, and only 107 decibels of sound under full load in standby mode – important characteristics for Royal Jubilee Hospital's Pacific Green goal. The 20V4000 also delivers high horsepower-per-liter and impressive fuel economy thanks to advanced digital engine controls and common rail fuel injection.

Because the new MTU Onsite Energy generators replaced existing units, Cullen and Genivar technicians had to carefully plan the logistics of the installation during energy center construction. "It was a challenge to coordinate a new energy center without shutting down existing facilities at RJH," said Rudi van den Broek, chief project officer for VIHA. "The fact that we managed to complete this piece of the project ahead of schedule and under budget is a testament to the work of everyone involved."

"The new power system enables us to continue providing excellent healthcare, even in the most extreme situations," said Jac Kreut, board chair of VIHA. "The generators provide safe, reliable, efficient and long-lasting power, and were the logical choice in keeping with the overall green project design."

MTU Onsite Energy Corporation/100 Power Drive/Mankato, MN 56001/USA/Phone: +1 800 325 5450/www.mtu-online.com

MTU Onsite Energy is the brand name under which the Tognum Group markets distributed power generation systems. The product range encompasses standardized and customized diesel generator sets for emergency standby, base and peak load applications based on diesel engines rated up to 3,250 kW, as well as compact cogeneration modules powered by gas engines with up to 2,150 kW or gas turbines up to 45,000 kW for the generation of both heat and power.