SUCCESS STORY

The Travel Corporation Increases Reliability and Lowers Carbon Footprint of Its Busy Data Center

The Travel Corporation (TTC) is a world leading travel company helping people craft holidays for every taste, place, and pace. With 30 award-winning brands that travel to seven continents that include Trafalgar, Uniworld, Insight Vacations, and Contiki, TTC is committed to providing the best travel experience. It also has a strong commitment to making travel matter, believing that travel and tourism companies play a vital role in safeguarding the people, planet, and wildlife for generations to come. To support this goal, and through its not-for-profit organization The TreadRight Foundation, TTC and its family of brands have supported some 50-plus sustainable tourism projects worldwide to date. Examples of TTC's sustainability efforts include planting a tree for every registered traveler that chooses e-documentation and leading the travel industry by becoming the first global operator to commit to the elimination of all unnecessary single-use plastics by 2022.

TTC's sustainability goals are corporate-wide including its dense 1,200 square foot data center that handles all the re-cords coming in from its 30 worldwide travel brands, the com-pany's eight main offices, and 40 sales offices worldwide. The data center also supports the booking engine, financial trans-actions, website hosting, email, and VoIP communications. Ensuring that TTC's data center is operating reliably and at peak efficiency is the job of Toronto-based facility manager, Craig Lee.

Greening the Data Center

With the data center located in the company's Toronto, Canada office, weather-related power interruptions are frequent, so having highly reliable power protection systems protecting the data center is paramount. "The weather has become unpredictable. Here in Toronto, temperatures can range from -30°C to 40°C (-22°F to 104°F) with ice storms in the winter taking out power lines and rain storms in the summer causing their own disruptions. We can no longer predict from past weather patterns," said Lee.

When the power load requirements of the data center in-creased, Lee took the opportunity to explore different approaches to reduce energy consumption without comprising reliability. Lee was using 3-phase UPS systems with lead-acid batteries that would switch to their two Caterpillar and Cummins diesel generators during a power outage.

"We were spending $50,000 every five years to replace the batteries, and we were not comfortable with the battery disposal cost and environmental impact. We wanted to find a greener approach to power protection," said Lee.

Looking to their technical partner, Urbacon, for their suggestions, Urbacon specialists recommended replacing their dual-strings of lead-acid batteries with four of VYCON's energy-efficient VDC-XXE flywheel energy storage systems. The VDC flywheels are environmentally friendly and are 20 times higher in reliability compared to lead-acid batteries. With a 20-year operational life and no bearings to replace, the VYCON flywheels offer a cost-effective power solution for organizations wanting to improve reliability with a lower total cost of ownership.

Previous Battery Strings in TTC's Data Center

VYCON

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"The VYCON flywheels have added to our reliability and lower carbon goals. We have had many power failures and interruptions in the last few years and the flywheels have worked perfectly every time."

The VDC flywheel holds kinetic energy in the form of a rotating mass and converts this energy to electric power through patented technology within the flywheel system. VYCON's unique technology includes a high-speed motor generator, active magnetic bearings that are used to levitate and sustain the rotor during operation, and a superior control system that provides vital information on system performance.

These technologies enable the VYCON flywheel to charge and discharge at high rates for countless cycles making conventional technologies like batteries obsolete.

Spinning up Reliability

Now, the data center has two 150kVA double-conversion UPSs each with 2 x 300kW VDC-XXE flywheel systems connected in parallel with a maintenance bypass switch with transformers.

"When there's a power outage, we're on the flywheels and then transfer to the diesel generators. We have two minutes per flywheel , so we have eight minutes before transferring to the generator. If the generators don't turn on in that time, they're not going to come online at all," said Lee.

The data center has a 2N redundant A/B configuration in place with one utility supply line that splits into two separate supplies each protected by a diesel generator for backup power.

Each separate power supply line has a transfer switch connected to the two flywheels and a UPS to feed the servers – so if one supply route has an issue, the other still maintains power to the data center.

For cooling the data center, Lee uses a Kyoto Wheel heat exchanger. Its large, slowly rotating honeycombed disc draws heat out of the data center room and cools it using less than a quarter of the energy needed to cool the data center with conventional air conditioning. One small electric motor is needed to turn the wheel, compared to the old air conditioning systems that continually pumped fluids.

In addition, for cooling and heating the offices, TTC eliminated their heat pumps and cooling tower and replaced them with a geothermal system. "We have 19 boreholes, 500 feet down. The water circulates in the closed pipe system where the temperature is a constant 50°F. This provides cooling

VYCON's VDC-XXE 300kW Flywheels in Parallel Configuration

in the summer, and the water needs only to be boosted to room temperature in the winter. We have dropped our use of natural gas by 75 percent," said Lee.

For the data center, Lee has reduced their energy usage from 1.4 million kW to 98,000 kW after incorporating the new power protection system bringing his Power Usage Effectiveness (PUE) to 1.3 from 2.0.

"We are using less power but have added more resources and 2.5 times the amount of people in the offices. The VYCON flywheels have added to our reliability and lower carbon goals. We have had many power failures and interruptions in the last few years and the flywheels have worked perfectly every time. So far, the flywheels have been fantastic, and low maintenance requirements are always a bonus," Lee adds.