



Power Generation

STANDBY POWER SYSTEM IS LIKE MONEY IN THE BANK FOR FINANCIAL DATA CENTER

Who Synovus
What Two 2,250 kW generator sets from MTU that operate in parallel
Where Columbus, Georgia, USA

Synovus is a financial services company that includes 30 Southeastern banking divisions, trust brokerages and mortgage companies, plus a credit/debit card processing company. With \$29 billion in assets, the divisions of Synovus provide banking, investment and mortgage services to customers in Georgia, Alabama, South Carolina, Florida and Tennessee. The company recently constructed a new mission-critical data center in Columbus to handle its e-banking, telecom and ATM transactions, and it chose emergency standby generator sets from Rolls-Royce to prevent any loss of services or data in the event of a utility outage.

“While Synovus has other off-site facilities for data storage and disaster recovery, the Columbus facility is the main data center for all our banking activities,” says Charlie Whipkey, facility maintenance coordinator for Synovus. “Whenever a Synovus customer makes a purchase with one of our bank cards, uses one of our ATMs or conducts business at any of our several hundred branches, that data is handled by this facility. The Network Operation Center is manned 24 hours a day, and there is constant data communication with our network to transact business.”

Synovus' new 50,000-square-foot data center was designed to accommodate considerable future growth, explains Whipkey. The current servers occupy only about one-third of the available space, but most of the essential infrastructure is already installed in the subfloors to allow future expansion with minimum construction and cost.

Redundancy a key design factor

As in most mission-critical facilities, the Synovus data center uses layers of redundancies to prevent loss of services or data. Starting at the server cabinets, Whipkey explains, every cabinet has two power supplies. These, in turn, are backed up by dual utility feeds, plus a rotary flywheel UPS system. The last line of defense is the emergency power system, consisting of two 2,250 kW MTU diesel generator sets operating in parallel.

"We have a fairly unique backup system at Synovus in that we use a UPS system based on rotary flywheels. We wanted to get away from a battery-backed UPS system because of ecological concerns regarding acid containment. There are also maintenance issues with wet cells that we wanted to avoid," says Whipkey. "The rotary flywheel UPS system gives us about 25 seconds of full load facility power after a utility outage, so we needed emergency standby generators that could start and accept load in eight seconds or less. One of the reasons we chose MTU was because these generators can start and assume full load in just 7.5 seconds."

As a facility design philosophy, it is typical to allow for N+1 redundancy in all critical components, and the Synovus data center is no exception. Currently, the facility's total electrical load is about 500 kW, which is just 10 percent of the combined capacity of the two standby generator sets. This means that even if the electrical load grows by 500 percent over time, the facility would still have one fully redundant generator set that could supply sufficient power if the other unit didn't start. If the facility's load grows beyond that level, Whipkey says there is already a third electrical room and space for a third generator set and transfer switch, thanks to the center's long-range planning.

When the power goes out

In the event of a utility outage, the facility's control system is designed to first try switching to the alternate utility feed. If the second utility feed is also down, the UPS system picks up the building's critical loads with the exception of the air conditioning chillers. Within one second of the outage, a signal goes to the generator sets to start; the emergency generators accept the critical loads within eight seconds. A few seconds later, other less critical loads, such as the chillers, are also picked up by the generator sets. To ensure starting reliability, the generator sets are outfitted with a state-of-the-art MTU DGC-2020 digital control system, which provides precise control of engine and alternator performance. To date, the units have not had a single failure-to-start event in over two years of operation.

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- 1 Two MTU 2,250 kW generator sets back up the main data center for Synovus Financial. The generator sets can start and assume full load in under eight seconds thanks to about 20 percent more cylinder displacement per unit of horsepower than other generator drive engines.
 - 2 Synovus' new 50,000-square-foot data center was designed to accommodate considerable future growth. The current servers occupy only about one-third of the available space.



Once power is restored, Synovus is also cautious about returning the load to utility power. “Because of the center’s criticality,” says Whipkey, “we don’t let the system automatically transfer back to the utility when normal power is restored. When the utility comes back on, we choose to manually transfer the power back because we want to make sure that everything is working normally. The operator has to physically check the building, the generator sets and the breaker positions, and also make sure the flywheels have recharged, before we hit the transfer button.”

Local distributor met key requirements

According to Eddie Oliver, a power generation sales engineer with MTU distributor W.W. Williams, the speed with which the MTU 2,250 kW generator sets start and assume load was a key factor in Synovus’ selection. This ability to start and accept load quickly is due, in part, to MTU diesel engines being designed with about 20 percent more cylinder displacement per unit of horsepower than other generator drive engines. The results are more reserve horsepower and torque, allowing the generators to be quickly block loaded and to respond faster to load changes.

Another factor in Synovus’ choice was that the distributor worked hard to accommodate application needs, such as sound attenuation and prompt delivery. “The data center had very strict noise-level requirements to meet due to the proximity of residential property,” says Oliver. “To help meet the sound-level goal, W.W. Williams sourced a much larger radiator with a lower-speed, lower-noise fan like those typically used on MTU 3,250 kW generator sets. The combination cools well and is very quiet.”

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Charlie Whipkey

Facility maintenance coordinator, Synovus

Maintenance is a big factor in reliability

Power system reliability starts with good equipment, but Synovus recognizes that ongoing maintenance also plays a vital part. Regular maintenance and exercise of generator sets, breakers and transfer switches are essential, and Whipkey has a precise schedule that he follows. “Every Monday, the generators are exercised for about 30 minutes – long enough to get them to operating temperature. Then, once a month, both generators are started and run for an hour with the full building load, completely off the grid. The paralleling switchgear is a closed-transition system that allows a nice, smooth transition from the utility to the generator sets and back.”

Whipkey says that the data center’s standby power system is also capable of various load management functions and is qualified by Georgia Power as a Real Time Pricing (RTP) Customer. To qualify for reduced electric rates under the utility’s RTP program, the data center had to demonstrate that it could run on its standby generators at full load for four hours off the grid. However, with the current high cost of diesel fuel, the utility has not been asking its RTP customers to reduce their load on the grid because it might cause an economic hardship.

With electronic financial transactions, such as e-banking and ATM and bank card use, increasing almost daily, Synovus will be relying on its central data center – and on reliable electric power. Whipkey says that the company’s Columbus data center will be able to accommodate the anticipated growth for the next 10-15 years before the facility reaches capacity. In the meantime, Synovus is banking on its MTU standby generators to keep its system secure and its customers happy.

Rolls-Royce provides world-class power solutions and complete lifecycle support under our product and solution brand MTU. Through digitalization and electrification, we strive to develop drive and power generation solutions that are even cleaner and smarter and thus provide answers to the challenges posed by the rapidly growing societal demands for energy and mobility. We deliver and service comprehensive, powerful and reliable systems, based on both gas and diesel engines, as well as electrified hybrid systems. These clean and technologically advanced solutions serve our customers in the marine and infrastructure sectors worldwide.