GENERAC®
INDUSTRIAL POWER

POWER SOLUTIONS
CASE STUDY

UNIVERSITY OF UTAH

Location
Salt Lake City, Utah
University of Utah

Market
Data protection, Data Centers

Unique Obstacle
Provide a scalable backup power system to backup immediate needs of the data center and have the capability to easily and efficiently expand as the data center capacity increases

Units
5000 kW MPS GEMINI, expandable to 11 MW

Solution
One MPS system comprised of 5 Gemini units on a single bus

Contact
Readers who may have similar application challenges and would like to discuss this success are invited to call 1-844-ASK-GNRC (1-844-275-4672)

> *"The Service has been exceptional, the pricing was very competitive. We recommend using Generac on other projects."*

Generac MPS Reliably and Cost-Effectively Backs Up University of Utah Data Center

Several organizations affiliated with the University of Utah in Salt Lake City have their data protected thanks to a particularly unique Generac Modular Power System (MPS) installation. The reliable, cost-effective solution was a perfect fit for the university's needs.

In 2012, the University of Utah opened a new multi-tier data center. The 74,000-square-foot facility consolidates seven different stand-alone data centers across the university campus. Ultimately, it is intended to house data from nearly all campus entities, including University of Utah Hospital, and the various academic departments. The current data center is the first phase of a project expected to expand as the university's data needs grow.

As part of this project, the university issued an RFP to select a backup power solution. "The university and hospital use computer systems to automate otherwise manual processes," said Brent Elieson, associate director, information technology and services at the University of Utah. "While we do have failover hot sites and DR [disaster recovery] sites, it would still be very disruptive to our efficiency if we experienced frequent power outages." The university had some specific expectations for their backup power system. The footprint, for instance, was an issue, as space in the yard where the generators were to be installed was at a premium. Sound requirements were another concern.

Additionally, as a multi-tier data center, reliability was crucial. "The requirements of our systems demand a Tier III level of reliability," Elieson said. "That would mean a paralleled backup power system."

Paralleled systems always offer significant advantages in backup power applications. They are more reliable than single-engine generator solutions, and they offer significant advantages in reliability for critical loads. For example, if the reliability of a standby generator is defined at 98 percent, an N+1 configuration has a reliability of 99.96 percent, and an N+2 configuration has a reliability of 99.999 percent. An N+2 configuration exceeds Uptime Institute's Tier IV certification.

Originally the specification had required several large, 2-megawatt single-engine generators connected in parallel using traditional switchgear. Such an approach has some drawbacks, largely due to the cost, complexity, space requirements and integration issues associated with traditional paralleled systems. As a result, Generac power solutions manager Curt Gibson and Generac dealer Energy Management Corp. (EMC) believed that a Generac MPS solution would be an ideal alternative for this application.

"Generac MPS solutions reduce complexity and costs by eliminating the custom paralleling controls," Gibson said. "That's often a very attractive differentiator. Eliminating external switchgear also

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> *This solution was very economical and saved us money over what we were expecting to pay.*

Gibson and EMC worked with engineering firm SmithGroup JJR, Phoenix, AZ, and electrical contractor Wasatch Electric in Salt Lake City to present the value of an integrated paralleling solution that was based upon Generac's Gemini generators. These 1MW units are actually comprised of two 500kW generators connected in parallel and housed within a single enclosure. The result is a generator that takes up even less space than a single-engine unit with the same output. The electrical contractor working on the project had familiarity installing Gemini generators and was able to document how the installation of Gemini units would reduce labor costs compared to competitive systems.

However, one additional hurdle had to be overcome—scalability beyond 9 megawatts. Under most circumstances, Generac MPS solutions—whether implemented with Gemini units or otherwise—have been limited to 9 megawatts. The university expected the data center would require 11 megawatts when complete, so it could accommodate future expansion.

The solution that Gibson and EMC proposed was a unique one: install one MPS system comprised of five Gemini units on a single bus now (delivering 5 megawatts to manage current demand) and install a second MPS system comprised of six Gemini units (6 megawatts) on a second bus in the future. The additional Gemini units would be added as necessary to meet capacity demands and minimize capital expenditures as the data center grows.

Generac and EMC were awarded the job after giving their MPS presentation and producing a schematic that showed how the MPS solution would fit the footprint, meet the noise criteria in the spec (the Gemini units were quieter at the outset than the competitive product) and accommodate future expansion.

The five Gemini units on the one bus were installed and commissioned in 2011. The other six units are slated to be installed in the near future as needed. A 22,000-gallon diesel fuel tank serves the five Gemini units, and a separate such tank will be installed with the other six units. "From a sheer installation standpoint, it's a lot less expensive. Cheaper to buy, faster and easier to install," said Josh Pettersson, project manager for Wasatch Electric.

While the fuel storage and delivery system was designed by the engineering firm, EMC worked closely with them on all aspects of system integration.

"This solution was very economical and saved us money over what we were expecting to pay," Elieson said. "The system comes online much faster than we had expected, taking the load off of the UPS and improving the life of the batteries. The units scale very well for our needs and are easy to grow without purchasing additional parallel gear."

"Quite honestly, they were very, very skeptical about them [the generators] being up, paralleling, and syncing in six or seven seconds," Pettersson said. "But then once it happened, then they were calling and saying, 'Oh my gosh. You need to come up here and take a look at this.'"

Also, the system met the university's sound requirements.

"The sound package that came with the generators was very good," Elieson said. "We were concerned about disturbing our neighbors, (and) we were very pleased with how quiet the systems run."

Early completion of the project allowed the university to move into the data center ahead of schedule.

Elieson added he would recommend Generac in the future. "The service has been exceptional," Elieson said. "The pricing was very competitive. We would recommend using Generac on other projects."

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BRENT ELIESON

Brent Elieson is currently the associate director of IT Infrastructure at the University of Utah, University Health Care and University Research. Previously, he served as vice president of IS&T at a S&P500 financial institution, corporate service manager at a Fortune 500 company, and consulted for the Fortune 1000. Elieson serves on multiple industry boards and governing bodies, has been a keynote speaker on multiple occasions, has authored several industry publications, and has participated on multiple national IT research grants. His undergraduate studies were in the fields of engineering, computer science, and business, with graduate work in banking and finance. Elieson has 24 years experience in the IT industry.

JOSH PETTERSSON

Josh Pettersson is a project manager/electrical engineer with Wasatch Electric in Salt Lake City, Utah, where he has worked at Wasatch since 1991. Pettersson's role includes guiding projects to a timely and profitable completion. He is responsible for overall project completion including pre-project planning, bid review, contract review, subcontract and major material procurement, bond and permit procurement, pre-construction coordination, scheduling and man-loading, submittal coordination, change order processing, project forecasting and reporting, field management training, overall quality control, and safety and closeout documentation.

ROBERT STY

Having practiced in the mechanical engineering field for over 15 years, Robert Sty is a principal and lead of SmithGroupJJR's Technologies Studio. He has been involved in various levels on many mission critical projects for co-location, enterprise, health care, higher education, high performance computing, and 911 emergency operations facilities. Sty has written articles on numerous topics for the ASHRAE Journal, Consulting-Specifying Engineer magazine, Building Design + Construction, and AZRE magazine. An active member of ASHRAE, he served on the Board of Governors from 2003-2007, and as Central Arizona Chapter president for the 2006-2007 session. Sty is also a provisional corresponding member of Technical Committee 9.9, Mission Critical Facilities, Technology Spaces and Electronic Equipment. In 2009, he was part of the City of Chandler, Arizona's Green Building Task force, assisting in establishing the city's sustainable building program. Sty also earned Consulting-Specifying Engineer magazine's "Forty Under 40" award for his contributions to the industry.

CURT GIBSON

Curt Gibson is Generac's Western power solutions manager. In this role, he works with clients to understand how to reduce risk and improve installation on complex emergency power projects. Beyond just generators, Gibson provides technical guidance for the entire emergency power system, including switchboards, switchgear, ATSs, UPSs, PDUs and the like. He is also well versed in common emergency power topics, such as arc flash, seismic, emissions, NFPA, NEC, UL, and a variety of regulatory and compliance issues. With over 15 years of experience in engineering and project management with custom paralleling switchgear, Gibson brings a wealth of knowledge in all aspects of large complex emergency power projects. He also earned a master's degree in business administration from California State University.

DAVE PETERSEN

With over 27 years of mechanical and electrical experience, Dave Petersen is the founding division manager of the Project Management Group at Energy Management Corporation, which is a Generac Industrial Power dealer operating in Utah, Colorado, Idaho, Wyoming, Nevada, and California. The Project Management Group handles project management, bid spec projects, and major projects. The main focus is in standby generators, automatic transfer switches, variable frequency drives from ¼ hp to 120,000 hp, including medium voltage, power quality, and power factor correction. Peterson has designed and implemented medium and low-temperature refrigeration systems, commercial HVAC systems, infrared heating systems, and numerous commercial and industrial air moving systems. He served in the US Army Special Forces, holds degrees in mechanical energy engineering, and has a Certified Energy Auditing Certificate.

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