

GENERAC®

INDUSTRIAL POWER

THE MUSEUM
OF THE BIBLE

Washington, D.C.

CASE STUDY

CHALLENGE:

Integrate a modern-day backup power solution into the infrastructure of a 100 year-old facility to protect priceless artifacts.

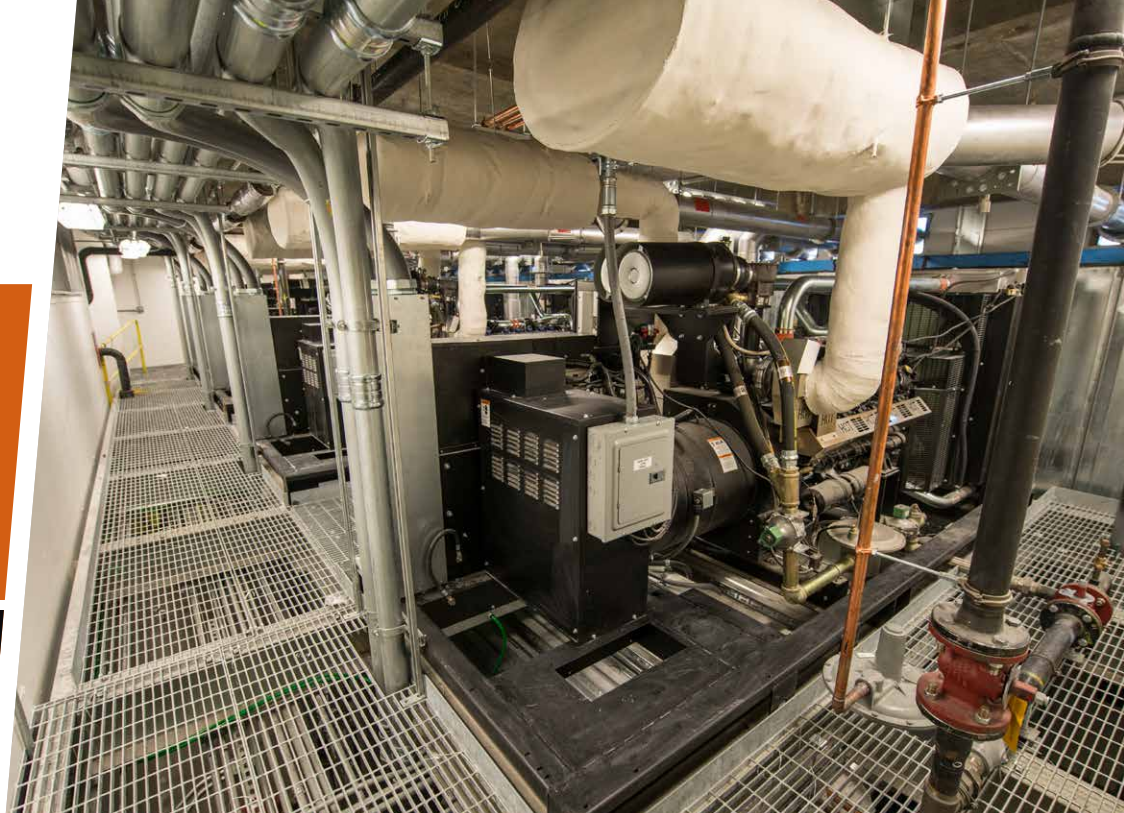
SOLUTION:

Generac 3.2 MW MPS solution consisting of eight paralleled 400 kW generators, uniquely installed four-over-four on a custom racking system.

RESULT:

An innovative solution utilizes Generac natural gas generators to maximize redundancy, consolidate switchgear and provide seamless operation in a tight space.

“We would specify Generac again. They demonstrate that they can deliver a natural gas fueled paralleling system that will compete at any level.”



Generac designs a backup power solution of Biblical proportions.

The Museum of the Bible (MOTB), located just three blocks from the U.S. Capitol in Washington, D.C., opened to the public in 2017. A 1920s-era, refrigerated warehouse was completely renovated to house the 430,000 square foot museum complex. The transformation came with a unique set of needs to fit the MOTB's vision of becoming one of the most technologically advanced and engaging museums in the world.

From a backup power generation standpoint, there were myriad considerations due to the enormity of the structure. "Facilities of this magnitude typically have much larger loads that need to be backed up compared to a smaller project," said Keith Fogle, a foreman for Ennis Electrical Company. "There are numerous life safety issues; fire alarms, security, egress lighting, as well as other considerations that must be supported by the backup power generation solution."

One of these considerations was the climate control system, needed to preserve the MOTB's priceless relics. "The museum has historic artifacts that date back centuries and we must keep those artifacts at specific temperatures and relative humidity set points," said Kenz Meliani, electrical engineer at SmithGroupJJR. "A large part of the climate control mechanical equipment was required to be on backup power."

Due to the size and complexity of the project, it was decided that the best project delivery method was design-assist. Design-assist allowed Generac to engage with contractors and design engineers earlier in the process to ensure all design and construction details were resolved prior to the final bid documents. That led to an ideal backup power solution created through the partnership of Kelly Generator & Equipment, Inc., Clark Construction, Ennis Electric, Southland Industries, and SmithGroupJJR. Generac brought extensive design, natural gas fuel applications, and digital paralleling technology expertise to the table.

The original design by SmithGroupJJR specified three 1 MW diesel fueled generator units on the penthouse level of the building, each with a dedicated load. There were a few unique complications with this solution, according to Mike Buser, project executive at Ennis Electrical Company. "The owner didn't want to deal with maintenance issues associated with diesel fuel, not to mention the risk of a spill or a leak." What's more, the generator units would have had to be installed on the penthouse level of the building, requiring fuel to be stored in an adjacent parking garage, resulting in lost parking spaces.



APPLICATION:

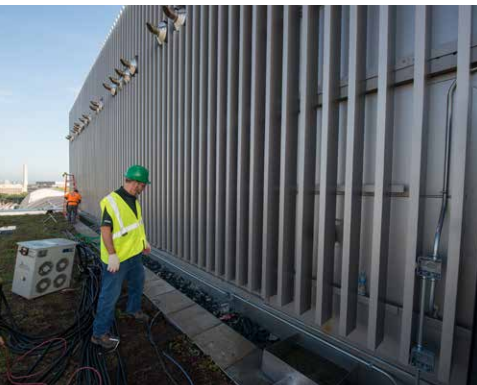
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SYSTEM CONFIGURATION:

3.2 MW MPS

MODELS:

8 x 400 kW Natural Gas



That's when Kelly Generator stepped in and recommended a Generac 3.2 MW Modular Power System (MPS). The MPS solution consisted of eight paralleled 400 kW Natural Gas generators, a solution that fit well with the maximum height requirements. "A big challenge was space limitations," said Meliani. "Generac was able to offer a physically shorter gen-set than the competition, which worked out really well with the design of the room that we were given."

To take advantage of the room height available, Kelly proposed mounting four units on a steel structure over the other four. "Four over four is something I have never done," said Gary Fink, sales engineer at Kelly Generator. "The idea came from seeing other projects Generac had done. So I reached out to Generac for some assistance and we put our heads together to see if the room could accommodate the necessary air flow and temperature rise." They decided to use a grated structure to facilitate airflow provided by four 50,000 CFM overhead fans. Natural ventilation was not an option to supply ample air flow for the eight generators.

Life safety systems needed to be upgraded to meet current codes and regulations as well. Generac was able to guarantee at least one of the eight generators would be serving life safety loads within ten seconds for up to 400 kW. As such, even in the unlikely event

that seven units are offline, life safety systems will still be supported.

"With Generac's paralleling system there is no single point of failure," said Meliani. "If one of the communications lines was to fail the looped configuration of the digital communications ensures the generators are still able to be paralleled."

The design team found another benefit by choosing Generac's digitally integrated paralleled system. "Paralleling in the past always required a separate switchgear lineup and often a separate controller lineup," said Buser. "That's usually a piece of equipment that isn't provided by generator manufacturers. With these units, everything is on board and Generac has a pretty seamless plug and play operation."

The museum also wanted to economize on the number of transfer switches, and Generac was able to consolidate the original design requirements from eight switches to five. Several team members commented that Generac was selected because of its fresh, innovative solutions.

"This was our first time working with Generac," said Jacob Pohlman, electrical engineer, SmithGroupJJR. "Generac is supportive and a team player. We don't always see that cooperation through all levels of the design so it was great that this critical element was fully supported by the manufacturer. Without it, I don't think we would have been able to deliver the same end product."

Generac proved it could deliver on the promise. "The company's performance on the Museum of the Bible project demonstrated to Ennis Electric and me that Generac can be a player on large, complex projects," said Buser.

"We would specify Generac again," said Pohlman. "They demonstrate that they can deliver a natural gas fueled paralleling system that will compete at any level."

Keith Fogle

Foreman
Ennis Electric
Company, Inc.



Keith Fogle has been with Ennis Electric for 19 years, 12 of them as foreman. He has a wealth of project experience from educational facilities to waste water treatment plants to museums. As foreman he is tasked with managing labor on the jobsite, materials management and ensuring jobsite schedules are met. Fogle holds a VA master license, a VA journeymans license as well as an assortment of other certifications including a NICET level 2.

Kenz Meliani

P.E., LC,
LEED AP BD+C



Electrical Engineer, SmithGroupJJR in Washington, D.C.
With 9 years of Industry experience, he has worked on multiple project types including Commercial office, Hotel/Hospitality, Healthcare, Science and Technology, Higher Education/University, and Museums in both the private and public sectors. Kenz has experience working in lighting design, low voltage systems, and power distribution systems on his various projects. He is currently pursuing his Master's Degree in Mechanical Engineering at the University of Maryland, College Park as he is interested in applying his Engineering knowledge across all building MEP system designs. Notable recently completed projects he has worked on include: Museum of the Bible, Washington DC and MGM National Harbor Casino and Hotel, National Harbor, MD.

Mike Buser

Project Executive,
Ennis Electrical
Company



Mike Buser has been with Ennis Electric for more than 30 years. He currently serves as a Project Executive with the company. Previously, he served as a Foreman, Superintendent and Project Manager at Ennis Electric. Mike spends his free time on photography, reading historical documents and driver education events. One fun fact about Mike is that he has driven California's Laguna Seca Raceway on a bicycle.

Gary Fink

Sales Engineer
Kelly Generator



Gary Fink has been in the construction industry as a licensed Master Electrician for over 20 years. Since 1998 Gary has been a part of the power generation business in the areas of design, installation and service of emergency generator systems. In 2009, Gary joined Kelly Generator as a Field Service Technician. Later that fall Gary was asked to join the Sales Team as a Turnkey Specialist. Gary has fulfilled the roles as an Outside Sales Rep and Sales Engineer since the fall of 2011. Gary's current responsibilities include working with engineering firms in Virginia, Washington, D.C. and along Maryland's I-270 corridor as well as Design/build contractors and end users to assist in the design and implementation of power generation products on their projects.

Jacob Pohlman

Associate,
SmithGroupJJR in
Washington, D.C.



Pohlman is an electrical team member of the higher education and cultural studios for the Washington D.C. office of SmithGroupJJR. He has over 7 years of electrical engineering experience including electrical and lighting designs for a variety of project types, during all stages of design and through construction services. His project experience includes major tenant renovations and new construction projects for numerous universities. He received his Bachelor of Science in Architectural Engineering from the University of Kansas and is currently registered as an Engineer-In- Training (EIT) and is a LEED BD+C Accredited Professional.