Rules of Engagement for Mission-Critical Standby Generator Operators

Understanding the Effects of the EPA’s Tier 4 Emissions Regulations on High-horsepower Stationary Generator Usage

EGSA Historical Data: Quarterly Generator Shipment Report

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The world’s largest show for power generation, featuring the EGSA On-Site Power Pavilion. For exhibit information, contact EGSA at (561) 750-5575, ext 205 or e-mail Jalane Kellough at J.Kellough@EGSA.org.

Conferences

NFMT Conference & Expo
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2012
Scottsdale, AZ .............................. October 16-18
2013
Savannah, GA .............................. April 23-25
Austin, TX ................................. August 13-15
Orlando, FL** ......................... November 12-14
*To be held concurrently with POWER-GEN International 2013

Advanced Schools
2012
Orlando, FL** .............................. December 10-13
**To be held concurrently with POWER-GEN International 2012
2013
Scottsdale, AZ .............................. January 28-31
Buffalo, NY ................................. June 24-27
Chicago, IL ................................. October 21-24

*To be held concurrently with POWER-GEN International 2013

Milwaukee, Wisconsin - site of the 2012 EGSA Fall Technical & Marketing Conference, September 9 - 12
We incorrectly identified Mr. Jim O’Rourke as a Cummins Power Generation employee, when he is in fact, employed by Cummins NPower, LLC. We sincerely regret the error, Jim, and look forward to your speaker presentation at the EGSA Fall Technical & Marketing Conference.

**Disclaimer**

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I was 24 years old and about to make my first sales call. My employer was a manufacturer of small air-cooled diesel engines and we needed a network of distributors in my new territory of 19 northeastern states to support our growing OEM business. My prospect was the Power Systems Manager at the northern New York State distributorship of a very large manufacturer of big diesel engines.

First impressions are important – as soon as I entered his office, I could tell that his impressions of me were not favorable. I could almost hear his mind “Huh, they sent a kid! Wet behind the ears, this will be a waste of time … and what’s with that accent!” But as soon as we started talking diesel engines, his first impression visibly changed. It was the subject that we spoke of – my subject, and I knew (diesels) from Shinola! We had a great conversation and I was proud to have earned his respect. Unfortunately, he declined the distributorship - but he did offer me a job during a follow up call!

I share this story only to give credit to the exceptional training I received in England as an engineering apprentice. I had joined the company at the age of 17, spent a few months in the company training school…then it was out on to the factory floor, operating all kinds of machine tools, making jigs, making engine parts, assembling, testing and servicing diesel engines. The program sent us to technical college one day and most nights of each week. Throughout this period, the Training Manager was available for consultation, advice and direction.

At the end of 4 or 5 years apprentices came out with a Certificate or Degree in mechanical engineering, and, most importantly, the hands-on practical knowledge to go with all of the theory. We have all met university graduates with great degrees but absolutely no practical knowledge. It takes many months of training before they become useful to an employer. Up until the late 1980s, this type of apprenticeship program was quite common with UK manufacturers. Sadly, it ended after government subsidies were cut and the economy forced budget cuts. There were many competent people who graduated from these programs and the long-term benefits to their employers were considerable.

It was a couple of years after graduating that I was offered a sales position with the company’s US headquarters in New York. I gave that offer careful consideration for about 4 seconds! I only stayed for 23 years, but some of my colleagues spent their entire career with the company. Most of those that left the company stayed within the engine and power generation industry and are in leadership positions around the globe.

One of the ironies of life is that we have to make a decision about what career path to take by the time we graduate from high school – when we know virtually nothing about any careers. Some of us are lucky and it works out for us. Others may select a path, study hard at university, graduate with a good degree, become employed in their career of choice, only to discover that the day-to-day work is not what they expected or wanted. So they find something else. But what a waste of a good education! Ask a group of people if they are in the career they expected to be in and it is likely that more than half will reply negatively. (I would have joined the Merchant Navy if it hadn’t been for slight color blindness). We had a few trainees drop out of the apprenticeship program early; they realized that engineering was not for them and they made the wise move before investing five years of training in a career that wouldn’t have worked out for them.

We are not, as an Association, seeing enough engineers coming into our Industry. One only has to check out the EGSA Job Bank at the back of any issue of Powerline to see that there is a critical shortage of engineers, technicians and technically-competent sales people.

Your Association is investing in the future of the On-Site Power Generation industry by helping students to get a head-start in our industry. In 2002 EGSA, in conjunction with the Coren family, founded the EGSA David I. Coren Scholarship Program. Full details of the program are on the EGSA website and photographs of the latest batch of scholarship winning students will be featured at the Fall Technical and Marketing Convention in Milwaukee. Since

“...Continued on page 13

“I hated every minute of training, but I said, don’t quit. Suffer now and live the rest of your life as a champion.” ~ Muhammad Ali
EGSA Education Report

As third quarter comes to a close, EGSA is pleased to report that 2012 is definitely going to be a stellar year for our Education Programs. Unfortunately, our “Captain” is unable to stand with us today and give us an opportunity to congratulate him on a job well done.

For those readers who know George Rowley, it is with a heavy heart that we advise of a traumatic fall he had in Seattle in route to an Alaskan cruise with his lovely wife, Beth. George is doing everything he can to rehabilitate after this fall and our hearts go out to him and his family as he faces tremendous hurdles to get back on his feet.

George Rowley’s legacy to this Association is not only the seeds that he planted while on EGSA staff for 11 years, but the benefits and strides that have been made with each Education Program EGSA has embarked upon to date. So, while we are all eagerly awaiting his recovery, it is our hope that you will consider our colleague George in your thoughts and well wishes.

Certification Update

In terms of certification testing, we are having the best year to-date. As of July 31, 184 of the 226 technicians who attempted EGSA certification passed the exam (the overall pass rate since program inception is 81%). Our best year for testing was 2011 when 148 of the 192 who took the exam passed it. This year, we are testing an average of 32 techs per month. With 5 more reporting months to go, it is possible that we could end up testing more than 300 techs this year. That would surpass the 2011 numbers by a good margin.

The eLearning Program

Members of the On-line Learning subcommittee of the Education Committee have been working hard to develop the first two EGSA eLearning courses. These folks are to be commended for their volunteerism. After studying the concept of eLearning for more than two years, the sub-committee is currently working with staff and outside vendors to produce the first two eLearning course, EGSA 101, an introduction to EGSA and On-Site Power 101, a non-technical overview of how electricity is produced and generated with emphasis on the On-Site Power Generation Industry.

On-Site Power Reference Book

The 5th Edition of the EGSA Reference Book is well underway with 28 of the 37 Chapters that are planned, as well as 3 of the 11 introductions written. This monumental undertaking involves countless hours and coordination. The EGSA volunteer spirit is alive and flourishing on this project.

Steady sales are also reported for the 4th Edition. Figures reported include 758 copies of the 4th edition were sold during this reporting period, with sales topping out at 432 copies, School usage at 148 and complimentary and Ferris State copies at 178 units. These numbers are impressive as we continue progress on the 5th Edition.

On-Site Power Generation Schools

We have had a great year thus far with our On-Site Power Generation Schools. First, hats off to Herb Daugherty and Michael Pope for their kind assistance in keeping the ship afloat during George’s rehabilitation efforts these last two months.

As most already know, we offered six schools in 2012. EGSA offered three Basic schools in 2012 (Dallas, TX; Rochester, NY and Scottsdale, AZ) as well as three Advanced Schools (in Atlanta, GA; Chicago, IL. and Orlando, FL). As always, we appreciate your continued efforts to support our EGSA Education Program. If you have suggestions for, or questions about, EGSA education programs, please contact Jalane Kellough via an e-mail to j.kellough@egsa.org or by phone at (561) 750-5575.
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UL has sent a notice that they will be calling an STP meeting for UL 2201, Standard for Portable Generator Sets, during the third quarter of 2012. The meeting will be held at or near the Consumer Products Safety Commission (CPSC) Headquarters in Bethesda, MD. Other subjects to be discussed include Carbon Monoxide emissions, weatherization requirements, 2014 NEC proposals for Articles 445 and 590.6, relating to GFCIs and transfer switches and a UL completed Hazard-based Safety Analysis.

The ISO has submitted several parts of ISO 7967 Reciprocating Combustion Engines – Vocabulary of components and Systems and ISO 8178 Reciprocating Combustion Engines – Exhaust Emission Measurement for balloting. For ISO 7967 there were three parts: Part 10: Ignition Systems; Part 11: Fuel Systems and Part 12: Emission Control Systems. For ISO 8178 there were two parts: Part 5: Test Fuels and Part 7: Engine Family Determination. Part 7 had the most significant changes. The number of engines families increased. This increase is due to the addition of several criteria that divided existing engine families into additional subdivisions.

There was also a result of ballots issued for ISO 8178 Part 9: Test cycle and procedures for test bed measurement of exhaust gas smoke emissions from compression ignition engines operating under transient conditions. This Ballot information email gives some interesting data about why these standards take so long to be enacted and about the voting structure of the ISO. The ballot was opened on May 8 and closed on July 8. It took 2 months to finalize it. Out of 12 eligible to vote (Europe has six votes, USA, China, India, Japan, Korea and Russia each have one vote.), 9 voted in favor. India, Switzerland and United Kingdom abstained. I am one of eleven in the country to advise the SAE how the USA should cast their one vote in the ISO.

In contrast, the ISO Technical Interim Amendment (TIA) was proposed to NFPA concerning the changes in wording for articles 6.6.2.2.3.2 and 6.6.3.1 thru 6.6.3.1 of the 2012 Edition of NFPA 99 Health Care Facility Code. The TIA asked to be considered an emergency change. This change was sent to the Technical Committee on Electrical Systems. The TIA said the change in wording could inadvertently change the interpretation of what was needed for a Type 3 EES. This TIA was sent to 25 people eligible to vote on this Committee. Twenty-two votes were returned. The results showed 21 of the 22 agreeing that the TIA had technical merit and was of an emergency nature. The deadline for voting was June 15 and the results were reported by NFPA on June 18. This, in my opinion, is the way such standard organizations should work.

Speaking of NFPA, for those of you who have corresponded with NFPA concerning the NEC, Jean O’Connor retired on July 31, 2012. In future, you should contact Kim Shea at kshea@nfpa.org or call (617) 984-7953 with any procedural questions regarding the National Electric Code.

The IEC is working on two more reliability standards. They seem to have nothing else to write standards on so they keep trying new reliability topics. One is a draft Standard IEC 62673/Ed 1. Methodology for communication network dependability assessment and assurance. The second is IEC 62741/Ed 1: Reliability of Systems, equipment and components. Guide to the demonstration of dependability requirements. The dependability case. The normative references in this standard are IEC 60050 – 191 International Electrotechnical vocabulary – Part 191 – Dependability, and IEC 60300-1 – Dependability management – Part 1 – Guidance for management and application. I have always voted against these type of standards since each industry has its own particular type of problems with reliability and dependability, so any standard that covered everything would be so long it would not be readable or useful. It is my firm belief that they are a waste of time and money.

This is not really Standards information but the July 2012 issue of Compressor Tech Magazine had two good articles: one titled “The basics of converting diesels to dual-fuel operation” the second “RICE, NESHAP rules require changes in stationary engine operations.”

The Report on Proposals meeting for the 2014 version NFPA 99 was held in San Diego from August 13 to August 15. This was the first standard to be looked at under NFPA's new system. Changes were suggested to NFPA to improve this new system. NFPA tried to get more user-sensitive by changing “Reject” to “Resolve” and the various “Accepts” to “Revise”.

“Resolve” caused problems as it really did not appear to mean “Reject” to the Committee Members. Although there were two proposals asking to change the wording of Selective Coordination, there was really no discussion before “Resolving” them both. The main item for further study was more than 50 proposals from NEMA, essentially rewriting chapter 7: “Information Technology and Communication Systems for Health Care Facilities.” These proposals were “Resolved” and given to a subcommittee to tackle and develop a proposal before the October deadline for input.
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its launch, your Association has granted a total of 99 scholarships to 84 students. The value of those scholarships amounts to a total of $225,500. We make sure that the graduating students are made aware that after a minimum of three years field experience, they are qualified to take the EGSA Certified Technician exam. The benefits to them are invaluable...increasing knowledge and earning power by increasing their value to an employer.

During the past eight to ten years, our Director of Education, George Rowley, has worked with a number of technical colleges across the country that have power generation programs. He has helped them with setting up a program, guided them to our On-Site Power Generation – A Reference Book, encouraged the students to join the Association (membership is free of charge for students) and encouraged them apply for the EGSA annual scholarship.

Apprenticeships have made a comeback in England and Europe but, sadly, they are rare in our Industry. However, internships are being offered by an increasing number of companies. What a great way to help students! They get paid, they get on-the-job training, they start to learn the culture and routines of a real business and they learn that BS is not an asset but responsibility is. By the time they graduate, they may have a job offer from that company. It is a real ‘win-win’ and a thoroughly good thing to do.

A number of our larger EGSA Member corporations take an active role in working with technical colleges to ensure they will have a steady flow of qualified recruits coming on stream. Some distributorships are also getting onboard. After all, it doesn’t take much to look through a list of critical, technical employees and estimate when some of the senior hands may be retiring. Estimate the normal attrition rate and the future hiring needs and a timeframe becomes established. But where are these replacement folks going come from? Perhaps some may be poached from competitors (“weaken them, establish. But where are these replacement folks going come from? Perhaps some may be poached from competitors (“weaken them, strengthen us”). Some will be new to the Industry.

“I got the job!” An exciting time for anyone. It is an opportunity for career advancement, learning new skills, making new friends and earning a living. The first few days on the job are critical to maintaining the new hire’s enthusiasm with the new company. Perhaps the new hire has the experience and knowledge to hit the deck running; no training needed; ready to produce from Day One.

More than likely, some training is needed and at the very least there should surely be an introduction to the company – Goals, Vision & Mission. That new hire should know something about the company’s origin, products and services, markets, recent achievements, and the “good stuff” that they could share with customers to build their loyalty. More importantly, he/she needs to know that they have joined a great team, that they are an integral part of that team and that their supervisor and the management have high expectations that they have the ability to contribute to the success of the organization.

It takes quite an investment in resources to bring a new employee up to speed; orientation, factory/in-house/on-the-job training, perhaps an EGSA school, uniforms, salary, benefits, etc..... What a tragedy if that new hire successfully gets past all the training and to the point where he/she is actually producing for the company – and they announce that they are leaving! All that investment has been for the benefit of another company and, most likely, a competitor. Clearly, something went wrong internally to create the dissatisfaction and it is critical that the problem be identified and fixed.

Should an employer consider a mentor for the new hire? Is there someone other than their supervisor that could be there for him/her? Perhaps an experienced employee that could help with any questions and act as a go-between? To help identify training needs, spot strengths and weaknesses, share their experience and offer advice when needed? Who has not been in the position, at some point in their career, when it was difficult to ask a supervisor or manager a key question because of the reluctance to admit a lack of knowledge to the person who hired them or signs their paycheck?

New employees need to be nurtured; orientation, training, more training, two-way evaluations. Treat them right and you may have a competitive advantage. Hands-off and no plan and it is Advantage: Competitor. If there is a consensus that the new hire might not work out for some reason ...... there should be no hesitation in making the break to allow that person to search for “new opportunities” before they create internal dissention and cause the rest of the team to wonder what management is thinking by keeping this person on the payroll.

Most larger corporations have all these procedures well figured out; they have the resources to invest in doing it right from the planned interview, reference checks, on-going training, communications and the all important Exit Interview whenever anyone leaves the company.

We all like to boast that our greatest company strength is its people. Perhaps our greatest challenge within EGSA is to foster a community that guides students to our Industry, hires them and then keeps them motivated to stay.
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EGSA Historical Data: Quarterly Generator Shipment Report

By Kyle Tingle, Chair of the Market Trends Committee & EGSA Board Member

EGSA has been conducting a quarterly generator shipment survey since before the turn of the century. This data is made possible through consistent participation in the survey from key Member companies. On behalf of the Market Trends Committee, and the EGSA Board of Directors, I extend a thank you to the Industry stewards at each of the following companies who have been actively participating: Caterpillar, Cummins Power Generation, Kato Engineering, Kohler, Leroy-Somer/USEM Div. of Emerson, Marathon Electric and Mecc Alte.

These companies are reporting quarterly shipments of loose generators/alternators (not to be confused with completed generator sets). On behalf of the Market Trends committee of EGSA, I am pleased to share with you a cumulative look at the generator shipments over the past 12 years!

The results are tabulated quarterly, compiled for EGSA by W & W Services, Inc. out of Bolingbrook, IL. The data is managed exclusively by W & W Services, maintaining total confidentiality of the data from each of the individual companies contributing to the survey.

The past 12 years have seen the full cycle of the market. We had a healthy start to the 21st century, with a little thanks to the Y2K scare that had many companies and homeowners “planning for the worst.”

Fast forward to 2012 (after all the events we have encountered during the last 12 years), and this added precaution of disaster preparedness is no longer viewed as “panic craziness,” but rather “good risk-mitigation, good business management.”

The Industry has survived 2 troughs in the generator market, dropping below 40K units in early 2001, and again after the Great Recession bottomed out in mid 2009. We have thankfully recovered back to the 60K unit mark as of late 2011, and early 2012 shows further improvement!

There is a definite trend change in the domestic North American (N.A.) shipments, as compared to N.A. imports. Prior to the Great Recession of 2007-2009, the domestic shipments were 2:1 over the N.A. imports. Post-recession, the N.A. imports were roughly 90% of the domestic shipments. The imports actually exceeded the domestic shipments in the 3rd and 4th quarter of 2011.

Continued...
Let’s take a close look at the 1st Quarter of 2012. This highlights that the N.A. imports are within 4% (as a % of the total) of the N.A. domestic shipments. Of the generators produced in N.A., 11% were exported. This equates to just over 6% of the total shipments.

The quarterly data, including the specific data by kWe range, is available on the EGSA website: www.egsa.org. This is a benefit of membership, and requires a login with your username (simply your email address) and a password. Forgot your password? No worries, you can get it emailed to you within a matter of seconds. Other member benefits include access to the summary results of the annual Pulse Survey, conducted every fall! As you can see above, the results of the 2012-2 (2nd quarter generator shipment survey results) have now been posted! Please take the time to seek out this information, as a value for your membership.

I hope to see you all at the Fall Conference in Milwaukee! ■

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Meet EGSA's David I. Coren Scholarship Recipients 2012-13

The Electrical Generating Systems Association (EGSA) Scholarship Committee has completed its review of applicants’ credentials and, at the direction of the EGSA Board of Directors, has awarded eight $2,500 scholarships for the 2012-13 academic year. The David I. Coren Scholarship Program provides financial assistance to qualified students and is designed to have a positive impact on personnel shortages. These scholarships are also an excellent vehicle for enhancing awareness of the industry. The competitive, merit-based scholarships are awarded to qualified students who plan on pursuing a career in On-Site Power. In addition to their career focus, applicants must be full-time students, have a declared major related to On-Site Power, and maintain a minimum 2.8 GPA.

EGSA launched the David I. Coren Scholarship Program in 2002 to promote awareness of and generate interest in On-Site Power careers and the Industry. The scholarship came in response to the growing need for skilled On-Site Power personnel. While EGSA has an established and widely-recognized On-Site Power School of its own, the Board of Directors noted the industry’s need for highly skilled individuals from a variety of applicable disciplines.

About David I. Coren

After working in the financial sector for nearly a decade, David I. Coren began his career in On-Site Power at Zenith Controls, headed by his father and 1978-79 EGSA President Arthur Coren. David became active in Zenith’s business development group. He worked closely with Executive Vice-President and 1998 EGSA President, Ron Seltick and was eventually named President of Zenith Controls. David actively served EGSA as a Conference Presenter; along with serving on and chairing the Convention Planning Committee in 1998. Sadly, in April of 1999, he was diagnosed with a brain tumor and in September of 2000, we lost him.

David is remembered for his desire to succeed, his leadership potential and his ability to motivate his fellow Association Members.

Michael Bruno

Michael Bruno was born and raised in Chicago, IL. He has taken part in a corporate sponsored program at Oklahoma State University (OSU) and currently works for Aggreko. “They are assisting me in obtaining my associate’s degree at OSU while gaining on-the-job experience in the power generation field for which I will receive college credit. I graduate in September 2013 and plan on working full time for Aggreko” he told Powerline. During his free time he enjoys boating and being outdoors.

Jeremy R. Foster

Jeremy R. Foster, the son of Jim and Carol Foster, is from Pittsfield, IL. He attended Ohio Technical College in Cleveland, OH, where he majored in AAS diesel technology (with a certificate in generated power systems). In June, Jeremy completed his degree, where he maintained a 3.7 GPA. While there, he received a Student of the Month Award, as well as an Academic Excellence Award. He is employed at Altorfer Caterpillar in Peoria, IL as a Field Technician. His ultimate career goal is to one day move into management.

Austen C. Geyer

Austen C. Geyer is a 21 year old graduate of Ohio Technical College in Cleveland, OH. Austen moved to Columbus, where he is currently employed by Buckeye Power Sales as a Service Technician. His studies in Cleveland included diesel technologies and generator power systems. While there, Austen received Student of the Month for July 2011 and an Academic Excellence Award, as well as becoming a tour guide for the school. Nearing graduation from the generator program this summer, he and his wife welcomed their first born, Miyana Corrine into the world on Father’s Day.

Austen says that his family has always been a great support system for him. As far as leisure time goes, he enjoy fishing, hunting for morel mushrooms and is quite the collector of music memorabilia, electronics and tools. Each day, he reports that “I wake up with the belief that there is always work to be done and go to bed feeling blessed.”
Morgan Jenkins

Morgan Jenkins is from Kansas City, MO and is currently attending Linn State Technical College, in Linn, MO.

Morgan recently graduated with an Associates of Applied Science degree in Medium/Heavy Truck Technology and is now pursuing a second Associate degree in Electric Power Generation. She will graduate with a second degree in August 2012. Morgan received the Scholastic Honor of maintaining a 4.0 GPA while attending Linn State, as well as being a Member of the Phi Theta Kappa Honor Society. In 2011, she was awarded Regional Postsecondary/Adult Female Award from “Breaking Traditions” for pursuing a non-traditional career.

In her free time, she enjoys working on demolition derby cars, motorcycle rides, teaching swimming lessons, as well as hanging out with family and friends. Following her graduation, she intends to pursue a career in the On-Site Power Industry.

Morgan imparted the following message “Thank you EGSA, it was an honor to be awarded the David I Coren Scholarship. I would also like to thank my family for the support they have given me while following my dreams.”

Kent Kettell II

Kent Kettell II graduated from Universal Technical Institute’s Cummins Power Generation graduate level program in Phoenix, AZ in February of 2012 with a 4.0 GPA where he earned an Associates of Occupational Studies Degree in Automotive/Diesel and Industrial Technology with Cummins Engines and Cummins Power Generation. After graduation, Kent was hired by Cummins Rocky Mountain as a Parts Technician in Denver, CO where he and his wife reside.

Kent remarks “When I’m not answering phones and digging through parts manuals for our generator customers, I enjoy hanging out in the Rocky Mountains with my best friend, my wife. My ultimate career job is one that I enjoy doing and can sufficiently provide for my family.”

Jeremy Raney

Jeremy Raney resides in Kearney, MO. He began his college career in Aug. 2010 for Medium/Heavy Truck Technology at Linn State Technical College and has since graduated with an Associate of Applied Science degree in May 2012. During that time period Jeremy was on the Dean’s list with a 4.0 GPA and achieved a 100% attendance record. He completed an internship for the program at Diamond International of Kansas City and has continued to work there part-time during school as a technician. In the 2012 summer semester, he started a second degree at Linn State Technical College in Electric Power Generation. Jeremy will finish the program in August 2012.

In his free time, Jeremy works on a Volkswagen TDI, takes trips to the lake and hangs out with friends. His plan for the future is to work his way up from a technician to either a technical service rep or a service manager.

Dan Rutler

Daniel Rutler claims that he will always be a student of electricity, but above all else he is a husband to a wonderful wife and the father of a beautiful daughter. Daniel’s interest in power generation was due to his curiosity of electricity and magnetism. Going to school for power generation enabled him to take a leap forward in his career, which he claims caused Caterpillar to take a serious look at him. He applied as an entry level power generator technician, and was offered a position in heavy equipment. Although it has been less than a year, he can’t believe how much he has learned.

Considering that the majority of generators are run by diesel engines today, the skills he is acquiring are directly transferable to the Power Generation Industry. The best part is that CAT has a power generation division in the same shop. Jeremy says he will be able to transfer when the time is right. He wanted Powerline readers to know that he “looks forward, with anticipation, to what my future career has to bring and I thank EGSA for helping make it financially possible.”

Jonathan Simon

Jonathan Simon is from Maurice, LA. In his spare time he enjoys playing sports and hunting. Jonathan is currently attending Oklahoma State University Institute of Technology in Okmulgee, OK in the Aggreko “SelecTech” program, where he is majoring in Diesel & Heavy Equipment with an Associate’s degree in Applied Science.

“I am currently halfway done with school, carrying a GPA of 3.7. I plan on graduating in the summer of 2012. After graduation I plan on working with Aggreko and being part of their team.”

Qualifying for the Scholarship

• A candidate must be enrolled (or accepted) as a full-time student at a Vocational/Technical School, Community College or a two-year or four-year educational institution.
• If the candidate is entering their first year of studies, they must include an acceptance letter from the school.
• Have a declared major that is related to the On-Site Power Generation industry.
• Have and maintain a cumulative GPA of 2.8 (A = 4.0) or above. Academic and personal achievements (merit) will be used as the primary basis for the award of a scholarship. Financial need may be evaluated as a secondary consideration.

For complete Scholarship details please visit www.EGSA.org.
MISSION CRITICAL STANDBY POWER

Rules of Engagement for Mission-Critical Standby Generator Operators
Understanding the Effects of the EPA’s Tier 4 Emissions Regulations on High-horsepower Stationary Generator Usage

By Gagan Malik, Product Management, Cummins Power Generation & Matthew D. Menzel, SAE Team Leader - North America, Cummins Power Generation

Setting the Record Straight: Tier 4, Tier 4 Interim and Tier 4 Final

Tier 4 is the latest regulation established by the Environmental Protection Agency (EPA) to reduce emissions of particulate matter (PM), oxides of nitrogen (NOx) and air toxins from new, non-road diesel engines. As part of this clean air initiative, the EPA proposed New Source Performance Standards (NSPS) to define the acceptable levels of emissions in high-horsepower stationary generator sets, beginning with the requirement of Tier 4 interim certification in January 2011. Standards set forth by the NSPS are intended to regulate national emissions and are designed to be progressively tightened over time to achieve a steady rate of air quality improvement without unreasonable economic disruption.

Tier 4i, or interim, refers to the NSPS emissions limitations that went into effect on Jan. 1, 2011, for all new, high-horsepower diesel generator engines. The Tier 4i standard significantly cuts NOx emissions and requires Tier 4i certification for non-emergency use. Tier 4i remains optional for emergency applications.

Tier 4F, or Final, refers to the NSPS emissions standard that will become effective on all high-horsepower stationary generator sets in 2015. Requiring additional, significant reductions in PM, Tier 4F represents the highest level of clean air regulations proposed to date. Since 4F certification cannot take place until one year prior to its effective date in 2015, all generator sets that currently meet 4Fs stricter requirements are classified as “4F-capable” or “4F-ready.”

Background: EPA Imposes Limits on Stationary Diesel Engine Emissions

The EPA has been regulating air emissions from stationary and mobile engine sources since it first introduced the Clean Air Act (CAA) in 1970. Since that time, scientific discoveries — such as ozone layer depletion and acid rain — have only increased public awareness of the harmful effects of exhaust-borne pollutants. Responding to public outcries and pressure from states that struggled with more severe pollution issues, the EPA amended the CAA in 1990, ushering in a new era of clean air regulations and the enforcement of progressively stricter emissions limits.

Among the EPA’s many initial corrective actions was the introduction of revised limits on diesel exhaust emissions from on-road and non-road engines, an initiative that prompted manufacturers to engineer both in-engine and aftertreatment technologies to more effectively scrub exhaust and reduce harmful emissions. The EPA chose a tiered approach to enforce these new regulations, phasing in each successively more stringent tier according to engine horsepower rating, with effective dates spanning several years to give manufacturers ample time to adapt.

Mission-critical generator sets — those greater than 751 hp — fell under the EPA’s Tier 2 emissions standard in 2006, requiring substantial reductions in nitrogen oxides (NOx), carbon monoxide (CO), particulate matter (PM) and non-methane hydrocarbons (NMHC). For manufacturers of large generator sets, Tier 2 necessitated the development of innovative technologies to aggressively address emissions reduction.

As of January 1, 2011, the EPA graduated its emissions regulations for mission-critical generator sets to the Tier 4 interim (Tier 4i) requirement, imposing stricter emissions reductions than previous Tier 2 limits. Like the regulations of the tiers that came before,
the Tier 4i regulation applies only to equipment built after the start date for specific engine and horsepower category, and not to existing equipment certified under Tier 2 requirements.

Today, Tier 4i is well into its second year of implementation, yet confusion about the regulation persists. While some power generation manufacturers have responded to Tier 4i by developing necessary emissions-reduction technologies, many operators have questions about the governing nuances that dictate allowable use for mission-critical stationary generator systems. Questions about the Tier 4 Final (Tier 4F) requirement that goes into effect in 2015 are only adding to Tier 4 confusion. Operators are also unclear about the increasing regulations found in regional high-pollution, high-population zones where stricter emissions reduction is enforced. To help remove all of the Tier 4 confusion, operators need to inform themselves of the myriad implications before they can make an educated decision about what stationary generator system is best suited for their mission-critical application.

Emergency Versus Non-Emergency Use: the Implications

The EPA defines “stationary emergency applications” as those in which generator set operation is limited to emergency situations and required testing and maintenance. Examples of emergency use include: the ability to produce power for critical networks, equipment and facilities when electric power from the local utility is interrupted; and the option to respond to disaster scenarios by powering emergency response equipment, such as pumping water in the case of fire or flood. Annually, operators are permitted 100 hours of run time for maintenance and testing purposes (otherwise known as “exercising”). Included in the 100 hours of annual allowable equipment exercising are 50 hours of non-emergency run time operation. Operators must keep in mind that every minute of the 50 hours of non-emergency operation contributes to the total 100-hour annual limit, and that run time usage exceeding 100 annual hours is subject to applicable fines (see Operator Responsibilities sidebar on page 22).

An important distinction with the Tier 4i standard is the EPA’s “non-emergency” stipulation that requires all generator sets built after January 1, 2011, meet Tier 4i certification to enable non-emergency operation (see Figure 1). For operators, this means that all new generator sets intended for non-emergency use must be Tier 4i-certified. Simply put, the EPA considers all run time usage other than exercising and emergency purposes “non-emergency” usage. But what exactly constitutes non-emergency usage has been a source of confusion and something that needs to be explored further.

Further Emissions Reductions

Tier 4i allows for stricter emissions reductions that exceed national standards (see Figure 2 on page 22). Additional steps that Tier 4i-certified systems offer include: Prime power. Prime power refers to the option for an operator of a mission-critical generator set to produce power as needed to maintain uptime and increase reliability for any number of power generation purposes. One example would be a data center manager electing to self-generate power during anticipated high demand periods to increase performance and improve stability.

Rate curtailment (or peak shaving). Rate curtailment is a process through which generator operators can participate in an arrangement with local power utilities, allowing the operator to produce self-generated power during the utility’s peak demand periods and avoid incurring peak utility rates.

Storm avoidance. As its name suggests, storm avoidance gives operators in mission-critical industries the option to engage generator power in anticipation of power interruption from the local utility due to incoming storms. If the power then does go out, operators will have effectively avoided any disruption. In addition, the operator may also elect to self-generate power after the utility’s power has been restored to allow time for proper stabilization (or a return to normal, stabilized power supply).

For all new generator sets built since 2011, only Tier 4i-certified systems offer the operational flexibility to run during all emergency and non-emergency applications, with no limitations or concerns about allowable run time.

Non-Attainment Areas Call for Further Emissions Reductions

There are many areas in the country where air quality does not meet the EPA’s current air quality standards due to the region’s higher population and pollution rates. Known as non-attainment areas, these regions are typically governed by local environmental regulations boards (ERBs) that enforce more stringent emissions requirements than the EPA’s national standards. Los Angeles, CA is one example where a non-attainment area has been established, though more and more cities throughout the U.S. are moving toward emissions-reductions that exceed national standards (see Figure 2 on page 22). Mission-critical generator set operators in non-attainment areas must be vigilant that their emissions meet the clean air objectives of the designated region. At the very least, Tier 4i certification is required to comply with these stringent regulations and may even apply to both emergency and non-emergency applications. And in some cases, Tier 4F-ready generators are the only technologically viable system to provide the degree of emissions scrubbing necessary. Operators should be fully aware that these locally governed ERBs have authority to enforce EPA penalties to the fullest extent.
OPERATOR RESPONSIBILITIES
Emergency and non-emergency generator set operators are subject to the EPA’s notification and reporting requirements. With the EPA issuing penalties of $37,500 per engine for emissions violations, it’s important for owners to understand what’s required of them.

Stationary non-emergency engines between 751–2,999 hp:
Operators of Tier 4i-certified large generator sets between 751–2,999 hp do not have to submit notification or reporting to the EPA. Tier 4i certification on the engine’s nameplate is sufficient.

Stationary non-emergency engines greater than 3,000 hp:
Operators of non-emergency engines greater than 3,000 hp must register with the EPA and submit an initial notification of operation, including:
- Name and address of the owner or operator
- The address of the affected source
- Engine information: make, model, engine family, serial number, model year, maximum engine power and engine displacement
- Emission control equipment
- Fuel used

Operators are responsible for keeping the following records for the EPA:
- All notifications submitted to the EPA
- Maintenance conducted on the engine
- Documentation from the manufacturer that the engine is certified to meet emission standards

Stationary emergency engines:
Owners of stationary emergency engines are not required to submit an initial notification. The owner must keep records of the engine’s operation in emergency and non-emergency service. This data must be recorded through the unit’s non-resettable hour meter. The owner must also record the time of operation of the engine and the reason it was in operation during that time.

Engines with DPF:
If the stationary engine is equipped with a diesel particulate filter, the owner must keep records of any corrective action taken after the back-pressure monitor notifies the owner that the engine is approaching its high back-pressure limit.

Aftertreatment Systems Provide Necessary Emissions Controls
While some operators seek emissions reductions exceeding Tier 4i levels today in response to non-attainment requirements, it’s important for them to understand that all new non-emergency generator sets cannot be officially EPA Tier 4F-certified until one year prior to 2015 when the next regulation takes effect. Industries that place a premium on green practices and the utilization of best available control technologies, such as water utilities and the data center industry, are also seeking the maximum emissions reduction capabilities available today. And, as emissions restrictions and the number of non-attainment areas are likely to increase as time goes on, having a system that is Tier 4F-ready is an advantage to those operators who require a flexible generator set architecture that can adapt to changing requirements.

In response, some manufacturers have accepted the challenge by engineering additional emissions controls that meet Tier 4F regulatory levels today, most notably by providing a dramatic reduction in PM. Manufacturers are achieving additional PM reduction by enhancing their add-on controls — or exhaust aftertreatment systems — required by the EPA to meet the 2011 Tier 4i regulation. Here’s how manufacturers are engineering aftertreatment systems that meet Tier 4i certification and Tier 4F readiness today.

Aftertreatment systems used on high-horsepower stationary diesel generator sets rely on a combination of proven selective catalytic reduction (SCR) technology and new innovations to reduce emissions by removing exhaust constituents to acceptable Tier 4i levels. If designed correctly, this flexible emissions-reduction architecture provides immediate Tier 4i certification as well as Tier 4F readiness when required.

Selective Catalytic Reduction (SCR)
— To remove the NOx required to achieve Tier 4i certification, generator set manufacturers have adapted this proven on-road, emissions-reduction technology for stationary applications. SCR works in combination with a diesel exhaust fluid (DEF) injection system to introduce DEF into the exhaust stream, monitor NOx surrounding the catalyst, and reduce it to less than Tier 4i-compliant levels.

Exhaust Pre-heater and Diesel Particulate Filter (DPF)
The addition of an exhaust pre-heater and DPF is required on some larger stationary generator sets to meet the Tier 4i PM and NOx reduction levels. Pre-heaters are designed to rapidly heat exhaust to 450 degrees Fahrenheit, beginning the NOx conversion process in as little as nine minutes. In addition, DPF technology reduces PM up to 94 percent, bringing PM into Tier 4i certification (and even Tier 4F readiness) levels.
Where Standby Power Is Mission Critical

In addition to emergency standby power (ESP), operators have traditionally used stationary diesel generators for mission-critical, non-emergency power in facilities — such as power plants and chemical and manufacturing plants — to generate needed electricity and provide power to pumps and compressors. Today, generator set usage is expanding into emerging industries, both for ESP and for sometimes equally important non-emergency applications. Here are a few examples where operators are relying on generator sets for mission-critical applications.

Data Centers

The data center industry growth has expanded dramatically in the last decade, with the advent of cloud computing and the increasing need for reliable information management and unfailing communications. While reliable backup power is an absolute necessity, many data center operators prefer having the options to run their high-horsepower stationary generator sets for storm avoidance and prime power applications, too. Operating during these non-emergency scenarios is the only way to ensure that large volumes of information and communications remain available regardless of the circumstances. Data centers are also very environmentally conscious, often seeking the best available control technologies for reducing emissions. In addition, many large data centers are located in some of the country’s most densely populated (and most polluted) regions that enforce strict, non-attainment emissions standards.

Water and Wastewater Utilities

Water and wastewater facilities managers have always operated generators for ESP during utility outages, especially those who operate plants in remote geographic regions that may have less reliable access to the power grid. More and more, generator set operators are also seeking the flexibility of non-emergency operation for prime power during high-demand periods. In addition, some operators make arrangements with local power utilities to operate during peak hours in exchange for discounted rates.

Hospitals

Due to the urgent nature of their work, hospitals and health care providers place a premium on reliable ESP. Generator set operators that seek additional protection, for purposes such as storm avoidance or anticipation of grid outages, may choose a Tier 4i-certified generator set for the flexibility it enables during non-emergency scenarios. And for those hospitals that operate in local non-attainment zones — or in a region that may soon have non-attainment status — even their emergency use may be subject to more stringent Tier 4i limits.

Tier 4i Certification Provides Operational Flexibility

Regardless of the mission-critical ESP application, generator set operators must realize all new non-emergency generators must be Tier 4i-certified to provide the level of flexibility to run beyond emergency use. Tier 4i certification enables operators to meet their individual requirements and comply with EPA regulations at the same time. And while Tier 4F readiness is important to operators seeking BAT or additional emissions reductions to comply with stricter regional mandates, Tier 4i certification is still the necessary first step for non-attainment applications. Tier 4i certification opens the door to the unlimited possibilities of non-emergency use, removing all doubt of the operator’s ability to achieve Tier 4i compliance.

About the Authors

Gagan Malick is senior product manager for Tier 4 aftertreatment systems at Cummins Power Generation. He’s been with Cummins for eight years, primarily in the engine business. Before joining Cummins, he was employed by an engineering consulting company. Gagan has a B.E. in mechanical engineering from the University of Pune and a master’s in mechanical engineering from Old Dominion University.

Matthew Menzel is in charge of the Application Engineering group at Cummins Power Generation, responsible for providing applications assistance and technical information to customers and distributors. He’s been with the company since 2008 in a variety of application engineering roles. Matt is a graduate of the University of Minnesota, with a B.E. in mechanical engineering.
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VISIT BOOTH #15 AT THE 2012 EGSA FALL TECHNICAL & MARKETING CONFERENCE IN MILWAUKEE
Just-in-Time Power Equipment for Emergencies & Opportunities: Used and New Surplus Equipment Opens the Door to Swift and Reliable Solutions

By Dave Vennie, VP of Sales & Engineering, Worldwide Power Products.

Sudden power equipment failure is disruptive for any firm, but for those without the financial capacity to have redundant power supplies, it can be disastrous. Firms in such situations can lose thousands of dollars per day in sales and customer goodwill, and in situations where power is mission critical, the toll can be even greater.

Traditionally, firms in such predicaments ordered factory replacements with potential lead times of 20-26 weeks. Today, companies, contractors and consultants who can’t afford the wait are working with third-party vendors to acquire reliable, used and new surplus units in addition to new factory orders. (New surplus equipment is identical to new factory ordered equipment, with zero hours and full warranties, but it is in stock—such as at a vendor’s yard).

In fact, a remarkable amount of low-hour, well-maintained equipment is now making its way into the used marketplace. The reasons for this surge could be several, but the result is that companies have a wider selection of reliable, low-hour and even zero-hour generator sets to choose from than ever before.

The trick, of course, is to locate these “jewels” without expending excess effort, time or cost. This article is a compendium of important questions and tips that power equipment users, their contractors and consultants can use to identify trustworthy sources of reliable, properly tested, used and new surplus power equipment. Armed with this information, purchasers will have the resources they need to make timely decisions about the most appropriate equipment for any purchase.

Pick a Partner

To avoid disappointment and build confidence in used and new surplus power equipment as a viable solution, companies should rigorously assess the capabilities of third-party providers—and make a determination about their dedication to quality and customer service—before failure or other unplanned need necessitates an equipment purchase.

Vendors vary widely in the amount of inventory they keep on hand as well as their capacity to test and load bank the used and new surplus units in house. Some power equipment sellers do not maintain any inventory, but rather are brokers of other company’s equipment. They lack personal knowledge of the inventory they sell and may not be able to offer expeditious delivery times.

Fortunately, there are power equipment providers that invest in a diverse inventory (or have access to one) and spend the time and resources to maintain and test the equipment they carry so their customers avoid those headaches. These companies offer the flexibility, nimble response and deep expertise to provide or procure a wide array of reliable generator sets quickly, effectively standing-in as a firm’s equipment yard. In other words, these companies invest in their customers’ success.

Figure 1 outlines some of the chief questions to ask of every potential power equipment provider. Those who can answer these questions competently and appropriately should have the expertise and breadth of offering to satisfy most needs.

If you are an electrical contractor or an electric power salesperson, there are added advantages to forging strong partnerships with power equipment providers. If the fit is right, you may develop a symbiotic relationship whereby they quote on providing your power equipment, and you quote them on the appropriate elements of the process they outsource, such as installation or commissioning.

<table>
<thead>
<tr>
<th>CAPABILITIES</th>
<th>TECHNICAL COMPETENCY</th>
<th>SALES EXPERIENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partnerships With which manufacturers do you maintain partnerships?</td>
<td>Warranty Do you offer a warranty on your used equipment? Can you procure factory surplus units that come with a full manufacturer’s warranty?</td>
<td>Rent vs. Purchase Do you both sell and rent equipment, and can you fill both used and new equipment orders?</td>
</tr>
<tr>
<td>Certifications Are you certified and pre-approved by any associations or government clearing-houses?</td>
<td>Service Shop Do you have a full-service shop with certified and experienced generator technicians? Does it have load-testing capabilities for a wide array of generator sets? What about fuel-tank cleaning capabilities?</td>
<td>Standby Rentals Do you offer standby rentals, and will you guarantee that a unit will always be available? What are the terms for standby rentals, and is there a different rate for standby versus in use? Can you store standby rentals at your facility so we do not have to store them at ours?</td>
</tr>
<tr>
<td>Inventory Database Is it online? How often is it updated? Are testing results, specs, photographs and other details posted? What is the range of generator set sizes and manufacturers you carry?</td>
<td>Testing and Inspections What type of inspection and/or testing does each piece of equipment go through?</td>
<td>Sales Team Do you have an experienced sales team who can quickly and correctly answer my questions? Are any of them trained experts in electric power generation, marine and petroleum applications, etc.? If not, are engineers with this training available to answer questions?</td>
</tr>
<tr>
<td>Logistics and Delivery What is your shortest lead-time? What is the longest it has taken to find a match? Are all units centrally located, or do you have scat-ter-site warehouses to expedite delivery? Will a dedicated logistics department work on delivery issues?</td>
<td>Auxiliary Services Do you offer add-on services such as design, installation and commissioning for a turn-key package? Do you offer EPA emissions consulting or assistance?</td>
<td>Financing Options Do you offer competitive financing options on both new and used equipment? What is your minimum purchase for financing?</td>
</tr>
<tr>
<td>Service Shop</td>
<td>Testing and Inspections</td>
<td>Sales Team</td>
</tr>
<tr>
<td>Auxiliary Services</td>
<td>Warranty</td>
<td>Rent vs. Purchase</td>
</tr>
<tr>
<td>Service Shop</td>
<td>Technical Competency</td>
<td>Sales Experience</td>
</tr>
</tbody>
</table>

Figure One: Qualifications Of A First-Rate Provider
RIGHT PLACE AT THE RIGHT TIME

Making the Call

Used and new surplus power equipment can bridge the gap between equipment failure and delivery of a factory order. Depending on the requirement, they can also be excellent permanent or standby installations, especially for rush projects. (For details on how two companies successfully specified and acquired used and new equipment on a fast-track basis for major projects, see the case example in this article).

Companies who establish a comfort level with purchasing used and new surplus equipment also discover that these options offer excellent ROI. This is true, not only for emergency power needs but also for situations with short turnarounds, tight budgets and/or contracts that do not specify purchase of a generator set from the factory.

On average, used equipment offers a 30-50% discount over the cost of factory-new equipment, with much faster delivery. Because pricing for used and new surplus units varies considerably, some companies are even able to procure a newer or better unit than what they expect, given the budget.

Despite these advantages, some companies are hesitant to procure new surplus or used equipment—or even rent it—for fear of unexpected failure. To ensure receiving a quality product, purchasers need as much information as possible about the history, use and other aspects of the power equipment.

Those who perform due diligence in their choice of a partner may find that the vendor asks them “the right questions.” If not, purchasers shouldn’t hesitate to make their own inquiries. Figure 2 outlines important questions in several categories to ask a potential supplier.

As we mentioned in Figure 1, top-notch providers should also perform rigorous inspection and testing. However, even if the representative for a chosen vendor states that the firm performs these important checks, purchasers have the right to view written inspection checklists and reports for the particular model they are considering. (Figure 3 illustrates a comprehensive inspection checklist.)

If a vendor can’t answer pertinent questions about the power equipment (preferably with written documentation), or if he doesn’t have the resources in house to thoroughly test and inspect it or cannot produce reports, exclude the power equipment from consideration (and rethink the choice of vendor).

---

<table>
<thead>
<tr>
<th>Age and Origin</th>
<th>What is the date of manufacture (year model of the unit)? What application did the generator set come from? What is its history? Do you own the equipment?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remaining Life (Used equipment)</td>
<td>How many hours are on the machine? Has the unit been rebuilt? If so, who performed the rebuild, and when? Has the unit been used since the rebuild and for what purpose and period?</td>
</tr>
<tr>
<td>Specifications</td>
<td>Horsepower, kW/MW, voltage, frequency, etc.</td>
</tr>
<tr>
<td>Package Configuration</td>
<td>What is the configuration of the package (fuel tank, enclosure, etc.) Can you modify or help create a custom package that meets my specifications?</td>
</tr>
<tr>
<td>Testing/Inspection</td>
<td>Has the unit been serviced and load banked? Do you use any formal inspection process, and what is it? (See Figure 3 for an example of a comprehensive inspection checklist.)</td>
</tr>
<tr>
<td>Service</td>
<td>Can you service and/or maintain the unit for us, and what are the terms? Does the package come with a warranty?</td>
</tr>
<tr>
<td>Delivery</td>
<td>What is the anticipated delivery time, and can you expedite it if needed?</td>
</tr>
</tbody>
</table>

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**Figure 2: What Vendors Should Know About Used and New Surplus Equipment**

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**Figure 3: A Comprehensive Inspection Checklist**
Rental Resources

This article alluded to rental equipment, and although it’s not the primary focus, it’s an important consideration for any all-in-one solution. A vendor that supplies both rental and for-purchase equipment—not only used or new surplus but also factory ordered, offers the best of all worlds.

With a provider fully vetted and qualified, companies, contractors, and consultants can shop their options confidently rather than being forced to seek other vendors as their needs change from rental to purchase and back. A truly full-service provider will also offer a program to convert a rental unit into a purchase, should your power needs extend longer than initially expected.

If there is any hesitancy regarding renting versus buying used or new surplus equipment for various scenarios, asking these questions should help you make a determination:
1. What is the anticipated period of need? If more than three months, it’s usually worth calculating the cost of purchase.
2. Is this unit replacing existing, failed equipment, or was a planned replacement or upgrade previously scheduled? What is the time horizon for that purchase? If equipment failure is involved, or if the time horizon for replacement is near, short-term rental and ordering of a new unit (or purchase of a new surplus unit) is a logical choice. If the replacement horizon is a few years away and financing a new unit is not an option, a fully tested and load-banked used unit could be a perfect interim solution.
3. Is the delivery delay for a factory-ordered unit the reason for considering rental? If so, would a new surplus unit with full warranty be an acceptable option? (A new surplus unit may be available immediately, saving the firm rental cost and reducing capital outlay over the price of factory-ordered equipment.)
4. Do budgetary issues (or potential disaster recovery or insurance reimbursements) make it more favorable for the unit to be expensed as an operating rather than a capital expense, at least for the time being? If so, rental could be the logical choice.

Final Notes

The logic behind evaluating and forging one or more alliances with power equipment providers is indisputable, yet it’s easy to allow day-to-day crises to stand in the way of performing these crucial evaluations. This is a process that should not be short circuited—the worst time to seek a quality provider that can meet your needs is when a unit fails.

Procuring used or new surplus power equipment will become far less intimidating once you have identified one or more partners you can trust. Furthermore, these partnerships put you in the position of never fearing failure again—and enable you to welcome fast-track opportunities.

Take time to explore all your options and apply the criteria offered here to determine which suppliers best suit your requirements. There are few more beneficial environments for businesses than working with vendors you can rely on; especially when those partnerships enable you to achieve the seemingly impossible.

Case Example: Peak Electrical Fast Tracks a Generator Set for Major Retrofit of a Marine Terminal.

When Port Neches, TX, electrical engineering, design and project management firm Peak Electrical received a contract for the retrofit of a midstream marine terminal’s electrical infrastructure, the specifications were daunting. The customer had a very small window of opportunity to complete the retrofit, which coincided with a complete shutdown of the facility for other maintenance and equipment upgrades.

Furthermore, the customer was looking for a low-hour, used, 2 MW, 4160-volt diesel generator set in a weatherproof enclosure with a secondary containment fuel tank base—a fairly rare configuration. With the likelihood that only a handful of suitable units would be available, nationwide, Peak Electrical President Ron Huebel contacted Worldwide Power Products (WPP) for assistance. WPP had, in inventory, a zero-hour diesel generator—an unused Caterpillar Model 3516B—that matched the project requirements but lacked some of the package specifications.

Through its relationship with another supplier, WPP was able to customize the package to meet Peak Electrical’s—and its customer’s—specifications. Upon completion of the project, WPP produced a Generator Set Testing Procedure for the client to ensure testing was carried out safely and according to established guidelines and procedures.

WPP performed the testing and provided Peak Electrical with an enclosure fabrication inspection and test report, a base fuel tank fabrication and test report, a medium-voltage high-pot wiring test report and a generator load test report. WPP reviewed the various reports with Huebel to address any unsafe conditions observed during the testing and to answer any questions or concerns he may have had. Included in the review were any recommendations for maintenance that was needed.

Although the factory warranty had expired, the inspection process enabled WPP to warranty the product in-house. Not only did WPP complete the project on time and within budget, but the customer gained a zero-hour unit with a warranty where it had expected (and budgeted for) used equipment.

About the Author

Dave Vennie is VP of Sales & Engineering for Worldwide Power Products (WPP), a power-generation equipment provider to industrial clients worldwide. Vennie holds a Bachelor of Science degree in Electrical Engineering and began his career as an engineer with Siemens Dematic. He worked in Sales and Marketing Management for Caterpillar’s electric power division for six years before joining WPP in 2011. To contact Vennie, email dvennie@wpowerproducts.com.
1. Contact Information

Please type or print all information in upper and lower case (NOT ALL CAPS!)

Company _____________________________________________________________
Address ____________________________________________________________________________________________
City ___________________________________________ State/Province ________________________________
Zip/Postal Code ___________________________ Country _________________________________
Phone ___________________________ FAX _____________________________________________
Official Representative __________________________________________________________________________________
Representative's E-Mail ________________________________________ Company's Web Address __________

How did you hear about EGSA?  ❑ Web site  ❑ Powerline magazine  ❑ Colleague  ❑ POWER-GEN  ❑ Other

Why are you joining EGSA?  ❑ Certification Program  ❑ CEU Program  ❑ Power Schools  ❑ Buying Guide Listing  ❑ Other

2. Member Classification

Read the Membership classifications below and check the box that describes your firm’s classification.

I. FULL MEMBERSHIP

❑ MF Manufacturer Membership
Any individual, sole proprietor, partnership or corporation seeking membership must apply for a Full Membership as a manufacturer if they meet one or more of the following criteria:
1. They manufacture prime movers for power generation.
2. They manufacture generators or other power conversion devices producing electricity.
3. They manufacture switchgear or electrical control devices.
4. They manufacture or assemble generator sets, UPS systems, solar power, hydropower, geothermal, or any other power production or conversion system including related components or accessories for national or regional distribution.
5. They are a wholly owned subsidiary of a firm that qualifies under rules one through four.

❑ DD Distributor/Dealer Membership
Any individual, sole proprietor, partnership or corporation actively engaged as a distributor or dealer for products listed under Manufacturer Membership may apply for Full Membership as a Distributor/Dealer. If an organization qualifies under Manufacturer Membership, it is not qualified under this section.

❑ CI Contractor/Integrator Membership
Any individual, sole proprietor, partnership or corporation actively engaged as a Contractor or Equipment Integrator of products listed under Manufacturer Membership, not bound by brand, geographic territory or contractually obligated as a Distributor/Dealer of a specific product. These firms typically purchase products from a Distributor/Dealer, Manufacturer or Retailer, adding value through installation, product knowledge, relationships, unique services, etc., and then re-sell the resulting product to an end-user.

❑ MR Manufacturer’s Representative Membership
Any individual, sole proprietor, partnership or corporation actively engaged in the representation of products listed under Manufacturer Membership may apply for Full Membership as a Manufacturer’s Representative. If an organization qualifies under Manufacturer Membership, it is not qualified under this section.

❑ EM Energy Management Company Membership
Any individual, sole proprietor, partnership or corporation engaged in energy management, including Energy Service Companies (ESCOs), Independent Power Producers (IPPs), Integrators, Aggregators, and other similar enterprises may apply for Full Membership as an Energy Management Company.

❑ AF Associate Full Membership (mark appropriate category at right)
Any individual, sole proprietor, academic institution, student, partnership or corporation meeting the requirements of Associate Regular Membership may apply for Full Membership at their option to enjoy the privileges of Full Membership, including the rights to vote and to serve on EGSA’s Board of Directors. Initiation fees and annual dues will be assessed at the existing non-manufacturer Full Member rates.

II. ASSOCIATE REGULAR MEMBERSHIP

❑ AA Trade Publication Membership
Any trade publication dealing with the electrical generating systems industry or its suppliers may apply for Associate Membership–Trade Publications.

❑ AB Trade Association Membership
Any trade association made up of individual or company members sharing a common interest in the electrical generating systems industry may apply for Associate Membership–Allied Associations.

❑ AC Engineer Membership
Any consulting or specifying engineer may apply for Associate Membership–Engineer. Membership may either be held in the employer’s name or individual’s name under this classification. Individuals whose employer qualify as a Full Member, as described in the Full Membership section, do not qualify for this category.

❑ AD End-User Membership
Any individual employee of a company who owns or operates electrical generating equipment and/or related switchgear or components, whose responsibility to his employer includes planning, design, installation, supervision, or service of such equipment may apply for Associate Membership–User. Membership may either be held in the employer’s name or individual’s name under this classification. Individuals whose employer qualify as a Full Member, as described in the Full Membership section, do not qualify for this category.

❑ AE Service Membership
Any individual, organization or academic institution that offers services such as research, testing or repair to the electrical generating systems industry may apply for Associate Membership–Services. Membership may either be held in the individual’s name or the organization’s name under this classification. Individual companies whose employer or parent organization qualifies as a Full Member, as described in the Full Membership section, do not qualify for this category.

❑ AG Educational Institution Membership
Any postsecondary vocational-technical school or college offering on-site power generation-related instruction may apply for Associate Membership–Education Institution.

❑ AR Retiree Membership
Any individual who retires from a member company may apply for Associate Membership–Retired. This classification does not apply to any individual who is employed more than 20 hours per week.

❑ AF Student Membership
Any individual currently enrolled at an academic institution may apply for Associate Membership–Student.
## Application for Membership – page 2

### Dues Schedule (Use for Section 3)

<table>
<thead>
<tr>
<th>Membership Level</th>
<th>Annual Dues</th>
<th>Initiation Fee</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>$825</td>
<td>$200</td>
<td>$1025</td>
</tr>
<tr>
<td>Distributor/Dealer</td>
<td>$285</td>
<td>$100</td>
<td>$385</td>
</tr>
<tr>
<td>Contractor/Integrator</td>
<td>$285</td>
<td>$100</td>
<td>$385</td>
</tr>
<tr>
<td>Manufacturer’s Representative</td>
<td>$285</td>
<td>$100</td>
<td>$385</td>
</tr>
<tr>
<td>Full Associate Member</td>
<td>$285</td>
<td>$100</td>
<td>$385</td>
</tr>
<tr>
<td>Energy Management Company</td>
<td>$200</td>
<td>$100</td>
<td>$300</td>
</tr>
<tr>
<td>Regular Associate Member</td>
<td>$200</td>
<td>$100</td>
<td>$300</td>
</tr>
<tr>
<td>Retiree Member</td>
<td>Complimentary</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Student Member</td>
<td>Complimentary</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>

**NOTE:** A FULL 12-MONTH DUES PAYMENT MUST BE RECEIVED WITH THIS APPLICATION. The Association’s Membership Year is January 1 through December 31. Dues payments that extend beyond the first Membership Year will be applied to the second year’s dues.

FULL PAYMENT MUST BE RECEIVED WITH APPLICATION.

### 3. Membership Dues

(Use for Section 3)

<table>
<thead>
<tr>
<th>Membership Level</th>
<th>Total Dues</th>
<th>Plaque Fee</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Membership Dues</td>
<td>$__________</td>
<td>$__________</td>
<td>$__________</td>
</tr>
<tr>
<td>Membership Plaque (optional)**</td>
<td>$49.95**</td>
<td>$49.95**</td>
<td>$49.95**</td>
</tr>
<tr>
<td>On-Site Power Reference Book (optional)**</td>
<td>$125.00**</td>
<td>$125.00**</td>
<td>$125.00**</td>
</tr>
</tbody>
</table>

**Florida Residents:** Add 6% Sales Tax to **items.

Continental US Residents add $5 shipping/handling to **items.

Non Continental US Residents should call EGSA Headquarters for shipping charges for **items.

**TOTAL $__________**

### 4. Payment Method

(Payable in US$ drawn on U.S. bank, U.S. Money Order, or American Express)

- [ ] Check # ___________  Amount Due $________
- [ ] Money Order
- [ ] Mastercard
- [ ] Visa
- [ ] American Express

Card #: __________________ Exp. Date ______
Signature: __________________
Print Name: __________________

### 5. Products/Services

Please describe the nature of your business (50 words or less, NOT ALL CAPS). If you are a Manufacturer’s Representative or Distributor/Dealer, please indicate which manufacturers you represent and/or distribute for; if you are a student, please provide the name and location of your school, your major and your anticipated graduation date:

________________________________________________________

________________________________________________________

________________________________________________________

________________________________________________________

Do you buy AND sell equipment? [ ] Yes [ ] No
Do you manufacture packaged equipment? [ ] Yes [ ] No

### Available Codes:

- 01 — Batteries/Battery Chargers
- 02 — Control Annunciator Systems
- 29 — Education
- 30 — Emission Control Equipment
- 04 — Enclosures, Generator Set
- 05 — Engines, Diesel or Gas
- 06 — Engines, Gas Turbine
- 07 — Engine Starters/Starting Aids
- 08 — Filters, Lube Oil, Fuel or Air
- 28 — Fuel Cells
- 03 — Fuel Tanks and Fuel Storage Systems
- 09 — Generator Laminations
- 10 — Generator Sets
- 11 — Generators/Alternators
- 12 — Governors
- 13 — Heat Recovery Systems
- 14 — Instruments and controls, including meters, gauges, relays, contactors, or switches
- 15 — Load Banks
- 16 — Motor Generator Sets
- 17 — Radiator/Heat Exchangers
- 18 — Relays, Protective or Synchronizing
- 19 — Silencers/Exhaust Systems/Noise Abatement
- 20 — Solenoids
- 21 — Switchgear and Transfer Switches (Automatic or Manual), Bypass Isolation Switches, and/or Switchgear Panels
- 22 — Trailers, Generator Set
- 23 — Transformers
- 24 — Uninterruptible Power Supplies
- 25 — Vibration Isolators
- 26 — Voltage Regulators
- 27 — Wiring Devices or Receptacles

**Enter codes here:**

**Products sold:**

**Products rented:**

**Products serviced:**

### 6. Sponsor(s)

A “Sponsor” is an EGSA Member who interested you in filling out this application. It is not mandatory that you have a sponsor for the Board to act favorably on this application; however, if a Member recommended that you consider membership, we request that individual’s name and company name for our records.

Sponsor Name __________________ Company Name __________________

### 7. Official Representative’s Authorization

Signature __________________ Date ____________
All Power Generators Corp. .......... AE
Medley, FL
Juan Garcia, Owner
Service & repair of generators.

City of Moreno Valley ................ EM
Moreno Valley, CA
Jeannette Olko, Electrical Utility Division Manager
City public utilities.

Engineered Technical Solutions, Inc. .... MR
Cedar Springs, MI
Thomas Thornton II, President
Gillette Rep.

Evon Causton .......................... AE
Salt Spring Island, BC, Canada
Evon Causton
Service/repair of marine & industrial diesel electric sets.

Global Power Components .......... MF
West Allis, WI
Vince Cialdini
We manufacture diesel fuel tanks, enclosures, trailers, etc. for the generator industry.

GRP Power Systems ............... DD
Bethalto, IL
Chuck Wentzel, Sales Manager
GRP Power Systems is a Baldor Generator and GE/ Zenith switch transfer distributor that prides itself on bringing over 50 years of experience to the market. We can assist with design, sizing, equipment selection, installation, commissioning and the long term reliability of your emergency power system.

Healthsouth Rehab Hospital ........ AD
Wichita Falls, TX
Ricky Allen, Director of Plant Operations
Healthcare - Rehab Hospital (Generator End-User).

IndustrialGenerators.com .......... AE
Riverview, FL
Patricia Edggell, VP Sales
IndustrialGenerators.com is an online market place for used commercial generators. We assist dealers, brokers and owners of used and surplus generators to help market and sell their equipment online. We provide the ideal platform for anyone trying to gain exposure for their quality used generators.

K2 PowerGen Solutions, LLC ........ CI
Austin, TX
Kevin Smith, President
We provide a wide range of power generation equipment, along with integrated pre and post sale solutions, custom tailored for our particular customer’s situation. We are brand agnostic and can provide new, surplus or used equipment (certified) to meet a range of budgets.

Louisiana State Penitentiary .......... AG
Angola, LA
John Easley, Re-Entry Specialist
Louisiana State Penitentiary operates a re-entry training school. Generator systems repair is one of the re-entry programs. We have the ability to offer students many varied training scenarios, as LSP has 31 operating generators on-site.

McKinney Containers ................ DD
Auburn, WA
Barry Harmon, Service Manager
Rent & sell containers & generators, refrigerated equipment and modify containers. Multiquip, Magnum, ThermoKing, Carrier, and more.

North American Site Services ....... AE
Irving, TX
Christopher Stiles, Managing Partner
North American Site Services was established as a premier power solutions provider to organizations having a nationwide network. They deliver to network facility managers’ one stop, one company, seamless 24/7/365 support and service for their network of power systems.

Nostrum Power, LLC .................. CI
New Brunswick, NJ
Max Dorflinger, Director
Nostrum Power, LLC. is a new startup company in distributed power. Currently we are developing a new technology that will significantly increase the efficiency of prime movers thus increasing the net electric efficiency of electric generating systems.

Potomac Generator Service & Repair, Inc. DD
Beltsville, MD
Brad Stranigan, Vice President
Briggs & Stratton dealer providing repair services, preventive maintenance and generator rentals.

SBP Industries ....................... DD
South Plainfield, NJ
Michael Goncharko, VP Engineering
SBP Industries provides temporary, standby and emergency power solutions to industry and government in the form of generators, transformers, distribution, transfer switches, cable and engineering. SBP Industries sells, rents, services and repairs generators. We are a dealer for Gillette generators, Multi-Quip generators and Wacker Neuson generators.

Soundown Corporation ............... MF
Salem, MA
Brian Thompson
Soundown is a leading manufacturer & supplier of noise & vibration control products. Products include acoustical foams & composites, vibration isolation mounts, gasketing, mineral wool, & exhaust blankets.

Sure Power, Inc. ..................... DD
Lester, PA
Gene McNeil, VP - Critical Power Systems
Sure Power, Inc. is a UPS rental provider. We carry a full-line of static UPS systems ranging in size from 15KVA through 750KVA. In addition, we provide rental DC power plants, battery systems, power distribution units and chargers. Emerson, APC, Powerware, MGE, Exide and Liebert.

Kirk Brittain ......................... AF
Charlottesville, VA

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• Remote starts
• Internet-based
• (generator activity documentation)
• Notifications by e-mail and cellular text messaging
• 3 ways to communicate (cellular, phone, ethernet)

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Manhattan property owners appreciate off-peak energy charges – just don’t mess with their view. And please don’t make a racket.

Aesthetics and noise control were top priorities when the Class-A office building at 717 5th Avenue was about to be the recipient of a 1.6 MW cogeneration plant to be installed atop a 13-story section of the 26-story office building. Several New York architectural icons, including Trump Tower, the St. Regis Hotel, and the Sony Building surround the property. The cogeneration plant would allow the owner to take advantage of off-peak rates by powering the building during the day – and even feeding the surplus energy back into the grid. There were enormous financial and environmental benefits, but no room for compromise when it came to aesthetics or tenant satisfaction. The plant had to meld seamlessly into its high-end surroundings. This made the enclosure for the plant just as critical as the power generating operations that it housed.

It was a logistical challenge on many fronts for Enercon Engineering, a leading manufacturer of electrical power generation control systems, packaged power generation equipment, and cogeneration units. To help them manage the demands of this high profile project, they turned to SEMCO.

“We worked with SEMCO on structure engineering, design and finally delivery. They have good experience with structural enclosures and acoustics, enabling us to achieve the decibel reduction required,” said Tony Hagen, Containerized Product Manager for Enercon.

Barely Seen, Barely Heard

The completed cogeneration plant consisted of two 820 kW lean burn natural gas engine generator sets, heat exchangers,
a 289-ton hot water absorption chiller, controls, electrical switchgear and energy distribution, all housed in a modular, sound-attenuated enclosure.

It was important that the packaged unit contain the noise produced by the large generator and mechanical equipment. After all, 1.6 MW of power generation doesn't happen quietly. The equipment required to produce this power, not to mention the additional equipment needed to keep the power plant cool is substantial — and noisy. With over 110,000 CFM of cooling air required to remove the heat rejection from the internal cogeneration components, generators, engines, and control panels, attenuating airside noise was a challenge in and of itself.

To reduce the noise levels on both the intake and exhaust cooling air openings SEMCO provided sound attenuated duct systems. The enclosure itself was constructed of 4-inch thick acoustical panels, doors and silencers. These measures enabled the client to stay within the maximum allowable decibels (85 dBA at 3 meters) for the area.

Aesthetically, the goal was to have the completed 48’ wide x 60’ long x 27’ tall power plant virtually disappear against its surroundings. This necessitated a factory applied powder coating to the exterior of the panels — one that could withstand the outdoor elements. This was a challenge for the manufacturer since the panels were larger than what would normally be processed in a powder coating system. However, adjustments were made to accommodate the larger panels, and the manufacturer has since made custom powder coated finishes on large acoustical panels a standard option.

Powder coated in a flat black, the unit blends seamlessly into this high-end business district.

Easy Does It

The structural characteristics for the enclosure were just as demanding if not more so than the acoustic capability and appearance, and required quite a bit more planning.

“This wasn't just about containment, it was about designing a 98-ton unit that could also be lifted in approximately 7-ton sections onto a 13-story building,” said Hagen.

The engineering involvement started at the structural base assemblies and continued through cooling airflow, enclosure sound attenuation, enclosure structural support for internal components and lifting, also cooling air inlet and outlet sound attenuation. The panel wall system was designed around structural tube frames that would allow support not only for the enclosure, but also for internal cogeneration components and the need to incorporate lifting provisions. The engine exhaust systems and several hot water expansion tanks were supported by the framing incorporated into the two upper level enclosure sections.

Because of the size of the project and the multiple sections, another obstacle was to design the final flashing, trim work, and sealing of the sections to allow a weatherproof result. Again, nothing was left to chance. SEMCO provided detailed drawings showing panel and trim placement along with detailed fastener and sealant application. The panels were labeled from the factory so that installation was straightforward when using the installation drawings.

The manufacturer designed and constructed each and every component, shipping everything to Enercon's facility in Barnesville, GA where workers assembled and tested the unit. Enercon then disassembled the structure for shipment to the 5th Avenue location where a crane was used to lift it in seven sections, one at a time. The process entailed blocking off a busy Manhattan street for an entire day and extra police for traffic control, but the unit was delivered and assembled 13 stories up, exactly as planned.

The Look of Success

The cogeneration project, supported by a grant from New York State Energy Research and Development Authority (NYSERDA), is the first of its kind to be interconnected to the Manhattan midtown utility grid. With an approximate operating efficiency of 77 percent, the system requires one-third less fuel than typical onsite thermal generation and purchased electricity. It is estimated that the system reduces CO2 emissions by 1,200 tons per year — equivalent to the annual emissions from 204 passenger vehicles. The project was even recognized by the Environmental Protection Agency (EPA) with an ENERGY STAR Combined Heat and Power (CHP) Award for outstanding pollution and energy efficiency qualities.

Visually and acoustically the structure met each and every one of the client’s demanding needs, proving that cogeneration plants are a viable solution in even the most discriminating urban areas. Thanks in part to lessons learned from this application, they are also more straightforward. Since the installation of this site seven years ago, the manufacturer has made many design improvements to allow easier installation and improve the quality of their product for challenging projects such as 717 5th Avenue. Their panel design has been used in hundreds of projects requiring everything from simple sound attenuation to building structures.
What Does this Statue Have in Common with Your Back-Up Power System?

(Maybe More Than You Think!)

Consulting & Specifying Engineers invest hundreds of hours into carefully crafting, developing and installing On-Site Power Generation systems. The work is intricate and painstaking — all to produce a unique system that precisely fits a client’s back-up power demands.

That System is Your Masterpiece... Your Opus...

In the end, the Consulting Engineer specifies an On-Site Power Generation system that not only meets the client’s power needs, increases efficiency and reduces emissions, but also complies with all the necessary codes and standards to withstand a catastrophic event.

Protect Your Masterpiece & Your Client’s Investment!

Ensure your client’s system is operating at its peak performance, specify that only EGSA Certified Generator Technicians maintain and repair it. EGSA’s Certification Program uses rigorous testing to identify generator technicians who have attained sufficient levels of skill, knowledge and expertise to demonstrate proficiency in various aspects of generator set and On-Site Power Generation systems maintenance and repair.

Only technicians who pass the test can use the title “EGSA Certified Electrical Generator Systems Technician.”

Our Members manufacture, distribute, market and sell; and they also install, maintain and service on-site power equipment. From codes and standards, emerging technologies, best practices, education, technician certification and industry enrichment, EGSA truly is the leading authority in On-Site Power!

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- Optional Integrated Power System Stabilizer

For more information
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EGSA Recognizes First “Kelly Challenge” Winner
County Government in Virginia Utilizes EGSA Certified Technician Standard in Request for Proposal

In 2011, John Kelly, Jr., then EGSA President, launched the “Kelly Challenge,” an initiative developed by the Electrical Generating Systems Association (EGSA) to generate branding awareness for the EGSA Certified Technician Program with facility managers across the nation.

When it comes to drafting and approving standards, the process can be arduous. Making in-roads with the facility management industry take time and so does waiting for a Request for Proposal to come out! However, EGSA is pleased to announce our first Kelly Challenge Winner is David Bratton, Territory Sales Representative for Bay Diesel & Generator in Richmond, VA.

Bay Diesel & Generator is an authorized Generac Dealer for most of Virginia as well as Caterpillar Marine Power, EDM and Scania. Their expertise ranges from Critical Mission facilities such as governmental, medical (hospitals) and data centers throughout Virginia, Maryland and North Carolina. They also support a Marine Service Team that troubleshoots and overhauls large shipping vessel power systems.

The goal of the Kelly Challenge is to recognize members who are taking the time to help increase the momentum of the initiative by awarding EGSA Bucks for each specification that is written and distributed publicly that prefers or requires the use of EGSA Certified Generator Technicians. The result of this type of momentum is increased awareness of EGSA, our Members and why the program is important. David Bratton was successful in getting the standard written in to a recent Request for Proposal put out by New Kent County, Virginia.

Kelly Challenge Bucks do not expire and are awarded to Members for each specification that is written and distributed that prefers or requires the use of EGSA Certified Generator Technicians. “As more RFPs containing our requirement continue to come out, there will be a huge incentive for companies that are serious about generator service and maintenance business to have their technicians certified. It may very well drive Membership up as well,” adds current EGSA President, Michael Pope. “As always, we also welcome ideas and suggestions for building the initiative.”

Update Your Listing for the 2013 EGSA Buying Guide

EGSA is asking all primary contacts to update their company listing for the 2013 EGSA Buying Guide and Member Services Directory. The Buying Guide is distributed to more than 30,000 Diesel Progress subscribers as well as at POWER-GEN and NFMT Trade Shows, so it is important that each listing be as accurate as possible.

If you are the primary contact for your company’s membership with EGSA, you have been sent an email with instructions on how to update your company listing. Changes need to be made by SEPTEMBER 30, 2012 to be included in the guide. Please contact EGSA if you cannot locate your instructions.

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Eight decades of dedicated research have made DEIF a leading supplier of 21st century power technology solutions. DEIF’s ground-breaking AGC plant management solutions, control up to 256 gensets, parallel to mains or in island mode. Dynamic control strategies secure stable and safe operation and keep the right number of gensets running at their optimised power setpoint, significantly reducing operating costs and maintenance.

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- Fuel optimization

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Gillette Generators of Elkhart, IN. is a privately held and family-owned U.S. manufacturing firm that competes on multiple levels with their diversified line of generators for the On-Site Power Industry. The Gillette offering: 3-15 kW gasoline/diesel portable units, 12-140 kW LP/NG standby units, and finally 25-400 kW diesel standby units. Gillette has competed successfully throughout their half century existence against what has become an industry dominated by large companies and major corporations.

They currently export approximately 10% of their products to countries like Canada, Mexico, Israel and Pakistan. “It is a challenge to export US Made standby gens and be competitive with Chinese units. The US machines are built to stringent domestic standards in comparison to the Chinese products, which are not (UL 2200 & EPA), making US-made standby products non-competitive in several overseas markets. The reverse of this is that the Chinese manufacturers of standbys cannot sell stateside at this time”, comments Charlie Habic VP of Sales, Gillette Generators.

Export business is just part of the mix, the majority of Gillette’s business success is in the USA domestic standby market selling 12-400 kW into the commercial, industrial, institutional, municipal bid/spec, and high end residential markets.

Gillette manufactures stand-by generators ranging from 3 to 400 kW. World class components are key ingredients to our culture: GM vortec gas prime movers and Deere diesel engines, Marathon generator ends, Deep Sea controllers, ABB breakers, etc. UL 2200-compliant products are available. Gillette is an engineering driven company that has focused on producing machines capable of serving the end customer with a long and robust duty cycle for over 40 years.

Their core marketing push and ideal customer is the independent power generation dealer. Interesting to note is that many of the active dealers in the Gillette network, were first introduced to one another in the halls of the POWER-GEN Convention, and then cultivated at EGSA Conventions.

“My father joined EGSA in 1992 because he believed that Industry partners have to work together for the good of On-Site Power,” says Habic, “As I was growing with our business, he encouraged me to get involved and stay involved with EGSA. That familial guidance has fulfilled me both professionally and personally, as I have evolved into an active EGSA player.”

Speaking of active, Charlie Habic has personally been an EGSA Member since the early 1990s and since that time, he has achieved a long history of active service to the Association. Achievements range from his service as a Member of the Board of Directors from 2007 to 2009 to an active role in the Membership and Communications & Conventions Committees. Charlie was also Chair of the Ad Hoc Nominating Procedures Committee in 2010. His enthusiasm for EGSA has helped him to be a consistent recruiter of new
Members and he was recently awarded the coveted Leroy H. Carpenter Award for his long and outstanding service to the Association.

What’s on the horizon for the firm? Gillette is a manufacturer of both portable and standby generators from 3-400 kW and this will not change. The company has staying power with their consistent track record for creating and taking new products to market. Charlie takes it one step further, “Our customer is our greatest asset, our muse. We are determined to build and deliver world-class products and services at a level that exceeds customer expectations and demands.” Their business philosophy can also be distilled into one promise: to build products using world-class power generation design criteria and components.

When asked about the future of Onsite Power, Gillette Generators is poised and ready. They stay relevant as a manufacturer that continues to provide the market with emerging technologies incorporated into their products. A high value is placed on their existing customers, exemplified by never compromising on quality, service and ethics.

In 2012, Gillette predicts an upswing of 8-10% growth this year as a conservative estimate on their firm’s growth, after a notable 20% increase in 2011. While the economy is looking up, it is their belief that there are several mitigating factors that could still damage the overall Nation’s business health.

The flip side of the conservative economic future view is that Gillette management believes at some point, due to North America’s aging infrastructure, that we will see the monster of all power outages, where a chunk of our grid system fails. “Whether the failure is caused by an aging grid system, extreme weather or an act of terrorism, this act will set our Industry in a forward motion like we have never seen. To give a case in point, the last big thing was Katrina. We are still selling machines as a result of that one hurricane,” Habic recollects.

Gillette Generators welcomes the future and its challenges and understands you have to be prepared because the only real certainty is uncertainty.
USA Central

Generator Sales
Central Power Systems & Services, Inc.
Location: Kansas City and Wichita
Generator Sales position based out of Kansas City. We offer a strong base wage, incentive program and a full benefit package (including company car, gas allowance, expense card, FREE MEDICAL insurance, FREE LIFE insurance, paid vacation, profit sharing and 401(k), etc.) and PAID RELOCATION depending on experience and skill set. Fax a cover letter, salary requirements and your resume to 816-781-4518 or e-mail it to jobs@cpower.com 
EOE
EGSA Certified Technicians Preferred.
To apply: e-mail resume to jobs@cpower.com or fax to 816-781-4518

Generator Technicians
Central Power Systems & Services, Inc.
Immediate openings for Generator Technicians at several of our Missouri, Kansas and Oklahoma facilities, with immediate needs in Kansas City, MO; Wichita or Liberal, KS and Woodward, OK. Applicants must have diesel engine exp and transfer switch knowledge. We offer a strong base wage and a full benefit package (including FREE MEDICAL & LIFE insurance) and PAID RELOCATION depending on experience and skill set. Fax a resume to 816-781-4518 or e-mail it to jobs@cpower.com 
EOE
EGSA Certified Technicians Preferred.
To apply: e-mail resume to jobs@cpower.com or fax to 816-781-4518

USA Midwest

Service Supervisor
Cummins NPower
Location: Oak Creek, WI
Cummins NPower has an opportunity for a Service Supervisor based out of Oak Creek, WI. 2+years of diesel industry experience preferred. EEO/AA Employer
To apply: http://www.cumminsnpower.com

Account Manager
Cummins NPower LLC
Location: Chicago, IL
Promote Cummins value package to end users within defined geographic area; Sell Cummins engines as a preference directly to the end user, leverage customer preference to pull sales through with OEM dealers. Please go to our website for complete job description and to apply! EEO/AA employer.
To apply: cumminsnpower.com/careers.html

USA Northeast

Parts Manager
FM Generator, Inc.
Location: Canton, MA
FM Generator is a privately owned company supporting the Power and Facilities Needs of mission critical industries for over 40 years. Looking for a go-to person and problem solver for dedicated team of generator professionals. Five years’ experience with procurement & inventory control. Use of software for budget forecasting and reporting. Experience finding modern equivalent for obsolete and sourcing compatible non-OEM replacement parts. Will consider technicians with management training or experience.
To apply: send resume to tdaniel@fmgenerator.com

Industrial Commercial Salesperson
Power Performance Industries
Location: Yonkers, NY
Power Performance Industries, a Westchester NY based power generation company seeks experienced salesperson.
Responsibilities:
- growing existing accounts
- opening new accounts
- selling of sales, rentals, service and repairs
Must have:
- 3 years selling experience
- commercial industrial end user relations preferred
- engineering degree recommended
- generator experience not necessary
Excellent benefit package: salary, medical, dental, 401k as well as excellent on-going training. Be part of our exciting and growing company. Visit our website www.4ppowersystems.com
To apply: Send resume to louis@tipower.com

USA National

Field Application Engineer
Collicutt Energy Services, Inc.
Location: California, USA
Responsible for creating brand awareness and promoting the use of Kohler Power System and Collicutt Energy Services products and services. Provide guidance for design and assist with developing project requirements, drawings, and specifications. Must be knowledgeable in power system products i.e. generators, ATS, and paralleling switchgear, and overall onsite power system design and integration. Benefits: Medical, Dental, Vision, 401k + matching, Life insurance, LTD, Flex Spending and more.
To apply: myvo@collicutt.com

EGSA Job Bank Guidelines
EGSA will advertise (free of charge) EGSA Member company job openings in the Job Bank. Free use of the Job Bank is strictly limited to companies advertising for positions available within their own firms. Companies who are not members of EGSA and third-party employment service firms who service our industry may utilize the Job Bank for a $300 fee. Blind box ads using the EGSA Job Bank address are available upon request; company logos may be included for an additional fee. EGSA reserves the right to refuse any advertisement it deems inappropriate to the publication. To post an EGSA Job Bank ad (limited to approximately 50 words) please visit www.EGSA.org/Careers.aspx.

USA Southeast

Service Manager/Field Technician
A&A Power Generators
Location: Miami FL
A&A Power Generators, Located in Miami, FL has an immediate opening for an experienced service manager and field technician. Must have at least 3 years of experience working with diesel and gaseous generators. A clean driving record is a must. Must be able to troubleshoot, service, and repair. Must speak English. Email resume highlighting skills and experience to service@aapower.com.
To apply: service@aapower.com or call (305) 477-7969

Service Secretary
A&A Power Generators,LLC
Location: Miami FL
A&A Power Generators, located in Miami, FL has an immediate opening for a service secretary responsible for scheduling and dispatching service, invoicing and driving record. Must have graduated school, computer proficiency and a motivated attitude. Must speak English. Spanish is a plus. Email resume highlighting skills and experience.
To apply: service@aapower.com

Experienced GE Jenbacher Field Technician
Nixon Power Services
Location: Atlanta, GA; Tampa, FL, Washington DC
Nixon Power & Nixon Energy Solutions division is a certified distributor for the GE Jenbacher generator systems. We have immediate openings for technicians in the Atlanta, Tampa, and DC area, and recruiting throughout the Southeast. The technicians should be trained and highly experienced in repairs and operations that allow them to perform overhauls, rebuilding and installations of engines, generators and equipment associated with GE Jenbacher generators. Must have clean driving record. We offer competitive compensation and benefit packages.
To apply: Fax resume and salary requirements to 615.309.5839 or email to resumes@nixonpower.com

Experienced Generator Field Technician
Nixon Power Services
Location: Birmingham AL, Louisville KY, Charlotte NC
Nixon Power Services, the largest distributor of Kohler stand-by power solutions in North America, is seeking experienced generator technicians throughout the Southeast, due to continued growth. We have immediate openings in the Charlotte, Louisville, Birmingham, areas. Experience in performing major and minor preventative maintenance, troubleshooting/repair/service on most generator models preferred. Must have clean driving record. We offer competitive compensation and benefit packages.
To apply: Fax resume and salary requirements to 615.309.5839 or email to resumes@nixonpower.com

Experienced Generator Installer
Nixon Power Services
Location: Atlanta, GA; Nashville, TN and Birmingham, AL
Nixon Power Services is seeking experienced generator installers throughout the Southeast with immediate openings in the Atlanta, Nashville, and Birmingham areas. This position requires the technical understanding of generator repair, operation, and installation of generators and associated equipment. Ideal candidate will have engine training plus 5 years of experience in electrical/mechanical installations, experience

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within telecommunications industry and AC/DC power knowledge. Clean driving record required. We offer competitive compensation and benefit packages.

To apply: Fax resume and salary requirements to HR @ (615)309.5839 or email to resumes@nixonpower.com  EOE

Residential Generator Sales
Nixon Power Services
Location: Georgia
Nixon Power Services has an immediate opening for a residential salesperson who is responsible for residential generator products sales, including all aspects of new unit start-up, and pre- and post-sale customer relations. A 4 year degree or equivalent experience is preferred and previous residential generator sales and technical experience required. We offer competitive wages and benefits.

To apply: Send resume to resumes@nixonpower.com or fax to 615.309.5839

USA West
Generator Service Technician
Collicutt Energy Services Inc
Location: Los Angeles, California
Collicutt Energy Services, Inc. is looking for a Journeyman level generator technician for our Los Angeles, CA location. Applicant must be highly motivated, experienced, and able to work well with others. Responsibilities: Preventative maintenance, start up, troubleshooting of industrial generators and start up. Benefits: Medical, Dental, Vision, 401k, Flex Spending, Life Insurance and more. We also have job openings for Bay Area, California.

To apply: my.vo@collicutt.com

HPS delivers four different ways to rent.
You Got It. Operator-Free Rental. Unlike other rental companies, HPS lets your technical expert operate our rental equipment. We offer 24/7 technical support just in case you need it. We Got It. Leave the details to us. One of our HPS certified technicians will run the equipment for you. We Train You. An HPS certified technician will train your staff on-site to run our rental equipment. HPS Boot Camp. Every quarter, your equipment technician is eligible to receive FREE training at HPS headquarters in San Diego, CA.

Get Your Rewards On!
Start enjoying discounts, rewards and premium services. Call your rental representative to join today.
ASCO Services Business Earns the Coveted Perpetual Safety Award for Excellence in Safety from Emerson

Emerson Network Power, a business of Emerson, reports that its ASCO Services business has earned the Emerson Perpetual Safety Award for excellence in safety in 2011.

The award recognizes the ASCO Services business for totaling more than 420,999 manhours with only three minor injuries reported, accounting for four days of missed work. Achieving excellence in safety is nothing new as the ASCO business received the award in 2009.

“The Emerson Perpetual Safety Award recognizes companies within Emerson for employee safety. Companies that earn this award tend to view safety as more than a priority, but a value, in every aspect of what their employees do to meet production numbers,” said Michael H. Langston, Director, Corporate Safety and Health for Emerson. “ASCO Services receiving this award is even more special because, unlike standard manufacturing environments that are typically consistent, the service industry employees face new and ever-changing working environments everyday. Achieving less than three recordable accidents in a year is very impressive.”

Shawn Burke, Director of Sales and Service for Emerson Network Power’s ASCO Services, said, “Safety is our number one priority. We set the standard because we’re not only experts on the equipment we service, but are well aware of all the potential hazards in a facility and are up-to-date on safety regulations. Our Service Management Team has been trained with safety leadership skills to develop a “want to” type attitude rather than a “have to” one. Making safety a core value of the company and not just an obligation has made a huge impact on the culture of our employees.”

The Occupational Safety and Health Administration (OSHA) lists sobering statistics for technicians working in the construction field. In 2010, OSHA’s “fatal four” most common causes for workplace fatalities were, in order, falls, electrocutions, being struck by an object and getting caught in or between equipment and/or machinery. Electrocutons alone accounted more than 10 percent of workplace fatalities.

Emerson Network Power’s ASCO Services Technicians provide regular maintenance on critical power systems, and critical thinking to enable the best solutions for current or potential power system issues. The Team (comprised of more than 100 ASCO Services technicians) is a big part of the Emerson Network Power global service business and are able to offer a broad range of complementary services and provide a bundled, 24/7 service solution.

Emerson Network Power’s ASCO Services business employs some of the best technicians in the business, according to Burke. The company trains technicians annually in both classroom and hands-on settings and they also use product simulators, which provide a realistic work envi-
Industrial Radiator Manufacturer

**IEA, Inc. Purchased by Current CEO**

James A. Kettinger, President and Chief Executive Officer of IEA, Inc., Kenosha, announced today that he has purchased the company from owners George and Sue Newell.

Kettinger, who has served as IEA’s CEO for the preceding five years following four years consulting with the Company on strategic and financial management issues, explained that to take advantage of its many domestic and global growth opportunities, IEA needed to expand its financing base. In light of the obligations such expansion presented, the Newells felt it was best to implement their established succession plan.

“Jim has done a great job guiding IEA to its current strong market position,” said George Newell. “Sue and I both felt having the company in the hands of someone who knew and appreciated our business would ensure the best possible future for our employees, customers, suppliers and sales representatives.”

In addition to an expansion of its industrial radiator business serving large engine manufacturers such as Caterpillar, Cummins and MTU, IEA entered the modular data center industry in the last two years under the Silver Linings brand. Silver Linings provides highly differentiated, thermally managed environments for technical data center equipment such as computer servers, switches and backup power units.

Strategic direction and management will be provided to the company’s four operating units by a corporate team comprised of existing managers. The new structure is incorporated under the name Engendren Corporation. “The new company name is based on the word, ‘engender’, which means to ‘cause to exist or to develop’, reflecting a key theme of our long term strategic plan,” said Kettinger. “Engendren is a platform for strategic growth of our existing companies and for the birth of new companies.”

The Engendren family will initially consist of IEA, LLC, continuing the IEA, Inc. legacy of world-class radiator manufacturing, ArcRon, LLC, a steel fabrication subsidiary, and Silver Linings Systems, LLC. Also included is Chrysalis, LLC, a subsidiary poised for international investments in markets demonstrating growing demand for the products of the other Engendren companies. All Engendren subsidiaries are wholly owned. Engendren employs 255 people at its facilities in Kenosha and Menomonee Falls, WI.

“As exciting as this stage of the venture is, it is just our beginning. We’re now in a position to take this enterprise to an even greater future”, said Kettinger.

Visit www.ieurad.com for more information.

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**Harry Bourne Joins National Power Corporation as New Project Manager**

National Power Corporation (NPC), a distributor of power systems and service provider, is delighted to announce that Harry Bourne has joined the company in the position of Project Manager. In this position, he will coordinate large turnkey projects.

Harry has a Business Degree in Management from Kaplan University. He served 5 years in the United States Air Force Space Command with responsibilities of satellite command and control to include telemetry acquisition, launch, on-orbit, early warning, navigation, R&D, and surveillance. He has over 15 years of experience in providing network based solutions for cable and telephone companies with extensive background in facility automation and energy management. Throughout his career, he has managed multiple electrical and mechanical contractors to complete installation in accordance with scope of work and facility requirements. He was responsible for increased revenues consistently year after year in his previous position with Quest Controls Inc.

“Harry will be a key component in the Power Quality team at National Power.” Allen Olgiate, Power Quality Division Manager at NPC says that “Harry brings with him a lot of energy and experience.” “We are very excited to have him on our team.” Harry will be working out of Florida and will be covering the Southeast region.

Visit www.natpow.com for more information.

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**Darryl Rider joins Himoinsa Power Systems, Inc. as National Product Support Manager**

Darryl has spent the previous 9 years of his professional career with Hertz Equipment Rental Corporation in various roles. He began his career as a Sales Coordinator, quickly moved to Outside Sales Representative, then Branch Manager, and most recently served as Service Manager in Kansas City, MO. Prior to Hertz he spent one year as a Customer Service Representative for Henry Wurst, Inc, a full-service printing company located in North Kansas City, MO.

Throughout his career with Hertz he has been introduced to the world of power generation and has knowledge of products ranging from the small suitcase size units up to 400kW units, as well as a basic knowledge of distribution. Darryl holds a Bachelor of Science Degree in Graphic Arts Technology Management from the University of Central Missouri in Warrensburg, MO and is currently working towards his Master of Arts in Teaching with an emphasis in Business from the same institution.

Darryl lives in Odessa, MO with his wife, Hilary, their twin 5 year olds, Brena and Mason, and 1 year old son, Camden.

Visit www.hipowersystems.com for more information.
Karen Zall Joins GFS Corp as Director of Human Resources

GFS Corp of Weston, FL, manufacturer of natural gas fuel solutions for heavy-duty diesel engines including the EVO-MT™ systems for mine haul trucks, has appointed Karen Zall as Director of Human Resources. Ms. Zall previously served in a similar position at Martinair Holland NV. Ms. Zall comes to the position as a Certified Senior Professional in Human Resources (SPHR) with an extensive background in global human resources.

“We are excited to welcome Karen to our team”, said Jason Green, GFS Corp’s President. “Karen’s extensive HR background and knowledge adds depth to our senior management staff during this critical growth phase of our company.”

Ms. Zall’s first task will be to staff the company’s new manufacturing facility where the EVO-MT™ line of products will be produced for large mine haul trucks. Full production is scheduled to begin in the fourth quarter of 2012. Other staff will be added as GFS expands its product offerings in the mining, rail, on-road and other sectors.

Visit www.gfs-corp.net for more information.

Universal Acoustic & Emission Technologies Restructures to Form Universal Europe

Universal has announced that its UK office (based in Hinckley, Leicestershire) is expanding its operations into Europe and the Middle East. In this exciting development for the company, the UK office will be responsible for operations in these extended regions with Bruce Cresswell overseeing the expansion in his new role as General Manager, Europe. The developments are part of a strategic move which will enable Universal to grow its customer base in Europe and the Middle East by utilizing the strengths of its UK and German offices.

Bruce Cresswell, General Manager Europe states “Despite the current economic climate, Universal is experiencing steady growth and we are keen to further enhance our position at the forefront of the acoustic and emissions markets with the creation of our Europe office. This development demonstrates our commitment to becoming the leading brand of acoustic silencers in Europe and the Middle East.”

This is an important chapter in the history of Universal, which was established in 1959. Specialists in the design and manufacture of acoustic solutions, Universal serves leading companies across a range of industry including: Power Generation, Co-Generation, Marine, Locomotive and Industrial markets.

For more information about the Universal visit www.universalsilencer.co.uk

Cummins Power Generation Announces Tier 4 Final Readiness three years ahead of EPA deadline, Receives EPA Tier 4 Interim Certification Across 680–2,750 kW Generator Set Range

Cummins Power Generation Inc., a division of Cummins Inc., announced today the company’s entire stationary diesel generator set range from 680–2,750 kW, including the industry leading Mission Critical 2500 kW diesel generator set, has received Environmental Protection Agency (EPA) Tier 4 interim (Tier 4i) certification for the North American market.

“Cummins has been a leader in developing technologies that meet all emission regulations ahead of their implementation dates,” said Tony Satterthwaite, Vice President, Cummins Inc. and President, Power Generation Business. “I am delighted to announce that our Tier 4 interim certified generator sets are Tier 4 Final ready and fully capable of meeting the most exacting EPA requirements three years ahead of schedule. Our customers’ operational flexibility is further enhanced with a clear roadmap to meeting EPA Tier 4 Final requirements in 2015.”

EPA mandates that all non-emergency applications be Tier4i certified. Nonetheless, in certain locations, the local ordinances may require that emergency backup generators also adhere to stricter emissions limits. Because Cummins’ stationary diesel generator sets can be configured to meet requirements beyond Tier 4i if necessary, Cummins generator sets are available to comply with the most stringent emissions regulations.

Visit www.cumminspower.com for more information.
hps loadbanks Appoints Brian Cleary General Manager

hps loadbanks has named Brian Cleary the General Manager of the company. In his new role, Cleary will lead the strategic development and growth plans to expand the distributions of Crestchic Loadbanks throughout the United States. He brings more than 20 years of proven business experience in the power generation marketplace.

Cleary’s accomplishments include the leadership and development of a core executive team to manage a national sales and distribution network. His senior management responsibilities encompass a diverse range of business practices including product development, sales and rental programs, customer retention initiatives and daily business operations.

Moving forward, hps will leverage Cleary’s experience as the Chief Executive of a multi-location sales and rental company to expand the hps business to focus on sales, rental, training, parts and service in North America. Crestchic UK will continue to focus on existing customers outside the North American region. According to Kirk Fowkes, Director of Sales and Marketing at hps loadbanks, “With the addition of his broad range of management experience and significant background in power generation, Brian will continue to accelerate the expansion of hps loadbanks and solidify our position as the leader in delivering the best products and customer experience in the industry.”

Visit www.power.hawthornecat.com for more information.
ASCO invites you to explore
3 to 18 cycle and 30 cycle power transfer switches

88%* of engineers agree —
Selective coordination requires choice, not compromise

Selective coordination demands the ability to choose. After all, since no two emergency and backup power systems are alike, why settle for a cookie-cutter selective coordination design?

ASCO Power Transfer Switches:
• Achieved industry first 3-cycle rating
• Qualified 18-cycle performance on core 3-cycle switch, another industry first
• Satisfy the demands of unique applications with a 30-cycle option

• Truly optimize selective coordination for what the application requires (typically an 18-cycle transfer switch)
• Provide a cost effective solution by utilizing 3 to 18 cycle ratings
• Are certified to UL-1008, 6th edition (April, 2011) test criteria

Compare power transfer switches for selective coordination applications. Then, select ASCO.
www.emersonnetworkpower.com/ASCO, (800) 800-ASCO (2726),ascoapu.com

* Results reflect the opinions of more than 300 engineers polled in a recent Webcast exit survey.

ASCO Power Switching & Controls
Just another reason why Emerson Network Power is a global leader in maximizing availability, capacity and efficiency of critical infrastructure.

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