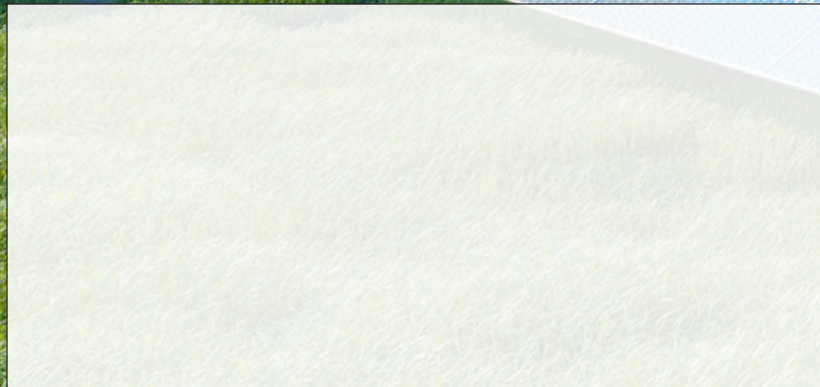
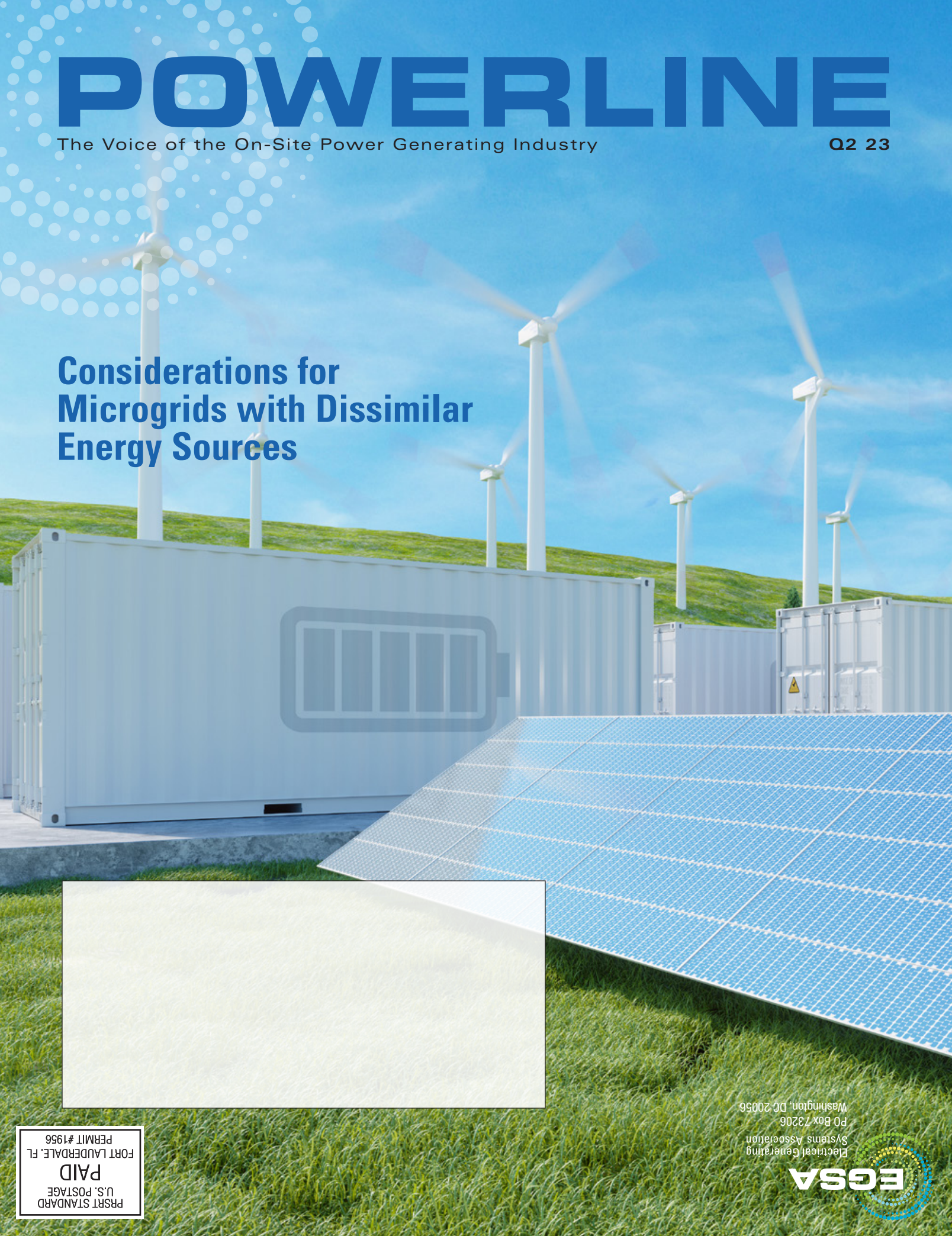


# POWERLINE

The Voice of the On-Site Power Generating Industry

Q2 23

## Considerations for Microgrids with Dissimilar Energy Sources



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EGSA's Power Schools cover the theory and practice of all the components within a generator system. All course modules are led by volunteer industry experts in a non-brand specific, generic format. School registration includes a copy of the 5th edition of **On-Site Power Generation: A Comprehensive Guide to On-Site Power**, a 700-page reference book that covers all aspects of On-Site Power Generation.

### Basic School

Perfect for staff new to the power generation industry or someone who needs an introduction to basic concepts and technologies, this school is appropriate for students seeking a foundation in generator technology. Whether you are in sales, marketing, management, application engineers, engine technicians, or administrative personnel, you will find great value in this course! The Basic School is a general, yet technical, overview of On-Site Power.

#### COURSE MODULES INCLUDE:

- Introduction to EGSA
- Basic Electricity
- Prime Movers
- Introduction to Generators/Alternators
- Starting Systems
- Introduction to Automatic Voltage Regulators
- Introduction to Governors/Speed & Load Controls
- Introduction to Transfer Switches
- Load Bank Fundamentals
- Generator Set Instrumentation
- Codes and Standards
- Generator Set Systems: Putting the Pieces Together
- Understanding Bid and Specification Documents

### Advanced School

Our Advanced School is designed for those who have a good understanding of the basic mechanical and electrical systems found in an on-site generator site. A minimum of three years of experience in the industry is recommended. It will be particularly useful for those employed in engineering, project management, service positions, and business owners.

#### COURSE MODULES INCLUDE:

- Advanced Generators/Alternators
- Generator Set and Critical Power System Controls
- Generator and System Protection
- Advanced Automatic Voltage Regulators (AVRs)
- Advanced Governors/Speed and Load Controls
- Advanced Transfer Switches
- Multiple Generator Paralleling Switchgear
- Engine Emissions
- Noise Control
- Communications
- Advanced Generator Systems: Sizing to Service

Visit our website at [EGSA.org](https://www.egsa.org) for additional details on the EGSA George Rowley School of On-Site Power Generation.



### REMAINING 2023 SCHEDULE

#### BASIC SCHOOL

San Diego, CA — October 9-12

Virtual — December 11-14

#### ADVANCED SCHOOL

Virtual — June 26-29

# POWERLINE

The Voice of the On-Site Power Generating Industry

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# CALENDAR OF EVENTS

## FEBRUARY

### EGSA at PowerGen

Orlando, FL

- **Feb 20-23**  
EGSA Basic School of On-Site Power
- **Feb 21**  
EGSA Power Party at Top Golf

## MARCH

**Mar 12-14**

### EGSA Spring Conference

Las Vegas, NV

**Mar 13**

### Engineering Symposium

## APRIL

**Apr 4-6**

### Load Bank School & Certification

Atlanta, GA

**Apr 10-13**

### EGSA Basic School of On-Site Power

(Virtual School)

## MAY

**May 22-25**

### EGSA Advanced School of On-Site Power

Chicago, IL

## JUNE

**Jun 26-29**

### EGSA Advanced School of On-Site Power

(Virtual School)

## JULY

**Jul 25-27**

### Load Bank School & Certification

Dallas, TX

## AUGUST

No Events on the Schedule

## SEPTEMBER

**Sep 5-7**

### Load Bank School & Certification

Atlanta, GA

## OCTOBER

**Oct 1-3**

### EGSA Fall Conference

San Antonio, TX

**Oct 9-12**

### EGSA Basic School of On-Site Power

San Diego, CA

## NOVEMBER

No Events on the Schedule

## DECEMBER

**Dec 11-14**

### EGSA Basic School of On-Site Power

(Virtual School)

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Marc Charon, COO/CFO

Nathan Harris, Director of Education

Gwynn Breckenridge, Director of  
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Sarah Cullen, Manager of Membership Services



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Powerline is published four times per year on a quarterly basis. Articles and information submitted for publication should be forwarded to the attention of the Editor at the address above 30 days prior to publication. Technical articles and articles of general interest to the electrical generation industry are actively sought and encouraged. Powerline reserves the right to limit information appearing in its pages to that which, in its sole discretion, will reflect positively on EGSA and the industry which it serves. Throughout every issue of Powerline, trademark names are used. Rather than place a trademark symbol at every single such occurrence, we aver here that we are using the names in an editorial fashion only. EGSA has no intention of infringing on these trademarks.

## Message from EGSA's CEO

Greetings, dear *Powerline* readers! As the warm weather arrives, I cannot help but think that while Spring is the season of rebirth and new possibilities, Summer is when those possibilities truly bloom.

A couple of years ago, the EGSA Board of Directors and I began planting the seeds for a new future for the Electrical Generating Systems Association (EGSA) and the on-site power generation industry. We wanted to strengthen the organizations' financial position, turn it into a leading 21st century trade association reflective of the important services our member companies provide to our nation, and most importantly to enhance the value of membership.

Thanks to the hard work of our staff and volunteer members, those seeds are now beginning to bud and bear fruit and the future is looking bright.

The organization has returned to profitability after hitting a rough patch leading up to and through COVID. We have refreshed our logo and marketing, bringing them in line with current brand aesthetics, and are making greater use of social media. We have modernized our internal governance, IT, financial management, and accounting systems, and embarked upon a process of transitioning to a new and more powerful association management software (AMS) which is the lifeblood of any sophisticated trade association.

While these changes are necessary, and will serve to enhance our members' experience, we know that there is more we can do to continually add value for our members. That is why EGSA is now offering more networking, educational, professional development, and promotional opportunities in more formats than it ever has before. We have increased our conference attendance, the number of exhibitors in our trade show, and have added educational sessions, which have been incredibly well attended, to the Spring and Fall conferences.

EGSA updated our Apprentice and Journeyman exams last year to bring them in line with current theory and practice. We separated the Journeyman exam into four sections to better measure a person's knowledge, as opposed to their test taking skills and now allow Journeyman recertification through continuing education Recertification Credits, as opposed to having to retake the test every 5 years. We have begun offering our Basic and Advanced Rowley Schools virtually online in addition to our in-person and on-demand schools. We continue to offer our Load Bank school and certification. We have added classes to our online learning management system (LMS) including content from OSHA and will soon add content from Cummins and hopefully other EGSA members looking to share their knowledge with the industry.

We have accomplished a lot, but we still want more for our members. That's why we will soon launch a new Government Affairs committee to begin advocating for legislation and regulations favorable for our members and it's also why we have asked other current EGSA's committees to begin meeting more regularly so that we can, for example, better influence codes and standards, so that we can streamline and update our Rowley Schools, and so that we can help members with workforce development challenges by creating a new hands-on EGSA curriculum for training new service and maintenance technicians.

As a result of all these efforts, we are seeing greater engagement from our current members and seeing former members returning to the association. In closing, I would like to thank our current members for their contributions to the on-site power generation industry. If you are a former member, or have never been one, I invite you to get involved by joining our family of member companies and individuals.

While there is much more in store, I am pleased to see our efforts beginning to bloom, and I wish you all a joyous and successful summer! ●

With gratitude,  
**Mir M. Mustafa, JD**  
EGSA CEO



**Mir M. Mustafa, JD**  
EGSA CEO  
M.Mustafa@egsa.org



**Nathan Harris**  
*EGSA Director  
of Education*  
n.harris@EGSA.org

## Reimagining Rowley Schools of On-Site Power

In a world where technological advancements are reshaping industries at an unprecedented pace, it becomes essential for industry associations like EGSA to keep up with the evolving landscape. That's why we are thrilled to announce the formation of a task force of dedicated volunteers, working tirelessly to reimagine the Rowley Schools of On-Site Power. This initiative aims to revitalize both the Basic School and the Advanced Schools, bringing in new topics covering the latest technologies that are on the forefront of the On-Site Power industry.

As the demand for sustainable and decentralized energy solutions continues to grow, it is imperative that we equip attendees with the knowledge and skills necessary to navigate this rapidly evolving field. The Basic School, which provides an introductory understanding of On-Site Power systems, will look to incorporate new topics such as renewable energy sources, energy storage, and microgrids. By including these emerging technologies, we can prepare attendees to be at the forefront of innovation in the field.

The Advanced Schools, designed for individuals seeking to deepen their expertise in On-Site Power, will look to include the most relevant and cutting-edge advancements. By focusing on more in-depth and critical aspects, we aim to enhance the knowledge of skilled professionals who can then tackle the unique challenges of the evolving On-Site Power landscape.

One of the primary goals of this reimagining process is to ensure that students receive information and understanding of the latest technologies and equipment. To achieve this, we hope to forge partnerships with leading industry players who can provide access to simulation tools and case studies of real-world projects. This collaboration between EGSA and industry leaders will not only enrich the learning experience but also foster a seamless transition from the classroom to the workplace.

We understand the urgency of this undertaking, and our goal is to launch the new schools in 2024. The timeline is ambitious, but our dedicated task force, consisting of industry experts, experienced instructors, and EGSA staff is committed to making this vision a reality. Through our collective expertise, we aim to create a training program that equips attendees with the skills, knowledge, and mindset required to shape the future of On-Site Power.

In addition to the revamped curriculum, we are also exploring opportunities for continuous learning and professional development. By establishing alumni networks and providing ongoing educational resources we can support the attendees throughout their careers and enable them to stay knowledgeable on the latest advancements in the field.

We are very excited about the potential of these reimagined Rowley Schools of On-Site Power. This initiative not only prepares attendees for a rapidly evolving industry but also contributes to the global transition towards a sustainable and decentralized energy future. With the support of our dedicated task force and the community of EGSA members, we are confident that these schools

will become beacons of innovation, empowering the next generation of On-Site Power professionals.

As we embark on this transformative journey, we invite individuals, businesses, and organizations to join us in shaping the future of On-Site Power education. Together, let us create a vibrant learning ecosystem that enables our members to thrive, innovate, and make a positive impact on the world. The time is now, and the possibilities are limitless. For more information about the Rowley School Task Force or to contribute information towards new courses/curriculum contact Nathan Harris at [n.harris@egsa.org](mailto:n.harris@egsa.org). ●

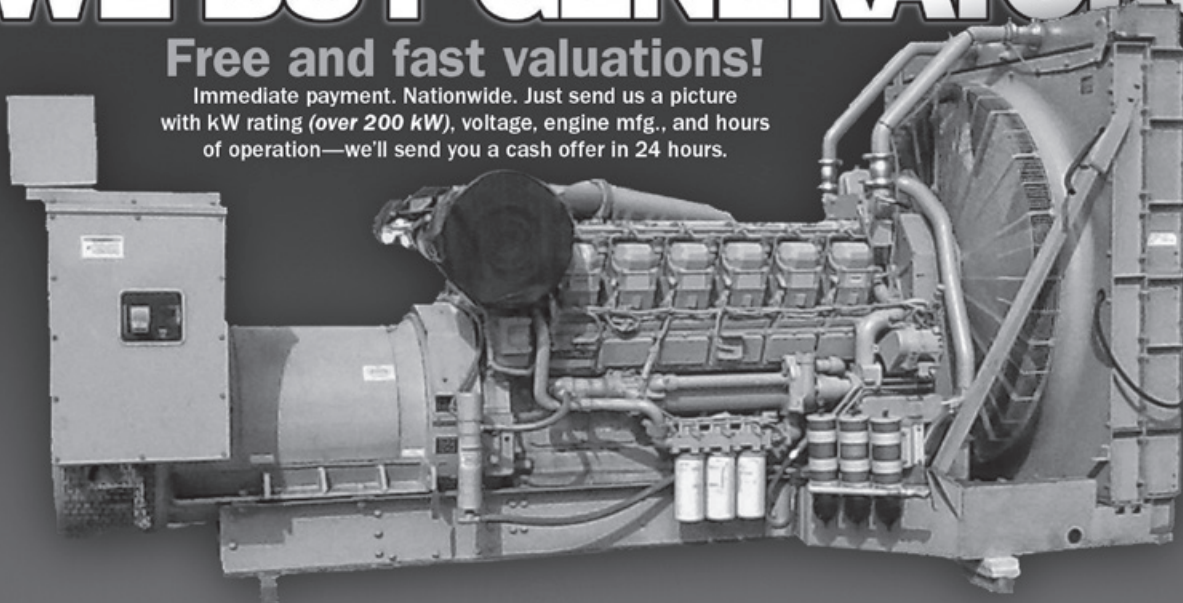
**Nathan Harris**  
Director of Education



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# SERVICE & MAINTENANCE

## Service & Maintenance Is Something Else

Nearly 70 years ago, Peter F. Drucker, perhaps the most often-quoted of all management experts, compressed the world's entire understanding of business into one short statement:

***The purpose of business is to create and keep a customer.***

We all appreciate the meaning of *creating* a customer. But we should place an even higher value on the magic of *keeping* a customer.

In everyday practical experience, sales & marketing is all about *creating* a customer.

Service & maintenance is something else. It's all about *keeping* a customer.

In most cases and in most industries, the achievement of keeping a customer is packed with more revenue-potential and profitability than the original accomplishment of landing that customer. Business gurus gauge all of this with the concept of *customer lifetime value*.

Service & maintenance constitutes the surest way of staying connected with a customer. It therefore compels the greatest reason to invest – and continually re-invest—in the education and training of everyone in your company to prepare them for their role in producing the kind of *customer experience* for which you would like your company to be known in the marketplace.

Companies often conduct customer-relations training for their staff members who are in positions defined in business-speak as “customer-facing,” but they minimize or even omit training for others. That approach works until one of the “omitted” employees accidentally becomes “cus-



***One of your staff representatives and one of your service technicians each give a customer a recommendation on an important issue. Which one carries more weight?***

tomers-facing” and the worst happens.

The only way that a company can confidently build its *customer-experience* competence, however, is through non-stop coaching on CX for everyone. (If “CX”—standing for “customer experience”—is a recognized abbreviation in your company's lexicon, that's a good sign.)

Meantime, organizations offering sales and service on customers' engineered products and capital equipment seem to never stop touting how well-trained and experienced their field technicians happen to be.

But technical training and qualifications ought to be treated simply as a given. It's certainly not the sort of thing to lead with in your advertising and sales promotion. *What would be your impression of your first office visit with a new doctor if she started out your appointment by boastfully rehashing the complete history of her medical education and clinical experience?*

Because service & maintenance

means preserving equipment and as much as possible returning it to a “like-new” condition, in essence it is like selling something over and over again. However, an even more critical outcome of maintaining customers' capital equipment is maintaining the customers themselves.

Here's a thought exercise. The scene is the main production floor in a customer's facility.

Your company has enjoyed a considerable number of years providing service & maintenance for a major piece of capital equipment there. A well-received representative from your company is giving the customer's general manager a preview of the latest version of it, which has just been released. Your staff member is wearing a neatly pressed white shirt and a gray silk tie. He speaks well. Better yet, as long as they have known him, he has always lived up to his pronouncements and promises to this key account.

He is convincingly explaining the pros and cons of whether to replace or retain that big piece of equipment.



The replacement will be costly. But the long-term ROI will justify it—if all goes well.

The customer's general manager promises to think it over and get back to your guy.

By chance, after your company representative has left the facility, one your service technicians arrives for a routine visit. The customer's general manager brings up the replace-or-retain question with him. Because he has always been more communicative than most other technicians—and has never steered them wrong—they have always had confidence in what he has to say. He gives them his honest opinion on whether to spring for a new piece of equipment.

Now, digesting the gist of both conversations, who is the customer more inclined to believe?

From past experience at Great Service Forums<sup>SM</sup>, we think that the service technician has the edge. His recommendation will carry more weight. His paycheck does not depend on which way the customer goes. This service technician knows his stuff from the inside out. In this situation he's an honest broker—and a good student of his company's customer experience training.

When we consider personal experience dealing with our family automobiles, our house, and other "big ticket" items, we tend to think of service & maintenance as a "necessary evil,"

an inescapable burden of ownership. But, as professional service-providers, we should seriously regard service & maintenance as an extension of the original sale that unleashed it and a bridge to future engagement with a customer.

When we hear the word "maintenance," we take it as a synonym for "upkeep." But in reality, it descends from two Latin words, *manu tenere* ("hold in the hand"), suggesting a guiding philosophy for dealing with service & maintenance customers. ●

**Frederic B. Sargent**  
*President, Great Service Forums<sup>SM</sup>*

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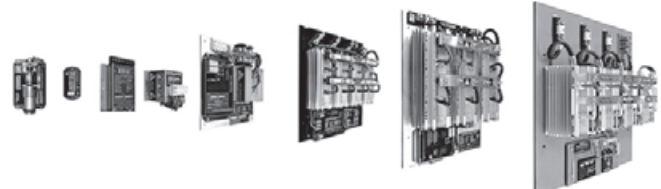


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## The Value of EGSA Membership



**Shana Duthie**  
*Committee  
Chair,  
Membership  
and Marketing*

As the power generation industry continues to evolve and grow, it's becoming increasingly important for businesses in this space to establish themselves as credible and trustworthy players in the market. That's where membership in organizations like the Electrical Generating Systems Association (EGSA) can make a significant difference.

Being a member of EGSA not only provides businesses with access to valuable resources and industry knowledge, but it also helps to build credibility and brand recognition within the industry. By simply sharing that they are a member of EGSA, businesses can immediately establish themselves as reputable players in the power generation space.

But the benefits of membership in EGSA go beyond just networking and knowledge-sharing. By joining committees and attending bi-annual conferences, businesses can connect with potential partners and customers from across the country, and even the world. These events provide ample opportunities for businesses to showcase their products and services, establish relationships with other industry players, and even form new partnerships. There is also the EGSA buying guide and membership directory which is a go to for all of our members when they are looking for partners.

One of the most significant benefits of EGSA membership is the opportunity to contribute to the organization's quarterly magazine, PowerLine. This publication offers businesses in the power generation space the chance to advertise their products and services, as well as share valuable content and insights with other EGSA members. By sharing tips, best practices, and industry news, busi-

nesses can establish themselves as thought leaders in the industry and build stronger relationships with their peers.

Beyond simply contributing content, businesses can also take advantage of thought leadership opportunities by speaking at EGSA events or joining committees focused on emerging trends and issues in the power generation industry. By establishing themselves as experts in their field, businesses can further build credibility and reputation within the industry, helping them to stand out from the competition and attract new customers.

Finally, EGSA is known for its education and certification programs. By certifying their technicians through the EGSA program, businesses can ensure that they are providing the highest level of service and expertise to their customers. These programs help to establish industry standards for servicing and repairing Prime Power and Emergency Backup Generators, making it easier for businesses to stay up-to-date on the latest industry developments and best practices.

In summary, membership in organizations like EGSA can provide a range of benefits for businesses in the power generation industry. By participating in committees and events, contributing to industry publications, and taking advantage of education and certification programs, businesses can establish themselves as credible, trustworthy players in the market and attract new customers and partners. If you're not already a member of EGSA or have not yet committed to renewing your membership, it's worth considering the many benefits that membership provides. ●

# Support the EGSA TOYA in 2023!

Take a look at Our Technician of the Year Award Program and Nominate a Worthy Candidate!

Get ready to shamelessly promote your EGSA-certified colleague by nominating him or her for the 2023 EGSA TOYA!

Every one, at every level, wants to be recognized for doing a great job! The TOYA is **THE** capstone to any technician's career, inciting further personal and professional growth. Can you imagine the competitive advantage of having a TOYA winner on YOUR team?



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Review of Applications  
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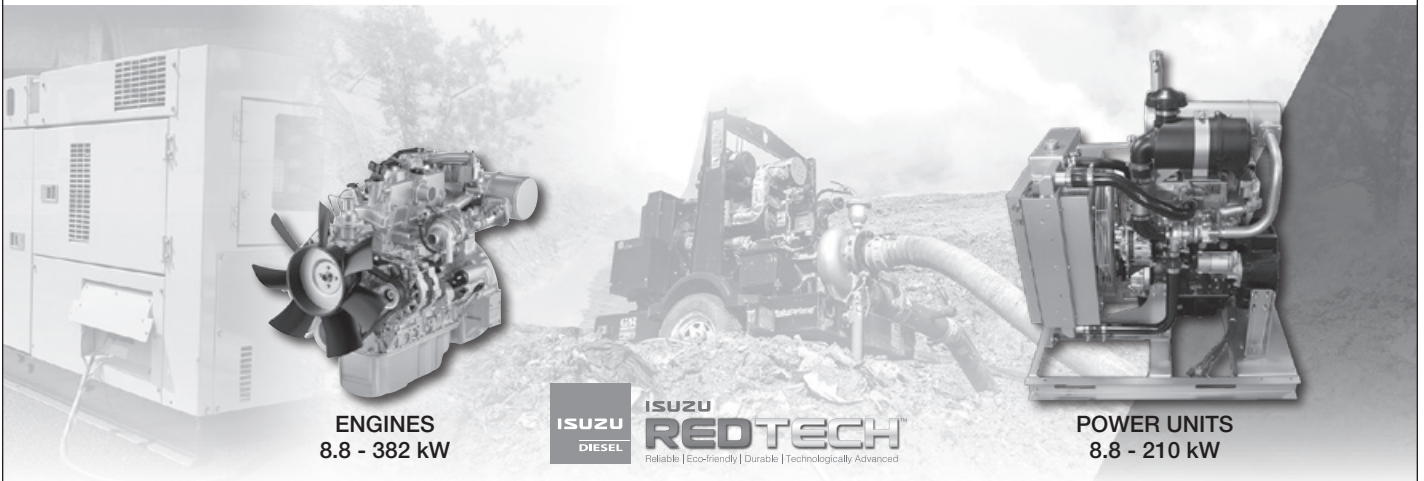


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# Reliable

## Initiating Tough Conversations



**Wes Dove, SHRM-CP/CHBC**  
*Owner, Dove Development*  
[www.dove-development.net](http://www.dove-development.net)

Not long after accepting a position as a Safety and Human Resources Manager for a Mechanical Contracting firm, I met the Construction Manager at the warehouse around 5am one morning so I could visit several job sites with him that day. He was there each morning to make sure his crews got the materials they needed before heading in various directions for the day and to answer any questions he could face to face. Since most of the team either lived nearby or met there to carpool to the jobsites, nearly all of them were at the warehouse between 5 & 5:30am each morning.

That morning, one of the most senior foremen didn't get all his change back from the soda machine and blew a gasket. As he started stomping around for everyone to see, he yelled something about how fitting it was that the soda machine was there; he said it was just like the owner of the company, always taking and never giving. For some perspective on just how strange it was that he'd make such a statement, he was the longest tenured employee in that part of the organization and the highest paid, by far, making more annually than even the Construction Manager with only a modest amount of overtime. And quite honestly, I can't tell you that I ever saw him put on a pair of gloves in the two years that followed while I was in that role.

If we were face to face, I'd ask you to guess how that behavior was addressed. Since we're not, I'll cut to the chase and tell you that it WASN'T handled; it was completely ignored. Being new to the organization, I chose to stand back and observe, something I rarely did from that day on. The Construction Manager and I discussed it a bit during our day. I shared a few concerns about the message that senior team member sent the rest of the crew through his tirade; a negative image of the owner, that they wouldn't be taken care of either, or that this type of behavior was acceptable. The manager shared a few concerns of his own about why it may have been even worse had he addressed it; that fellow would have had a bad attitude all day, he may have sabotaged the job he was on, or just quit and went to work for a competitor.

While I understood each issue he was concerned about, I believed the first two were completely unacceptable and the third was extremely unlikely given that employee's tenure. Since I was working to build a working relationship with the Construction Manager, my only real pushback at the point was that not addressing it at all likely endorsed the behavior as being acceptable.

I have to think that you've experienced something similar at least once in your career, I've certainly seen or heard about variations of it in nearly every organization I've worked with over the years. Before you get the impression that I'm placing blame on that manager, or any other specific manager who's been in a situation like that, please know that I'm not. I'm convinced that no one in a leadership role believes that kind of outburst is OK; but most have never been given the tools for handling something like that effectively. And unfortunately, subpar behavior goes unaddressed until the supervisor or manager reaches their boiling point and completely blows their top!

As difficult as it may seem, these are some of the simplest and most critical conversations we should be having with the team members we lead, but there are a few things we much do to make sure we get the best possible results;

- The first step is separating the behavior from the individual. I've met very few people who are genuinely bad, but we all have bad days! By isolating the behavior, it's less likely to be received as an attack. In most cases, we can even point out something they do well that the poor behavior contradicts.
- We should also look for ways to explain how the behavior goes against our company values, as well as how it negatively impacts other team members' performance.
- We also need to be sure we're very clear about our expectations that the behavior isn't repeated and explain the repercussions that will follow if it is. This isn't about issuing a threat of discipline but explaining the consequences they're choosing through their actions.



As leaders, it's natural to care for our team members. That can make it difficult to initiate a tough conversation, especially when it's with someone we've worked with for years or someone with a unique set of skills. If we avoid these conversations though, it makes things even harder for the rest of the team! And truth be told, the best folks I've ever worked with appreciated being held to a high standard! ●

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# Eco-friendly

# COMMITTEE HIGHLIGHT

## Revitalizing EGSA: Unveiling Our Enhanced Committee Structure for Greater Industry Impact and Member Engagement

In our continuous commitment to support our member community and enhance the on-site power generation industry, EGSA is delighted to announce the revamp of our committee structure. This is part of a strategy to enhance the value of our membership and bolster our focus on substantial issues impacting our industry. Our reinvigorated committees serve as platforms for professional development, best practice sharing, and industry networking.

Each committee now boasts a comprehensive mission statement, reflecting its purpose and relevance to our association. To provide clear direction, committees will also outline 3 to 5 annual priorities that align with EGSA's organizational and strategic goals. Progress on these priorities will be presented biannually to the EGSA Board, ensuring transparency and accountability. EGSA Committee Leadership will present their Committee priorities and tangible action items at our upcoming Fall 2023 Conference. The EGSA Board is committed to monitoring our collective progress, ensuring that our initiatives align with the overall strategic vision of the association.

To foster engaging discussions and promote continual learning, our committees will meet on at least a quarterly basis. These sessions provide the opportunity for collaboration with industry experts who can provide valuable insights on various topics. EGSA staff will be included in every

committee meeting to offer their expertise and logistical support.

Here's a brief overview of our committees:

- The **Codes and Standards Surveillance Committee** monitors and reports on national and international industry codes and standards, educating EGSA members, developing recommendations, and establishing recommended practices.
- The **UL 2200: Codes and Standards Surveillance Sub-Committee** specifically focuses on the UL 2200 Standard, ensuring safety, removing ambiguities, updating members on revisions, and developing proper application practices.
- The **Distributor/Dealer Committee** actively shares the needs and solutions to common challenges and opportunities for Distributors and Dealers in Sales, Product Support, and Business and Operations Management.
- The **Education Committee** actively cultivates member value by developing and delivering educational resources for our members and the broader industry, working closely with Committee Officers, members, Subject Matter Experts, and the EGSA Board of Directors.
- The **Microgrid and Renewables Committee** represents members in the growing market of microgrid and renewable technologies. It focuses on energy storage, fuel cells, solar and integrated gas/diesel genset technologies, and wind energy.
- The **Membership and Marketing Committee** works towards increasing brand awareness by partnering with EGSA staff to establish marketing plans, branding strategies, and communication initiatives that enhance member value and engagement.
- The **Technical Oversight Committee** provides EGSA members and the industry with technical articles and videos on matters that affect the power generation industry that are targeted for policy makers, customers and other stakeholders.
- Lastly, we are excited to introduce the **Veterans Task Force**. This committee is dedicated to providing active and retired military personnel with more opportunities to engage in the on-site power generation industry. It offers substantial benefits such as networking events, job placement outreach, and access to specialized educational programs, including our Transitional Assistance Program (TAP).



EGSA committees are hubs of innovative ideas and thoughtful strategies, driving the industry forward. They are at the heart of our mission and your participation is vital. Therefore, we are inviting all members to participate in the committee(s) best suited to their interests and expertise.

Together, we can bolster the value of our association, lead the on-site power generation industry with conviction, and achieve new milestones. The success of EGSA and the industry relies on our collaborative endeavors, and your individual contribution is key.

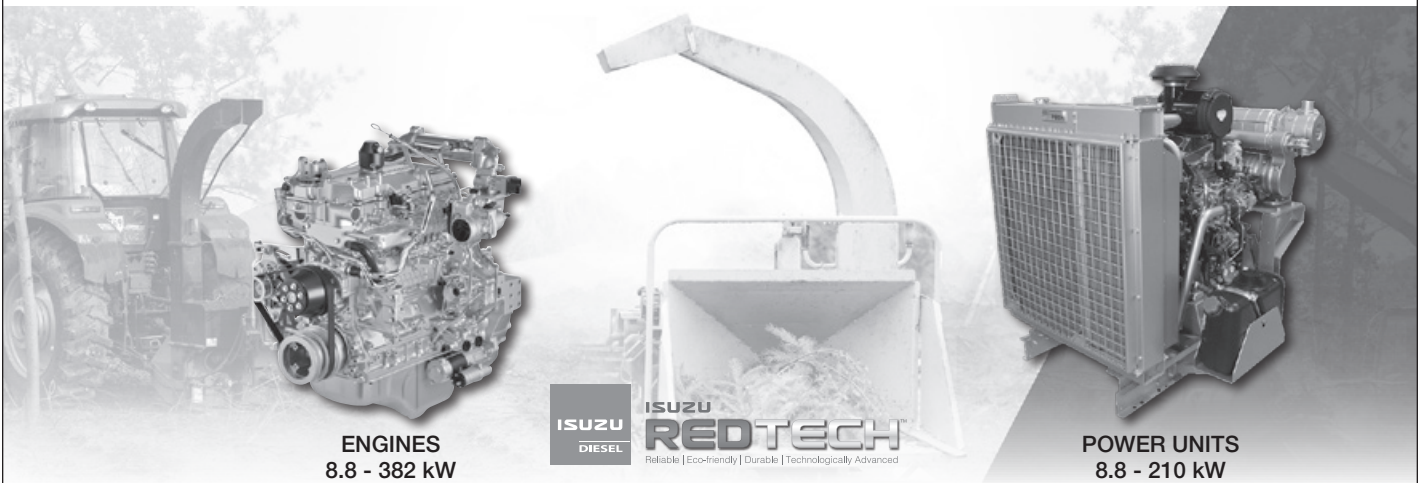
Take an active role in shaping the future of on-site power generation industry and join a committee today by emailing Sarah Cullen at [s.cullen@egsa.org](mailto:s.cullen@egsa.org). ●

*Each Quarter will highlight one of our committees to give our members insight on their current initiatives, key priorities and how to get involved.*

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# Durable

# AI Model Boosts Microgrid Optimization

By Nick Flaherty, *Electronic Europe News* | [eenewseurope.com](http://eenewseurope.com)

Researchers at Gwangju Institute of Science and Technology in Korea have developed an AI-based optimization model to boost the performance of electrical microgrid systems.

The model incorporates possible variations in future power outputs to arrive upon an optimal scheduling decision and reduce operational costs and load shedding.

Microgrids are smaller, localized electricity grids, often with renewable energy sources such as solar panels or

wind turbines. These can be connected to the main grid of the region, but also can also be disconnected or “islanded” if needed. Models that guide the operation of microgrids, such as scheduling load shedding, are key to their efficient functioning.

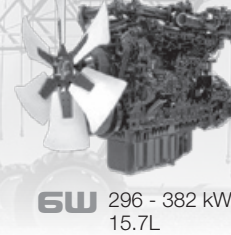
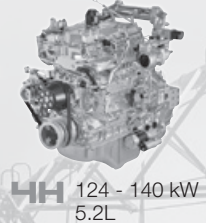
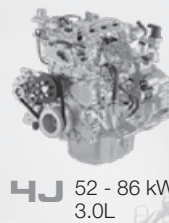
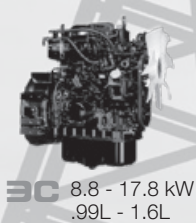
So far though most microgrid models have either neglected the uncertainty and variations in renewable energy or assumed the worst-case scenario, which can lead to an increase in energy not supplied (ENS) and operating costs.

The team at GIST developed a new two-stage stochastic optimization model to minimize operating costs and load shedding.

“One of the problems with microgrids is that they sometimes cannot supply enough electricity for the load, causing load shedding, and at other times they produce too much electricity,” said Dr. Yun-Su Kim, who led the study. “We created an operation algorithm that can reduce operation costs and load shedding.”

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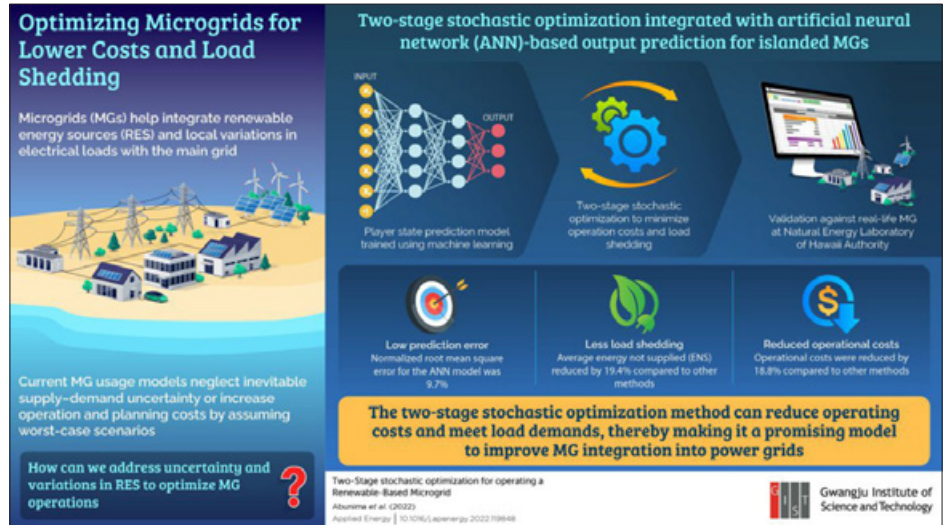
# Technologically



Key to the new optimization model was an artificial neural network (ANN) to create a prediction model for the power output of renewable energy sources. This power output is obtained in the form of a probability density function, providing the likelihood that a given power output will be obtained at any given point of time.

This accounts for variations and uncertainty in the renewable energy supply. This probability density function is then fed into a stochastic optimization model that makes operating decisions, such as scheduling.

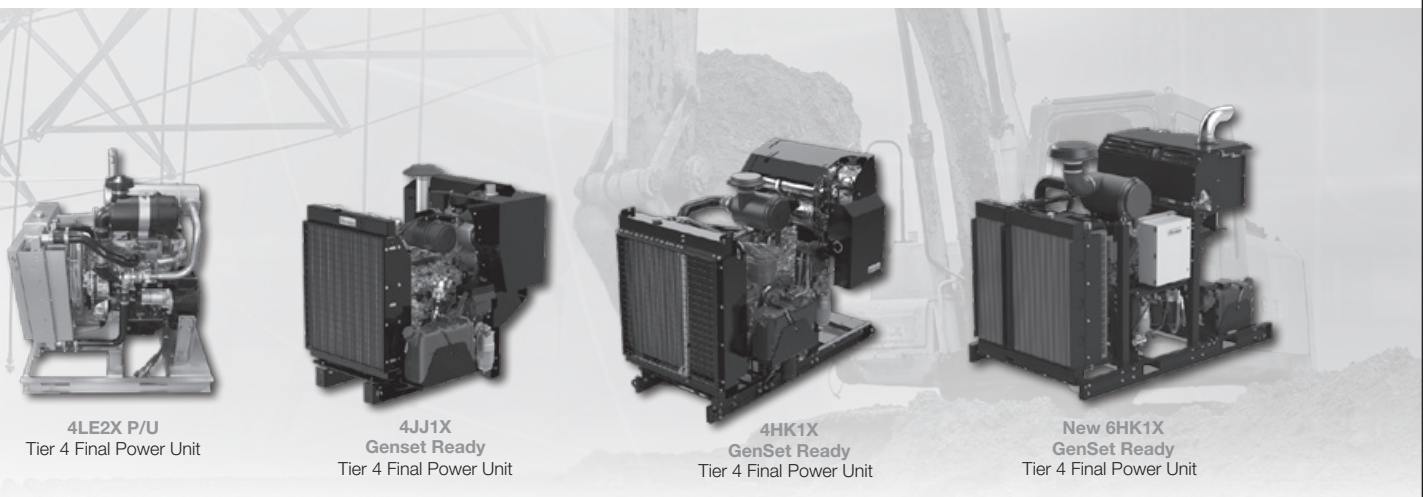
The researchers validated their model using data from a microgrid designed by the Natural Energy Laboratory of Hawaii Authority. They found that the ANN predicted power output with a



low error of 9.7%. The stochastic optimization model also offered an approximately 20% reduction in average ENS, as well as around 19% lower operating costs.

“Reforming the power grid using microgrids can help renewable energy integration. Thus, improving the efficiency and integration of microgrids will bring us one step closer to energy security and stability,” said Kim. ●

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Advanced



# Considerations For Microgrids With Dissimilar Energy Sources

By Hassan Obeid & Jamie Hamilton-Antonsen

As more renewable energy sources and battery storage units are specified and incorporated into power systems consultant specifying engineers are faced with many challenges which could impact the overall design and performance of these solutions. This paper outlines and addresses some of these challenges to aid in the system design, explains some common components found in microgrids, and discusses the value of an advanced microgrid controller for system operation.

The traditional top-down flow of electricity from large, centralized power plants, through transmission and distribution lines to a power meter has been experiencing disruptive forces over the past two decades due to deregulation of energy markets, de-carbonization, technology advances, availability, and cost decline, higher customer expectations, and increased penetration of renewable technologies.

Today, power consumers can become power producers as roof-top solar, behind-the-meter generators, and battery energy storage systems become more economical and ubiquitous. Additionally, concerns about the reliability of the traditional utility electricity due to its aging infrastructure, extreme weather events, and more sensitive loads have led to wider adoption of microgrids.

## What is a Microgrid?

A microgrid is a local energy grid with control capability. Microgrids can be disconnected from the traditional grid and operate autonomously. Some microgrids may be entirely off-grid and be the prime power source for the end-users it serves.



These microgrids may incorporate a variety of traditional and renewable power sources such as diesel or natural gas generator sets, wind turbines, solar panels, fuel cells, and energy storage. Microgrids may even incorporate combined heat and power (CHP) to address both electrical and thermal energy needs of its users. Through on-site generation with a microgrid, consumers of electricity can achieve their goals of increased resiliency, lower energy costs, greater independence, and reduced environmental impact by becoming producer-consumers or “prosumers” of energy.

## Challenges When Evaluating A Microgrid Application and Incorporating Dissimilar Energy Sources

Some of the considerations related to microgrid projects are as follows:

- Finding an optimal economic and environmental solution with the best Return on Investment (ROI)
- Identifying the right combination of traditional, renewable, and stor-

age assets to meet the operational and load demands

- Integrating the various generating, storage, controls, and electrical distribution assets with simplicity
- Synchronizing and paralleling dissimilar energy Sources
- Complying with grid code requirements for interconnection
- Ensuring 24/7 resiliency and uptime
- Handling changes in resource availability such as cloud cover, changes in wind speed, and seasonal variation
- Ensuring both electrical and thermal loads are satisfied consistently and securely
- Managing assets to ensure best efficiency and longest lifecycle
- Reducing utility demand charges
- Generating revenue through demand response programs, behind the meter applications, and net metering

- Designing for future load expansion needs

### Where To Start?

When beginning to evaluate a microgrid project it is important to:

- Identify the goals of the project and customer in undertaking a microgrid project.
- Engage the local utility to understand interconnection requirements in the case of a utility connected and evaluate if the cost and complexity of interconnection can be avoided through a system architecture such as “open transition” to and from utility.
- Conduct a feasibility study and stability analysis.

A feasibility study will evaluate the needs and constraints of the specific site and customer to identify a wide range of design options. The feasibility study will look at assets such as synchronous generator sets, battery energy storage, solar, wind and fuel cells, etc. to find the best mix and sizing of each asset to achieve the project goals. Through this energy model, a representative system can be evaluated for the key metrics of the system such as levelized cost of energy (LCOE), system emissions, renewable penetration, energy shortfalls, fuel consumption, etc.

The energy modeling begins with a detailed analysis of the site’s load profile at 15-minute to 1-hour intervals for an entire year and a review of the exact site details to determine the wind availability, solar radiation, etc. for the specific geographical location being considered. Finally, by investigating existing utility charges and/or on-site fuel consumption, a variety of solutions can be measured against the baseline or status quo.

Various assets can be considered in the energy model and the sizing of these assets can be constrained based on site-specific information. For example, while solar panels are cost competitive both from an initial

investment and operating expense perspective, they take up a significant amount of space. Another common constraint is the availability of specific fuels for generator sets at the project location. The energy model will determine how each of the chosen assets should be utilized to reduce the LCOE and maintain power to the microgrid. For example, the energy model will find the best time to utilize grid power, when and how to charge batteries, and when to utilize generator sets in the system.

A system stability analysis will ensure adequate power quality (i.e., frequency, voltage deviation, etc.) and eliminate system disturbances. The stability analysis will confirm that the various energy assets being considered for the microgrid will maintain the required electrical quality to maintain continued operation and prevent damage to connected loads.

Through these two analysis steps, the most efficient and stable integration of assets can be optimized for the specific drivers of the project such as the lowest net present cost or lowest system emissions.

### Components Commonly Found in Microgrids

#### INVERTER BASED TECHNOLOGIES:

##### Photovoltaic Panel

Photovoltaic, or solar, panels are made of silicon cells which when exposed to sunlight change their electrical characteristics and generate electric current. PV Panels are typically mounted on the rooftop of buildings, above parking garages, over carports, or in open space at ground level. They require a large amount of physical space unobstructed by shade.

PV panels are a Direct Current (DC) power source and require an inverter to transform the DC power to Alternating Current (AC) for use in most common electrical devices.

Solar panel costs have recently fall-

en drastically, and they have an extremely low or even non-existent marginal cost of generation making them a valuable asset in a microgrid. They are, however, a highly intermittent power source – only producing energy when solar radiation is available during the daytime. PV panels alone cannot provide uninterrupted electrical reliability and are increasingly being paired with battery energy storage systems to ensure greater utilization and reliability.

##### Battery Energy Storage

Battery storage is another common component found in microgrids as, when coupled with intermittent energy sources like PV panels, can address the curtailment and irregularity of renewable energy sources.

During the day when solar energy is abundant energy produced in excess of the load demand can be stored in batteries to be discharged overnight rather than being curtailed. Batteries can also be charged by utility power, if allowed by the utility, when utility rates are lowest and discharged during high-rate periods or to avoid costly demand charges.

Lithium-ion batteries are currently the most prevalent technology used in stationary storage applications due to their high-power density, low costs, and durability. Energy storage systems can be utilized in both off-grid and grid connected systems and can be used to supply near instantaneous power during grid outages or during dispatchable asset start up events. Battery storage can also be used to improve the transient response during large load changes.

As with PV panels, batteries are a DC power source and utilize inverters to charge or discharge to an AC electrical system.

##### Other Technologies Used in Microgrids

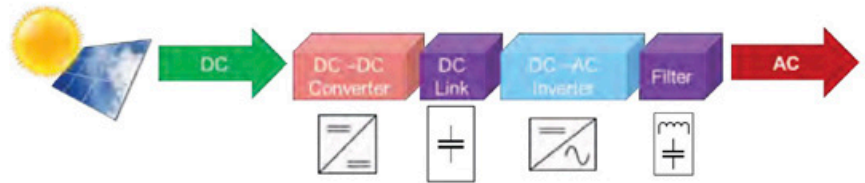
Microgrids can also utilize other power technologies such as wind turbines and fuel cells. Wind turbines, like PV panels, are intermittent sourc-

es which produce power when there is adequate wind. Geographic location has a major impact on the viability of using wind energy in a microgrid but in the right location can be very beneficial.

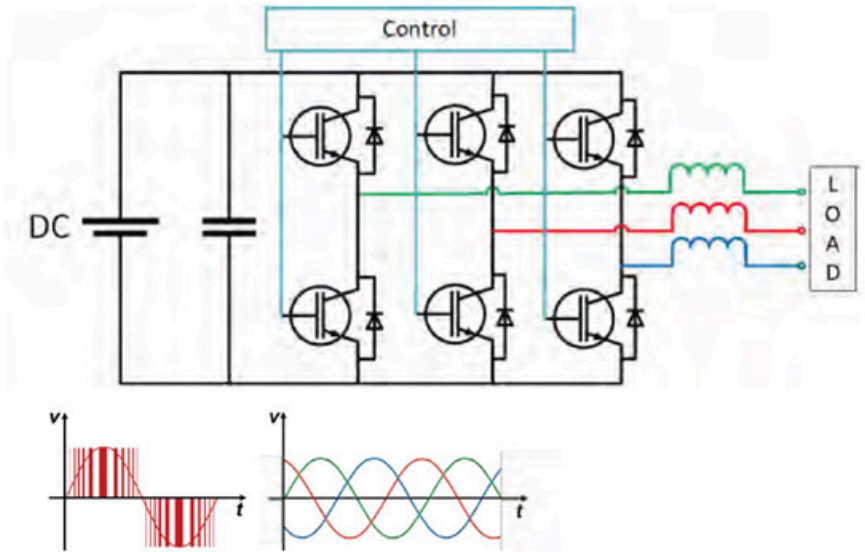
Fuel cell technology has been steadily improving with higher efficiencies, increased power density, and reduced costs leading to more microgrid projects considering fuel cells. There are different fuel cell technologies available such as Proton Exchange Membrane (PEM) fuel cells and Solid Oxide Fuel Cells (SOFC) which can accept and generate power from different fuel sources. PEM fuel cells utilize very pure hydrogen (H<sub>2</sub>) to produce power while SOFC can utilize a variety of hydrocarbon-based fuels such as biogas, natural gas, propane, and hydrogen. When considering a fuel cell for a microgrid it is important to understand the performance characteristics of the chosen fuel cell as well as have a good understanding of the supply chain costs of the required fuel.

**Inverters**

To connect the DC output of solar, storage and fuel cells to an AC network, the DC output must be inverted to AC power first. Inverters, which are semiconductor-based electronics utilize Insulated-Gate Bipolar Transistors (IGBTs), are used to invert the DC power to AC power. In addition to inverters, filters and other electronic devices are used at different stages of the conversion to produce a clean sinusoidal waveform. Figure-1 shows the typical inverter stages. The AC output is achieved by turning on/off the IGBTs at a pre-defined sequence and speed which generates pulses of currents which is known as modulation, Figure-2. There are multiple modulation techniques such as Pulse-Width (PWM), Pulse-Frequency, and Pulse- Amplitude. PWM inverters are the most common as they eliminate lower order harmonics and decrease the Total Harmonic Distortion (THD) content in the output AC voltage.



**Figure 1.** Typical inverter stages



**Figure 2.** Typical PWM inverter

Inverters can be grid forming or grid following. In grid following, a voltage reference must be established by another AC energy source such as the utility or a generator set before the inverter is able to synchronize and connect to the network. In grid forming inverters, the inverter does not require a reference voltage and can establish the voltage of the network independently. Solar inverters are most commonly grid-following, whereas storage inverters can be either grid forming, grid following or both.

**SYNCHRONOUS MACHINES:**

**Generator Sets**

While PV panels and batteries are DC power devices, most electrical equipment utilizes AC power. A generator set, by its nature, generates AC power and can directly be used to power AC loads on demand and can be paralleled with other AC power sources such as the utility grid.

Incorporating a synchronous machine into a microgrid application has many benefits. A generator set is a dependable, dispatchable energy source which, if fuel is available can be utilized to meet the electrical load demand. Generators, with their high-power density, can start quickly, accept large block loads, and provide a reference to grid following components such as PV or battery inverters. With intelligent controls in modern generator sets, autonomous synchronization and load sharing can be done at the equipment level and there are a wide variety of generator sets avail-



able at various power levels that accept different fuel types. Generator sets provide inertia to a system that inverter-based generation cannot provide, contributing to the overall stability of the system. Some microgrids, consisting of synchronous generators and PV energy for example, will require a minimum capacity of synchronous generators to be operating at all times to maintain inertia.

Generator sets selection should consider the fuel available at the project location, the expected usage, emissions requirements, noise limitations, and the microgrid's configuration. There are many different generator set technologies available on the market that can meet the needs to microgrids.

The two most common concerns when utilizing generator sets for microgrids and prime applications are noise and emissions with increasing pressure to be environmentally and socially responsible. Modern generator sets are available with exceptionally low emissions due to advancements in combustion and after-treatments technologies. Additionally, low carbon fuels such as Renewable Natural Gas (RNG) and biogas can be used for carbon neutral operation. Noise can be addressed through highly sound attenuated enclosures and buildings. Noise and emissions at the site level can also be minimized through intelligent controls which optimize the use of each asset to minimize the duration and timing of operation.

### Paralleling AC Power Sources

To parallel or connect alternating power sources, several characteristics of the AC output voltage must be the same or within an acceptable range. It is essential that the waveform and phase sequence are the same. Also the frequency, phase angle and voltage amplitude must be within the acceptable range to safely and effectively parallel the AC sources, Figure-3.



Figure 3. Synchronizing frequency, phase and voltage sources

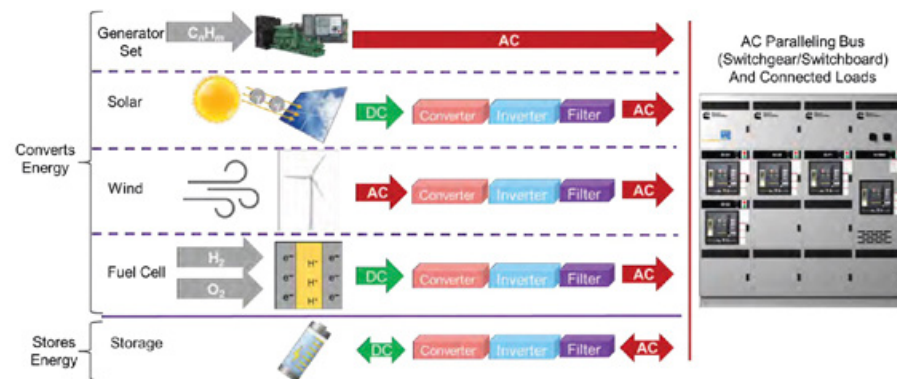


Figure 4. Dissimilar power sources

Synchronous generator sets naturally produce AC voltage and they can be either in load sharing (analogous to grid forming) or in load govern mode (analogous to grid following) which are the terms used to describe the generator set paralleling functions. Load sharing is the proportional division of kW and kVAR total load among multiple generator sets in a paralleled system. Load sharing is essential to avoid overloading and stability problems on the paralleled generator sets. In load sharing the generator sets regulate their voltage and frequency. Load sharing can either be isochronous (where voltage and frequency stay constant at a 100% regardless of the load) or droop (where the voltage and frequency vary as the load varies).

The advantage of isochronous load sharing is the constant voltage and frequency; however, it requires the sources to communicate with each other. On the other hand, droop does not require communication interconnection between the power sources at the expense of varying voltage and frequency as the load varies.

The load govern function applies when a generator set, or multiple sets are paralleled to a utility or the grid. Because the utility voltage and frequency are fixed, the generator sets regulate their kW and kVAR output, instead of their frequency and voltage.

It is expected that the synchronous generator onboard paralleling controls to have paralleling and protection capabilities built in. The generator sets' paralleling control is typically responsible for all the following:

- Paralleling functions
- First start arbitration
- Synchronizing ( $\emptyset$ , V, Hz)
- Load sharing (kW and kVAR)
- Protection
- Metering
- Alarms
- Built-in safe manual paralleling

When it comes to renewable energy sources and battery storage units, the output voltage is DC and therefore an inverter will be utilized to invert the DC into AC, Figure-4. Typically, photovoltaic inverters are grid following whereas storage inverters

can be both grid forming and/or grid following.

Inverters are responsible for the lower-level synchronization, protection, and metering. However, one essential aspect when paralleling is load sharing across all the sources. Load sharing across synchronous generators is simply accomplished via the on-board paralleling control and it can either be isochronous, the most common and preferred method or droop as described earlier. When it comes to load sharing with inverters, one method would be to set the generator sets to operate as the utility (load sharing/grid forming) and the inverters would operate in grid following and act like a constant real-reactive power (PQ) source. And an external control system would send these PQ commands to the inverter.

### Microgrid Controller

At the heart of any microgrid power system there must be an autonomous controller (Figure-5). The microgrid controller is expected to do, as a minimum, the following:

- Optimize energy production from all energy sources to meet demand
- Maximize the output of renewable sources
- Control loads via load add and load shed
- Minimize emissions and fuel consumption
- Achieve the lowest Levelized Cost of Energy (LCOE) and Total Cost of Ownership (TCO) for all assets
- Allow for monetizing assets via grid support and demand response programs
- Ensure assets in the system are best utilized
- Adapt to changing weather conditions (i.e., cloud cover, wind speed, and other conditions)
- Operate the system entirely or partially off-grid
- Monitor and/or control assets remotely with real-time notifications

What is not expected from the microgrid controller is the lower-level machine-to-machine operations such as synchronizing, load sharing, and protection. By moving these operations to the individual machines, single point of failure is eliminated and therefore reliability is increased. Failure of the microgrid's autonomous controller does not jeopardize the reliability of the microgrid power system. Any failures must be analyzed and mitigated for safe and reliable operations which is typically performed by the microgrid controller provider.

### Value of Single Supplier/ Integrator

Microgrids, which incorporate a wide variety of assets such as PV panels, energy storage batteries, utility power, and generator sets, can seem intimidating with all the complexities of integrating these energy sources. It is critical to work with a reputable system designer and supplier who can not only provide engineering guidance on the size, mix and configuration of the optimum assets for a project, but can also deliver the individual components, integrating them into a solution all the way through to commissioning.

While every effort is taken to engineer out issues, with the complexities of microgrid projects, challenges are often unavoidable. Having a single integrator on the hook to resolve issues is invaluable. When a system is delivered by a single integrator there is no risk of finger pointing between component suppliers and the project will ultimately be more successful.

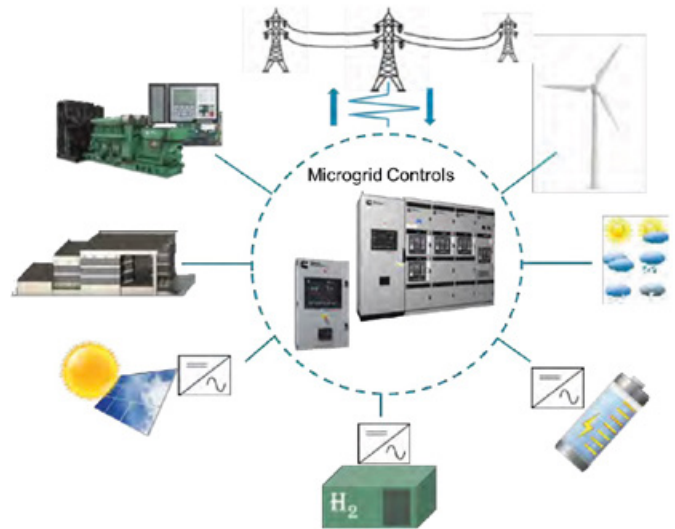


Figure 5. Microgrid Controller

### Summary

Microgrids can provide significant benefits for **resiliency, sustainability, and cost savings**. Every project should begin with a feasibility study and stability analysis to determine the best mix and sizing of assets to meet the goals of the project. The sequence of operation should be written to ensure system resiliency and power quality with mitigated failure modes. The integrated paralleling and protection controls for the synchronous generator sets as well as the microgrid controller are critical components to ensure seamless operation, system recovery, failure mode analysis, and system optimization. As with all specifications, the microgrid specification should be based on function and performance. Working with a reputable power system supplier who fully understands the power system design space can ensure a well-engineered solution which will achieve the project objectives. ●



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## Meet Your New EGSA Manager of Membership

As we continue our effort to add value to the EGSA membership experience, I'd like to introduce myself. My name is Sarah Cullen, and as the new Manager of Membership Services, I'm excited to get to know the EGSA community, grow the association, and have the opportunity to enhance the value of your EGSA membership.

I bring with me a diverse background in production, events, marketing, and hospitality. At the Durham Performing Arts Center, the North Carolina Museum of Art, and a number of major venues and events, my roles in booking, marketing, and event production allowed me to gain valuable insights into organizing impactful events and creating community opportunities. More recently, I challenged myself in the world of film and television production with leading companies such as Netflix, Hulu, Apple, and FX, where I learned the art of creating exceptional experiences for audiences begins with effective interactions and authentic connections; knowledge I look forward to bringing with me to EGSA.

### **What are your primary goals and strategies as our new Manager of Membership Services?**

As your Manager of Membership Services, my focus will be on creating an environment that brings value and engagement to your membership experience. I'm dedicated to assisting members access valuable benefits, delivering meaningful communications, and increasing the value of EGSA by fostering connections within our industry and growing the membership. I truly believe that a vibrant community can share knowledge more effectively and contribute significantly to the success of our industry. I am excited about this opportunity to apply my unique skillset to EGSA's continued growth.

### **What do you like about working for EGSA so far?**

The highlight of my first month has undoubtedly been meeting the membership base. They have proven to be welcoming, caring, and actively involved. I thrive in the company of passionate individuals, and our members are caring industry leaders focused on growth, safety regulations, and innovative ideas through committees and community.

Thank you for the warm welcome, and here's to a future of collaboration, growth, and shared success!

See you this fall in San Antonio! ●



**Sarah Cullen**  
*EGSA Manager of  
Membership Services*  
S.Cullen@egsa.org



# 2023 FALL CONFERENCE

Hyatt Regency Hill Country Resort | San Antonio, TX | October 1-3

## NETWORK ► LEARN ► ADVANCE

### SCHEDULE AT-A-GLANCE

#### Sunday, October 1

- Committee Meetings
- Welcome Reception

#### Monday, October 2

- Breakfast
- Exhibition Open
- General Session
- Educational Sessions
- Welcome Lunch
- Educational Sessions
- Gear Head Tour
- Banquet Dinner

#### Tuesday, October 3

- Breakfast
- Exhibition Open
- General Session
- Educational Sessions
- Networking Activities
- Closing Reception

#### General Sessions:

- Keynote Speaker Hall of Famer Reggie Jackson
- Panel Presentation: Federal Investments in Renewable and Resilient Energy: Learn How This Can Impact Your Bottom Line

#### Educational Sessions (*Pending\**):

- Technician Safety
- Generator Operation/Maintenance Optimization
- Emissions Requirements
- Energy Storage
- Best Business Practices for Dealers & Distributors
- Fuel Quality
- Recruitment & Retention
- DPF and Tier 4 Compliance
- CHP Systems
- Noise Control Strategies
- Demand Response
- A.I. in Power Generation
- Industry 4.0

[egsa.org/Events/Conference-Home](https://egsa.org/Events/Conference-Home)

*\*EGSA is accepting Call For Proposals through July 15, 2023.*





# Dr. Sean T. Collins of Governors America Corp.

For nearly 30 years, Dr. Sean T. Collins has divided his time between his military obligations and a civilian career, currently running a successful design and manufacturing company.

As a Major General, he serves as the Assistant to the Surgeon General for the Department of the Air Force, Space Force. His early career was health care driven, having done four combat tours as a medic. He has been assigned at the Pentagon over the past seven years, currently overseeing Medical Operations for Space Force, the newest military branch.

As owner and CEO of Governors America Corp (GAC), the Massachusetts native is dedicated to ensuring that quality is part of every product manufactured in the Agawam, MA facility. "I am passionate about manufacturing. Making things is important to our country. If we do not have manufacturing in this country, we do not have a country."

GAC, founded in 1986 by William Ferry, had humble beginnings in the back of a warehouse in Springfield, MA before relocating to Agawam in 1991. GAC designs and manufactures engine control systems, from heavy-duty actuators to digital speed control units that can survive the harshest environments. GAC is a responsive vertically integrated company that designs and manufactures solutions used around the world.

Dr. Collins has been a part of GAC since its inception as a family business; he can be heard on facility tours pointing out with pride the file cabinet he painted back in 1986. He embraced every aspect of the business from the early days, doing what needed to be done – potting, shipping, packing. He took on

leadership positions throughout the years and has served in later years as Director of Operations and Chief Operating Officer. He took over as president in 2011 after returning from his deployment to Afghanistan. In 2017 he founded Hawkeye Innovation, a partner company to GAC, providing both government sourcing of GAC products and contract manufacturing, all with the key of keeping Americans employed.

Dr. Collins encourages the next generation to learn more about manufacturing, engaging with schools from middle school to college co-op students to visit the facility to spark an interest in a future career in manufacturing. When describing GAC to the students he describes vertical engineering as a way to control the company's destiny. "We control our destiny as a company and so you control your destiny in life. Keep after



*Armchair chat by General David Petraeus and Dr. Sean Collins.*



**Dr. Sean T. Collins**  
Major General

it. You control your success." A sign in his office reads *EVERYTHING IS FIGUREOUTABLE*. "I have a positive outlook on life. You can accomplish whatever you put your mind to."

GAC has been involved with EGSA since 1987, with several key engineers as members throughout the years. Dr. Collins became a member of the Board of Directors in 2022. He is the founding member of the Veterans Task Force, a newly developed EGSA group that works to introduce Veterans and their unique skills and insights to the power generation industry. His most gratifying event to date was engaging with retired General David Petraeus at the EGSA fall 2022 conference. "Given many years in the war zones, I have a deep appreciation for those who generate power and keep generators going," said retired General David Petraeus as he gave the keynote welcome. Collins, who last met with General Petraeus in Iraq in 2008, said, "it was great to see General Petraeus again; his ability to address the complex questions on energy, power generation, and other diverse subjects was just amazing!"

In his free time, Dr. Collins enjoys bicycling and spending time with his family. ●

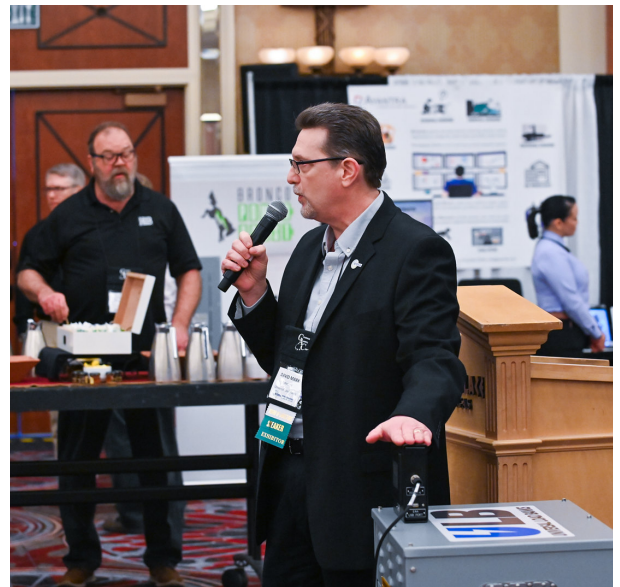
# 2023 SPRING CONFERENCE RECAP

Caesars Palace | Las Vegas, NV | March 12-14

## Taking a Look Back at Spring 2023



Keynote Speaker Kevin O'Leary



Power Talk presented by Mark Prevoznik of ULB



Board Member Chad Youkers enjoying the Exhibition Booths



Education Session on Generator Reliability by Jon Pinney



Tom Black presenting the Gordan Johnson Award to Armand Visioli



John Kelly Jr. and 2022 TOYA winner Rustin Riss



Welcome Reception



Closing Reception



Welcome Reception



Golf Tournament



Shelby Museum Tour



Off Roding in the Nevada Desert



Welcome Reception

# EGSA Certified Technicians

## Advancing Professionalism in On-Site Power

As part of its commitment to advancing professionalism within the On-Site Power industry, EGSA has created the Electrical Generator Systems Technician Certification Program. Certification of personnel has become the hallmark of many industries in the United States today for one simple reason: It helps advance the profession by identifying consistent standards through which proficiency can be determined.

EGSA Technician Certification demonstrates a commitment to that ideal. Through rigorous testing, the program will identify those technicians who not only have a broad knowledge of electricity, mechanical and electrical components and the interaction between them, but are proficient in the installation, service, maintenance, and repair of On-Site Power generation systems.

Please visit [egsa.org/Certification](http://egsa.org/Certification) to learn more about EGSA Technician Certification. ●



**aksa** POWER GENERATION

# POWER YOUR FUTURE

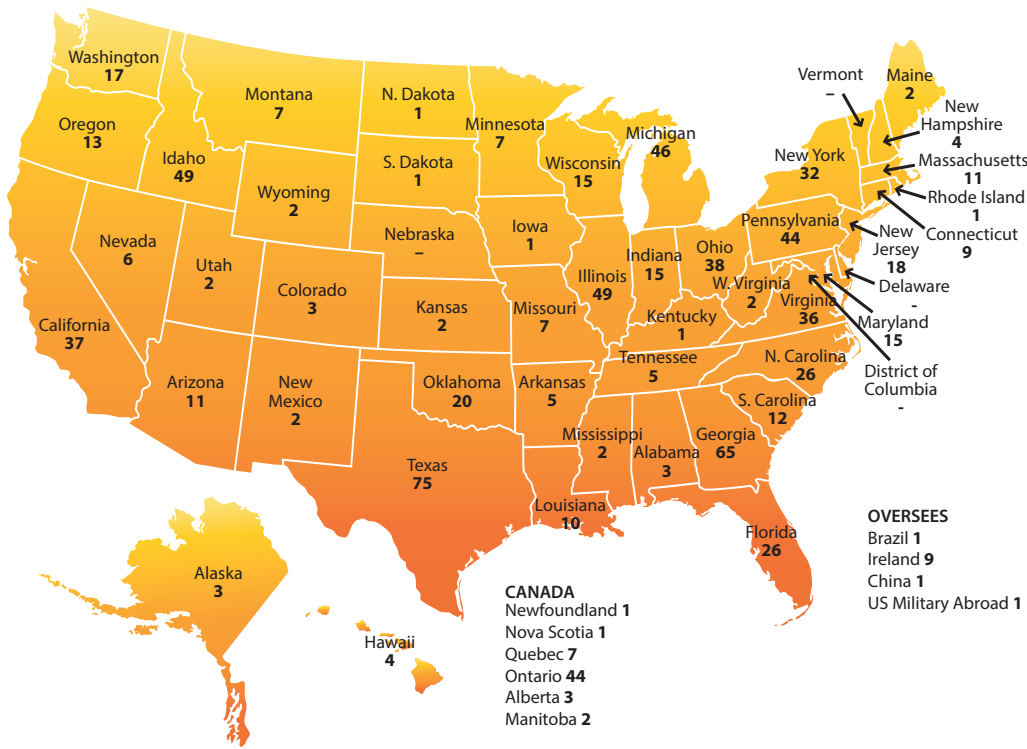
- 9 kW - 2 MW UL2200 Listed Diesel Generators
- 15 kW - 1 MW UL2200 Listed Natural Gas Generators
- Mobile Generators

C **UL** US LISTED

**EGSA**

[www.aksausa.com](http://www.aksausa.com)

## 832\* EGSA Certified Technicians



### EGSA Certification Levels

#### Apprentice

The Apprentice level exam provides technical college students, recent graduates, military personnel and other 1st or 2nd-year technicians with proof that the basic skill set has been met (certification valid for 3 years).

#### Journeyman

A passing grade on our Journeyman exam assures an employer that this technician meets or exceeds 3 years of practical field experience. This exam tests in 61 individual areas of expertise (certification valid for 5 years).

**OVERSEES**  
 Brazil 1  
 Ireland 9  
 China 1  
 US Military Abroad 1

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# JOB BANK

## 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 [EGSA.org/Careers.aspx](http://EGSA.org/Careers.aspx).



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### Live Virtual Rowley School

These live virtual schools are taught by the same knowledgeable and professional instructors who have been teaching at the in-person schools across the country. One of the best parts of physically going to the in-person school is the ability to speak directly with the instructors and ask questions. Rest assured, we have made our live virtual schools as interactive as possible and instructors are still able to answer your questions on the spot.

### Virtual Basic Schools

Dec 11-14

### Virtual Advanced School

June 26-29

### Pre-Recorded Sessions

All live virtual sessions are recorded and access to the recordings are provided when you register for the live virtual school. These recorded sessions will also be available on EGSA.org as individual sessions or a package of the complete school. As we continue to complete live virtual schools, our library of recorded content will grow and be made available.

Check out [EGSA.org](http://EGSA.org) for more information and available courses.





# Application for Membership

Under the leadership of its Board of Directors and operating through its various committees and staff, EGSA strives to educate, provide networking opportunities and share relevant knowledge and trends with industry professionals including manufacturers, distributor/dealers, engineers, manufacturer representatives, contractor/integrators and others serving On-Site Power consumers.

## EGSA MEMBER CLASSIFICATION & DUES SCHEDULE (Please complete form on next page)

FULL MEMBERSHIP		Annual Dues	Initiation	TOTAL DUE	
These Full Memberships categories are for corporations and their memberships cover all employees of the company.					
MF	<b>Manufacturer Membership</b> 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.	\$1,354	\$257	\$1,611	
DD	<b>Distributor/Dealer Membership</b> 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	<b>Contractor/Integrator Membership</b> 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.	\$508	\$128	\$636	
MR	<b>Manufacturer's Representative Membership</b> 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	<b>Energy Management Company Membership</b> 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.	\$347	\$128	\$475	
ASSOCIATE MEMBERSHIP		Annual Dues	Initiation	TOTAL DUE	
EGSA has two Associate Member types, <b>Associate Regular</b> and <b>Associate Full</b> . Companies have the choice of joining as an Associate Regular Member or Associate Full Member. Individuals can join as an Associate Regular Member only.					
<b>Associate Regular Membership</b> (Select Appropriate Category Below)		\$347	\$128	\$475	
<b>Associate Full Membership</b> 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 <b>enjoy the privileges of Full Membership, including the rights to vote and to serve on EGSA's Board of Directors.</b> Initiation fees and annual dues will be assessed at the existing non-manufacturer Full Member rates. (Select Appropriate Category Below)		\$508	\$128	\$636	
Associate Membership Categories					
Associate Regular Membership Categories	AA	<b>Trade Publication Membership</b> Any trade publication dealing with the electrical generating systems industry or its suppliers may apply for Associate Membership—Trade Publications.			
	AB	<b>Trade Association Membership</b> 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.			
	AC	<b>Engineer Membership</b> 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	<b>End-User Membership</b> 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	<b>Service Membership</b> 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	<b>Educational Institution Membership</b> Any postsecondary vocational-technical school or college offering on-site power generation-related instruction may apply for Associate Membership—Education Institution.			
	AI	<b>Individual Membership</b> Any individual who was previously employed in the on-site power generation industry but is no longer actively employed in the industry.	\$142	N/A	\$142
	AM	<b>Military Membership</b> Any individual who is currently enlisted, or who has been discharged, or has retired from the US or Canadian Military may apply for membership within this category. Proof of military engagement is required by either current Military ID card or honorable discharge documents.	\$84	N/A	\$84
	AR	<b>Retiree Membership</b> 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.	Complimentary		\$0
	AF	<b>Student Membership</b> Any individual currently enrolled at an academic institution may apply for Associate Membership—Student.	Complimentary		\$0

# 1. Contact Information

Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State/Province \_\_\_\_\_  
 Zip/Postal Code \_\_\_\_\_ Country \_\_\_\_\_  
 Phone \_\_\_\_\_ FAX \_\_\_\_\_  
 Official Representative \_\_\_\_\_ Title \_\_\_\_\_  
 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

Please use the worksheet on page one of this application to determine your membership type.

### Full Memberships

- Manufacturer (MF)
- Distributor/Dealer (DD)
- Contractor/Integrator (CI)
- Manufacturer's Representative (MR)
- Energy Management Company (EM)

### Associate Memberships

- Regular Associate Membership →
- Full Associate Membership →

(Select Appropriate Category)

- Trade Publication (AA)
- Trade Association (AB)
- Engineer (AC)
- End User (AD)

- Service (AE)
- Educational Institution (AG)
- Individual (AI)
- Military (AM)
- Retiree (AR)
- Student (AF)

# 3. Membership Dues

(Please fill in the appropriate TOTAL amount from the dues schedule on page one.)

Membership Dues \$ \_\_\_\_\_  
 Membership Plaque (optional)\*\* \$102.00  
 On-Site Power Generation: A Comprehensive Guide to On-Site Power (optional)\*\* \$260.00  
**Florida Residents:** Add 7% Sales Tax to \*\* items \$ \_\_\_\_\_  
 \*\* Shipping and handling is included for Continental US & Canadian Residents.  
 All others should call EGSA Headquarters for \$ \_\_\_\_\_ shipping charges for \*\*items.  
**TOTAL \$ \_\_\_\_\_**

# 4. Payment Method

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

Check # \_\_\_\_\_ Amount Due \$ \_\_\_\_\_

Please contact Marc Charon via email (m.charon@egsa.org) if you wish to pay by credit card.

# 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

# 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 \_\_\_\_\_

### Available Codes:

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

Enter codes here: (Limit 10 codes per category)

**Products sold:** \_\_\_\_\_  
**Products rented:** \_\_\_\_\_  
**Products serviced:** \_\_\_\_\_

# 7. Official Representative's Authorization

Signature \_\_\_\_\_ Date \_\_\_\_\_

# EGSA Enriches & Unites the On-Site Power Generation Industry with **POWERLINE Magazine!**

## Tap Into the Captive Audience Your Organization Needs to Reach!

**POWERLINE** Magazine is one of the best ways to stay on top of the rapidly changing landscape of On-Site Power. From codes and standards, emerging technologies, best practices and education to industry trends, **POWERLINE** Magazine is the BEST vehicle to reach thousands in the Industry, with a targeted approach and vehicle.

Published quarterly, **POWERLINE** is the only magazine that thoroughly and exclusively covers On-Site Power, electrical generation or any method of producing power at the site in which it is generated. No other publication can match **POWERLINE** for its focus on On-Site Power.

If you sell products or services in this constantly expanding Industry, **POWERLINE** will deliver your advertising message to the key decision-makers you want to reach!

**Our readership includes Manufacturers, Distributor/Dealers, Manufacturer's Representatives, Consulting and Specifying Engineers, Facility Managers, Service Firms, and end-users around the world who make, sell, distribute, and use generators, engines, switchgear, controls, voltage regulators, governors, and related products and services!**

Every issue of **POWERLINE** includes important articles covering diverse industry issues, such as international markets, contracts, financing, trade agreements and more. Technical and "case studies educate readers about emerging technologies and commonly misunderstood applications. In addition, regular columns on industry codes and standards, news from Europe, manufacturer's representative issues, industry events and other compelling news keeps our readers engaged and informed year after year.

The EGSA member Job Bank is also a great industry resource for members and job applicants alike!

### **Harness the energy by advertising in POWERLINE today!**

Advertising with **POWERLINE** is really a "no brainer." Our advertising rates are competitive and provide superior industry reach into this multi-faceted market.

For more information on building a customized advertising plan please contact

Marc Charon  
m.charon@egsa.org  
202.997.4666

No other publication can match **POWERLINE** for its focus on On-Site Power.

#### **Powerline Readers are...**

- Company Owners
- Marketing Professionals
- Upper/Middle Managers
- Facility Managers
- Salespersons
- Engineers
- Financial Officers

#### **Working for ...**

- Manufacturers
- Distributor/Dealers
- Manufacturer Reps
- Contractors
- End-users
- Consulting & Specifying Engineers

They read **POWERLINE** to gather product, market and trends information and make an informed final decision when recommending purchases or specifying components, services and equipment for new projects, upgrades, routine maintenance and retrofits.



### **Submit Your On-Site Power Article!**

**POWERLINE** Magazine is continually seeking feature articles (1,500 - 2,500 words) addressing any one of the many issues pertinent to On-Site electrical generating systems and equipment. To be considered, please e-mail a title, brief summary and highlights of your article to the Editor, Nathan Harris via [n.harris@EGSA.org](mailto:n.harris@EGSA.org).

# POWERLINE

the Official Publication of the Electrical Generating Systems Association (EGSA)

**Electrical Generating Systems Association (EGSA)**

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Contact M.Charon@EGSA.org to advertise

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	Dimensions in inches	Member	Member	Non-Member	Non-Member
Ad Size	Width x Height	1-time (per edition)	4-times (per edition)	1-time (per edition)	4-times (per edition)
<b>Full Page</b> <i>Bleed Size</i> <i>Trim Size</i>	8.625" x 11.125" 8.375" x 10.875"	\$1,250 B&W \$2,220 4-Color	\$1,100 B&W \$2,000 4-Color	\$1,350 B&W \$2,425 4-Color	\$1,250 B&W \$2,220 4-Color
<b>1/2 Page</b> <i>Horizontal</i> <i>Vertical</i>	7.375" x 5" 3.687" x 10"	\$800 B&W \$1,770 4-Color	\$700 B&W \$1,600 4-Color	\$900 B&W \$1,975 4-Color	\$800 B&W \$1,770 4-Color
<b>1/4 Page</b>	3.687" x 5"	\$475 B&W \$1,445 4-Color	\$410 B&W \$1,310 4-Color	\$525 B&W \$1,600 4-Color	\$475 B&W \$1,445 4-Color



## TERMS

All quoted ad rates are non-commissionable. In the case of four insertions, EGSA will bill the total in four installments. *POWERLINE* reserves the right to refuse advertising that is deemed to be in poor taste, not within reasonable bounds of accuracy, or otherwise deemed unacceptable by the publisher.

## CANCELLATIONS

In the event of cancellation of a multiple-month advertising space order prior to the final issue of the contract, the advertiser agrees to repay EGSA any discounts granted for multiple insertions. All cancellations must be received in writing prior to the advertising sales deadline.

## MECHANICAL REQUIREMENTS

Electronic files are required. Materials may be submitted as high-resolution CMYK Adobe Acrobat files with embedded fonts. All full-page ads should be submitted at bleed size with 1/8" bleed included. For additional information, e-mail Marc Charon at m.charon@EGSA.org

Company Name: \_\_\_\_\_ EGSA Member?  Yes  No

Billing Address: \_\_\_\_\_ Agency (if any): \_\_\_\_\_

City/State/Zip/Country: \_\_\_\_\_

Contact Name: \_\_\_\_\_ Contact's Email: \_\_\_\_\_

Contact Phone: \_\_\_\_\_ Contact Fax: \_\_\_\_\_

Signature: \_\_\_\_\_

*By signing above, I hereby authorize placement of advertising in EGSA's Powerline Magazine*

**PAYMENT:** Please check one of the following options:


Check # \_\_\_\_\_ Total Amount Due: \$ \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Please contact Marc Charon via email (m.charon@egsa.org) if you wish to pay by credit card.

Ad Size	Color	Frequency	Position Request*
<input type="checkbox"/> Full Page <input type="checkbox"/> Half Page <input type="checkbox"/> Quarter Page	<input type="checkbox"/> B&W <input type="checkbox"/> 4-Color	<input type="checkbox"/> 1-time <input type="checkbox"/> 4-times	

*\*We will do our best to honor placement requests, but reserve the right to decide placement.*



**ARE YOU  
CONFIDENT  
YOUR TECHNICIANS  
HAVE THE  
KNOWLEDGE  
TO GET THROUGH  
THE NEXT  
ELECTRICAL  
EMERGENCY ?**

**MAKE SURE THEY ARE**

#### **What is EGSA Technician Certification?**

Generator technicians vary in skill level from employer to employer and market to market. Finding a way to identify a proficient and knowledgeable technician, or even identifying a technician's skill level can be challenging.

The EGSA Technician Certification Program has expanded to meet these challenges.

*We offer two levels of certification!*

#### **Program Updates**

- We have made changes to both the Apprentice and Journeyman programs to ensure technicians are being tested on the most current advancements and technologies our industry.
- The Journeyman test has been split into four modules that will be taken separately. This allows technicians additional time to prepare for each portion of the test.
- The process for recertifying as a Journeyman technician has also been revised. Technicians may retake the test to recertify for an additional 5 years –OR– submit education/recertification credits to extend initial certification 1-2 additional years.

## **EGSA CERTIFIED!**

#### **APPRENTICE LEVEL**

*(certification valid for 3 years)*

The Apprentice level exam provides technical college students, recent graduates, military personnel and other 1st or 2nd-year technicians with proof that the basic skill set has been met.

#### **JOURNEYMAN LEVEL**

*(Initial certification valid for 5 years. Option to extend up to 2 additional years with education/recertification credits)*

Our Journeyman exam assures an employer that this technician meets or exceeds 3 years of practical field experience. It tests in 61 individual areas of expertise and has been upgraded to reflect current technologies.



Please visit [EGSA.org/Certification](https://www.egsa.org/Certification) for additional details on the program.



Our *On-Site Power Generation Reference Book* is a great resource

to prepare for the certification exam. We also offer bundle packages that include study guides.

## BASIC SCHOOL

Perfect for staff new to the power generation industry or someone who needs an introduction to basic concepts and technologies, this school is appropriate for students seeking a foundation in generator technology. Whether you are in sales, marketing, management, application engineers, engine technicians, or administrative personnel, you will find great value in this course! The Basic School is a general, yet technical, overview of On-Site Power.

### 2023 IN-PERSON BASIC SCHOOL SCHEDULE

Orlando, FL – February 20-23  
San Diego, CA – October 9-12

### 2023 VIRTUAL BASIC SCHOOL SCHEDULE

Virtual – April 10-13  
Virtual – December 11-14

### Basic Course Modules

- Introduction to EGSA
- Basic Electricity
- Prime Movers
- Introduction to Generators/Alternators
- Starting Systems
- Introduction to Automatic Voltage Regulators
- Introduction to Governors/Speed & Load Controls
- Introduction to Transfer Switches
- Load Bank Fundamentals
- Generator Set Instrumentation
- Codes and Standards
- Generator Set Systems: Putting the Pieces Together
- Understanding Bid & Specification Documents

## ADVANCED SCHOOL

Our Advanced School is designed for those who have a good understanding of the basic mechanical and electrical systems found in an on-site generator site. A minimum of three years of experience in the industry is recommended. It will be particularly useful for those employed in engineering, project management, service positions, and business owners.

### 2023 IN-PERSON ADVANCED SCHOOL SCHEDULE

Chicago, IL – May 22-25

### 2023 VIRTUAL ADVANCED SCHOOL SCHEDULE

Virtual – June 26-29

### Advanced Course Modules

- Advanced Generators/Alternators
- Generator Set and Critical Power System Controls
- Generator and System Protection
- Advanced Automatic Voltage Regulators (AVRs)
- Advanced Governors/Speed and Load Controls
- Advanced Transfer Switches
- Multiple Generator
- Paralleling Switchgear
- Engine Emissions
- Noise Control
- Communications
- Advanced Generator Systems: Sizing to Service

## LOAD BANK SCHOOL

EGSA's Load Bank School & Certification is a 3-day course which includes classroom and hands-on training sessions. This school is designed specifically for experienced technicians looking to increase their knowledge and abilities. The school concludes with EGSA's Load Bank Certification test.

### 2023 LOAD BANK SCHOOLS/CERTIFICATION

Atlanta, GA – April 10-13  
Dallas, TX – July 25-27  
Atlanta, GA – September 5-7

### Load Bank School Modules

- Safety protocols
- Deciphering nameplate ratings of generators
- Different types of load tests
- Connections
- Testing requirements of the local authority having jurisdiction (AHJ)
- Applying the appropriate loads for the test required
- Gathering/calculating/documenting load test parameters and results
- Site and environmental conditions
- Potential problems/corrective actions.

# POWERLINE

The Voice of the On-Site Power Generating Industry

Q1 23



To view the Q1 Edition of *Powerline Magazine* visit  
[www.egsa.org/publications](http://www.egsa.org/publications)

**ON-SITE POWER GENERATION**  
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Guide to On-Site Power

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This is THE On-Site Power Generation book.  
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