

NATURAL GAS EXPERIENCE OVERVIEW

ReliableNatGasGen.com



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WHY NATURAL GAS? AN INDUSTRY PROFILE

An abundant and growing supply, expanded pipeline network and increased customer confidence have led a recent shift in the industry from diesel to natural gas. Technological advancements have allowed Generac to take lead in the industry and deliver a full line of natural gas engine-driven generators. As Authorities Having Jurisdiction increasingly accept natural gas as a viable on-site fuel source for emergency power, owners will continue to benefit from reduced emissions, increased runtimes, lower total cost of ownership and, most importantly, improved reliability.

Generac is the industry leader in gaseous generator technology and plays a key role in natural gas becoming the future of power generation. You'll get a sense of our experience, our expertise and our proof. Our innovative advances in natural gas generators have won us back-to-back awards from Frost and Sullivan as "The Natural Gas Generator Company of the Year." In addition, our 500 kW natural gas generator recently earned a Silver Award from the readers of *Consulting-Specifying Engineer* magazine.



Natural gas can provide the key to a smart energy future through its efficient, safe, and reliable delivery and use as an abundant, domestic, affordable, low carbon energy source for all segments of the economy.

WHITEPAPER: Natural Gas in a Smart Energy Future, Gas Technology Institute



NOTEWORTHY MARKET TRENDS:

Technological advancements have increased the popularity of gaseous gen-sets. For instance, advanced engine designs have increased speed, improved load response – and provided high performance while maintaining favorable economic efficiency. Advances in integrated generator paralleling approaches and bi-fuel (combined diesel and gas fuel) operations have also made natural gas the appropriate choice for more applications. Compared to diesel, natural gas generators also provide environmental advantages such as: lower levels of NO_x and CO₂, reduced particulate emissions, and virtually no SO₂ or mercury emissions. With extended runtimes, virtually uninterrupted supplies – and a proven track record in power outage situations, natural gas is destined to become the fuel of the future.



*There are more than 2.5 million miles of pipeline that transport natural gas to more than 5.4 million commercial consumers.***



*Commercial buildings account for one-fifth of total US energy use, of which natural gas accounts for 18 percent.***



Natural gas utilities spend \$22 billion annually to enhance natural gas distribution reliability.

** American Gas Association (AGA) Homepage. (2018). Retrieved November 28, 2018, from <https://www.aga.org/natural-gas/good-for-business/>

MAKE DEMAND RESPONSE WORK FOR YOU

Demand Response is a great way for organizations to unlock value and be flexible in how they use their gen-set— many large energy users are already using it to help the grid balance supply and demand. The grid also pays users for this flexibility: whether it's reducing energy usage at certain times, supplying energy back into the grid, or increasing consumption when the grid has over-supply.

Participation in Demand Response programs can offset generator capital and operational expenses while providing the owner some return on what would otherwise be an insurance policy.

Generac's natural gas generators can be used in Demand Response applications so you can easily improve your bottom line and help pay back your initial investment.

VALUE PROPOSITION OF NATURAL GAS

Use of a natural gas-fueled generator offers the following practical benefits:

- ▶ The capital cost for a natural gas generator set that meets the more stringent exhaust emissions limits for Demand Response is significantly lower than a comparably equipped diesel engine.
- ▶ Natural gas generators have a lower fuel cost when compared to the same amount of power produced with a diesel engine.
- ▶ Natural gas generators have no diesel fuel maintenance costs, such as fuel polishing.
- ▶ Natural gas is a highly reliable fuel source, even in situations where the transportation of diesel fuel may be at risk.

WHY NATURAL GAS?

GENERAC MEETS CUSTOMER DEMANDS WITH:



GASEOUS GENERATORS

Natural gas is becoming the preferred solution in many standby applications as it provides:

- ▶ Essentially unlimited runtimes
- ▶ Easier permitting
- ▶ Lower emissions
- ▶ Lower maintenance requirements
- ▶ Reliable resistance to weather conditions
- ▶ EPA certified in emergency and non-emergency situations



BI-FUEL GENERATORS

Diesel's power meets natural gas's longevity and ease of use — the best of both worlds:

- ▶ Meets the on-site fuel requirements of National Electric Code (NEC) 700 and National Fire Protection Agency (NFPA) 110 with a diesel storage tank
- ▶ Delivers the benefits of longer runtimes as the generator transitions to natural gas under load
- ▶ Fully integrated solution from manufacturer
- ▶ No third party or aftermarket field conversion
- ▶ EPA compliant from Generac Industrial Power



MODULAR POWER SYSTEMS (MPS)

Our signature integrated paralleling offers many benefits over a single gen-set configuration. It's a transformational technology that delivers redundancy for top-notch reliability, eliminates unnecessary expenses, and enables space-saving solutions that may not be possible with traditional paralleling techniques.

- ▶ Redundancy: Up to 99.999% reliability
- ▶ Reduced space requirements: Smaller, more compact units can make more installation locations possible
- ▶ Serviceability: Take one unit out of service while the others remain operational; Smaller engines don't require specialized service
- ▶ Flexibility: Add gen-sets as needed to keep pace with growth
- ▶ Fuel redundancy: Parallel our natural gas – bi-fuel or diesel gen-sets for expanded runtimes
- ▶ Substantially cheaper than traditional switch gear



MUNICIPAL

RELIABILITY

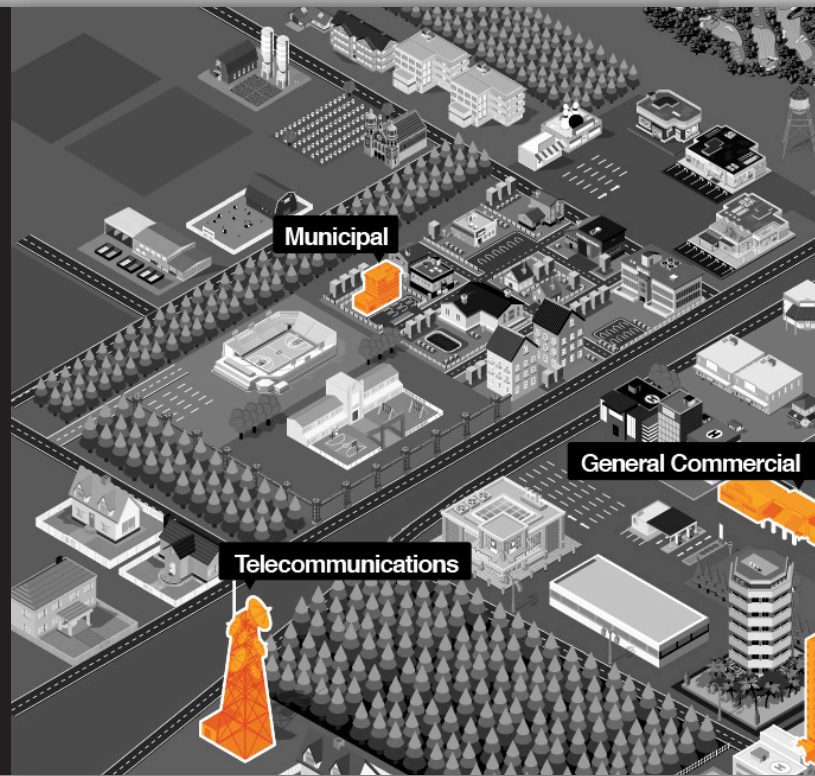
Since natural gas is supplied by a utility with underground pipelines, it is rarely impacted by weather and the flow of fuel is largely secure, which means generators can run for as long as they are required during an outage situation. For diesel generators, the fuel supply typically ends after three days, and many times in less than that. To make matters worse during a crisis, fuel deliveries are often delayed or non-existent.

ADVANTAGE IN ACTION

Georgia's Route 400 relies on 2 x 200 kW natural gas gen-sets from Generac to help more than 125,000 vehicles pass through the vital toll plaza each day. Chosen for their lower emissions profile, cost-effectiveness and reduced noise through sound-attenuated enclosures, these gen-sets proved their reliability when Hurricane Ivan ravaged the area. Though the storm caused a massive blackout, the Generac system provided power for more than 14 hours. "They ran like champs," said plaza manager Robert Smith.

WHY GENERAC?
GENERAC MEETS CUSTOMER DEMANDS WITH:

**VIEW HUNDREDS MORE AT:
GENERACITY.COM**



DATA CENTER

AFFORDABILITY

Generac continues to explore ways in which we can increase our natural gas generators' cost effectiveness—such as reduced maintenance costs or a streamlined paralleling solution that integrates the switchgear into the gen-set—to make them a higher-value option with lower cost of ownership.

ADVANTAGE IN ACTION

At Quilogy, a multi-service information technology company located 20 miles west of St. Louis, Generac protects the organization's all-important data center with a 130 kW QT Series natural gas gen-set. In addition to expected natural gas benefits, the unit was considered a superior solution over diesel options because of its lower cost of ownership: no refueling, no storage considerations, no spillage, no fuel spoilage.

"By selecting the QT model, we easily saved more than \$10,000 annually when compared to the diesel alternatives," said Alan Groh, chief technology officer. "It was an easy decision."

MANUFACTURING

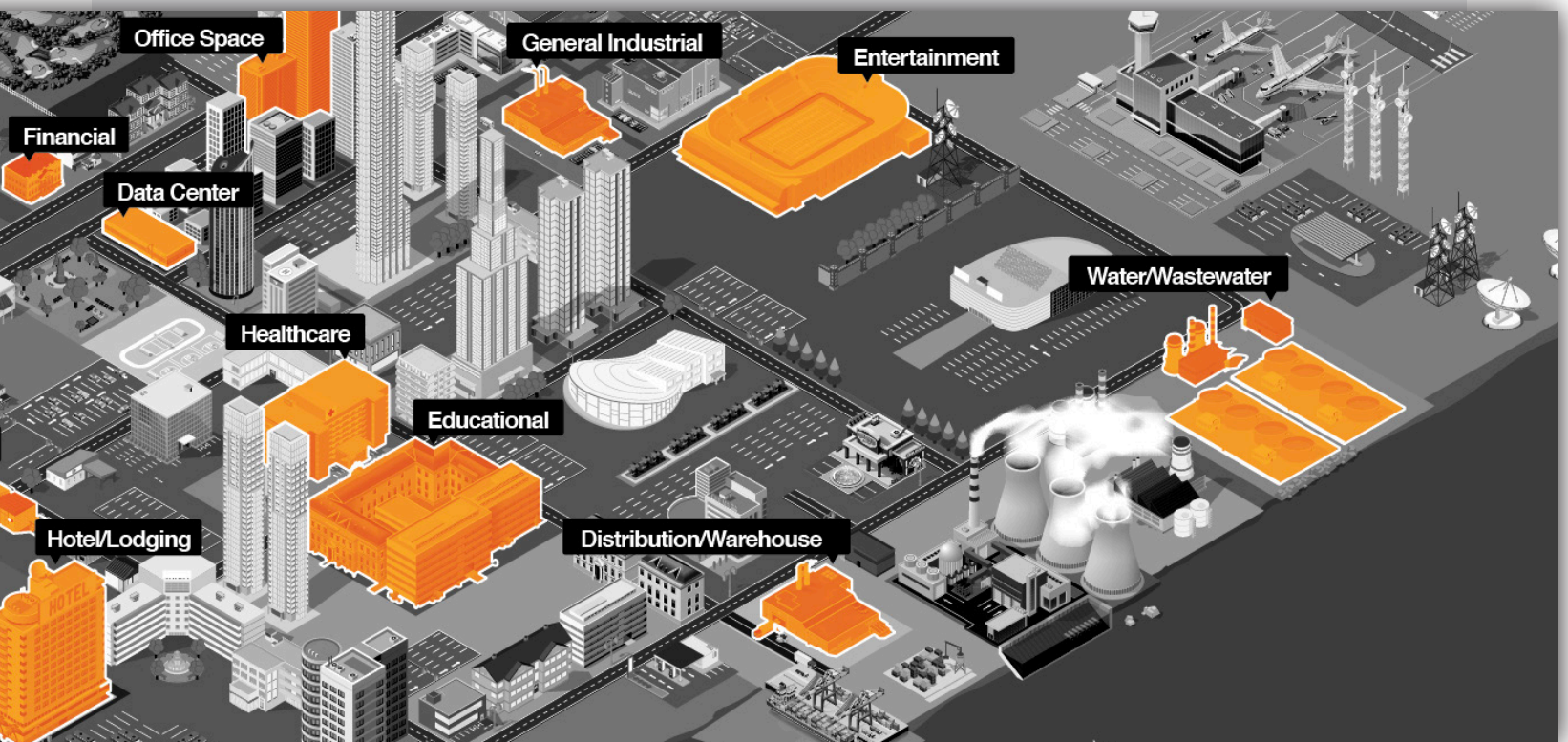
ECO-CONSIDERATION

Many companies are going “green,” especially when it comes to new construction or remodeling. Natural gas is the cleanest burning fossil fuel today. It produces the fewest emissions and has a much smaller carbon footprint than diesel fuel. Natural gas generators also avoid the fuel containment, spillage and environmental concerns associated with storing diesel fuel.

Trust Generac to deliver a solution that benefits your facility and the planet.

ADVANTAGE IN ACTION

A Minnesota-based exterior home products manufacturer was concerned about its carbon footprint and looking for a “green solution” for its backup energy system. They found that 3 x 250 kW Generac natural gas generators were the perfect fit for their corporate culture due to their reliability, redundancy and lower emission status.



HEALTHCARE

CODE COMPLIANCE

For facilities that are subject to NEC 700 and NFPA 110 NEC 517 standards, Generac's Bi-fuel generators are recommended. They meet on-site fuel requirements while delivering longer runtimes and lower maintenance requirements.

ADVANTAGE IN ACTION

Doctors Hospital at Renaissance (DHR) in Edinburg, Texas is one of the nation's premier healthcare providers. Like every hospital, DHR is required to have reliable backup power to protect the life and safety of its patients in the event of severe weather or a utility power outage. They rely on a 4.5 MW MPS with two 3 x 750 kW Bi-Fuel™ Gemini® gen-sets operating in parallel.

“It was a revelation,” said Randall Eulenfeld, project manager and master electrician. “The best thing since sliced bread.”

THE ONLY MANUFACTURER FOCUSED ON POWER GENERATION

The best generators don't run on fuel alone—they run on expertise and innovation.

When you open up a Generac industrial generator, you'll see more than the assembly of an engine, alternator, control and formed metal. You'll see 60 years of ingenuity hard at work.

Generac's commitment to vertical integration means that we source, design and build gen-sets to provide solutions with less customization. Because we control the supply chain, you get the best fit for your power, performance, durability, reliability and lead-time requirements.

Our generators are the result of decades of experience gained by serving the backup power needs of industrial customers around the world. No matter what you need standby power for—whether to keep a hospital operating, a data center functioning or a factory producing—count on Generac Industrial Power to provide the right engine to meet your demands. Our consistency and flexibility will handle any power need.

Generac delivers extensive options in commercial and industrial standby applications to deliver more performance benefits, including:

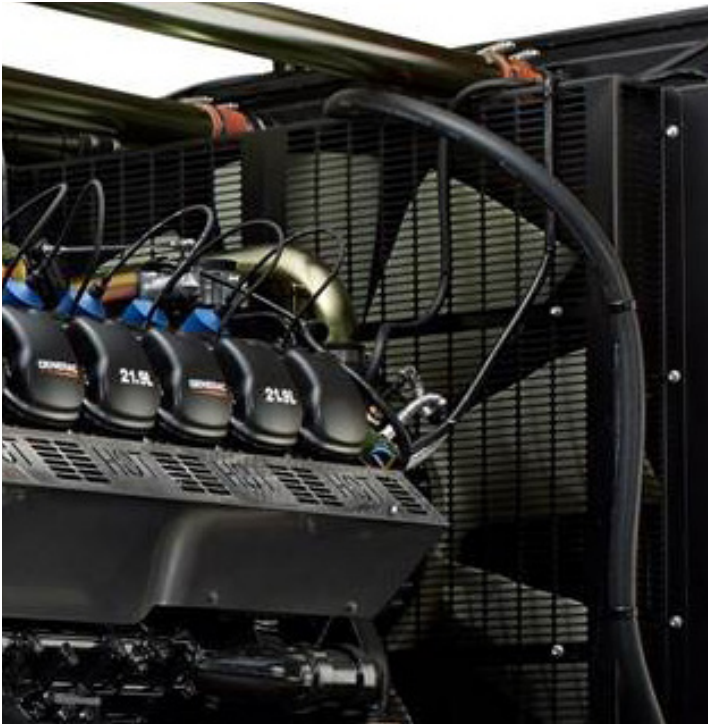
- ▶ Extended run times from utility-fed natural gas
- ▶ On-site fuel security options from straight Liquid Propane or dual fuel (Natural Gas and LP)
- ▶ Lower total ownership costs (capital, fuel and maintenance) compared to diesels
- ▶ Lower exhaust emissions
- ▶ High power density and optimized RPM options

PASSING THE TEST

Generac goes to great lengths to inspect our generators before they leave the factory to ensure customers get the power they need, when they need it.

We operate our own test and R&D facility. Before a design goes into production, it undergoes prototype testing to evaluate every aspect of performance. This ensures each engine and gen-set conforms to every major industry and EPA standards. Our testing uses specialized protocols to test emissions, sound and endurance, torsional analysis, transient response, maximum motor starting and structural soundness.

Applying natural gas and LP-fueled engines to generators takes advanced engineering and specialized components. That's why Generac uses materials designed for dryer, hotter-burning fuel. It's why our engines last longer and require less maintenance.



BEST-IN-CLASS GENERAC INDUSTRIAL POWER NATURAL GAS ENGINES

Generac's engineers apply their expertise to our engines from the block up to ensure maximum efficiency. Because of gaseous fuel's higher ignition temperature, the company uses hotter spark plugs and specialized plug tips, such as iridium. The components in and around the combustion chamber are made of higher-grade materials—such as high silicon-molybdenum and stainless steel—that are built to deal with higher temperatures. We also employ more durable valve and seat materials, and reduce the angle of the valve seats to minimize friction.

Engine timing is also adjusted to accommodate for the slower combustion rate of gaseous fuels. Since natural gas is extremely tolerant of compression, Generac increases the engine's compression ratio to maximize the thermal efficiency of the combustion event, and thus engine power.

SINGLE SOURCE RESPONSIBILITY

GENERAC PRODUCES A FULLY INTEGRATED SYSTEM SO THAT OUR CUSTOMERS CAN CONTROL COSTS, MAXIMIZE SPACE AND OPTIMIZE INTEGRATION.



GENERATOR ENCLOSURE

Generac manufactures its own enclosures, ensuring each unit combines the highest level of durability, noise reduction, weather resistance and streamlined design.



GENERATOR PARALLELING

Generac's Modular Power Systems (MPS) boast a rate of up to 99.999% reliability, and are more cost-effective and flexible than single generators with the same load capacity.



TRANSFER SWITCHES

The power series transfer switch (PSTS) offers open, delayed and closed transition options. Available from 100–5000 amps, ISO 9000 certified, meet all relevant NEC codes, and are rated for full load transfers.



POWER ZONE® CONTROLLERS

Generac's innovative Power Zone controller is the first in the market to feature bluetooth, Wi-Fi, and a color touch screen.



POWER MANAGER

Concurrently manages up to 15 units to simplify the system and increase performance.



INTEGRATED PARALLELING SWITCHGEAR

Provides flexibility for location of switching and load sequencing. Contactor-designed for repetitive switching, it is the most reliable way to switch.

STRONGER TOGETHER: GENERAC'S DISTRIBUTION NETWORK

When you work with Generac, you're supported by a tested, trusted team. We provide a world-class Industrial Distribution Network that stands behind you 24/7/365.

At Generac, we set the industry bar with EGSA training certification. Every single service technician is factory trained to the highest industry standards.

EXCEPTIONAL TECHNICAL SUPPORT

When you have an issue, we're on it with nearby service, installation, repair, parts, rentals and technical support.

LOCAL PRESENCE

The personnel in your network will have:

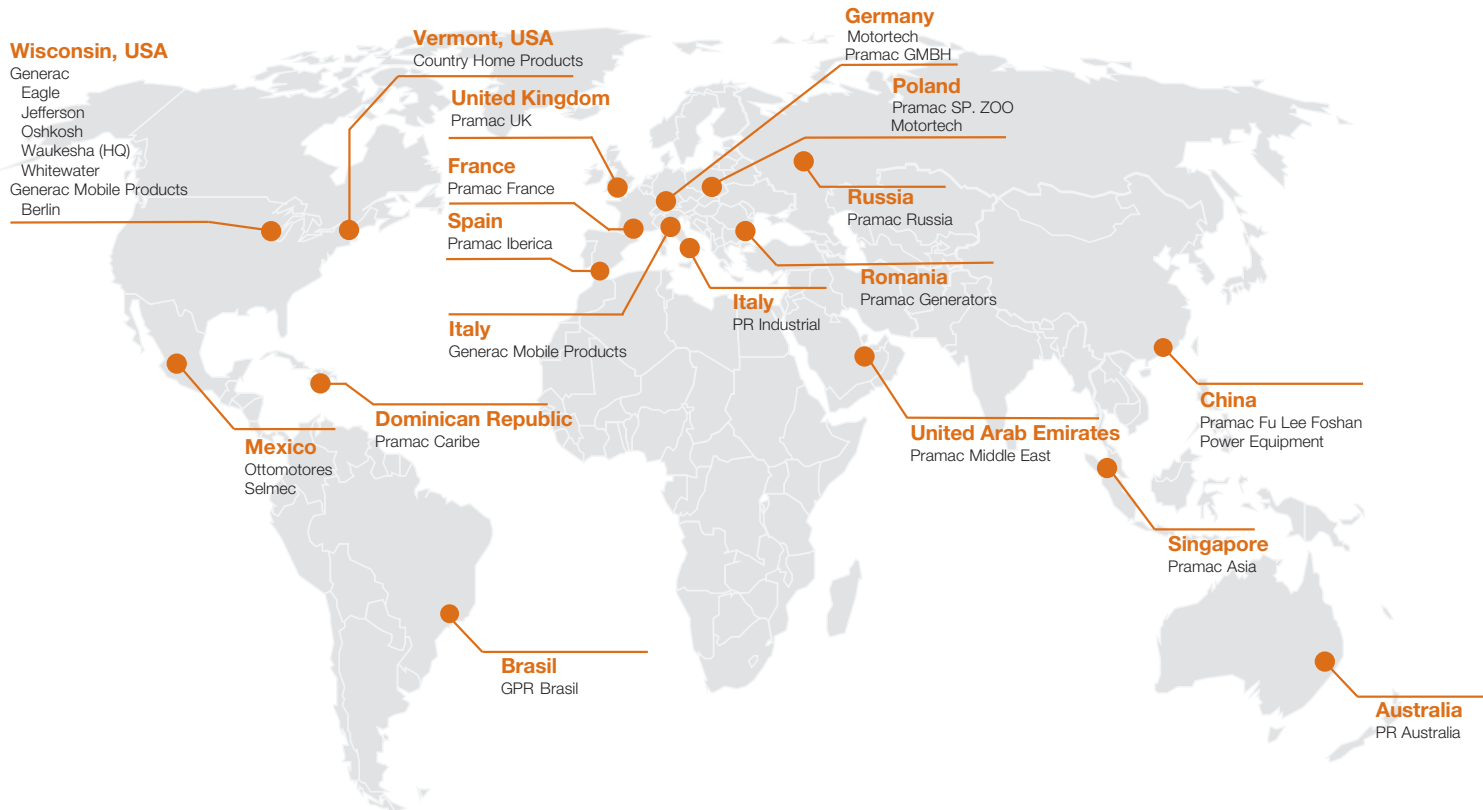
- ▶ Knowledge of the market's regulatory climate
- ▶ Relationships with utility companies and awareness of Demand Response programs
- ▶ Relationships with local contractors

POWERFUL RESOURCES

Generac's distributors have access to the strongest tools in the industry to support all of their customers:

- ▶ Power Design Pro design and sizing software
- ▶ Professional Development Seminars, CEUs and PDHs
- ▶ BIM modeling
- ▶ Specwriter software
- ▶ A complete library of technical documentation
- ▶ Fly-In programs: If you still need convincing, Generac invites customers in to partake in hands-on tours
- ▶ GeneracCity.com: Take a virtual tour of a cityscape that shows why Generac is the most trusted partner for industrial power solutions.





PROVEN SOURCE. POWERFUL SOLUTIONS.

We are a global company with more than 2.7 million square feet of vertically integrated manufacturing capacity. We are one of North America's largest suppliers of power generation equipment with an intense focus on innovation that creates a disruptive force in the marketplace. We design and manufacture natural gas, diesel and bi-fuel generators that can work alone or be paralleled to provide you with a more robust gen-set solution. We also provide a world-class Industrial Distribution Network that stands behind you 24/7/365, as well as access to our in-house engineers and technical support.

Our inventive Industrial Power gen-sets are standing by, ready to meet virtually any application.

For more information, such as FAQ's,
visit us on-line at GeneracIndustrialPower.com
844.ASK.GNRC

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