

GE Energy

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Network Magazine

Powering solutions for the energy industry



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Welcome to the inaugural issue of *Network Magazine*. We're pleased to bring you timely, relevant articles that help you see your energy projects through to completion and grow your business. Throughout this magazine, you'll discover energy service providers are achieving new heights of success through collaboration with GE Energy.

One energy sector that promises continued growth is wind generation. Canada has made a strong regulatory commitment to renewable energy, and several states in the United States have passed legislation to begin aggressively integrating renewables. With a plurality of citizens from both major American parties in favor of adding wind power capacity, and 5,500 MW under construction in the United States alone, we forecast a robust future for wind power in North America.

We're proud to help our customers find answers to the energy industry's toughest challenges. We hope this digital magazine will serve as both a conduit for information and a forum for dialogue. Toward that end, we invite you to join the conversation. We welcome your input.

For more than 80 years, GE Energy has provided innovation, partnership, and leadership on energy issues. We're confident that you'll find *Network* to be another vital resource for your project planning and execution needs.

Sincerely,



Bill Jayne



Bob Prantil



Barry Weiss

A handwritten signature in black ink that reads "Bill".

A handwritten signature in black ink that reads "Bob".

A handwritten signature in black ink that reads "Barry".

GE Energy Region Executives

FEATURE STORY

Shifting Trends in Power Generation

Predicting power plant retirements is a lot like predicting the weather. Both are based on highly complex models, include lots of assumptions, and are notoriously inaccurate beyond the near term. Still, given the potential impact of retirement, preparation is important, if not essential.

Many states and provinces have passed or are considering mandates that will shift their populations away from using fossil fuels for power generation. The EPA's proposed rules require retiring or retrofitting 900 MW of coal generation, and may lead to further retirements due to economic considerations. Older, smaller units will be most affected by these changes, with gas and oil, steam, and single-cycle gas turbine units projected to comprise up to 70 percent of retirements.

Greater Emphasis on Flexibility

The remaining thermal units will see a shift in demand, with a reduced need for true baseload operation and a higher demand for cyclical operation—a shift that GE Energy is prepared to meet. As renewable energy generation expands, GE offers several solutions to help integrate renewables into the generation mix. The changing resource mix will further emphasize the need for flexibility in both operational and expansion strategies.

The foreseeable future, however, is murky beyond 2015. Since retirements are often announced with little notice, actual numbers could be higher than projected. Now, more than ever, customers need a reliable, experienced partner like GE to support their needs through this time of uncertainty.

Sources:

*http://www.duke-energy.com/pdfs/Slides_021610.pdf

**<http://blogs.wsj.com/environmentalcapital/2009/12/09/clean-coal-aep-ups-expectations-for-carbon-capture-and-storage/>

“As a result of carbon capture, AEP will be able to retire 25% of its coal-burning power plants and install advanced carbon-capture equipment on the remaining 75%.”

- Mike Morris, Chairman, President, and Chief Executive Officer, AEP**



Learn more about the solutions:

- Heavy Duty Gas Turbines
- Steam Turbines
- Aero derivatives
- Generators
- Controls
- Alterrex™
- Plant Design and Optimization Services
- Remote Services



FEATURE STORY

Solutions for Integrating Renewables



Learn more about the solutions:

- [Smart Grid Augmented Reality Solar Game](#)
- ["Rays" TV Ad](#)
- [Wind Services Brochure](#)
- [Renewable Energy Solutions](#)

Integrating renewable energy from wind, solar and biogas into the North American grid is no easy challenge. It's a complex process requiring foresight, planning, and cooperative decision-making among many stakeholders. It also requires a partner with the technical expertise to manage the volatility inherent in renewables integration.

Renewables are highly variable over a variety of timescales. Wind power strength can vary by the minute; solar energy varies from day to day; and both are variable from season to season. GE Energy offers a suite of tools to manage power over each timescale, from second-to-second, hour-to-hour, and for planning up to a week ahead.

Flexibility is critical; that's why GE offers a range of solutions—from Jenbacher gas engines to aeroderivatives.

Software Solutions to Address Renewables Integration

GE's Positive Sequence Load Flow™ (PSLF) Software provides comprehensive load flow, dynamic simulation and short-circuit analysis. Using this tool, engineers can analyze transfer limits while performing economic dispatch. The software is ideal for simulating the transfer of large blocks of power across a transmission grid or to neighboring systems. It includes detailed dynamic models of GE's doubly fed and full converter wind turbine generators, as well as a GE PV solar plant model.

GE's MAPS™ Software helps utilities plan ahead by modeling market dynamics hour-by-hour. This tool provides valuable insight into regional power markets, which are defined by physical transmission limits. MAPS models the electrical system in detail, examining the flow on each line for every hour of the simulation, identifying both normal and security-related transmission constraints. By providing a more accurate picture, MAPS helps improve utilities' bottom lines.

One of the key drivers that can accelerate renewable integration will be governmental policy initiatives that incentivize power producers and consumers to shift toward greater use of clean power—an issue we examine in greater detail in this issue's [perspective column by GE Vice President Vic Abate](#).

SOLUTIONS FOR INTEGRATING RENEWABLES

The New 7FA

GE has technologies to integrate wind and solar energy when they're available, and solutions to compensate with traditional generation methods when they're not. The newest iteration of GE's 7FA turbine will soon be available to address the uncertainty and variability characteristic of renewable energy integration.

In addition to delivering greater output and efficiency, its superior operational flexibility makes the 7FA one of the most reliable turbines ever designed. By combining a host of technologies from across GE's product lines, the new 7FA offers improvements in output, thermal efficiency, and operability, and lower life-cycle costs, all without compromising the high degree of reliability historically delivered by GE's F-class fleet.

The next 7FA offers customers the ability to operate according to their specific business priorities and industry parameters, largely free from the constraints of equipment limitations. It's also part of GE's ecomagination portfolio—an assortment of innovative technologies that help customers address their environmental and financial needs, such as the need for cleaner, more efficient sources of energy. In order to join the ecomagination portfolio, a system must complete the company's rigorous internal and third-party environmental and operational evaluation. The new 7FA is more efficient and capable of higher output, which will result in less fuel consumption and lower emissions per MW-hour.

With GE's 7F fleet already providing more than 15 percent of North American capacity, the balanced combination of flexibility, reliability, and efficiency make this offering a smart choice for energy generation. Manufactured in Greenville, South Carolina, the 7FA will be available for delivery beginning in January, 2012.

95.4%
availability

98.4%
starting
reliability

99.3%
operating
reliability



FEATURE STORY

Introducing the J920

Whether you're seeking full power at high efficiency levels or a unit capable of short start-up times, GE's J920 power generation gas engine—targeted for 2012 availability—will be an ideal, reliable solution for your lasting power needs and grid stabilizing efforts.

GE's J920 Jenbacher gas engine is designed to achieve the highest electrical efficiency level in its class, reaching 48.7 percent efficiency. Its unique design enables high-power density for a lower investment cost. Two-stage turbocharging technology allows stable power outputs and efficiency at high ambient conditions. Additionally, the innovative modular design allows fast and seamless installation, with easier maintainability in both industrialized zones and remote areas. As an ecomagination-approved innovation, the J920 requires less fuel consumption, thereby reducing environmental impact and lowering lifecycle costs.

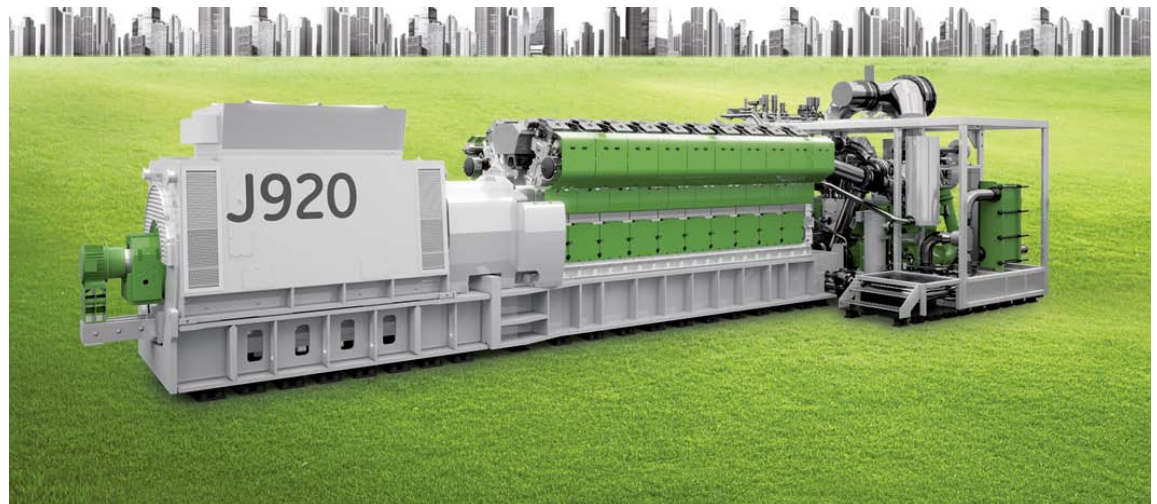
GE has been at the forefront of power generation gas engine technology. With customers in more than 80 countries throughout the world, GE offers multifaceted service capabilities designed to meet a variety of needs.

Based on our modular plant concept and your specific requirements, our system engineers guide you through every critical planning phase, from the feasibility study to the design and installation. Our trained project and system engineers offer project management expertise to support you during the plant realization phases and our contractual service agreements provide flexible and optimum care for your plant during operation. Through our global service network, you'll have dedicated personnel to help ensure predictable operating costs and risk mitigation.

With the introduction of the J920, GE is the only gas engine manufacturer currently offering small and large gas engines. The J920 also offers the highest electrical efficiency in its class, with an electrical output of 8.55 MW available from the 60 Hz unit.

Features and Benefits:

- High power density at low investment costs
- Top in its class electrical efficiency level of 48.7%
- Stable power output and efficiency at high ambient conditions
- Quick start-up for grid stabilization
- Fast and easy installation
- Designed for ease of maintainability
- Full plant flexibility with any multiple-engine installation
- Combined heat and power solution with 90 percent efficiency



PERSPECTIVE

The Case for National Renewable Energy Standards



By Vic Abate

GE Energy Vice President, Renewables
 President, American Wind
 Energy Association 2010-2011

The wind industry in the United States is at a crossroads. The outlook for new projects is under pressure due to reduced power demand, lower natural gas prices, transmission challenges, and the lack of a long-term renewable energy policy.

China and Europe, on the other hand, are each projected to realize robust annual installations of more than 10 GW for the next decade because they've adopted long-term renewable policies. The United States needs federal policy to drive demand for renewable energy in general, and for wind power, in particular.

Without a strong national policy, annual wind installations in the United States will likely drop 50 percent from numbers reported in 2009—with a corresponding loss of manufacturing and industry-related jobs. Fortunately, we can avert stagnation if we act quickly. A recent study by Navigant Consulting concludes that the United States could create 266,000 new jobs if it adopts a proposed national renewable energy standard (RES) that could generate 25 percent of its power from renewable sources by the year 2025.

As an industry, we've made tremendous progress. Investment and innovation in advanced wind technologies has resulted in more efficient wind

farms with higher reliability. We have the technology to help decrease our dependence on foreign energy sources, increase national security, and preserve the environment. Together, the energy industry is poised to help the United States renew its manufacturing sector and create jobs if Congress passes a national RES.

As we witnessed during GE's 28-day Capture the Wind Blade Tour from Aberdeen, South Dakota, to Dallas, Texas, there is strong public support for wind energy across the country. Thousands of people from all walks of life saw the wind blade up close and signed their names on this travelling petition in support of America's clean energy future.

We look forward to working together with policy-makers to ensure a better energy future for generations to come.

CASE STUDY

Transforming Waste to Energy using GE's Gas Engine Technology



In Catawba County, North Carolina, a unique initiative is gaining attention for turning industrial waste into energy. On a 1,000-acre site near Charlotte, Gregory Wood Products, Pallet One, Inc., Appalachian State University, and other local businesses have formed a cooperative to recycle each other's by-products into energy to power their own manufacturing processes. At the heart of this EcoPlex sits the Blackburn Landfill, which has produced energy from methane for more than a decade using GE's Jenbacher gas engines.

Since 1999, the Jenbacher gas engines at the EcoPlex's Landfill Gas-to-Energy Facility have transformed the landfill's waste gas into enough electricity to power about 1,400 homes. With approximately 650 tons of waste entering the landfill each day, the EcoPlex's potential to produce electricity will continue to grow.

The EcoPlex serves as a laboratory for several environmentally friendly business practices. Lumber scraps from Gregory Wood Products are used by Pallet One, Inc. to construct shipping pallets; and wood shavings, bark, and sawdust will be used in a planned bio-energy facility. That facility will double the EcoPlex's current waste-to-energy capabilities using Jenbacher engines and a biomass gasification system. Sunflower and canola are cultivated in the buffer acreage that surrounds the landfill, and construction is underway on a biodiesel research facility where students from Appalachian State University will experiment with biodiesel produced from those crops.

GE is proud to collaborate with its fellow stakeholders in North Carolina, and hopes that the EcoPlex can serve as a continental model of successful conservation.

“GE Energy and its associated resources are qualified to meet our needs, both today and in the future. Not only does GE share our commitment to protecting the environment, but the company also has engaged in research and planning activities to further the development of the EcoComplex, and help us deliver on that commitment.”

– Barry Edwards, Catawba County
Director of Utilities and Engineering



Introducing the new J920
Jenbacher gas engine

- [In This Issue](#)
- [Visit Our Web Page](#)

2011 North America Events Calendar

Calendar is subject to change

1Q

Distributech	<i>San Diego, CA</i>
7FA.05 Compressor/Test Stand Customer Event	<i>Greenville, SC</i>
Energy Generation Conference	<i>Bismarck, ND</i>
Oil & Gas Technology Summit	<i>Houston, TX</i>
Energy Utility and Environment Conference	<i>Phoenix, AZ</i>
Energy Technology Seminar	<i>Weehawken, NJ</i>
Medical Design & Manufacturing	<i>West Anaheim, CA</i>
Mining, Metallurgy and Exploration Conference	<i>Denver, CO</i>

2Q

Offshore Technology Conference	<i>Houston, TX</i>
Food Automation and Manufacturing	<i>Palm Beach, FL</i>
AWEA Windpower	<i>Anaheim, CA</i>
BevTech	<i>Ft. Lauderdale, FL</i>
APPA National Conference & Public Power Expo	<i>Washington, DC</i>
Syngas Association Annual Conference	<i>Tulsa, OK</i>
Offshore Technology Conference	<i>Houston, TX</i>

3Q

International Dairy Association	<i>Atlanta, GA</i>
Intersolar	<i>San Francisco, CA</i>
Renewable Energy Technology Conference	<i>Washington, DC</i>
Hydrovision	<i>Sacramento, CA</i>
Oil Sands & Heavy Oil Technologies	<i>Calgary, Alberta, Canada</i>
CoalGen	<i>Columbus, OH</i>
Oil Sands Trade show and Conference	<i>Ft. McMurray, Alberta, Canada</i>

4Q

ChemShow	<i>New York, NY</i>
CanWEA	<i>Vancouver, British Columbia, Canada</i>
Solar Power International	<i>Dallas, TX</i>
60Hz Tech Symposium	<i>Houston, TX</i>
International Water Conference	<i>Orlando, FL</i>
WEFTEC	<i>Los Angeles, CA</i>



SPEAK UP

We want to hear from you.

GE Energy is committed to helping our customers. We'd like to make sure your voice is part of the *Network* conversation. If you have a question or a business challenge to overcome, consider letting us help you through one of the channels below.

Ask the Expert ▶

Our team of subject matter experts stands ready to provide answers to your queries. Please send in your question, along with your contact information.

Solve my Problem ▶

Take advantage of GE's vast array of operational experience by letting us solve your toughest challenges. Please describe your challenge, and include your contact information so that we can get in touch with you and your team.

To submit questions or topics for any of the above channels, please [contact us](#).

For the latest news on GE Energy's products, services, and events, please visit [our home page](#).