

# Now you can have it all – more innovation, power & efficiency.

Lasting power with the incredible  
new 10 MW range Jenbacher gas engine.



**ecomagination™**  
a GE commitment



GE imagination at work

# Lasting Power with Less Fuel Consumption and CO<sub>2</sub> Emissions

As the only gas engine specialist offering small and large gas engines, GE introduces the innovative J920 Jenbacher 9.5 MW system. Whether you're seeking full power at high-efficiency levels or a unit capable of short start-up times, GE's J920 Jenbacher gas engine is your ideal solution for reliable lasting power and grid stabilization with a low carbon footprint.



## J920 Customer Benefits:

- Top of its class electrical efficiency of 48.7%
- High power density at low investment costs
- Stable power output and reliable efficiency in any ambient condition
- Quick start-up for grid stabilization
- Fast and easy installation
- Simple maintainability
- Full plant flexibility available with any multiple-engine installation
- Combined heat and power solution with over 90% efficiency

## Performance to Lifecycle Services: GE's All-in-One Solution

With a full range of lifecycle services – from planning and plant realization to operation – you can rely on GE to get you up and running and keep you there with the utmost efficiency. Our highly skilled staff will give you the support you need to achieve optimal performance levels with a solution based on our J920 Jenbacher powerhouse plant concept.



### Planning

GE is available to support you from the inception of your power generation project proposal to the design, testing, and completion of your plant. Based on our modular plant concept and your specific requirements, our highly experienced system engineers accompany you through every critical planning phase – including the *feasibility study*, *power plant engineering* and *design* – to tailor the best solution for your plant.

### Plant Realization

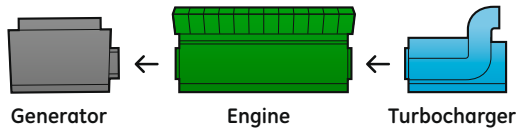
GE's trained project managers and system engineers offer *project management* expertise to support you during the plant realization phases. Construction and commissioning procedures are standardized to minimize risks and assure successful implementation. As part of our *construction* and plant installation services, GE can also provide engineering, procurement and construction (EPC) support as well as a worldwide qualified EPC-network. GE's start-up and *commissioning* service includes a series of tests performed by our experienced service technicians to ensure the optimum installation and functionality of your plant.

### Operation

Our *contractual service agreements* are designed to provide flexible and optimum care for your plant during operation. Through our global service network, you'll have dedicated personnel that help to ensure predictable operating costs and risk mitigation. *Remote diagnostics* provide you with online access to your plant and J920 equipment, thereby minimizing downtime, increasing plant availability, and lowering expenses for maintenance. All maintenance work on your J920 gas engine system – including *upgrade, repair and overhauls* – is performed at your plant, saving you time and updating your engine to the latest technology.

## Innovative Design for Ease, Installation, and Maintainability

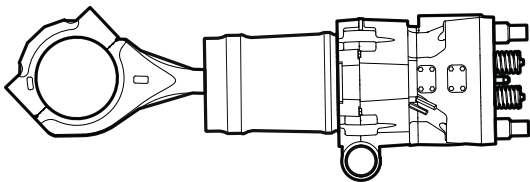
GE's J920 Jenbacher gas engine is top of its class for electrical efficiency and designed for durability, simple installation, and maintainability. The engine consists of three modules, including a generator, engine, and turbocharger auxiliary module, that provide a high-quality, pre-fabricated, standardized generator-set module. Each module is factory-tested, then shipped separately and assembled on site, offering reduced installation time. In addition, the modules have highly standardized interfaces that work well with the balance of plant (BoP) systems, and ultimately simplify BoP installations and total plant erection time. To maximize plant availability, GE's J920 Jenbacher gas engine is optimized for operation and maintainability.



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### Power unit

The power unit ensures low downtime – the J920 power unit can easily be replaced without major disassembly of the engine.



### Divided camshaft

The J920 is equipped with a segmented camshaft, allowing easy exchange through a maintenance window at the top of the crankcase.

### Coupling

With the modular engine design, decoupling the units is a simple process. Major engine parts stay in place and are easily accessible.

## Make the Most out of Energy Sources

### Combustion

Based on the extensive experience of GE's type 6 gas engine combustion system, the J920 Jenbacher unit is equipped with an advanced pre-chamber combustion system with spark ignition and optimal conditions for longer part life. In addition, the individual gas mixing achieved by port injection in combination with cylinder-specific sensors allows each cylinder to be controlled to operate at optimal performance. The J920 mechanical structure is designed to allow high-peak firing pressure. In combination with the latest miller technology and 2-stage turbocharging, the J920 Jenbacher engine can achieve top of its class electrical efficiency of 48.7%.

### 2-stage turbocharging

The 2-stage turbocharger design enables optimized miller technology and high-power density. Compared to single-stage turbocharging, GE's 2-stage turbocharging technology allows higher cooling water temperatures, making it an ideal fit for independent power production projects in hot ambient conditions. Combined heat and power (CHP) applications benefit from the use of mixture cooling heat at high temperatures. No deration at higher altitudes is another advantage.

### Engine management system

The J920 is equipped with GE's well-proven comprehensive Jenbacher gas engine management system with a programmable logic unit, handling engine and plant controls as well as visualization. To allow for smooth plant operation, the system specifically supports adaptive condition-based controls, individual cylinder balancing, optimization and protection of core controls, and limp home mode. Designed as part of the entire module system, with all core competencies in-house, every function is developed with a holistic point of view.

# Revolutionary Three-Modules Concept

## Generator

- Integrated module design and assembly
- High-efficiency, air-cooled generator
- Digital regulator unit



### 20-cylinder power module

- 48.7% electrical efficiency
- High-power density
- Easy maintenance power unit concept

### Turbocharger auxiliary module

- 2-stage turbocharging technology
- Increased efficiency
- No deration in hot ambient conditions or at high altitudes



### Key Performance Data

Performance Data	J920 (50Hz / 1,000 rpm)	J920 (60Hz / 900 rpm)
Electrical Output	9,500 kW	8,550 kW
Electrical Efficiency	48.7%	48.7%
Heat Rate	7,006 BTU/kWh	7,006 BTU/kWh
Thermal Output	8,100 kWth	7,300 kWth
Total Efficiency	90%	90%

### Installed Dimensions

	Length	Width	Height	Weight
Engine	27.5 ft	9.5 ft	10.8 ft	174,000 lb
Generator	17.1 ft	8.2 ft	9.5 ft	108,000 lb
TCA Module	9.8 ft	21.3 ft	11.2 ft	79,000 lb

Output and efficiency at generator terminals, ISO 3046.  
Nat. Gas MN >80, Power Factor 1.0, 500 mg/Nm<sup>3</sup> (@ 5% O<sub>2</sub>) NO<sub>x</sub>, Efficiency at LHV

# Solving More than Simple Electricity Needs

GE's J920 Jenbacher gas engine is designed to support a broad variety of multiple-engine power plant solutions – from remote power supply to combined heat and power (CHP) generation.

## Powerhouse Solutions

GE's J920 is optimized for large gas engine power plants. It offers a highly standardized powerhouse plant concept with fast delivery times and low installation costs. While the size of the plant, actual plant design, and layout depend on your specific customer needs and site requirements, the J920 plant solution is developed as a modular system with a minimal footprint. This design allows for seamless installation with any multiple-engine configuration, and, therefore, offers flexible size options for a multiple 9.5 MW system at constant top of its class electrical efficiency levels. Combining the multiple-engine concept with a 5-minute engine start-up time provides flexible power – from baseload to cyclic and peak operations.



## Combined Heat and Power

The simple use of jacket water heat and heat from oil and mixture coolers, combined with heat from the gas engine exhaust makes CHP in combination with the J920 gas engine a favorable solution. When the heating water circle is designed to include return water at 70°C and hot water at 90°C, a total efficiency improvement is achieved. The 2-stage turbocharging technology has the ability to increase the total efficiency for providing power and heat to more than 90% – about 3% points better than that of a single-stage turbocharging gas engine.

## Reducing Life-Cycle Costs and Environmental Impact

Designed to achieve top-class electrical efficiency levels, GE's J920 solutions allow you to benefit from low fuel consumption, operating costs, and CO<sub>2</sub> emissions. Operating a J920 at 48.7% top of its class electrical efficiency level has the capacity to produce approximately 68 million kWh of electricity, enough to power over 6,000 US households for a year.

With more than 1.5% higher electrical efficiency than comparable gas engines, operating a J920 avoids:

- The consumption of more than 6.4 million kWh of natural gas per year, saving over \$ 96,000 per year at a natural gas price of \$ 4.80 per MMBTU.
- The emission of more than 1,300 metric tons of CO<sub>2</sub> per year, equivalent to the annual CO<sub>2</sub> emissions of about 260 cars on US roads.

With more than 90% overall efficiency compared to the separate production of heat and electricity, a J920 as a CHP solution achieves over the course of a year<sup>1</sup>:

- Over 400,000 MMBTU primary energy savings, equivalent to the energy contained in more than 69,000 barrels of oil.
- Emission reduction of more than approximately 20,000 metric tons of CO<sub>2</sub>, equivalent to the CO<sub>2</sub> emissions of over 3,800 cars on US roads.

GE's J920 is approved under ecomagination, a corporate-wide initiative to aggressively bring to market technologies that help customers meet pressing environmental challenges ([www.ecomagination.com](http://www.ecomagination.com)).

<sup>1</sup> Compared to the separate production of heat by a natural gas-fired boiler and delivery of electricity on the US grid


# A Range of Innovative Solutions from a Leader in Global Power Generation

GE's Jenbacher gas engine division is one of the world's leading manufacturers of gas-fueled reciprocating engines, packaged generator sets, and cogeneration units for power generation. It is one of the only companies in the world focusing exclusively on gas engine technology with more than 50 years of power generation experience and business in some 80 countries throughout the world. With the introduction of its J920, GE is the only gas engine specialist covering the full output range from 250 kW to 9.5 MW.

50  
over  
years of power

Jenbacher gas engines

<p><b>1948</b> Serial production of diesel engines and compressors</p>	<p><b>1951</b> Start with production of diesel locomotives</p>	<p><b>1957</b> 1<sup>st</sup> gas engine</p>	<p><b>1979</b> 1<sup>st</sup> cogeneration module</p>	<p><b>1985</b> 1<sup>st</sup> LEANOX<sup>®</sup> gas engine</p>	<p><b>1994</b> 1<sup>st</sup> 20 cylinder gas engine J320</p>	<p><b>1997</b> World's smallest 20 cylinder gas engine in the 3 MW power range J620</p>	<p><b>2000</b> Presentation of "High Efficiency Concept" J420</p>	<p><b>2007</b> World's 1<sup>st</sup> 24-cylinder 4 MW engine J624</p>	<p><b>2010</b> World's 1<sup>st</sup> 2-stage-turbocharged gas engine and 1<sup>st</sup> ORC gas engine</p>	<p><b>Introduction J920</b> Entering the large gas engine segment Highest electrical efficiency in its class</p>
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Are you interested in a unique solution for your plant? For more information on GE's new J920 Jenbacher large gas engine, visit: [www.ge-J920gasengine.com](http://www.ge-J920gasengine.com) or contact your GE sales team member.

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