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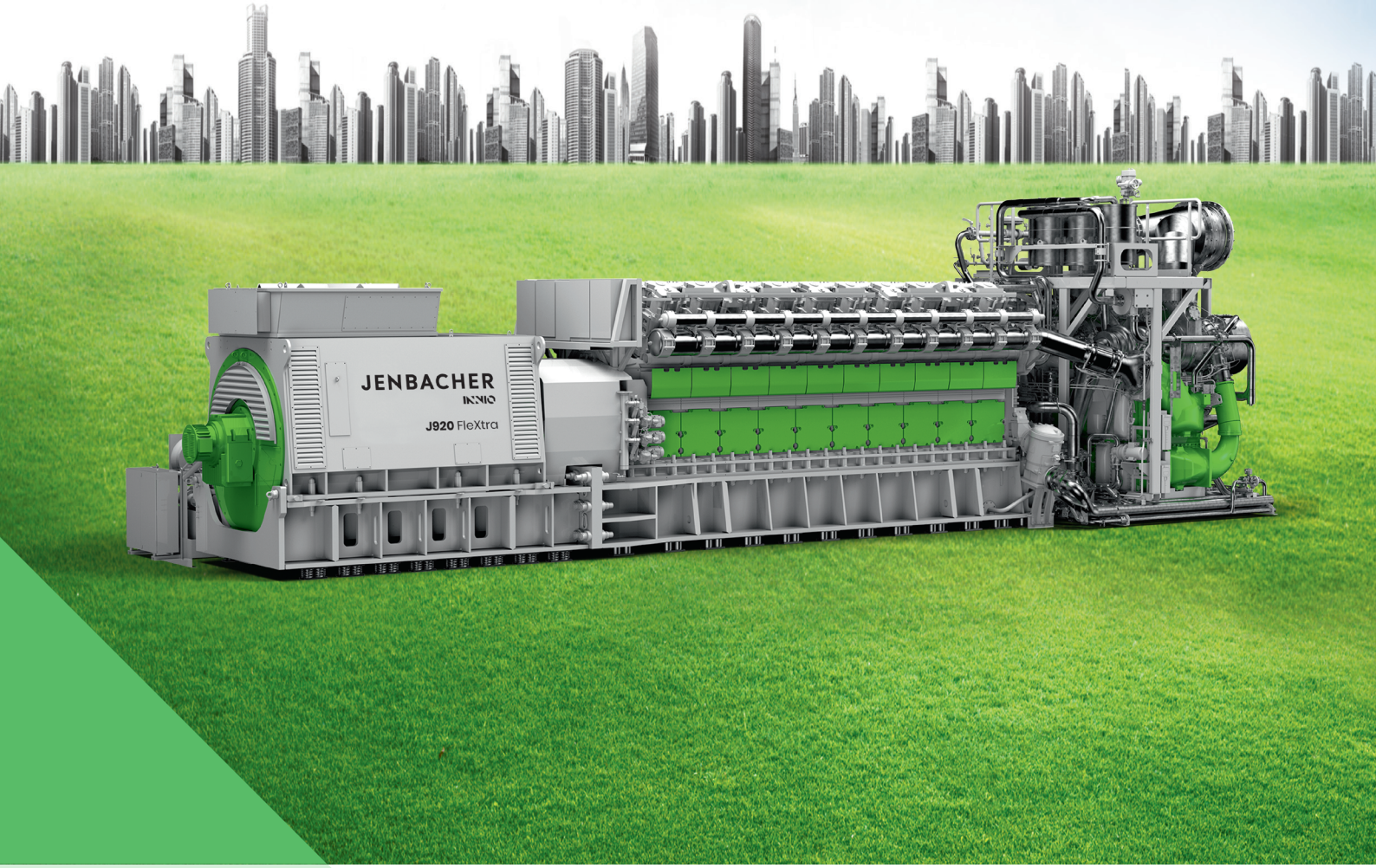
MORE INNOVATION, POWER & EFFICIENCY

Lasting power with the incredible 10 MW range Jenbacher gas engine



ENERGY SOLUTIONS.
EVERYWHERE, EVERY TIME.

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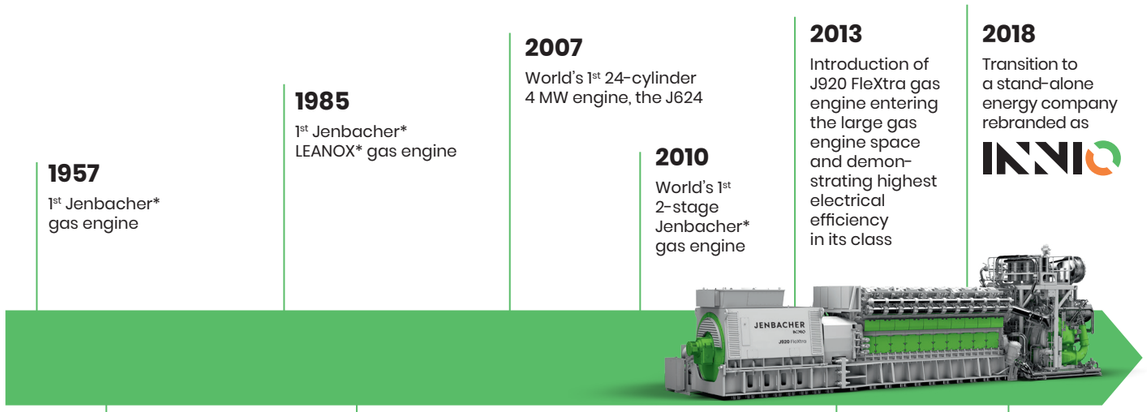
A RANGE OF INNOVATIVE SOLUTIONS
LEADING TO THE J920 FLEXTRA GAS ENGINE



LASTING POWER WITH LESS FUEL
CONSUMPTION AND CO_2 EMISSIONS

Whether you're seeking full power at high-efficiency levels or a unit capable of short start-up times, INNIO's J920 FleXtra gas engine is your ideal solution for reliable lasting power and grid stabilization with a lower carbon footprint.

J920 FLEXTRA – CUSTOMER BENEFITS:

- Excellent electrical efficiency of up to 48.7 % and a total efficiency of up to 94% (CHP version)
- High power density at low investment costs
- Stable power output and reliable efficiency in any ambient condition
- Quick startup for grid stabilization
- Fast and easy installation
- Simple maintainability
- Full plant flexibility available with any multiple-engine installation
- Combined heat and power solution with more than 90 percent efficiency
- Lower water usage
- Designed for high reliability, renewable backup power, extended maintenance intervals

*Indicates a trademark ** Tolerance on fuel consumption according ISO 3046

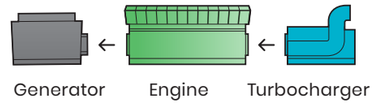
INNOVATIVE DESIGN FOR EASE,
INSTALLATION, AND MAINTAINABILITY

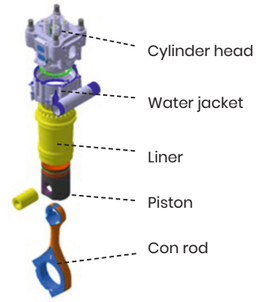
INNIO's J920 FleXtra gas engine is offering outstanding electrical efficiency and is designed for durability, simple installation, and maintainability. The genset consists of three modules – a generator, engine, and turbocharger module – that provides a high-quality, pre-fabricated, standardized module. Each module is factory-tested, then shipped separately and plugged together on side, 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 construction time. To increase plant availability, INNIO's J920 FleXtra gas engine is designed for smooth operation and maintainability.

Power unit
The J920 FleXtra power unit helps to ensure low downtime, as it is easily replaced without major disassembly of the engine.

Divided camshaft
The J920 FleXtra 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.





Power unit

MAKE THE MOST OUT OF ENERGY SOURCES

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

2-stage turbocharging
The 2-stage turbocharger design enables improved miller technology and high-power density. Compared to single-stage turbocharging, INNIO'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 charge air cooling heat at high temperatures. No deration at higher altitudes is another advantage.

Engine management system
The J920 FleXtra is equipped with INNIO'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 homemode. Designed as part of the entire module system, with all core competencies in-house, every function is developed with a holistic point of view.

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REVOLUTIONARY THREE-MODULES CONCEPT

GENERATOR

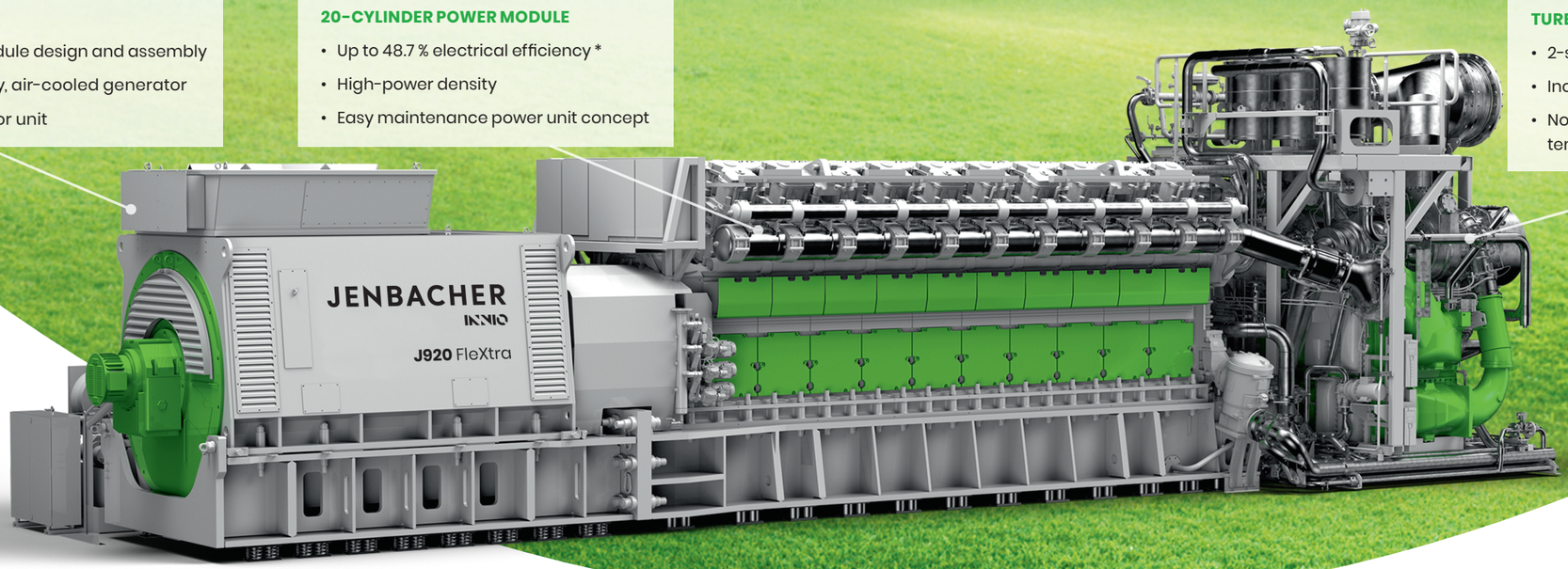
- Integrated module design and assembly
- High-efficiency, air-cooled generator
- Digital regulator unit

20-CYLINDER POWER MODULE

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

TURBOCHARGER MODULE

- 2-stage turbocharging technology
- Increased efficiency
- No derating at high ambient temperatures or altitudes



KEY PERFORMANCE DATA CHP VERSION

Performance Data CHP* Version*	J920 FleXtra (50Hz / 1,000 rpm)
Electrical output	10,400 kW
Electrical efficiency	48.7 %
Heat rate	7,393 kJ/kWh 7,007 BTU/kWhe
Thermal output	9,620+ kWth
Total efficiency	~ 94 %

Output and efficiency at generator terminals, ISO 3046 with 5% tolerance for energy input, Natural Gas MN >80, Power Factor 1.0, 500 mg/Nm³ (@ 5 % O_2) all Efficiency at LHV

* CHP* Version (C101) dedicated engine version for max. total efficiency @ 70/90°C water circuit, full recovery of low temperature intercooler other versions on request

INSTALLED DIMENSIONS

	Length	Width	Height	Weight
Engine	8.4 m	3.0 m	3.5 m	91 t
Generator	4.0 m	3.0 m	3.2 m	45 t
TC Module	3.2 m	3.8 m	5.8 m	30 t

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SOLVING MORE THAN SIMPLE ELECTRICITY NEEDS

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

Powerhouse solutions

INNIO's J920 FleXtra is specially adapted to 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 FleXtra 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 10 MW system at constant high 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 charge air coolers, combined with heat from the gas engine exhaust makes CHP in combination with the J920 FleXtra 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 or more a high total efficiency 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 % – 4 % points better than that of a single-stage turbocharging gas engine.

20 Jenbacher J920 FleXtra gas engines make up the heart of the coastal power plant, generating 190 megawatts of electrical power for the German city of Kiel. "Photo Copyright -Stadtwerke Kiel"

Reducing life-cycle costs and environmental impact

Created to achieve excellent electrical efficiency levels, INNIO's J920 FleXtra solutions allow you to benefit from low fuel consumption, operating costs, and CO_2 emissions. Operating a J920 FleXtra at 48.7 % electrical efficiency for 50 Hz or has the capacity to produce more than 83 million kWh of electricity, enough to power over 20,000 European households for a year.

By offering a high electrical efficiency, the J920 FleXtra gas engine avoids:

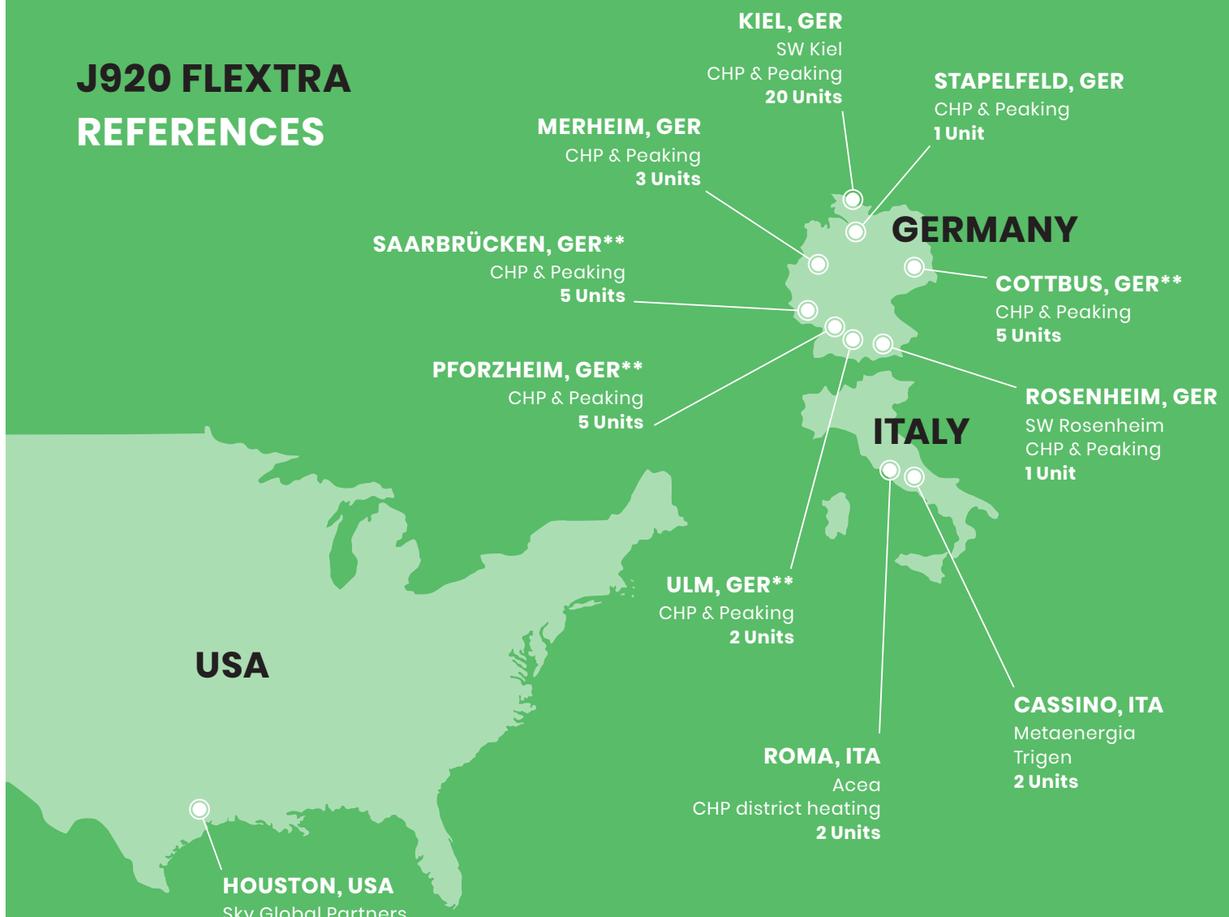
- The consumption of more than 6.4 million kWh of natural gas per year
- The emission of approximately 1,500 metric tons of CO_2 per year, equivalent to the annual CO_2 emissions of about 800 cars on European roads

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

- Over 130 millions kWh primary energy savings, equivalent to the energy contained in more than 76,000 barrels of oil
- Emission reduction of more than 7,800 metric tons of CO_2, equivalent to the CO_2 emissions of over 4,100 cars on European roads

[1] Compared to the separate production of heat by a natural gas-fired boiler and delivery of electricity on the EU grid

J920 FLEXTRA REFERENCES



Operation

Our contractual service agreements are designed to provide flexible, advanced care for your plant during operation. Through our global service network, you'll have dedicated personnel who can help to ensure predictable operating costs and risk mitigation. INNIO's online monitoring and diagnostic tool provides you with online access to your plant and J920 FleXtra equipment. In addition, myPlant* technology enables us to monitor and control your global fleet of Jenbacher gas engines. The myPlant 2.0 technology transmits sensor data back to our enterprise servers so that we can calculate your plant's operational state, predict faults and analyze any issues. All maintenance work on your J920 FleXtra gas engine system–including upgrade, repair and overhauls– is performed at your plant, saving you time while updating your engine to the latest technology.

Service benefits

- Longer lifetime service
- Advanced service design for easier maintainability and shorter downtime
- Easy access to consumable parts
- Remote Monitoring & Diagnostics cut costs and boost equipment availability
- Sensors that monitor vital engine parts
- Excellent engine operations through fleet comparison

** going live soon

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INNIO is a leading provider of renewable gas, natural gas, and hydrogen-based solutions and services for power generation and gas compression at or near the point of use. With our Jenbacher and Waukesha gas engines, INNIO helps to provide communities, industry and the public access to sustainable, reliable and economical power ranging from 200 kW to 10 MW. We also provide life-cycle support and digital solutions to the more than 53,000 delivered gas engines globally, through our service network in more than 100 countries. We deliver innovative technology driven by decarbonization, decentralization, and digitalization to help lead the way to a greener future. Headquartered in Jenbach, Austria, the business also has primary operations in Welland, Ontario, Canada, and Waukesha, Wisconsin, U.S.

Follow INNIO on Twitter and LinkedIn.

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SILVER 2021 ecovadis Sustainability Rating

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