

DATA CENTER POWER SOLUTIONS

Secure and
efficient

JENBACHER
INNIO





RELIABLE AND RESPONSIVE power

Your data center is considered critical infrastructure, meaning you must provide the highest levels of availability and reliability and prevent IT blackouts. Yet, you face increased capacity and energy demand from growing global data traffic and an exponential rise in internet-connected IoT devices.

Despite this rising energy demand, your industry recognizes the need to support UN climate goals by developing a roadmap to zero carbon emissions. The aim: bring down the Power Usage Efficiency (PUE) ratio of total facility power, including cooling needs, to IT equipment power.

INNIO has tailored solutions that can meet or even exceed your energy requirements with decentralized, highly efficient engine technology.

DECENTRALIZATION with heat recovery

Data center solutions at the national level are a key industry trend, creating the need for decentralized power solutions. To make these onsite energy systems sustainable, integrated waste heat recovery solutions are needed to enable cooling, which usually accounts for up to 40% of a data center's energy consumption.

Efficient heat recovery solutions can serve as a driver of emission reductions for data centers. The growing availability of green hydrogen as an energy source for power generation systems will open up the way to zero emissions.



SUSTAINABLE

trigeneration solutions

INNIO's Jenbacher trigeneration plants are flexible, innovative systems offering combined cooling, heat and power (CCHP) solutions.

With a wealth of experience, Jenbacher is among the global technology leaders when it comes to engine-based power generation and waste heat recovery solutions.

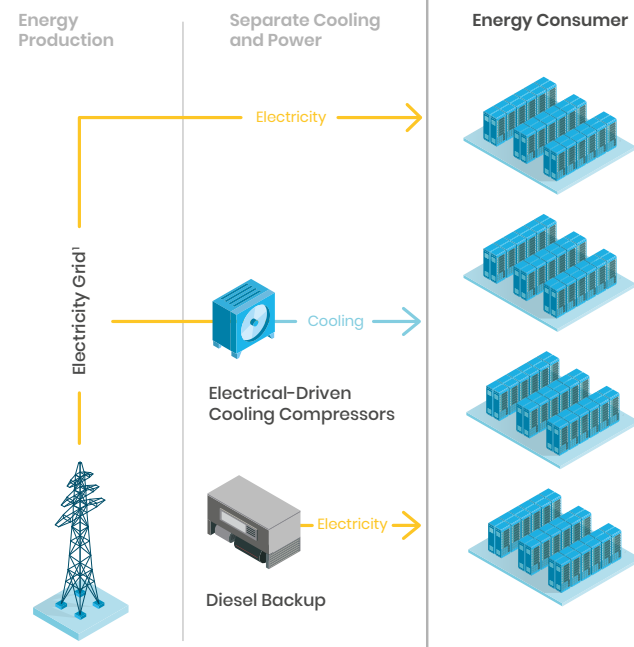
You can bring down emissions significantly by replacing the conventional electric-driven cooling compressors now used in data centers with combined onsite power generation. Our technology uses the generated waste heat with individual solutions based on absorption chillers, heat pumps and other waste heat recovery solutions. When fueled with highly reliable pipeline gas, Jenbacher CCHP systems can cut your data center's CO₂ footprint by up to 50%—depending on the energy mix—while saving more than 20% of the primary energy used.

Overall, trigeneration technology makes the most sense in applications with continuous power and cooling demand such as data centers that are located in the warmer regions of the world.

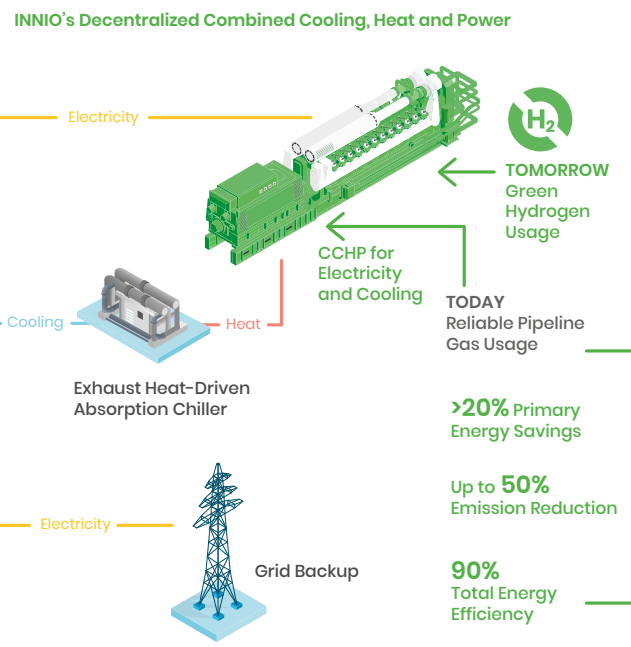
And there is potential for an even more sustainable solution

INNIO's Jenbacher energy systems are able to use a mixture of pipeline gas and CO₂-free hydrogen as an energy source. In the future, these systems can be converted to 100% hydrogen (H₂) operation as H₂ becomes more available.

CONVENTIONAL TECHNOLOGY



TECHNOLOGY FOR A CARBON-NEUTRAL FUTURE



¹e.g., Energy Mix South East Asia > 50% from Coal

CONVINCING ADVANTAGES



Ensure supply security

Our Jenbacher CCHP plants using pipeline gas provide you with power that is independent from the grid. This extremely reliable power supply means you avoid interruptions and financial losses caused by power outages or fluctuations in grid frequency. Particularly during manmade or natural disasters, the highly reliable pipeline gas grid secures your data center operation.

Lower your costs

The electrical and thermal efficiency of a Jenbacher CCHP plant can reach up to 90%. Trigeneration with absorption cooling can produce electric power as well as power for refrigeration at significantly lower cost than the power purchased from a utility company for conventional air or water chilling.

Benefit from scalable modular systems

Onsite power sources provide you with more flexibility when you need to expand your data center—or even design a new one. Upgrading outdated data centers with new equipment can lead to a significant power demand increase, which may not be met near term by a utility supplier. A modular CCHP plant provides you with needed flexibility and independence in power supply.

Open up the opportunity for CO₂-free operation

Our pipeline gas-driven Jenbacher engines produce only half as much CO₂ emissions as power produced from coal. With our

Ready for H₂ option, our engines are capable of running with up to 25% (vol) of hydrogen in pipeline gas. As hydrogen becomes more readily available, all Ready for H₂ new units and most of the currently installed Jenbacher conventional gas-fueled engines can be converted to operate on 100% H₂. Type 4 engines and CHP systems are available today to run on 100% H₂, enabling a CO₂-free power supply for your cogeneration system today.

EFFICIENCY AND RELIABILITY

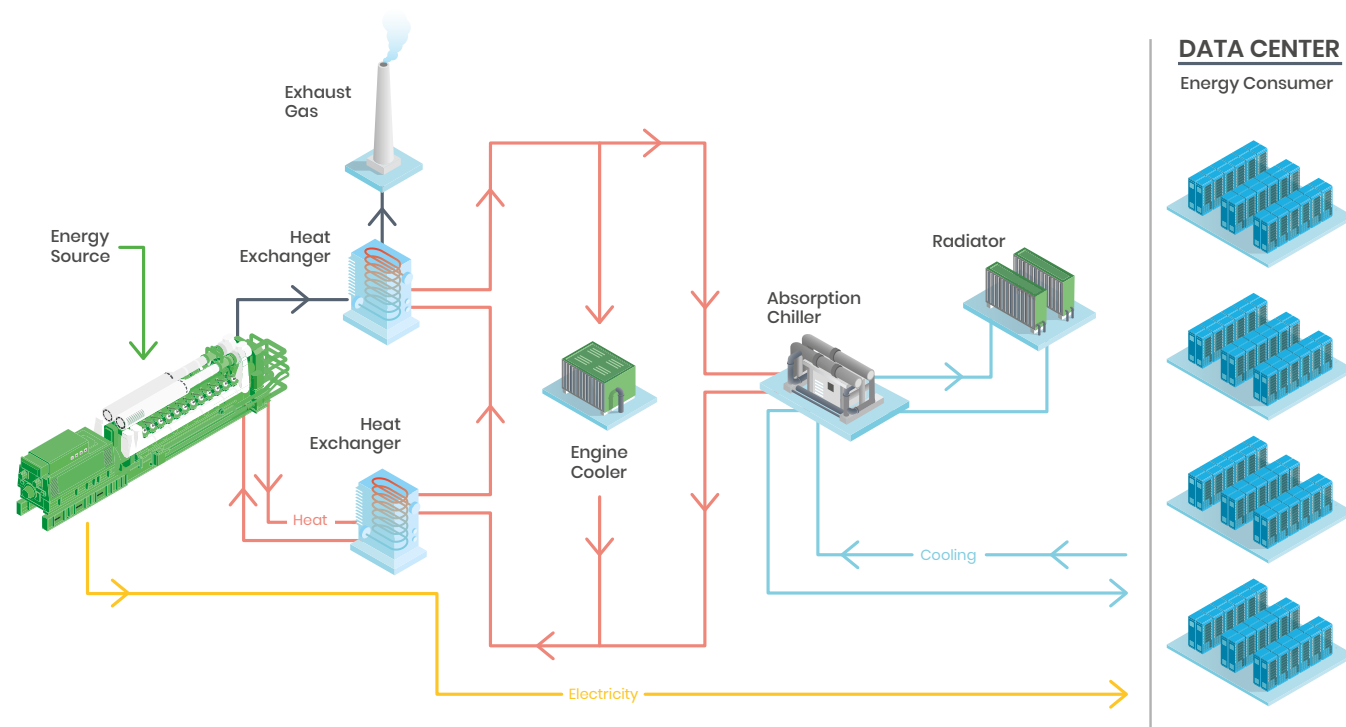
with Jenbacher CCHP technology

In a Jenbacher trigeneration plant, the engine continuously provides electrical power, efficiently and reliably.

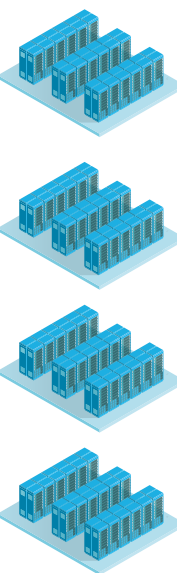
The waste heat it generates can be used in an absorption chiller to produce continuous, energy-efficient cooling. Because they have no moving parts, absorption chillers are very reliable and represent the technology of choice for continuous operation.

A Jenbacher CCHP solution provides:

- Optimized engine versions for hot and humid countries
- Maximized overall plant efficiency with integrated absorption chillers and heat pumps
- Low operational cost
- Simple chilling production
- Reduced carbon footprint today
- Carbon-free power production based on H₂ tomorrow



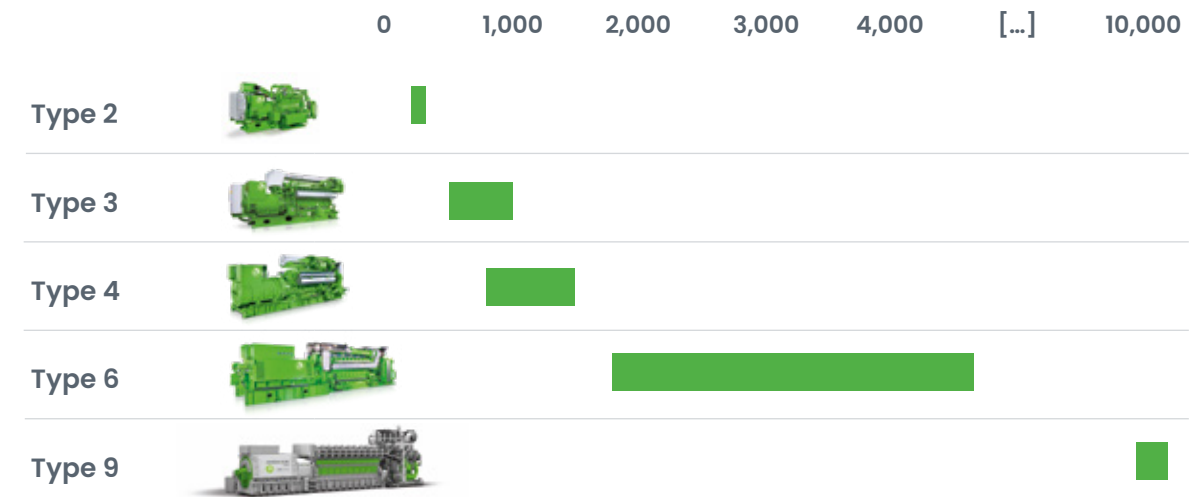
DATA CENTER Energy Consumer



A POWERFUL portfolio

All Jenbacher engines can be used for CCHP. As data center infrastructure typically is based on scalable co-locations, the usual power output node is 1.5 MW and 3 MW.

Electrical Power Output (kWel)



Jenbacher Container Solutions

Containers are available for Jenbacher Type 2, 3, 4 and 6 engines with a broad range of options to meet the project requirements.

Benefits

- Pre-installed package completed with auxiliary systems ensures a quick and easy site installation
- Compact footprint consumes minimum amount of space on site
- All components perfectly matched and tuned to the specific site requirements by Jenbacher engineering experts to help ensure optimal performance



Want to prepare for a greener future?



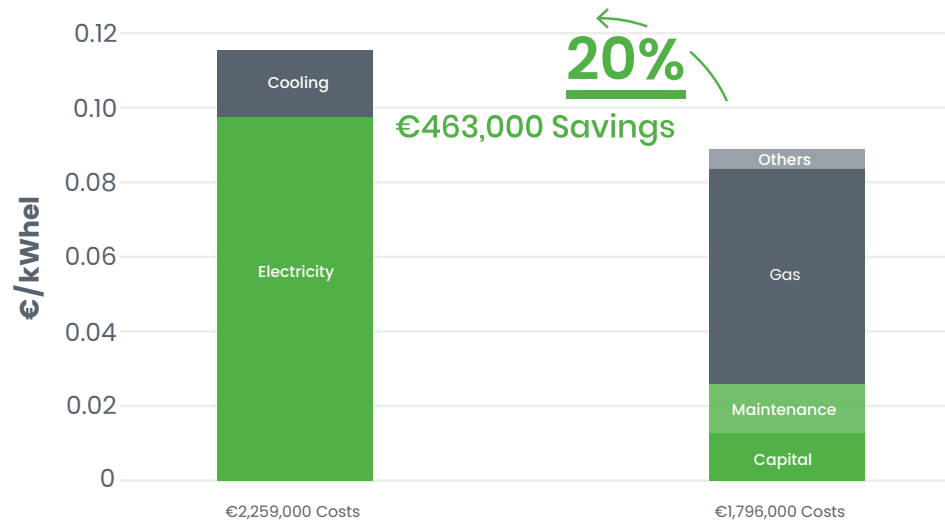
Visit innio.com/hydrogen to learn more about INNIO's hydrogen solutions.



INVESTING

in Jenbacher CCHP technology pays off

With INNIO's CCHP solutions, you gain economically, and so does the environment. Want to know how? Here is an example based on a real business case, with data from one of our customers.



Customer business case and saving potential²

Plant Key Technical Data:

Engines	1 x J620
Energy Source	Pipeline Gas
Electrical Output	3,360 KW
Thermal Output (Cooling):	2,408 KW
Total Efficiency	~88%

² 9.8 € Cent/kWh electricity rate, 2.85 € Cent/kWh gas cost, 6,000 oh, cooling saving calculated against electrical chiller with COP = 5

800 CCHP SYSTEMS

around the globe



CCHP at a data center in China since 2014

Instead of using traditional diesel generator sets as a backup power source, Jenbacher power generation systems cover the site's primary energy needs with backup power provided by the grid. The innovative setup results in reduced CO₂ and NO_x emissions with high energy efficiency.



PLANT FACTS

Engine	5 x J620
Energy Source	Pipeline Gas
Electrical Output	16.8 MW
Thermal Output (Cooling)	16.7 MW
Total Efficiency	88%



High efficiency trigeneration system for Vodafone Village in Italy

Trigeneration has been a game changer at Vodafone Village, which manages the entire Vodafone Italia network infrastructure. With combined cooling, heat and power, the customer can efficiently meet the year-round needs of the village’s four buildings while saving significant amounts of CO₂ from being emitted into the atmosphere.



PLANT FACTS

Engine	1 x J620
Energy Source	Pipeline Gas
Electrical Output	3.4 MW
Thermal Output (Cooling)	3.4 MW
Total Efficiency	88%

Reliable CCHP system for Karlsruhe Institute of Technology in Germany

In Southwest Germany, the Jenbacher team has installed a J612 CCHP plant powered by highly reliable pipeline gas at the Karlsruhe Institute of Technology. The system provides needed cooling for the onsite data center by an absorption chiller. The investment into Jenbacher CCHP technology was driven by the customer’s commitment to protect the climate and use available resources more efficiently.



PLANT FACTS

Engine	1 x J612
Energy Source	Pipeline Gas
Electrical Output	2 MW
Thermal Output (Cooling)	2 MW
Total Efficiency	84.7%



OUR COMMITMENT

to you

Flexibility and experience you can count on

For the last 65-plus years, Jenbacher has been an innovator of power generation technology. Today's highly efficient Jenbacher systems deliver energy independence through an efficient, low emission, secure and cost-effective energy solution.

Thinking long-term. Thinking circular

With our flexible, scalable, and resilient energy solutions and services, INNIO is embracing the circular economy—recycling, reusing, and upgrading our engines to meet the latest environmental requirements. For example, upgrading to hydrogen operations for a renewed life or using heat that normally would be wasted during power generation are sustainable solutions that can keep entire communities or businesses warm and electrified.

Through our service network in more than 100 countries and our digital capabilities, we provide life-cycle support for our globally installed units, helping to ensure a greater runtime for longer equipment life.

Zero-carbon H₂ operation tomorrow

In addition, the same proven and economically viable INNIO equipment can be moved from conventional fuels today to full CO₂-free H₂ operation tomorrow, once H₂ becomes more readily available.



BENEFIT

from a powerful digital platform



Through our myPlant Performance digital solution, INNIO provides digital remote support for our connected customer-operated systems across the globe. Today, more than 12,000 engines are managed remotely, with more than 1.2 trillion data points evaluated annually—a powerful proof-point of INNIO's knowledge and experience.

Fulfill emission requirements

Our engine and fleet emission monitoring solutions help you more easily comply with emissions requirements—until you can operate your plant with 100% H₂ and become carbon-free.

Improve business planning

Increase your power system's lifespan by taking advantage of self-learning algorithms that analyze component condition and calculate parts lifetime.

Optimize engine management

Real-time engine monitoring and operations provide you with remote access to your assets via desktop or app, whenever you need it, by aligning operational practice with maintenance requirements.

Achieve greater availability

With the ability to solve more than 60% of logged cases remotely, you can reduce the need for travel to your site—saving time and money.

Rely on INNIO's engagement to sustainability

For INNIO, ethics and compliance, along with a sustainable way of conducting business, are front and center of everything we do. By selecting INNIO as your supplier, you enter a long-term relationship with a dependable collaborator. Our fundamental mission to accelerate the world's transition to net zero was recognized with the prestigious EcoVadis ratings. Also in 2021, INNIO joined the "Race to Zero" campaign, initiated by the United Nations, to bring together global leadership for a healthy transition to a net-zero future. Thanks to our efforts in 2021, INNIO's ESG Risk Rating places us number one out of more than 500 worldwide companies in the machinery industry assessed by Sustainalytics.*

*Rating took place in February 2022

INTERESTED?

INNIO is among the world's technological leaders in energy solutions and services for data centers.

Let us develop a powerful energy concept for your company.

Reach out today by completing the contact form online:
innio.com/contact

Our Sales team will get back to you.



INNIO is a leading energy solution and service provider that empowers industries and communities to make sustainable energy work today. With our product brands Jenbacher and Waukesha and our digital platform myPlant, INNIO offers innovative solutions for the power generation and compression segments that help industries and communities generate and manage energy sustainably while navigating the fast-changing landscape of traditional and green energy sources. We are individual in scope, but global in scale. With our flexible, scalable, and resilient energy solutions and services, we are enabling our customers to manage the energy transition along the energy value chain wherever they are in their transition journey.

INNIO is headquartered in Jenbach (Austria), with other primary operations in Waukesha (Wisconsin, U.S.) and Welland (Ontario, Canada). A team of more than 4,000 experts provides life-cycle support to the more than 55,000 delivered engines globally through a service network in more than 100 countries.

INNIO's ESG Risk Rating places it number one of more than 500 worldwide companies in the machinery industry assessed by Sustainalytics.

For more information, visit INNIO's website at www.innio.com

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ENERGY SOLUTIONS.
EVERYWHERE, EVERY TIME.

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