JENBACHER

ENHANCING PERFORMANCE

Services that matter



GET THE MOST

Out of your plant’s operations

Your Jenbacher equipment helps you operate effectively in a fast-changing energy landscape, highly influenced by the ongoing energy transition. Ambitious efficiency and climate goals require you to generate and manage energy sustainably, while at the same time maintaining your plant’s profitability.

Latest technology updates

With the extensive range of INNIO Group’s service products, continuous adjustment can bring excellent economic results. Still, you must have the confidence that your systems can be updated to the latest technology when needed. That’s why you need to be fully supported throughout your investment’s lifetime, receiving advice at every step of the decision-making process.

Your strategic partner

As the Jenbacher system’s original equipment manufacturer (OEM), INNIO Group is your strategic partner with unique insights into your needs, and we can lead you through the process of keeping your equipment up to date. We offer smart solutions for your sustainable system development backed by our ability to manage every aspect of your upgrade projects.

Our experience, your success

Based on decades of experience empowering industries and communities to make sustainable energy work today and in the future, INNIO Group continuously invests in our technology. Building on your constant feedback, we offer a broad range of upgrade packages for your Jenbacher products — from greater efficiency and power output, to lifetime extension, to emission reduction. We even offer hydrogen convertibility.



SUPPORTING UPGRADES

That matter

As the experts who developed your Jenbacher systems, we know best which upgrade steps will drive your business forward. We work with you proactively to continuously improve your power generation plant.

Modeling your future operations

Before our upgrade products are released, they are subject to strict in-house validation and field testing — all supported by digital modeling technology. We can match components, parameters, and component tolerances to help ensure all elements work together smoothly for optimum performance of your power system.

A customized solution

We meet your individual needs by selecting the ideal option for your system from our comprehensive portfolio of upgrade packages. We precisely match our upgrade solution to your installation requirements.

A well-defined process

Prior to performing any service, we carefully check all of the values we agreed on together to ensure that our upgrade solution fits your plant setup as well as your current and future engine performance requirements.

Top quality

For the development of our upgrade packages, we follow our certified New Product Introduction process based on uncompromised quality standards and our extensive system experience and fleet operability knowledge. Today, more than 25,000 Jenbacher engines have been produced globally.

YOUR OEM UPGRADE ADVANTAGES

Increased system performance

You'll get the latest engine technology.

Comprehensive upgrade portfolio

We cover all your needs, from greater efficiency to emissions control.

Covered by INNIO Group warranty

All our upgrades are covered by our INNIO Group warranty terms.

In-house testing and validation

Our upgrades are developed, tested, and validated in our factory, where they are matched to the DNA of our engines.

After-sales support

Trained on our upgrades, our INNIO Group's technicians provide certified support during your engine's entire life cycle.

Fast return on investment

On average, our upgrade products are developed to meet a customer return on investment within 2-3 years (pending on application).



Proven success

— With delivery of about 1,000 upgrades annually over the past 10+ years

POWERFUL BENEFITS

Jenbacher upgrade packages make a difference

Increase efficiency

Lower your life-cycle costs through higher engine efficiency, which means reduced fuel consumption.

Increase power

Obtain a boost in nominal power output over the life of your unit with a power output increase upgrade package.

Reduce emissions

As regulations around the globe become more stringent, you'll meet your emissions requirements with our continuously enhanced, tailored emissions control systems and analytics upgrades. Our technical experts can help you select just the right exhaust gas treatment system, catalyst solutions, and emissions performance monitoring packages for your plant.

Extend lifetime

Boost your engine's lifetime by several additional years (up to five years for peaking applications) with our lifetime extension upgrades.

Gain better control of your plant

Get significantly improved options for plant management directly on the engine or via remote monitoring. Additionally, you can opt for the latest features available from myPlant Performance — our tailored digital remote support platform.

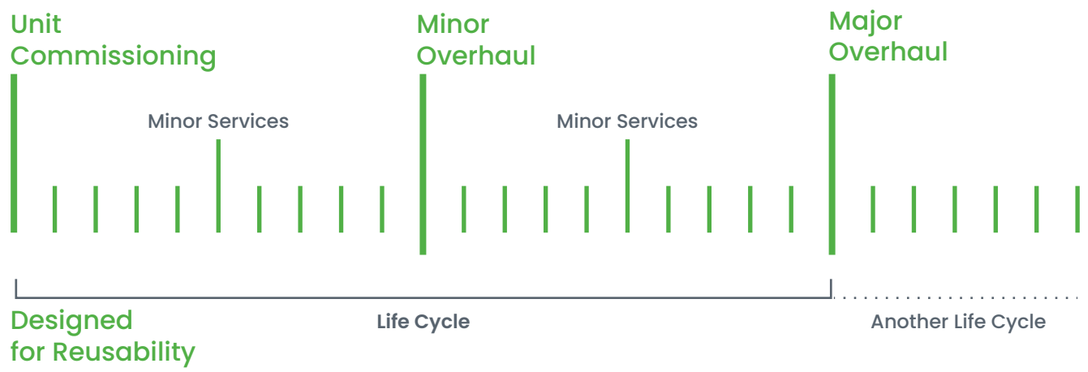
Receive future-oriented investment security

Our options for the use of CO_2-neutral fuels (e.g., all new Jenbacher engines are "Ready for H_2")[1] support future-oriented investment security for your plant operation.

[1] In general, "Ready for H_2" Jenbacher units can be converted to operate on up to 100% hydrogen in the future. Details on the cost and timeline for a conversion may vary and should be clarified individually.

PERFECT TIMING

Our upgrade packages can be installed and offered at any time to match your requirements. Together with your INNIO Group point of contact, we define convenient installation timing.



Other services to consider over the life cycle of an engine

Over the life cycle of an engine, our customized service agreements give you more predictable life-cycle costs.

Proven success

— More than 80% of our overhauls include technology upgrades.

ECONOMICALLY SMART

Investing in the latest Jenbacher technology upgrades pays off

Not only do our upgrade solutions help you gain economically, but they also benefit the environment. Upgrades can be applied at reasonable cost with a substantial return on investment (ROI) within a short period of time. Customers with high electrical power demand realize benefits the fastest. Here is an example based on a real business case made with data from one of our customers and a few basic assumptions.

Significant saving potential when upgrading to the 3F version with biogas

Biogas prices can fluctuate heavily. In some cases where biogas is a by-product, it may even be free. In Germany, for example, the cost for energy corn crops is €0.07–0.10 per kWh (as of October 2022) — and that may increase. In the calculation below, we assume €0.10 per kWh.

Engine type	J320 F25 (Biogas)
Electrical output	1,067 kW
Fuel price	€0.10/kWh
Annual operating hours	5,000 ophs

Engine type	J320 D25	J320 F25
Electrical output	1,067 kW	1,067 kW
Electrical efficiency	40.7%	42.0%
Difference		1.3% pt.
Energy input (gas input)	2,622 kWh	2,540 kWh
Energy savings per hour (gas input)		81 kWh
Gas price (assumption)	€100/MWh	€100/MWh
Gas price	€0.1/kWh	€0.1/kWh
Gas cost savings per hour	€0/kWh	€8.11/kWh
Operating hours per year	5,000 hrs/year	5,000 hrs/year
Gas cost savings per engine per year	€0/year	€40,573/year



THE DIFFERENCE

A Jenbacher upgrade package makes

For more than 20 years, church foundation Dominikus-Ringeisen-Werk (DRW) has been operating three Jenbacher Type 3 combined heat and power (CHP) units at its largest location in Bavaria. In 2013, after the first 60,000 hours of operation, DRW upgraded from version B to version C. Another 60,000 operating hours later, the foundation again opted to upgrade to the latest technology in 2021/22 as part of a major overhaul.

3F major overhaul and upgrade customer benefits

- **Greater efficiency**
  Up to 2 percentage points improvement in fuel usage
- **Lower emissions**
  Smaller environmental footprint through compliance support with THC emissions regulations
- **Reduced oil costs**
  Life-cycle cost reduction due to less consumption and longer lube oil lifetime
- **Convenient upgrade**
  During major overhaul of the installed engines on site
- **Greater runtime**
  Maintenance interval extension to 80,000 operating hours before next major overhaul

KEY TECHNICAL DATA

Installed engines (Upgrade: 2013 - 3C version, 2021/22 - 3F version)	3 x J312 (F)
Electrical output	1.6 MW
Thermal output	2 MW
Energy source	Pipeline gas
Commissioning (3B version)	1999/2000

»Our past experience of Jenbacher upgrades was so positive that it was an easy decision for us to upgrade to the next generation of the Type 3F. Thanks to the improved fuel usage of the modern 3F generation engine, we have been able to both increase our profitability and reduce our environmental footprint.«

Thomas Roth
Head of Power and Engineering of Dominikus-Ringeisen-Werk (DRW, church foundation under public law)



Upgrade video:
Scan the QR code for more information on the engine version upgrade at DRW.

3F product video:
Scan the QR code to find out more about the customer benefits of the Jenbacher next-generation 3F engine platform.

HANSEWERK NATUR

Conversion to hydrogen in Hamburg

A joint flagship project by HanseWerk Natur and INNIO Group was the first combined heat and power (CHP) plant in the 1 MW range converted in the field and capable of operating with either 100% pipeline gas or variable hydrogen-pipeline gas mixtures up to 100% H_2.

H_2 conversion customer benefits

- **Climate neutral**
  energy solution with low emissions
- **High total efficiency**
  at around 93%
- **Highly flexible operation**
  with different fuels
- **Reliable decentralized energy supply**
  at the point of use
- **Renewable support**
  to balance seasonal wind and solar power

»We have demonstrated that our Jenbacher combined heat and power plant from INNIO Group can operate reliably with 100% hydrogen.«

Dr. Nikolaus Meyer,
Managing Director of Hansewerk Natur GmbH

KEY TECHNICAL DATA

	Pipeline gas (2019 design)	20% (vol.) H_2 admixing (after conversion)	100% H_2 operation (after conversion)
Electrical output	999 kW	999 kW	> 600 kW
Electrical efficiency	42%	~ 42%	~ 40%
Total efficiency	93.5%	~ 93.5%	~ 93%
CO_2 emissions	216 g/kWh$_{el}$	201 g/kWh$_{el}$ (-7%)	0 g/kWh$_{el}$ (-100%)

First hydrogen conversion video:
Scan the QR code for more information about the hydrogen conversion.



JENBACHER SERVICES SOLUTIONS

Our global Jenbacher Services team knows your Jenbacher energy system best. As your OEM, INNIO Group provides you with a full suite of life-cycle solutions — from original parts to reliable remote and on-site services — all enabled by our cutting-edge myPlant technology.



Your Jenbacher Services team

TOTAL SUPPORT FROM INNIO GROUP

Delivering flexibility and experience

Drawing on more than 65 years of power innovation, INNIO Group's Jenbacher technology provides hydrogen-ready power generation to businesses and industries striving for a greener future. Today's highly efficient Jenbacher systems deliver energy independence through low-emission, secure, and cost-effective energy solutions.

With key benefits from our powerful digital platform

Through our myPlant Performance digital platform, we provide remote support for our connected customer-operated systems around the globe. Today, more than 12,000 Jenbacher systems are managed remotely, and more than 1,200 billion data points are evaluated annually – a powerful proof-point of INNIO Group's knowledge and experience.

Backed by our commitment to sustainability

At INNIO Group, we commit to the highest ethical standards and implement best practices in governance and compliance. A sustainable way of conducting business is front and center of everything we do. By selecting us as your supplier, you enter a long-term relationship with a reliable partner. Our fundamental mission to deliver a sustainable future and empower the world's transition to net zero was recognized with prestigious EcoVadis ratings. In 2021, we joined the "Race to Zero" campaign, initiated by the United Nations, to bring together global leadership for an accelerated transition to a net-zero future. Thanks to our efforts, INNIO Group's ESG Risk Rating again secures our number one position across more than 500 companies globally in the machinery industry assessed by Sustainalytics.[2]

[2] Ratings took place in March 2023.

HOW WILL YOU BENEFIT?

Contact a consultant from Jenbacher Services to learn more.

Work with us and take advantage of the most recent technological advances for your Jenbacher systems.

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



About INNIO Group

JENBACHER

INNIO Group is a leading energy solution and service provider that empowers industries and communities to make sustainable energy work today. With its product brands Jenbacher and Waukesha and its 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. INNIO is individual in scope, but global in scale. With its flexible, scalable, and resilient energy solutions and services, INNIO enables its 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 INNIO's more than 55,000 delivered engines globally through a service network in more than 100 countries.

In March 2023, INNIO's ESG rating ranked first out of more than 500 companies worldwide in the machinery industry assessed by Sustainalytics.

For more information, visit the INNIO website at **innio.com**, the Jenbacher website at **jenbacher.com** or the Jenbacher Services website at **jenbacher.com/en/services.**

Follow INNIO Group and its brands on 𝕏 (formerly known as Twitter) and in.

ready for H_2

ENERGY SOLUTIONS.
EVERYWHERE, EVERY TIME.

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PLATINUM Top 1% 2023 ecovadis Sustainability Rating

SUSTAINALYTICS 2023 ESG INDUSTRY TOP RATED

Jenbacher is part of the INNIO Group

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