Moving energy forward

NEAR-ZERO WATER CONSUMPTION FOR DATA CENTER POWER GENERATION

On-site power for data centers:

INNIO's Jenbacher gas engine generators provide reliable and flexible power generation for data center applications.

Near-zero water consumption:

Closed-loop engine cooling combined with dry-cooled heat rejection minimizes freshwater consumption* to near-zero levels.

Modular and scalable:

Engine-based power generation supports phased capacity expansion as data center campuses grow.

Decarbonization pathway:

"Ready for H_2" solutions support the transition toward hydrogen operation and reductions in CO_2 emissions.



Industry challenge

Data centers are expanding rapidly, while access to grid capacity and water is becoming more constrained in many regions.

Industry solutions

Reciprocating gas engine generators can address this challenge through closed-loop engine cooling, flexible heat-rejection options and heat-recovery solutions.

Why water matters to project developers

Siting

Enables projects in locations with limited freshwater availability

Permitting

Supports clear, quantifiable water-use reporting for authorities

Resilience

Reduces exposure to water supply constraints and disruptions

Scalability

Enables phased capacity expansion with minimal additional cooling-water demand

Closed-loop gas engine cooling recirculates coolant

Coolant is continuously circulated through the engine and heat exchangers and is reused within the closed system. INNIO's gas engine solutions help minimize water consumption without compromising performance.

* **Initial fill:** coolant held and recirculated inside the equipment. This is a one-time inventory, not continuous consumption.
Small volumes may be required for condition-based maintenance or auxiliary systems. With dry-cooled heat rejection, there is no continuous evaporative water consumption during normal operation.

FOLLOW THE WATER

Where water circulates, where it is consumed and how to minimize it

Closed-loop circulation (engine cooling)

Coolant circulates continuously through the engine and heat exchangers and stays inside the closed system.

→ High circulation flow does not mean high freshwater consumption.

Heat rejection

Heat is transferred from the engine cooling system to the final heat-rejection system. Types of heat rejection:

Wet cooling (applicable in special cases): water is consumed through evaporation and blowdown.

Dry cooling: heat goes to ambient air, with no evaporative consumption in normal operation.

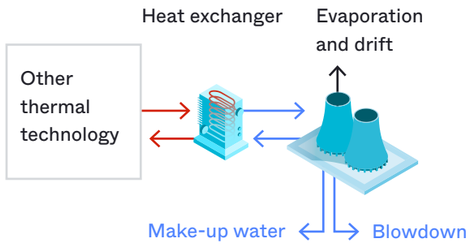
Other auxiliary water uses

Small volumes of water needed for maintenance, sampling and water treatment.

Key takeaway

With **dry cooling heat rejection**, freshwater demand is limited to the initial fill, condition-based service and auxiliary systems. There is no continuous evaporative cooling.

How conventional thermal power plants operate



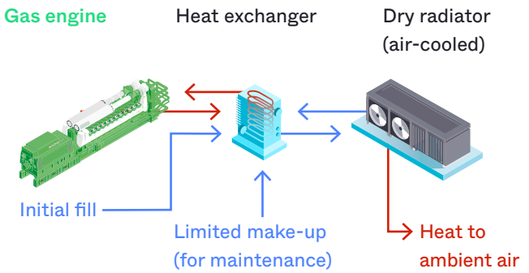
Water is consumed through evaporation, drift, blowdown and water treatment.

Reference thermal power plants' water consumption

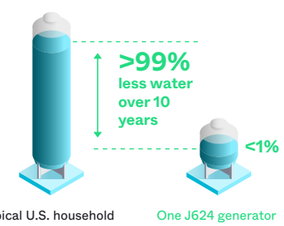
~700* liters/MWh (consumption)

Generic gas generation (modeling assumption). Actual values vary by technology configuration and operating conditions

Dry-cooled configuration with INNIO Group's Jenbacher technology



<0.1** liters/MWh



→ Over 10 years, one gas generator (J624) under our model would use less than 1% of the water used by a typical U.S. household***

Overall facility water performance depends on the complete cooling and balance-of-plant design.

Source context:

*BloombergNEF, Thirst for Power: Water Stress in Electricity Generation, Sept. 8, 2026, Table 3, Appendix A

Other sources indicate some specific cases with water consumption at around 200 liters/MWh or less

**Based on INNIO internal sources (model-based assumption), at 8,000 oph/year with water service intervals every 20,000 oph

***Illustrative comparison based on internal calculations and publicly available US houshold water-use data

OPTIMIZING ENERGY AND WATER TOGETHER

One low-water cooling approach — several ways to get more from the same fuel

The water-performance objective and the energy-efficiency objective should be considered together.
A dry-cooled configuration can minimize cooling-related consumptive water use.
On top of this, heat recovery and trigeneration can increase the amount of useful energy obtained from the same fuel input.

Energy dimension

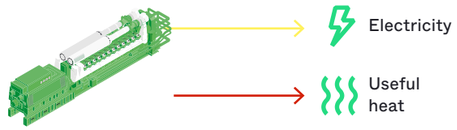
The same low-water cooling philosophy can be maintained while different levels of energy integration are added.

Power only



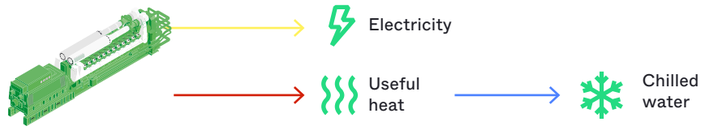
Reliable onsite electricity.

CHP (Combined Heat and Power)



Recovered heat increases total fuel utilization.

CCHP / Trigeneration



Recovered heat can also be converted into useful cooling.

WUE — Water usage effectiveness

WUE is a whole-data-center metric.
It measures how efficiently water is used at facility level.

Annual data-center water use [L] / Annual IT equipment energy [kWh]

PUE — Power usage effectiveness

PUE measures the energy efficiency of a data center.

Total facility energy [kWh] / IT equipment energy [kWh]

Source: Uptime Institute, Digital Infrastructure Sustainability Glossary.

WUE + PUE

PUE and WUE are complementary site-level metrics.

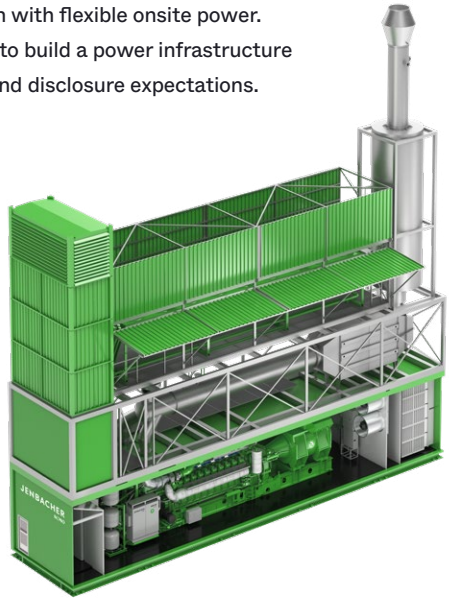
One cooling philosophy. Multiple ways to use the energy more efficiently.

INNIO's Jenbacher solutions can support improved PUE through energy integration while helping minimize cooling-related water use, supporting lower WUE at facility level.

For a business case on PUE optimization for datacenters with trigeneration, scan the QR code:

Modular and integrated power generation solutions

INNIO offers Jenbacher modular generation solutions that combine dry-cooled heat rejection with flexible onsite power. By minimizing routine operational cooling-water demand, they enable data center operators to build a power infrastructure that is more resilient to local water constraints and better prepared for evolving permitting and disclosure expectations.



By combining closed-loop cooling with reliable, flexible onsite power, data centers can maintain high performance while minimizing water use.

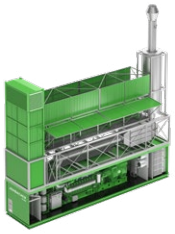
INNIO's modular Jenbacher containerized Type 6 solutions are designed to meet these requirements, combining high power density, rapid installation, and flexible operation in a compact, plug-and-play format.
As closed-loop cooling systems increase the importance for reliable, continuous power for both IT load and thermal management, Jenbacher Type 6 engine technology can provide a long-term power solution rather than serving only as a temporary bridge during grid interconnection delays. More broadly, Jenbacher engines are suited for prime, bridge-to-grid, and backup applications.
Their modular container concept enables phased capacity expansion in line with campus growth, while fast-start capability and strong transient performance help maintain operational continuity under dynamic load conditions.

For operators seeking the most suitable solution for high-availability data center environments, the Jenbacher Type 6 fast-start gas generator in a container offers an attractive combination of speed to power, commercial flexibility, and dependable performance in one integrated package.

In addition, its fuel-flexible design creates a natural bridge to further decarbonization, with "Ready for H_2" options that can support hydrogen admixing and, depending on configuration and application, operation with up to 100% (vol) hydrogen.

Built as natural gas asset

Natural gas →



Standard natural gas product with <5% (vol) of H_2 content

Built as a "Ready for H_2" asset

Natural gas →

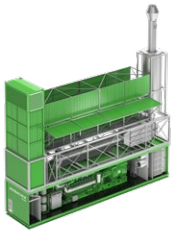


Natural gas with up to 25% (vol) of H_2 content
Pipeline gas can have up to 25% (vol) of hydrogen content

Step 1: Reduce in CO_2 emissions

Switched to a hydrogen asset

Natural gas (optional) →
Hydrogen →



Hydrogen fuel (natural gas optional)
When hydrogen becomes available

Step 2: Eliminate CO_2 emissions: Potential for near zero CO_2 when fueled with certified green hydrogen, as hydrogen infrastructure becomes available.

Illustration: Decarbonization pathway with Jenbacher technology, enabling cleaner and greener operations © INNIO Group

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 future conversion may vary and need to be clarified individually.

This communication draws on publicly available third-party publications and related statements. Any views expressed are those of the relevant third parties, not INNIO, and INNIO's own views may differ. INNIO makes no representation as to the completeness or ongoing accuracy of third-party information.

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