



Technical Innovations

R&D Excellence: Structured Processes, Agile Execution

- **Agile method** of working
- Company-wide use of **standardized software tools**
- A **defined development process** with **adaptable project structures**
- **Cooperation with Universities** locally and worldwide
- **Long-standing supplier partnerships** with strong ties to 2G for common development
- **Joint development projects**

R&D Manufacturing Area

Software Development (Product and System)

Heatpump-, Engine- and 2G Module Design | CFD Simulation

Containerdesign

R&D Testbenches |
Electrical hardware design



Market Needs drive our Innovation Agenda



Reliable energy

Decentralised power and heat supply, grid support and island operation for Data Centers and critical infrastructure.



Rapid deployment

Quickly available generation capacity, modular installations and rental solutions for urgent or temporary demand.



Decarbonisation

Electrification of heat, efficient combined heat and power, and solutions using biogas and hydrogen.



Engineering Priorities

- **Expanding market access**
Develop products for additional applications and power requirements
- **Owning critical technologies**
Build expertise in the technologies that determine system performance
- **Engineering for industrial scale**
Simplify production, installation and service through product design
- **Improving customer economics**
Multi-gas usage
Improve efficiency, availability and lifetime operating cost, also for non-2G products

**Our ambition is to deliver market-leading customer value with every 2G product.
We measure this by total cost of ownership (TCO).**

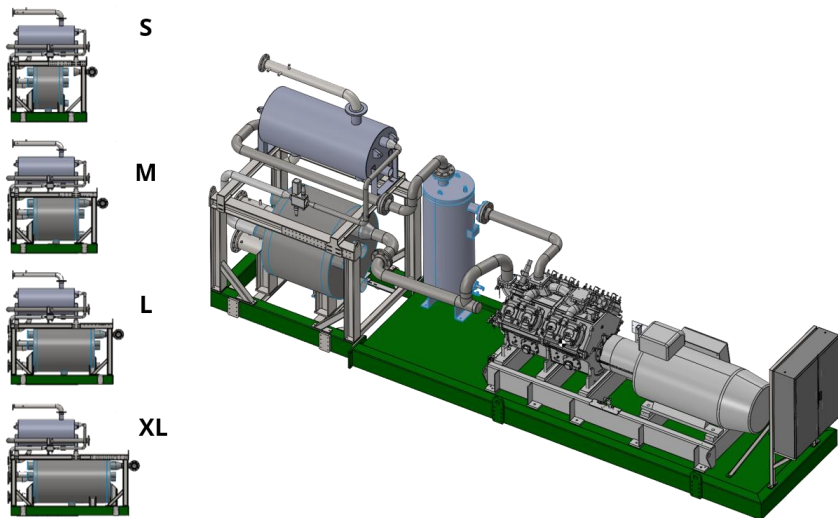
Heat Pump Scaling

Number of machines: 34

Number of series: 5
(2024: 3)

Power Range:
75-3500 kW

Temperature: up to 100 °C
(2024: up to 90 °C)



Modular design for manufacturing

- Reusable modules with defined interface
- Simpler assembly
- Easier access for maintenance

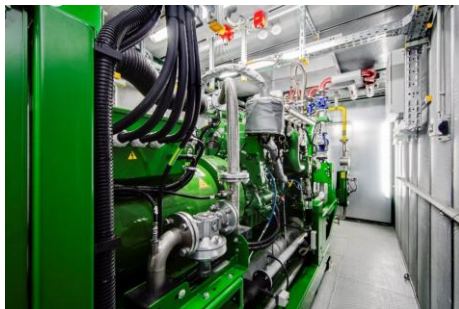
AI-assisted sizing development

- Engineering input of heat source, temperature levels and customer load profile
- Faster evaluation of system configurations

Container Solutions



**All Equipment mounted in
or on the container**



**Standards in
connection points**

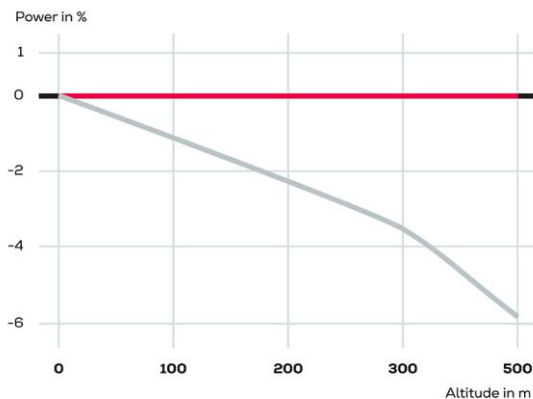
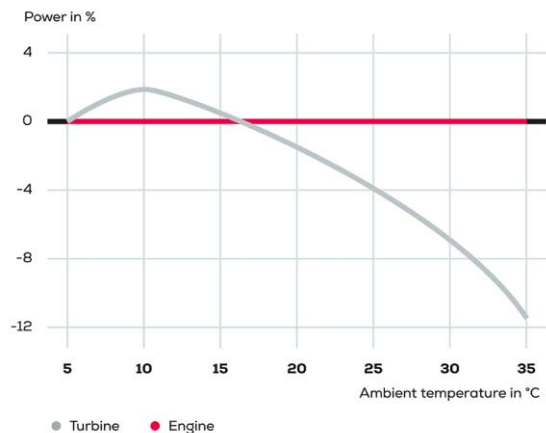


avus 1000plus triple stacked
Power Density: $19\text{m}^2/\text{MW}$
3 x 15 MW

**We turn standardized components into
an integrated customer solution**

Hot-weather Performance Depends on the Cooling Concept

High-temperature engine cooling avoids evaporative water.



The engine remains robust at high ambient temperatures.
A turbine needs water to compensate its hot-weather penalty.

Engine Genset | CHP

High-temperature cooling loop
Dry radiator · no evaporative water

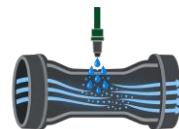


Gas Turbine

≈ -12% power at 35°C
without inlet cooling

Water Injection

Power and efficiency restored
Up to ≈ 80–85% recovery*

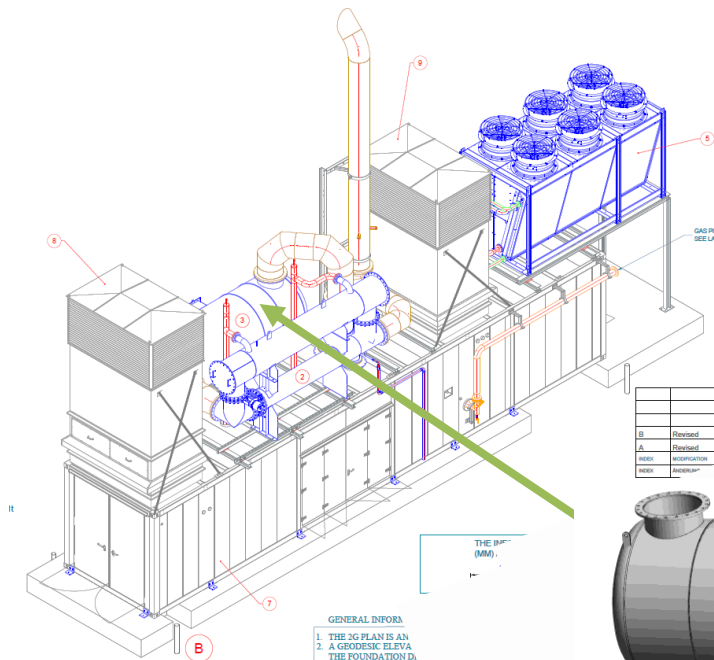


Technology Ownership – Emissions

OnBoard SCR Catalyst

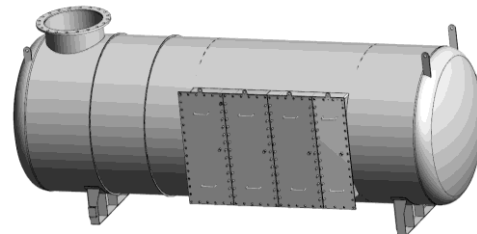


**Technology ownership
strengthens
our ability to optimize the system**



2G PSCR-System

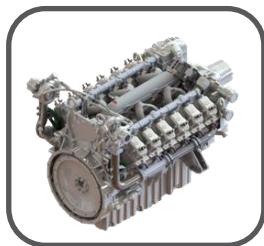
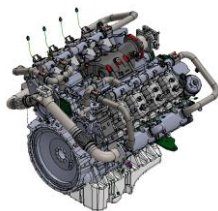
- Compact/ OnBoard-Design
- Low maintenance design
- Very low NOx emissions
- Fully integrated into control system



Gas-to-power Products

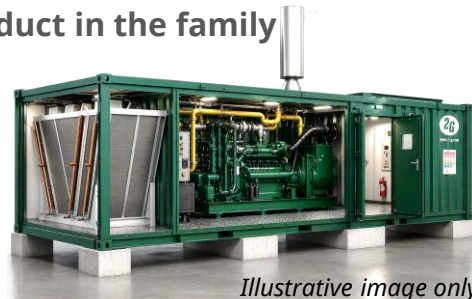
Existing product in the family

DR aura 412
up to 620 kW (ESP | 60 Hz)

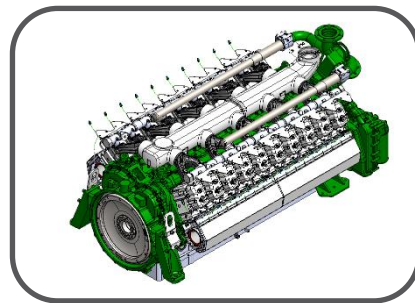
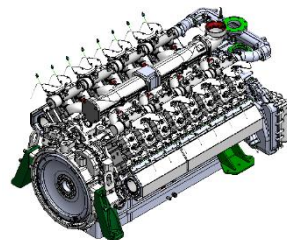


Upcoming product in the family

DR aura 420
>1.000 kW (ESP | 60 Hz)
Start of Sales Feb. 2027



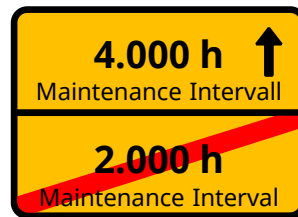
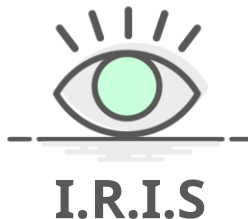
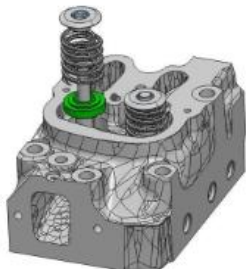
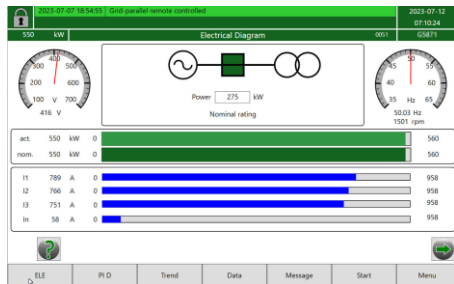
Illustrative image only



Engine family based on common parts

I.R.I.S. Integration in all 2G Systems

Own control system and software



- IRIS integration of all 2G products
- Implemented deep in the service and company processes
- More than 400 Mio. sensor values in real time



Future Gases

Technology roadmap

A path from today's fossil gas-based systems to hydrogen- and ammonia-capable solutions



**Natural
Gas (LNG)**



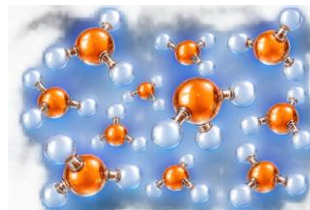
Biogas



**Propan
(LPG)**



Hydrogen



Ammonia

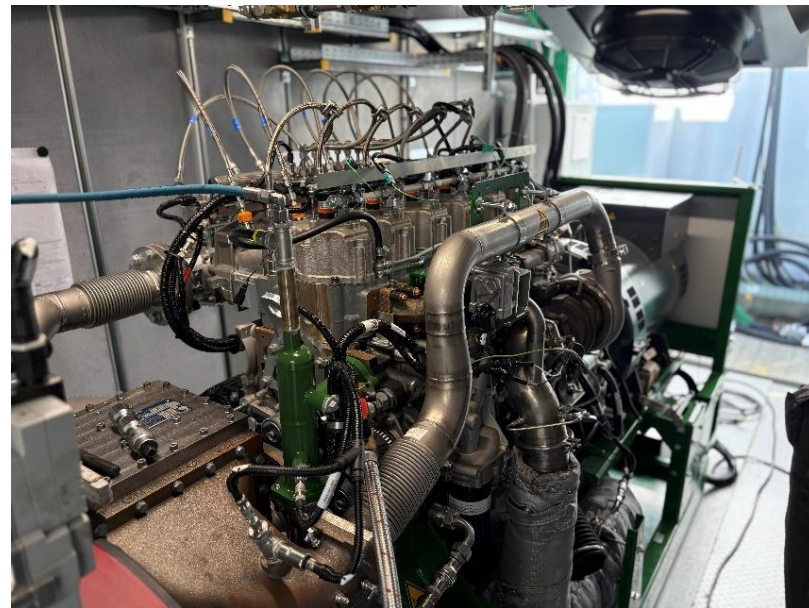
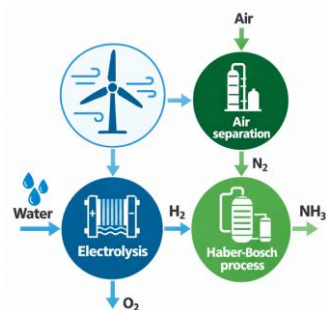
100% H₂ Engines: Part of the Path to a CO₂-Free Future

- 100% H₂ engines with an output of up to 750 kW
- More than 50 H₂ CHP units (100% hydrogen) in operation worldwide
- Retrofit skid available for converting from natural gas to 100% H₂
- Dynamic fuel blending capability
- Blending of up to 40 vol% H₂ possible without modification

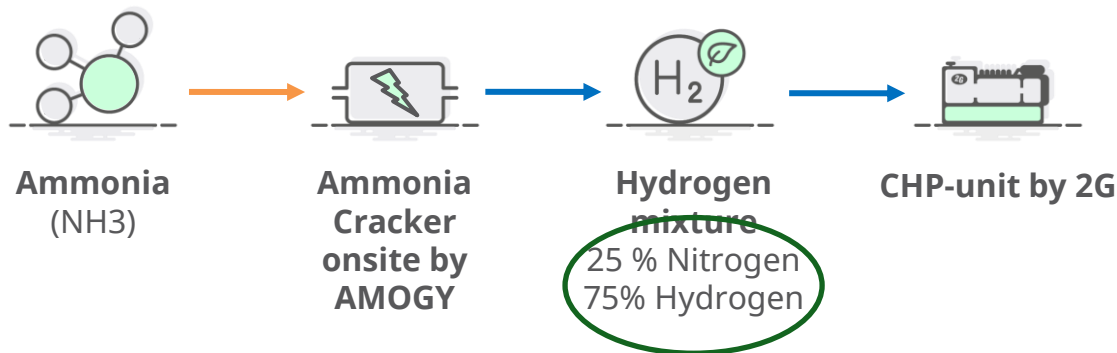


Campfire Ammonia Engine

- Volumetric energy density: $\text{NH}_3(\text{l}) > \text{LH}_2 \gg \text{H}_2$ at 350 bar
- Energy demand H_2 at 350 bar and $\text{NH}_3(\text{l})$ equal, LH_2 4 – 5 times higher
- 150 million metric tons of annual production
- Basic chemical for fertilizers
- Haber-Bosch



Hydrogen – Cooperation



→ More cost-effective concept → step towards decarbonization

Hydrogen Technology

Availability of hydrogen at the 2G company site



Wasserstoff Entwicklungs GmbH & Co. KG has nearly completed the first regional connection to the hydrogen core network. Solutions for supply, distribution, and sales are being developed.

Source: Wasserstoff Entwicklungs GmbH & Co. KG



Key Takeaways

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**Thank you very much
for your attention**