

GREEN THERMAL ENERGY 24/7 FOR A DECARBONIZED CHEMICALS & PHARMA INDUSTRY

Thermal energy (heating and cooling) represents a significant and hard-to-decarbonize share of energy consumption in the chemicals and pharmaceutical industry. Achieving cost parity with fossil fuels is challenging but possible.

Production patterns are often cyclical: batch runs, seasonal peaks, and shift-based schedules create sharp, time-dependent thermal loads. To meet them, plants are forced to run gas boilers and CHP units continuously or cycle them frequently, driving high fuel costs, increased maintenance, and rising CO₂ emissions.

Magaldi offers a safer, cleaner alternative. Our MGTES (Magaldi Green Thermal Energy Storage) – the world's first fluidized sand thermal battery – represents a scalable solution to replace fossil fuel-based heat with dispatchable, renewable-derived thermal energy, available 24/7 and without direct emissions.

Charged with renewable electricity during low-cost, high-availability hours, **MGTES** releases stable heat with fast ramping capability to match batch starts, CIP cycles, or peak steam demand - fully compatible with chemicals & pharma applications.

BUSINESS CASE IN GERMANY KEY TAKEAWAY



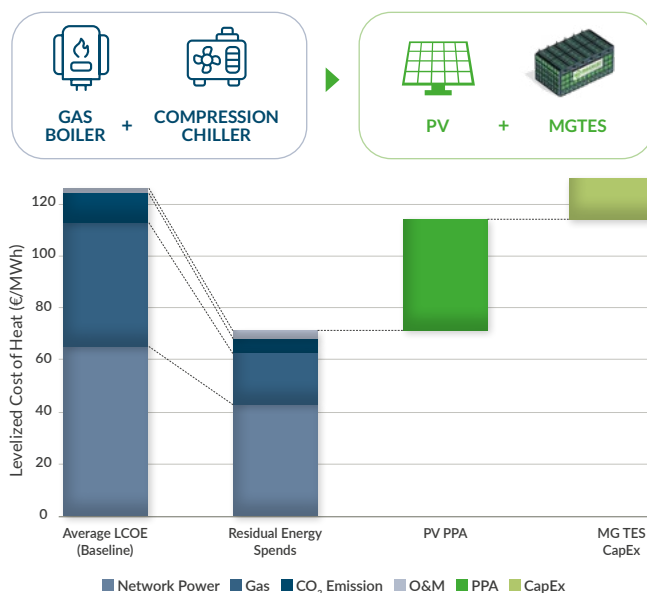
German market ideal for small scale deployments not relying on national grid.

Highly competitive heat supply with co-investment in renewable technologies:

- > Long term investment in PV array
- > Long term investment in MGTES Technology
- > Currently supported by European & local programs

Risk mitigation from the energy market price (crisis scenario).

COST TRANSFORMATION



Replacement of the existing gas boiler.

The CAPEX values shown refer to illustrative scenarios for projects located within Central Europe and include reductions from applicable incentives and subsidies. These simulations are intended for illustrative purposes only and do not represent a binding offer. Technical and commercial conditions may be subject to change and must be verified on a case-by-case basis.

ACCESS TO DECARBONIZATION INCENTIVES



- European Heat Auction: up to 20-25 €/MWh for first 5 years.
- EIB decarbonisation loans: highly favourable interest rates.
- BMW: Announced competitive auctions for mid-2026 to support industrial decarbonization.

BENEFITS AT A GLANCE

DECARBONIZATION & COMPLIANCE



- Replace fossil-fired steam with renewable-derived thermal energy.
- Cut Scope 1 & 2 emissions to near-zero when powered by green electricity.
- Meet tightening regulatory requirements.

COST SAVINGS & OPERATIONAL FLEXIBILITY



- Energy cost arbitrage: charge during low-price periods, discharge at peak hours.
- Shield operations from volatile gas prices and carbon taxes.
- Pair with on-site PV or wind, maximizing selfconsumption and reducing grid withdrawal.
- Additional revenues by providing grid services (demand response, peak shaving, frequency regulation).

PROCESS RELIABILITY & PRODUCT QUALITY



- Stable steam pressure and temperature for critical processes, reducing thermal variability that can affect product quality.
- Inert materials, ensuring a contamination-free process, without fire risk or hazardous chemicals.
- Continuous steam supply even during renewable fluctuations, ensuring uninterrupted production and foodsafety cycles.
- Scalable autonomy of up to 20 hours based on the installed capacity and state of charge (SoC).

DURABILITY, RESPONSIVENESS & MODULARITY



- +30 years design lifetime with no performance degradation under typical operating conditions.
- High cycling capability, with fast and flexible ramping thanks to simultaneous charge/discharge.
- Scalable modules from 5 to >100 MWh thermal capacity, matching site-specific loads.
- Drop-in solution for both greenfield and retrofit installations with no costly changes to existing processes.

