

Who doesn't like Nutella?

Commercialization of the Decarbonization of Industrial Heat



DRIVING
SUSTAINABLE
INNOVATION

MAGALDI GROUP

DEPENDABLE TECHNOLOGIES SINCE 1929

Innovation is our DNA

Magaldi leads the way in innovation with nearly a century of expertise in **tailored process and conveying solutions** for the most challenging industrial applications, and 12+ years in the renewable energy field with cutting-edge **CST technologies** and **Power-to-Heat (P2H) Thermal Energy Storage (TES)** based on solid particles fluidized bed (FB).



BULK MATERIAL
HANDLING DIVISION



POWER
DIVISION



ENERGY
STORAGE



AFTER-SALES

95+

YEARS

Innovation rooted in industrial excellence and guided by deep, technical knowledge gained over nearly a century of tackling highly demanding industrial applications.

5%

INVESTMENTS
IN R&D

of annual revenue invested in R&D to push the boundaries of sustainable industrial technology.

200+

EMPLOYEES
WORLDWIDE

> 50% Engineering graduates

60+

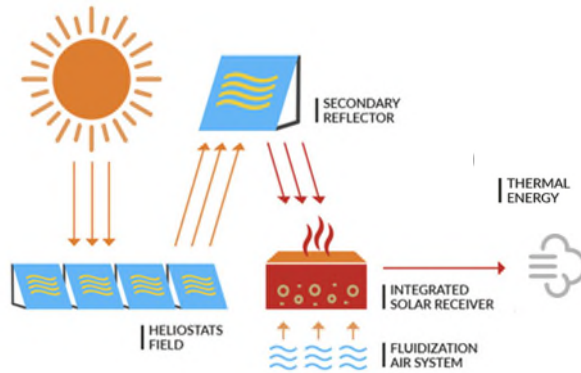
PATENT
FAMILIES

with approximately 400 applications filed worldwide. From conveyor systems to thermal energy storage solutions, we own and develop all our technologies in-house.

GREEN SOLUTIONS FOR HIGH-TEMPERATURE PROCESS HEAT

STEM®-CST & MGTES

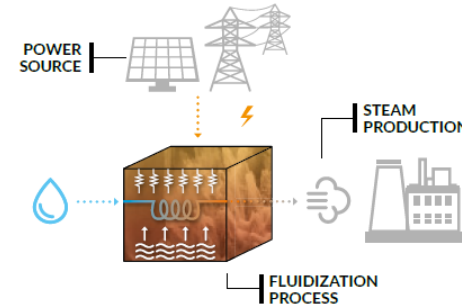
Magaldi STEM®-CST



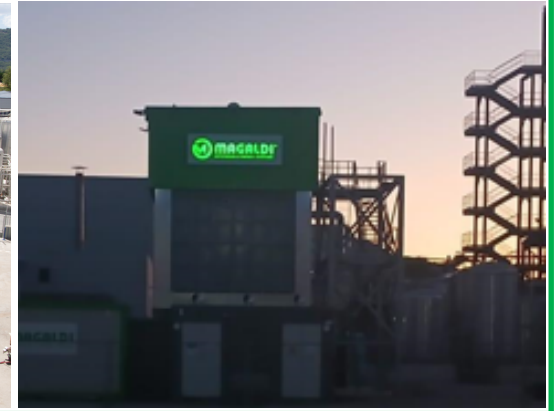
- Patented Concentrated Solar Thermal technology
- Key element: a **fluidized sand bed** charged by **direct solar radiation**.
- Deliver **Green Heat on demand**



Magaldi Green Thermal Energy Storage – MGTES



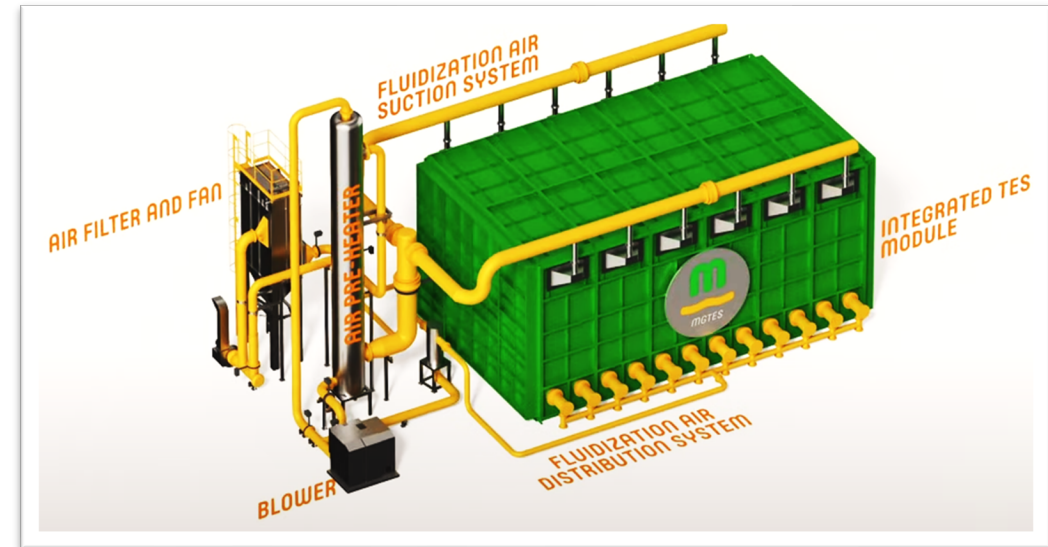
- Patented P2H technology with TES
- Key element: a **fluidized sand bed** charged by **renewable electricity**.
- Deliver **Green Heat on demand**



MGTES P2H – FLUIDIZED BED UNIT ASSEMBLY

MGTES fluidized bed enables:

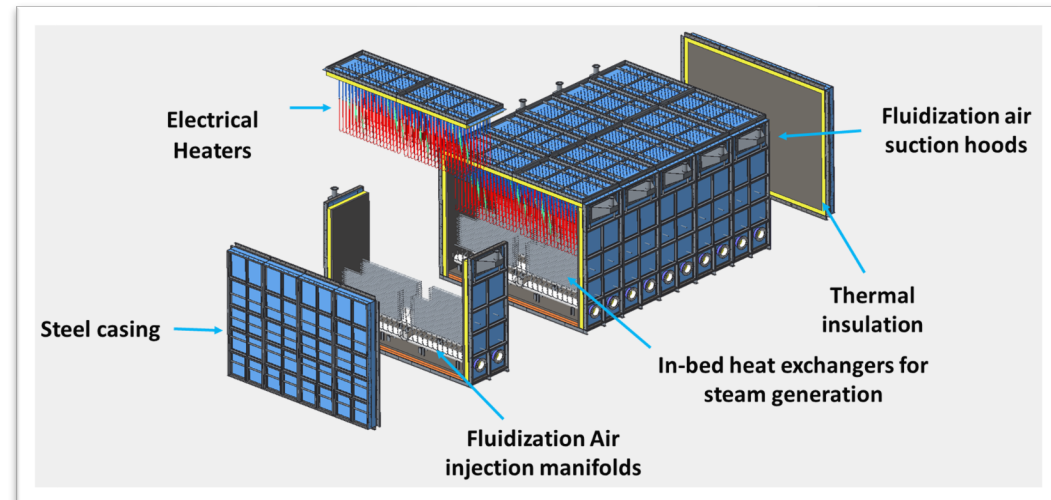
- **direct heating** (charge) of FB TES by **resistive heaters**;
- **direct release** of stored heat from the FB TES to the **in-bed heat exchangers** for steam generation, **on demand**.



Thus, **3** different **functions** are integrated **into one unit**:

- Electrical power charge;
- Thermal Energy Storage;
- Thermal power transfer to HTF (steam).

the materials used are mainly sand and steel



MGTES – INDUSTRIAL PLANT

Enel X and **Magaldi Group** joined forces to install a 7,5 MWh MGTES system (Beta X) for the continuous production of steam at a plant of **I.GI.**, a vegetable oil refinery, that supplies Ferrero Group, with headquarters in the Industrial Development Area of Buccino (Italy).



enel x



Heat the Change | Ceremonial Inauguration of Magaldi's First Commercial Thermal Energy Storage Plant

MGTES BETA-X INDUSTRIAL PLANT

PIONEERING CARBON-FREE HEAT ELECTRIFICATION



Technical Data

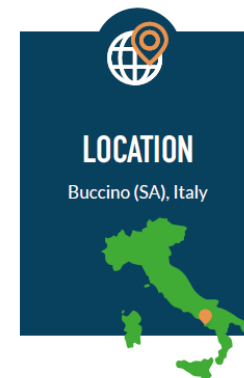
Technology	Fluidized sand bed
Storage Media	Silica sand
Operating Fluid Bed Temperature	up to 620 °C
Thermal Storage Capacity	~7,5 MWh
Charging Power (Nominal)	up to 1,9 MWe
Steam Generation (required)	up to 1,08 t/h @ 184° C, 10 barg
Steam Availability	24/7
Operational Cycle (Nominal)	1 cycle per day

ELECTRICAL CHARGE

Charged by electricity from the Magaldi factory's rooftop PV plant, integrated by grid power when electricity cost is low. This flexibility ensures green and cost-effective charging of the thermal battery.

STEAM GENERATION

Steam is used at I.GI refinery for refining processes such as heating, neutralization, decolorization and deodorization – essential steps in vegetable oil production – reducing fossil fuel consumption and cutting emissions.



Innovation and sustainability can transform the face of industry. Our collaboration with [Magaldi Group](#) marks a new milestone in the decarbonization of thermal processes. In Buccino, in the heart of Southern Italy, we have inaugurated our first Italian Thermal Energy Storage (TES) plant, applied to a company in the food sector. This technology, based on a sand-based thermal energy storage system capable of converting solar energy into high-temperature steam, represents a replicable model for various industrial sectors. A concrete step towards large-scale decarbonization, capable of increasing production efficiency and reducing dependence on fossil fuels. A result that confirms Italy's role as a pioneer at the international level and the Group's commitment to promoting innovative solutions for a sustainable and competitive energy future.

#EnelconItalia



MGTES – MODULES STANDARD DESIGN



UP TO 1 GWh
STORAGE IN LESS
THAN 1 HECTARE

Typical MGTES module size	140 tons sand 56 m ²	280 tons sand 97 m ²	560 tons sand 178 m ²	1120 tons sand 322 m ²
Charging power (MW)	3.9	7.8	15.7	31.4
Full charge duration (hrs)	4 to 6			
Energy storage capacity (MWh)*	13	30	60	120
Discharging power and duration (hrs)	Customized to user's specifications			
Round trip efficiency	> 90%			

*steam temperature 200°C

Different **module sizes** can be realized by using **standardized components** (e.g. electrical heaters, fluidization air manifold, in-bed HXs, steel casing panels etc.), for **easier scale-up** and **cost-effectiveness**.



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