



**FROM ITALY  
THE INNOVATION  
IS CIRCULAR**

A photograph of an industrial facility, likely a power plant or data center, with a dark grey facade. A prominent green horizontal stripe runs across the middle of the building. The CarboREM logo is mounted on the wall, with "Carbo" in white and "REM" in green. Various pipes and mechanical components are visible on the building's exterior.

**CarboREM**



## ▶ A COMPANY FOCUSED TO DEVELOP HYDROTHERMAL TECHNOLOGY

Carborem's mission is to design, build and operate state-of-the-art plants based on Hydro-Thermal Conversion (HTC) technology for the treatment of sewage sludge and organic waste, promoting circular resource recovery.

Founded in 2017 in Northern Italy, by a business manager and a pool of PhD engineers from the University of Trento. Since 2022, the company has been part of the Greenthesi Group and represents a strategic added value in the Group's commitment to the green economy.

### SIZE PLANTS

#### C-700



Agro-alimentary factory  
/ Small scale WWTP

#### C-2500



Medium scale WWTP /  
AD OFMSW

#### C-5000/C-10000



Large scale WWTP /  
AD OFMSW

# RECOVERY AND REUSE OF SEWAGE SLUDGE AND DIGESTATE

The CarboREM C-700 Plant installed in Mezzocorona (Trento - Italy), treats and converts sludge from Trentino Region's wine cellars and dairies to a sterilized solid.

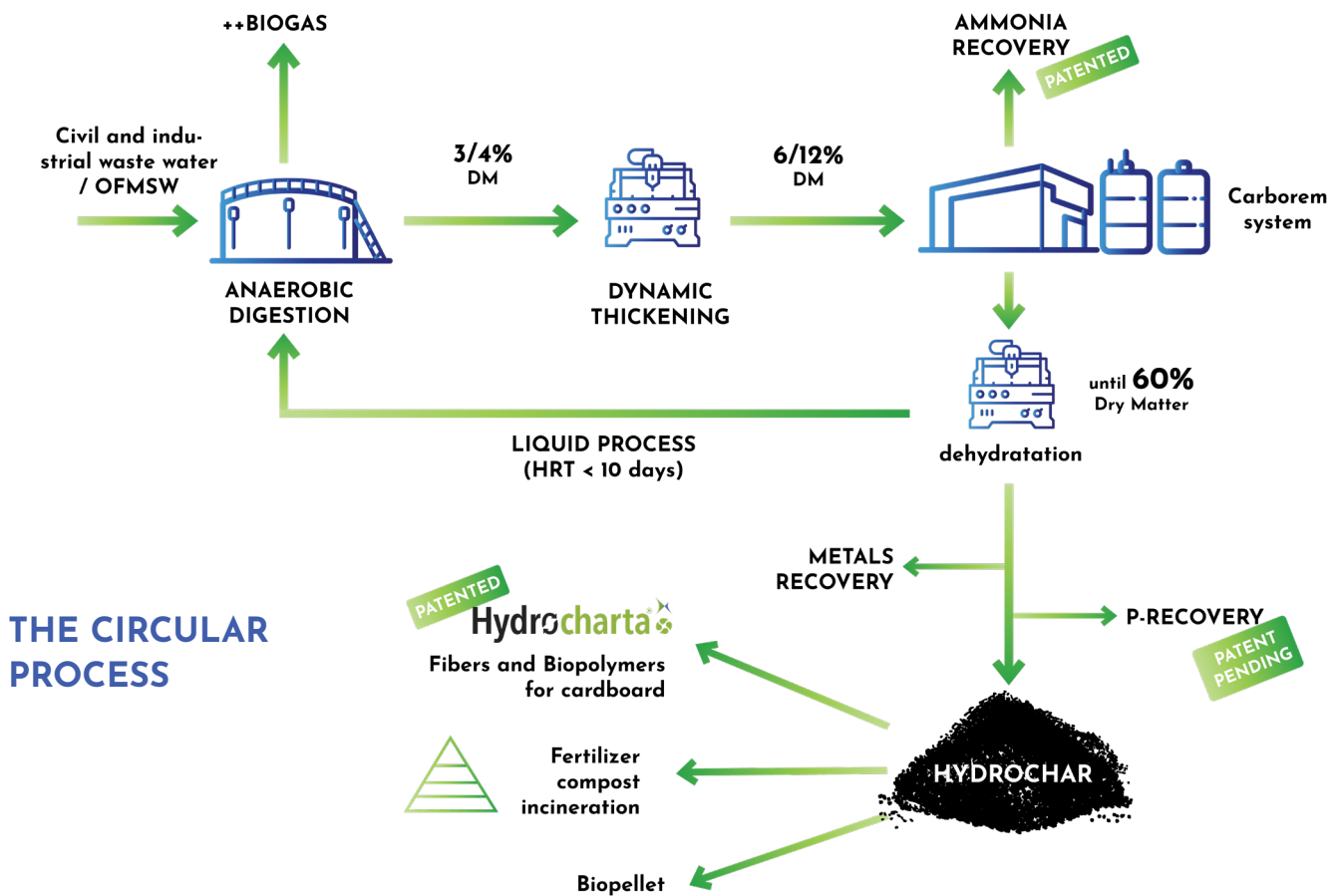
The plant is a patented HTC process in which the novelty is the continuous recovery of ammonia, at pressures of 12-15 bars and temperatures of 180-200°C.

The product that comes out of the plant is a sterilized slurry, free of pathogens.

After HTC-process, a solid/liquid separation is done by centrifugation or filter press, from which two products are obtained:

- 1 a liquid with high biodegradable COD contents that can be used in anaerobic digestion to increase biogas production (+25-40%);
- 2 a highly hydrophobic and pathogen-free solid called hydrochar, which complies with UNI 11853:2022 standards. It can be used as biopellet (solid biofuel), fertilizer, biopolymers, cardboard...

The other main advantage of the process is reducing post-dewatering solid volumes by 60-75%.



THE CIRCULAR PROCESS



## ► FROM SLUDGE TO CARDBOARD, FROM WINE REBORN NEW LIFE

In synergy with its technical partner Specialized Polymers Industry (SPI), Carborem has developed the Hydrocharta project: an application of hydrochar to help Trentino Wine Makers to transform the sludge produced by wineries into cardboard for wine bottle packaging, with a view to a circular supply chain economy. A highly exportable and scalable project given that in Europe alone this market has a volume of 22 million tons per year.



### CERTIFIED QUALITY.

The quality of Hydrocharta packaging board was tested for its standards and compatibility with UNI/EN/ISO standards. The test results certified its suitability for production, excellent stiffness characteristics and typical mechanical properties of Testliner type 3-4 papers according to the CEPI Container Board classification for recycled papers for corrugated board.

### ALL THE BENEFITS OF THE PROJECT:

**Conversion** of a waste into a raw material;  
**Reduction** of emissions;  
**Substitution** of virgin pulp in the production cycle of packaging board and thus wood hauling reduction due to its production;  
**Implementation** of a sustainable local supply chain with industrial positive spill overs in the local context.

# ▶ A DATA ANALYSIS PLATFORM WITH ARTIFICIAL INTELLIGENCE

During the development of the plant, CarboREM built an in-house Big Data Analytics and Artificial Intelligence (AI) platform compatible with the standards required by Industry 4.0.

Specifically, the platform enables:

- **replicate** measurements from standard PLCs (pressure, temperature, hertz, flow rate, level readings, etc.) and collect measurements per minute in real-time;
- **automatically** historicize measurements (day, month, year);
- **compare** measurements and create dedicated graphs;
- **visualize** production and cleaning cycles, plant productivity and energy consumption;
- **manage** maintenance notes and activities according to predictive maintenance logic.

The platform also allows setting minimum and maximum threshold levels beyond which alarms are automatically generated.

The plant operator is thus able to intervene in real-time, going directly back to the eventual failure or malfunction.



CarboREM is part of Greenthesi Group.

Greenthesi S.p.A. is a listed company in the stock marker of Milan.

With more than 30 years of experience in the Green Economy sector, the Group represents one of Italian's leading operators with global experience in environmental services, remediation solutions, waste-to-energy technologies, wastewater treatment, sludge management, biogas and biomethane production.

[www.greenthesisgroup.com](http://www.greenthesisgroup.com)



**GREENTHESIS**  
GROUP

**THINK GREEN, ACT SMART**



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