



**ECOSPRAY**<sup>®</sup>  
technologies for the planet

[ecospray.eu](http://ecospray.eu)

# Who we are: key facts

**Ecospray started in 2005** as an engineering company. For almost 20 years, we have made maritime and industrial operations more **sustainable, through the cleaning and treatment of polluting emissions.**

With offices in Italy, Miami and now a dedicated warehouse in Singapore, today Ecospray offers a wide range of technological solutions driven by the objective of creating clean energy.

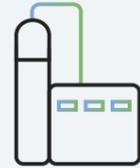
This results in **zero-emissions for the planet**, as well as for the maritime and land-based industries.



a global company that is part of **Carnival Corporation**



market leader in **EGCS for Marine engines**



**800+** systems installed worldwide

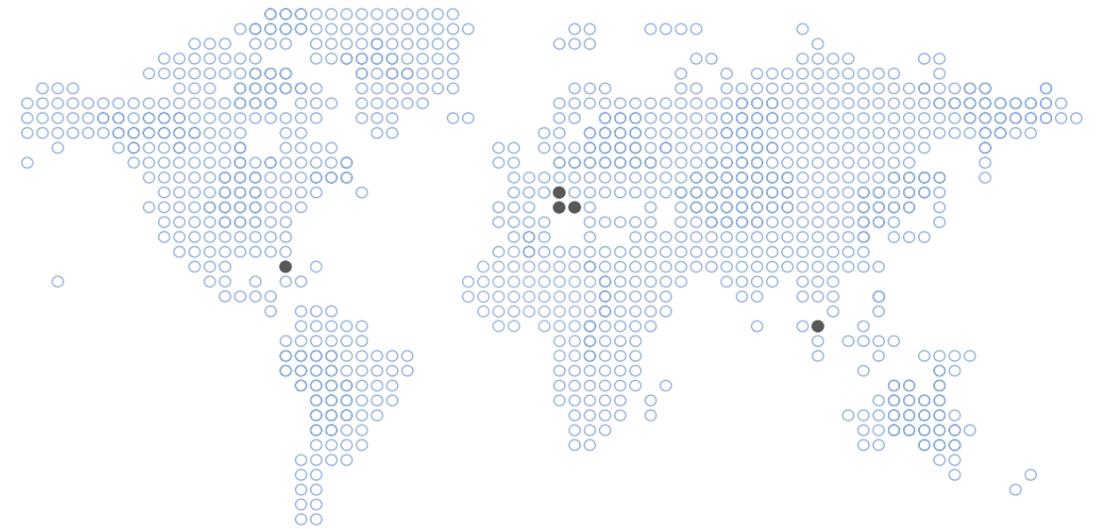


**5% R&D** investment to turnover



**2 labs** for in-house validation of test protocols, a **3<sup>rd</sup> lab** for fuel cell tests

# The Ecospray world: all our businesses



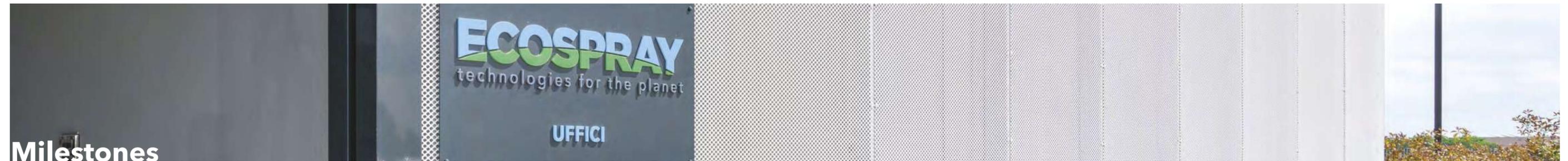
Decarbonization and carbon capture



Carbon capture, green power, clean fuel and air pollution control



Catalytic solutions and advanced equipment manufacturing



# Milestones

- 2005**: Ecospray Technologies was founded
- 2006**: First Gas Cooling systems for electric furnaces (IT) and DeNOx SNCR systems for cement plants
- 2009**: First DeNOx SCR system for diesel engines
- 2010**: First high temperature filtration system with ceramic filter components + DeNOx SCR
- 2011**: New headquarters in Alzano Scrivia (AL)
- 2012**: Key partnership with Carnival Corporation + first full-scale marine EGCS installation on a cruise ship (Queen Victoria)
- 2014**: First fogging system installation at the GDF Group Power Plant
- 2015**: Launch of the Biogas upgrading system development
- 2017**: First biogas upgrading system installed for sewage sludge, Ecospray becomes part of the Carnival Group
- 2018**: Start of construction of new headquarters in Alzano Scrivia
- 2019**: More than 300 EGC systems installed on cruise ships, commercial vessels and ferries
- 2019**: Development of micro-liquefaction technologies, first carbon capture technologies studies
- 2020**: First biogas upgrading and biomethane liquefaction plant for bio-LNG production from landfill (Novi Ligure)
- 2021**: Ecospray rebranding, partnership with Ruhe Company Group for bio-LNG production. More than 600 EGCSs certified on passenger and commercial vessels
- 2022**: First bio-LNG plant fully running in Germany
- 2022**: New Ecospray office in Miami, new orders for CH<sub>4</sub> and CO<sub>2</sub> liquefaction in Italy and Germany. Launch of Carbon Capture technologies
- 2023**: Fuel cells testing lab fully operational, agreement with OneLng on micro-liquefaction plants in US

# Our activities

We design and manufacture a wide range of systems based on **proprietary environmental technologies**:

- Exhaust gas pollution control (desulfurization, denitrification and de-dusting)
- Renewable fuels (biogas upgrading and methane/biomethane micro-liquefaction to LNG and bio-LNG)
- Green power generation (carbon capture and micro-generation systems based on micro-turbines and Molten Carbonate Fuel Cells)

We specialized in developing customized solutions to meet the specific needs of our customers and complete **turnkey installations**. These range from basic and detailed engineering to procurement, building and commissioning activities, as well as ongoing maintenance programs which ensure that your system performs according to the original design throughout its lifetime.

## Research and Development

We seek technological solutions and develop systems to meet the needs of our customers in the air & gas cleaning and cooling, biofuels and power generation sectors. In our research division, we develop solutions dedicated to renewable energies and environmental protection. Our innovative proprietary technologies are developed in-house and within a network of universities to provide the best solutions for each field of application.

In our laboratories, we perform in-house validation of test protocols using state-of-the-art instrumentation and analyzers. In some cases, after successful lab testing, we design and fabricate pilot industrial systems in order to test the technology in real conditions. This ensures our systems perform appropriately under any given conditions.

## Engineering

We devise R&D technological solutions with a team of engineers, research chemists and process engineers. Together with our customers, we design innovative solutions to comply with existing emissions standards, increase system efficiency and optimize costs. Our systems and products rely on advanced hardware and software tools to simultaneously achieve full customization and cost competitiveness.

## Production

We produce all key components and smart parts within our own facilities to guarantee the highest quality, fastest time-to-market and production scalability. Furthermore, we rely on a consolidated network of production partners and an advanced quality control system.

## Installation supervision and commissioning

Thanks to the know-how acquired through the design and construction of more than 800 plants, we are able to assist customers in the installation of our systems. We carry out commissioning activities with skilled qualified technicians and support customers in obtaining the necessary certifications.



## After-sales support

From technical support to real-time assistance and 24-hour maintenance services, we can remotely control and diagnose system operating parameters, in addition to providing specialized on-site support worldwide.

Constant monitoring and prompt availability of spare parts allow us to perform maintenance within the agreed time limits, thereby avoiding service disruption and additional costs.

## Training and management

We offer advanced training services to prepare operators for the management all our solutions and make the investment profitable. Training is a key part of increasing reliability and usage rates and optimizing system performance.

The Ecospray Training Center - EsTC has a wide range of courses in both the maritime and industrial fields, offered worldwide in dedicated training centers or online.

## Data analysis and IoT

We use the latest digital tools and AI to provide fully compliant, best-in-class performance and cost optimization through our systems.

The data is analyzed to monitor performance, efficiency, maintenance needs and compliance, allowing our customers to accelerate their return on investment and to provide predictive maintenance.

Furthermore, IoT technology minimizes the value lost from non-compliance fines, downtime and fuel switching costs. This is achieved through the use of advanced analytics and better monitoring, while reducing operating costs to achieve compliance.

### One

One is **our cloud platform** supporting both our marine and land-based technologies, which is used to collect and analyze system performance and provide predictive maintenance. One is designed to share data with the working group, regardless of how diverse this may be: this approach is key to obtaining greater reliability, productivity and operational excellence of the system, transforming passive data into useful information to allow different stakeholders to make informed decisions.



# Markets and applications

## Marine

Integrated solutions for sustainable fleets: we serve **the cruise, merchant, ferry and yacht markets**, treating air and water emissions so this meet and exceed compliance standards for the entire industry. Ecospray is studying and developing a range of customized technologies to help ship owners find the right solution to achieve decarbonization, in line with the type of vessel, application, ship size or operating profile.

IMO decarbonization targets are our drive to define development pathway with these carbon capture technologies:

- Carbon capture with amine
- Carbon capture with calcium hydroxide
- Carbon capture with Molten Carbonate Fuel Cells (MCFC)

With reducing emissions in mind, Ecospray has developed one of the largest portfolios of EGCSs in the industry, with hundreds of thousands of hours of operation. Our installed base represents one of the company's most valuable assets. Our advanced air quality systems are time-tested and offer proven performance for any kind of vessel, both for retrofitting and new building projects.

### Our marine solutions:

- Open Loop and Hybrid EGCS (scrubber) for SOx abatement
- Advanced wash water filtration for soot and pollutant abatement in open loop design EGCSs
- WESP (Wet Electrostatic Precipitator) for black smoke, plume and PM abatement
- SCR systems for NOx abatement
- Methane slip reduction for LNG-fueled engines
- Air and surface sanitization to reduce pathogens and contaminants inside closed spaces

## Renewables

High-performance technologies to produce **sustainable fuels for automotive and ship transport**, via a virtuous cycle based on the circular economy model.

We actively support decarbonization thanks to our on-site production and supply of bio-LNG or LNG and liquid CO<sub>2</sub>.

From the biogas/gas flange to the distributor, our turnkey systems allow for the profitable conversion of agricultural biogas plants or the use of waste to produce bio-LNG.

- Pre-treatment to remove H<sub>2</sub>S, VOC and other contaminants prior to conversion into biomethane
- Biogas upgrading removes CO<sub>2</sub> without the use of chemicals and produces biomethane with a high CH<sub>4</sub> content (>97%)
- Biomethane and methane liquefaction solutions for power generation and sustainable fuels
- Natural gas separation & liquefaction (NGL & LNG) from flare/APG/wells/pipelines
- Liquefaction of CO<sub>2</sub> into an industrial/food grade-quality product
- Lean gas to power to turn lean gas into viable energy

## Industry

A range of tailor-made solutions to ensure maximum efficiency in the removal of polluting gases from **power plants, cement plants, steel mills and foundries, as well as chemical, refinery and waste incineration plants.**

Ecospray serves the industrial sector by removing polluting emissions (SOx, NOx and PM abatement) and increasing the performance of industrial production facilities with our fogging, wet compression and gas cooling systems that are always in compliance with emissions regulations.

- SCR and SNCR systems for NOx abatement
- Wet, dry and semi-dry technologies for SOx removal
- Filtration solutions, filter cassettes, baghouse filters and diesel particulate filters for multi-pollutant abatement
- Evaporative gas cooling solutions to achieve excellent performance and low energy consumption
- Fogging and adiabatic cooling to increase the power output of gas turbines



# Make clean energy a reality for a zero-emission Planet



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