

**Ecomondo 2023**  
Area Forum CIB  
Padiglione D5 | Stand 314

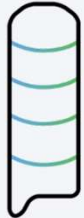
# **Liquefazione biometano e CO<sub>2</sub>: due soluzioni, molteplici benefici**

Giorgio Copelli  
Director

8<sup>th</sup> November 2023

**ECOSPRAY**  
technologies for the planet

# Ecospray



market leader  
in **EGCS for  
Marine engines**



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



**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



**800+**  
systems installed  
worldwide

**Ecospray** started in 2005 as an engineering company.

For almost 20 years we have made marine and industrial processes more sustainable with the cleaning and treatment of polluting emissions.

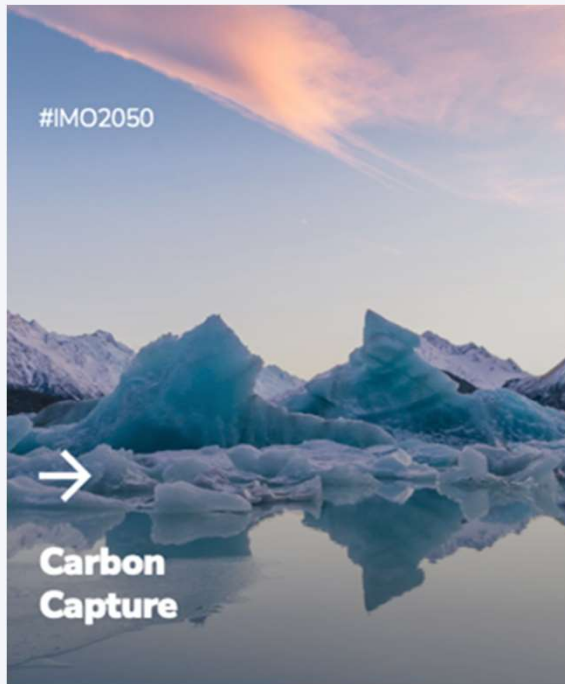
Today we offer a wide range of **technological solutions**, driven by the target of creating **clean energy for a zero-emission Planet** for every industry.



**Padiglione D5  
Stand 210-311**



# with you for a Zero Emission 2050



... get ready for **decarbonization**

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# Ecospray projects

## Bio-LNG

- #1 demo
- #1 fully operational
- #16 in construction
- #3 LCO<sub>2</sub>

## Oil & gas

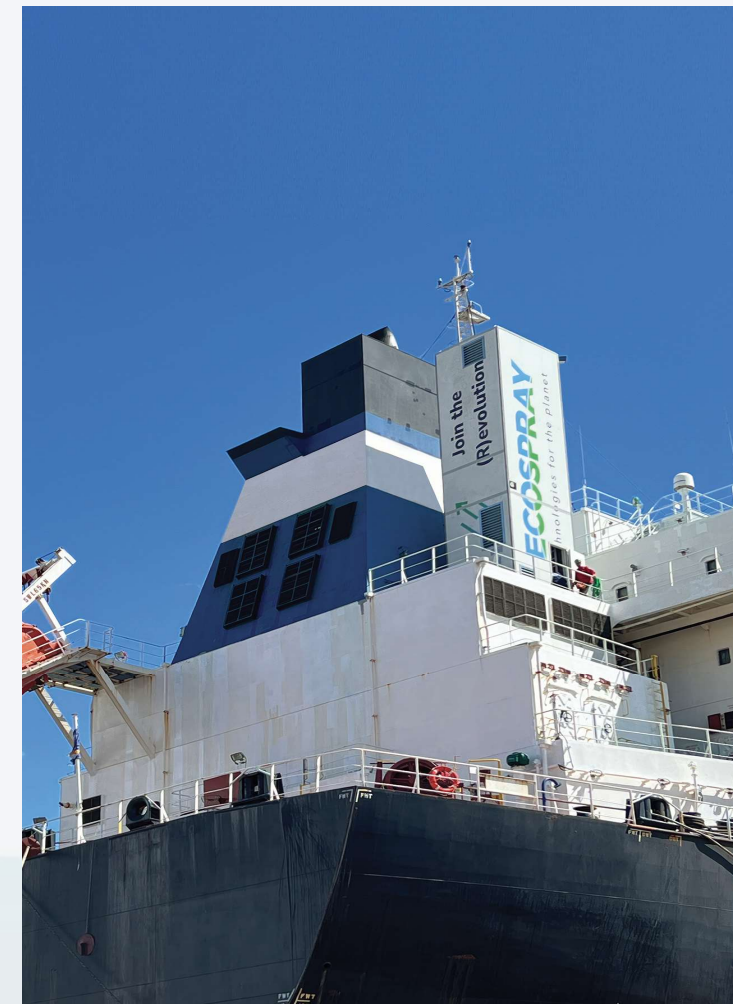
- #6 in construction

## Carbon Capture

- #1 demo



# Decarbonization: $\text{CO}_2$ liquefaction & carbon capture



# Liquefaction **Bio-LNG**

## **Bio-LNG**

Standard modules sizes: **3, 6, 9, 12, 15, 18 ton/day**

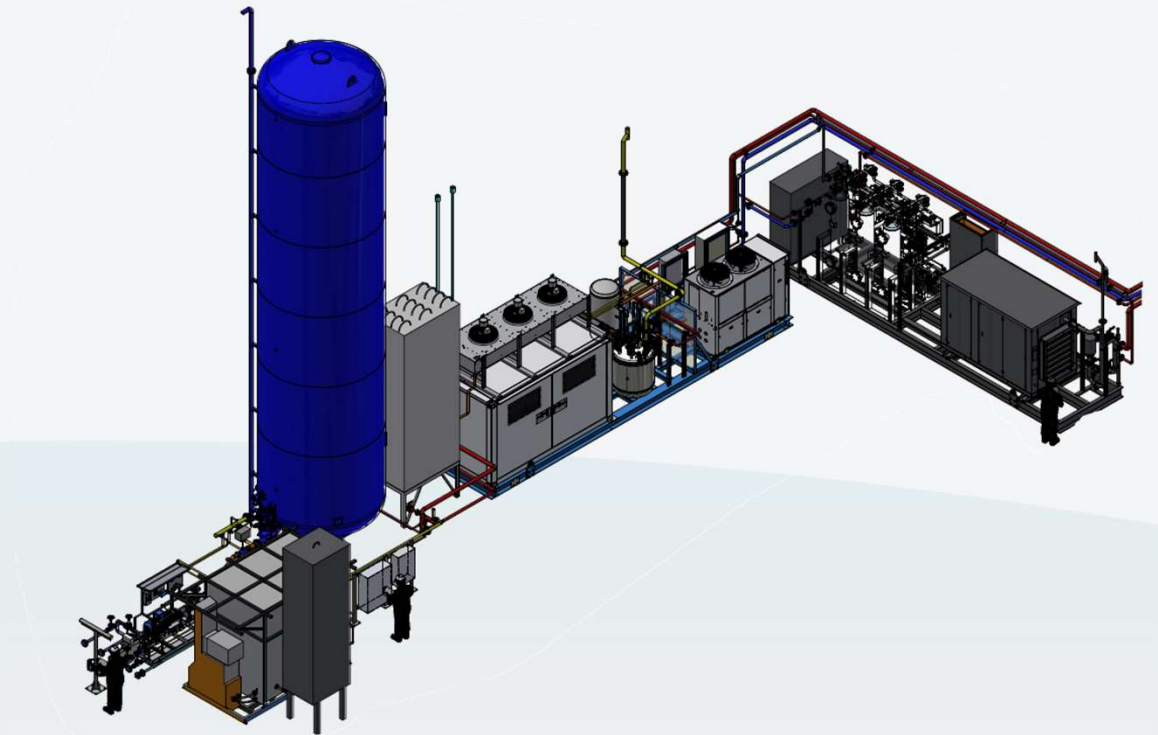
- Single control system optimized with the pre-treatment and any upgrading manufacturer
- Biomethane quality flexibility from upgrading systems

## **DRY NATURAL GAS (i.e. pipeline)**

Standard modules sizes: **1.0 & 2.0 MMSCFD (~20 & 40 ton/day)**

Special upstream modules for pollutants (i.e. Hg, H<sub>2</sub>S etc)

Easily "relocatable" configuration



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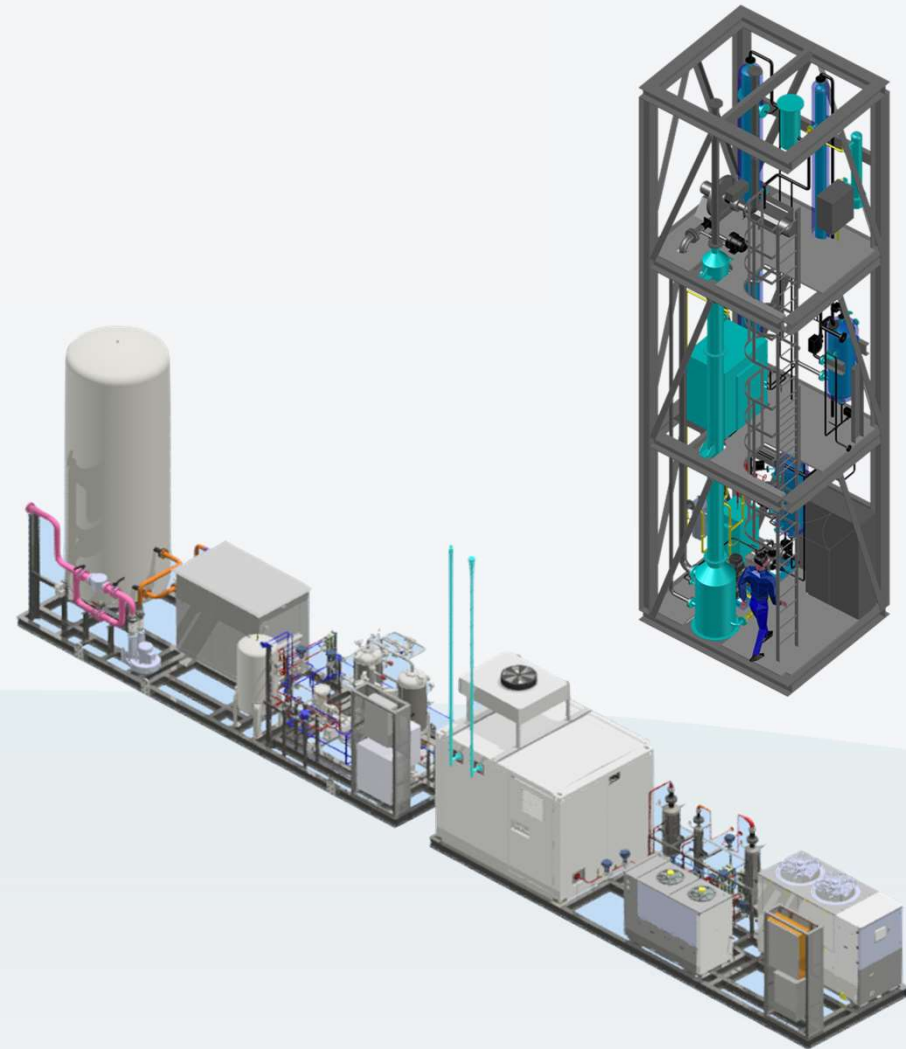


# Liquefaction **Bio-LCO<sub>2</sub>**

From biogas upgrading or other sources (i.e. combustion, syngas, reforming) the CO<sub>2</sub> stream is:

- cleaned from micropollutants (remaining traces of H<sub>2</sub>S, VOCs, oil)
- dried (H<sub>2</sub>O removal to avoid presence of ice)
- purification from macro-elements (i.e. CH<sub>4</sub>, O<sub>2</sub>, N<sub>2</sub> etc.) and liquefaction

The last step allows to reach industrial or food grade specification using different equilibrium points or a distillation columns.





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# Bio-LNG & Bio-LCO<sub>2</sub>: applications and uses

## UTILIZATION

### Transportation:

- HGV
- Maritime bunkering
- Blending

### Regassification:

- Power generation
- Pipeline injection

### E-fuels:

- Synthetic methane
- E-Kerosene
- E-Methanol

### Chemicals:

- Polyurethanes
- Polycarbonates
- Refrigerants

### Food:

- Beverage
- Packaging
- Cooling media
- Bio-proteins

### Agricultural/farming:

- Greenhouses
- Slaughterhouses

## SEQUESTRATION

### CO<sub>2</sub> injection

### Construction materials:

- Cement curing
- Carbon hydroxide

### Algae growing

# Bio-LNG & Bio-LCO<sub>2</sub>: benefits

## Bio-LNG

### Environmental (for all of us)

- Bio-LNG (carbon neutral fuel) produces 20% less CO<sub>2</sub> emission vs. fossil oil

### Economical (for end users)

- Incentives tariffs and premium pricing vs. fossil gas
- Increased sustainability in case of internal use
- Unmanned operation

### Customer (for contractors)

- Thanks to Ecospray's design the installation does not need special construction activities

## Bio-LCO<sub>2</sub>

### Environmental (for all of us)

- CO<sub>2</sub> conversion from pollutant into resource that can be used instead of fossil CO<sub>2</sub>

### Economical (for end users)

- Despite the volatility, CO<sub>2</sub> remains a product needed either for industrial or food applications
- Unmanned operation

### Customer (for contractors)

- Thanks to Ecospray's design the installation does not need special construction activities

# Bio-LNG + Bio-LCO<sub>2</sub>: benefits<sup>2</sup>

## **Environmental (for all of us)**

- Bio-LNG becomes a carbon negative fuel
- Blending procedure more sustainable
- Bio-CO<sub>2</sub> can replace the fossil one

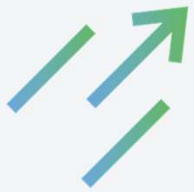
## **Economical (for end users)**

- Additional Premium incentives tariffs

## **Customer (for contractors)**

- Integrated Bio-LNG and Bio-LCO<sub>2</sub> production operation

Thank you



**Join the  
(R)evolution**

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