



Press release

## **RINA statement confirms the validity of Molten Carbonate Fuel Cells-based technology for Carbon Capture developed by Ecospray**

*The system, combined with use of bio-LNG as fuel, reaches the expected results in terms of CO<sub>2</sub> reduction*

Genoa (Italy), 3 November 2022

**RINA** released a statement confirming that the CO<sub>2</sub> reduction achieved by the new *Molten Carbonate Fuel Cells* (MCFC) technology for Carbon Capture (CC) in shipping, developed by **Ecospray**, matches expected targets announced by the company at the beginning of the project.

In a push to even greater sustainability, Ecospray chose to use bio-LNG as fuel for the MCFC technology. The MCFC can be fueled with hydrogen, methanol, ammonia, fossil LNG, but the use of a CO<sub>2</sub> neutral - or negative- fuel represents a plus in the application of this technology.

The statement comes after a 2-months assessment carried on by RINA, following the signing of a Memorandum of Understanding (MoU) with Ecospray back in July.

The classification society assessed the CO<sub>2</sub> life cycle, confirming that a 500 kW MCFC, when fed with the carbon negative super bio-LNG (a bio-LNG for which the CO<sub>2</sub> is captured during the production process) can cut the CO<sub>2</sub> equivalent emissions of a 10 MW engine by 20%, as calculated and stated by Ecospray. The process combines the effect of using a bio-LNG, for which the CO<sub>2</sub> has been captured, with the high-efficiency and carbon negative power generation capability of the system "MCFC fuel cell with the CO<sub>2</sub> capturing feature", a peculiarity of this specific type of fuel cell granted by its specific electrochemical composition.

The calculation considers the complete CO<sub>2</sub> lifecycle analysis, resulting from the following processes:

- Ship engine operation

- Bio-LNG production
- Bio-LNG processing through a steam reformer to obtain H<sub>2</sub> rich gas
- MCFC reaction
- Capture/Liquefaction of the CO<sub>2</sub>

The MoU also includes the assessment of feasibility of the installation of MCFC technologies on ships.

### **Carbon Capture with MCFC: how it works**

This CC technology was one of the three officially launched by Ecospray in June 2022, together with the one based on the use of *amines* and the one using *calcium hydroxide*.

Technologies based on MCFC enable the capture of CO<sub>2</sub> at the same time as energy production. As such, these technologies are considered strategic in the context of the energy transition, precisely due to their capacity to capture the carbon dioxide in exhaust gases and generate additional clean energy.

This is undoubtedly a technologically complex solution, but it is also the one which guarantees the best results in terms of reductions in emissions, as well as keeping operating expenses low for companies. The ideal application for these technologies is not limited to a particular type of ship: they can be used on all types of engines (2-stroke and 4-stroke) and with all fuels, HFO / LNG.

The Department of Civil, Chemical and Environmental Engineering of the University of Genoa collaborated with Ecospray for the MCFC technology, whose development began in 2020.

After completing this key stage in the validation process, Ecospray plans to start testing MCFC technologies at its Lab, equipped with engine, DeSO<sub>x</sub> scrubber and wet electrostatic precipitator, with industrialization stage expected in 2024 and launch on the market in 2025.

It's important to note that the 500 kW MC fuel cell is very small and compact, meaning its footprint is limited, and has little to no effect on the ship's layout.

*"Ecospray continues working on several shipping decarbonization projects, focusing on two main aspects: CC technologies and bio-LNG production. In our view the bio-LNG is already playing an important role in road transportation but will have an ever-increasing role in shipping, beside the LNG. We are very pleased with RINA statement, which encourages us to accelerate the next steps of the MCFC specific project, such as the Approval in Principle, and rewards our huge efforts in R&D."* says Filippo Lossani, Marine Business Unit Director of Ecospray.

Giosuè Vezzuto, Executive Vice President Marine at RINA, comments *"The results achieved by Ecospray are the demonstration that systems and technologies for achieving the CO2 reduction goals set by Regulators are being developed and introduced to the market. The industry is asking for doable and sustainable solutions: we are delighted to confirm that the Ecospray MCFC system may well be a possible option, as it delivers what it promises in terms of emission reduction"*.

### **About Ecospray**

*From research to development, Ecospray specialises in the creation of integrated solutions for the sustainable conversion of marine and land-based industries, as well as for the reduction of dependence on fossil fuels. Founded in 2005, Ecospray has been part of the Carnival Group since 2013, operating at global level to offer systems designed to render industrial processes more sustainable through the cleaning and treatment of polluting emissions.*

### **About RINA**

*RINA provides a wide range of services across the Energy&Mobility, Marine, Certification, Infrastructure & Real Estate and Industry sectors. With net revenues in 2021 of 533 million Euros, over 4,600 employees and 200 offices in 70 countries worldwide, RINA is a member of key international organizations and an important contributor to the development of new legislative standards. [www.rina.org](http://www.rina.org)*

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