PRESS RELEASE

# The Barcelona metro network will feature intelligently controlled ventilation thanks to RESPIRA®, the new AI platform developed by SENER

**This year 2020, the Barcelona metro will have a new Artificial Intelligence (AI)-based ventilation system, developed by the SENER engineering and technology group, that will improve the comfort of the network's passengers and workers alike while at the same time lowering energy costs. The goal of this initiative is to improve the efficiency of all the ventilation assets of the metro network, for which more than 400 million trips are made every year.**

Barcelona (Spain), April 02, 2020 - The engineering and technology group SENER and Ferrocarril Metropolità de Barcelona (FMB) have signed a collaboration agreement to launch a new initiative called RESPIRA®, whose main objective is to improve passenger comfort inside Barcelona's metro stations through the efficient and optimised use of ventilation systems.

RESPIRA® is an artificial intelligence system that will make it possible to set up an ideal ventilation strategy for each of the metro lines, in terms of improving comfort and energy efficiency. The new system, developed by SENER, takes into account the temperature perceived by passengers and workers by using a comfort index, as well as various criteria and variables, such as temperature, humidity, air quality inside the stations and the electrical consumption of the ventilation. With these data, it implements a dynamic algorithm for predicting environmental conditions inside the stations. Additionally, the system can also be used to make long-term forecasts, thus allowing FMB to prioritize future investments and maintenance work.

SENER's Director of Innovation, Òscar Julià, states that "RESPIRA® will be used to monitor and process over 500 million datapoints a year. Thanks to its self-learning process, the system will be able to adapt and act in advance." By maximising the performance of the current shafts and fans with the help of artificial intelligence, the system will reduce the average temperature of the tunnel, improve air quality and thermal comfort for the more than 400 million journeys made by the Barcelona metro every year.

In the initial phase, the system will be installed in Line 1 in May of this year, where it will be used to control all the fans. In the remaining lines of the conventional network (lines 2, 3, 4, 5), the system will be phased in throughout 2020.

## Main advantages of RESPIRA®

On the one hand, RESPIRA® will be used to monitor the environmental conditions inside the stations (temperature, humidity, heat index and air quality, among others) in real time, which will be useful in identifying problem spots within the metro network.

And, on the other, it will be used to monitor the operation of the fans and their effect on indoor temperatures, which will be of significant help to the maintenance activities required for the installation and to the efficient management of future investments.

This initiative is consistent with the following Sustainable Development Goals (SDGs) approved by the UN:

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- Enhance the health and well-being of metro users by improving the thermal comfort and air quality.

- Help use energy more efficiently by saving up to 30%, and contribute to reducing the carbon footprint by more than 700 tons of $CO_2$ a year.

- Develop an advanced technology system with a distinctly innovative nature.

- Offer an environmentally friendly product that promotes sustainable development by minimizing equipment operating hours, reducing wear and tear, the maintenance and/or replacement period of the equipment, all while helping manage future investments in the ventilation system.

The RESPIRA® project is one of the digitalisation initiatives of SENER, a technology group with more than 60 years of history, which has been a leader in innovation in many sectors of activity. For SENER, the digital transformation does not consist of using new technologies, but of integrating them into the business from its conception, and in line with the company's founding vocation: to put technology at the service of society, providing innovations capable of improving people's lives and that are sustainable and environmentally friendly.

## *About SENER*

*SENER is a private engineering and technology business group founded in 1956. Its aim is to offer its clients the most advanced technological solutions and to achieve international recognition based on its independence and commitment to innovation and quality. SENER has 2,300 professionals across its centres in Algeria, Argentina, Brazil, South Korea, Canada, Colombia, Chile, China, the United Arab Emirates, Spain, the United States, Morocco, Mexico, Poland, Portugal, the United Kingdom and South Africa. The group's operating revenue exceeded 589 million Euros (2018 data).*

*SENER has excelled as a turnkey supplier of combined cycle and cogeneration plants and its portfolio of past works in this type of plant totals over 10,000 MWe of installed capacity throughout the world. Within the most outstanding references in the field of cogeneration and combined cycle plants, there are projects (all of them delivered as EPC construction contracts) for the Mexican energy sector, such as: the Cryonfra-Afranrent cogeneration plant; two cogeneration plants for the CYDSA group; TG-8 Madero cogeneration plant for Pemex; the Agua Prieta II combined cycle plant; and the Empalme I combined cycle plant. In Energy, SENER has become a technology solutions and EPC projects' company recognized the world over for its execution of technologically complex turnkey projects in Europe, America, Africa and the Middle East.*

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