PRESS RELEASE
June 25th, 2025

Ch0C Gas Boiler: a French consortium innovates for industrial decarbonization

The low-carbon gas boiler Ch0C has just been commissioned at the Villers-Saint-Paul site (Oise) after only three years of agile and collaborative work. Launched by a consortium of 16 stakeholders, this demonstrator aimed at industry has received support from ADEME and France 2030. This boiler is based on the integration and development of cutting-edge technological components. Driven by French companies, Ch0C marks the emergence of a new center of excellence. This industrial equipment enables a very high level of decarbonization at a competitive cost. Industrial boilers, across all energy sources, account for 23% of the total emissions from French industry.

Reducing direct CO_2 emissions from steam production by over 90%

The demonstrator is now operational, a major milestone in validating the results of the various technical studies conducted prior to the project. Starting today, multiple tests will be carried out under real conditions to optimize the performance of this 3 MW boiler. The Ch0C is a next-generation industrial boiler designed to facilitate the capture of CO_2 emitted during gas combustion.

"Ch0C marks a turning point. We are no longer in the experimental phase: we now have a functioning equipment that will allow its users to significantly improve their carbon footprint." announced members of the consortium.

Recovering or capturing CO_2: when a constraint turns into an opportunity

The high-efficiency Babcock Wanson boiler is equipped with a state-of-the-art burner (Pillard OXYFLAM® [1]) and a CO_2 capture and liquefaction system developed by Verdemobil Biogaz. The CO_2 is recovered directly at the boiler outlet instead of being released into the atmosphere, thus drastically reducing the carbon impact associated with the production of steam and hot water. The CO_2 can then be sequestered or recovered. Many industrial players require CO_2 in their processes, such as in the food or chemical industries.

Optimizing performance to consume less energy

The innovation of the Ch0C boiler is based on the principle of oxy-combustion, which replaces air with oxygen during combustion. This process not only concentrates the CO_2 produced for capture and recovery but also improves the boiler's performance. For the same amount of gas consumed, the boiler allows better use of the heat produced—a major expectation from industrial players.

A competitive technology closely monitored by industry players

The Ch0C boiler is expected to be commercialized as early as next year. In terms of total operating cost[2] (excluding taxes), the Ch0C should offer a cost per kWh of steam produced up to 40% lower than that of an electric boiler and at least equivalent to that of a biomass boiler. Another advantage: compared to alternative solutions, the carbon impact is halved when the CO_2 is recovered. The higher the power, the more competitive the Ch0C boiler becomes. It will meet the high levels of decarbonization imposed on industrial players.

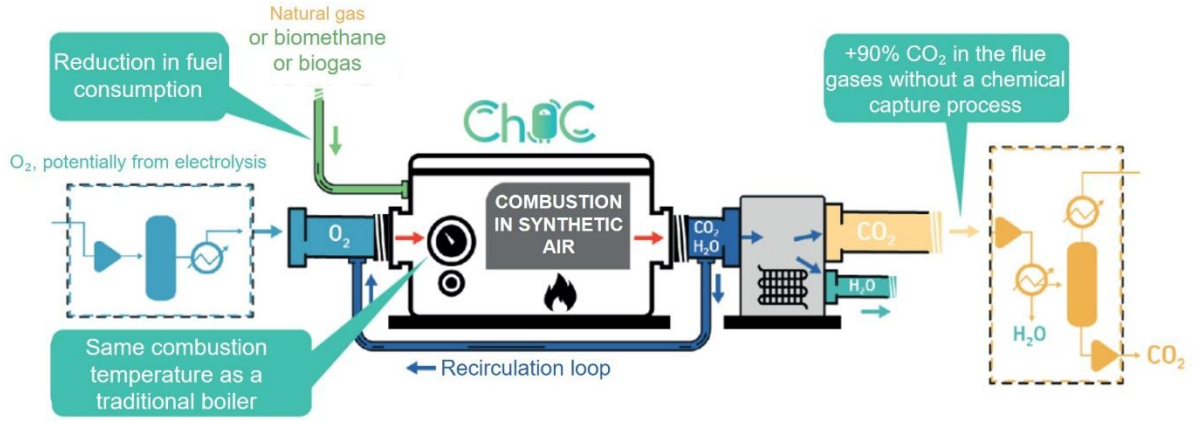
Replacing 1,000 industrial boilers with this new boiler could prevent the emission of 4 million tons of CO_2 per year[3]. A potential of 2,000 such boilers is identified in the French market for power ranges between 1 MW and 20 MW.

Effective decarbonization: 16 stakeholders supporting Industry

The consortium, led by Naldeo Technologies & Industries, brings together energy providers, equipment manufacturers, scientific experts, and industrial companies. Babcock Wanson, ENGIE Solutions, Fives, GRDF, NaTran, TotalEnergies, and VERDEMOBIL BIOGAZ are project partners. Agrial, Agro Mousquetaires, Bonduelle, Carboneo, Coca-Cola, Constellium, Eiffage Énergie Systèmes, and the University of Paris are observer members.

[1] Latest-generation ultra-low NOx burner operating in both air and oxy-combustion modes
[2] The total operating cost includes the cost of the boiler and operational expenses
[3] Assumptions used: 1,000 gas boilers of 3 MW operating 7,000 hours per year; associated gas consumption: 21 TWh (billion kWh); 90% reduction in direct CO_2 emissions related to this consumption compared to a conventional gas boiler. The emissions considered are direct emissions (Scope 1)

A HIGH-PERFORMANCE TECHNOLOGY FOR EASY AND EFFICIENT CO_2 CAPTURE



Operating principle of the Ch0C boiler (Credit: Naldeo Technologies and Industries)

About ENGIE Solutions

ENGIE Solutions is the sustainable ally of cities, industries, and service-sector companies on the path to decarbonization. To accelerate their energy transition and better combine economic and energy performance, our 16,000 employees work daily across regions to design energy mixes and facilities tailored to our clients' resources. This is achieved through a range of complementary solutions such as local energy networks, on-site production of decarbonized energy, and energy performance services. ENGIE Solutions is a brand of the ENGIE Group, a global reference in low-carbon energy and services, whose purpose is to act to accelerate the transition toward a carbon-neutral world. ENGIE Solutions achieved a turnover of €5.4 billion in 2024.

More information: www.engie-solutions.com or www.linkedin.com/company/engie-solutions

Press contact - Lise Forest – lise.forest@engie.com - +33 6 32 47 62 48

About Naldeo

With nearly 300 employees across 12 sites in France, **Naldeo** is an engineering and consulting firm addressing all climate-related challenges (energy, water, waste, environment, and biodiversity) on behalf of industrials, local authorities, and stakeholders (investors, banks, insurers). In 2023, the Naldeo Group set a goal to reduce its clients' CO_2 emissions by at least 150,000 tons.

Press contact - Emilie Le Douaron - Cabinet MITI - emilie.ledouaron@cabinet-miti.fr - +33 6 76 56 21 48

About Babcock Wanson

Babcock Wanson is a major international player in the energy transition, providing equipment and solutions for industrial boiler rooms. With over 100 years of experience, the company delivers customized solutions to reduce energy consumption and environmental impact for its clients.

More information: www.babcock-wanson.com – www.babcock-wanson-group.com

Press contact – Florent Barry - fbarry@babcock-wanson.com

About Fives

Fives, your partner for a more efficient and virtuous industry

From the first railway lines to the Eiffel Tower lifts and factory 4.0, for over 200 years Fives has been designing the disruptive solutions and technologies that make up industry. As a pioneer of decarbonization and digitalization, Fives is always one innovation ahead thanks to its ability to anticipate customer needs. By responding to the specificities of each market locally, Fives combines economic and environmental performance in 25 countries thanks to its 9,200 employees.

The Energy | Combustion Business Unit of Fives, under the renowned names ITAS, North American and Pillard®, designs, supplies and manufactures customized burners, combustion systems, and controls for furnaces, flares, and boilers. Fives' offer also includes maintenance services, process optimization and reduction of environmental footprint.

More information: www.fivesgroup.com

Press contact - Diana Alves - diana.alves@fivesgroup.com - +33 6 30 41 25 90

About GRDF

GRDF operates the largest gas distribution network in Europe, managing and maintaining 207,000 km of pipelines while ensuring the safety of people and property. GRDF is a key player in an affordable and locally rooted energy transition. Present in over 9,500 municipalities, the company supports local authorities in their decarbonization strategies through energy and sustainable mobility policies.

GRDF supplies gas to nearly 11 million customers for heating, cooking, and transportation, regardless of their supplier. For each use, GRDF offers practical solutions to reduce its clients' carbon footprint: energy efficiency, green gas, and high-performance equipment. The company is committed to reaching 20% green gas in the network by 2030, enabling the widest possible access to renewable, locally produced energy.

GRDF is the first gas distributor to commit to a decarbonization trajectory—across all scopes and at constant scope—in line with the Paris Agreement.
Follow GRDF news on the new platform Just decarb
Press contact - grdf-nat-presse@grdf.fr **-** +33 1 71 19 18 11

About NaTran
NaTran is the new name of GRTgaz. In 2025, NaTran changed its name and launched a new corporate project focused on energy transition and carbon neutrality. To achieve its strategic goals, the company is adapting its networks and practices to address ecological, economic, and digital challenges. It provides infrastructure and logisitics solutions tailored to gases that contribute to the energy transition (biomethane, hydrogen and CO2). NaTran is the second-largest gas transmission operator in Europe. The Group has two subsidiaries: Elengy (Europe's leading LNG terminal operator) and NaTran Deutschland (operator of the MEGAL network). NaTran undertakes public service missions aimed at ensuring safe gas transport for its customers. The NaTran R&I research center (formerly RICE) is an international benchmark in research and innovation applied to the energy transition.
NaTran Group key figures: 33,800 km of pipelines, 590 TWh of gas transported, nearly 3,850 employees, nearly €2.5 billion in revenue in 2024.
To find out more about NaTran and its initiatives, visit: NaTrangroupe.com, X, LinkedIn, Instagram.
Press contact – Chafia Baci - chafia.baci@natrangroupe.com - +33 6 40 48 54 40

About TotalEnergies
TotalEnergies is a global integrated multi-energy company that produces and supplies energy, including oil and biofuels, natural gas and green gases, renewables, and electricity. With more than 100,000 employees, we are committed to providing energy that is more affordable, more available, and more sustainable to as many people as possible. Present in around 120 countries, TotalEnergies places sustainable development at the core of its strategy, projects, and operations.
Press contact - presse@totalenergies.com - +33 1 47 44 46 99

About VERDEMOBIL BIOGAZ
Based in Montaigu-Vendée, VERDEMOBIL BIOGAZ is a company made up of a dynamic team of 42 employees, specializing in the design, manufacturing, maintenance, and operation of renewable gas recovery units.
A pioneer in biomethane recovery in France, VERDEMOBIL BIOGAZ developed its first biogas upgrading unit in 2010.
Since 2018, backed by proven technological expertise, VERDEMOBIL BIOGAZ has expanded its range of solutions to meet diverse uses and needs: biomethane liquefaction into BioLNG, BioCO_2 capture and recovery, and BioH_2 production through biogas steam reforming.
Press contact - Carole Couhert - carole.couhert@verdemobil.com - +33 6 43 32 76 72