

A2A, NEW GREEN HEAT FOR BRESCIA: INAUGURATED THE FIRST LIQUID-COOLED DATA CENTER CONNECTED TO A DISTRICT HEATING NETWORK

- Thanks to Qarnot technology, thermal energy is recovered at 65 °C and is immediately usable to heat buildings.
- Once fully operational, 16 GWh of clean heat will be produced annually—enough to meet the heating needs of approximately 1,350 apartments.
- 3,500 tons of CO₂ emissions will be avoided each year, equivalent to the carbon dioxide absorbed by 22,000 trees.
- With this first datacenter in Italy, Qarnot also positions itself as a sovereign HPC cloud service provider in Italy, supporting the Italian market's growing needs for high-performance computing resources in key industrial sectors.

Brescia, June 25, 2025 – Fifty years after becoming the first Italian city to be equipped with a district heating infrastructure, Brescia reaffirms its role as a hub for ecological transition. Today, A2A inaugurated a new data center at its Lamarmora plant, developed by the French company Qarnot. Through an advanced liquid-cooling technology, it enables the recovery of high-temperature thermal energy – up to 65 °C – that can be directly supplied to the district heating network for building heating.

This is one of the first initiatives in Italy to recover heat from data centers, and the first within a city-wide network using liquid-cooling technology. It responds to a global energy challenge: capturing and reusing waste heat from digital infrastructures, which are rapidly expanding and consume large amounts of energy¹, to supply urban areas with usable thermal energy. At full capacity, the system will be capable of meeting the heating needs of more than 1,350 apartments², avoiding the release of 3,500 tons of CO₂ per year – the equivalent of the annual absorption capacity of over 22,000 trees³.

Laura Castelletti, Mayor of Brescia, Renato Mazzoncini, CEO of A2A, and Paul Benoit, CEO of Qarnot, took part in the inauguration.

*“The rapid expansion of data centers and the growing electrification of consumption call for major investments in power grids to support the increasing demand for energy. At the same time, they also offer an extraordinary opportunity for cities equipped with district heating networks: to recover waste heat from servers and convert it into usable thermal energy,” explained **Renato Mazzoncini, CEO of the A2A Group**. “In Milan alone, based on the projects in the pipeline, an estimated 150,000 apartments could be heated simply by capturing that residual heat. This is not just a technological advantage, but a key asset for urban decarbonization: with district*

¹ According to the International Energy Agency, global electricity demand from artificial intelligence systems is expected to double by 2030 compared to 2024, reaching 945 TWh annually – an amount equivalent to Japan's total current electricity consumption. See: “Energy and AI”, IEA, www.iea.org/reports/energy-and-ai/executive-summary

² Figure based on data from Italy's Energy Regulatory Authority (ARERA), which estimates that a typical household in Italy consumes approximately 12 MWh per year for space heating and domestic hot water.

³ Value calculated based on the average annual CO₂ absorption capacity of a silver birch (*Betula verrucosa*), which absorbs approximately 155 kg of CO₂ per year, according to research conducted by the Italian National Research Council (CNR) in Bologna.

heating 4.0, networks become smart systems, capable of integrating all available thermal surplus and accelerating the path toward climate neutrality by 2050. In this perspective, Brescia stands out as a model, not only on a national scale. The pilot project with Qarnot, officially inaugurated today, is further proof that integrating energy recovery from the earliest design stages of data centers means creating strategic infrastructure for the future: more competitive cities, more sustainable communities, and heat available where it is needed, without relying on fossil fuels.”

*“Once again, Brescia confirms its role as a city-laboratory, testing increasingly advanced technologies to improve CO₂ emission levels in the atmosphere,” stated the **Mayor of Brescia, Laura Castelletti**. “This represents a crucial and no longer deferrable key element in our climate change mitigation strategy, which our Administration has strongly pursued in recent years. Just as it happened in the 1970s with district heating - when Brescia, through ASM, was the first city in Italy to make this infrastructure available to its citizens - today we are launching a new technology that enhances our strategies against air pollution and marks a step forward in the city’s decarbonization process. We are proud that this laboratory begins in Brescia and confident it can become a model for Italy and Europe. A2A is our partner on this path toward increasingly sustainable prospects.”*

*“This first deployment in Italy is a strategic milestone for Qarnot,” said **Paul Benoit, CEO and co-founder of Qarnot**. “Made possible through our collaboration with A2A, it gives us the opportunity to address the Italian market’s growing needs for sovereign, energy-efficient cloud computing tailored to High-Performance Computing (HPC). Our infrastructure is particularly suited for sectors such as automotive, aerospace, energy, maritime, and all simulation-intensive industries. Sectors that not only require computing performance, but above all sovereignty, given the strategic nature of the challenges they face. Our approach allows us to cover the entire value chain of our HPC cloud, from the design of low-carbon infrastructure to the delivery of intensive computing services. By designing data centers that produce usable heat, we combine performance, sustainability, and local value creation”*

This initiative marks another step forward in A2A’s ongoing commitment to making district heating increasingly sustainable, through various projects focused on the recovery and enhancement of decarbonized heat sources available locally. These include heat generated by the city’s waste-to-energy plant and its flue gases, as well as from other industrial sources such as the Alfa Acciai and Ori Martin steelworks, and the use of thermal storage systems for hot water.

Thanks to these solutions, which have significantly reduced the use of gas, 83% of the heat distributed in Brescia in 2024 came from non-fossil sources. This share is expected to grow further with the contribution of computational processes from data centers: their operation produces large amounts of heat which, rather than being dispersed, can be recovered to heat buildings without relying on fossil fuels.

For Qarnot, this initiative represents a significant expansion in Europe, enabled by its close collaboration with A2A. Qarnot provides an intuitive and high-performance platform designed to simplify numerical simulations (CAE) in the cloud. Developed to support innovation in sectors such as aerospace, automotive, and energy, this platform enables intensive computing workloads while minimizing environmental impact through a low-carbon infrastructure. A key feature is Qarnot’s control over the entire value chain of its HPC cloud—from designing sustainable data centers to delivering sovereign high-performance computing services.

The project

Brescia's district heating network is among the largest and most advanced in Europe: over 684 kilometers of pipelines, 22,000 connected customers (equivalent to the heating demand of around 180,000 apartments), and over 80% of heat already produced comes from non-fossil sources. Digital heat from data centers now adds to this mix, further strengthening Brescia's circular energy model.

The Qarnot project is structured in two phases. The first one, already operational, involves 30 QBx computing units capable of generating about 800 MWh of thermal energy annually. Thanks to liquid cooling, heat can be recovered at 65 °C - suitable for direct use in the district heating network via heat exchangers. Air cooling, in contrast, only recovers heat at around 30 °C, requiring supplemental heating through heat pumps.

The second phase, "Qarnot 2," is already in design and involves installing servers in the former coal storage area of the Lamarmora plant, a reconversion that is both symbolic and concrete. The project, supported by European funding, will generate 16 GWh of clean thermal energy per year - enough to provide heat and hot water to approximately 1,350 apartments. The goal is to make it operational within the next two years.

Qarnot's innovative technology not only ensures high computational performance, but also delivers high-quality thermal energy, ready to be utilized within an intelligent urban system. The development of Artificial Intelligence will require such power density that the use of liquid cooling - more efficient than traditional systems - will become essential.

As highlighted in the Position Paper "*Urban sustainability: decarbonization, electrification and innovation – Opportunities and solutions for future-fit cities*", developed by A2A in collaboration with The European House – Ambrosetti and ASVIS, district heating is one of the key technological levers to reduce CO₂ emissions in Italian cities by more than 50% by 2050 - particularly through targeted investments in the recovery of waste heat from industrial and digital sources, such as data centers.

An innovation that looks to the future, in a world where increasing digitalization also demands for new solutions to ensure urban energy sustainability.

FOR FURTHER INFORMATION

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