

Enerdrape's system installed in an underground parking garage. Photo courtesy of Enerdrape

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A Startup Is Tapping Underground Parking Garages for Clean Energy

As cities look to harness zero-carbon power and heating, Enerdrape is offering a novel no-drill solution for geothermal energy.

By [Miquela V Thornton](#)
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The heat held in New York's underground labyrinth of infrastructure, from hundreds of miles of subway tunnels to parking garages and malls, is a clean energy gold mine. Now, a Swiss startup wants to tap it to heat and cool buildings, all without drilling a single borehole.

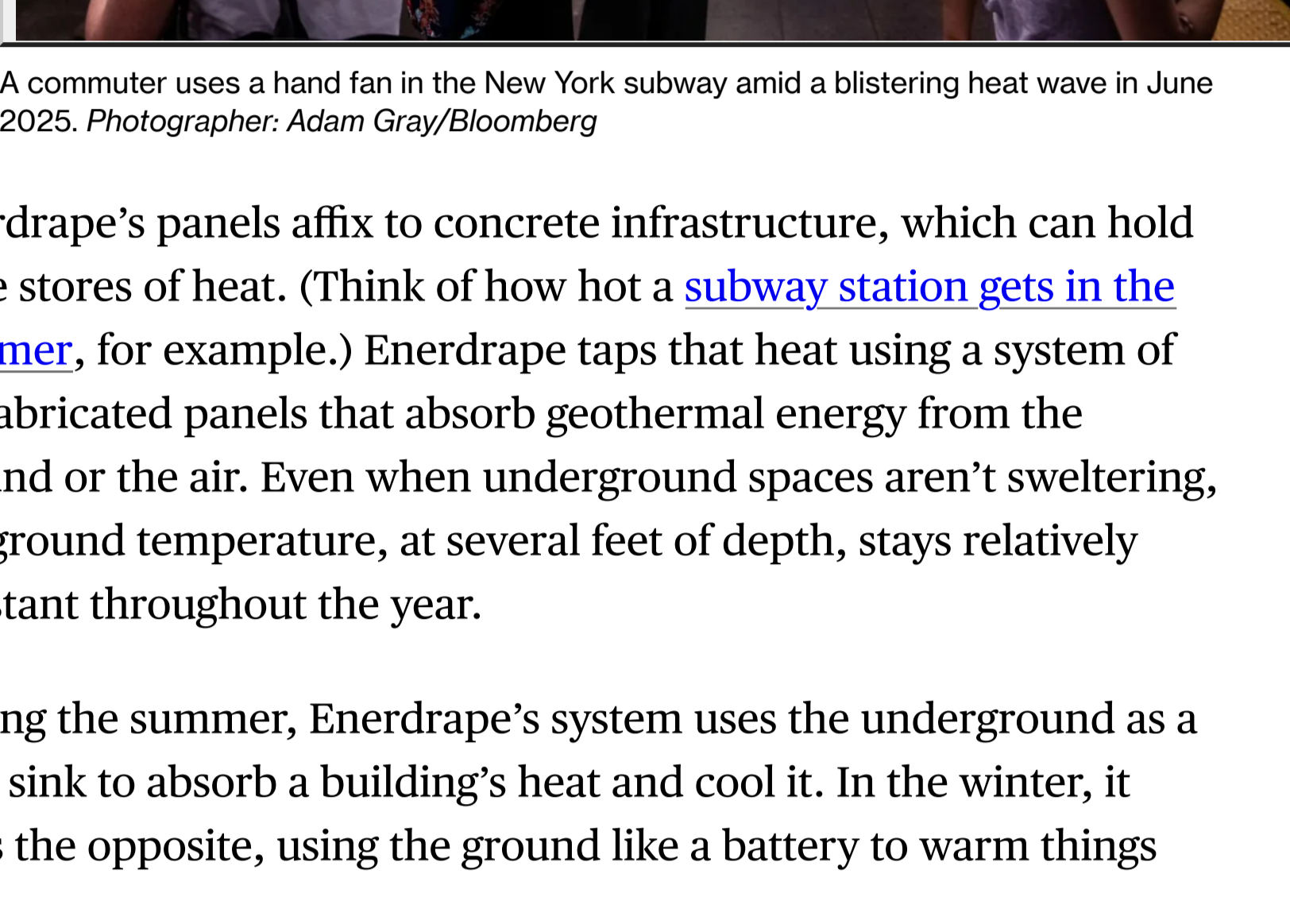
Globally, heating accounts for nearly half of all energy consumption. That could make decarbonizing it a half-trillion-dollar market, according to a [BloombergNEF analysis](#). Using the Earth's heat offers one route to cut emissions, but traditional geothermal projects can be costly and require space to operate drilling equipment, making them a poor fit for cities.

Startup Enerdrape's system uses energy-harvesting panels in manmade underground spaces, though, which could allow it to gain a foothold in cities. The Swiss company focuses on older multifamily buildings, which are harder to decarbonize than newer builds. In New York, residential structures built before 1960 [make up more than 64%](#) of the housing stock, though not all of it is well-suited for the panels.

"There really aren't many companies doing this," said BNEF analyst Stephanie Diaz. "They are truly a novel approach in how to decarbonize buildings," though the company will have to figure out how to scale its technology to work with a wide variety of buildings.

Enerdrape's technology is the product of decades of research spearheaded by Lyesse Laloui, a professor at the Swiss Federal Institute of Technology at Lausanne. A five-time startup founder, he's spent the last 15 years tackling the question of how to turn underground structures into energy sources.

Initially, he created a solution for new construction, but realized that it only addressed a small part of the decarbonization puzzle compared to existing buildings. He and his team developed a prototype heat-exchanging panel in 2015.



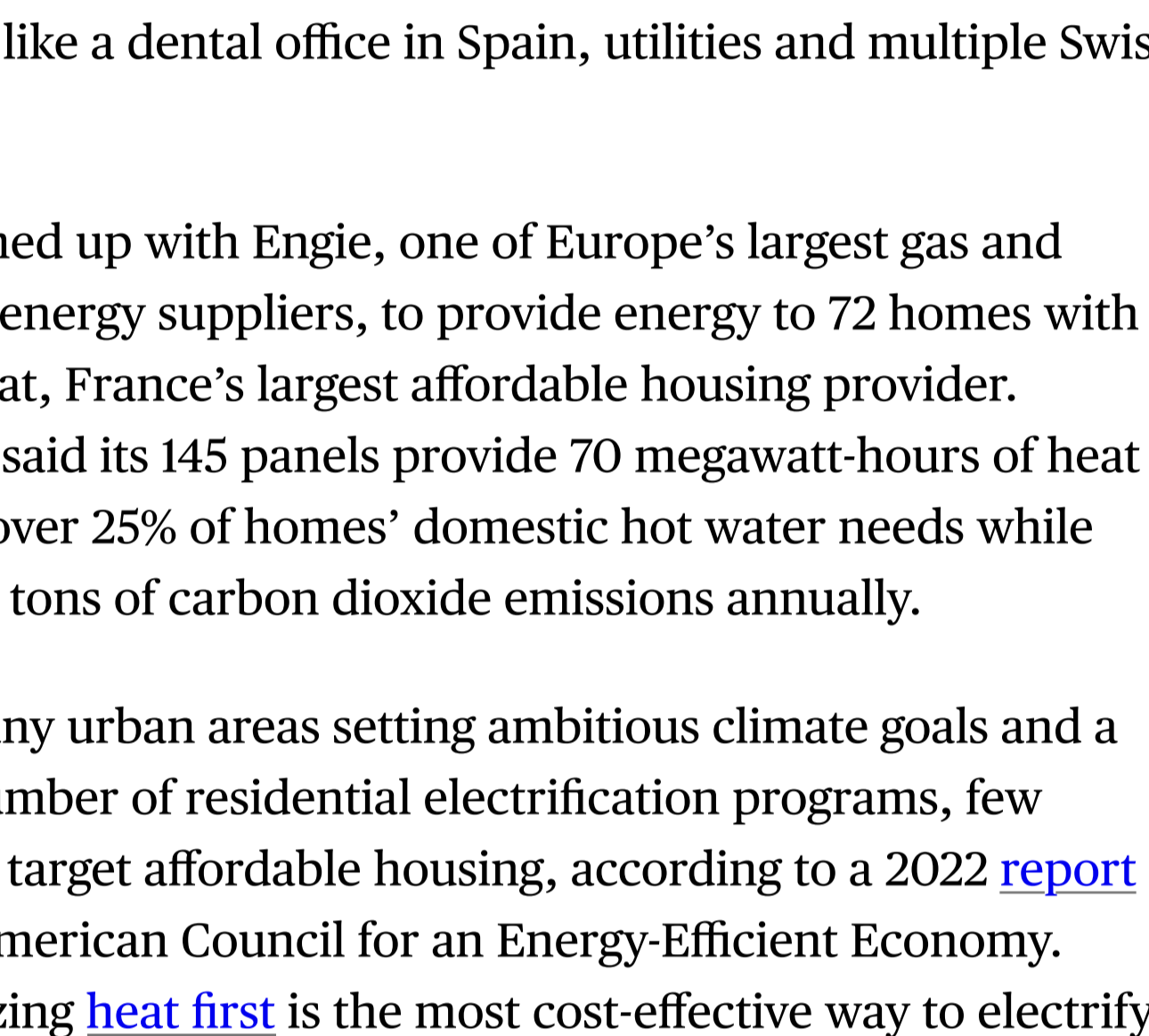
A commuter uses a hand fan in the New York subway amid a blistering heat wave in June 2025. Photographer: Adam Gray/Bloomberg

Enerdrape's panels affix to concrete infrastructure, which can hold large stores of heat. (Think of how hot a [subway station gets in the summer](#), for example.) Enerdrape taps that heat using a system of prefabricated panels that absorb geothermal energy from the ground or the air. Even when underground spaces aren't sweltering, the ground temperature, at several feet of depth, stays relatively constant throughout the year.

During the summer, Enerdrape's system uses the underground as a heat sink to absorb a building's heat and cool it. In the winter, it does the opposite, using the ground like a battery to warm things up.

The system requires installing one panel for roughly every 110 square feet (10 square meters) of a building's floor area. The panels are connected to heat-transferring fluid, working in tandem with one or more heat pumps.

"Enerdrape moves heat from where it's not needed to where it is," co-founder and Chief Technology Officer Alessandro Rotta Loria said.




A closeup of Enerdrape's panels. Photo courtesy of Enerdrape

Rotta Loria, who was Laloui's former PhD student, likened it to an underground solar panel that feeds on heat rather than the sun's rays. Enerdrape says its panels can meet 100% of the space heating, cooling and hot water needs for buildings up to 10 stories in height.

The company, which launched in 2019, has projects across Europe, including with Switzerland's largest retailer, Coop Immobilier, small businesses like a dental office in Spain, utilities and multiple Swiss cities.

It also teamed up with Engie, one of Europe's largest gas and renewable energy suppliers, to provide energy to 72 homes with Paris Habitat, France's largest affordable housing provider. Enerdrape said its 145 panels provide 70 megawatt-hours of heat per year and cover 25% of homes' domestic hot water needs while avoiding 15 tons of carbon dioxide emissions annually.

Despite many urban areas setting ambitious climate goals and a growing number of residential electrification programs, few companies target affordable housing, according to a 2022 [report](#) from the American Council for an Energy-Efficient Economy. Decarbonizing [heat first](#) is the most cost-effective way to electrify affordable housing, the group found.



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Low-income housing tends to be old buildings that are more expensive to retrofit, said Thatcher Bell, who leads climate tech accelerator The Clean Fight's programs. High upfront cost for replacement, the financial constraints and the large number of stakeholders in these buildings make operators less likely to install new technology. The accelerator selected Enerdrape for a recent cohort of startups focused on low-cost, low-construction ways to cut emissions from older units, without displacing residents. The need for those types of solutions is growing.

In New York, Governor Kathy Hochul calls for building 800,000 electrified or electrification-ready homes by 2030. New York City, meanwhile, passed a law to tackle building emissions, which account for approximately 70% of the city's carbon footprint. Similar measures in cities like [Boston and Seattle](#) have followed.

The majority of New York City residential buildings covered by the law are pre-war construction of six stories or less, according to the [Urban Green Council](#). That provides plenty of opportunities for technology like Enerdrape's. However, the startup faces some challenges.

Heat pump adoption is [higher in parts of Europe](#), and Enerdrape will have to contend with [slower adoption](#) in the US due to cost. Upfront cost, which includes panel installation and heat pump connection, is typically between \$100,000 and \$500,000, depending on a building's available surface area that can be activated as a heat source. Political headwinds in the US are another issue, with President Donald Trump [curtailing federal support](#) for heat pumps.

The system can cut electricity costs, though. According to the company, it can deliver energy at 3 to 4 cents per kilowatt hour, compared to the average US gas price of 17 cents per kWh. Enerdrape says its solution is cheaper in Europe, where fuel costs are 3 to 5 times higher than in the US.

The system also won't help with larger buildings, which are some of New York's biggest energy users. "We're not going to be able to do much" with a 60-floor high-rise, Rotta Loria said.

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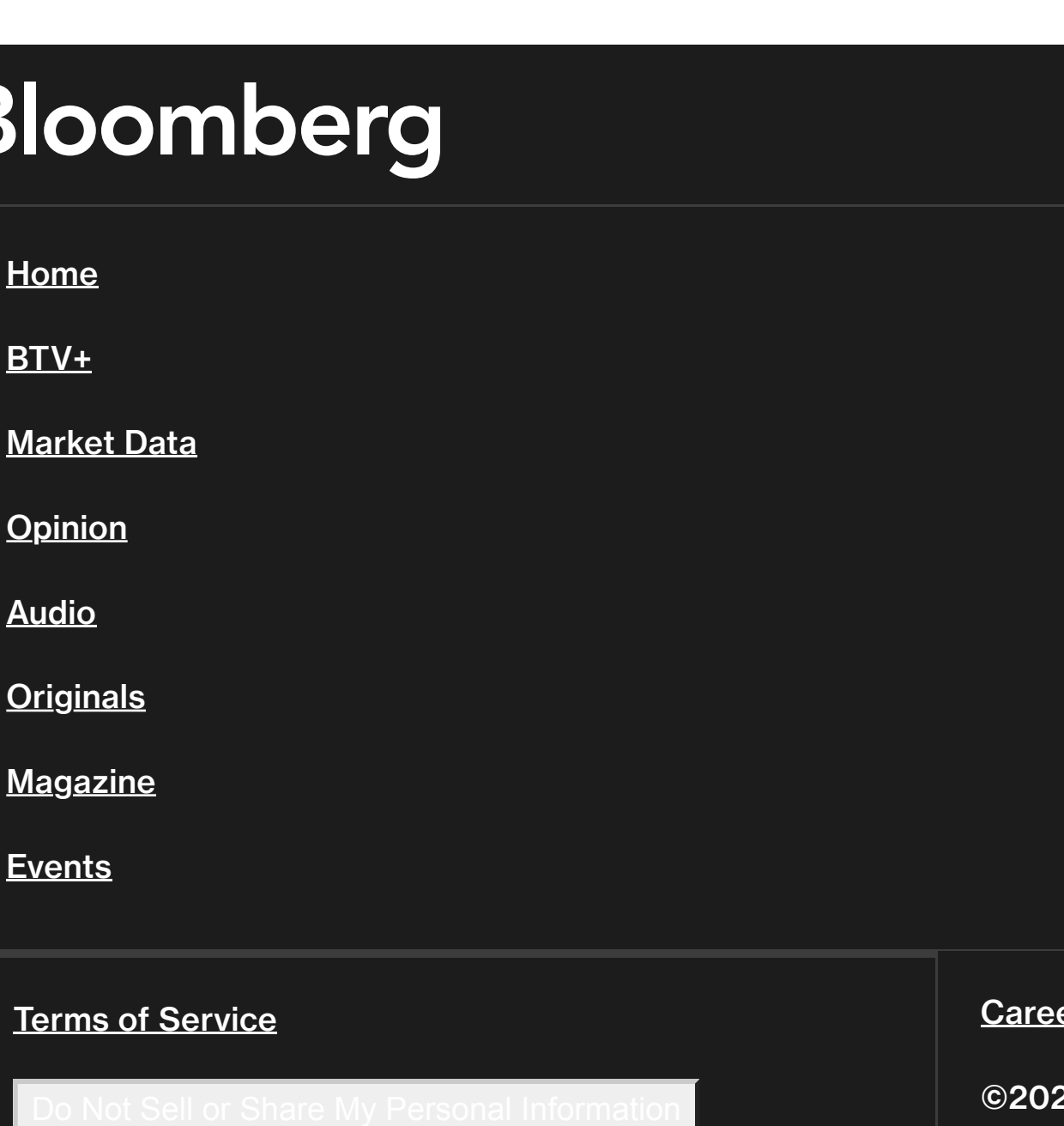
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