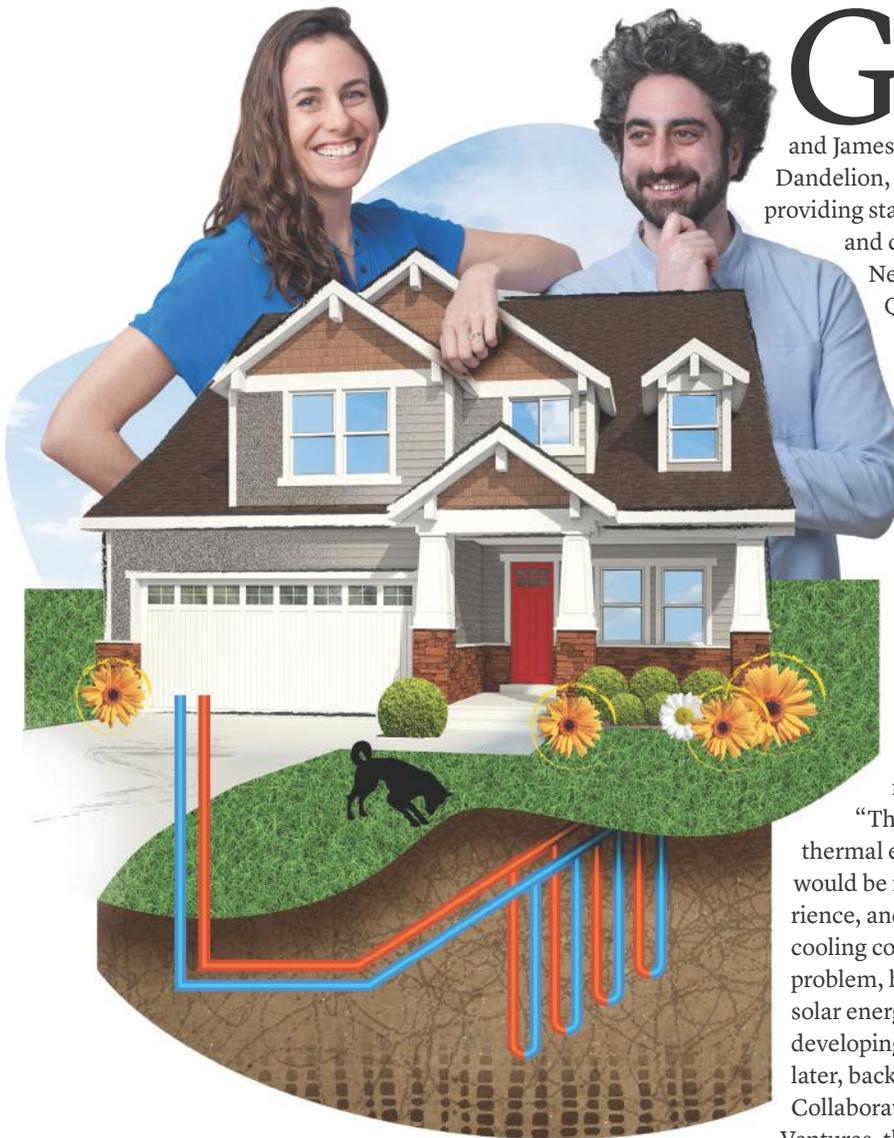


TABLE TALK

Making Geothermal Heating Mainstream

A CONVERSATION WITH KATHY HANNUN '05 AND JAMES QUAZI '98

By Debbie Kane



Geothermal energy is one “hot” renewable energy source. Just how hot may depend on the efforts of Kathy Hannun '05 and James Quazi '98 and their new venture, Dandelion, a New York-based company providing state-of-the-art geothermal heating and cooling systems to homeowners in New York State. Hannun is CEO and Quazi is chief technology officer of the company, which spun off last year from X, Alphabet’s famed innovation lab.

Hannun, who has bachelor’s and master’s degrees from Stanford University, was an X project manager when she learned about the potential of geothermal power. “A colleague in our New York office explained the problem of how to efficiently heat and cool homes and buildings, especially in the Northeast, where many people rely on heating oil,” Hannun says.

“There’s an abundant free resource of thermal energy if we can access it. People would be free of oil, have a better experience, and have predictable heating and cooling costs.” She drilled further into the problem, hiring Quazi, a Cornell-educated solar energy entrepreneur experienced in developing energy technologies. Two years later, backed with venture capital from Collaborative Fund, ZhenFund and Borealis Ventures, the duo launched Dandelion. “Our

investors understand Dandelion’s potential to redefine a huge market — home heating and cooling — and use technology to provide a better solution than currently exists,” Hannun notes.

Geothermal power is an attractive alternative to traditional heating and cooling

DARLENE MOELROY

sources because it taps into the thermal energy underground where temperatures are a steady 50 to 60 degrees. A residential geothermal system harnesses energy from the ground to heat and cool homes and produce hot water. Dandelion installs closed-loop systems that use a closed circuit of water running through piping to exchange heat between the earth and the home, pushing heat out in the summer and pulling heat in during the winter. Unlike heating systems that produce heat by combusting fuel oil, propane, or natural gas, geothermal heating uses electricity to harvest renewable thermal energy, producing no point-source emissions.

Two barriers to widespread residential use of geothermal energy, according to Hannun and Quazi, are cost and installation. Residential systems have usually cost \$80,000 and up to install. “Very few people have the skill set to install geothermal systems,” Hannun says. “For years, the industry has had quality issues, which drove up costs.” Installation of the underground pipes — called loops — that carry water in and out of the home is also daunting, typically requiring large drills and heavy equipment.

Dandelion’s solution: a smaller, simpler geothermal heat pump, powered by electricity. The pump is installed alongside a water heater and a monitoring system with a smart thermostat; the monitoring system flags problems for homeowners. The company also developed a smaller drilling rig that enables the systems to be installed in densely populated areas; the smaller rig drills smaller holes, meaning less destruction to residential lawns. Dandelion works with existing heating and cooling companies in the Hudson River Valley and New York’s Capital District to install the systems. “New York has an existing geothermal industry,” Quazi says. “We started out working with experienced local contractors and, now that we’ve automated the installation process and have the right tools, we’re talking to other installers, training them, and supervising installation.” The company estimates its geothermal system, when tax incentives and federal tax credits are taken into account, costs New York consumers around \$20,000 to install.

“This is an entirely new way of approaching the problem,” Hannun says. “We’re looking at a high-quality, low-maintenance solution that’s best for the homeowner over the long run.”

Dandelion is in discussions with the Village of Rhinebeck, New York, enabling the company to install and own ground loops on town property in front of homes. The loops will be installed at no upfront cost to

homeowners, who have the option to connect to them to switch over from fuel oil or propane heat. “The mayor is very progressive and excited about putting his town at the forefront of renewable energy,” Hannun says. “It really inspires us to work on how we can make geothermal even more affordable and easier to get. We hope to use it as an example for other towns.”

Although existing residential installation is currently Dandelion’s focus, Hannun and Quazi aren’t ruling out moving into the new home or commercial building markets. “We’re tackling the existing home market because we’re dramatically simplifying the installation process,” Hannun says. “We started with home retrofitting because you can largely standardize the process.” They also hope to bring geothermal energy to other Northeastern states. “As a start-up, we’ve learned to

“HOW OFTEN DO YOU GET TO WORK ON AN OPPORTUNITY THAT OFFERS BETTER OPTIONS FOR HOMEOWNERS AND SOCIETY? IT’S VERY REWARDING.”

be really deliberate about what we can take on,” Quazi notes. “We can’t solve all problems at once.”

Hannun and Quazi attended Exeter at different times, but similar experiences with the school’s math curriculum may have helped shape their career paths. For Hannun, Exeter’s cooperative learning gave her confidence to pursue engineering and computer science in college. “It let me learn at my own pace and develop an understanding of logic and the satisfaction of achieving an insight that allowed a difficult problem to be solved in an elegant way,” she says.

Quazi cherishes Exeter for teaching him to learn. “At other schools, you may be given a textbook and shown how to solve problems, and the outcome is that you now can perform that function,” he says. “When I got to Exeter, my first math class had no textbook, just a sheet of problems that you had to work through with your classmates. The goal was to work collaboratively to figure out how to problem-solve.

“This sort of view on problem solving, along with some risk tolerance, makes taking risks — like leaving Google to start your own company — feel less risky.”

Despite the inherent risk of a start-up, Hannun and Quazi are excited about Dandelion’s future. “How often do you get to work on an opportunity that offers better options for homeowners and society?” Hannun says. “It’s very rewarding.” ■