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By Heather Clancy April 22, 2020

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This is climate tech | Greenbiz

Since mid-March, as the economic impact of the coronavirus pandemic infected certain sectors of the U.S. economy, more than 200 U.S. startups have cut thousands of jobs. While they're not immune to the forthcoming fiscal challenges, entrepreneurs developing solutions for addressing climate change — from agtech to decarbonization to clean energy and more — are among those proving to be the most resilient.

In mid-March, Chicago-based alternative protein startup Nature's Fynd disclosed a healthy infusion of $80 million, bringing its total to $113 million. The firm plans to double its workforce this year, to more than 100 employees.

In Pittsburgh, artificial intelligence software company RoadRunner Recycling — which automates routing for commercial recycling processes — secured $28.6 million in a Series C round intended to help it expand into up to 10 new markets this year.

And this week, ClearFlame Engine Technologies — maker of a "clean combustion" engine that burns renewable fuels and can be dropped into existing diesel trucks — closed its initial financing round of financing of $3 million.

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"ClearFlame's innovative technology has the potential to reduce well over 5 gigatons of greenhouse gas emissions by 2050 and to disrupt freight transportation and other hard-to-decarbonize sectors such as construction, mining, agriculture and distributed power generation," said Daniel Goldman, managing director of Boston-based Clean Energy

Ventures, a firm explicitly focused on global climate risks, which led the round. Its portfolio of early-stage investments also includes Boston Materials, which is working on a carbon fiber composite material that could help lightweight cars and planes; and Rebound Technologies, developing natural refrigerant solutions.

At the surface level, these companies have little in common, but they are all representative of a wave of innovation known as climate tech — technologies that are explicitly focused on reducing greenhouse gas emissions or addressing the impacts of global warming. Research released several years ago by the World Bank estimated the opportunity for smaller climate tech firms at more than $1.6 trillion (PDF).

According to Tommy Leep, founder of Jetstream, which has advised early-stage climate tech startups including reforestation firm Pachama, and editor of the climate tech newsletter The Breeze: "These are solutions to the crisis. They are in service of helping the climate."

Lila Preston, co-head of the growth equity strategy at London-based Generation Investment Management, the firm founded by former Vice President Al Gore and one of the two lead investors in that $80 million Nature's Fynd round, adds another dimension to that definition. "These are businesses that accelerate the transition to a more sustainable economy," she told GreenBiz.

An homage to cleantech

What, exactly, falls under the climate tech category?

The list is gratifyingly long, encompassing advances in carbon capture and sequestration, combined heat and power systems, crop waste recycling, building automation and biofuels.

A 2018 article (PDF) (chart below) from the Stanford Social Innovation Review considers solutions in five main categories: transitioning the energy supply to renewable sources; moving toward zero-emissions transportation; reducing the impact of buildings and other infrastructure; cultivating sustainable agriculture, forestry and land use; and decarbonizing industrial processes.

Climate Solution by Innovation Stage

SOLUTION CATEGORY	ENERGY SUPPLY	TRANSPORTATION	BUILDINGS	AGRICULTURE, FORESTRY, AND OTHER LAND USE	INDUSTRY
Commercially viable or near commercially viable solutions	■ Silicon-based photovoltaics ■ Onshore wind power ■ Lithium-ion batteries for short duration (< 4 hour) storage ■ Power system optimization software solutions ■ Demand response and consumer engagement solutions ■ Ice-based thermal energy storage ■ Generation 3+ nuclear power	■ Light- and medium-duty electric vehicles ■ Sugarcane feedstock biofuels ■ Composite materials for vehicle lightweighting	■ LEDs ■ Residential cold climate heat pumps ■ Building automation and control technologies ■ Efficient window technologies and coatings	■ Advanced sensing solutions ■ Crop resource optimization technologies ■ Crop waste recycling ■ Forest management and reforestation ■ Anaerobic digestion ■ Biotechnology assisted animal breeding ■ Genetic modification of crops	■ Low-grade industrial heat production ■ Combined heat and power systems
Nascent solutions	■ Carbon capture and sequestration ■ Generation 4 nuclear energy technologies ■ Fuel cell technologies ■ Long-duration energy storage solutions (> 4 hours) ■ High-efficiency, low-cost transmission ■ Offshore wind power ■ Next-generation photovoltaics	■ Low carbon hydrogen production and storage ■ Hybrid or electric heavy-duty vehicle drive trains ■ Algal or cellulosic biofuels ■ Fuel cell vehicles ■ Advanced combustion engines	■ Hyper-efficient building envelope technologies ■ Hyper-efficient refrigeration and freezing ■ Wide bandgap semiconductors ■ Transparent photovoltaic window coatings	■ Carbon-neutral fertilizer production processes ■ Livestock methane capture ■ Synthetic meat production ■ Vertical farming techniques ■ Genetic engineering for sustainable food production	■ Industrial process-integrated carbon capture ■ Low-carbon cement production ■ Low-carbon steel and aluminum production ■ High-efficiency industrial motors ■ Thermoelectrics, rectennas, and other waste heat recovery technologies
Unexplored solution spaces	■ Biomass energy with carbon dioxide capture and storage ■ Fusion energy ■ Solar geoengineering	■ Next-generation transportation solutions (e.g. "hyperloops") ■ Third- and fourth-generation biofuels (solar fuels)	■ Space-based living and terraforming	■ Non-fuel-based ammonia production	■ Non-fossil petrochemical production ■ Carbon-negative cement ■ Space-based mining

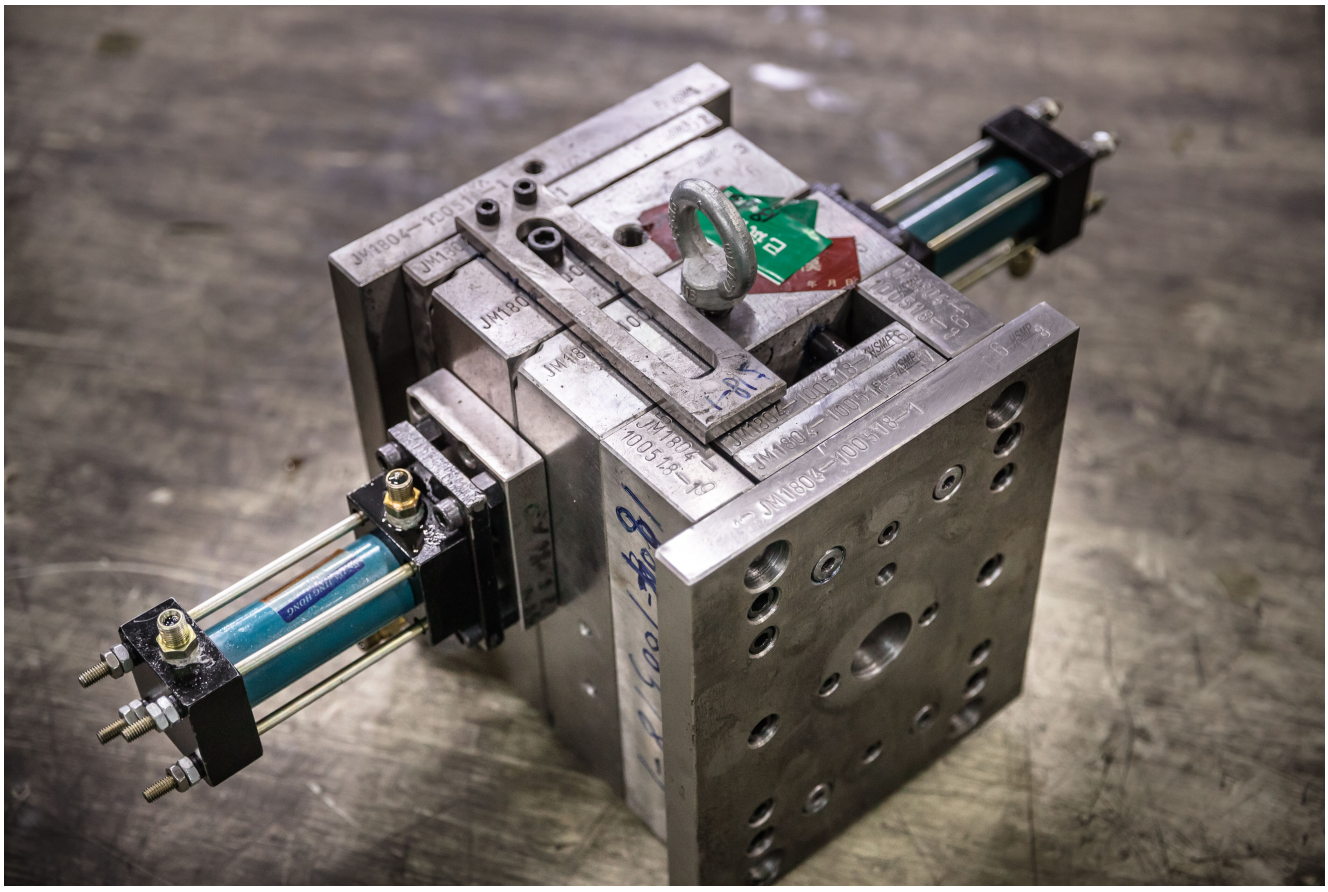
I can hear some of you saying: "That sounds like cleantech." Certainly, there are similarities, but climate tech directly links the solution to the urgency of climate crisis, according to a dozen venture capitalists, startups and other investors interviewed for this story.

Ted Dillon, director of marketing for Clean Energy Ventures, notes in a February blog: "Though we use the terms interchangeably, climate tech and cleantech aren't synonymous, nor is one the parent and the other the child," he writes. "In reality, the terms are more like siblings with shared areas of interest but slightly different missions. While climate tech has a unique set of priorities based on addressing a monumental, global challenge, cleantech is

focused on improving humankind's efficiency and interaction with the environment around use."

Over the past two years, guided by data underscoring the severity of the climate crisis, venture capital firms long associated with the cleantech movement have refined their investment criteria to recognize the long-term, systemic risks that global warming poses to the economy and to humanity. Part of that is a branding thing: the collapse (PDF) of widely trumpeted and heavily funded companies — including solar manufacturing company Solyndra, which eventually filed for bankruptcy — became an easy talking point for politicians and skeptics. But, as Dillon notes, the phrase "climate tech" also underscores the urgent need to support such solutions.

"We don't see a world where the future doesn't have a climate lens," said Andrew Beebe, managing director of San Francisco-based Obvious Ventures, another firm that has aligned its portfolio with this sensibility. Three representative examples from the Obvious portfolio: electric bus company Proterra, fleet charging technologies Amply and construction materials delivery company RenoRun.



What’s in a successful pitch

To be clear, pitches by climate tech entrepreneurs are subject to the same scrutiny and skepticism as any other startup. "Successful climate tech cannot be charity," said Valerie Shen, chief operating officer at G2VP in Menlo Park, California, the climate tech group spun out of Kleiner Perkins Caufield & Byers. Two intriguing startups in the G2VP portfolio: Carbon, a 3D printing company; and Fictiv, an on-demand hardware manufacturing startup.

That means the business models for these companies must demonstrate the same potential for market scale and returns expected by any venture capital firm — including compelling leadership and domain expertise, and knowledge of how to navigate the unique regulatory requirements associated with their chosen sector, Shen said.

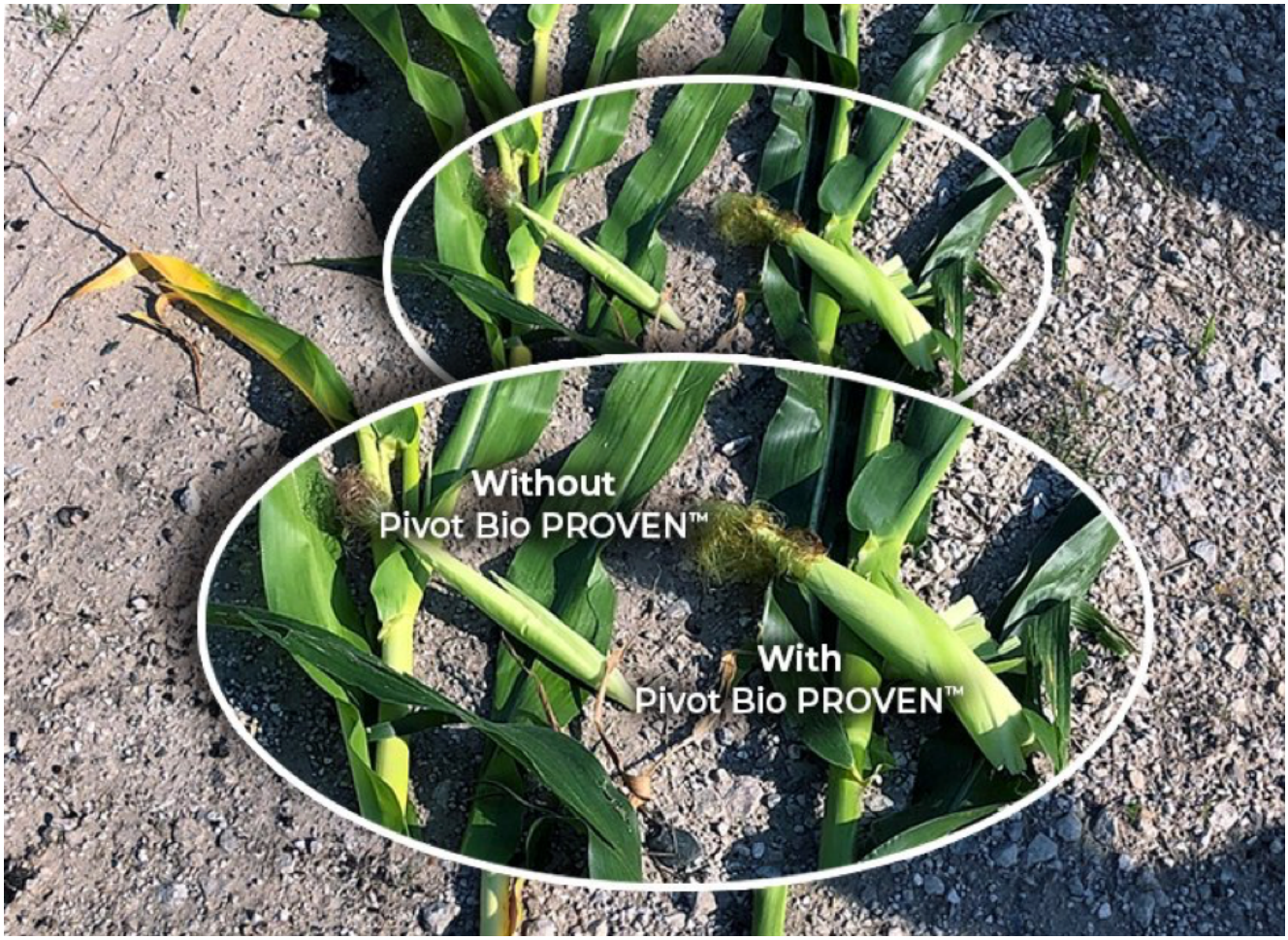
But that’s just a start. Climate tech startups must prove their "world-positive component" to earn that moniker, Beebe said. That means being able to discuss both the impact of their technology on the world as well as the environmental and social sustainability footprint of their operations as they scale.

Clean Energy Ventures follows a specific commitment as part of its mission statement for climate tech investments: It’s looking to invest in companies that can reduce GHG emissions by 2.5 gigatons over the next 30 years, which means individual startups need to be able to address how their solutions can eliminate up to 100 million tons annually, Goldman said.

How does it measure this? It has developed a methodology to help entrepreneurs calculate that impact, which it uses to evaluate companies that are seeking funding. It was one of the organizations involved with development of the CRANE Tool, created specifically to assess the impact of climate technologies; the platform should be launched formally later this year.

Another metric that venture capital firms are looking at closely: potential and actual partnerships between climate startups and "enterprise customers," as Preston puts it.

Research and development alliances between entrepreneurs and government agencies or respected businesses in their industry sector are critically important to scaling these solutions quickly. Don’t be surprised if many climate tech investment rounds include participation by corporate venture funds.



"Most if not all these companies need to have a story for the Fortune 500," said Zachary Bogue, managing partner at Data Collective (DCVC) in San Francisco. Artificial intelligence is at the heart of many of the DCVC-backed startups, such as Pivot Bio, which is using computation to develop non-chemical fertilizer approaches for crops.

"There is not a lot of forgiveness when you talk with a large company about partnering," echoed Andrew Chung, founder and managing partner of 1955 Capital in Los Altos, California. "We're really looking for ideas that can transform an industry. That is what gets people to pay attention."

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As an example, Chung cites his experience with LanzaTech, a carbon capture company that he was involved with while at Khosla Ventures. Chung worked closely with LanzaTech on orchestrating pilot projects of its technology at steel mills in China. Those proof points helped LanzaTech forge relationships with companies including Mitsui, Siemens and Arcelor Mittal. LanzaTech's $72 million Series E round in August came from life sciences company Novo.

While many of 1955 Capital's companies are still in stealth, the firm was the lead investor on Nature's Fynd's first round of funding and it is also a backer of Crop Enhancement, which is working on ways to boost crop yields while minimizing or eliminating chemical fertilizers.

How coronavirus is infecting climate tech investing

It will take months for the ultimate economic disruption of the coronavirus pandemic to be truly understood, and Leep anticipates "major setbacks" in funding and adoption. It's clear that the current crisis is having two immediate impacts.

First, despite the three special funding examples listed at the beginning of this story, it will take a longer time for deals to come together. "A lot of firms are tapping their brakes," Bogue said. That's primarily because it's tougher to do due diligence — visiting labs and research facilities or meeting key team members — when people are unable to travel.

Some concrete evidence from DCVC's own portfolio: Satellite company Capella Space — one of the companies hoping to play a role in the earth observation data space, such as for monitoring fishing fleets in the ocean — was forced to delay an important satellite launch.

The CEO of another startup I interviewed late last month, Ben Lamm of Hygergiant Industries, told me he had no choice but to postpone the launch of its Eos Bioreactor, which

uses algae to sequester carbon dioxide, by roughly three months. But he's determined to make it happen later this year. "If we just play our part, we can make a big difference," he said.

The pandemic's effect on global stock markets also has rightsized funding valuations, which had become overinflated. That said, the COVID-19 crisis — and the parallels that can be drawn with the long-term risks of global warming — are providing powerful talking points for investors.

"It's a powerful looking glass toward the fragility of our global system overall," said Nancy Pfund, managing partner of DBL Partners in San Francisco, which is behind companies such as Apeel Sciences (which makes plant-based coatings to reduce produce food waste) and Bellwether Coffee (developing a zero-emissions, electrified approach to roasting coffee). "If you have fresh powder, it's a great time to invest. We know there will be a generation of category-defining climate companies that come out of this time."

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For that reason, all eight technology investment firms interviewed for this article are steadfast in their support for the climate tech category. Clean Energy Ventures even took the step of orchestrating an open letter to startup founders, signed by dozens of funds and incubators.

"Climate change is an existential threat to humanity — albeit a longer-term threat than this virus," the investors wrote. "If your company is focused on helping current and future generations live longer, healthier lives over the decades to come, we're interested."

As for current portfolio companies, the investors said much of their time amid the COVID-19 crisis is dedicated to helping founders and leadership teams lead through the crisis. "Some of these companies will come out stronger than before," Chung said. 1955 Capital also penned a tome similar to the one referenced above, intended for entrepreneurs inside and outside its portfolio.

Elemental Excelerator, the early-stage startup accelerator with a presence in Honolulu and East Palo Alto, California, is in close communication with its portfolio companies, said

Elemental Excelerator CEO Dawn Lippert. That includes activating its network of investor partners and convening conference calls and briefings on topics such as crisis management, how to buoy employee morale and where to find financial resources. "We're moving from reaction to learning to action," she said.

She's optimistic that interest in climate tech will prevail, pointing to the more than 800 applications that Elemental Excelerator just received for its latest accelerator program, which includes 15 to 20 companies per year.

"More companies have closed rounds in the last four weeks than in the previous three months," Lippert added, declining to be specific. "Investors are stepping up."