Corporate investment could improve climate-tech innovation

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Corporate investments in climate-tech start-ups are a growing but overlooked aspect of energy innovation. According to a new report from Morgan Edwards, a professor at the La Follette School of Public Affairs

at the University of Wisconsin–Madison, and her lead co-author at University of Maryland, these investments should be more fully considered as methods to advance climate technology. The report was published in *Joule*.

Start-up companies have the potential to rapidly commercialize innovation, but they don't always have the resources to make such ventures successful. Corporations, on the other hand, tend to have the resources that start-ups lack, like access to global markets and supply chains, manufacturing facilities and experience across the energy system.

While corporations are often strategic investors motivated by profits, they can also be motivated to expand existing business models, gain innovation insights, and meet environmental, social, and governance (ESG) commitments. When well-resourced corporations invest in start-ups, they can have an outsized influence on which start-ups succeed and grow, therefore shaping climate technology trajectories.

"We will need a whole host of new technologies to transition to a net-zero or net-negative emissions economy. Many innovations are currently in development but not yet mature," says Edwards, who holds a joint position in the Nelson Institute Center for Sustainability and the Global Environment at UW–Madison. "Finding the right mix of corporate, private, and public investments will be critical to getting these technologies to market quickly and encouraging new innovations."

In 2021, corporate investments in climate technology totaled over $11 billion, flowing to more than 460 start-ups, representing a quarter of all public and private investment dollars. This number has grown considerably since the Paris Agreement began in 2016 but still leaves a sizeable gap for governments to step in and incentivize investment in climate-tech that aligns with long-term climate and societal goals.

Kavita Surana, lead co-author with Edwards and a senior fellow at the Center for Global Sustainability at the University of Maryland, says this gap needs to be a larger point of emphasis moving forward to make necessary advances in climate technology.

"Corporations and the choices they make investing in climate-tech start-ups are particularly important as they tend to focus on technologies closer to reaching widespread adoption compared to public or other private investors. However, their role in climate change innovation has been overlooked to this point in our efforts to mitigate the effects of climate change," says Surana, who is also an associate faculty member at the Complexity Science Hub Vienna.

The paper's team of researchers investigated a dataset of 6,996 climate-tech start-ups from North America, Europe, and Israel that were founded between 2005 and 2021. They also looked at 9,749 investors who participated in 33,698 investment deals.

Among the paper's findings, the research team observed that corporate investors are most active in later investment stages when technologies are closer to market deployment.

They also found that corporate investment in climate-tech start-ups is highly concentrated, with a few large corporations like Shell, Alphabet, and Samsung playing an outsized role. Between 2016 and 2021, these large companies each invested in over 25 climate-tech start-ups. A handful of companies, including Amazon, Ford, and Alphabet, each invested over $1 billion.

Investments were also concentrated in certain technologies. For example, fuel cell and hydrogen technologies received a much higher percentage of corporate investment than other sectors like marine and hydropower, nuclear, and biomass generations. These sectors also receive little

funding from other private sources, suggesting that public investment may be necessary to fill the gap.

The research team's policy recommendations include:

- Using data-driven insights on corporate climate-tech investments and their outcomes to anticipate technological change and identify policy and regulatory gaps for emerging sectors and industries.
- Incentivizing investments that support long-term climate solutions over short-term workarounds. This could help policymakers target the technologies that reduce emissions most efficiently.
- Identifying and filling in gaps in corporate and private investment in key technologies and infrastructure. Policymakers need a more complete picture on the full investment landscape to keep balanced the portfolio of technologies needed for decarbonization.
- Mobilizing and rewarding additional corporate and private finance to support climate-tech start-ups. Designing new public-private models that mobilize capital from corporations through rewards or accountability nudges can help advance corporate efforts to invest in climate and energy innovation.

Edwards, Surana and their team see this paper as a first step in being able to understand the relationship between corporate investors and climate-tech start-ups and eventually inform policy that can ensure beneficial climate and societal outcomes.

More information: Kavita Surana et al, The role of corporate investment in start-ups for climate-tech innovation, *Joule* (2023). DOI: 10.1016/j.joule.2023.02.017

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