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**Jennifer M. Granholm**  
Secretary of Energy

1140 3rd Street, NE  
Washington, DC 20002  
Erin Burns • (304) 633-8495  
[policy@carbon180.org](mailto:policy@carbon180.org)

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### **Leading with Innovation: Direct Air Capture Hubs as a Path to Gigaton-Scale**

To Whom It May Concern:

The Infrastructure Investment and Jobs Act (IIJA) authorizes the Department of Energy (DOE) to spend \$3.5 billion on four direct air capture hubs, each capturing at least one million metric tons of CO<sub>2</sub>, across the US through the Regional Direct Air Capture (DAC) Hubs (hereinafter referred to as “DAC Hubs”) program. We believe the DAC Hubs will drive new breakthrough DAC approaches down the cost curve and up the commercial readiness scale, enabling technology advances necessary to meet climate goals both domestically and abroad.

Through extensive discussion with carbon removal startups and experience running the Carbon180 Entrepreneur-in-Residence Fellowship, we’ve learned that entrepreneurs bring a valuable perspective to innovation policy. They are at the forefront of building projects and commercializing technologies and, accordingly, have firsthand knowledge of the biggest barriers to scale. To leverage that experience, we have partnered with leading DAC, carbon utilization, and carbon transformation startups to share recommendations on how DOE can maximize the impact of the proposed DAC Hubs so near-term innovation can flourish.

DAC Hubs represents the largest federal investment in direct air capture to date and an opportunity to dramatically accelerate the pace of active deployments. Currently, DAC removes a combined total of approximately 10,000 tons of CO<sub>2</sub> from the atmosphere per year. Even one DAC hub represents a hundredfold increase in the size of the industry. While this is an encouraging milestone, DOE should continue to think long-term when considering the potential of the field. There is still significant opportunity for new technology to radically impact the cost and scalability of DAC. To maximize climate impact, DAC Hubs should be designed to reduce the time it takes to reach gigatons of removals annually, not capture the first million tons as quickly as possible. New approaches increase opportunities for companies and, therefore, the breadth of regional co-benefits and designs that enable more robust community engagement.

Below, we provide suggestions for how to implement DAC Hubs in a way that removes roadblocks for early-stage innovators and clears the path towards a gigaton-scale DAC industry. These recommendations are endorsed by [Carbon Capture](#), [CarbonCure](#), [Heirloom](#), [Holy Grail](#), [LanzaTech](#), [Mission Zero](#), [Noya](#), and [Twelve](#).

Sincerely,

In collaboration with:

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**Erin Burns**  
Executive Director



**DAC Hubs should accommodate DAC at all scales: small, medium, and large.**

- This is the best way for DOE to magnify the value created by this program. To date, no company has executed at the scale targeted by DAC Hubs — this is a new challenge for the whole field.
- Rather than building DAC Hubs around a small number of larger companies, we believe that the best way to mitigate overall program risk is to diversify funding across many DAC companies and technological pathways. Not only is this approach a better way to support early-stage innovation, it will be more broadly inclusive of startups across the whole country.

**DOE should reserve funding for new innovation demonstrations at DAC hubs.**

- DOE should prioritize proposals that incorporate and provide federal funding for diverse and promising technologies that could eventually lead to lower costs and greater scale, rather than exclusively on more proven approaches that can deliver more tons in the near term. To do so, DOE should use some funding to defray the cost of building small pilots and mid-scale demonstrations, in addition to megaton-scale projects, at DAC hubs.
- DOE should maximize the leverage of cost-share by awarding funding to projects that allocate significant and material cost-share proportions to companies with more nascent technologies. This way, a greater number of smaller projects can receive DOE support via this program.
- Rather than operate according to a fixed timeline, DOE should segment awards and deploy capital when companies meet performance criteria. This will encourage companies to compete on performance standards as well as execution speed.

**DOE should prioritize hub locations that include CO<sub>2</sub> storage or transportation capabilities.**

- Accessing permanent storage for atmospheric CO<sub>2</sub> captured by DAC facilities is still an extremely challenging problem, especially for early-stage startups. The technical, permitting, and financial requirements for submitting a successful application for geologic storage are burdensome to all but the largest companies. Yet, it will be a communal requirement for all companies that access a DAC hub. As such, DOE should make Class VI geologic storage and common carrier transportation, compression, and injection infrastructure, a priority feature of all DAC hubs.
- DOE should award funding for storage in high-quality utilization and alternative sequestration modalities like mineralization. Incorporating utilization generates additional revenue opportunities for DAC companies while also providing carbon-to-value companies access to high-grade and reliable CO<sub>2</sub> sources. Examples of utilization opportunities that still provide a durable storage function include concrete and limestone. There are also utilization options that displace fossil fuels and create new waste-carbon-based supply chains that help transition away from fossil energy for the production of sustainable fuels, chemicals and products.

**DOE should provide critical infrastructure.**

One of the greatest opportunities for DAC Hubs is to provide the necessary infrastructure that companies struggle to deploy alongside new projects. Most of these roadblocks are shared by DAC startups, making DAC

Hubs an ideal opportunity to accelerate progress of the industry. We suggest DOE take the following steps to overcome these challenges:

- Integrate DOE funding support for dedicated zero-carbon firm power at all DAC hubs. Hundreds of megawatts of clean power are an essential ingredient of DAC, given carbon emitting energy sources reduce the net-removal capacity. Local utilities may be unable or unwilling to provide the necessary electrical capacity.
- Provide support for other shared resources, such as compression facilities for CO<sub>2</sub> injection, independent measurement and verification, water, natural gas, and pressurized air.
- Ensure that support provided to an individual project for common infrastructure such as the above be made available to all DAC Hub participants at cost.

**DOE should provide ongoing technical support.**

- Early-stage startups may struggle to integrate their systems into DAC hubs as their internal technical resources will already be operating close to capacity. DOE should provide engineering support for initial setup, safety review, integration into common carrier infrastructure, and ongoing operational guidance in the form of updated injection plans, and life cycle assessment tools.
- DOE should facilitate ongoing community engagement and implementation of health and safety rules, assist with hiring local labor, and create forums with local communities to share progress updates.

**DOE should optimize for openness.**

- The DAC industry will only succeed if that success is shared across many DAC companies. DOE should request that larger DAC companies share infrastructure and equipment built at DAC hubs with smaller startups. For example, common carrier CO<sub>2</sub> transportation and storage infrastructure will be essential for new companies to enter the market in the future.
- DOE should consider ways that data produced at DAC hubs may be shared between both participating companies and the public while protecting intellectual property.

**DOE should integrate DAC Hubs into broader carbon removal innovation efforts.**

- There are many carbon removal solutions that hold promise outside the definition of DAC specified in the 45Q statute. Fortunately, DOE has significant funding outside of the IIJA that can help demonstrate promising innovations across the carbon removal spectrum. Integrating these solutions into DAC Hubs will demonstrate DAC's ability to exist within a carbon removal portfolio. Co-located carbon removal solutions also expand the potential for co-benefits enjoyed by local communities.

*Carbon180 is a DC-based NGO with a vision to eliminate legacy carbon emissions and create a livable climate in which current and future generations can thrive. We design and champion equitable, science-based policies that bring carbon removal solutions to gigaton scale.*