



RFI Number: DE-FOA-0003333

Re: Request for Information on Opportunities to  
Support Mid-scale Commercial Direct Air Capture  
(DAC) Demonstration Facilities

April 25, 2024

To Whom It May Concern,

Carbon180 submits the following comments in response to the Request for Information on the role of mid-scale commercial DAC demonstration facilities in the DAC industry's commercialization plans. Carbon180 is a DC-based climate NGO on a mission to design and champion equitable, science-based policies that bring carbon removal solutions to gigaton scale. We commend the Department for acknowledging the challenges faced by mid-scale DAC facilities and thank the Department for the opportunity to provide input on the potential design of a mid-scale DAC demonstration facilities program.

A mid-scale Commercial Direct Air Capture program could be an important opportunity to support the unique obstacles that MSC DAC faces and the sector's scaling plans. A MSC DAC program could support the goals of the Carbon Negative Shot, filling a market gap in DAC development and deployment and further driving innovation. The Department of Energy (DOE) should design the program to be highly-accountable, equitable, and just. Our recommendations reflect priorities to both design and implement the MSC DAC program.

Sincerely,

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Director of Policy



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## Category 1

**Question 1. Are DOE's views on the need for public funding to support mid-scale DAC facilities generally accurate? Please provide a yes or no answer and elaborate on the reason.**

**Response:** Yes. As stated in the RFI and other recently published reports, most of today's DAC companies have developed technologies with a technology readiness level between four and six, meaning they have successfully piloted their technology and now need to demonstrate the ability to fulfill commercial services. Companies with technologies in this range must overcome the challenges associated with demonstrating commercial viability. These include addressing engineering and commercial risk, public and private investment access, and securing consistent market demand for their product/service. Given these challenges, public funding for mid-scale DAC facilities will support:

**An innovative portfolio approach.** Designing a funding opportunity to support mid-scale (MSC) DAC facilities encourages a diversity of project and technology approaches, balancing what can be executed today with where the field needs to go in the long term. Supporting the technologies that are not quite ready for demonstration today can also avoid technological lock-in and enable innovation, optimizing for long-term climate impacts of DAC beyond the four initial hubs.

DOE should diversify its investments by distributing public funding across project developers, technology licensees, and financiers. An MSC DAC program should provide an additional pot of public funds to de-risk the market for pre-commercial providers scaling from pilot to demonstration projects, but it is not yet able to meet the million-ton requirement of the Regional DAC Hubs Program. Without support for MSC DAC, the leading incumbent providers will dominate the market, securing the bulk of programmatic funding and potentially hindering innovation and collaboration.

Innovation in technologies and the lessons learned from deployments will significantly scale annual DAC capacity from where we are today (10,000 metric tons) to where we need to be (gigaton scale), offering lessons that can yield lower costs, greater energy and capture efficiency, social license to operate, and more. Dedicated funding for MSC DAC facilities creates an opportunity to continue innovating across the full portfolio of DAC technologies, providing important engineering lessons for future project scale-up. A MSC DAC Program could also encourage the co-location of projects near ancillary infrastructure and pre-permitted storage sites that could enable participation and education across the portfolio of DAC technologies.

**Leveraging DOE learnings for future funding opportunities.** From the first FOA for the Regional DAC Hubs Program, DOE has a foundational database to inform future funding opportunities, including likely sites for DAC Hubs, potential couplings with other DOE-sponsored projects, and an overall assessment of the landscape of credible commercial projects and technologies. DOE should use that information to 1) guide the design of future funding opportunities for DAC; and 2) publish early, non-business sensitive learnings about:

- the status of projects and technologies, including current and projected cost data, lifecycle analyses, environmental data, climate impact data, progress towards Justice40,
- DOE's learnings and understandings through administering the program, and
- DOE's approach to administering carbon management programs moving forward, including information about DOE's selection methodology, key objectives, as well as projected and proposed impacts.

**Question 6. Has DOE accurately reflected the challenges related to siting and operating MSC DAC facilities? Please provide a yes or no answer and elaborate on the reason.**

**Response:** No, not entirely. DOE has accurately identified anticipated challenges of comparative longevity and co-location preferences, but additional considerations exist for siting and operating MSC DAC. Challenges will differ depending on if a site is chosen to optimize for on-site energy generation, geologic storage, or other infrastructure.

**Recommendation:** We recommend that DOE prioritize projects that 1) minimize environmental harm from pipeline or transmission development by siting near existing infrastructure or in areas that offer close energy and storage/offtake and 2) produce long-term community benefits. We're uncertain if there will be a consistent demand for CO<sub>2</sub> offtakes or products. Project siting needs to balance the short-term interests of developers with long-term opportunities for communities. As stewards of publicly funded projects, DOE must consider the impacts of concentrated industries like DAC hubs and prioritize projects that minimize their negative effects on natural systems, biodiversity, and public health.

**Recommendation:** DOE should emphasize projects that are sited near existing infrastructure or near potential future DAC Hubs. This will help ensure longer-term investment into DAC sites and avoid investing in sites that may be abandoned in less than a decade. Encouraging the deployment of temporary sites (decommissioned in less than five years) might make developers less likely to invest in their host communities or view them as partners in their process. Infrastructure labeled or socialized as temporary is less likely to receive buy-in from communities because it can cause harm and provide unstable economic support. DOE should promote the exploration of modularity with MSC DAC to scale towards a larger, socially responsible, and more efficient DAC fleet.

**Recommendation: Cumulative impacts analysis.** DOE should require MSC DAC projects conduct a cumulative impacts analysis to inform siting considerations at the initial phase of a project. Cumulative impacts would include the public health or environmental effects from the combined emissions and discharges in a geographic region, an important consideration with divergent perspectives on facility operational lifetimes. More dispersed MSC DAC facilities raise questions to the host community about the impacts of facilities constructed and decommissioned in a short life cycle, including what community benefits look like for quick-turnover projects. DOE should encourage project developers to work with a comprehensive range of community stakeholders (e.g., environmental justice, labor, religious, environmental and climate groups, Tribes, academia, and local government) to finalize project components, including site locations, through consent-based processes akin to DOE’s consent-based siting process for federal consolidated interim storage of spent nuclear fuel.

**Question 7. What challenges related to MSC DAC facilities were not addressed? In what ways could DOE support MSC DAC facilities that were not mentioned?**

**Response:** DOE should require transparency and knowledge sharing for all funded MSC DAC projects. Insights gained from deploying this level of DAC will be invaluable for future carbon removal endeavors, especially when conveyed through publicly accessible data, which can propel new projects past existing obstacles or bottlenecks. To maximize transparency and promote broader learning, DOE should mandate that award recipients publish non-proprietary data detailing their technology development, deployment, life-cycle analysis methodologies, and community benefits plans and agreements.

**Question 8. How would a future program most effectively support MSC DAC demonstration facilities? Please address total funding amount, cost share percentage, requirements for facility operational life, specific technology types, or other topics that may help further define a future DOE program.**

**Response:** Future programs could be supported through the following recommendations:

**Recommendation: Flexibility in drawing geographic boundaries.** Technological diversity allows for greater creativity in designing DAC hubs and the Regional DAC Hubs Program, including a flexible definition of the geographic bounds for hubs. Funding support for mid-scale DAC facilities highlights unique challenges and opportunities, including offtake agreements, clean energy inputs, and different siting interests. Congress defined a “hub” as having “the capacity to capture, sequester, and utilize, or sequester and utilize at least 1,000,000 metric tons of carbon dioxide from the atmosphere annually from a single unit or multiple interconnected units.” DOE should lean into that flexibility implied in the definition in implementing the

program as it empowers the agency to aggregate removals from a geographically dispersed network of MSC DAC facilities of various sizes.

**Recommendation: Transparency.** DOE should require transparency and knowledge sharing for all funded MSC DAC projects. Insights gained from deploying this level of DAC have the potential to inform future carbon removal projects, especially when conveyed through publicly accessible data. To maximize transparency and promote broader learning, prior to awarding any funding, DOE should clearly communicate what information the public can expect to receive, where to find it, and at what stage of the implementation process it will be communicated. This should include basic, non-business-sensitive information, such as project locations, energy source(s), involved parties, and carbon storage type. The agency should clearly communicate what cannot be made public and why, including what is business-sensitive.

**Question 9. What timing and frequency would be most effective for DOE to offer funding for MSC DAC demonstration facilities? (e.g., a specific calendar year, recurring offerings in multiple years, rolling applications)**

**Response:** We acknowledge that DOE has to strike a balance between climate and political urgency in disbursing funding with a desire to do community engagement well. This is difficult and we applaud the work that DOE has done to this end so far.

**Recommendation: Timelines.** DOE extends timelines to the extent possible between a MSC DAC NOI release, FOA release, application due dates, merit reviews, award announcements, negotiations, and finalizations. Longer timelines allow for community engagement and community benefits plans (CBP) planning between MSC DAC applicants and potential host communities. Meaningful community engagement and effective CBPs are still relatively new concepts for developers. They require building trust with potential host communities to ensure they are rooted in and responsive to community desires and demands. This is especially important considering the low level of public awareness of DAC and the burgeoning skepticism for CDR entirely. Additionally, pursuing inclusive governance and accountability mechanisms and preparing to enter into high-bar Memorandums of Understanding (MOUs), Community Benefits Agreements (CBAs), Project Labor Agreements (PLAs), and other community agreements (see #29 for a definition of ‘high bar community agreements’) will require time. Longer timelines for review and negotiations would also enable DOE to do outreach with and contract community leaders and organizations in potential host communities to be directly involved in decision-making processes with DOE and developers. We recommend DOE build in as much flexibility in timeline and frequency as possible.

Ideally, MSC DAC timelines should be longer than those seen in the Regional DAC Hubs program, including at least the following:

- 3 months between NOI and FOA,
- 6 months between FOA release and final application due dates,
- 4 months for merit review, and
- 6 months for award negotiations.

**Recommendation: Rolling Applications.** DOE should pursue rolling applications with a long-term deadline for full project selection. This methodology would allow for project hurdles to be addressed and necessary project changes to be made without the pressure of a strict deadline, resulting in the submission of subpar or non-ideal project applications. Flexibility in the timeline can help enable consent-based approaches for project planning, selection, and decisions.

**Question 10. Are there more effective ways DOE could support the direct air capture field that would be higher priorities than MSC DAC facilities?**

**Response:** DOE's Carbon Negative Shot is an innovation call to reach gigaton-scale carbon removal by 2050 at a cost of \$100/metric ton or less. As outlined in the RFI, there is a public funding gap for the suppliers and technologies between the 50,000 tons/year minimum in the DAC Hubs program and the pilot projects eligible for the DAC Pilot Prize and DAC Test Center, and these suppliers often do not have access to project-level financing, offtakers, and clean energy inputs. Therefore, we agree that MSC DAC would benefit from dedicated public funding.

**Recommendation: Procurement.** In addition to funding MSC DAC facilities, DOE should consider using a portion of available funding to purchase tons of carbon removed and durably stored using DAC technologies. Direct investments through the DAC Hubs program, DAC pilot prizes, and other research, development, demonstration, and deployment funding can support scaling the DAC sector. However, these supply-side public investments and incentives are even more powerful when paired with a long-term public market for durable carbon removal. Direct public procurement of carbon removal would de-risk offtakes for project developers of all sizes, including MSC DAC, helping to crowd in private funding (purchases, equity investment, and debt financing). Beyond its financial capacity, the federal government can uniquely establish stringent project standards and position carbon removal as a public good.

**Question 11. Would it be advantageous for DOE to fund shared facilities offering DAC developers access to clean energy and CO2 offtake, where a mid-scale facility could be built, in lieu of funding that directly supports the DAC facility's development and construction?**

**Response:** Yes, funding programs that prioritize shared infrastructure should be deployed in tandem with, not in replacement of, direct support for facility development and construction.

Providing funding for both development and shared resources will enable DAC companies to access specialized resources that might otherwise pose challenges due to high CAPEX costs, engineering requirements, and limited expertise in niche subject matters.

DOE needs to champion proposals that aim to permit and build common carrier energy, capture, transportation, storage, and utilization infrastructure that exceeds the initial supply of CO<sub>2</sub> from MSC DAC facilities to enable future development and co-location. It is imperative for DOE to refrain from endorsing utilization in the form of enhanced oil recovery. We can effectively remove entry barriers by providing DAC developers with access to clean energy and CO<sub>2</sub> offtake. This support benefits developers who may otherwise struggle to secure private funding for mid-scale projects.

If implemented successfully, MSC-DAC projects are an opportunity to test practical, high-quality monitoring, reporting, and verification at shared facilities, and would yield direct performance data across different capture technologies, enhancing DOE's ability to refine carbon management standards and inform programs.

### **Category 3: Community and Labor Engagement, Benefits, and Impacts**

**Regarding category 3, Community and Labor Engagement, Benefits, and Impacts (questions 16 through 21),** Carbon180 endorses the Blue Green Alliance's recommendations in their response to this RFI. Specifically, we support their recommended criteria for evaluating and selecting applicants for an MSC DAC program. This includes support for quality jobs with collective bargaining authority and the recognition and utilization of existing labor community assets, which DOE should use to evaluate and select applicants for a MSC DAC program.

### **Category 3: Equity, Environmental, and Energy Justice**

**22. What equity, environmental, and/or energy justice concerns or priorities are most relevant for an MSC DAC program? How can/have these concerns or priorities be/been addressed?**

**Response:** The environmental justice movement is underpinned by various forms of justice—procedural, distributive, reparative, and transformative—that must be incorporated into the MSC DAC program's processes and outcomes. Many of these justice types can be addressed through current initiatives at DOE, such as Community Benefit Plans (CBPs) and the Responsible Carbon Management Initiative, but they are by no means guaranteed.

**Procedural justice** is fairness and inclusivity in decision-making processes. One important avenue in achieving procedural justice in an MSC DAC program would be meaningful

community engagement which allows the co-creation of projects between developers and communities with multi-directional flows of information, insights, resources, perspectives, and opinions through both speaking and listening. Engagement plans must 1) include an understanding of community history and dynamics, 2) be tailored to the unique characteristics and needs of communities (e.g. internet, language, transportation), and 3) build the capacity of all stakeholders to engage (e.g. technical education, compensation, childcare). Truly meaningful engagement enables community self-determination, where communities have decision-making power over what projects they accept or reject based on their priorities, needs, and values.

**Distributive justice** requires equitable distribution of benefits, opportunities, risks, and harms in hopes of addressing a history where BIPOC and low-income communities have borne the burdens of industry, like air and water pollution, while receiving few of the financial benefits with minimal agency. Community-defined benefits and opportunities, as well as community-accepted risks and harms, can be identified through a meaningful community engagement process and integrated into legally enforceable agreements, such as CBAs. For CBAs to be truly just and effective, they should at a minimum be created with a comprehensive range of community stakeholders and rights-holders (e.g., environmental justice, labor, religious, environmental, and climate groups, Tribes, academia, and local government). They should include clear metrics for measuring the success of delivery of benefits over time, acceptable mitigation and compensation measures for potential adverse project impacts, penalties for noncompliance, and successor clauses.

**Reparative justice** is the repair of previous harms committed through violations and crimes. Many environmental justice groups are concerned over the involvement of historically extractive and harmful industries in the build-out of the new DAC industry. Furthermore, many communities where DAC projects are likely to be deployed have endured significant environmental, social, and public health harms that build on each other, resulting in cumulative impacts. Reparative justice demands an acknowledgment of historic harms that have occurred and a remedy, when possible, of those harms. Through a meaningful community engagement process, including background research, community assessments, and conversations with community stakeholders, developers can understand a community's history and dynamics and where their DAC project could repair some of those historic damages. Some examples include repurposing legacy infrastructure and removing existing waste. Ultimately, projects resulting from the MSC DAC program should, to the greatest extent possible, be designed to repair previous and existing harms within host communities.

In addition to advancing these variations of justice, there are also generally agreed-upon priorities from the environmental justice movement that should be integrated into the MSC DAC program:

- Use of additional, clean, renewable energy



- Reduction, to the maximum extent possible, of CO<sub>2</sub> transportation infrastructure
- Monitoring, reporting, and verification of CO<sub>2</sub> and non-CO<sub>2</sub> impacts
- Creation of emergency response plans
- Early and transparent publication of CBPs before any award negotiations are announced

**Question 23. Describe possible human health, environmental or ecological considerations, both positive and negative (e.g., are there any air quality impacts, impacts on sensitive ecosystems, impacts on communities with environmental justice concerns, other considerations) in connection with implementation of this program.**

**Response:** Potential impacts associated with this program could include damage to sensitive environments as well as:

- **Water demand:** DAC has the potential to use between 1 and 8 tonnes of water per ton of CO<sub>2</sub> captured. Local water resources and demands must be assessed and reported pre-permitting to better understand the impact of a project on water resources and to help community members plan. Regions that are water-stressed or will experience future water stress should not be chosen to site DAC.
- **Chemical use:** Projects must have a clear and transparent plan for manufacturing solvents and sorbents, monitoring for workplace safety, and solvent/sorbent end-of-life disposal. Sorbents are still nascent and lack a history of research to clarify associated environmental and public health impacts and improve sorbent lifetimes. DOE must consider additional research and development around the impacts of sorbents on public and environmental health. DOE must also consider the public health and environmental impacts associated with manufacturing steel, concrete, copper, and aluminum for building DAC plants.
- **Air quality impacts:** Though DAC works to remove CO<sub>2</sub> from the air, communities are concerned with other pollutants and byproducts from DAC facilities. EJ communities are often burdened with compounding pollution from traffic and other heavy industries. DOE should require all projects to demonstrate that the host site is not already facing elevated levels of pollutants that would be compounded by increased DAC siting.
- **CO<sub>2</sub> transportation infrastructure:** Expansion of transportation infrastructure for carbon dioxide could bifurcate communities through highway build-out, take land away from residents and communities through the use of eminent domain, and increase local air pollution through associated construction of transportation infrastructure.

**Question 24. How can adverse impacts be measured or monitored, and which materials/processes/components may result in the largest environmental impact? What opportunities exist to minimize impacts?**

**Response:** The best measurement, monitoring, reporting, and verification protocols measure all variables associated with the project, including removals and impacts on human health and

ecosystems. This includes direct measurements of a comprehensive set of external impacts on public health and ecosystems, including but not limited to air and water quality, co-signed by the host community. Additionally, all data related to project performance, storage reversals, safety, and ecosystem impacts should be open and available for peer review. For DAC systems that propose using natural gas facilities with carbon capture and storage to supply energy, methane emissions from transport, power, and facility operation must be quantified.

**Question 25. What information do communities, Tribal or State governments, or entities/organizations need to engage with the Department on MSC DAC?**

**Response:** While the DAC industry has grown substantially, the public is still largely unaware of the concept and technology involved. Through our outreach, we have identified the need for introductory and advanced education on DAC.

**Recommendation: Education Materials.** DOE should create education materials that are available in multiple languages across the US, particularly in BIPOC and low-income communities. In our engagements, we have identified three categories of materials needed:

- **Introductory:** Most groups (community, governments, EJ, academics, etc.) will require materials that provide an introduction to DAC and its role in addressing the climate crisis, its associated infrastructure, and its potential impacts, as well as why the federal government is investing in it.
- **Intermediate:** Some groups will require more intermediate and advanced education that includes DAC technologies, processes, infrastructure, and policies. Eventually, all groups will require this level of information as familiarity and understanding grows.
- **Government:** Many local, state, and Tribal government agencies would also benefit from information on federal DAC happenings, what they can access, and how their efforts could be complementary.

Once a baseline understanding of DAC technologies and investments is widely established, it will be important for communities and organizations to receive information on what the MSC DAC program hopes to achieve, why scaling the technology is critical, the timeline for program set-up and activities, how this program will fit in the bigger picture of federal DAC work, and program commitments to work with, benefit, and protect communities.

Communities and organizations should receive information on how they can be meaningfully involved in decisions and actions around MSC DAC. Transparent, clear, accessible, and frequently updated information on MSC DAC program timelines, milestones (e.g. RFIs, FOAs, award negotiations), project and policy decision points and reviews, activities, and events, and other important program information should be shared with communities and organizations multiple times, in multiple formats, and in advance.

**Question 26. What benefits or opportunities could encourage local, State, and Tribal governments to consider engaging with the Department?**

**Response:** Many benefits and opportunities could encourage governments and communities to consider engaging with DOE on MSC DAC. Through our engagement with EJ groups and communities, we learned there are varying levels of trust with DOE and of perceived access to staff. DOE has an opportunity to build a relationship with local, state, and Tribal Governments, discuss additional specific priorities, and directly share federal opportunities.

**Opportunity: Collaboration.** The ability to influence DOE actions on DAC and collaborate on programs, projects, and policies would be monumental. Through our engagement with many EJ groups and communities across the country, we've identified a frustration that the federal government is going full speed ahead on DAC regardless of public opinion, and billions of dollars are being spent with little to no influence from impacted communities and local governments. For example, the opacity around merit review opportunities and project go/no go decision points have been community tension points.

**Opportunity: Governance.** Communities, tribes, and local governments may appreciate the opportunity to explore novel governance structures and processes that empower communities. DAC's nascency lends itself to exploration and on-the-ground study of innovative business, ownership, governance, and similar mechanisms that may be more difficult to explore in more established industries. While there is growing interest in community ownership models, community reinvestment, and community power in project development and deployment processes, DAC deployment continues to follow traditional mechanisms. As we learned through our work in the CALDAC Hub, communities are excited by the potential opportunity for DAC to set a new precedent for placing power in community hands and creating avenues for investment in community priorities. There is a lack of familiarity with DAC technologies at local, state, and Tribal government levels. Resources on DAC could benefit communities and governments to make informed decisions and organize collectively on how to engage with DAC.

**Benefits: Economic.** Local, state, and Tribal governments could benefit from the inflow of safe projects into their communities that provide social, economic, labor, and environmental benefits. DAC projects could provide new quality jobs, repurpose legacy infrastructure, enable renewable energy build-out, support a just transition, and more.

**Benefits: Local Expertise.** Investing in community residents and leaders for their knowledge, lived experiences, and expertise. Project developers can use compensated contracts with people for their unique knowledge, building the capacity of those most impacted by DAC on the ground to engage in federal DAC policies and activities.

**Question 27. How should the Department better engage local, State, and Tribal communities to establish reasonable expectations and plans concerning MSC DAC?**

**Response:**

**Recommendation: Transparency.** A tension point in the current Regional DAC Hubs Program is a perceived lack of transparency and clarity from DOE around when communities can receive information about and be involved in federal DAC activities, including project merit reviews, CBPs, award negotiations, and project go/no-go decision points. DOE must provide this information to communities early (before decisions are made and program stages advance), clearly, frequently, and in multiple formats.

Communities have voiced frustration with the lack of access to basic information (e.g. site location, involved parties, carbon storage type, energy source) of projects to date in the DAC Hubs program. This lack of information can lead to groups “filling in the blanks,” with the potential for misinformation. DOE must be able to provide transparent, clear information to communities on potential projects coming to their vicinity. We encourage DOE to be honest with communities (and require the same from funded project developers) and to have answers to basic questions (that do not involve IP or other protected, legal information) around project site location, involved companies, transportation and storage, energy sources, and more.

**Recommendation: Direct Engagement.** DOE should expand its direct engagement with communities. There are clear, hotbed areas for DAC deployment across the US, such as California’s Central Valley and the Gulf Coast, where communities would benefit greatly from increased direct interaction with DOE on DAC. DOE should try to meet communities where they are by considering joining existing community events or co-planning events with communities and having them lead the development of the format, agenda, etc.

**Question 28. What organizations, universities, or communities should the Department consider partnering with to develop MSC DAC?**

**Response:** Community-based organizations in frontline communities across California, Texas, Louisiana, and other hotbed states are receiving a large influx of permits and projects for DAC and other emerging technologies. To alleviate engagement fatigue and resource limitations, DOE should prioritize applications for MSC DAC in areas outside these regions. Furthermore, to ensure any MSC DAC program is developed in a way that benefits historically disadvantaged and disenfranchised communities and stakeholders, DOE should partner with HBCUs, HSIs, Tribal colleges, community colleges, high schools, trade schools, and vocational schools; minorities in STEM programs; departments at national laboratories and universities with a proven track record of working in trust and respect with communities; community development

groups; community science groups; community-based organizations, including EJ, social justice, health justice, and economic justice groups.

**Question 29. What are the key equity-aligned review criteria that DOE should use to evaluate and select MSC DAC?**

**Response:** We recommend DOE evaluate and select MSC DAC based on the following:

**Transparency:** Project developers implement robust mechanisms for transparency — before, during, and after the project ceases. In particular, project developers will:

- Select the project site by directly integrating public input.
- Publicly share the project governance process and model.
- Work with communities to identify the types of data collected and publicly shared, including the level of detail, frequency of monitoring and reporting, response to findings, and means of disseminating information.
- Transparently and honestly share the potential risks and benefits of and gaps in data associated with a project.
- Make any CBPs, CBAs, and similar project plans publicly available.

**Community engagement:** Project developers implement robust mechanisms that enable procedural justice through meaningful community engagement. In particular, project developers will:

- Accurately identify who the community is, including the use of screening tools and by allowing the community to define themselves.
- Conduct social characterization, racial equity, and social equity assessments to develop a deep understanding of community history and dynamics.
- Maintain a public record of engagement activities and events over the project life.
- Maintain a public record of all community questions, input, ideas, perspectives, desires, and sentiments shared and how they were incorporated, or not, into the project.
- Conduct a longitudinal study to observe community relationships and trust with developers as they evolve over the course of the project's lifespan.
- Present a uniquely tailored community engagement plan at the outset with a robust budget, metrics for success, and clear identification of how it is responsive to the needs and characteristics of the community.
- Provide honest, transparent, and unbiased community education on DAC.
- Provide financial resources for disadvantaged community stakeholders to engage.
- Maintain and verify community engagement over the project's life to retain funding.

**Delivery of community-defined benefits:** Project developers integrate distributive justice and ensure community-defined benefits are directly delivered. In particular, project developers will:

- Conduct background research and engagement to identify community priorities.
- Demonstrate direct alignment between the proposed project and existing community priorities, explaining how specific priorities were identified, how the project advances them, how the project may not advance certain identified priorities, and how that gap could potentially be filled.
- Prioritize benefits for disadvantaged stakeholder groups within communities whose priorities and values have historically been sidelined or excluded.
- Provide a wide range of benefits outside of jobs and economic development, such as public health, environmental, social, infrastructure, and other benefits.
- Formalize commitments to provide community-defined benefits in legally enforceable agreements.

**Repair of previous harms:** Project developers acknowledge historic harms within a community and, where possible, repair them. In particular, project developers will:

- Conduct social characterization and similar assessments to understand community history, identify historical harms, and determine who was most impacted by those harms.
- Acknowledge and demonstrate understanding of historic environmental, social, economic, and other harms within a community through project commitment letters, purpose statements, communications, and materials, etc.
- Demonstrate how project design can currently address identified historic harms and how it could be altered to address additional harms.
- Formalize commitments to repair previous community harms in legally enforceable agreements.

**Governance:** Project developers empower communities and enable their self-determination, a core principle of justice. In particular, project developers will:

- Pursue consent-based decision-making processes for finalization of project components, such as site location, technologies included, and involved parties.
- Establish a multi-party Memorandum of Understanding (MOU) with a wide range of community groups involved in the project, collaboratively defining and deciding shared principles, equitable decision-making process, compensation strategy, compensation method, training, conflict resolution, and evaluation methods for the project.
- Incorporate at least one project veto point in the engagement timeline where community stakeholders, with support from community groups included in the MOU, can collectively vote to end or terminate the project in good faith.
- Enter into high-bar legally enforceable agreements (see above).

**Accountability:** Project developers ensure accountability across project dimensions, including climate, environmental, public health, social, and economic impacts. Project developers will:

- Enter into legally enforceable agreements to ensure delivery of community-defined

project benefits, like CBAs and PLAs, with a comprehensive range of community stakeholders and including clear metrics for measuring success over time, acceptable mitigation and compensation measures for potential adverse project impacts, penalties for noncompliance, and successor clauses to ensure continuation.

- Establish a compensated community oversight board for the project that will provide consistent reports to communities and, potentially, DOE on project progress and potential violations of accountability mechanisms, governance agreements, and/or regulatory requirements.
- Implement detailed protocols for measuring, modeling, and monitoring net carbon removal and other project-specific environmental and public health impacts.
- Where possible, collaborate with community organizations to enable mechanisms and opportunities for participatory community monitoring and science.
- Contract an independent third party to validate the monitoring plan, shared publicly for consultation, and verify data collected, also made accessible to the public.

**Question 30. How can OCED ensure community-based entities/organizations are engaged and included in the planning, decision-making, and implementation processes (e.g., including community-based organizations on the program/project/activity team)?**

**Response:** DOE and project developers must publicly share information about prospective projects to allow for the iterative process of building a proactive, honest, two-way engagement between communities and project developers and to incorporate community collaboration meaningfully. Trusting relationships require extensive resources and information exchange. For (host) communities to meaningfully engage with the planning, decision-making, and implementation processes of a potential MSC DAC program, they must be equipped with clear expectations around information sharing, including what information will be shared, where to find it, and at what stage of the implementation process it will be communicated. Furthermore, communication on limitations, like project delays, challenges, and alternatives, also helps to increase transparency. Information to share that enables meaningful engagement with community-based organizations can include:

- An engagement timeline and overview of opportunities for involvement.
- An information hub, as readily available, includes fact sheets, project mapping, reporting on the public health and environmental impacts, and opportunities for engagement.
- Non-business sensitive information such as project locations, energy source(s), involved parties, and carbon transportation and storage type.
- Community benefits plans, as early as possible, before negotiations conclude and with a commitment to an iterative process undertaken together with communities.
- Public reporting on project progress through its milestones, measurement, monitoring, reporting, and verification (MRV). This should include MRV methods and data, and progress toward community benefits and Justice40 metrics.

- Facilitating community meetings or workshops as co-learning spaces where host communities can engage.

Project developers need to approach each community differently as their needs will differ. Each potential host community brings, and knows best, their local history, culture, and environment. They are the best resources to ensure project developers understand and address community concerns. This requires developers to understand a potential host community’s environmental and public health burdens when deciding a project site.

Project developers can ensure communities and community-based organizations are involved by:

- Providing financial compensation for their time, energy, expertise and lived experiences spent on the project.
- Recruiting them into project merit review, negotiations, award, and go/no-go decision processes.
- Entering into MOUs that clearly and collaboratively define project principles, goals, decision-making processes, conflict resolution strategies, and internal and external evaluation methods (see #29).
- Entering into high-bar, legally enforceable community and workforce agreements.

**Question 31. What barriers exist, if any, for deeper economic and other engagement with communities impacted by this program/project/activity?**

**Response:**

**Barrier: Knowledge & Accessibility.** There is a lack of readily available, culturally relevant resources on DAC that incorporate communities’ languages and worldviews. For communities to meaningfully engage in MSC DAC and make well-informed decisions, they should have the opportunity to develop a deep understanding of the technical, social, economic, environmental, climate, and political implications. Communities with large populations of non-English speakers struggle to find foundational and technical information on DAC technologies, projects, and programs in their language. This prevents them from organizing among themselves on how to engage in DAC, planning how they’d like DAC to show up in their communities, if at all, and poses barriers to them engaging with DOE and project developers.

**Barrier: Resource Constraints.** Many community-based organizations face insufficient staff, time, and funding. These organizations base their work on a communities’ immediate needs and often have pressing concerns — access to clean water, food, air, and more — that take up the majority of their available capacity. Supporting DAC engagement further strains their limited resources and capacity. Many of the communities where DAC projects are being proposed are grappling with not just DAC, but also CCS, hydrogen, and other emerging technologies, further



compounding the capacity issue. Deep engagement with frontline communities requires meaningfully investing in their capacity in order to build knowledge, plan long term, organize within themselves, and engage with external actors, including DOE. Communities should be financially compensated for their engagement, participation, and partnership in MSC DAC.

**Barrier: Mistrust.** Deep engagement with communities will require addressing the distrust many communities have of the federal government, including the existing sentiment that “DAC deployment is going to happen whether we want it to or not.” This sentiment of lack of power to influence DOE’s actions is further compounded by the questioning of why DOE and the federal government have placed such a large down payment on DAC technologies when communities have been asking for investments in other urgent priorities for decades. While we applaud DOE’s commitment to communities, equity, and justice, we acknowledge that these efforts are relatively new, and that communities are distrustful that these commitments are genuine and long-term.

**Barrier: Lack of Transparency.** Communities impacted by the Regional DAC Hubs program have voiced concern over the lack of answers to basic questions from DOE on DAC deployment, including around project locations and involved parties. Communities are asking for CBPs to be made publicly available for review and input, and for clearly defined processes of how their feedback will be integrated into key project decision points.

**Question 32. DOE requires Community Benefits Plans (CBPs) as part of all BIL and IRA funding opportunity announcements. CBPs are based on four core policy priorities: engaging communities and labor; investing in America’s workforce; advancing diversity, equity, inclusion, and accessibility; and implementing the Justice40 Initiative. Please give input on how CBPs for MSC DAC can support the identification and implementation of benefits to local communities, including disadvantaged communities.**

**Response:**

**Recommendation: Iterative CPBs.** CBPs *should be* living documents that require updates and collaboration throughout project implementation, creating robust and authentic collaboration mechanisms. Host communities bring local knowledge and lived experiences, and meaningful engagement can empower them to identify and define harms, benefits, and potential alternatives. Community-developed solutions can start small, iterate quickly, and later migrate to commercial scale. DOE has emphasized the importance of early and often community engagement, highlighting CBPs and their formal role in project go/no-go decision points.

**Recommendation: Publicize CPBs.** DOE and project developers should make community benefits plans public as early as possible, before any project actions or finalizations, and share all non-business-sensitive portions of these documents. This info needs to be released before

contracts are final and decisions are made in order to incorporate input and feedback into ongoing planning for hubs. CBPs are ever-evolving and offer documentation to hold project developers and DOE accountable in ensuring DOE fulfills its equity, environmental, and energy justice priorities.

**Recommendation: Transparent CBP processes.** DOE must provide communities with clear details about where, when, and how they can provide feedback and input to shape CBPs, participate in merit review process, influence go/no go decision points, and overall impact MSC DAC project plans. Clarifying and simplifying the engagement timeline and opportunities for direct input and feedback along the way can support communities in identifying and implementing benefits to local communities.

**Question 34. Please describe any issues that should be addressed to enable the equitable implementation of the MSC DAC?**

**Response:** As outlined in previous responses, timely and transparent communication of MSC DAC program information with the public is crucial to building trust and assuring the public that DOE is a thoughtful steward of public funds. It can lay the foundation for similarly ambitious, publicly funded efforts to de-risk other emerging climate technologies. DOE should continue to enable genuine stakeholder engagement, generate robust transparency and information-sharing practices, and maximize learning across a potential MSC DAC program. We see this opportunity as a common thread across the DAC Hubs, Hydrogen Hubs, and industrial decarbonization efforts being spearheaded by DOE.

**37. What factors should be considered when identifying and selecting the location of the technology/project/activity (e.g., economic considerations, policy considerations, environmental and energy justice considerations, geology, workforce availability and skills, current industrial and other relevant infrastructure and storage available/repurposed/reused, industry partners, Socially Disadvantaged Businesses or Enterprises, regional specific resources, security of supply, climate risk, etc.)?**

Response: DOE should consider the following:

**Geographic flexibility.** Including a flexible definition of the geographic bounds for hubs. Funding support for mid-scale DAC facilities highlights unique challenges and opportunities for MSC DAC, including offtake agreements, clean energy inputs, and different siting interests. DOE should lean into the Congressional definition of a hub — “ the capacity to capture and sequester, utilize, or sequester and utilize at least 1,000,000 metric tons of carbon dioxide from the atmosphere annually from a single unit or multiple interconnected units” — and consider aggregating removals from a geographically dispersed network of MSC DAC facilities.

**Technological diversity.** A MSC DAC program would support suppliers not quite ready for demonstration today or preparing their first demonstrations, avoiding technological lock-in or market domination by the few leading suppliers today. Supporting innovation across a portfolio of DAC technologies optimizes for long-term climate impacts drawing on the full range of technologies and suppliers to generate learnings at every stage.

**Collaboration with carbon management programs.** Learnings from administering the Carbon Dioxide Transportation Infrastructure Finance and Innovation (CIFIA) program, CarbonSAFE, DAC Hubs, Hydrogen Hubs, and other related prize programs that should be evaluated and used to benefit the design of subsequent programs. Program coordination is vital to effectively spending tax-payer cost-shared dollars and leveraging existing infrastructure. Award selections should be coordinated and prioritized across cost-share programs to prevent delays or stranded investments.

**Support for just transition.** Studies have shown that many of the anticipated new DAC jobs overlap with the skillsets of energy industry workers. As Congress highlighted DAC projects have the opportunity to support a just energy and economic transition for historically fossil fuel-dependent communities. DOE should prioritize selecting MSC DAC in areas where projects could help enable a just transition for existing energy workers. However, siting alone can not enable a just transition and must be accompanied by workforce development, education and skills training, and union membership support.

**History of extractive industries.** DOE must also consider a community's history with extractive industries when selecting MSC DAC. In many historic energy communities, environmental, political, and social burdens have accompanied selective job and economic opportunities, and many of these impacts still stand today. As a result, energy communities are justifiably distrustful and hesitant that the new DAC industry, with many of the same actors as those from previous extractive industries, will not perpetuate the same injustice DOE should avoid selecting MSC DAC in communities with harmful histories of extractive industry involvement unless reparative justice (defined in #22 and #29) and trusted actors are thoroughly integrated into the project.

**Influx of other DAC and carbon management projects.** As stated throughout this RFI response, there are areas across the country being inundated with carbon management projects and other emerging technologies. Many of these communities struggle to catch up with the rapid pace of permits and deployments. DOE should de-prioritize, to the extent possible, selecting MSC DAC in communities experiencing an influx of projects in order to support them in building internal capacity and reduce barriers for these groups to engage in the project and future advocacy.

**Community consent.** As defined by DOE’s Office of Nuclear Energy, consent-based siting is an approach to siting that prioritizes the participation and needs of people and communities and seeks their willing and informed consent to accept a project in their community. A consent-based approach enables meaningful and inclusive public participation, addresses community well-being and community needs, and centers equity and environmental justice as core values. While DAC technologies do not carry the same perceptions or implications of nuclear waste, community consent will ensure projects are only deployed where communities see value in DAC technologies and where investments in the potential social, economic, labor, environmental, climate, and/or political opportunities are welcomed. This approach will build social license for DAC technologies and ensure the long-term success of projects.

**Energy justice.** There are ample opportunities for the deployment of DAC to support additional, renewable energy build-out. However, there are understandable concerns that without additionality, DAC projects could divert existing renewable energy, increasing energy costs for ratepayers. DOE should prioritize selecting MSC DAC that utilizes its own additional renewable energy sources or that can tangibly demonstrate how it will not divert renewable energy resources or increase energy burdens.

**Impact on Tribal lands.** Tribes are sovereign nations and any potential impact to their lands should be thoroughly discussed and agreed upon. Consent from Tribal communities is absolutely necessary before any planning and on-the-ground action is taken. DOE must only select MSC DAC with potential impacts to Tribal lands that have free, well-informed, and prior consent from Tribal governments.

*Carbon180 is a DC-based NGO on a mission to reverse two centuries of carbon emissions. We design and champion equitable, science-based policies that bring carbon removal solutions to gigaton scale.*