

DOE FECM Carbon Management Strategy Request for Feedback

COMMENTS OF THE AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY (ACEEE) ON “DEPARTMENT OF ENERGY (DOE) FOSSIL, ENERGY, AND CARBON MANAGEMENT’S (FECM) REQUEST FOR FEEDBACK ON CARBON MANAGEMENT STRATEGY”

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The below comments from ACEEE are in response to the DOE FECMs [Carbon Management Strategy 10.10.24 0.pdf \(energy.gov\)](#)

1. Focusing research, development, demonstration, and deployment funding on priority use cases

- ***Direct funding towards demonstration/deployment of utilization use-cases as a priority***

We recommend that utilization of carbon be further emphasized to complement the priority use cases, which should include setting aside additional funding for beneficial utilization of captured carbon. One such way to prioritize funding for beneficial utilization could be through the [Carbon Utilization Parity Act](#) which would increase the utilization tax credit so that it equals the credit offered for carbon capture projects.

- ***"300M in funding pending project selection for state and local governments to purchase lower carbon products that use CO₂ as a feedstock" -- p.14***

Figure 5 in the Office Structure and Budget (OSB) section of the document includes a row on the “Carbon Utilization Program.” A review of the DOE website and available funding notices indicates that the [current round of funding](#) appears to be capped at \$100 million rather than \$300 million.

In addition to our recommendation to make utilization one of DOE FECM’s priority use cases, we recommend additional funding be allocated to this program, to match other efforts described in figure 5 which have billions of dollars set aside to support them. Another way to level the playing field for utilization would be to create funding for a new program that focuses on grants for companies that manufacture products that are made with captured carbon, to complement the funding that is available for the procurement of such materials.

Priority use case on carbon removal: We recommend a paragraph be added on how carbon capture could remove various other pollutants and greenhouse gases, especially those that are more potent e.g., methane and nitrogen oxides. Some resources/references are: betterenergy.org/blog/capturing-carbon-at-industrial-facilities-leads-to-billions-of-dollars-in-annual-us-health-benefits/ and www.catf.us/2023/12/carbon-capture-help-clean-harmful-air-pollution-critical-industrial-applications/. This could also lead into a discussion of how CCUS may be helpful in nonattainment and maintenance zones in capturing not only carbon but also emissions that contribute to ozone and air pollution.

Priority use case(s): Industrial decarbonization – Glass is mentioned in the appendix but not included in the main text, so more may be added on this subsector. It would be useful to better understand the rationale for why pulp and paper should be a near-term focus for CCUS by 2035. ACEEE research on industrial electrification indicates that there are easy opportunities to electrify paper manufacturing due to the low processing temperatures, including deployment of industrial heat pumps (Rightor et al. 2022 aceee.org/research-report/ie2201). However, since biomass use can contribute to carbon emissions in this sector that may require carbon capture as a solution. Therefore, we recommend a footnote be added on how pulp & paper production contributes to industrial emissions and refer readers to the appendix for additional information. The appendix could include information from sources like <https://www.sciencedirect.com/science/article/pii/S2666278724000369#bib0033>.

We concur that chemicals and building materials like cement are top focus areas for the near-term, including sustainable aviation fuel. However, we also encourage advanced research into products utilizing other forms of carbon (e.g., conversion of gaseous carbon into solid carbon) such as carbon nanotubes, carbon nanofibers and graphene that may be used to create high value industries and new carbon markets. Captured carbon that is processed into other forms may also be used in existing industries that use carbon today, such as the carbonated beverage industry or the cement/concrete industry (where carbon may be sequestered in blocks).

Priority use case: Clean fuels and products – moving the paragraph about CO₂ conversion from the appendix (paragraph that starts with “In this line of research” on page 61) into the main text will provide additional useful context on clean fuels and products.

RD&D/National laboratories discussion: It would be valuable to include a plan for integrating research on related subjects within and across national labs to ensure that lab work is complementary and not siloed, perhaps through setting up of cohort(s) that can share resources, data, and lessons learned across the labs.

Lifecycle analysis discussion: if the lifecycle analyses account for carbon from manufacturing/building the carbon project, it would be valuable to include that information in the discussion. It is important for CCUS projects to utilize low-carbon materials and processes in their construction (where available) to further minimize carbon impacts and ensure net zero embodied carbon.

Other clarifying comments

- **Figure 8:** would benefit from clarifying the difference between “DOE focus” versus “Necessary” labels in a note below the figure.
- **Figure 8:** industrial heat pumps should be listed as an example of electrification under Industrial Decarbonization as it represents a valuable strategy for electrifying and reducing emissions from low temperature/heat industrial processes.

- **Figure 9:** since the estimated costs are generally prohibitive for most use cases, this figure may benefit from addition of a column listing incentives/other mechanisms that could drive down the costs. This information may also be presented in another figure.

2. Building out CO₂ transportation and storage infrastructure where it likely will be needed most in the future

The DOE Carbon Management Strategy document would benefit from greater discussion of regional planning and how the Office of Clean Energy Demonstrations (OCED) regional clean hydrogen hubs integrate with the FECM carbon management plan, since the U.S. National Clean Hydrogen Strategy and Roadmap is mentioned in the Strategy document. Co-location of industrial activities will be critical in whole industry decarbonization, especially given the infrastructure already planned for hydrogen hubs. Lessons learned and best practices from implementation of the hydrogen hub projects should be shared with those looking to develop carbon management hubs in the same or nearby regions.

A second issue for consideration in a national strategy is the need to have alternate approaches and secondary plans for transportation and storage in the event primary storage repositories do not work out or are insufficient. For example, companies like Heidelberg Materials are planning for alternate sites (as far as 100 miles away from their Mitchellville plant, which is an OCED Industrial Demonstration Project (IDP) project), if the originally proposed site underneath the cement/CCS plant does not fully meet the needs of the project.

Thirdly, the strategy may also consider focusing CCUS infrastructure around industrial hubs to promote circular economy approaches and carbon utilization across industries.

Lastly, while hydrogen and CCUS infrastructure appear to serve different needs and could have very different business cases leading to the need for different strategies and policies to address elements unique to each, some areas where these two do merge however include pipeline infrastructure. Therefore, matters such as safety regulations, interstate commerce, and jurisdictional oversight would benefit from a common policy and strategic approach. This would also serve to ensure that the Agency's strategies and policies across different areas are aligned and integrated in a manner that reduces duplication of effort and resources.

3. Supporting the implementation of effective and evidence-driven policies and regulations related to carbon management at other federal agencies

- ***Comment on other carbon management programs at federal agencies to identify the gaps that need support. p.31-34***
- ***Support the creation of markets for products utilizing carbon***

To continue coordinated efforts in capture technology, we suggest adding [NIST's Carbon Dioxide Removal Consortium](#) to the Interagency collaboration sub-strategy.

The strategy document would also benefit from greater discussion on the creation of markets for products manufactured using the captured carbon. Such a discussion should include supply and demand side strategies, the support required to build and maintain such a market and circular economy considerations that would help to ensure a robust carbon utilization market ecosystem. One potential

resource includes reports published by the National Academies in 2023 and 2024 on [Carbon Utilization Infrastructure Markets Research and Development](#).

4. Engaging communities and workers to ensure projects deliver benefits and mitigate potential risks to public health and the environment

- ***Underscore how utilization offers a way to mitigate community and worker concerns and potential risks to public health and the environment***
- ***Utilization also helps create productive jobs in the green economy***

We recommend expanding the role of utilization to show how it can help mitigate community concerns over the scale of underground carbon storage by providing alternative pathways and uses for carbon, the potential for increased economic activity at local and regional levels due to the creation of new carbon utilizing industries and therefore more workforce opportunities and reduced public health and environmental risks.

However, it is important to recognize that while energy communities present prime opportunities for CCUS projects and a way to reinvest in historically marginalized communities, there needs to be careful consideration in engaging these communities that have been disproportionately impacted by industrial activities. For example, there may be communities that are not interested in hosting CCUS projects. Additionally, while it is critical to engage trusted leaders in communities and environmental justice leader voices in working groups, residents who are typically less involved in these discussions within energy communities should also be brought to the table. This may involve inviting different types of community-based organizations (CBOs) to working group discussions and presenting important information in more accessible ways depending on the needs of the community e.g., types of media, technical language, feedback forms. With respect to university training and minority serving institution (MSI) programs, it is important to consider how closely these schools are located to any potential CCUS project sites and to adjust the framing of training opportunities accordingly for institutions that may not be directly involved in such projects. Forming partnerships with businesses to provide workforce internships and on-the-job training opportunities would benefit from expansion to ensure engagement of workers who pursued trade schools or other workforce opportunities instead of 2- or 4-year college programs.

5. Supporting climate diplomacy efforts to accelerate the adoption of carbon management at scale globally in a way that aligns with the Paris Agreement.

- ***India is heavily focused on CCUS, as are some other emerging economies. We can support the idea of tech sharing through DOE's international affairs office to advance adoption of carbon management globally.***

We suggest a reframing of Strategy 5 in the overview section (page 20), given the limited discussion of developing countries in the expanded version of Strategy 5 (pages 47-49). One way to reframe is to move the appendix paragraph on page 57 (following the cement IDP graphic) to page 20, broaden its scope beyond just the cement industry, and edit it further to give additional context for how the use of CCUS to address U.S. emissions, provides an opportunity to share lessons learned from the implementation of decarbonization and CCUS and how this technology may be tailored for emerging economy contexts. transnationally.