This document has been prepared as part of the implementation project of Legal Pathways to Deep Decarbonization (Michael B. Gerrard and John C. Dernbach, eds. Environmental Law Institute [2019]) (LPDD). For background information on the project, see https://lpdd.org

Memorandum in Support of Executive Order Directing State and Municipal Departments to Purchase Minimum Amount of Energy Produced via Carbon Capture and Sequestration and Other Clean Energy [1]

1. Introduction

1.1. According to the Deep Decarbonization Pathways Project ("**DDPP**"), the United States Mid-Century Strategy for Deep Decarbonization issued by the White House in November 2016, and measures including the Inflation Reduction Act, carbon capture and sequestration ("**CCS**") can play a major role in reducing greenhouse gas emissions in the United States to hit its 2030 climate targets and net zero goals by 2050.

1.2. The 2023 Synthesis Report of the Sixth Assessment Report issued by the Intergovernmental Panel on Climate Change provides that, to reach net zero carbon dioxide (CO_2) and other greenhouse gas ("**GHG**") emissions, it would require global efforts to transition from using fossil fuels without CCS to very low- or zero-carbon energy sources, such as renewables or fossil fuels with CCS[2]. The International Energy Agency ("**IEA**")'s Roadmap for the Global Energy Sector [3] also highlights the importance of CCS in facilitating the transitioning to net-zero CO_2 emissions. In IEA's "Net-Zero Emissions by 2050 Scenario", there are a range of measures to establish markets for CCS investment and to encourage use of shared CO_2 transport and storage infrastructure by those involved in the production of hydrogen and biofuels, the operation of industrial hubs, and retrofitting of existing coal-fired power plants. On that basis, IEA estimates that 1.6 gigatonnes CO_2 can be captured per year globally by 2030, rising to 7.6 gigatonnes by 2050.

1.3. CCS is a technology that currently is used commercially and deployed around the world. It continues to be improved and explored as one of the most promising options to prevent CO_2 from continuing to be released from point sources into the atmosphere. Briefly, the technology involves capturing (purifying) CO_2 produced by industrial plants (such as steel mills, chemical plants and cement plants), coal and natural gas-fired power plants, and oil refineries, compressing it for transportation and then injecting it deep underground (at least 800 meters below the surface) into a carefully selected and safe geological storage site, where it is trapped and permanently stored in porous rock.[4] Many consider CCS to be an important technology to support the energy transition

[1] Full recommendation is: State entities, such as State governors, could issue executive orders to (1) direct agencies to purchase a minimum amount of energy from plants equipped with CCS technology for use in buildings; and (2) significantly raise the minimum total amount of clean energy to be purchased by the state government by 2050, where the grid includes plants that are or can be equipped with CCS. W. Jacobs & M. Craig, *Carbon Capture and Sequestration*, *in* Legal Pathways to Deep Decarbonization in the United States at 725 (Michael B. Gerrard & John C. Dernbach, eds., 2019).

[2] IPCC, 2023: Sections 3.3.2 and 3.3.3. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 35-115, doi: 10.59327/IPCC/AR6-9789291691647, available at:
https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf.

[3] International Energy Agency, Net Zero by 2050: A Roadmap for the Global Energy Sector, available at: https://iea.blob.core.windows.net/assets/4719e321-6d3d-41a2-bd6b-461ad2f850a8/NetZeroby2050-ARoadmapfortheGlobalEnergySector.pdf.

[4] David Kearns, Harry Liu, Chris Consoli, Global CCS Institute, *Technology Readiness and Costs of CCS* (2021) at

now underway and for the world efforts to achieve net-zero CO_2 and other GHG emissions by 2050.

1.4. Widespread adoption of CCS in the United States has not occurred for several major reasons, including: high cost of capturing and compressing carbon dioxide at power plants, concerns regarding local environmental impacts, and regulatory uncertainty, including inadequate policy signals at the federal and state levels. Additionally, there are concerns that CCS may not alleviate harmful criteria or hazardous air pollutants in certain circumstances, and that burning additional fossil fuels needed to power the CCS process may lead to increased emissions of such harmful pollutants on-site. Moreover, CCS may increase the upstream impacts of fossil fuel production and refining in proportion to the additional energy consumed. The development and deployment of CCS technology also raises certain environmental justice concerns, which are discussed in Section 9 below.

1.5. The Intergovernmental Panel on Climate Change ("**IPCC**") rightly notes that while CCS is a serious contender for a promising technology, it needs further review. While changes made at the state and local level to create markets for power produced from CCS operations are critical to overall decarbonization, state and municipal governments need to carefully weigh the advantages and disadvantage of using CCS in each community being considered for this technology.

1.6. Establishing markets specifically for electricity generated by CCS-equipped facilities would encourage CCS deployment by increasing certainty that a market will exist for this type of electricity once the relevant energy system is operational, thereby reducing project risk. One way to create a market for the higher-cost electricity produced by plants that utilize CCS is for the state and municipal departments themselves to buy that electricity, which can be done via power purchase agreements. These contracts are not only important for providing a reliable revenue stream for electricity generators, but they also provide an asset that supports the ability of the generator to obtain debt and equity financing, and would thus help generators "afford" to invest in CCS—even if it is not yet mandatory under law.

1.7. The model executive order (the "**Model Order**") accompanying this memorandum can be used by governmental entities, such as state governors, to (1) direct agencies to purchase a minimum amount of energy from plants equipped with CCS technology ("**CCS energy**") for use in buildings; and (2) significantly raise the minimum total amount of clean energy to be purchased by the state and municipal departments by 2050, where the grid includes plants that are or can be equipped with CCS. All percentages and minimum purchases of CCS energy in the Model Order are subject to the availability of CCS energy to the state/city entity.

2. Overview of current obligations and historical relationship between Executive Orders No. 13693, 13834 and 14057

2.1. President Joe Biden signed Executive Order No. 14057 (*Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability*) in December 2021 (the "**Biden EO**").[5] The Biden EO sets out specific goals to be consistent with President Biden's goal of reducing the United States greenhouse gas emission by 50% from 2005 levels by 2030 and limiting global warming to 1.5

Paragraph 2.0, *available at*: https://www.globalccsinstitute.com/wp-content/uploads/2022/03/CCE-CCS-Technology-Readiness-and-Costs-22-1.pdf.

[5] https://www.whitehouse.gov/briefing-room/presidential-actions/2021/12/08/executive-order-on-catalyzing-clean-energy-industries-and-jobs-through-federal-sustainability/.

degrees Celsius.[6] The Biden EO affirms that the federal government aims to achieve a carbon pollution-free electricity sector by 2035 and net-zero emissions economy-wide by no later than 2050.[7] Specifically, it requires that the federal government shall use its scale and procurement power to (i) achieve 100% carbon pollution-free electricity on a net annual basis by 2030, including 50% 24/7 carbon pollution-free electricity (meaning procured to match actual electricity consumption on an hourly basis and produced within the same regional grid where the energy is consumed), and (ii) a net-zero emissions building portfolio by 2045, including a 50% emissions reduction by 2032, prioritizing improvement of energy efficiency and the elimination of onsite fossil fuel use. Carbon pollution-free electricity means electrical energy produced from resources that generate no carbon emissions, among others, including electrical energy generation from fossil resources to the extent there is active CCS technology that meets Environmental Protection Agency requirements. These goals provide incentive for the federal agencies to purchase electricity from plants equipped with CCS technology.

2.2. The currently effective Biden EO revoked Executive Order No. 13834 (*Efficient Federal Operations*) signed by President Donald Trump in May 2018 (the "**Trump EO**").[8] Prior to that, the Trump EO revoked Executive Order No. 13693 (*Planning for Federal Sustainability in the Next Decade*) signed by President Barack Obama in March 2015 (the "**Obama EO**")[9].

2.2.1. Compared with the Obama EO, the Trump EO did not provide any environmental sustainability-related specific goals for federal agencies, and only directed federal agencies to manage their buildings, vehicles, and overall operations to optimize energy and environmental performance, reduce waste, and cut costs generally.

2.2.2. On the contrary, the Obama EO set a clear aim to reduce agency direct greenhouse gas emissions by at least 40% over the next decade, and laid down multiple specific sustainability goals for federal agencies. Such sustainability goals include, among other goals and suggested measures, (i) setting out the minimum percentage of clean energy out of total amount of building electric energy and thermal energy to be not less than 25% by fiscal year 2025, and (ii) setting out the minimum percentage of renewable electric energy out of total amount of building electric energy to be not less than 30% by fiscal year 2025. Specifically, the Obama EO required federal agencies to utilize alternative energy from plants equipped with CCS technology where feasible. Whilst the Obama EO was not resurrected by the revocation of the Trump EO and the adoption of the Biden EO, the Obama EO clearly set a foundation for the currently effective Biden EO with regards to environmental sustainability-related goals.

3. Legislative efforts to materialize the Biden EO

3.1. The Biden EO outlines a coordinated, whole-of-government approach, along with individual agency goals and actions, to transform Federal procurement and operations to reduce GHG emissions and environmental impacts and secure a transition to clean energy and sustainable technologies. It establishes that the federal government will lead by example to achieve a carbon pollution-free electricity sector by 2035 and net-zero emissions economy-wide by 2050, using its scale and procurement power to achieve, including without limitation, 100% carbon pollution-free electricity on a net annual basis by 2030, including 50% 24/7 carbon pollution-free electricity.

[6] https://www.sustainability.gov/federalsustainabilityplan/.
[7] https://www.whitehouse.gov/briefing-room/presidential-actions/2021/12/08/executive-order-on-catalyzing-clean-energy-industries-and-jobs-through-federal-sustainability/.
[8] https://www.federalregister.gov/documents/2018/05/22/2018-11101/efficient-federal-operations.
[9] https://www.govinfo.gov/content/pkg/DCPD-201500184/pdf/DCPD-201500184.pdf.

3.2. Section 203 of the Biden EO further provides that each federal agency shall facilitate new carbon pollution-free electricity generation and energy storage capacity by authorizing use of their real property assets, such as rooftops, parking structures, and adjoining land, for the development of new carbon pollution-free electricity generation and energy storage through leases, grants, permits, or other mechanisms, to the extent permitted by law.[10] In sum, the Biden EO requires action only by federal agencies.

3.3. In November 2021, the United States enacted the Infrastructure Investment and Jobs Act of 2021 ("**IIJA**"), which included over US$12 billion to be spent on CCS over the next five years.[11] The legislation includes funding for CCS research, development, and demonstration, CO_2 transport and storage infrastructure, carbon utilization market development and four regional direct air capture with carbon storage ("**DACCS**") hubs, and DAC Technology Competition. The United States enacted the bipartisan Creating Helpful Incentives to Produce Semiconductors for America fund in 2022, or the CHIPS Act (US). CHIPS provides funding for increased carbon removal research, development and demonstration. Taxes on CCS projects have also been reduced, and initial analyses suggest that this could lead to a 13-fold increase in CCS deployment by 2030[12]. In addition, the most significant climate legislation, the Inflation Reduction Act of 2022 ("**IRA**") was enacted in 2022, which offers funding, programs, and incentives to accelerate the transition to a clean energy economy.[13] The combined impact of the IRA and IIJA demonstrates the federal government's backing behind the transition to clean energy. These two acts together bring together a wide ranging set of policies including tax credits, grants, rebates, loans, and other financial incentives to make clean energy and other climate solutions cheaper and accessible.

4. Inadequacy of the current Biden EO

4.1. As noted above, the Biden EO aims to, among other things, achieve a "carbon pollution-free electricity" sector by 2035. "Carbon pollution-free electricity" here means "*electrical energy produced from resources that generate no carbon emissions, including marine energy, solar, wind, hydrokinetic (including tidal, wave, current and thermal), geothermal, hydroelectric, nuclear, renewably sourced hydrogen, and electrical energy generation from fossil resources to the extent there is active capture and storage of carbon dioxide emissions that meets EPA requirements*".

4.2. While electricity generated by CCS-equipped facilities falls under the above definition of "carbon pollution-free electricity", and as such the Biden EO can be seen to be encouraging the use of CCS energy, it is arguably inadequate in pushing widespread use of such CCS energy as the cost of carbon capture and sequestration is higher than some of the more well-established renewable technologies, such as wind and solar power, which are known to be among the lowest-cost emissions reduction technologies with very low operating and capital costs.[14] Further, although the 2022 IRA provides critical policy signals to incentivize CCS—notably, by updating and

[10] Section 203 of Executive Order 14057.
[11] *Global Status of CCS* (2022), available at: https://status22.globalccsinstitute.com/wp-content/uploads/2022/11/Global-Status-of-CCS-2022_Download.pdf.
[12] https://www.bilfinger.com/en/news/customer-magazine/details/study-nearly-200-commercial-ccs-projects-worlwide/.
[13] Summary of Inflation Reduction Act provisions related to renewable energy, https://www.epa.gov/green-power-markets/summary-inflation-reduction-act-provisions-related-renewable-energy.
[14] Lawrence Irlam, Global CCS Institute, *The Costs of CCS and Other Low-Carbon Technologies in the United States – 2015 update* (2015), Paragraphs 5.1, 5.2 and 5.4, *available at* https://www.globalccsinstitute.com/archive/hub/publications/195008/costs-ccs-other-low-carbon-technologies-united-states-2015-update.pdf.

enhancing the 45Q tax credit—additional, non tax-based, incentives are needed. In fact, out of its comprehensive USD 369 billion allocations, the IRA earmarked just USD 3.2 billion for the CCS tax credit over the next 10 years, thus falling short of fully tackling CCS's capital intensity.

4.3. Studies have shown the capital costs of CCS are significant, around double that of an unabated coal- or gas-fired generator (meaning a generator that is not equipped with CCS technology)[15]; further, the cost of both gas and coal CCS generation is dependent on fuel input prices, which vary widely depending on market conditions. The total cost of CCS is affected by a number of variables, including the costs of:

- CO_2 capture at the emission source – purifying CO_2 from a gas upstream up to over 95% purity by volume;
- CO_2 dehydration and compression/liquefaction, depending on the transport method;
- CO_2 transport by pipeline, ship or mobile vehicle; and
- CO_2 injection and monitoring of stored CO_2.[16]

The cost of each CCS component varies from project to project. That said, one key factor for the higher costs of CCS is the lack of economies of scale – the CCS costs become much higher if done on a small scale. As scale increases, capture costs decline considerably.[17] At the moment, the Biden EO does not specifically promote the production or purchase of CCS energy, but instead lumps it with the cheaper "carbon pollution-free electricity". As such, the federal government would arguably be less incentivized to adopt CCS as its go-to source of "carbon pollution-free energy" when there are cheaper short-term alternatives available. This will in turn hamper the development CCS energy production if large-scale buyers of energy, like the federal government, are not reliable buyers of CCS energy. Consequently, CCS costs will remain high without increasing economies of scale, therefore contributing to a vicious cycle with no reliable buyers of CCS energy, lack of economies of scale, and high prices of CCS energy (relative to other forms of "carbon pollution-free electricity").

4.4. It is clear that there are many opportunities to deploy CCS today that can deliver material emission abatement at costs that should be, in the long run, competitive with other options.[18] To accelerate the rate of deployment of CCS, strong policy to incentivize private sector investment in CCS is needed, and the large-scale adoption of CCS by public agencies would serve such purpose. In this sense, the US federal government and states shall take a purposeful approach to innovation and industrial policy by smartly supporting less mature technologies with more opportunity for significant technological advances, such as CCS, notably to enhance mechanical performance and reduce environmental impact.

4.5. Accordingly, whilst the Biden EO recognizes CCS energy as one of the several forms of clean energy and aims to encourage its use by the federal government, the Biden EO is, on its own, inadequate in serving as a driving force for large scale uptake or usage of CCS energy. Without the large-scale adoption and purchase of CCS energy by the government, CCS production will continue to remain low as compared with other forms of renewable energy, and it will remain costly to produce.

4.6. In view of the Biden EO's weaknesses, and the fact that it requires action only by federal agencies,

[15] Paragraph 5.1, *Ibid.*
[16] *Technology Readiness and Costs of CCS* (2021) at Paragraph 7.0.
[17] Paragraph 9.1, *Technology Readiness and Costs of CCS* (2021).
[18] Paragraph 11, *Technology Readiness and Costs of CCS* (2021).

the Model Order proposed is intended to harness the power of states and municipal entities to accelerate the rate of deployment of, and incentivize private sector investment in, CCS.

5. Overview of the Model Order

5.1. The Model Order begins with the overarching environmental goals and identification of some of the benefits that would result from (i) state agencies purchasing a minimum amount of CCS energy for use in buildings ("**Objective 1**") and (ii) raising the minimum total amount of clean electricity (comparable to the Biden EO definition of "carbon pollution-free electricity") to be purchased by the state government by 2050, where the grid includes plants that are or can be equipped with CCS ("**Objective 2**" and together with Objective 1, the "**Objectives**"). (The Model Order uses the term Order 1 and Order 2 as opposed to "Objectives"). All percentages and minimum purchases of CCS energy mandated by the Objective 1 shall be subject to the availability of CCS energy to the state/city entity. The two Objectives together will encourage "fuel switching" in state government buildings – transitioning from fossil fuels to clean electric energy – as well as the use of CCS energy.

5.2. It also sets forth the specific goals and targets state agencies should meet with respect to the two Objectives, though we expect each state government and municipality will set different standards based to fit its particular needs, goals, and political circumstances.

6. Benefits of Model Order

6.1. As noted above, widespread adoption of CCS in the United States has not occurred for several major reasons, including: high cost of capturing and compressing carbon dioxide at power plants, concerns regarding local environmental impacts, and regulatory uncertainty, including inadequate policy signals at the federal and state levels. Concerns about the environmental, health and safety, environmental justice, and other effects of CCS technology are discussed above at Sections 1.3 and 1.4 and below in Section 9.

6.2. Establishing markets specifically for CCS energy would encourage CCS deployment by increasing certainty that a market will exist for their electricity once operational, thereby reducing project risk. One way to create a market for the higher-cost electricity produced by plants that utilize CCS is for the state and municipal entities themselves to buy that electricity, which can be done via power purchase agreements. These contracts are not only important for providing a reliable revenue stream for electricity generators, but they also provide an asset that supports the ability of the generator to obtain debt and equity financing, and would help generators "afford" to invest in CCS—even if it is not yet mandatory under law.

6.3. Requiring an increasing percentage of total building energy use to include carbon pollution-free electricity will result in the transition of fuel use in state government buildings from fossil fuels (primarily natural gas or oil for heating, or natural gas for cooking) to electricity, and ultimately carbon pollution-free electricity. Not only will this transition result in lower carbon emissions from buildings, but also the reduction or elimination of the emissions of traditional (criteria) pollutants from buildings.

7. Assessment of current production level of energy from plants with CCS technology

7.1. Global CCS Institute issued a report in 2022 which noted that as of September 2022, there are 196 (including 2 suspended) projects in the CCS facilities pipeline worldwide, which shows an impressive growth of 44% in the number of CCS facilities since the report was last updated in 2021 and continues the upward momentum in CCS projects. The United States is currently leading

the way with 34 new projects since 2021[19].

7.2. Despite the jump in new capacity, all existing and proposed projects in aggregate would only store 244 million tons of CO_2 a year—less than 1% of the 36 billion tons of carbon dioxide the International Energy Agency estimates was added to the atmosphere last year.[20] Accordingly, the current production of CCS energy remains insufficient. There needs to be a long-term commitment in the adoption of CCS energy. One way this can be achieved is for public agencies, like state governments, to commit to purchasing a certain amount of CCS energy, which would incentivize the private industry to scale up the production of CCS energy.

7.3. The Model Order aims to incentivize private sector investment in CCS by having state and municipal entities take a firmer commitment to their purchase of CCS energy. Financial subsidies in the development of plants equipped with CCS technology would also be beneficial to increasing the production of CCS energy.

8. Discussion on Usage of Captured Carbon Dioxide

8.1. As noted above, the current limited application of CCS technology is partially due to its high production costs. Wide industrial use of captured carbon dioxide could make CCS more financially viable and sustainable as there will be economies of scale at the production level. We set out below two common usages of captured carbon dioxide and their respective pros and cons.

8.2. Captured carbon dioxide can be converted into virtually any type of fuel or chemical that is otherwise produced from petroleum. For instance, captured carbon dioxide is sometimes used as feedstock after combining it with hydrogen to create synthetic fuels, which can be used to power existing gasoline and diesel vehicles as well as planes. The main issue with using captured carbon dioxide to produce synthetic fuels is that it can be difficult to ensure the resulting fuels are cost-competitive with those derived from petroleum. For example, the chemical reaction between hydrogen and carbon monoxide molecules (which is a necessary step for creating synthetic fuels) is difficult, and the demand for hydrogen could reach the point where it is more economical to use as an energy source to generate hydrogen fuels rather than making liquid fuels with carbon dioxide. Nevertheless, it is noted that several cheaper and more efficient catalysts to break down carbon dioxide into carbon monoxide have been discovered recently, which is regarded as a critical first step to the widespread use of captured carbon dioxide as a synthetic fuel feedstock.[21]

8.3. Selling to oil companies for enhanced oil recovery (EOR) is the most common use of captured carbon dioxide at present, in which carbon dioxide is injected into active oil and/or gas fields to increase extraction and productivity. We note that this practice is highly controversial – whilst EOR can utilize and store carbon dioxide at scale, it may not yield any net climate benefit, and may even be detrimental given it will in turn promote and allow the continuous use of fossil fuel and encourage its mining. However, there are also recent studies showing that it can provide net carbon dioxide benefits if the injected gas is sequestered.[22] In particular, studies have shown that integration of CCS with hydrogen production appears to be an economically viable strategy for

[19] Global CCS Institute, *Global Status of CCS 2022*, p. 10.
[20] James Fernyhough, *Study: Carbon capture would mitigate less than 1% of annual emissions*, available at: https://ieefa.org/articles/study-carbon-capture-would-mitigate-less-1-annual-emissions.
[21] https://www.mckinsey.com/capabilities/sustainability/our-insights/why-commercial-use-could-be-the-future-of-carbon-capture.
[22]https://iea.blob.core.windows.net/assets/bf99f0f1-f4e2-43d8-b123-309c1af66555/Storing_CO2_through_Enhanced_Oil_Recovery.pdf.

dramatically reducing GHG emissions over the next decade, particularly in oil- and gas-producing countries where there are numerous depleted reservoirs that are potentially suitable for large-scale carbon storage.[23]

9. Concerns Related to CCS and Environmental Justice ("EJ") Considerations

9.1. Generation of electricity using CCS is a controversial topic with most, if not all, environmental justice advocates (as well as other climate activists) opposed to its development and use.

9.2. Many existing fossil fuel electric generating plants are situated, or result in pollution concentrated, in EJ communities. A chief environmental justice concern is that retrofitting existing fossil fuel plants with CCS technology will delay those communities from transitioning from fossil fuels to renewable energy, thus prolonging the emission of criteria and hazardous pollutants, as well as the detrimental health and environmental effects of those plants. As noted in Section 1.3 above, burning additional fossil fuels needed to power the CCS process may actually lead to increased emissions of such harmful pollutants on-site. And, CCS increases the upstream impacts of fossil fuel production and refining in proportion to the additional energy needed to power the CCS process.

9.3. Widespread development of CCS will also likely result in a boom in pipeline development for transporting the captured carbon dioxide. In the past, pipelines have often been routed through EJ communities, and many fear that those same communities will bear the burden of future CO_2 pipelines.

9.4. A related concern is that criteria pollutants (and other health and environmental effects) from newly constructed fossil fuel power plants equipped with CCS technology (which will likely be primarily or exclusively gas-fired power plants) may also be located in or adversely affect EJ communities. Especially, the transportation and storage of carbon dioxide in huge volumes could be a safety concern. According to the IPCC, if CO_2 were to leak from a pipeline, a concentration between 7% and 10% in the ambient air can pose an immediate threat to human life.

9.5. The Biden EO acknowledges the EJ concerns and addresses them in Section 402 by requiring that: "*the Federal Government incorporate environmental justice considerations into sustainability and climate adaptation planning, programs, and operations. Consistent with applicable law, agencies shall consider incorporating recommendations of the Justice 40 Initiative, required by section 223 of Executive Order 14008 of January 27, 2021 (Tackling the Climate Crisis at Home and Abroad), on how Federal investments might be made toward a goal that 40 percent of the overall benefits flow to disadvantaged communities that have been historically marginalized and overburdened by pollution and underinvestment in housing, transportation, energy, water, wastewater infrastructure, and health care, into operational planning and decision-making regarding Federal facilities, fleets, and operations*".

9.6. The Model Order here addresses the purchase of electricity by state and municipal entities, and does not address the permitting, siting or construction of a power plant or pipeline, Accordingly, environmental justice effects of CCS energy shall be considered and addressed during the permitting and approving phases of power plant siting and construction, either by the federal government or, for permitting or siting requirements delegated or reserved to the state, by state

[23] Zoback M, Smit D. Meeting the challenges of large-scale carbon storage and hydrogen production. Proc Natl Acad Sci U S A. 2023 Mar 14;120(11):e2202397120. doi: 10.1073/pnas.2202397120. Epub 2023 Mar 6. PMID: 36877852; PMCID: PMC10089151.

agencies. In February 2022, the Council on Environmental Quality issued a Guidance addressing how to advance CCS in a "responsible manner", including through the environmental review process under the National Environmental Policy Act ("**NEPA**"), increased transparency and through consultation with affected communities in permitting and siting projects[24].

9.7. Moreover, environmental justice concerns may be mitigated somewhat by the reduction of criteria pollutants emitted from state government buildings located in or near EJ communities, resulting from the Model Order's required transition from fossil fuels (primarily natural gas or fuel oil for heating) to electricity.

9.8. As part of due diligence in negotiating a power purchase agreement, states and municipalities shall nonetheless mitigate the environmental justice concerns of CCS energy by ensuring that the power generator has duly considered and addressed all applicable environmental justice considerations over the long term. Including appropriate representations and warranties in the power purchase agreement might also help ensure that environmental justice concerns have been adequately considered and addressed.

9.9. While changes made at the state and local level to create markets for CCS energy are critical to overall decarbonization, state and municipal governments need to carefully weigh the advantages and disadvantages of using CCS in each community being considered for this technology.

[24] *Council on Environmental Quality, Carbon Capture, and Sequestration Guidance* 87 Fed. Reg. 8808 (Feb. 16, 2022); *see also, New Source Performance Standards for Greenhouse Gas Emissions from New, Modified, and Reconstructed Fossil Fuel Generating Units*, 88 Fed, Reg. 33, 240 at 33, 413-16 (May 23, 2023).