NACAA
national association of clean air agencies

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To Whom It May Concern:

On behalf of the National Association of Clean Air Agencies (NACAA), we are submitting the following comments on the U.S. Environmental Protection Agency's (EPA's) April 21, 2022 draft white paper, *Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Combustion Turbine Electric Generating Units*. NACAA is the national, non-partisan, non-profit association of 154 state and local air pollution control agencies in 40 states, the District of Columbia and four territories. The air quality professionals in our member agencies have vast experience dedicated to improving air quality in the U.S. These comments are based on that experience. The views expressed do not represent the positions of every state and local air pollution control agency in the country.

EPA states that the draft white paper "is intended to assist states and local air pollution control agencies, tribal authorities, and regulated entities in their consideration of technologies and measures that may be implemented to reduce [greenhouse gas (GHG)] emissions from stationary combustion turbines." Additionally, the paper "may also provide context for permit development under the prevention of significant deterioration (PSD) program of the Clean Air Act (CAA), including in the assessment of the best available control technology (BACT) for GHG emissions from stationary combustion turbines." NACAA's member agencies implement the Clean Air Act as co-regulators with EPA, including the major source permitting programs; in most areas of the country, state and local permitting authorities are responsible for issuing PSD permits. Our members also implement many programs that aim to reduce GHG emissions, beyond what is required by federal law.

NACAA recognizes this white paper's potential to help lay a foundation for important policy advances at the federal, state, and local levels. The

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synthesis of information offers a "one-stop" resource that is otherwise missing from our clean air regulatory conversation, and as our agencies take steps to facilitate a clean energy transition, the document may prove to be a highly valuable resource. In general, EPA's cataloging of technology types, operational approaches, and emissions implications provides a uniquely credible point of reference to support state and local efforts, as well as future federal efforts, to reduce GHG emissions.

Moreover, the paper's intent aligns with NACAA's January 15, 2021 transition letter,[1] which calls for EPA to "make a strong and urgent effort to lead the nation and global community towards comprehensive, inclusive and economically sound climate change mitigation and adaptation policies and regulations." While acknowledging the meaningful progress that state and local agencies within NACAA have made toward reducing GHGs, our letter emphasizes the association's conviction that "a strong, comprehensive federal approach is essential for providing lasting nationwide reductions, regulatory certainty and a more protective baseline for all states to meet." The draft white paper lays important foundational work that is a necessary precursor for a broader federal answer to help meet our shared goals for emission reductions of climate-damaging pollutants.

While it is a welcome resource, NACAA has identified several areas in which the white paper could be improved or expanded before it is finalized. These improvements and additions would make the paper a more useful tool for state and local agencies as they carry out their PSD permitting obligations and advance GHG emission-reduction programs outside of the Clean Air Act permitting context. Broadly, our recommended improvements include: 1) greater exploration of the contexts in which state and local agencies could use the information; 2) inclusion of more information about the GHG implications of indirect emission reduction approaches; 3) stronger consideration of non-CO_2 GHGs; 4) the addition of cost information associated with GHG reduction measures; 5) the addition of information about associated air pollution benefits or impacts; and 6) the correction of technical inaccuracies in certain sections of the paper. We discuss these recommendations in more detail below.

First, we recommend that the paper incorporate a more robust discussion of the types of state and local programs for which it might be used, including siting reviews, permit reviews, certificates of public convenience and necessity, integrated resource plans, and other actions – some of which may not be roles played by air pollution control agencies, but by other state and local officials. The discussion in Section 2.3 makes reference to two state laws, but it should be more encompassing in the range of program applications that exist in the state and local context. This list need not be exhaustive, but it could help build and leverage connections to non-air-agency constituencies, such as public utility commissions and state energy offices, which may also find value in the material presented.

[1] NACAA's January 15, 2021, transition paper, "Improving Our Nation's Clean Air Program: Recommendations from the National Association of Clean Air Agencies to President-Elect Biden's and Vice President-Elect Harris' Administration" is available online at https://www.4cleanair.org/wp-content/uploads/NACAA2021PresidentialTransitionDocument-01152021.pdf

While the white paper supplies a description of technologies and their performance characteristics, it should offer more detail on associated air pollution impacts. It should also provide information or context on costs and other economic considerations associated with each of the technologies and approaches. This would be particularly useful in the context of BACT determinations. More detail about non-CO_2 GHG impacts would also be beneficial.

In Sections 3 and 4, the draft white paper lays out the GHG emission reduction potential of the controls. However, in later sections discussing non-control alternatives such as fuel switching, changes in combustion, or grid-based approaches, no emissions reduction potential information is given. A potential improvement is for each section to discuss methodologies for evaluating the emission reduction potential, (ideally on a rate and mass basis, but even a broadly indicative manner would be helpful) for these approaches. For example:

- In the discussion of parasitic load in Section 5.1, the paper should provide examples characterizing the extent of the additional load impacts of control equipment.
- Section 5.8 should not only discuss the technical operation of oxy-combustion but also the emission outcomes, and compare these emissions to those from traditional combustion.
- The same comment is true for Section 5.9 on hydrogen blending, which describes the technology but not its direct and associated emissions implications, which are particularly important for NO_x emissions. For example, hydrogen blending can involve higher combustion temperatures than natural gas, which can lead to additional thermal NO_x emissions. These and other emission implications should be detailed in the final white paper.
- On page 50, the paper discusses methane emissions from fossil gas production, processing, transportation, storage, and local distribution. It indicates that "many stakeholders, including federal, state, and local regulators" are working on programs to reduce emissions, but does not articulate the possibilities for emission reductions from avoided production.
- Another example occurs with the discussion of municipal solid waste landfill and agriculture-sourced gas fuels on page 53. While the description of this approach is helpful, a discussion (even indicative, if not exhaustive) of the emission reductions that would result would be helpful to state and local decision making.
- Exhibit 5-10 and section 8.0 should be updated to better show the role of battery storage technology as an alternative to combustion turbines, with no on-site emissions.

The emission reductions of non-CO_2 GHGs receive inadequate attention in the white paper. The six gases treated in aggregate as GHGs under the PSD program have different global warming potentials (GWP). While the paper notes and describes the

characteristics of these GHGs, it focuses on their formation but not their differing GWP implications. This is especially apparent in the discussion of NO_x on page 16. The paper should add information that better describes the GWP of the emissions to help contextualize the weighting of potential controls. This might also facilitate a stronger discussion of co-benefits of avoided emissions of other pollutants of concern, such as criteria pollutants and air toxics.

Economic factors are a central issue in determining BACT. Unfortunately, however, costs are not considered in the white paper, either on the basis of gross cost of the examples given, nor on a per-mass-reduced basis for the controlled pollutant (in this case, potentially CO_2 equivalent or CO_2e). This is a lost opportunity to provide credible information to state and local agency policymakers, as cost information associated with GHG control technologies can be extremely challenging to locate and justify. Where specific information is unavailable, or disagreed upon, contextual cost information may also be beneficial.

Both in and outside of the context of BACT determinations, cost is a critical factor for policymakers to evaluate. Including cost information benchmarked against the year of implementation would be a tremendously useful addition to determine not only the effectiveness, but also the true feasibility of a control technology. A summary table that compares the emission reduction effectiveness, availability, and costs of the GHG reduction approaches described in the white paper would be a highly valuable addition, and NACAA strongly recommends its inclusion.

The paper does not take into consideration non-GHG pollution benefits and trade-offs of the emission reduction technologies and approaches outlined in the paper. This is a significant missed opportunity to offer information that will help clean air agencies evaluate control options more strategically. A range of emission reduction goals exist, including attainment and maintenance of health-based National Ambient Air Quality Standards (NAAQS) and reduction of air toxics. Offering information about these emission reduction synergies (and where they exist, trade-offs) would be valuable to agencies using limited resources to meet multiple clean air and climate goals.

The draft white paper's exploration of GHG reduction approaches that extend beyond direct emission controls is welcome information that may be valuable to state and local programs, no matter what direction federal programs take. However, the paper would benefit from technical clarifications in its discussion of the bulk power system. In Sections 3, 4 and 5, there is significant discussion of merit order dispatch as defined by units' ramping and operational characteristics – essentially, describing some units as "baseload," others as "intermediate" and others as "peaking." Beginning around 2016, the practice of categorizing generating units based on their operating characteristics has evolved as the power system has integrated new technologies and functions.[2] Descriptors

[2] See, e.g., a 2017 Brattle Group document on this paradigmatic shift, Advancing Past 'Baseload' to a Flexible Grid: How Grid Planners and Power Markets Are Better Defining System Needs to Achieve a Cost-Effective and Reliable Supply Mix, available at https://www.brattle.com/insights-

such as "baseload" inaccurately reflect market-driven dispatch. In practice, "intermediate" or "intermittent" units may dispatch as first-run units; other generators that may once have been described as "baseload" may dispatch differently because of price and see commitment in the "intermediate" shoulder, despite operational characteristics (e.g., more expensive coal or nuclear units that ramp poorly), and so on. A more useful differentiation of units would consider "dispatchable" and "intermittent" generators, and within those considered dispatchable, would further differentiate based on flexibility characteristics that are valuable in the context of the operation of today's grid. EPA should reconsider sections of the paper that describe generators with the "baseload" shorthand. If the draft white paper is finalized with this descriptive shorthand, a footnote or other discussion of how it relates to and differs from real-world system conditions should be included in the final version.

The discussion of co-locating renewables on pages 34 and 35, particularly as it relates to transmission, would benefit from robust review and incorporation of feedback from grid experts. For example, the statement, "Often worth hundreds of millions of dollars, an interconnection point to enter a dispatch queue is critical," illuminates misunderstandings about grid interconnection, transmission planning, bulk power markets and unit dispatch that exceed detailed response here. Review of that section by grid experts may eliminate inaccuracies and yield insights and technical discussions that would improve the paper's usefulness and technical accuracy.

One other minor note: page 18 states that the paper will cover four GHG control topics, but then lists three. Either this is a minor typo, or a section has been accidentally omitted.

Thank you for the opportunity to comment on the draft white paper[3]. NACAA looks forward to the finalization of this important resource and stands ready to assist if that would be helpful. If you have any questions about these comments, please do not hesitate to contact me or Miles Keogh, Executive Director of NACAA.

Sincerely,

Alberto Ayala
(Sacramento, CA)
Co-Chair
NACAA Climate Change Committee

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events/publications/brattle-economists-recommend-moving-beyond-baseload-generation-for-planning-and-operating-todays-electric-grid/

[3] Available online at https://www.epa.gov/system/files/documents/2022-04/epa_ghg-controls-for-combustion-turbine-egus_draft-april-2022.pdf