April 4, 2022

Via upload to Regulations.gov

Bryan Manning,
Office of Transportation and Air Quality,
Assessment and Standards Division (ASD),
Environmental Protection Agency,
2000 Traverwood Drive,
Ann Arbor, MI 48105

Re: Notice of Proposed Rulemaking: Particulate Matter Standards and Test Procedures for Airplane Engines (Docket No.: EPA-HQ-OAR-2019-06600; FRL-7559-01-OAR)

Dear Mr. Manning:

On behalf of the Center for Biological Diversity and Friends of the Earth, we are submitting comments on EPA's proposal to set standards for particulate matter from airplane engines. Control of Air Pollution from Airplanes and Airplane Engines: Emission Standards and Test Procedures, 87 Fed. Reg. 6,324 (Feb. 3, 2022) ("Proposal").

To fulfill the requirements of Section 231 of the Clean Air Act and the guiding objective of the Act to "prevent" pollution, EPA is required to set standards that reduce harmful emissions from aircraft.[1] Yet the Biden administration continues to embrace weak, industry-developed standards that do not improve air quality *at all*.[2] Like the 2021 greenhouse gas emissions standards that the Biden administration is defending in court,[3] EPA's Proposal here does not reduce emissions. EPA has rubberstamped international standards that intentionally lag behind current pollution control technologies, making no effort to study alternatives that would decrease emissions. As described below, the Proposal violates the Clean Air Act and is arbitrary and capricious. EPA should replace the Proposal with strong, technology-forcing standards to advance environmental justice and demonstrate international leadership.

I. Aircraft Contribute to Particulate Matter Emissions that Harm Human Health and Welfare

Particulate matter ("PM") pollution from burning fossil fuels, including aviation fuels, is a leading contributor to global mortality. Fine particulate pollution—defined as particles 2.5 micrometers and smaller ("$PM_{2.5}$")—from fuel combustion causes *one in five* premature deaths

[1] 42 U.S.C. § 7401.
[2] Control of Air Pollution from Aircraft Engines: Emission Standards and Test Procedures, 87 Fed. Reg. 6,324, 6,327, 6,336 (Feb. 3, 2022) (to be codified at 40 C.F.R. pts. 87, 1030, 1031).
[3] *California v. EPA*, No. 21-1018 (D.C. Cir.); *Center for Biological Diversity v. EPA*, No. 21-1021 (D.C. Cir.).

worldwide, including 355,000 premature deaths in the United States in 2018.[4]

As EPA notes in its August 23, 2021 memo to the docket, a "large body" of scientific evidence shows that particulate matter pollution is linked to a broad range of short- and long-term health effects.[5] Due to its small size, $PM_{2.5}$ enters people's lungs and bloodstream, leading to respiratory and cardiovascular problems that can lead to death.[6]

Short-term exposure to $PM_{2.5}$ increases emergency hospital visits, asthma, and chronic obstructive pulmonary disease.[7] Long-term exposure to $PM_{2.5}$ is linked to asthma, decline in lung function, and cardiovascular and respiratory mortality.[8] Recent studies also connect long-term $PM_{2.5}$ exposure to nervous system effects, such as declines in brain volume and cognition.[9] Fine particulate matter pollution also harms the environment. It affects the climate by altering cloud processes, atmospheric circulation, and the hydrologic cycle.[10] It can also lead to acidification of terrestrial and aquatic ecosystems and to inhibition of photosynthesis and plant growth.[11]

As the scientific and public health community continue to document the extreme health and environmental consequences of fine particulate matter pollution, there is growing recognition that the benefits of reducing exposure justify stricter pollution limits. For example, EPA's independent advisory scientific committee recently endorsed lowering national annual exposure limits for fine particle pollution due to its health costs.[12]

A. Aviation PM emissions are especially harmful to health and the environment

Aircraft emissions significantly contribute to ambient $PM_{2.5}$ pollution, especially in areas with large commercial airports.[13] Premature deaths due to aviation emissions number about 16,000 per year globally, with $PM_{2.5}$ responsible for 87% of those deaths.[14] In North America alone, 1,500 premature deaths per year have been attributed to aviation emissions, with 650 or

[4] Vohra, Karn et al., Global mortality from outdoor fine particle pollution generated by fossil fuel combustion: Results from GEOS-Chem, 195 Environmental Research 110754 (2021), https://www.sciencedirect.com/science/article/abs/pii/S0013935121000487.
[5] Cook, Rich, U.S. EPA, Memorandum re: health and environmental effects of non-GHG pollutants emitted by turbine engine aircraft at 2-3 (Aug. 23. 2021) [hereinafter *Memorandum*].
[6] U.S. EPA, Criteria Air Pollutants, https://www.epa.gov/criteria-air-pollutants (last visited Feb. 24, 2022); U.S. EPA, Health and Environmental Effects of Particulate Matter, https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm (last visited Feb. 24, 2022).
[7] Memorandum at 3.
[8] *Id.* at 4.
[9] *Id.*
[10] U.S. EPA, Integrated Science Assessment for Particulate Matter at 13-2 (2019) [hereinafter *2019 ISA*].
[11] U.S. EPA, Integrated Science Assessment for Oxides of Nitrogen, Oxides and Sulfur and Particulate Matter – Ecological Criteria IS-99 (2020).
[12] Reilly, Sean, *EPA science advisers unanimously back tighter soot limits*, E&E News, Mar. 4, 2022, https://www.eenews.net/articles/epa-science-advisers-unanimously-back-tighter-soot-limits/.
[13] Proposed Rule Control Air Pollution from Aircraft Engines: Emission Standards and Test Procedures, 87 Fed. Reg. at 6,333.
[14] Yim, S.H.L. et al., Global, regional and local health impacts of civil aviation emissions, 10 Env't Res. L. 034001 (2015) (of 16,000 total premature deaths from $PM_{2.5}$ and ozone, 87% were attributable to $PM_{2.5}$).

43% of those deaths attributable to landing and takeoff emissions.[15]

Studies centered around busy airports have linked aircraft and health impacts. A study that focused on three New York Airports found that residents living within 5 miles of these airports were at increased risk of hospital admissions for respiratory illnesses relative to those living farther than 5 miles away.[16] A report prepared by various Washington State government agencies similarly determined that there were significantly higher rates of lung cancer, oral and pharyngeal cancer; deaths from lung cancer and chronic obstructive pulmonary disease; and hospital admissions for asthma, pneumonia, and influenza within one-three miles of the Seattle-Tacoma Airport as compared to the rest of King County and to Washington State.[17]

In another study, focused on the area surrounding Los Angeles International Airport, exposure to ultrafine particles was linked to increased instances of preterm birth.[18] There is growing evidence that the ultrafine PM aircraft generates is especially harmful—ultrafine PM's properties of larger surface area per unit mass and potent cell penetration leads to even more adverse health impacts than $PM_{2.5}$.[19] Outdoor ultrafine particle number concentrations ("PNC") are elevated in areas around commercial airports.[20] One study found concentrations of ultrafine particles to be four or more times higher in areas surrounding airports.[21] And research reveals that this aviation-related ultrafine PNC penetrates indoors and contributes to higher PNC indoors.[22]

The harmful impacts of particle pollution fall most heavily on communities of color and low-income communities that disproportionately live near airports. For example, in California, communities within 10 miles of international airports are disproportionately low-income and people of color, exposing them to above-average airport-associated air pollutants.[23] These communities often already bear the brunt of climate change impacts and compounding air pollution from nearby industry and roadways.[24]

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[15] *Id.*
[16] Lin, S. et al., Residential proximity to large airports and potential health impacts in New York State, 81 Int Arch Occup Environ Health 797 (2008).
[17] Osaki, C. & J. Finkbonner, Final Report State Board of Health Priority: Environmental Justice (2001).
[18] Wing, S. E. et al., Preterm birth among infants exposed to in utero ultrafine particles from aircraft emissions, 128 Environmental Health Perspectives (2020).
[19] Li, N. et al., Ultrafine particulate pollutants induce oxidative stress and mitochondrial damage, 111 Environmental Health Perspectives 455 (2003); Oberdörster, G. et al., Translocation of inhaled ultrafine particles to the brain, 16 Inhalation Toxicology 437 (2004).
[20] 87 Fed. Reg. at 6,333.
[21] Hudda, N. et al., Impacts of aviation emissions on near-airport residential air quality, 54 Environmental Science & Technology 8580 (2020); Shirmohammadi, F. et al., Emission rates of particle number, mass and black carbon by the Los Angeles International Airport (LAX) and its impact on air quality in Los Angeles, 151 Atmospheric Environment 82 (2017).
[22] 87 Fed. Reg. at 6,332.
[23] Corey, Richard, California Air Resources Board, Comments re: Proposed Rulemaking for Control of Air Pollution from Airplanes and Airplane Engines: GHG Emission Standards and Test Procedures; 85 Fed. Reg. 51,556, August 20, 2020, to Administrator Andrew Wheeler, U.S. EPA (October 19, 2020).
[24] *See, e.g.*, American Lung Association, Disparities in the impact of air pollution (updated April 20, 2020), https://www.lung.org/clean-air/outdoors/who-is-at-risk/disparities; Carlson, A., The Clean Air Act's blind spot: Microclimates and hotspot pollution, 65 UCLA Law Review 1036 (2018).

B. Aviation PM emissions will increase as air traffic increases, especially near large airports

Globally, air traffic is expected to increase by 3.3 times by 2045.[25] The International Civil Aviation Organization ("ICAO") anticipates that this increase in air traffic will increase aircraft-related PM emissions. In 2015, PM emissions were approximately 1,243 tonnes.[26] ICAO estimated in 2019 that PM emissions would increase to 3,572 tonnes by 2045.[27] Although the global COVID-19 pandemic has depressed air traffic since ICAO made its predictions about future growth in 2019, international air travel and tourism associations do not anticipate a long-term reduction in air travel.[28] In fact, North American air travel is recovering at a faster rate than other regions.[29]

Because aircraft PM pollution is most associated with take-off and landing operations,[30] areas around airports will see the largest increases in PM pollution from increased air traffic. In some regions like Los Angeles, airplane traffic has grown to be as significant a contributor to elevated particle pollution as the entire urban freeway network.[31] Increasing traffic also will make it harder for regional air quality districts with large airports to meet air quality standards.[32] For example, the South Coast Air Basin, which covers Los Angeles, Orange, Riverside, and San Bernadino counties and has over 12 million residents, already has elevated levels of $PM_{2.5}$ and is classified as in nonattainment.[33] As long as air traffic continues to increase toward and beyond pre-pandemic levels, regional air quality districts may struggle to reach attainment status even as they take measures to reduce particulate pollution from other sources within their jurisdiction.

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[25] International Civil Aviation Organization, ICAO Global Environmental Trends –Present and Future Aircraft Noise and Emissions, A40-WP/54 at 2 (May 7, 2019), https://www.icao.int/Meetings/A40/Documents/WP/wp_054_en.pdf.

[26] *Id.* at A-4.

[27] *Id.*

[28] International Air Transport Association and Tourism Economics, Air Passenger Forecasts: Potential Paths for Recovery into the Medium- and Long-run (2020), https://resources.oxfordeconomics.com/hubfs/Webinar%20presentations/Air-Passenger-Forecasts-potential-paths-for-recovery-into-medium-and-long-run.pdf.

[29] International Civil Aviation Organization, *2021 global air passenger totals show improvement from 2020, but still only half pre-pandemic levels*, ICAO Newsroom, Jan. 17, 2021, https://www.icao.int/Newsroom/Pages/2021-global-air-passenger-totals-show-improvement.aspx.

[30] 87 Fed. Reg. at 6,345.

[31] Hudda, N. et al., Emissions from an international airport increase particle number concentrations 4-fold at 10 km downwind, 48 Environmental Science & Technology 6628 (2014).

[32] U.S. EPA, Clean Air Act (CAA) and Federal Facilities, https://www.epa.gov/enforcement/clean-air-act-caa-and-federal-facilities (a region of the U.S. is categorized as "non-attainment" when it does not meet the required air quality standards under the Clean Air Act).

[33] Corey, Richard, California Air Resources Board, Comments re: Proposed Rulemaking for Control of Air Pollution from Airplanes and Airplane Engines: GHG Emission Standards and Test Procedures; 85 Fed. Reg. 51556 August 20, 2020, to Administrator Andrew Wheeler, U.S. EPA (October 19, 2020); South Coast Air Quality Management District, 2016 Air Quality Management Plan, Appendix II Current Air Quality (March 2017), https://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/appendix-ii.pdf?sfvrsn=4.

II. Statutory and Regulatory Background

A. Clean Air Act Section 231

The Clean Air Act requires EPA to regulate pollutants from aircraft engines. Section 231 of the Act establishes a regulatory framework for standards to reduce air pollutants from aircraft. This section directs the EPA Administrator to study and investigate emissions of air pollutants from aircraft and determine the extent to which aircraft emissions affect air quality in the United States and the technological feasibility of controlling those emissions.[34] Under Section 231(a)(2)(A), the Administrator "shall, from time to time, issue proposed emission standards applicable to the emission of any air pollutant from any class or classes of aircraft engines which in his judgment causes, or contributes to, air pollution which may reasonably be anticipated to endanger public health or welfare."[35]

On February 3, 2022, EPA issued its Proposal to adopt ICAO's 2017 and 2020 PM emission standards. The 2022 Proposal is EPA's first attempt to set particulate matter standards for planes since the *early 1980s*, when EPA finalized "smoke standards" focused on improving visibility. EPA set standards for aircraft-related PM emissions in 1973, and made subsequent revisions and amendments in 1982 and 1984.[36] When setting the 1973 standards, EPA recognized that smoke emissions and violations of national ambient air quality standards in several air quality control regions endangered the public health and welfare.[37] EPA then concluded that airports and aircraft were already, "or [were] projected to be[,] significant sources of emissions"[38] in regions that exceeded the ambient air quality standards. This "require[d] that aircraft and aircraft engines be subject to a program of control compatible with their significance as pollution sources."[39] The 1982 amendments did not make any substantial changes to PM emission standards, but instead made changes to the compliance schedule for the 1973 standards.[40] And the 1984 review merely extended the date for compliance with the 1982 amendments for certain engines.[41] Since these reviews and amendments that resulted in minimal changes to the 1973 standards, the science regarding the adverse health and environmental impacts of PM emissions has become more certain. In 2019, EPA issued an integrated science assessment detailing the adverse health and welfare effects of PM pollution, which affirmed and strengthened previous findings regarding the links between PM exposure and mortality and cancer.[42]

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[34] 42 U.S.C. § 7571(a)(1).
[35] *Id.* § 7571(a)(2)(A).
[36] 87 Fed. Reg. at 6,329.
[37] Control of Air Pollution from Aircraft and Aircraft Engines, Proposed Standards, 37 Fed. Reg. 26,488 (Dec. 12, 1972).
[38] *Id.*
[39] *Id.*
[40] Control of Air Pollution From Aircraft and Aircraft Engines; Emission Standards and Test Procedures, Final Rule, 47 Fed. Reg. 58,462 (Dec. 30, 1982) ("the proposal did not affect the smoke and fuel venting emission standards expect for a proposed delay in the T3 compliance schedule").
[41] *Id.* at 31,873.
[42] 2019 ISA at ES-11.

B. The International Civil Aviation Organization's PM Standards

The 1944 Convention on International Civil Aviation, or Chicago Convention, established rules governing airspace, aircraft registration, and the safety and sustainability of international air travel. It also created a UN specialized agency, the International Civil Aviation Organization, to manage the administration and governance of the Chicago Convention, establish standards, and recommended policies for the civil aviation sector.

ICAO seeks to reach consensus on aircraft standards, but the Chicago Convention does not automatically commit ICAO members to a single set of standards. In fact, "it is expected that States will adopt their own airworthiness standards, and it is anticipated that some states may adopt standards that are more stringent than those agreed upon by ICAO."[43] Certificates will be recognized by other member states if they are "equal to or above the minimum standards" set pursuant to the Convention; the deviating member simply sends notice that it deems different regulations necessary.[44] Thus, the Convention gives member states the freedom and flexibility to establish national standards that are more stringent. Indeed, the U.S. has opted in the past to adopt stricter standards.[45] For example, the U.S. phased out noisy in-service aircraft on a faster timeframe than ICAO, in part to alleviate community concerns.[46]

In 2017, an ICAO technical committee established, and ICAO adopted, international airplane maximum PM mass concentration standards. In 2020, ICAO adopted the PM mass and number standards. The standards apply only to nonvolatile particulate matter and to emissions from new aircraft (not existing aircraft).[47] In addition, "ICAO intentionally established its standards at a level which is technology following."[48] The Proposal acknowledges that all in-production engines already meet the proposed emission limits for in-production engines and most meet the limits for new engines.[49] The standards are therefore not anticipated to reduce PM emissions,[50] and will allow overall emissions to increase as air traffic grows.

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[43] Control of Air Pollution From Aircraft and Aircraft Engines; Emission Standards and Test Procedures, 70 Fed. Reg. 69,664, 69,667, n.11 (Nov. 17, 2005).
[44] International Civil Aviation Organization, Convention on International Civil Aviation, Ninth Edition at art. 33, 38 (2006), https://www.icao.int/publications/Documents/7300_cons.pdf ("Chicago Convention").
[45] *See* Federal Aviation Administration, Interagency Comments on Proposed NPRM at 1 (May 15, 2020), https://downloads.regulations.gov/EPA-HQ-OAR-2018-0276-0038/attachment_1.pdf ("While we strive to make sure our aviation regulations are in line with ICAO standards per Article 37, we sometimes decide not to follow the ICAO standard and instead opt to file a difference per Article 38"); *id.* at 14 ("Our treaty obligations do allow for us to file a difference if we opt not to follow an ICAO standard, so there is no obligation to follow ICAO standards.").
[46] U.S. General Accounting Office, GAO-01-1053, Aviation and the Environment: Transition to Quieter Aircraft Occurred as Planned, but Concerns about Noise Persist (2001), https://www.gao.gov/assets/240/232737.pdf; 49 U.S.C. § 47528(a); International Civil Aviation Organization, GIACC/3-IP/1, Agenda Item 2: Review of aviation emissions related activities within ICAO and internationally Parallels between Noise and CO_2 Environmental Goals (July 1, 2009), at ¶ 2.2 https://www.icao.int/environmental-protection/GIACC/Giacc-3/Giacc3_ip01_en.pdf (deadline that is 15 months after deadline set out in the United States' Aircraft Noise and Capacity Act of 1990).
[47] 87 Fed. Reg. at 6,342, 6,324.
[48] *Id.* at 6,349.
[49] *Id.* at 6,324, 6,338, 6,339, 6,341.
[50] *Id.* at 6,347.

III. The Proposal Violates Section 231 of the Clean Air Act.

The Proposal violates the Clean Air Act because it fails to reduce aircraft-related PM emissions or even consider the factors set out in Section 231.

The purpose of the Clean Air Act is to protect the public health and welfare through the prevention of air pollution.[51] To further this purpose, in 1971, EPA determined that PM harmed the public health and welfare and promulgated its first national ambient air quality standards for PM.[52] Thereafter, in 1973, EPA found that aircraft-related PM emissions harm the public health and welfare and set emission standards under Section 231.[53] Since 1973, the EPA has strengthened ambient air quality standards multiple times in recognition of its significant health and environmental impacts and last year announced that "available scientific evidence and technical information indicate that the current standards may not be adequate to protect public health and welfare."[54] Similarly, with this Proposal, EPA continues to acknowledge that aircraft-related PM emissions "endanger the public health and welfare," and cites to numerous studies emphasizing that PM is more harmful and its damage more certain than was previously understood.[55]

Despite the Clean Air Act's primary goal to prevent air pollution, Section 231(a)(2)(A)'s requirement that EPA set emission standards for air pollutants from aircraft that "may reasonably be anticipated to endanger public health or welfare,"[56] and EPA's acknowledgement that aircraft-related PM emissions harm the public health and welfare, the Proposal does nothing to reduce PM emissions.[57] The new standards will not "produce any emission reductions, beyond the business-as-usual fleet turn over that would occur absent of the proposed standards."[58] Without any emission reductions, the Proposal cannot address the growing harms to public health and welfare from airplane PM pollution.

EPA notes that Section 231 does not require it to obtain the "greatest degree of emission reduction achievable,"[59] but this does not give EPA license to issue standards that entirely fail to reduce emissions.[60] Nor does it give EPA the ability to ignore other considerations set out in Section 231, such as the "technological feasibility of controlling . . . emissions" that affect air quality.[61] In fact, Section 231(b) provides that standards should take effect "after such period as

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[51] 42 U.S.C. § 7401(b)-(c).
[52] National Primary and Secondary Ambient Air Quality Standards, 36 Fed. Reg. 8,186, 8,187 (Apr. 30, 1971).
[53] Emission Standards and Test Procedures for Aircraft, 38 Fed. Reg. 19,088 (July 17, 1973).
[54] U.S. EPA, EPA to Reexamine Health Standards for Harmful Soot that Previous Administration Left Unchanged, Press Release (June 10, 2021), https://www.epa.gov/newsreleases/epa-reexamine-health-standards-harmful-soot-previous-administration-left-unchanged.
[55] 87 Fed. Reg. at 6,327, 6,331; *see* Memorandum, *supra* footnote 5.
[56] 42 U.S.C. § 7571(a)(2)(A).
[57] 87 Fed. Reg. at 6,324.
[58] *Id*. at 6,347.
[59] *Id*. at 6,327 (citing 42 U.S.C. § 7547(a)(3)).
[60] *See National Association of Clean Air Agencies (NACAA) v. EPA*, 489 F. 3d. 1221, 1230 (D.C. Cir. 2007) (Court held that EPA's NO_X emission standards under Section 231 were not required to be more stringent because "to the extent that §231 requires rules promulgated thereunder to tighten emissions standards, the Final Rule in fact does so by 16%.").
[61] 42 U.S.C. § 7571(a)(1)(b).

[EPA] finds necessary . . . to permit the development . . . of the requisite technology."[62] Thus, EPA should have considered technology that is currently available as well as technology that may reasonably be developed and deployed within a given time frame but which is not yet available.[63] EPA did not do that here; it conducted no analysis of options that could control PM emissions and analyzed the ICAO standards in only a cursory manner, to show that aircraft engines already meet them.[64]

EPA justifies its action by noting it has "greater flexibility" under Section 231 than other sections of the Clean Air Act that require EPA to obtain the ''greatest degree of emission reduction achievable,'' and explaining that it is not required "to give subordinate status to factors such as cost, safety, and noise in determining what standards are reasonable."[65] While EPA is permitted to weigh other factors, it cannot give emission reduction no weight at all.[66] Moreover, EPA does not explain anywhere in the Proposal why "cost, safety, and noise" justify the standards. It never considers those factors. Instead, EPA attempts to graft the adoption of international standards onto the framework of Section 231 without applying any of the factors Congress set out in the section. Whatever discretion is afforded to EPA in adopting aircraft emissions standards, it does not encompass a rule that fails to achieve any reduction in PM emissions. And EPA's discretion certainly does not encompass a rule that fails to even *consider* standards that could achieve reductions.

IV. The Proposal is Arbitrary and Capricious

An agency's rule is arbitrary and capricious when the agency has "relied on factors which Congress did not intend it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view of the product of agency expertise."[67] Here, EPA failed to consider pollution harm reduction or other statutory factors and instead focused on harmonization with international standards. Additionally, EPA failed to consider any alternatives to its Proposal.

A. The Proposal is arbitrary and capricious because it fails to consider EPA's duty to reduce PM emissions to protect public health and welfare, or other factors set forth in Section 231.

EPA has a duty under the Clean Air Act to reduce or prevent pollution consistent with the goal of protecting public health and welfare. This Proposal fails to fulfill this duty or explain why technological infeasibility, cost, noise, safety, or any other factor laid out in the statute

[62] 42 U.S.C. § 7571(b).
[63] Control of Pollution from Aircraft and Aircraft Engines, 38 Fed. Reg. 19,087, 19,089 (July 17, 1973).
[64] Control of Air Pollution from Aircraft Engines: Emission Standards and Test Procedures Proposed Rule, 87 Fed. Reg. 6,324, 6,338, 6,339, 6,341 (Feb. 3, 2022).
[65] 87 Fed. Reg. at 6,327.
[66] *See NACAA v. EPA*, 489 F.3d at 1226 ("EPA interprets its authority under section 231 to be somewhat similar to those provisions that require us to identify a reasonable balance of specified emissions reduction, cost, safety, noise, and other factors.").
[67] *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983).

prevented EPA from setting standards to address harmful PM emissions. EPA's analysis is untethered to the Clean Air Act's emission-reduction purpose as outlined in the statute and which EPA emphasized when setting its initial aviation smoke standards; that proposal acknowledged the importance of standards under Section 231 to address regional air quality challenges around airports.[68] Here, EPA admits that the proposed standards are not expected to reduce pollution or improve air quality near airports.[69] The factors set out in the statute are "important aspects of the problem" that EPA has ignored.[70] EPA's failure is particularly egregious in this rulemaking because there is ample evidence that if EPA had performed any analysis, it would have found that technology exists to cost-effectively reduce emissions.[71]

B. The Proposal is arbitrary and capricious because EPA does not consider the costs and benefits of the reduction of other harmful aircraft emissions.

The Proposal also fails to consider the particularly harmful and significant effects of volatile PM. The combustion of aircraft fuel creates emissions of volatile and involatile PM, which both cause well-recognized harm to human health and the environment. EPA takes into account only nonvolatile PM "[b]ecause of the difficulty in measuring volatile PM, which is formed in the engine's exhaust plume and is significantly influenced by ambient conditions."[72] But standards that increase aircraft fuel efficiency also decrease fuel use, and thus would reduce the emissions of both types of particulate matter. In addition, ICAO has stated that volatile particulate emissions are dependent on controls related to "gaseous emission certification and the fuel composition (e.g., sulfur content)."[73] Standards that incorporate these controls could also address both types of particulate matter.[74] EPA failed to consider these costs and benefits of its Proposal, rendering its rule arbitrary and capricious.[75]

C. The Proposal is arbitrary and capricious because EPA relies on factors Congress did not intend to be considered.

EPA states that the purpose of the Proposal is "international harmonization of aviation requirements," and also claims that the standards are "anti-backsliding."[76] Yet international harmonization is not a factor Congress identified for setting emission limits under Section 231—nor is it even expected by the Chicago Convention. Moreover, EPA's assertion that the Proposal adopts "anti-backsliding" standards is misleading.

The Proposal correctly notes that, in addition to developing standards that meet the

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[68] 37 Fed. Reg. at 26,488.
[69] 87 Fed. Reg. at 6,327.
[70] *State Farm*, 463 U.S. at 29.
[71] *See infra* Section VI.
[72] 87 Fed Reg. at 6,331.
[73] Rindlisbacher, Theo & S. Daniel Jacob, New Particulate Matter Standard for Aircraft Gas Turbine Engines, ICAO Environmental Report (2016) https://www.icao.int/environmental-protection/Documents/EnvironmentalReports/2016/ENVReport2016_pg85-88.pdf at 1.
[74] *See infra* at footnotes 112-113.
[75] *State Farm*, 463 U.S. at 43; *Michigan v. EPA*, 576 U.S. 743, 753 (2015) (explaining that "reasonable regulation ordinarily requires paying attention to the advantages *and* the disadvantages of agency decisions").
[76] 87 Fed. Reg. at 6,326.

requirements of Section 231, the U.S. must adopt standards that are at least as strict as those adopted by ICAO for planes that are certified in the U.S. to operate abroad without additional certification.[77] It also correctly observes that Chicago Convention member states may adopt more stringent standards than the ones set by the ICAO.[78] But EPA goes on to say that adopting the international standards instead of more stringent standards is proper given the importance of "international uniformity and regulatory certainty,"[79] and that to "deviate from them might well undermine future efforts by the United States to seek international consensus on aircraft emissions."[80] EPA provides no legitimate basis for these assertions. EPA does not explain why setting stricter standards would "undermine" future efforts. All members of the Chicago Convention know that adoption of stricter standards is possible, and many of them have in fact adopted stricter standards.[81] Given that international negotiations are driven by pledges from participating countries to reduce their fair share of emissions, it is more plausible that setting stricter standards would improve rather than hinder future cooperation. Regardless, EPA's primary concern about harmonization to the lowest-common-denominator international standards is a policy one, which EPA cannot assign more weight than its statutory obligations under the Clean Air Act to set health-protective standards.

Furthermore, EPA mischaracterizes the proposed standards as "anti-backsliding." EPA states that the ICAO standards would "prevent aircraft engine PM levels from increasing beyond their current levels."[82] It doesn't make sense for EPA to assume that future in-production engines will suddenly be higher emitting and generate more pollution than engines in-service today so as to lead to backsliding. With all in-production engines already meeting the proposed emission limits for in-production engines and most meeting the limits for new engines, and with many airplane engines meeting the recommended standards for new planes and new types of planes by a "considerable margin," no backsliding could reasonably occur.[83] The proposed standards cannot be touted as "anti-backsliding" when current conditions would not change absent these standards.

Another reason why the proposed standards cannot be characterized as "anti-backsliding" is because they do not consider the anticipated increase in air traffic that will cause an increase in emissions. The narrow application of the proposed standards to aircraft engines does not account for the cumulative impact of increased air traffic.

EPA has some discretion under Section 231 to consider cost, safety, and noise when setting standards.[84] However, EPA has not tied the development of the Proposal to these factors.

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[77] *Id.*
[78] *Id.* at 6,328.
[79] *Id.* at 6,337.
[80] *Id.*
[81] Dempsey, Paul Stephen, Compliance & Enforcement in International Law: Achieving Global Uniformity in Aviation Safety, 30 N.C. J. Int'l L. & Com. Reg. 1, 17 n.65 (2004) ("[A]s of 2000, 55 states had notified ICAO of the differences between their domestic laws and Annex 1."); Peterson, Mark Edward, The UAV and the Current and Future Regulatory Construct for Integration Into the National Airspace System, 71 J. Air L. & Com. 521, 559 n.197 (2006) ("A review of the filed differences [pursuant to Article 38] reveals that most deal with differences in terminology or involve more stringent practices.").
[82] 87 Fed. Reg. at 6,326.
[83] *Id.* at 6,338, 6,339, 6,341, 6,348.
[84] *See supra* Section III.

EPA relies on factors outside the scope of Section 231 and prioritizes them over EPA's statutory obligations. It is arbitrary and capricious for EPA to prioritize the harmonization of international aviation standards over its statutory duty to protect the public health and welfare.

D. The Proposal is arbitrary and capricious because it failed to consider alternatives.

EPA is "required to address common and known or otherwise reasonable options, and explain any decision to reject such options."[85] The Proposal does not offer *any* alternatives to the proposed standards. Instead, EPA states that it "considered whether to propose more stringent standards," but decided to adopt the ICAO's standards because "international uniformity and regulatory certainty are important elements of these proposed standards."[86] EPA provides no further information about the more stringent standards it supposedly "considered" but rejected before formally developing them into a viable alternative. The agency offers no insight into how much those standards would reduce emissions and how many aircraft engines would already meet them. This is improper. In order to weigh the costs and benefits of a rule and determine that it is reasonable, it is essential to consider alternatives. This is especially true here, where the statutory factors that should have been considered include emissions-reduction-potential, feasibility, and cost—factors that cannot be properly weighed without considering a range of options. EPA has failed to meaningfully consider and provide reasonable alternatives to the proposed standards, and such a failure is arbitrary and capricious.

V. The Proposal Does Not Meaningfully Discuss Environmental Justice Impacts.

"[E]nvironmental justice is not merely a box to be checked."[87] Executive Order 12898 and Title VI of the Civil Rights Act of 1964 require EPA to consider how its Proposal would impact disadvantaged communities.[88] EPA's action is arbitrary and capricious because the agency has made no effort to conduct any meaningful analysis of those impacts.[89]

EPA's "Environmental Justice" discussion consists only of a recitation of Technical Guidance questions and a brief summary of existing scientific literature that notes that communities near airports experience higher concentrations of PM as well as that those same communities are disproportionately low-income and communities of color.[90] Rather than apply the Guidance questions, EPA summarily concludes that there will be no "improvement in air quality for those who live near airports where these aircraft operate."[91]

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[85] *Int'l Ladies' Garment Workers' Union v. Donovan*, 722 F.2d 795, 818 (D.C. Cir. 1983).
[86] 87 Fed. Reg. at 6,337.
[87] *Friends of Buckingham v. State Air Pollution Control Bd.*, 947 F.3d 68, 92 (4th Cir. 2020).
[88] *See, e.g.*, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, Exec. Order No. 12898, 59 Fed. Reg. 7,629 (Feb. 11, 1994), *as amended*, 60 Fed. Reg. 6,381 (Jan. 30, 1995).
[89] *See Vecinos para el Bienestar de la Comunidad Costera v. FERC*, 6 F.4th 1321, 1330-31 (D.C. Cir. 2021) (federal agency's environmental justice analysis was arbitrary and capricious where it failed to examine a pipeline project's environmental effects extending beyond the two-mile radius it studied).
[90] 87 Fed. Reg. at 6,336.
[91] *Id.*

It was insufficient for EPA to recite Technical Guidance questions without making any attempt to answer them. EPA's "Technical Guidance for Assessing Environmental Justice in Regulatory Analysis" offers recommendations on "conducting the highest quality [EJ] analysis feasible."[92] The Guidance document provides three broad questions that agencies should address when conducting an EJ analysis: (1) "[a]re there potential EJ concerns associated with environmental stressors affected by the regulatory action for population groups of concern in the baseline;" (2) "[a]re there potential concerns associated with environmental stressors affected by the regulatory action for population groups of concern for the regulatory option(s) under consideration;" and (3) "[f]or the regulatory option(s) under consideration, are potential EJ concerns created or mitigated compared to the baseline?"[93] As the Guidance notes, these questions are intended to help the agency understand "differences in impacts or risks," such as "differential exposures" and "differential health and environmental outcomes," that help decisionmakers understand whether they should take a different action.[94]

EPA should have attempted to answer these questions and described in detail whether the Proposal will have a disproportionate impact on environmental justice communities near airports. To properly consider whether environmental justice concerns would be created or mitigated, EPA also should have analyzed the benefits of setting a standard for covered aircraft that would cause real and incremental reductions in PM emissions. And it should have considered how standards might be paired with investment in climate adaptation and filtration technologies for communities near airports that have borne the brunt of historical pollution.

The Guidance further recommends that "[a]nalysts should present information on estimated health and environmental risks, exposures, outcomes, benefits and other relevant effects disaggregated by income and race/ethnicity."[95] According to this recommendation, EPA should have provided information on the anticipated health and environmental risks and impacts the proposed standards will have on these vulnerable subcommunities. Where this data is not available, the Guidance recommends using other metrics.[96] EPA cites to several studies that examine the disparate health impacts experienced by communities near airports. EPA should have utilized this information to conduct a disparate impacts analysis to explain how its Proposal would allow continued and even *increasing* PM emissions in these communities due to rising air traffic, resulting in further suffering in already overburdened communities.

It was also inappropriate for EPA to defer to a separate action a "demographic analysis to explore whether populations living nearest the busiest runways show patterns of racial and socioeconomic disparity."[97] While EPA's efforts to better understand environmental justice concerns near airports are laudable, EPA is describing future efforts that are beyond the scope of this rulemaking. EPA should have at a minimum completed *some* environmental justice analysis before issuing its proposal and explained why the information it had was insufficient to provide a

[92] U.S. EPA, Technical Guidance for Assessing Environmental Justice in Regulatory Analysis 13 (2016) https://www.epa.gov/sites/default/files/2016-06/documents/ejtg_5_6_16_v5.1.pdf.
[93] *Id.* at 11.
[94] *Id.*
[95] *Id.* at 13.
[96] *Id.*
[97] 87 Fed. Reg. at 6,336.

detailed analysis of the present implications of the action under consideration for disadvantaged communities.

VI. Proper Consideration of the Endangerment Findings, Purpose of the Clean Air Act, and Other Factors Demands the Promulgation of Ambitious, Technology-Forcing Standards.

At a minimum, EPA should set standards that reduce emissions using readily-available technology. The Proposal acknowledges that all in-production engines already meet the proposed emission limits for in-production engines and most meet the limits for new engines.[98] In other words, technology that reduces *more* emissions than the proposed standards is *already* widely available and in commercial use. By setting standards that the vast majority of in-production engines already meet, EPA could presumably reduce emissions from new planes with little cost.

In addition to setting standards based on available engine technology, EPA has both the authority and the obligation to consider strong, technology-forcing standards that go further. To effectively reduce greenhouse gas emissions from the aviation sector, emission standards should: (1) apply to in-service aircraft, not just to new aircraft and new aircraft designs; (2) include the emissions reductions achievable through design and operational improvements; and (3) include a ratchet mechanism to decrease emissions over time. The most effective way of incorporating these features would be to set a declining fleetwide average standard. If EPA chooses not to employ these options, it should provide a reasonable explanation for that decision.[99]

A. Standards should apply to new and existing aircraft.

In contrast to other mobile source provisions that limit standard-setting authority to "new" engines and vehicles, Section 231 does not distinguish between new and existing sources. Section 231 instead authorizes EPA to establish emission standards for "any class or classes of aircraft engines."[100] EPA is therefore empowered to regulate emissions from both new and existing aircraft. In fact, EPA has previously interpreted Section 231 to allow regulation of existing aircraft. In 1973 EPA included retrofit standards for in-use aircraft engines.[101] In 2008, EPA referred to its ability to regulate "previously certified engines" and to setting standards based on fleet average performance.[102] And in 2015, EPA again reiterated its understanding that

[98] Control of Air Pollution from Aircraft Engines: Emission Standards and Test Procedures Proposed Rule, 87 Fed. Reg. 6,324, 6,338, 6,339, 6,341 (Feb. 3, 2022).
[99] *See, e.g.*, *State Farm*, 463 U.S. at 47-49 (reaffirming that "an agency must cogently explain why it has exercised its discretion in a given manner").
[100] 42 U.S.C. § 7571(a)(2)(A) (1990); *compare* section 7571(a)(2)(A), *with* section 7521(a)(1) (authorizing emission standards for "any class or classes of new motor vehicles or new motor vehicle engines"). "Where Congress includes particular language in one section of a statute but omits it in another section of the same Act, it is generally presumed that Congress acts intentionally and purposely in the disparate inclusion or exclusion." *Bates v. United States*, 522 U.S. 23, 29-30 (1997) (internal quotations and citations omitted).
[101] Control of Air Pollution from Aircraft and Aircraft Engines, 38 Fed. Reg. 19,088, 19,089 (July 17, 1973).
[102] Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. 44,354, 44,472 (July 30, 2008).

Section 231 authorizes regulation of existing aircraft.[103]

EPA has not explained why it has abandoned the option of regulating all classes of aircraft, including in-service aircraft. Regulation of in-service aircraft is especially important because aircraft and aircraft engines operate for about 25 to 30 years.[104] Applying in-production particulate matter standards to in-service aircraft, and requiring additional improvements over time, could promote early retirement of less efficient models.[105] Studies show that this is one of the most effective means of reducing aircraft emissions.[106]

B. Standards should include emissions reductions achievable through improvements that do not relate to aircraft engine technology.

EPA also should have taken design, operational, and other non-engine improvements into account when setting particulate matter standards. EPA has a history of considering such options in prior rulemakings. When EPA set emissions standards for hydrocarbons, carbon monoxide, and nitrogen oxides in 1973, for example, it recognized that evidence of compliance with standards through improved operations was sufficient to counter arguments that certain technologies would impose drastic compliance costs.[107] Other examples where EPA considered incorporation of aircraft design and operational improvements include the 2015 proposed endangerment finding for greenhouse gas emissions, and 2008 Advanced Notice of Proposed Rulemaking related to *Massachusetts v. EPA*.[108]

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[103] Proposed Finding That Greenhouse Gas Emissions From Aircraft Cause or Contribute to Air Pollution That May Reasonably Be Anticipated To Endanger Public Health and Welfare and Advance Notice of Proposed Rulemaking, 80 Fed. Reg. 37,758, 37,791 n.203 (July 1, 2015) (citing fuel venting and smoke number standards that applied to in-use aircraft and noting that "unlike the EPA's authority to promulgate emission standards for motor vehicles under CAA section 202(a) or for nonroad engines and vehicles under section 213(a), section 231 of the CAA does not restrict the EPA's authority to set standards for only new aircraft.").

[104] Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. 44,354, 44,471 (July 30, 2008).

[105] Such phase-out regulations could be modeled on FAA's regulations to phase out the loudest civil turbojet aircraft. *See* Adoption of Statutory Prohibition on the Operation of Jets Weighing 75,000 Pounds or Less That Are Not Stage 3 Noise Compliant, 78 Fed. Reg. 39,576 (July 2, 2013) (prohibiting the operation of jet airplanes with a maximum weight of 75,000 pounds or less in the contiguous United States after December 31, 2015, unless they meet Stage 3 noise levels).

[106] *See* Grampella, Mattia et al., The Impact of Technology Progress on Aviation Noise and Emissions, 103 Transp. Res. A: Pol'y and Prac. 525 (2017) (2017 study analyzing local emissions reductions from incremental technical progress [improvements in existing aircraft type] and substantial innovation [the production of new-type aircraft], finding that deploying a one-year younger aircraft/engine combination results in a 1% decrease in local emissions; on a per-passenger basis, local emissions are reduced by 24% the introduction of a new aircraft model).

[107] Control of Air Pollution from Aircraft and Aircraft Engines, 38 Fed. Reg. 19,088, 19,089 (July 17, 1973) ("Commenters representing general aviation interests opposed the introduction of emission standards applicable to piston engine aircraft, on the arounds that compliance would require introductions of exhaust system reactors which would have drastic and costly effects on the configuration of the entire aircraft. The Agency has concluded that sufficient evidence is already available in the form of measured emissions data on current aircraft to indicate that the *proposed standards can be met by improved fuel management and will not require exhaust system reactors*.")

[108] Proposed Finding that Greenhouse Gas Emissions from Aircraft Cause or Contribute to Air Pollution that May Reasonably Be Anticipated to Endanger Public Health and Welfare and Advance Notice of Proposed Rulemaking, 80 Fed. Reg. 37,758, 37,797 (July 1, 2015) (discussing use of advanced materials, new manufacturing processes, aircraft changes to improve propulsion and aerodynamics, and means to reduce drag and improve combustion and engine cycle refinements); Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. 44,354, 44,470-473 (July 30, 2008) (discussing technology and operational changes).

EPA's failure to consider non-engine improvement options was especially problematic here because certain non-engine improvements could target emissions at airports and during the landing and take-off cycles, which contribute most to particulate matter impacts.[109] For example, emissions would be reduced by minimizing engine idling time on runways and employing single engine taxiing and reducing engine thrust and reverse during high-intensity periods like take-off and landing.[110] Other operational strategies include optimizing timetables, route networks, and flight frequencies to reduce stopovers and select fuel-efficient routes; reducing the use of auxiliary power units; reducing the amount of excess weight carried, including fuel; and more regular maintenance and cleaning of engines and airframes to correct minor deterioration.[111]

Finally, given the relationship between fine particulate matter generation and fuel composition, EPA should have considered more aggressive emissions standards that could be met by using particular fuels and by transitioning away from fuels to hybrid and all-electric aircraft. For example, the Federal Aviation Administration has determined that fuel with reduced aromatics—especially napthalenes—and sulfates results in less particle matter pollution.[112] Studies indicate that use of low sulfur jet fuel globally is "likely to prevent 1000-4000 premature mortalities per year."[113] Jet fuel can be desulfurized in the same way as road transportation fuels, with "an increase in the cost of a gallon of just over 1% at 2011 prices."[114] Aircraft electrification is also gaining momentum and becoming more cost-effective, especially for short flights. The country of Norway has committed to fully electrifying such flights by 2040.[115]

The combined effect of these reduction strategies is substantial. For example, one cost assessment of near- and mid-term technologies aimed at improving new aircraft fuel efficiency (i.e., not including fuel composition changes), found that the fuel consumption of new aircraft could be reduced by approximately 25% in 2024 and 40% in 2034 when compared with 2016's aircraft by deploying emerging cost-effective technologies.[116] The rate of fuel efficiency

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[109] 87 Fed. Reg. at 6,345; *see also* Heathrow Airport Ltd., Heathrow Air Quality Strategy 2011-2020 (2011); Yunos, S.N.M.M. et al., Aircraft LTO Emissions Regulations and Implementations at European Airports, 1831 AIP Conf. Proc. 020006-1 (2017).

[110] Waitz, Ian A. et al., Aviation and the Environment: A National Vision Statement, Framework for Goals and Recommended Actions, Report to the United States Congress (2004) ("Aviation & the Environment") at 34, http://web.mit.edu/aeroastro/partner/reports/congrept_aviation_envirn.pdf; Center for Clean Air Policy and Northeast States for Coordinated Air use Management, Controlling Airport Related Pollution (2003) ("CCAP Report") at III-7-9, https://crp.trb.org/acrp0267/controlling-airport-related-air-pollution/.

[111] CCAP Report at III-7-11; *see also* Aviation & the Environment at 34.

[112] Hileman, Jim, Federal Aviation Admin., Fuel Composition & Aircraft Emissions (2018), https://www.caafi.org/resources/pdf/3.2_SAJF_Benefits.pdf.

[113] Ascent, Project 27: Environmental cost-benefit analysis of ultra low sulfur jet fuels, https://ascent.aero/partner-27/.

[114] *Id.*

[115] Fleming, John, Flight Path: A Trajectory for U.S. Aviation to Meet Global Climate Goals (2020), https://www.biologicaldiversity.org/programs/climate_law_institute/pdfs/Flight-Path-A-Trajectory-for-U-S-Aviation-to-Meet-Global-Climate-Goals.pdf.

[116] Kharina, Anastasia et al., Cost Assessment of Near- and Mid-term Technologies to Improve New Aircraft Fuel Efficiency, International Council on Clean Transportation (2016), https://theicct.org/publications/costassessment-near-and-mid-term-technologies-improve-new-aircraft-fuel-efficiency; *see also* Rutherford, Dan, Standards to

improvement for new aircraft can be more than doubled through 2034, from about 1% in 2016 to 2.2% annually, through technologies to improve engine efficiency, reduce aerodynamic drag, and trim aircraft empty weight.[117]

C. Standards should decrease emissions over time and should be technology forcing.

EPA has also previously discussed the option of creating "a declining fleet average emissions program," which would consider efficiency gains from improved "engine, aircraft and operational greenhouse gas control[s]."[118] This type of emissions program is critical for actually decreasing emissions over time. EPA admits that there will be no emission reductions from the proposed rule.[119] Worse, because the standards apply to emissions at individual engines, the rule will do nothing to curb emissions that will continue to rise with increased passenger and cargo traffic. To abate emissions, EPA needs to set a cap across the sector.

That fleetwide emissions cap should decrease over time to encourage retirement of the most polluting aircraft and continue to push technological innovation. Congress intended the Clean Air Act to be a technology-forcing statute. The statute itself provides that standards should take effect "after such period as [EPA] finds necessary . . . to permit *the development* . . . of the requisite technology."[120] Thus, as EPA explained in its first rulemaking under Section 231, "the standards set by EPA may reflect technology which may reasonably be obtained within a given time frame but which is not yet available."[121] EPA in 2005 again confirmed its authority to implement a "technology-forcing standard," and the agency need not "demonstrate that a [necessary] technology is currently available universally or over a broad range of aircraft" to require implementation of its standards, so long as "sufficient lead time" is provided.[122] EPA should have analyzed what suite of technologies are available now, and what technologies could become readily deployed in the coming years.

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promote airline fuel efficiency, International Council on Clean Transportation (2020), https://theicct.org/sites/default/files/publications/Airline-fuel-efficiency-standard-2020.pdf (a declining fleet average standard could yield 2.5 percent annual fuel efficiency improvements via three main pathways: (1) replacing older aircraft with newer, more fuel-efficient aircraft; (2) improving operations to carry more passengers and freight per flight and to fly more directly to destinations; and (3) finding optimal flight paths and avoiding congestion near airports using advanced air traffic management).

[117] Kharina, Anastasia et al., Cost Assessment of Near- and Mid-term Technologies to Improve New Aircraft Fuel Efficiency, International Council on Clean Transportation (2016), https://theicct.org/publications/costassessment-near-and-mid-term-technologies-improve-new-aircraft-fuel-efficiency.

[118] Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. 44,354, 44,472-73 (July 30, 2008). Section 231's language is similar to that in Section 202, under which EPA has historically employed a fleet-wide averaging approach to regulate of emissions from new motor vehicles. The D.C. Circuit has upheld this approach as lawful, emphasizing the "absence of any clear evidence that Congress intended to prohibit averaging" under section 202 and the strong policy arguments for adopting this approach. *See NRDC v. Thomas*, 805 F.2d 410, 425 (D.C. Cir. 1986).

[119] 87 Fed. Reg. at 6,347.

[120] 42 U.S.C. § 7571(b) (1990).

[121] Control of Pollution from Aircraft and Aircraft Engines, 38 Fed. Reg. at 19,089.

[122] Control of Air Pollution From Aircraft and Aircraft Engines; Emission Standards and Test Procedures, 70 Fed. Reg. at 69,676 ("forward-looking language" of section 231 does not preclude EPA from setting a technology-forcing standard, and "the Agency is not limited in identifying what is 'technologically feasible' as what is already technologically achieved").

VII. EPA Should Replace the Proposal with a Rule that Complies with Section 231 and Basic Requirements of the Administrative Procedure Act.

The Proposal violates Section 231 of the Clean Air Act because it fails to reduce particulate matter emissions from aircraft when cost-effective technology is available to safely do so. EPA did not even consider the statutory factors laid out in Section 231 and made no attempt to look at any alternative. Instead, it relied on factors outside the statute. Adoption of ICAO's emission standards was the purpose of the regulation, and the description of those standards was the entirety of the agency's analysis. The flaws in this approach cannot be remedied in a final rule. EPA must therefore replace the Proposal with one that meets its duties under the Clean Air Act to reduce emissions from aircraft and protect the public health and welfare.

Respectfully submitted,

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