Regulating New Fossil-Fuel Appliances Under Section 111(b) of the Clean Air Act

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Table of Contents

Introduction 1

I. Fossil-fuel appliances qualify as “stationary sources” under Section 111 3

II. EPA could easily support a finding that fossil-fuel appliances “contribute significantly” to one or more types of harmful air pollution 4

A. The D.C. Circuit has declined to specify a particular test for the significance of a source category’s contribution to pollution 4

B. Past significant contribution findings for criteria pollution have not identified a particular test or numerical threshold for significance 5

C. The Trump administration’s recent attempt to constrain EPA’s discretion on significance findings would not prevent the agency from finding that fossil-fuel appliances contribute significantly to dangerous pollution 6

III. Multiple means of reducing emissions from fossil-fuel appliances are “adequately demonstrated” and could be incorporated into a “best system of emission reduction” for the source category 7

A. Appliance emissions can be reduced with ultra-low-NO_x combustion technology 9

B. Appliance emissions can be reduced with condensing technology 9

C. Appliance emissions can be reduced with electric-heat-pump technology 9

D. EPA could incorporate emissions averaging and trading into a Section 111(b) rulemaking for appliances 11

1. EPA has repeatedly incorporated averaging and trading into best-system determinations for stationary sources under Section 111 11

2. EPA uses averaging and trading in Section 202(a) emission standards for motor vehicles 14

3. EPA has established trading programs under multiple other Clean Air Act provisions that do not expressly authorize trading 15

E. EPA could use subcategorization in a Section 111(b) rulemaking for appliances 15

IV. EPA’s issuance of performance standards for fossil-fuel appliances under Section 111(b) would not preclude continued regulation of such appliances by other governmental entities 16

A. Section 111(b) standards would not preempt more stringent state and local restrictions on fossil-fuel appliances 16

B. Section 111(b) standards would not displace DOE’s responsibility to set energy conservation standards for fossil-fuel appliances 16

Conclusion 17

Introduction

The majority of residential and commercial buildings use appliances powered with fossil fuels for space and/or water heating.[1] Collectively, these appliances—most of which run on natural gas[2]—emit substantial quantities of a variety of harmful air pollutants, including particulate matter, nitrogen oxides ("NO_x"), and carbon dioxide.[3] Fossil-fuel appliances in the U.S. emitted over 425,000 tons of NO_x in 2017—almost three times the amount attributable to gas-fired power plants in that year.[4] And fossil-fuel combustion in residential and commercial buildings accounted for almost 10% of the nation's greenhouse gas emissions in 2019—only slightly less than gas power plants.[5] Yet while the U.S. Environmental Protection Agency ("EPA") has limited gas power plants' NO_x emissions since the 1970s and their greenhouse gas emissions since 2015,[6] the agency has never regulated emissions from residential appliances and restricts emissions from only a tiny fraction of heating systems in commercial buildings.[7]

This report explores EPA's authority to regulate residential and commercial fossil-fuel appliances under Section 111(b) of the Clean Air Act. Section 111(b) requires EPA to establish nationwide standards of performance for new stationary sources in categories that, in the EPA Administrator's judgment, "cause[ ], or contribute[ ] significantly to, air pollution, which may reasonably be anticipated to endanger public health or welfare."[8] These performance standards, which are

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1 *See* U.S. Energy Info. Admin., 2015 Residential Energy Consumption Survey tbl.CE4.1 (2018) *available at* https://www.eia.gov/consumption/residential/data/2015/c&e/pdf/ce4.1.pdf [hereinafter "2015 RECS"] (showing building counts for each fuel, including electricity, used as a primary energy source); U.S. Energy Info. Admin., 2012 Commercial Buildings Energy Consumption Survey tbl.B26 (2016), *available at* https://www.eia.gov/consumption/commercial/data/2012/ [hereinafter "2012 CBECS"] (showing building counts for each fuel, including electricity, used as a primary space- or water-heating energy source).

2 2015 RECS, *supra* note 1, at tbl.CE4.1 (showing that five times more households use natural gas as a primary heating fuel than use propane or fuel oil); 2012 CBECS, *supra* note 1, at tbl.B26 (showing that five times more commercial buildings use natural gas as a primary space-heating fuel than use propane or fuel oil).

3 Yifang Zhu et. al, Effects of Residential Gas Appliances on Indoor and Outdoor Air Quality and Public Health in California 8-9 (UCLA Fielding Sch. of Pub. Health, Dep't of Env't Health Sci., 2020).

4 Based on data from *2017 National Emissions Inventory*, EPA, https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei (last visited Oct. 15, 2021). Appliance emissions total does not include emissions from commercial and institutional boilers with heat input capacity over 10 mmBtu/hr; *see also* RMI & Sierra Club, Fact Sheet: Why EPA Must Address Appliance Pollution 1 (2021), https://rmi.org/wp-content/uploads/2021/04/rmi_factsheet_appliance_pollution.pdf (finding that gas appliances alone emit over 320,000 tons of NO_x annually, which is more than twice the amount emitted by gas power plants).

5 EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990–2019, 3-7 tbl.3-5 (2021), *available at* https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks (showing emissions associated with fossil-fuel combustion in residential and commercial buildings, as well as emissions associated with gas combustion in electric power sector); *id.* at ES-9 tbl.ES-2 (showing total U.S. GHG emissions) [hereinafter "EPA GHG Inventory"].

6 *See Stationary Gas and Combustion Turbines: New Source Performance Standards (NSPS)*, EPA, https://www.epa.gov/stationary-sources-air-pollution/stationary-gas-and-combustion-turbines-new-source-performance (last visited Oct. 8, 2021); *NSPS for GHG Emissions from New, Modified, and Reconstructed Electric Utility Generating Units*, EPA, https://www.epa.gov/stationary-sources-air-pollution/nsps-ghg-emissions-new-modified-and-reconstructed-electric-utility (last visited Oct. 8, 2021).

7 EPA's new source performance standards for industrial, commercial, and institutional boilers apply to particulate matter and sulfur dioxide emissions from boilers with a heat input capacity greater than 10 mmBtu/hr and NO_x emissions from boilers with a heat input capacity greater than 100 mmBtu/hr. *See Industrial-Commercial-Institutional Steam Generating Units: New Source Standards of Performance (NSPS)*, Env't Prot. Agency, https://www.epa.gov/stationary-sources-air-pollution/industrial-commercial-institutional-steam-generating-units-new (last visited Oct. 15, 2021).

8 42 U.S.C. § 7411(b)(1)(A) (Section 111). Less than 10% of commercial buildings use boilers, 2012 CBECS, *supra* note 1, at tbl.B26, and the "vast majority" of those have a heat input capacity below 10 mmBtu, meaning they are exempt from EPA's standards. *See* Energy & Env't Analysis, Inc., Characterization of the U.S. Industrial/Commercial Boiler Population ES-1 (2005), *available at* https://www.energy.gov/sites/prod/files/2013/11/f4/characterization_industrial_commerical_boiler_population.pdf.

typically expressed as a maximum rate of permissible pollution or minimum rate of pollution reduction,[9] must "reflect[] the degree of emission limitation achievable through the application of the best system of emission reduction which . . . the Administrator determines has been adequately demonstrated."[10]

Our analysis reveals the following:

(1) Fossil-fuel appliances are "stationary sources" subject to regulation under Section 111(b).

(2) EPA could easily support a finding that fossil-fuel appliances "contribute significantly" to one or more types of dangerous air pollution.

(3) Multiple means of reducing emissions from fossil-fuel appliances are "adequately demonstrated," including the use of ultra-low-NO_x combustion technology, condensing technology, and electric-heat-pump technology.

(4) EPA need not find in a Section 111(b) rulemaking that any of these technologies should be used by every new appliance. The agency could instead assume increased (but less than universal) deployment of one or more reduction techniques, by making emissions averaging and trading part of the "best system of emission reduction" and/or by exercising its discretion to set different performance standards for different appliance subcategories.

(5) EPA's issuance of performance standards for fossil-fuel appliances under Section 111(b) would not preclude continued regulation of such appliances by state and local governments or the federal Department of Energy.

Each finding is discussed in more detail below.

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[9] New Source Performance Standards (NSPS) Review, 76 Fed. Reg. 65,653, 65,655 (Oct. 24, 2011) ("The resultant standard is usually a numerical emissions limit, expressed as a performance level (i.e., a rate-based standard or percent control.").

[10] 42 U.S.C. § 7411(a)(1).

I. Fossil-fuel appliances qualify as "stationary sources" under Section 111

A source category regulated under Section 111 must be comprised of "stationary source[s]," which Section 111(a) defines extremely broadly as "any building, structure, facility, or installation which emits or may emit any air pollutant."[11] As already discussed, fossil-fuel appliances emit multiple types of air pollution. And while Section 111 does not define "facility" or "installation," regulatory precedent supports using either term to describe fossil-fuel appliances.

EPA characterized residential wood heaters as facilities when it first listed them as a Section 111 source category in 1988, and the agency could do the same for fossil-fuel appliances.[12] Wood heaters are a particularly relevant precedent because, like most fossil-fuel appliances, they are mass-produced consumer products. In the 1988 rulemaking, EPA found that "[n]othing in the text or legislative history of Section 111 suggests that a facility, such as a woodstove, cannot be a stationary source because it is a mass-produced or consumer product."[13] The agency also quoted a decision by the U.S. Court of Appeals for the D.C. Circuit recognizing that "facilities" under Section 111 could include "individual machines."[14]

Fossil-fuel appliances are machines that serve a purpose similar to that of wood heaters (providing heat) in similar settings (homes and businesses). Accordingly, EPA's longstanding treatment of wood heaters as facilities—as well as the statutory analysis underlying that treatment—suggests that applying the same classification to fossil-fuel appliances would be appropriate.[15]

Alternatively, EPA could characterize fossil-fuel appliances as installations. In a 2016 rulemaking establishing performance standards for various sources in the oil and gas sector, including relatively small pieces of equipment like compressors and pneumatic controllers, the agency found that Section 111 standards could reasonably extend to "small, discrete sources that exist separate and apart from a large facility, like a processing plant."[16] EPA justified this conclusion by pointing out that the definition of "stationary source" in Section 111 included "not only buildings, structures and facilities (e.g., plants) but also installations, such as equipment, that emit or may emit any pollutant."[17] "Moreover," EPA noted, "this definition contains no size limitation."[18] Under this logic, because fossil-fuel appliances are small, discrete pieces of equipment that emit pollution but are not part of any larger facility regulated under Section 111, they can appropriately be classified as installations.

In sum, whether fossil-fuel appliances are considered facilities, like wood heaters, or installations, like compressors and pneumatic controllers, they qualify as stationary sources subject to regulation under Section 111.

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[11] *See id.* § 7411(a)(3) ("The term 'stationary source' means any building, structure, facility, *or installation* which emits or may emit any air pollutant.").

[12] Standards of Performance for New Stationary Sources; New Residential Wood Heaters, 53 Fed. Reg. 5860, 5863 (Feb. 26, 1988).

[13] *Id.*

[14] *Id.* at 5362–63 (quoting Asarco, Inc. v. EPA, 578 F.2d 319, 324 n.17 (D.C. Cir. 1978)).

[15] A 2015 update to the residential wood heater standards was recently affirmed by the D.C. Circuit. Hearth, Patio & Barbecue Ass'n v. EPA, 11 F.4th 791, 796 (D.C. Cir. 2021).

[16] Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources, 81 Fed. Reg. 35,824, 35,874 (June 3, 2016).

[17] *Id.* at 35,875.

[18] *Id.*

II. EPA could easily support a finding that fossil-fuel appliances "contribute significantly" to one or more types of harmful air pollution

Before setting new source performance standards for a source category under Section 111(b), the EPA Administrator must first conclude that "in his judgment [the category] causes, or contributes significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare."[19] There is no question that the types of pollution emitted by fossil-fuel appliances endanger public health, as EPA already regulates emissions of particulate matter, NO_x, and greenhouse gases from other source categories and has carefully documented their harmful effects.[20] Furthermore, EPA could easily support a finding that fossil-fuel appliances "contribute significantly" to these long-recognized pollution problems.

As discussed in more detail below, neither the Clean Air Act nor related case law specify a numerical threshold for significance, and the D.C. Circuit has consistently deferred to EPA's conclusions on this issue. And while a recent Trump administration rule interpreted significance to require that a category's greenhouse gas emissions constitute at least 3% of the U.S. total, that policy has already been vacated by the D.C. Circuit at the Biden administration's request. In any event, fossil-fuel appliances' greenhouse gases emissions greatly exceed the Trump administration's now-defunct threshold, and that threshold expressly did not apply to other types of pollution emitted by appliances, like NO_x.

A. The D.C. Circuit has declined to specify a particular test for the significance of a source category's contribution to pollution

In reviewing challenges to significant-contribution findings under Section 111, the D.C. Circuit has never attempted to impose a numerical threshold for significance or identified any consistently dispositive factor(s) in the inquiry. Instead, the court has required only that EPA justify its finding with reasoned analysis.

The most recent case on point is *American Lung Association v. EPA*, in which the D.C. Circuit vacated the Affordable Clean Energy Rule.[21] There, industry petitioners claimed that EPA "did not properly make a finding that fossil-fuel-fired power plants 'contribute[ ] significantly' to greenhouse gas pollution."[22] Specifically, industry petitioners faulted EPA for failing "to articulate a specific threshold measurement" beyond which pollution became significant.[23] But the court flatly

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[19] 42 U.S.C. § 7411(b)(1)(A).

[20] *See generally Criteria Air Pollutants*, EPA, https://www.epa.gov/criteria-air-pollutants (last visited July 13, 2021); *Endangerment and Cause or Contribute Findings for Greenhouse Gases under the Section 202(a) of the Clean Air Act*, EPA, https://www.epa.gov/ghgemissions/endangerment-and-cause-or-contribute-findings-greenhouse-gases-under-section-202a-clean (last visited Oct. 8, 2021).

[21] Am. Lung Ass'n v. EPA, 985 F.3d 914 (D.C. Cir. 2021). Petitions for review of this decision are currently pending before the Supreme Court. If those petitions were granted, ensuing Supreme Court pronouncements might affect some conclusions in this report.

[22] *Id.* at 975.

[23] *Id.* at 976

rejected this challenge, concluding that "nothing in the Clean Air Act 'require[s] that [the] EPA set a precise numerical value as part of' a contribution endangerment finding."[24]

The very first case to discuss significant contribution findings under Section 111—*National Asphalt Pavement Association v. Train*—is also instructive.[25] In upholding EPA's 1973 rule designating asphalt concrete plants as a new source category under Section 111,[26] the D.C. Circuit described its objective on review as determining whether the agency acted "in a manner calculated to negate the dangers of arbitrariness and irrationality."[27] After examining EPA's analysis—which had considered several factors, including the "rate of emissions of particulate matter pollution from uncontrolled plants, the stringency of existing state and local regulations limiting emissions from these plants, the number of existing plants, and the expected rate of growth on the number of plants"[28]—the court concluded that "nothing in the record indicat[ed] that the Administrator was arbitrary and capricious" in making the significant contribution finding.[29] In other words, the review was highly deferential.

Thus, EPA need not show that fossil-fuel-appliance emissions surpass any particular threshold to comport with relevant case law. Instead, the agency must ensure only that its significance analysis is not conclusory and addresses the relevant factors in making its finding.

B. Past significant contribution findings for criteria pollution have not identified a particular test or numerical threshold for significance

Until recently, EPA itself has likewise declined to specify a consistent threshold or set of factors to consider when evaluating the significance of a contribution to pollution under Section 111 and other, similarly worded Clean Air Act provisions. That said, a review of past significant contribution findings reveals some commonly cited metrics.

First, EPA typically notes the total quantity of pollution emitted by the source category, as both an absolute number and percentage of either nation- or sector-wide emissions.[30] Second, EPA sometimes highlights locations in which the pollution will be particularly harmful.[31]

These precedents indicate that EPA could justify a significant contribution finding for fossil-fuel appliances by observing, first, that such appliances emit approximately 425 thousand tons of NO_x[32] and somewhere between 340 and 590 million

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[24] *Id.* at 977 (quoting Coalition for Responsible Regulation, 684 F.3d 102, 122 (D.C. Cir. 2012)).

[25] Nat'l Asphalt Pavement Ass'n v. Train, 539 F.2d 775 (D.C. Cir 1976).

[26] *See id.* at 778 (discussing Notice of Additions to the List of Source Categories of Stationary Sources, 38 Fed. Reg. 15,380, 15,380 (June 11, 1973)).

[27] *Id.* at 783–84 (quoting Automotive Parts & Accessories Ass'n v. Boyd, 407 F.2d 330, 338 (D.C. Cir. 1968)).

[28] *Id.* at 784.

[29] *Id.* at 785.

[30] *See, e.g.,* Standards of Performance for New Stationary Sources; Listing of Residential Wood Heaters for Development of New Source Performance Standards, 52 Fed. Reg. 5065, 5066 (Feb. 18, 1987) (citing 50 Fed. Reg. 31,501 (Aug. 2, 1985) [hereinafter Wood Heaters Listing] (noting that wood heaters emitted approximately 2.8 million tons of particulate matter per year, accounting for about 15% of total emissions from particulate sources)); Standards of Performance for New Stationary Sources; VOC Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit, 48 Fed. Reg. 48,932, 48,934 (Oct. 21, 1983) (noting that sources in the category emitted 110,000 Mg of VOCs per year, accounting for 50 and 55% of the VOCs for the entire SOCMI industry).

[31] *See, e.g.,* Wood Heaters Listing, 52 Fed. Reg. at 5066 (noting exceedance of NAAQS for PM and CO in areas of the country where wood supplies were abundant).

[32] As discussed in note 4, this estimate of NO_x emissions is drawn from EPA's 2017 National Emissions Inventory and excludes commercial boilers with a heat input capacity above 10 mmBtu/hr.

metric tons of carbon-dioxide equivalent[33] each year, accounting for approximately 4% of the nation's annual NO_x emissions[34] and between 6 and 10% of its greenhouse gas emissions.[35] Second, EPA could note that many states with particularly high levels of appliance-related NO_x emissions—such as New York, Pennsylvania, Michigan, Texas, Illinois, and California—also contain areas that are out of attainment with national ambient air quality standards for ground-level ozone, for which NO_x is a precursor.[36]

C. The Trump administration's recent attempt to constrain EPA's discretion on significance findings would not prevent the agency from finding that fossil-fuel appliances contribute significantly to dangerous pollution

As mentioned in the introduction to this section, a rule promulgated in the final days of the Trump administration sought to constrain EPA's discretion in making significant contribution findings under Section 111.[37] Arguing that the agency needed standardized criteria for distinguishing "between a *contribution* and *a significant contribution*,"[38] the rule established "a threshold of 3 percent of U.S. GHG emissions" as the point at which "a source category's [GHG] emissions" become "significant for purposes of Section 111(b)."[39] This rule was, however, recently vacated by the D.C. Circuit.[40] In any event, as noted earlier, the rule expressly applied only to greenhouse gas emissions.[41] In the rule, EPA claimed that the absence of local impacts from greenhouse gas emissions justifies a larger national threshold for significance,[42] implicitly conceding that a threshold smaller than 3% would be warranted for criteria pollutants, which do have localized health and welfare impacts. Furthermore, fossil-fuel appliances' greenhouse gas emissions, between 6 and 10% of the nation's total, are well above the 3% minimum specified in the vacated rule. Accordingly, even if the Trump-era rule were still in effect and had some rational basis in the Clean Air Act, it would pose no obstacle to EPA's finding that fossil-fuel appliances contribute significantly to greenhouse gas emissions (for which appliances significantly exceed the threshold in the Trump-era rule) or to NO_x emissions (to which the rule did not apply).

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[33] Fossil-fuel combustion in residential and commercial buildings produced 587 million metric tons of carbon-dioxide equivalent in 2019. *See* EPA GHG Inventory, *supra* note 5, at ES-7 tbl.ES-2. As discussed in note 7, a small fraction of commercial heating equipment is already included in EPA's Section 111 source category for industrial, commercial, and institutional boilers. Residential combustion alone, however, produced 337 million tons of carbon-dioxide equivalent in 2019. *Id.* Thus, a source category consisting of all residential fossil-fuel appliances and all commercial fossil-fuel appliances not already covered by the industrial, commercial, and institutional boiler source category would account for somewhere between 337 and 587 million tons of carbon-dioxide equivalent per year—a massive sum no matter where in the range the precise total falls.

[34] EPA, 2017 National Emissions Inventory: January 2021 Updated Release, Technical Support Document 2-11 to 2-12 tbl.2-3 (2021), *available at* https://www.epa.gov/sites/default/files/2021-02/documents/nei2017_tsd_full_jan2021.pdf (showing total NO_x emissions from all U.S. sources). By comparison, petroleum refineries, which are already subject to NO_x performance standards, emit 68,000 tons annually (i.e., less than one-sixth as much as fossil-fuel appliances). *See id.* (showing total refinery emissions); 40 C.F.R. § 60.102a (refinery performance standards).

[35] EPA GHG Inventory, *supra* note 5, at ES-9 tbl.ES-2 (showing total U.S. greenhouse gas emissions).

[36] RMI & Sierra Club, *supra* note 4, at 2 exh.2 (illustrating overlap between states with ozone nonattainment areas and states where gas appliances account for a large share of NO_x emissions).

[37] Pollutant-Specific Significant Contribution Finding for Greenhouse Gas Emissions from New, Modified, and Reconstructed Sources: Electric Utility Generating Units, and Process for Determining Significant of Other New Source Performance Standards Source Categories, 86 Fed. Reg. 2542 (Jan. 13, 2021) [hereinafter SCF Final Rule].

[38] *Id.* at 2547 (emphasis in original).

[39] *Id.* at 2552.

[40] Jennifer Hijazi, *Appeals Court Scraps Trump Rule that Limited Emission Regulation*, Bloomberg (Apr. 5, 2021), https://news.bloomberglaw.com/environment-and-energy/appeals-court-scraps-trump-rule-that-limited-emission-regulation.

[41] *See* SCF Final Rule, 86 Fed. Reg. at 2553.

[42] *Id.*

III. Multiple means of reducing emissions from fossil-fuel appliances are "adequately demonstrated" and could be incorporated into a "best system of emission reduction" for the source category

Once EPA has made a significant contribution finding for a source category, Section 111(b) gives the agency one year to propose standards of performance for new sources in that category.[43] Section 111(a), meanwhile, defines standard of performance as "a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of reduction which (taking into account the cost of achieving such reduction and any non-air quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated."[44]

This text reveals the following constraints on EPA's discretion to set performance standards:

1. EPA must identify the "best system of emission reduction" and calculate the "degree of emission limitation achievable through the application" of that system. That is, the agency cannot set a performance standard without first identifying a means of achieving it. Regulated sources are not, however obligated to use the "best system" identified by EPA, so long as they achieve an equivalent level of emission reduction.[45]

2. In deciding whether an available system of emission reduction is "best," EPA must consider the amount of air pollution that the system will eliminate, relative to other options. Though this factor is not expressly mentioned in the statutory text, the D.C. Circuit has explained that there is "no sensible interpretation of the statutory words 'best . . . system' which would not incorporate the amount of air pollution as a relevant factor to be weighed when determining the optimal standard for controlling . . . emissions."[46]

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[43] 42 U.S.C. § 7411(b)(1)(B). For new fossil-fuel appliances, EPA could set performance standards for NO_x emissions, greenhouse gas emissions, or both. Because greenhouse gases are not subject to regulation under either Sections 108 (the National Ambient Air Quality Standards program) or 112 (the Hazardous Air Pollutants program) of the Clean Air Act, setting greenhouse gas standards for new sources in a category under Section 111(b) typically triggers an obligation to establish emission guidelines for *existing* sources in the category under Section 111(d). *See id.* § 7411(d)(1); *Am. Lung Ass'n*, 985 F.3d at 978. In the case of appliances, however, EPA might have grounds for concluding that the costs of available systems of emission reduction would be unreasonably high if applied to appliances that are already installed in homes and businesses. A fuller discussion of such a finding is, however, outside the scope of this report.

[44] *Id.* §7411(a)(1) (emphases added).

[45] 42 U.S.C. § 7411(b)(5) (noting that, with limited exception, "nothing in this section shall be construed to require, or to authorize the Administrator to require, any new or modified source to install and operate any particular technological system of continuous emission reduction to comply with any new source standard of performance.").

[46] Sierra Club v. Costle, 657 F.2d 298, 326 (D.C. Cir. 1981).

3. In identifying the best system, EPA must consider the system's cost. The D.C. Circuit has repeatedly interpreted this factor to preclude EPA from imposing "exorbitant"[47] or "unreasonable"[48] costs. But the court has also consistently granted EPA "a great degree of discretion" when assessing the reasonableness of a system's costs.[49]

4. In identifying the best system, EPA must consider "nonair quality health and environmental impacts." For example, the use of a scrubber to remove sulfur dioxide emissions from a power plant's smokestack produces coal ash, which can, if improperly stored, contaminate groundwater.[50] EPA must account for such indirect environmental effects—whether positive or negative—when weighing systems of emission reduction.

5. In identifying the best system, EPA must consider "energy requirements." In past proceedings under Section 111, EPA has examined energy requirements in two ways. First, the agency has assessed the amount of energy needed to apply the best system at an individual source (e.g., the amount of electricity required, per unit of production, to operate an end-of-stack pollution scrubber).[51] Second, EPA has assessed whether broad application of the best system will interfere with energy demands at the regional or national level.[52] The D.C. Circuit, meanwhile, has held that EPA may consider energy impacts at the level (or levels) the agency deems most appropriate.[53]

6. EPA must conclude that its chosen system of emission reduction has been "adequately demonstrated." Under D.C. Circuit case law, EPA cannot identify a "purely theoretical or experimental means of preventing or controlling air pollution" as the best system of emission reduction.[54] But a system need not already be in "actual, routine use" by the category to be chosen.[55] Instead, "Section 111 looks toward what may fairly be projected for the regulated future, rather than the state of the art at present."[56]

This report does not purport to weigh the relevant statutory factors and identify a "best system of emission reduction" or optimal set of performance standards for fossil-fuel appliances. We do, however, note that multiple means of reducing appliance emissions are already "adequately demonstrated," including ultra-low-NO_x combustion technology, condensing technology, and electric-heat-pump technology. We also emphasize that EPA would not, as part of a best-system determination, need to conclude that any of these technologies should be applied to every new source in the category. Instead, the agency could assume increased (but less than universal) deployment of one or more reduction techniques, by making emissions averaging and trading part of the best system of emission reduction and/or by exercising its discretion to set different performance standards for different appliance "classes."[57]

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[47] Lignite Energy Council v. EPA, 198 F.3d 930, 933 (D.C. Cir. 1999).

[48] *Costle*, 657 F.2d at 351.

[49] *Lignite Energy Council*, 198 F.3d at 933.

[50] *See generally* Charles Duhigg, *Cleansing the Air at the Expense of Waterways*, N.Y. Times (Oct. 12, 2009), http://www.nytimes.com/2009/10/13/ us/13water.html.

[51] *See, e.g.,* EPA, Primary Aluminum: Guidelines for Control of Fluoride Emissions from Existing Primary Aluminum Plants 9-32 to 9-33 (1979) (discussing energy requirements of various control technologies for fluoride emissions from aluminum plants).

[52] *See, e.g., Costle*, 657 F.2d at 330 (describing EPA's modeling to account for various factors in setting emission standards for coal-burning power plants); EPA, Primary Aluminum, *supra* note 51, at 9-34 (discussing whether nation could meet energy demands of aluminum industry, after increased demand due to control requirements).

[53] Costle, 657 F.2d at 330.

[54] Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375, 391 (D.C. Cir. 1973) (quoting H. Rep. No. 91-1146, 91st Cong., 2d Sess. 10 (1970)).

[55] S. Rep. No. 91-1196 at 16 (1970).

[56] *Portland Cement Ass'n*, 486 F.2d at 391.

[57] *See* 42 U.S.C. § 7411(b) (authorizing "the Administrator to "distinguish among classes, types, and sizes within categories of new sources for the purpose of establishing [performance] standards").

A. Appliance emissions can be reduced with ultra-low-NO_x combustion technology

Ultra-low-NO_x combustion technology, which reduces NO_x emissions by altering the amount of air introduced during the fuel-burning process and the temperature of the resulting flame, is already required for furnaces in California's South Coast Air Quality Management District[58] and for water heaters in Utah.[59]

B. Appliance emissions can be reduced with condensing technology

Condensing fossil-fuel furnaces and water heaters, which extract waste heat from combustion exhaust rather than simply venting it, are substantially more efficient than their non-condensing counterparts and, as a result, emit both NO_x and greenhouse gases at lower rates.[60] Condensing furnaces are already in widespread use and accounted for 40% of furnace sales in 2010.[61] Condensing water heaters are also widely available.[62]

C. Appliance emissions can be reduced with electric-heat-pump technology

Air-source electric heat pumps, which extract heat from outdoor air and transfer it either to indoor air or a water tank, are far more efficient than conventional fossil-fuel appliances[63] and, as of 2015, accounted for 40% of space heater sales.[64] While heat pump water heaters have a significantly smaller market share, manufacturers already have almost 200 different models for sale in the U.S.[65]

That heat-pump technology relies on a different source of energy than fossil-fuel appliances and would fully eliminate, rather than merely reduce, their direct emissions does not preclude its inclusion in a Section 111(b) rulemaking. On the contrary, as discussed in more detail in Section III.D.1 of this report, the D.C. Circuit recently held that shifting production of electricity from fossil-fuel-fired power plants to zero-emitting renewable facilities qualifies as a system of

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[58] *See* SCAQMD, Rule 1111 Reduction of NO_x Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces at 1111-3 (last amended Sept. 4, 2020), http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1111.pdf.

[59] *Air Quality: New Water Heater Rule Will Help Reduce Wintertime Air Pollution*, Utah Dep't Env't Quality, https://deq.utah.gov/air-quality/air-quality-new-water-heater-rule-will-help-reduce-wintertime-air-pollution (last visited Oct. 8, 2021).

[60] U.S. Energy Info. Admin., *Gas furnace efficiency has large implications for residential natural gas use*, Today in Energy (Dec. 5, 2013), https://www.eia.gov/todayinenergy/detail.php?id=14051.

[61] Alex B. Lekov, Victor H. Franco & Steve Meyers, Economics of Condensing Gas Furnaces and Water Heaters Potential in Residential Single Family Homes 3 (2010), *available at* https://www.osti.gov/servlets/purl/1022722.

[62] *How It Works — Whole-Home Gas Tankless Water Heaters*, Energy Star, https://www.energystar.gov/products/water_heaters/water_heater_whole_home_gas_tankless/how_it_works (last visited Oct. 11, 2021) (explaining that Energy Star-certified tankless water heaters use condensing technology); *Product Finder*, Energy Star, https://www.energystar.gov/productfinder/product/certified-water-heaters/ (last visited Oct. 19, 2021) (listing 623 models of Energy Star-certified tankless water heaters).

[63] Claire McKenna et al., *It's Time to Incentivize Residential Heat Pumps*, RMI, June 8, 2020, https://rmi.org/its-time-to-incentivize-residential-heat-pumps/; *see also Selecting a New Water Heater*, Energy Star, https://www.energy.gov/energysaver/selecting-new-water-heater (last visited Oct. 19, 2021) ("[A]n electric heat pump water heater . . . might have lower energy costs than a gas-fired conventional storage water heater, even though local natural gas costs might be lower than the electricity rates.").

[64] Melissa Lapsa et al., Heat Pumps in North America – 2017 Regional Report 6 (2017), https://hpc2017.org/wp-content/uploads/2017/05/P.2.1.3-Heat-Pumps-in-North-America-%E2%80%93-2017-Regional-Report.pdf.

[65] *Technology Solutions: Heat Pump Water Heater*, U.S. Dep't of Energy, https://rpsc.energy.gov/tech-solutions/hpwh (last visited Oct. 11, 2021).

emission reduction under Section 111(a).[66] Furthermore, the 2015 Clean Power Plan discussed in that ruling is not the only example of a Section 111 rule predicated, in part, on the use of a non-emitting technology. For example, EPA's 2016 Section 111(b) standards for the oil and gas sector set standards required "that pneumatic controllers have a zero natural gas bleed rate (i.e., they are operated by means other than natural gas, such as being driven by compressed instrument air)."[67] Similarly, a 1984 set of Section 111(h) design standards for volatile-organic-compound emissions at petroleum refineries required the use of "closed-purge sampling connection systems" that "eliminate emissions."[68]

The text of Section 111, too, supports the idea that the substitution of a non-emitting technology qualifies as a system of emission reduction. As noted earlier, a performance standard issued under Section 111(b) must reflect application of the "best system of emission reduction" identified by EPA. And although Section 111 does not expressly define "system of emission reduction," its definition of "technological system of continuous emission reduction" is instructive: Section 111(h) authorizes EPA, for source types with diffuse or difficult-to-measure emissions, to promulgate design, work practice, or equipment standards, rather than performance standards specifying a particular rate of emissions.[69] These alternative standards must "reflect[] the best technological system of continuous emission reduction,"[70] which is defined in Section 111(a)(7) to include "technological process[es] for production or operation . . . which [are] inherently . . . nonpolluting."[71]

The point here is not that fossil-fuel appliances can or should be regulated through design or equipment standards. Because appliance pollution is emitted "through a conveyance" and is measurable, performance standards are required.[72] But the definition Congress provided for "technological system of continuous emission reduction is nevertheless relevant to the question of whether non-emitting technology can serve as the basis for such a standard. If lawmakers interpreted the phrase "technological system of continuous emission reduction" in Section 111(a)(7) to encompass inherently nonpolluting technology (like a heat pump system), it is reasonable to assume that they also intended for the inarguably broader (but statutorily undefined) "system of emission reduction" in Section 111(a)(1) to encompass such technology.

Importantly, while an electric-heat-pump appliance does not release emissions, the electricity-generating resources that power it do. The intensity (per unit of heat output) of such upstream emissions varies based on the energy mix of the area in which the appliance is operated. That said, as of 2020, greenhouse gas emissions per unit of delivered heat were lower for electric-heat-pump systems than gas furnaces in 46 states (representing 99% of U.S. households).[73] And the emissions advantage of heat-pump systems can be expected to grow as federal and state policies further decarbonize the power sector.[74] Nevertheless, when weighing systems of emission reduction and considering the "amount of air pollution" that

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[66] *See infra* Section III.D.1 (discussing Am. Lung Ass'n v. EPA, 935 F.3d 914 (D.C. Cir. 2021)).

[67] Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources, 81 Fed. Reg. 35,824, 35,844 (June 3, 2016).

[68] Standards of Performance for New Stationary Sources; VOC Fugitive Emission Sources; Petroleum Refineries, 48 Fed. Reg. 279, 287 (proposed Jan. 4, 1983); *see also* Standards of Performance for New Stationary Sources Equipment Leaks of VOC Petroleum Refineries and Synthetic Organic Chemical Manufacturing Industry, 49 Fed. Reg. 22,598 (May 30, 1984) (finalizing closed-purge requirement).

[69] 42 U.S.C. § 7411(h).

[70] *Id.*

[71] *Id.* § 7411(a)(7)(A).

[72] *Id.* § 7411(h)(2).

[73] McKenna et al., *supra* note 63.

[74] *See, e.g.,* The White House, Fact Sheet: The American Jobs Plan (Mar. 31, 2021), https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/ (discussing President Biden's plans to invest federal spending to achieve 100% carbon-free electricity by 2035).

each could be expected to eliminate, as required by Section 111,[75] EPA should take heat pumps' upstream emissions into account.[76]

D. EPA could incorporate emissions averaging and trading into Section 111(b) rulemaking for appliances

EPA need not choose universal application of a single means of emission reduction as the best system of emission reduction for fossil-fuel appliances. By identifying the averaging and trading of emissions across appliances as a component of the best system, EPA could base performance standards on an assumption of increased deployment of one or more reduction techniques.

Under this approach, the agency would set a rate-based performance standard that could be achieved by a manufacturer's fleet, including its zero-emission electric appliances, *on average* (or by trading across multiple manufacturers' fleets). In determining what percentage of the overall fleet could reasonably be expected to be electric in a given year, EPA could take into account the lower cost of installing and/or operating heat pump systems in certain regions and building types.[77] In calculating an achievable average rate, the agency could also assume the use of ultra-low-NO_x combustion technology and/or condensing technology on the non-electric portion of the fleet. EPA could periodically tighten the average rate in new regulatory proceedings, in response to declines in the cost of manufacturing, installing, and/or operating relevant technologies.[78]

Although Section 111(b) does not expressly authorize systems of emission reduction based on averaging or trading, nothing in the statutory text or applicable case law precludes such an approach. Moreover, EPA has repeatedly incorporated trading and averaging into best-system determinations for stationary sources under Section 111. EPA has also implemented—and courts have upheld—trading and averaging-based regulations under several other Clean Air Act provisions that are similarly silent on the permissibility of collective reduction techniques.

1. EPA has repeatedly incorporated averaging and trading into best-system determinations for stationary sources under Section 111

For three decades, and under administrations of both parties, EPA has used emissions averaging and trading in Section 111 rulemakings. And earlier this year, the D.C. Circuit rejected the Trump administration's contention that the statutory text precludes the use of these flexible reduction techniques. Specifically, in *American Lung Association v. EPA*, the court held that that Section 111(d) did not bar EPA's 2015 Clean Power Plan from identifying "generation shifting" to zero-emitting wind and solar facilities as part of the best system of emission reduction for existing fossil fuel-fired electric

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[75] *See Costle*, 657 F.2d at 326.

[76] *See, e.g.,* EPA, Regulatory Impact Analysis for the Clean Power Plan Final Rule 3-20 to 3-21 (2015), *available at* https://www3.epa.gov/ttnecas1/docs/ria/utilities_ria_final-clean-power-plan-existing-units_2015-08.pdf (explaining that EPA "analyzed the potential changes in upstream methane emissions from the natural gas and coal production sectors" resulting from Clean Power Plan-induced increases in gas-fired electricity generation and decreases in coal-fired generation).

[77] *See, e.g.,* Sherri Billimoria et al., The Economics of Electrifying Buildings 7 fig.1 (2018), *available at* https://rmi.org/insight/the-economics-of-electrifying-buildings/ (comparing net present costs of space and water heating with different appliance types in different building types and cities).

[78] Costs for existing buildings are also expected to decrease significantly in the coming years. *See id.* at 48 (2018) (citing the National Renewable Energy Laboratory's projected cost declines of 20-38% for air-source heat pumps and 42-48% for heat pump water heaters by 2050). Section 111 requires EPA to "review and, if appropriate, revise" performance standards "at least every 8 years." 42 U.S.C. § 7411(b)(1)(B).

generating units.[79] The court observed that EPA had "consistently concluded" in Section 111(d) rulemakings that "emissions trading programs or production shifts from higher- to lower-emitting sources" could be components of a best system, if appropriate given the "characteristics of the source category and the pollutant at issue."[80] In addition to the Clean Power Plan, it noted that EPA's 2005 Clean Air Mercury Rule and 1995 Municipal Waste Combustors Rule had allowed emissions trading.[81]

Admittedly, these precedents all involved regulation of existing sources under Section 111(d), rather than new sources under Section 111(b), and the D.C. Circuit in *American Lung Association* did observe that "the best, most efficient and effective systems for controlling emissions from *existing* sources ordinarily differ from the best systems for *new* sources."[82] The court did not suggest, however, that Section 111(b) categorically bars the use of production-shifting or trading in new-source rulemakings. Such an interpretation would be difficult to justify, given that the exact same statutory definition of standard of performance applies to both new- and existing-source rulemakings under Section 111 and that EPA thus must consider the exact same statutory factors when identifying best systems of emission reduction for new and existing sources.[83]

Instead, the most reasonable reading of the court's comment is that, as a practical matter, averaging and trading is *less likely* to be the best system of emission reduction for new sources in a category than it is for existing sources, because existing sources "present different regulatory challenges than new sources."[84] Designing a new source with a particular emission-reduction technology in mind is generally cheaper than retrofitting an old source to incorporate that same reduction technology.[85] Thus, "a requirement that owners and operators constructing new facilities apply state-of-the-art, lowest-emitting equipment and methods 'at and to [each individual] source'" will more often be practical for new sources.[86] This does not mean, however, that standards based on production-shifting, averaging, and trading will *never* be the best approach for new sources.

On the contrary, EPA has at least twice incorporated averaging and trading into a best system of emission reduction for new sources under Section 111(b). In its 2006 new source performance standards for stationary compression ignition internal combustion engines, EPA allowed manufacturers that were already using averaging and trading to comply with Section 213 emission standards for *mobile* nonroad engines to include in their averages emissions from certain *stationary* engines for purposes of demonstrating compliance with Section 111(b) performance standards.[87] In justifying this approach, the agency explained:

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[79] 985 F.3d 914, 951 (D.C. Cir. 2021).

[80] *Id.* at 954.

[81] *Id.* at 954–55. The D.C. Circuit had, in 2008, vacated the Clean Air Mercury Rule for reasons unrelated to the trading scheme. *See* New Jersey v. EPA, 517 F.3d 574, 582–584 (D.C. Cir. 2008).

[82] *Am. Lung Ass'n*, 985 F.3d at 956 (emphases added).

[83] As explained *supra* in note 42, for some types of pollution, EPA's promulgation of Section 111(b) standards for new sources triggers an obligation to regulate existing sources in the same category under Section 111(d). Unlike new source performance standards, existing source standards are ultimately imposed by states, rather than EPA. 42 U.S.C. § 7411(d)(1); *see also* Richard L. Revesz, Denise A. Grab & Jack Lienke, Bounded Regulation: How the Clean Power Plan Conforms to Statutory Limits on EPA's Authority 2 (2016). But EPA still selects a best system of emission reduction in accordance with the same Section 111(a) definition of standard of performance that applies to new-source rulemakings under Section 111(b). *Am. Lung Ass'n*, 985 F.3d at 931. Based on this system, EPA provides emission guidelines to states that specify the degree of emission limitation their standards must achieve. *Id.*; 40 C.F.R. § 60.22a.

[84] *Am. Lung Ass'n*, 985 F.3d at 955.

[85] *See* Richard L. Revesz & Jack Lienke, Struggling for Air: Power Plants and the "War on Coal" 37 (2016).

[86] *Am. Lung Ass'n*, 985 F.3d at 955.

[87] *See* Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, 71 Fed. Reg. 39,154, 39,159 (July 11, 2006).

> [W]e believe that these [averaging, banking, and trading ("ABT")] provisions are essential elements in our determination that the final standards reflect best [demonstrated technology]. The flexibility provided by the ABT provisions allows the manufacturer to adjust its compliance for engine families for which coming into compliance with the standards will be particularly difficult or costly, without special delays or exceptions having to be written into the final rule. Emission-credit programs also create an incentive for the early introduction of new technology (for example, to generate credits in early years to create compliance flexibility for later engines), which allows certain engine families to act as trailblazers for new technology. This improves the feasibility of achieving the standards for the entire population of regulated engines. EPA has concluded as a factual matter, as reflected in this final rule, that an ABT program, operated at the level of the manufacturer, represents the best system of emissions reductions, considering all relevant factors.[88]

The agency further argued that averaging and trading were particularly appropriate when setting emission standards for a manufactured product:

> The ABT provisions are applicable to engine manufacturers, who manufacture numerous engines for use in all areas of the country, as opposed to the final owner/operators of the units. These standards will apply to hundreds of different engine families that will be used in tens of thousands of different engines. The flexibility provided by the ABT program is an important instrument for manufacturers to use in meeting the stringent standards of this program affecting a large number of engine families.[89]

EPA subsequently included similar averaging and trading provisions in new source performance standards for stationary spark ignition internal combustion engines.[90] While no court has had occasion to weigh in on the averaging and trading provisions of either engine rule, the provisions remain in effect.[91] Furthermore, while the provisions built upon an existing averaging and trading scheme under Section 213, EPA never suggested that the provisions' legal permissibility under Section 111 hinged on this fact, and the statutory text provides no support for such a claim.[92]

Accordingly, incorporating averaging and/or trading into a best system of emission reduction for new fossil-fuel appliances should be permissible under Section 111, so long as EPA provides a sufficient justification. Specifically, EPA will need to make a persuasive, statutory-factor-based case that, given the "characteristics of the source category and the pollutant at issue," such an approach is a better system of emission than requiring *every* new appliance to achieve an emission rate consistent with the use of "state-of-the-art, lowest-emitting equipment and methods," such as electric-heat-pump

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[88] *Id.*

[89] *Id.*

[90] *See* Standards of Performance for Stationary Spark Ignition Internal Combustion Engines and National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines, 73 Fed. Reg. 3568, 3595 (Jan. 18, 2008) (allowing manufacturers of stationary spark ignition internal combustion engines to include a family of engines that contains both nonroad and stationary engines in the averaging, banking, and trading provisions applicable to nonroad engines).

[91] 40 C.F.R. § 60.4210(d) ("An engine manufacturer certifying an engine family or families to standards under this subpart that are identical to standards applicable under parts 89, 94, or 1039 for that model year . . . may include any such family containing stationary engines in the averaging, banking and trading provisions applicable for such engines under those parts."); *see also* 40 C.F.R. § 60.4242(b).

[92] In issuing the 2006 stationary engine standards, EPA concluded that "nothing in section 111 prevents . . . applying such new source performance standards to manufacturers, where appropriate" and that it was thus "appropriate" for the rule to be "primarily directed at regulating engine manufacturers, rather than individual owners and operators." Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, 70 Fed. Reg. 39,870, 39,884-85 (proposed July 11, 2005). The agency noted that compliance obligations under its 1988 residential wood heaters standards were similarly focused on manufacturers. *Id.* at 39,885 (citing 53 Fed. Reg. 5860 (Feb. 26, 1988)).

technology.[93] Notably, because criteria pollutants like NO_x have local and regional effects, EPA's explanation would need to address the potential for averaging and trading to create pollution "hot spots." This could occur if sales of appliances that emit over the performance standard and sales of appliances that emit under the standard end up concentrated in different communities.[94]

2. EPA uses averaging and trading in Section 202(a) emission standards for motor vehicles

EPA employs emissions averaging and trading in its fleetwide standards for motor vehicles under Section 202(a) of the Clean Air Act. For example, the agency sets "attribute-based" greenhouse gas standards for each light-duty vehicle model.[95] But compliance is not achieved by having each model meet its target; instead, EPA "compar[es] the fleet average standard (based on the production weighted average of the target levels for each model) with fleet average performance (based on the production weighted average of the performance for each model)."[96] Because cars, like appliances, are consumer goods, these standards provide a particularly useful model for Section 111 appliance standards built around trading and averaging.

Like Section 111, Section 202(a) does not expressly authorize averaging or trading. It merely instructs EPA to "prescribe . . . standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines."[97] But the D.C. Circuit concluded in 1986 that, absent "any clear congressional prohibition of averaging," it was reasonable for EPA to allow the practice, in order to give "manufacturers more flexibility in cost allocation while ensuring that a manufacturer's overall fleet still meets the emissions reduction standards."[98]

Notably, EPA takes the availability of electric vehicles into account when determining the stringency of vehicle standards.[99] For compliance purposes, such models are generally treated as generating zero emissions per mile.[100] Thus, by exceeding model targets with electric cars, a manufacturer can continue to produce gasoline models—which may fail to meet their individual model targets—and still meet its fleetwide average. The same would be true for appliance manufacturers under a Section 111(b) standard based on trading and averaging.

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[93] *Am. Lung Ass'n*, 985 F.3d at 954.

[94] Jonathan Remy Nash & Richard L. Revesz, *Markets and Geography: Designing Marketable Permit Schemes to Control Local and Regional Pollutants*, 28 Ecology L.Q. 569, 572 (2001) (explaining that a tradable emission permit regime can "reduce aggregate emissions to the chosen aggregate level for the least cost" but will not necessarily "prevent the formation of . . . locations at which the damage caused by pollutants is particularly severe"); EPA, Tools of the Trade: A Guide to Designing and Operating A Cap and Trade Program for Pollution Control B-2 (2003), https://www.epa.gov/sites/production/files/2016-03/documents/tools.pdf (discussing the potential for hot spots in trading programs).

[95] *See* 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards, 77 Fed. Reg. 62,624, 62,686 (Oct. 15, 2012).

[96] *See id.*

[97] *See* 42 U.S.C. § 7521(a) (Section 202(a)).

[98] Nat. Res. Def. Council v. Thomas, 805 F.2d 410, 425 (D.C. Cir. 1986).

[99] 77 Fed. Reg. at 62,776–77 (explaining that EPA took electric-vehicle technologies, as well as "flexibilities that will facilitate compliance" like trading and averaging, into account when setting standards).

[100] *See id.* at 62,651. EPA does take upstream emissions into account when estimating the amount of pollution reduction the standards will achieve. *See* EPA, Regulatory Impact Analysis: Final Rulemaking for 2017-2025 Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards 4-111 (2012), *available at* https://nepis.epa.gov/Exe/ZyPDF.cgi/P100EZI1.PDF?Dockey=P100EZI1.PDF (explaining that the agency's emissions analysis includes "emission increases from power plants as electric powertrain vehicles increase in prevalence as a result of this rule").

3. *EPA has established trading programs under multiple other Clean Air Act provisions that do not expressly authorize trading*

Courts have repeatedly affirmed EPA's use of emissions trading or averaging under additional Clean Air Act provisions that do not expressly authorize flexible emission-reduction strategies.

For example, EPA has used emission trading to address regional haze under the Clean Air Act's visibility-protection provision.[101] In 2012, the agency approved a trading program proposed by a group of western states and municipalities to address their collective contributions to haze in the Colorado Plateau.[102] In approving the program, which was later upheld by the U.S. Court of Appeals for the Tenth Circuit, EPA found that interstate trading "would result in greater reasonable progress than [installation of the best available retrofit technology]" at individual sources.[103] And while Section 169A does not expressly authorize the use of trading, the D.C. Circuit has nevertheless found that EPA has "wide discretion" under that provision to allow trading that "ensure[s] reasonable progress" toward meeting national visibility goals.[104]

Additionally, EPA has set standards designed to be met collectively when regulating motor-vehicle fuels under Section 211.[105] In 1982, EPA promulgated a standard for the lead content of gasoline that some refineries could satisfy only by obtaining blending components or "lead credits" from others.[106] Even though Section 211 includes no mention of trading, the D.C. Circuit upheld that approach as reasonable, deferring to EPA's judgment that "small refineries that lack[ed] octane-enhancing equipment [could] purchase high-octane blending components or lead credits from better equipped refineries at reasonable cost."[107]

E. EPA could use subcategorization in a Section 111(b) rulemaking for appliances

As a supplement or alternative to an emissions averaging and trading program, EPA could accommodate less-than-universal deployment of one or more emission-reduction methods by exercising its authority to "distinguish among classes, types, and sizes within categories of new sources for the purpose of establishing [performance] standards."[108] Under this approach, EPA could designate classes of appliances based on, for example, the type of building in which they are installed. It could then identify different best systems of emission reduction (and, in turn, set different performance standards) for the different classes. For example, because electric heat pumps can be cheaper to install in newly constructed building,[109] the agency might deem heat pumps the best system for all new space-heating appliances installed in new buildings, while finding some lower level of heat-pump deployment, combined with some level of deployment for ultra-low-NO_x condensing furnaces, as the best system for new space-heating appliances installed in existing buildings.

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[101] *See* 42 U.S.C. § 7491.

[102] 77 Fed. Reg. 73,926, 73,927 (Dec. 12, 2012); 77 Fed. Reg. 74,355, 74,357 (Dec. 14, 2012); 77 Fed. Reg. 70,693, 70,695 (Nov. 27, 2012); 77 Fed. Reg. 71,119, 71,121 (Nov. 29, 2012).

[103] 77 Fed. Reg. at 73,928. *See* WildEarth Guardians v. EPA, 770 F.3d 919, 923 (10th Cir. 2014) (upholding program and EPA's conclusion that "this alternative program [was] better than [the best available retrofit technology] in improving air visibility").

[104] Util. Air Regulatory Grp. v. EPA, 471 F.3d 1333, 1340–41 (D.C. Cir. 2006).

[105] 42 U.S.C. § 7545.

[106] 47 Fed. Reg. 49,322, 49,324 (Oct. 29, 1982) (explaining that promulgated standards "should generally be achievable . . . through use of the averaging provisions in the regulations").

[107] Small Refiner Lead Phase-Down Task Force v. EPA, 705 F.2d 506, 535 (D.C. Cir. 1983).

[108] 42 U.S.C. § 7411(b)(5).

[109] Billimoria et al., *supra* note 77, at 7 fig.1.

IV. EPA's issuance of performance standards for fossil-fuel appliances under Section 111(b) would not preclude continued regulation of such appliances by other governmental entities

Some local governments are working to reduce emissions from fossil-fuel appliances by, for example, prohibiting gas hook-ups in newly constructed buildings.[110] Additionally, the federal Department of Energy ("DOE") sets "energy conservation standards" for appliances under the Energy Policy and Conservation Act.[111] EPA's promulgation of new source performance standards for fossil-fuel appliances under Section 111(b) would have no legal effect on the efforts of these other government entities.

A. Section 111(b) standards would not preempt more stringent state and local restrictions on fossil-fuel appliances

Promulgating Section 111(b) standards for fossil-fuel appliances would not prevent state and local governments from regulating such appliances themselves, so long as the state and local regulations were supplemental to federal requirements. The Clean Air Act expressly preserves the right of state and local governments to regulate air pollution from stationary sources *more* stringently than the agency.[112] Section 111(b) standards would thus serve as a floor, not a ceiling, for state and local appliance regulation.

B. Section 111(b) standards would not displace DOE's responsibility to set energy conservation standards for fossil-fuel appliances

Issuing Section 111(b) standards for fossil-fuel appliances would also not prevent DOE from continuing to set efficiency standards for fossil-fuel appliances.

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[110] Mark Specht, *Why Berkeley Banned Natural Gas in New Buildings*, Union of Concerned Scientists Blog (July 31, 2019), https://blog.ucsusa.org/mark-specht/why-berkeley-banned-natural-gas-in-new-buildings; *New York City to ban natural gas hookups in new buildings by 2030: mayor*, Reuters (Jan. 29, 2021), https://www.reuters.com/article/us-natgas-new-york-ban/new-york-city-to-ban-natural-gas-hook-ups-in-new-buildings-by-2030-mayor-idUSKBN29Y2T0.

[111] *Appliance & Equipment Standards: Consumer Furnaces*, Off. of Energy Efficiency & Renewable Energy (last visited Oct. 8, 2021), https://www1.eere.energy.gov/buildings/appliance_standards/standards.aspx?productid=59&action=viewlive.

[112] *See* 42 U.S.C. § 7416 (providing that the Clean Air Act shall not "preclude or deny the right of any State or political subdivision thereof to adopt or enforce (1) any standard or limitation respecting emissions of air pollutants or (2) any requirement respecting control or abatement of air pollution; except that . . . such State or political subdivision may not adopt or enforce any emission standard or limitation which is less stringent than" applicable Clean Air Act standards). By contrast, states are generally preempted from setting more stringent *mobile source* standards than EPA (though California can seek a waiver to do so). 42 U.S.C. § 7543.

In *Massachusetts v. EPA*, the George W. Bush administration argued that EPA could decline to regulate greenhouse gases from motor vehicles under the Clean Air Act because, among other reasons, "the only feasible method of reducing tailpipe emissions would be to improve fuel economy" and vehicles were already subject to fuel economy standards set by the Department of Transportation ("DOT").[113] As a result, the government argued, "EPA regulation would either conflict with those standards or be superfluous."[114]

The Supreme Court roundly rejected this reasoning, finding that EPA's Clean Air Act mandate to protect public health and welfare was "wholly independent of DOT's mandate to promote energy efficiency."[115] The same logic applies to DOE's appliance efficiency standards, which are established pursuant to the Energy Policy and Conservation Act, the same statute under which DOT establishes vehicle fuel economy standards.[116] Thus, just as DOT's regulation of vehicle efficiency did not displace EPA's responsibility to regulate vehicle emissions, an EPA regulation of appliance emissions would not displace DOE's responsibility to continue regulating appliance efficiency.

Despite their independent statutory mandates, EPA and DOT have attempted to harmonize their respective vehicle regulations by engaging in joint rulemakings.[117] It may be similarly advisable to coordinate EPA and DOE regulations of fossil-fuel appliances.

Conclusion

In sum, we find that EPA has authority to regulate harmful emissions from new fossil-fuel appliances under Section 111(b) of the Clean Air Act and that multiple means of reducing emissions from such appliances are adequately demonstrated. We further conclude that EPA could base performance standards for appliances on an assumption of increased (but not necessarily universal) deployment of one or more reduction methods, by incorporating emissions averaging and trading into the best system of emission reduction and/or by exercising its discretion to set different standards for different subcategories of appliance. Finally, we conclude that EPA's issuance of performance standards under Section 111(b) would not interfere with efforts by state and local governments or the U.S. Department of Energy to regulate appliances.

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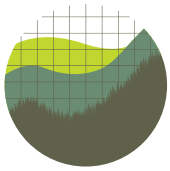
[113] 549 U.S. 497, 513 (2007).

[114] *Id.*

[115] *Id.* at 532.

[116] *See id.* (noting that fuel economy standards are set pursuant to the Energy Policy and Conservation Act); Energy Conservation Program for Appliance Standards: Procedures, Interpretations, and Policies for Consideration in New or Revised Energy Conservation Standards and Test Procedures for Consumer Products and Commercial/Industrial Equipment, 86 Fed. Reg. 18,901, 18,903 (Apr. 12, 2021) (explaining that "the Energy Policy and Conservation Act, as amended . . . established the Energy Conservation Program for Consumer Products and Certain Industrial Equipment").

[117] *See* Notice of Upcoming Joint Rulemaking To Establish Vehicle GHG Emissions and CAFE Standards, 74 Fed. Reg. 24,007 (May 22, 2009) ("It is intended that this joint rulemaking proposal will reflect a carefully coordinated and harmonized approach to implementing these two statutes . . ..").



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