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Docket No. EPA-HQ-OAR-2021-0044; Phasedown of Hydrofluorocarbons: Establishing the Allowance Allocation and Trading Program Under the American Innovation and Manufacturing Act; Proposed Rule
86 FR 27,150 (May 19, 2021)

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I. INTRODUCTION

The undersigned free market organizations have a longstanding interest in bringing to light the deleterious consequences of federal regulations, which are often neglected by agencies in their attempts to adopt a regulatory agenda. Scrutiny is particularly important when a regulatory agency implements statutory authority for the first time, as any initial misinterpretations of that authority could set unnecessarily costly precedents. For this reason, we raise a number of concerns with the Notice of Proposed Rulemaking (NPRM) implementing the American Innovation and Manufacturing (AIM) Act, which was enacted in December of 2020 as part of the Consolidated Appropriations Act, 2021.[1]

The AIM Act imposes limits on the future production of hydrofluorocarbons (HFCs), and does so on the grounds that they contribute to climate change. The economic impacts will be very significant and widespread, as HFCs are the class of refrigerants used in hundreds of millions of air conditioning and refrigeration systems. Keeping this equipment in operation will cost considerably more because of these provisions. In addition, new equipment designed to use alternative refrigerants with lower global warming potentials (GWP) carries a price premium and will likely continue doing so as competition with the HFC-using systems currently dominating the market is increasingly constrained.

While some of these cost increases are unavoidable, we believe that the NPRM exacerbates others through incorrect and/or unnecessarily aggressive interpretations of the law.

[1] H.R. 133, Consolidated Appropriations Act, Section 103, December 27, 2020, https://www.epa.gov/sites/production/files/2021-03/documents/aim_act_section_103_of_h.r._133_consolidated_appropriations_act_2021.pdf.

Among them is the agency's proposed means of determining the baselines of past HFC production from which the future percentage restrictions are calculated. The chosen method is likely to lead to an undercount and thus more stringent HFC quotas than the statute envisioned.

The NPRM is accompanied by a Regulatory Impact Analysis (RIA) that grossly understates the costs of the rule – and indeed makes the irrational claim that there are no net compliance costs. At the same time, the RIA overstates the climate change-related benefits of the rule. Perhaps most one-sided of all are the environmental justice claims which completely ignore the disproportionate impact of costlier air conditioning on low income households and communities.

Evident throughout the NPRM and RIA is EPA's reliance on claims made by the air conditioning and refrigeration sector – the companies that supported the AIM Act and will benefit by the forced transition to more expensive products. In lobbying for the AIM Act, these companies made a number of outlandishly optimistic claims about minimal to non-existent compliance costs and astronomical environmental benefits, and these claims have now been incorporated into the NPRM.

Absent from the NPRM and RIA is any realistic consideration of the costs to the many consumers and businesses adversely affected by these measures, and especially so for those least able to afford these costs. Nor is there a realistic assessment of the environmental impacts. This comment seeks to remedy at least some of this imbalance so that the agency can make changes to the NPRM before the rule is finalized.

II. THE NPRM DEPARTS FROM THE AIM ACT

Section (e)(1) of the AIM Act sets out the baseline production and consumption levels for HFCs, and it is from these levels that the mandated percentage reductions are calculated. The statute specifies that the baseline is set by taking the average HFC annual production and consumption for the years 2011 through 2013, but it is silent on how this figure is to be determined. The NPRM proposes to use the data in the agency's Greenhouse Gas Reporting Program (GHGRP), despite a number of known deficiencies in this database. Any undercount of the baseline would lead to HFC reductions more restrictive than those intended under the AIM Act.

The limitations with the GHGRP result in it capturing considerably less than all of the HFC production and use in any given year. One of these limitations is that the threshold reporting levels of 25,000 tons carbon equivalent would leave out a significant number of smaller entities. The agency, through a Notice of Data Availability (NODA), has attempted to solicit input from entities whose HFC production and consumption escaped inclusion in the GHGRP.[2] Similarly, the NPRM again requests all previously uncounted entities inform the

[2]Environmental Protection Agency, "Notice of Data Availability Relevant to the United States Hydrofluorocarbon Baselines and Mandatory Allocations," February 11, 2021,

agency.[3] Thus, the baseline is essentially the GHGRP plus anyone else who comes forward. There are numerous flaws with this method, especially given that many such entities are not yet even aware of the AIM Act provisions. An undercount of the baseline is quite likely, and possibly a significant one.

Further, the NPRM arbitrarily proposes to exclude from the baseline all refrigerant contained in imports of pre-charged equipment, thus only counting bulk shipments of refrigerant itself. The agency points to no justification for doing so under the AIM Act, instead asserting that this is how it implemented similar provisions that predate the statute. The agency noted that including importers of pre-charged equipment would make the regulated community "many times greater," which strongly suggests that the amounts of refrigerant involved are not trivial. There is nothing in the AIM Act to suggest that ease of implementation can take precedence over accuracy.

The NPRM does not even consider any alternative methods or databases that could lead to more accurate baselines. Rather than try to fix the heavily-flawed GHGRP while arbitrarily ignoring entire categories of HFCs, EPA must at least explore better options for setting the baselines without which a faithful implementation of the AIM Act is not possible.

In addition to a likely undercount of the HFC baseline, the NPRM misinterprets the AIM Act in ways that would further constrain the future supply of HFCs beyond the statutory intent. Specifically, subsection (e)(4) of the statute, entitled "Exceptions; Essential Uses," sets out a process by which certain applications for HFCs are given a 5-year exception from the program's restrictions.[4] The statute sets out six such categories, including military applications, aircraft fire protection, and certain medical devices. The AIM Act also includes a process by which users of HFCs in any other application that can demonstrate hardship in transitioning away from HFCs may petition for a 5-year exception from the agency.

The clear meaning of "exceptions" in the heading as well as the rest of the language in this subsection would lead to the conclusion that HFCs used in these categories are outside the overall HFC cap. However, the NPRM now seeks to subtract the excepted usage from the overall quota for HFCs.

Inclusion of exceptions under the cap would undermine the purpose of these provisions. Since there is no change to the overall cap, it could lead to prohibitively expensive HFCs for such entities. In other words, the excepted users would be "first in line" but since the overall supply is not changed the cost may be too high for these users to bear. It may also be that certain specialty HFCs with very high GWPs that are used for exempted applications may become unavailable at any price if they are counted under the overall allocation. This is so because HFCs are weighted by their GWP, so HFC makers may opt to forego making these high-GWP HFCs in favor of being able to make larger volumes of lower-GWP ones.

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https://www.federalregister.gov/documents/2021/02/11/2021-02774/notice-of-data-availability-relevant-to-the-united-states-hydrofluorocarbon-baselines-and-mandatory.

[3] 86 FR 27,165.

[4] 86 FR 27,171.

Beyond the harm to excepted users, subtracting from the overall cap would add to the hardship on the non-excepted users.

It should also be noted that the treatment of "exceptions for essential uses" for ozone depleting substances (ODS) under the 1990 Amendments to the Clean Air Act were treated as counting outside the overall allocations.[5] The NPRM, which otherwise relies heavily on the experience with phasing out ODSs as precedent, departs from that precedent by counting any exceptions within the overall cap.

III. THE REGULATORY IMPACT ANALYSIS UNDERSTATES COMPLIANCE COSTS

The NPRM is accompanied by and makes references to a draft Regulatory Impact Analysis (RIA) which projects both the costs and the benefits of the phasedown of HFCs under the AIM Act. As will be discussed in more detail below, the RIA ignores most of the costs associated with the forced shift away from high-GWP refrigerants.

The final RIA will play an important role in EPA's ongoing implementation of the AIM Act. For example, section (f) allows for public petitions to accelerate the initial phasedown schedule for HFCs, and section (e)(4) allows regulated entities to apply for additional essential use exceptions. EPA's disposition of these matters will be based in part on the costs and benefits associated with the program, so it is vital that the final RIA be accurate.

A. Inadequate Analysis Of Costs Imposed On Existing HFC-Using Equipment

Any rational analysis of the AIM Act's costs would begin with an inventory of existing HFC-dependent air conditioning and refrigeration equipment that will be impacted by its provisions. The number of such systems is staggering, stretching well into the hundreds of millions. It includes the majority of residential and vehicle air conditioners as well as most air-conditioned commercial properties. It also encompasses much of the refrigeration systems used in more than a million businesses both large and small, from the food storage equipment in restaurant kitchens to the industrial process refrigeration systems relied upon by many manufacturers. It also includes the majority of air conditioning and refrigeration equipment in schools, hospitals, houses of worship, and other institutions.

Most categories of air conditioning and refrigeration equipment have expected lifetimes of 15 years or more, thus the majority of existing systems will still be in use when the first restrictions on HFC production take effect on January 1, 2022.[6] Refrigerant leaks are a common occurrence (especially as systems age) and necessitate replacing the lost refrigerant. With few exceptions, equipment makers strongly recommend using only the refrigerant the equipment was

[5] 42 U.S.C. section 604(d), https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapVI-sec7671c.htm

[6] See Department of Energy, Office of Energy Efficiency and Renewable Energy, "Central Air Conditioning," https://www.energy.gov/energysaver/central-air-conditioning.

originally designed for[7], which in the majority of cases will be the high-GWP HFCs that are the target of the AIM Act.

It is a near certainty that the costs of HFCs needed to maintain these systems will rise as supplies are constrained, as happened with chlorofluorocarbons (CFCs) and hydrofluorocarbons (HCFCs) when these refrigerants were subject to production limits pursuant to the 1990 Amendments to the Clean Air Act.[8] The only real question is how high they will go. In addition to increased refrigerant costs, section (h) of the AIM Act authorizes EPA to promulgate regulations regarding the handling of HFCs during the servicing process in order to minimize releases of these refrigerants. As happened with CFCs and HCFCs, such measures could add further to costs by mandating additional time-consuming steps in the repair process. Other proposed measures, such as those requiring refillable refrigerant containers, may also have an impact on costs. And the proliferation of refrigerants both old and new necessitates redundant sets of service equipment and further complicates the repair process.

There is scant discussion in the RIA of the cost impacts on existing HFC-using equipment. There is no mention of the amount of HFC-dependent equipment affected, the likely future price trends for replacement HFCs as the progressively tighter quotas take effect, nor the impact of the AIM Act on average repair costs for homeowners, vehicle owners, business owners, and others. For this reason, the RIA is wholly insufficient.

B. Inadequate Analysis Of Costs For New Equipment

In addition to higher costs to maintain existing equipment, the AIM Act also threatens higher prices for new equipment designed to use one of the low-GWP replacement refrigerants. Rather than acknowledge these cost increases, the RIA makes the far-fetched assertion that the new equipment using AIM Act-favored refrigerants will actually save its owners money on net.

It does so by assuming a number of cost-saving attributes of this new equipment, including improved energy efficiency and lower refrigerant leakage rates, and claims such savings would quickly offset any increase in initial costs. For example, the RIA informs us that supermarket owners would save $13,400 annually as soon as they replace their existing HFC-using systems for next generation, low-GWP technologies. For certain large cold storage facilities, the estimated benefits of doing so are $50,200 annually. The RIA asserts without evidence that equipment owners are ignorant of the potential savings from abandoning HFCs and would not make the change on their own.

It is doubtful that the claimed benefits are real. For example, there is a documented tendency for the theoretical energy efficiency improvements used to justify government

[7] See Environmental Protection Agency, "Homeowners and Consumers: Frequently Asked Questions," https://www.epa.gov/ods-phaseout/homeowners-and-consumers-frequently-asked-questions.
[8] See Ben Lieberman, "Doomsday Déjà Vu: Ozone Depletion's Lessons For Global Warming," Competitive Enterprise Institute, October 1998, http://cei.org/sites/default/files/Ben%20Lieberman%20-%20Doomsday%20D%C3%A9j%C3%A0%20vu%20Ozone%20Depletion's%20Lessons%20for%20Global%20Warming.pdf.

interventions to fall short in practice.[9] But even if the savings do materialize, they cannot logically be attributed to the AIM Act since any genuinely superior alternatives to HFCs would catch on anyway.

In reality, there are reasons why the alternative refrigerants lauded in the RIA were nobody's first choice. In the words of a study conducted for the Clean Energy Manufacturing Analysis Center, "[e]xisting 'alternative' refrigerants have limitations (e.g., toxicity, flammability, efficiency) that have restricted their use until now."[10] Particularly problematic is the use of flammable refrigerants which add costs throughout the supply chain.[11] The RIA speculates, without support, that these longstanding disadvantages will be easily overcome (and with minimal costs) once the AIM Act is implemented.

The RIA references a study, conducted for two of the trade associations that supported the AIM Act and Kigali Amendment, that also predicts net savings for new equipment owners.[12] As with the RIA, this study assumes, without logical explanation, that the cost-savings are dependent on government restrictions on HFCs and would not happen without them.

In perhaps the clearest example of EPA's flawed thinking, the RIA states that "when designing a new model of equipment to use an HFC alternative, companies have the opportunity to redesign other components of the equipment to achieve greater energy efficiency…." However, companies would have that opportunity even in the absence of the AIM Act, and indeed competitive forces would necessitate such improvements regardless of the law. Indeed, the air conditioning and refrigeration sector has a long track record of energy efficiency improvements of about 1 percent per year unrelated to the refrigerant chosen.[13]

In truth, the only thing the AIM Act does is restrict the range of refrigerant choices by limiting the supply of HFCs, and doing so can only be bad news for the cost of buying and operating new equipment. Any future efficiency gains or other system improvements would most likely occur in spite of the AIM Act than because of it. For this reason, the RIA's claims of net cost savings are as implausible as they are unsupported.

C. Early Cost Data Already Disproving The RIA

Reality is already beginning to intrude on EPA's claim of a painless transition. For example, several AIM Act-favored substitute refrigerants are under patent protection by two

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[9] *See* Hunt Allcott, Michael Greenstone, "Is There An Efficiency Gap?" Journal of Economic Perspectives, Winter 2012, https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.26.1.3; Arik Levinson, "How Much Energy Do Building Codes Really Save? Evidence from California," American Economic Review, October 2016, https://pubs.aeaweb.org/doi/pdfplus/10.1257/aer.20150102.

[10] Chuck Booten et al., "Refrigerants: Market Trends and Supply Chain Assessment," Clean Energy Manufacturing Analysis Center, February 2020, p. 41, https://www.nrel.gov/docs/fy20osti/70207.pdf.

[11] Ibid. at 42.

[12] JMS Consulting and Inforum, "Consumer Cost Impacts of U.S. Ratification of the Kigali Amendment," November 9, 2018, at https://www.ahrinet.org/App_Content/ahri/files/RESOURCES/Consumer_Costs_Inforum.pdf.

[13] ICF International, "Changes In HCFC Consumption And Emissions From The U.S. Proposed Adjustments For Accelerating The HCFC Phaseout," August 2007, https://ozone.unep.org/Meeting_Documents/mop/19mop/USA-HCFC-Accerelated-phase-proposal.pdf.

companies, Honeywell and Chemours, and they already cost considerably more than the HFCs they would replace. Most notably, HFO-1234yf currently sells online for at least 5 times the cost of HFC-134a, which it was designed to replace in new vehicle air conditioners.[14] There is no acknowledgement of refrigerant cost increases of this magnitude in the RIA. And that price differential doesn't tell the full story on costs, since HFC-134a and other HFCs have also risen in price since the AIM Act became law, quite possibly in anticipation of the restrictions to come.

The RIA is devoid of this or any other real-world price data, though it is readily available. It is also worth noting that the CFCs and HCFCs subject to similar restrictions beginning in the 1990s still sell for prices well above pre-regulation levels, which attests to the staying power of the elevated costs.[15]

IV. THE REGULATORY IMPACT ANALYSIS OVERSTATES THE CLIMATE BENEFITS

The RIA also estimates the climate benefits of the AIM Act, which are determined by the projected reductions in future HFC emissions multiplied by the estimated social cost of HFCs (SC-HFC). We have concerns with both.

The RIA's projected business-as-usual increases in HFC use and emissions, and therefore the reductions estimated to result from the AIM Act, do not fully account for the extent to which low-GWP alternative refrigerants would catch on anyway. This is particularly so over longer timespans and for those applications where the refrigerant transition is relatively less costly and technologically challenging. Several state-level HFC restrictions have played a role, as have EPA restrictions enacted in 2015 and 2016 which were subsequently overturned in court but lasted long enough to spark some manufacturers to move towards alternative refrigerants.[16] Another contributor has been the expectation (not yet realized) that the U.S. would ratify the Kigali Amendment and thus be committed to an international HFC allowance allocation and trading scheme.[17] Overall, the use of a more realistic business-as-usual scenario in the RIA would likely result in a less dramatic reduction in HFC emissions attributable to the AIM Act.

Regarding SC-HFC, the RIA states that the estimates were developed using methodologies consistent with those underlying the interim social cost of carbon dioxide and other greenhouse gases (SC-GHG) published in February 2021 and currently subject to review by the Interagency Working Group (IWG).[18] As such, we believe it suffers from several of the

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[14] *See* Refrigerant Depot, at https://www.refrigerantdepot.com/.

[15] Ibid.

[16] Kate C. Shouse, "Hydrofluorocarbons (HFCs): EPA and State Actions," Congressional Research Service, May 7, 2020, https://fas.org/sgp/crs/misc/IF11541.pdf.

[17] It should be noted that, while the AIM Act authorizes trade in HFC allowances with foreign nations, and section VII of the NPRM seeks to implement these measures, the Kigali Amendment has not yet been ratified. Non-ratification limits the extent of international cooperation measures that can be undertaken at this time.

[18] Interagency Working Group on Social Cost of Greenhouse Gases, United States Government (hereafter IWG), Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990, February 2021, https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf (hereafter TSD 2021).

same methodological flaws. This includes the use of inflated climate sensitivity estimates based on models that have consistently overstated observed warming for the past 40 years. We incorporate by reference a comment on SC-GHG submitted by several of the same organizations that are signatories here.[19]

The social costs of all greenhouse gases, including HFCs, can be manipulated into virtually any value based upon the Integrated Assessment Model (IAM) employed, assumptions about discount rates, and equilibrium climate sensitivities (ECSs) in the underlying climate modules.

While we draw attention to those extensive comments and will not simply repeat them here, we would like to take a somewhat different approach given the large and varying SC-HFC results that accrue from—among other things—a large range of ECS values.

This is a major flaw in the RIA. Simply put, it does not follow best scientific practices that are universally accepted in the realm of atmospheric forecasting. Further, we will show that following those practices reduces the prospective HFC warming through 2050 (without mitigation) to a nugatory-to-small value.

If a modeler intends to make climate change look economically catastrophic and make greenhouse gas regulations (including eliminating HFCs) appear essential, the modeler can run the IAMs with below-market discount rates. It has now become fashionable to assume values of 2% or even less. If sustained, these are likely politically inviable and would result in massive election-to-election policy shifts.

Perhaps most important is the problem with model selection. Many original SC-GHG calculations use a frequency distribution of ECS values calculated from Roe and Baker (2007), a highly outdated reference with a "fat" tail that is increasingly inconsistent with observations.[20] Others use statistics derived from the Fifth Coupled Model Intercomparison Project (CMIP-5), a suite of models associated with the most recent (2014) comprehensive scientific assessment of the UN's Intergovernmental Panel on Climate Change (IPCC). It is likely that SC-HFC calculations will ultimately rely upon the CMIP-6 version which is now almost completely populated with revised or new models.

Use of either outdated Roe and Baker (2007) ECS probabilities or the suite of CMIP-5 models in aggregate violates scientific best practice for atmospheric prognostics.

Christy (2017) documented the remarkable disparity between the community of CMIP-5 models and tropical tropospheric temperatures.[21] These are especially critical in SC-GHG

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[19] Comment on "Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under Executive Order 13990," June 21, 2021, https://cei.org/wp-content/uploads/2021/06/Comments-OMB-Technical-Support-Document-Social-Cost-of-Carbon.pdf.

[20] Gerard H. Roe et al., "Why is Climate Sensitivity So Unpredictable?" Science, Oct. 26, 2007, https://science.sciencemag.org/content/318/5850/629.

[21] Christy, J.R.: 2017, [in "State of the Climate in 2016"], Bull. Amer. Meteor. Soc. 98, (8), S16-S17, https://journals.ametsoc.org/view/journals/bams/98/8/2017bamsstateoftheclimate.1.xml.

calculations because the vertical tropical temperature distribution determines in large part the amount of moisture flux into the free atmosphere.

Forecasters do *not* routinely take all the available forecast models and average them up to determine the forecast. Instead, they tend to rely more upon model(s) that historically perform best given the synoptic situation.

Only one model, the Russian Institute for Numerical Mathematics model (INM-CM4) correctly simulates the tropical troposphere. It also has the lowest ECS of all, 2.05°C versus the ensemble average of 3.2°C. The 21st-century warming predicted by INM-CM4 is very close to the goal of the Paris Accord without expensive policies like the now-fashionable (and impossible) global "net zero" emissions by 2050.

Should the final RIA move to reliance on the CMIP-6 suite, a similar result will accrue.

Again, the overall family of models is overpredicting tropical warming at altitude. Of the two models that work, the Russian INM-CM4.8 has even less warming than its predecessor, with an ECS of 1.8°C, compared to the CMIP-6 community value of around 4.0°C.

According to Hausfather and Peters (2020), the likely emissions pathways are RCP 4.5 and 6.0.[22] Appendix II of the Fifth (2014) IPCC Assessment indicates a prospective warming for that first half of the 21st century of around 1.2° C based on the CMIP-5 ensemble. Scaling it down with INM-CM4 (the best practice), drops this value to approximately 0.7° C.

IPCC AR5 radiative forcing value changes from 2020 to 2050 from HFCs are very small compared to the total anthropogenic RF, approximately 2.5% of the total for RCP 4.5 and 1.2% for RCP 6.0 (the total forcing change in this period is higher for RCP 4.5 than it is for 6.0). Multiplying all of this through yields a 2020 to 2050 HFC warming on the order of 2% of the CMIP-5 mean, or 0.01 to 0.02ºC for INM-CM4 and the CMIP-5 ensemble, respectively.

Much higher RF values for HFCs through 2050, about 0.22-0.25 w/m^2, are given in Velders et al., (2015).[23] Using these forcings while scaling to INM-CM4 gives a warming to 2050 of 0.13ºC. Given this as the upper limit, and the AR5 forcings as the lower, the warming expected through 2050 from HFCs is, conservatively speaking, on the order of a tenth of a degree or less, with a mean value of around 0.06ºC.

In contrast, Tables A-1 through A-9 in the RIA show very large SC-HFC values that are rhetorically striking. But when using working climate models and the relatively small forcing from HFCs compared to the total, the actual warming is nugatory.

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[22]Zeke Hausfather et al., "The 'Business as Usual' Story is Misleading," Nature, January 29, 2020, https://www.nature.com/articles/d41586-020-00177-3.

[23] Guus Velders, et al., "Future Atmospheric Abundances and Climate Forcings From Scenarios of Global and Regional Hydrofluorocarbon (HFC) Emissions," Atmospheric Environment, December 2015, https://www.sciencedirect.com/science/article/pii/S135223101530488X.

In addition, the potential adverse impact of the AIM Act on energy efficiency, discussed previously, is also relevant to SC-HFC. Studies estimate that nearly 75 percent of the greenhouse gas contribution from air conditioning and refrigeration equipment is associated with the indirect CO2 from the electricity needed to run these systems.[24] The rest comes from the relatively small amount of HFCs leaking from such systems – the reason being that although HFCs have a much higher GWP than CO2 on a per molecule basis, the sheer number of CO2 molecules released is many orders of magnitude larger.

Thus, realistic assessments of the impact of the AIM Act on energy efficiency should be a part of the SC-HFC calculations. Despite the RIA's assumptions to the contrary, it is likely that the restrictions on refrigerant choice imposed by the AIM Act will create a relative energy penalty and thus more CO2 emissions. It is worth remembering that high energy efficiency is one of the reasons HFCs came to dominate so many air conditioning and refrigeration applications. Thus, restricting this option is likely to undercut future efficiency levels. Similarly, HFCs are the preferred foam blowing agent used to make many types of insulation, but they will have to be replaced by substitutes that may lead to less effective insulation and thus higher greenhouse gas emissions.

For these reasons, we believe that an SC-HFC estimate must consider the very real possibility that the AIM Act's restrictions on the range of available refrigerants and foam-blowing agents will compromise energy efficiency (relative to a base case without such choice restrictions) and that these indirect emissions increases would undercut any direct ghg emissions reductions associated with the switch to lower-GWP refrigerants.

The RIA also errs by including only the calculated global benefits with no breakout of the U.S. benefits. As the costs of the AIM Act will be visited only on Americans, the American people should also be informed of the benefits to them.

V. THE ENVIRONMENTAL JUSTICE ANALYSIS ASSERTS DISPROPORTIONATE BENEFITS BUT IGNORES DISPROPORTIONATE COSTS

After speculating as to the future climate change impacts avoided by the AIM Act, the RIA section on environmental justice speculates further that certain communities are disproportionately vulnerable to such impacts and thus would disproportionately benefit from the HFC restrictions in the statute. Yet, the RIA completely ignores the most direct impacts of the AIM Act on vulnerable communities – that from the higher cost of air conditioning.

The health and welfare benefits attributed to air conditioning, though substantial, get no mention in the RIA. One study estimates that widespread market penetration of air conditioning

[24] U.S. Department of Energy, "The Future of Air Conditioning for Buildings," July 2016, https://www.energy.gov/sites/prod/files/2016/07/f33/The%20Future%20of%20AC%20Report%20-%20Full%20Report_0.pdf

in the U.S. has prevented up to 18,000 deaths annually.[25] Beyond mortality reductions, air conditioning also improves the quality of life, including learning ability and labor productivity.[26]

Of course, these benefits accrue only to those who can afford air conditioning. Not surprisingly, data from the Energy Information Administration's Residential Energy Consumption Survey finds that low-income households are less likely to have air conditioning.[27] Heat-related mortality and morbidity is highest among those with low-incomes, especially low-income seniors, and lack of access to air conditioning has been identified as a major cause.[28]

HFCs currently dominate the residential air conditioning market and do so because equipment using them provides the best combination of affordability and quality. As discussed previously, the AIM Act's constraints on future HFC supplies will undoubtedly raise the cost of fixing a broken air conditioner. They will also raise the price of new equipment by limiting the availability of HFCs in favor of more expensive alternative systems. However, the RIA doesn't discuss even the possibility of cost increases and their potential for disparate impacts.

Any discussion of the disproportionate impacts of regulatory actions should include both the costs as well as the benefits.[29] Here, EPA purports to consider the implications on "minority populations and low-income populations in the United States," but completely ignores costs. This is perhaps the most egregious deficiency in the RIA.

VI. CONCLUSION: THE NPRM IS INADEQUATE AND MUST BE RE-PROPOSED BEFORE FINALIZATION

The NPRM sets out an implementation scheme for the AIM Act that goes well beyond the statute's provisions. Most notably, its formula for determining the baselines for HFC production and consumption will lead to an undercount that is at odds with statutory intent. Furthermore, the NPRM relies on an RIA that ignores costs and overstates the environmental benefits.

Given the potential adverse impacts on consumers and businesses, we urge that a supplemental NPRM and RIA be issued that remedies these flaws before any rule is finalized.

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[25] Alan Barreca et al., "Adapting to Climate Change: The Remarkable Decline in the U.S. Temperature-Mortality Relationship over the 20th Century," Journal of Political Economy, January 2016, https://epic.uchicago.edu/wp-content/uploads/2019/08/684582.pdf.

[26] Jose Guillermo-Cedeno-Laurent et al., "Extreme Heat Linked To Lower Cognitive Performance In Students In Non Air Conditioned Buildings," Neuroscience News, July 2018, https://neurosciencenews.com/ac-heat-cognition-9548/

[27] U.S. Energy Information Administration, "Air Conditioning In Nearly 100 Million Homes, August 2011, https://www.eia.gov/consumption/residential/reports/2009/air-conditioning.php.

[28] *See* Joyce Klein Rosenthal et al., "Intra-Urban Vulnerability To Heat-Related Mortality In New York City, 1997-2006," Health & Place, November 2014, https://www.sciencedirect.com/science/article/pii/S1353829214001087.

[29] See Project 21 Black Leadership Network, "Blueprint For A Better Deal For Black America," April 2018, https://nationalcenter.org/wp-content/uploads/2018/04/Blueprint-for-a-Better-Deal.pdf.

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