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**Prepared Statement of
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on S. 2754, “American Innovation and Manufacturing Act of 2019”**

**Committee on Environment and Public Works
U.S. Senate**

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I. Introduction and Summary Conclusions

The Committee on Environment and Public Works of the U.S. Senate is considering the proposed bill S. 2754, the “American Innovation and Manufacturing Act of 2019,” (hereafter “AIM”) which would mandate a phaseout of hydrofluorocarbon (HFC) refrigerants, ostensibly to reduce the climate change (“radiative”) impacts of HFC leakage into the atmosphere. This would engender in substantial part a large shift to hydrofluoroolefins (HFOs), the only viable replacement option in a number of such applications as auto air conditioning. Other substitutes may be available in various functions, or may prove over time to become so, but that does not change the basic benefit/cost problem discussed in section II. Note that HFCs previously had replaced hydrochlorofluorocarbons (HCFCs) due to the purported adverse effects of the latter in terms of the depletion (thinning) of the stratospheric ozone layer. And prior to that HCFCs had replaced chlorofluorocarbons (CFCs), which had effects on the ozone layer stronger than those created by emissions of HCFCs.¹

We urge the Committee to reject the proposed AIM legislation for the following central reasons:

- The climate benefits of the proposed legislation, even (or in particular) under mainstream scientific assumptions, would be trivial or unmeasurable. Accordingly, the mandates for refrigerant replacement specified in the proposed legislation could

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¹ For information on these earlier phaseouts, see the U.S. Environmental Protection Agency, “Phaseout of Ozone-Depleting Substances (ODS),” August 15, 2019, at <https://www.epa.gov/ods-phaseout>.

- not satisfy any plausible benefit/cost test. This is true even if the AIM Act is viewed as part of a larger effort, whether by the U.S. or under an international agreement, to reduce emissions of greenhouse gases (GHG).
- Endorsement of policy proposals that cannot satisfy a plausible benefit/cost test leaves few principles available to be invoked against such proposals as the green new deal and other “climate” proposals, all of which would have future climate effects virtually unmeasurable.
 - The economic benefits of the proposed legislation are illusory, driven in substantial part by confusion about the distinction between the gross and net impacts of resource reallocations driven by legislative mandates. Moreover, even if the asserted economic benefits are assumed correct, it is not at all clear why legislation is needed to obtain them; market forces would lead firms and industries to pursue them as a simple matter of profit-seeking behavior.
 - Endorsement of such legislative proposals as AIM would encourage future efforts by numerous interest groups to obtain economic benefits by lobbying public officials (“rent-seeking”) rather than by innovating or by finding new production efficiencies.

II. Would the AIM HFC Restrictions Reduce Global Surface Warming By a Half-Degree C By 2100?

Claims that a phaseout of HFC refrigerants will mitigate a half-degree (C) of global surface warming by 2100 represent an extreme forecast based upon extreme assumptions. Note that the entire Paris agreement, if implemented immediately and enforced strictly, would reduce global temperatures by 0.17 degrees C by 2100, under assumptions that exaggerate the effects of reduced greenhouse gas emissions.² Writing about the HFC forecast in *Science*, reporter Warren Cornwall noted that “the figure has its origins in a 2006 dinner held by five scientists in a village in the Swiss alps.”³ The underlying analysis appeared in a paper published some seven years later; it assumed massive adoption of HFC-

² The most important such assumption is an equilibrium climate sensitivity of 4.5 degrees C, the upper bound of the range estimated by the Intergovernmental Panel on Climate Change in the Fifth Assessment Report. See the Model for the Assessment of Greenhouse Gas Induced Climate Change/Scenario Generator (MAGICC/SCENGEN, version 5.3), developed at the National Center for Atmospheric Research, and available at <http://www.magicc.org/>. This is the model used by the U.S. Environmental Protection Agency and other government bureaus. See page 16 and Table SPM.2 in *IPCC, 2013: Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley, eds., Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, at http://www.climatechange2013.org/images/report/WG1AR5_SPM_FINAL.pdf. The higher the assumed ECS, the greater the future temperature impact of reduced GHG emissions. The Paris emissions reductions--the “Nationally Determined Contributions”---are not to be taken seriously. See Benjamin Zycher, “The Absurdity that Is the Paris Climate Agreement,” *aei.org*, May 25, 2017, at <https://www.aei.org/articles/the-absurdity-that-is-the-paris-climate-agreement/>. For the nationally determined contributions, see <https://www4.unfccc.int/sites/submissions/indc/Submission%20Pages/submissions.aspx>.

³ See Warren Cornwall, “Data Check: How a Figure Key to new HFC Pact Was Born,” *Science*, Vol. 354, Issue 6311 (October 28, 2016), p. 402, at <https://science.sciencemag.org/content/354/6311/402>.

equipped air conditioning in the developing world by 2050.⁴ The authors assumed that by that year all those demanding air conditioning would have it, a premise that was applied to Africa, where the assumption that in thirty years the availability of electricity will be widespread and reliable is problematic at best. In addition, the authors assumed that any replacement equipment---air conditioning units and heat pumps have finite lives---also will be charged with HFCs. The paper argues:

In the scenarios discussed here, the demand for HFCs for the period 2050 to 2100 is assumed to maintain at the 2050 levels (assuming complete market saturation), which results in increasing HFC abundances and radiative forcing past 2050.

The 2013 paper reported an estimated warming range mitigated by an HFC ban of 0.35 to 0.5 degrees C. But, as Cornwall noted, "...[A]dvocates and negotiators tended to cite the higher, 0.5 degrees C estimate in their public remarks." That latter figure is four times larger than the projected warming under "business as usual" in the latest (2013) report of the Intergovernmental Panel on Climate Change.⁵

Consider the IPCC estimates of the radiative forcing (warming) effect of HFCs relative to that of carbon dioxide, from the Third Assessment Report.⁶ For carbon dioxide the radiative forcing effect in watts per square meter was estimated at 1.46 as of 1998. For HFC-23 it was 0.002; for HFC-134a and HFC 152a, they were 0.001 and 0.000, respectively. These estimates are not consistent with a projected effect of 0.5 degrees C for a phaseout of HFCs.

If we use the surface temperature effect of an HFC phaseout estimated (implicitly) by the IPCC under the "business as usual" scenario, that effect would be about 0.13 degrees C by 2100, a figure barely larger than the standard deviation of global average surface temperatures from year to year.⁷ Accordingly, it would be difficult to detect. This means that a policy-driven phaseout of HFCs could not satisfy any plausible benefit/cost test if the costs of the phaseout prove greater than trivial. If the substitutes for HFCs are not costlier than HFCs, whether currently or prospectively, including costs for equipment,

⁴ Y. Xu, *et. al.*, "The Role of HFCs in Mitigating 21st Century Climate Change," *Atmospheric Chemistry and Physics*, Vol. 13 (June 26, 2013), pp. 6083-6089, at <http://www.igsd.org/wp-content/uploads/2014/10/acp-13-6083-2013.pdf>.

⁵ See Tables AII.6.1 to AII.6.10 in Intergovernmental Panel on Climate Change, *The Physical Science Basis*, Working Group I of the Fifth Assessment Report, 2013, at https://www.ipcc.ch/site/assets/uploads/2017/09/WG1AR5_AnnexII_FINAL.pdf. See also European Fluorocarbons Technical Committee, "Massive Growth in HFCs Is Not Considered Likely in the IPCC Scenarios, January 2016, at https://www.fluorocarbons.org/wp-content/uploads/2016/09/EFCTC_Learn_about_Massive_growth_HFCs_not_in_IPCC-scenarios.pdf.

⁶ See O. Boucher, *et. al.*, "Radiative Forcing of Climate Change" in IPCC Third Assessment Report, 2001, Table 6.1, at <https://www.ipcc.ch/site/assets/uploads/2018/03/TAR-06.pdf>.

⁷ The standard deviation of the surface (land-ocean) temperature record is about 0.11 degrees C. See J. Hansen, *et. al.*, "GISS Analysis of Surface Temperature Change," *Journal of Geophysical Research*, Vol. 104, No. D24 (December 27, 1999), pp. 30,997-31,022, at <https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/1999JD900835>.

repairs, and the like, then no legislation would be needed to drive the HFC equivalents out of the market.⁸ Producers of HFOs and other HFC substitutes and the complementary equipment and the like would be free to compete. That the proponents of a phaseout of HFCs find it advantageous to support such legislation as the AIM Act, which in effect would shut down such competition, suggests that the substitutes for HFCs in reality are costlier in one or more important dimensions by amounts that are not trivial. Given the very small temperature effect of such a phaseout as estimated by the IPCC, this means that a phaseout cannot satisfy a basic benefit/cost test.

One argument often encountered is that any given policy effort to reduce emissions of GHG would have small climate effects, but the aggregate impact of many such policies would be significant. Accordingly, the policies taken as a whole would satisfy a benefit/cost test. The reality is that even policies vastly more aggressive in terms of reducing GHG emissions also would have effects effectively equal to zero by the end of the century.⁹ Full implementation of the Obama Administration Climate Action Plan would have reduced temperatures in 2100 by 0.015 degrees C.¹⁰ The most prominent recent proposals for a U.S. carbon tax are those promoted by the Alliance for Market Solutions and the Climate Leadership Council; the temperature reduction in 2100 yielded by each of those proposals would be 0.015 degrees C.¹¹ As noted above, the entire Paris agreement, if implemented immediately and enforced strictly: 0.17 degrees C.¹² The contemporaneous agreement between the Obama administration and China: an additional 0.01 degrees C, if one were to take the agreement seriously.¹³ The electricity component of the Green New

⁸ See Ben Lieberman, “The American Innovation and Manufacturing (AIM) Act: Myth vs. Fact,” Competitive Enterprise Institute WEBmemo No. 48, January 16, 2020, at <https://cei.org/content/american-innovation-and-manufacturing-aim-act-myth-vs-fact>. For one example of an argument that the costs of a phaseout would be low, see JMS Consulting, “Consumer Cost Impacts of U.S. Ratification of the Kigali Amendment, November 9, 2018, at http://www.ahrinet.org/App_Content/ahri/files/RESOURCES/Consumer_Costs_Inforum.pdf.

⁹ See Benjamin Zycher, “The Climate Empire Strikes Out: The Perils of Policy Analysis in an Echo Chamber,” monograph, American Enterprise Institute, September 2018, Table 3, at <https://www.aei.org/wp-content/uploads/2018/09/The-climate-empire-strikes-out-the-perils-of-policy-analysis-in-an-echo-chamber.pdf>. The source for the temperature projections attendant upon the respective policy proposals are author computations using the MAGICC/SCENGEN climate model, version 5.3, under an assumed ECS of 4.5 degrees C. See fn. 2 *supra*.

¹⁰ See fn. 2 *supra*.; and the White House analyses at <https://obamawhitehouse.archives.gov/sites/default/files/image/president27sclimateactionplan.pdf> and <https://obamawhitehouse.archives.gov/blog/2016/06/28/third-anniversary-climate-action-plan>.

¹¹ See Benjamin Zycher, “Observations on the Alliance for Market Solutions’ ‘Conservative’ Case For a Carbon Tax,” monograph, American Enterprise Institute, May 2019, at <https://www.aei.org/wp-content/uploads/2019/05/Carbon-Tax.pdf>; and Benjamin Zycher, “The Deeply Flawed Conservative Case For a Carbon Tax,” monograph, American Enterprise Institute, March 2017, at <https://www.aei.org/wp-content/uploads/2017/03/Carbon-Tax-CLC.pdf>.

¹² See fn. 2 *supra*.

¹³ That agreement was meaningless. See Benjamin Zycher, ““Observations on the U.S.-China Climate Announcement,” *The Hill*, November 14, 2014, at <https://thehill.com/blogs/pundits-blog/energy-environment/224076-observations-on-the-us-china-climate-announcement>; and Benjamin Zycher, “The U.S.-China Climate Agreement Hangover,” *The Hill*, December 8, 2014, at <https://thehill.com/blogs/pundits-blog/energy-environment/226272-the-us-china-climate-agreement-hangover>.

Deal: 0.17 degrees C.¹⁴ A net reduction to zero of GHG emissions by the entire Organization for Economic Cooperation and Development: 0.35 degrees C.¹⁵

Assume a truly serious international effect to reduce GHG emissions: a 20 percent reduction by China, a 30 percent reduction by the rest of the industrialized world, and 20 percent by the rest of the developing world, all in addition to the U.S. reductions as envisioned in the Obama Climate Action Plan, and all by 2030. The temperature effect by 2100: a bit more than 0.5 degrees C.¹⁶ Can anyone argue that policies yielding such reductions in emissions---or ones even greater---are even remotely plausible as a political matter? The point here is that an argument to the effect that such legislation as the AIM Act satisfies a benefit/cost test as part of a larger effort even if it fails it narrowly is not correct.

The trivial effects of such policies are the central reason that the “insurance” argument for proposals to reduce GHG emissions---given the uncertainties, we should hedge against the possibility that serious climate impacts will emerge---fails analytically.¹⁷

III. Support for AIM Will Increase the Future Difficulty of Opposing Inefficient Policies

Supporters of policy proposals that implicitly adopt the assumptions of the more-alarmist view of anthropogenic climate change inexorably will be driven to oppose the expanded use of fossil fuels, a profoundly anti-human stance.¹⁸ The data show unambiguously that greater consumption of conventional energy results in reduced poverty, and reduced poverty yields an increase in the consumption of conventional energy.

Accordingly, the campaign in opposition to fossil fuels has slipped into the anti-human trap that is the hidden but essential core of modern environmentalism: Far from being a resource, ordinary people are a scourge on the planet. They prefer inexpensive energy, but the moral imperative of reduced fossil-fuel consumption is diametrically opposed, and investments in people---education, health, etc.---make matters worse by increasing human capital and wealth, and thus the demand for energy. In short, opposition to fossil fuels---its very logic---leads also disinvestment in people, in particular in a third world desperate to emerge from grinding poverty.

¹⁴ See Benjamin Zycher, *The Green New Deal: Economics and Policy Analytics*, American Enterprise Institute, April 2019, at <https://www.aei.org/wp-content/uploads/2019/04/RPT-The-Green-New-Deal-5.5x8.5-FINAL.pdf>.

¹⁵ See fn. 2 *supra*.

¹⁶ *Ibid.*

¹⁷ See Irwin Stelzer, “Asking the Right Question on Climate Change,” *The American Interest*, September 16, 2019, at <https://www.the-american-interest.com/2019/09/16/asking-the-right-question-on-climate-change/>; and Benjamin Zycher, “Has Irwin Stelzer Asked the Right Question on Climate Change?” *aei.org*, October 1, 2019, at <https://www.aei.org/articles/has-irwin-stelzer-asked-the-right-question-on-climate-change/>.

¹⁸ See Benjamin Zycher, *The Green New Deal: Economics and Policy Analytics*, pp. 13-29. See also Benjamin Zycher, “Springtime for the Rockefellers,” *aei.org*, March 30, 2016, at <https://www.aei.org/articles/springtime-for-the-rockefellers/>.

It is not difficult to list several low-probability catastrophes. Asteroid impacts. Mass volcanic eruptions. Powerful earthquakes. Tsunamis. Mass contagion. Terrorist use of bioweaponry. Nuclear war. Gamma ray storms. Massive crop failures. Do the proponents of climate policies, whatever their effectiveness, believe that we should spend 1-2 percent of GDP as insurance against each of them?

Once opponents of alarmist policy prescriptions endorse alternative policies based upon the same assumptions, they will leave themselves with no principled approach for opposition to even the most extreme proposals.¹⁹ After all, if anthropogenic climate change is an “existential threat,” no cost of a policy proposal is too high and no benefit is too small; opponents of alarmist policies will not be able to fall back on benefit/cost arguments in favor of their proposals as a substitute for others more draconian.

IV. The Purported Employment and Other Economic Benefits of AIM/Kigali Are Illusory

Some proponents of a replacement of HFCs on climate grounds argue that there will develop a sizeable domestic and international market for new refrigerants replacing HFCs, and that the attendant economic benefits of U.S. industrial leadership in that process will prove significant.²⁰ Whatever the merits of that forecast, it raises a fundamental question: Why would such legislation as AIM be needed? If such domestic and international market opportunities emerge, no legislation would be required to induce U.S. manufacturers to make the requisite investments and marketing efforts. One could argue that reduction of GHG emissions is a classic collective good, so that legislation is needed to “jumpstart” the refrigerant substitution process. But that observation---far less obviously correct than many assume, in part because of the trivial climate impacts of such substitution---would apply only to the U.S., as such refrigerant substitution overseas would be exogenous from the perspective of domestic industries and policymakers. Accordingly, in terms of efforts to exploit a newly emerging foreign market for new refrigerants, it is, again, wholly unclear why such legislation as AIM is needed.

But the proponents of the AIM legislation and the Kigali amendment to the Montreal Protocol²¹ assert that such policies will increase manufacturing employment by

¹⁹ See Benjamin Zycher, “Once the GOP Rolls Out Climate Policies, It Endorses All the Assumptions of the Left,” *RealClearMarkets*, May 6, 2019, at https://www.realclearmarkets.com/articles/2019/05/06/once_the_gop_rolls_out_climate_policies_it_endors_es_all_the_assumptions_of_the_left_103725.html?utm_source=rcp-today&utm_medium=email&utm_campaign=mailchimp-newsletter&utm_source=RC+Markets+Today&utm_campaign=1f869f9fe1-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_1f71a1eaa2-1f869f9fe1-85044953.

²⁰ See, e.g., Inforum, *et. al.*, “Economic Impact of Kigali Ratification & Implementation,” slide presentation, May 3, 2018, at http://www.ahrinet.org/App_Content/ahri/files/RESOURCES/Kigali-Impacts-final.pdf.

²¹ On the Kigali Amendment, see the United Nations Environment Programme discussion at <https://www.unenvironment.org/news-and-stories/news/kigali-amendment-montreal-protocol-another-global-commitment-stop-climate>. On the Montreal Protocol, see the U.S. State Department discussion at <https://www.state.gov/key-topics-office-of-environmental-quality-and-transboundary-issues/the-montreal-protocol-on-substances-that-deplete-the-ozone-layer/>.

33,000, economic output by almost \$39 billion, and improve the U.S. trade balance by \$12.5 billion, all between 2016 and 2027.²²

Those assertions are deeply problematic even apart from the usual set of issues attendant upon economic forecasting. The employment assertion ignores the adverse employment effects of the higher costs of refrigeration caused by the replacement of HFCs, both in refrigeration production sectors defined broadly, and in the sectors consuming refrigeration goods and services. If the replacements for HFCs were not more expensive, one would predict that the market would shift toward them without need for legislation. The assertion about economic output similarly ignores the adverse production effects of higher costs in the pre-existing sectors producing and consuming refrigerant goods and services; and it incorporates a fundamental error (the “broken windows” fallacy) by ignoring the effect of the proposed policy in terms of destroying the economic value of part of the refrigerant-producing and -consuming capital stock. (If it were efficient to replace a significant part of that existing capital stock, the market would do so, again without a need for legislation, and the trivial effect of replacing HFCs in terms of future climate phenomena means that the collective good argument fails.)

The argument about the trade balance is fundamentally flawed, even apart, again, from the wholly-justified skepticism about economic forecasting. The “improved trade balance” argument is precisely wrong: It is imports that are the benefit of U.S. international trade, and it is exports that are the cost, in precisely the same sense that goods and services purchased by a consumer are the benefit of his/her market transactions, and the dollars spent (compensation for the labor effort expended) are the cost. Imports increase the aggregate size of the economic “pie,” that is, the availability of goods and services, while exports reduce it.

There is the further matter that the Inforum *et. al.* analysis ignores the exchange-rate effects of its exports/imports assertions. If such legislation as AIM were to “improve” the trade balance as projected by Inforum *et. al.*, then one would expect the dollar to strengthen, *ceteris paribus*, whether by an amount large or small. That would reduce exports and employment in other U.S. sectors by increasing the prices of U.S. goods and services in overseas markets, and increase imports in other U.S. sectors by reducing the prices of foreign goods and services in the U.S.

V. Congressional Approval of AIM Would Encourage More Rent-Seeking

AIM would bestow benefits upon producers of substitutes for HFCs and complementary capital and labor services, which is why we observe various lobbying efforts in favor of it. Such efforts are termed “rent-seeking” in the economic and political literature, and as a general proposition are a wasteful use of resources from the social standpoint, both narrowly and more broadly. At a narrow level, the use of resources for rent-seeking purposes is intended to obtain benefits at the expense of others, and so is a socially wasteful use of resources; and in many cases elicits “rent-defending” efforts by

²² See Inforum, *et. al.*, “Economic Impact of Kigali Ratification & Implementation.”

those who would lose on net from the policies being proposed. More broadly, the inefficient reallocation of resources resulting from successful rent-seeking efforts reduces the productive efficiency of the economy.

By approving such legislation as AIM, which would yield environmental improvement either trivial or effectively nonexistent, Congress in effect would reward rent-seeking by private parties and industries, thus encouraging additional efforts to obtain special favors from government. Any such outcome would be highly disadvantageous from the social standpoint, and thus it is strongly advisable to avoid it.

VI. Conclusions

The proposed AIM legislation should not be approved. The climate benefits of the proposed AIM legislation, even (or in particular) under mainstream scientific assumptions, would be trivial or unmeasurable. Accordingly, the mandates for refrigerant replacement specified in the proposed legislation could not satisfy any plausible benefit/cost test. This is true even if the AIM Act is viewed as part of a larger effort, whether by the U.S. or under an international agreement, to reduce emissions of greenhouse gases (GHG).

Endorsement of policy proposals that cannot satisfy a plausible benefit/cost test leaves few principles available to be invoked against such proposals as the green new deal and other “climate” proposals, all of which would have future climate effects virtually unmeasurable.

The economic benefits of the proposed legislation are illusory, driven in substantial part by confusion about the distinction between the gross and net impacts of resource reallocations driven by legislative mandates. Moreover, even if the asserted economic benefits are assumed correct, it is not at all clear why legislation is needed to obtain them; market forces would lead firms and industries to pursue them as a simple matter of profit-seeking behavior.

Endorsement of such legislative proposals as AIM would encourage future efforts by numerous interest groups to obtain economic benefits by lobbying public officials (“rent-seeking”) rather than by innovating or by finding new production efficiencies.