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Administrator Michael Regan  
U.S. Environmental Protection Agency  
1301 Constitution Avenue, NW  
Washington, DC 20004

Cc: Ms. Cindy Newberg  
Mr. Chris Grundler  
Mr. Joseph Goffman

### **Petition for Technology Transitions under AIM Act Consistent with Restoring U.S. Climate Ambition**

Dear Administrator Regan,

The Environmental Investigation Agency (EIA) and co-petitioners submit this petition on technology transitions under subsection (i) of the American Innovation and Manufacturing Act of 2020 (AIM Act). EIA is an independent campaigning organization based in Washington D.C., working worldwide to protect the global climate, forests and threatened species with intelligence. As part of our work, we have undertaken groundbreaking investigations into the illegal trade in ozone depleting substances, including uncovering widespread illegal use of CFC-11 in China in 2018, and have been closely involved in the international ozone and climate negotiations for several decades.

We request that the U.S. Environmental Protection Agency (EPA) restrict the use of hydrofluorocarbons (HFCs) in a number of stationary refrigeration and air conditioning end-uses, when exceeding certain global warming potentials (GWPs) consistent with a proposed HFC regulation recently approved by the California Air Resources Board (CARB) following a robust multi-year consultation process with industry and other stakeholders.<sup>1</sup> CARB's rulemaking sets the bar for future U.S. domestic policy on HFCs and should guide additional federal restrictions on their use.

Ambitious domestic actions to reduce HFCs and other short-lived climate pollutants is essential to the work of the Biden-Harris Administration to restore U.S. climate leadership under the Paris Agreement and Montreal Protocol. Timely and comprehensive implementation of the AIM Act is critical after years of inaction following the 2016 agreement to the Kigali Amendment. We also support immediately restoring the restrictions on the use of various HFCs that were finalized under the Significant New Alternatives Policy (SNAP) Program in 2015 and 2016 by SNAP Rules 20 & 21, particularly for other end-uses not covered by this petition. However, more ambitious, comprehensive, and cost-effective technology transition requirements are feasible given the further advancement in availability and industry acceptance of low GWP technology in recent years. Timely action to advance these technology transitions is needed to meet approaching targets for reducing HFC consumption. We urge EPA to act quickly to propose and finalize a rulemaking on technology transitions, consistent with California, that will more comprehensively address both the stationary refrigeration and air conditioning sectors, and adequately support the market in meeting the HFC phase-down under the AIM Act.

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<sup>1</sup> California Air Resources Board, Proposed Regulation Order and Related Material, posted October 20, 2020: <https://ww2.arb.ca.gov/rulemaking/2020/hfc2020>

## Background

California’s proposed HFC rulemaking addresses the two largest sectors of HFC consumption and emissions: stationary air conditioning and stationary commercial and industrial refrigeration. CARB initiated a series of stakeholder consultation workshops on proposed HFC rulemakings beginning in 2017, introducing proposals to restrict HFC refrigerant use in the major consuming and emitting sectors of stationary refrigeration and air conditioning.<sup>2</sup> These early workshops initiated discussion on the proposals to prohibit the use HFCs above 150 GWP in stationary refrigeration systems containing more than 50lbs of refrigerant, and above a GWP of 750 in residential and light commercial air conditioners. These proposed measures had been previously introduced in California’s Short-lived Climate Pollutant Reduction Strategy published in March 2017.<sup>3</sup> A number of additional workshops to discuss and refine the scope of the proposals with stakeholders were held over the next several years.

CARB released a formal proposed HFC rulemaking in October, 2020 for public notice and comment that was subsequently approved at a Board Meeting in December, 2020 and is pending final publication subject to 15-day changes. Final 15-day changes in the rulemaking are not anticipated to impact the scope of the GWP limit use restrictions or end-uses covered. Requested effective dates in this petition for the air conditioning sector reflect the most up-to-date information available to allow additional time for updates to safety standards and building codes for substitutes. Legislation has also been introduced in Washington state to replicate California’s proposed sector restrictions and GWP limits.

## Requested Use Restrictions

Subsection (i) of the AIM Act on “Technology Transitions” authorizes EPA to “restrict, fully, partially, or on a graduated schedule, the use of a regulated substance in the sector or subsector in which the regulated substance is used.” Consistent with this authority, this petition requests a rule to partially restrict using refrigerants equal to or greater than a specified GWP limit in new equipment, for the given end-uses outlined in Tables I and II. The requested prohibitions apply to using a substance in “new” equipment, which includes a replacement of an existing refrigeration or air conditioning system as defined in the CARB Proposed Regulation Order under the definitions for “New Air-conditioning Equipment”, “New Chiller”, and “New Refrigeration Equipment”.<sup>4</sup>

**Table I: Requested Restrictions in the Air Conditioning Sector**

End-Use/Subsector	New/Retrofit	GWP Limit	Effective Date
Residential and Non-residential	New	750 or greater	January 1, 2025
Variable Refrigerant Flow (VRF)	New	750 or greater	January 1, 2026
Chillers	New	750 or greater	January 1, 2024

**Table II: Requested Restrictions in the Refrigeration Sector**

End-Use/Subsector	New/Retrofit	GWP Limit	Effective Date
Supermarket Systems (>50lbs)	New	150 or greater	January 1, 2023, or one year following

<sup>2</sup> California Air Resources Board, HFC Reduction Measures: Meetings & Workshops: <https://ww2.arb.ca.gov/our-work/programs/hfc-reduction-measures/meetings-workshops>

<sup>3</sup> California Air Resources Board, Final Short-Lived Climate Pollutant Reduction Strategy (March 2017)

<sup>4</sup> For refrigeration equipment, CARB’s rulemaking distinguishes between New Facilities and Existing Facilities, however, the definition of a “New Facility” includes existing facilities with a replacement of 75% or more of evaporators and 100% of compressor racks and condensers. A replacement in Industrial Process Refrigeration that does not meet the full replacement criteria for an existing facility are subject to a 2,200 GWP. Ice rinks are excluded from the part c) of definition of “New Facility” and all replacements in existing facilities are subject to a 750 GWP. For further information see CARB Proposed Rulemaking Order, October 2020.

			finalization of rulemaking
Cold Storage Warehouses	New	150 or greater	January 1, 2023, or one year following finalization of rulemaking
Industrial Process Refrigeration (excluding Chillers)	New	150 or greater	January 1, 2023, or one year following finalization of rulemaking
Other stationary refrigeration equipment (>50 lbs)	New	150 or greater	January 1, 2023, or one year following finalization of rulemaking
Ice Rinks	New	150 or greater for a new or repurposed facility, 750 or greater for an existing facility	January 1, 2024
Chillers for Industrial Process Refrigeration (minimum evaporator temp designed for >35F)*	New	750 or greater	January 1, 2024
Chillers for Industrial Process Refrigeration (minimum evaporator temp designed for -10 to 35F)*	New	1,500 or greater	January 1, 2024
Chillers for Industrial Process Refrigeration (minimum evaporator temp designed for -58 to -10 or greater than 58F)*	New	2,200 or greater	January 1, 2024

\*Note: For Chillers in Industrial Process Refrigeration, EPA may wish to consider additional stakeholder input regarding widespread availability substitutes with a GWP less than 150.

We request to partially restrict use in the end-uses outlined above for new equipment; however, additional future restrictions on use of a regulated substance under the AIM Act in a given end-use could also include which substances may be used in retrofits of existing equipment, or requiring the use of reclaimed rather than newly produced refrigerants in new equipment or to service or maintain existing equipment. While not within the requests made by this petition, these options should be explored by EPA in future rulemakings.

### Factors for Determination

In carrying out a rulemaking or making a determination to grant or deny a petition under subsection (i), the AIM Act requires EPA consider, to the extent practicable, the following factors:

- (A) the best available data;
- (B) the availability of substitutes for use of the regulated substance that is the subject of the rulemaking or petition, as applicable, in a sector or subsector, taking into account technological achievability, commercial demands, affordability for residential and small business consumers, safety, consumer costs, building codes, appliance efficiency standards, contractor training costs, and other relevant factors, including the quantities of regulated substances available from reclaiming, prior production, or prior import;
- (C) overall economic costs and environmental impacts, as compared to historical trends; and
- (D) the remaining phase-down period for regulated substances under the final rule issued under subsection (e)(3), if applicable.

The information gathered during the multi-year rulemaking process in California represents some of the best available data on the various factors for determination. Various documents produced in the CARB HFC rulemaking contain ample data on availability of substitutes, technological feasibility, buildings codes, and costs. These available resources include CARB's Initial Statement of Reasons and the Standardized Regulatory Impact Assessment.<sup>5</sup> The expected cumulative climate benefits<sup>6</sup> of the proposed regulation substantially exceed total estimated direct costs.<sup>7</sup> Costs for the refrigeration sector through 2040 were estimated to be considerably less than for the air conditioning sector.

Further information relevant to these factors is provided for each subsector below.

#### *Residential and Non-residential Air Conditioning and Chillers for Air Conditioning*

The transition to air conditioning technologies under a 750 GWP is already underway in other countries globally including Australia, Japan, European Union, and UK. Safety standards and model codes under UL 60335-2-40 and ASHRAE 15 have been updated to allow for a transition to lower-GWP HFCs and HFC blends categorized as A2L. Further updates are needed to adopt revised standards to enable more widespread safe use of near-zero GWP refrigerants including hydrocarbons which are categorized as A3. A letter from the Air-Conditioning Heating and Refrigeration Institute (AHRI) and the Natural Resources Defense Council (NRDC) that included support from a number of major equipment manufacturers was submitted to CARB in 2018 requesting the 750 GWP limit. Industry studies suggest that costs to consumers of such a transition will be minimal.<sup>8</sup>

#### *Supermarket Systems*

Large central refrigeration systems used in supermarkets that contain more than 50lbs of refrigerant are a low-hanging fruit for transitioning to low GWP substitutes and highly impactful in terms of reducing HFC use and emissions due to their large charge sizes and high leak rates. As these types of systems have particularly long lifetimes and substitute technologies are readily available, it is important to ensure this transition begins early in the phase-down period.

The transition to under 150 GWP technologies in new supermarket systems is well underway in North America, and even further along elsewhere around the world, including in Europe, Japan, Australia, and South Africa. Multiple substitute options exist for centralized direct and indirect supermarket refrigeration systems under a 150 GWP utilizing carbon dioxide, hydrocarbons, and ammonia.<sup>9</sup> Additional technology options are also increasingly available to replace centralized refrigeration with distributed systems that utilize hydrocarbons or other low GWP refrigerants in self-contained equipment. There are now more than 600 supermarkets in the U.S. using transcritical CO<sub>2</sub> systems, and more than thirty thousand across the world.<sup>10</sup> A requirement to transition to under 150 GWP refrigerants for these systems in the European Union has contributed to a widespread adoption of low-GWP technology across the region, which could be similarly encouraged by such a requirement here in the United States.

This petition does not cover smaller light commercial refrigeration systems such as condensing units and other remote systems containing less than 50lbs of refrigerant. Following adoption of revised UL 60335-

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<sup>5</sup> CARB Initial Statement of Reasons (ISOR) and Standardized Regulatory Impact Assessments available at:

<https://ww2.arb.ca.gov/rulemaking/2020/hfc2020>

<sup>6</sup> Ibid, p32.

<sup>7</sup> Ibid, sum of total annual direct costs at a 2.5 and 3% discount rate in Table35, at p73.

<sup>8</sup> JMS Consulting and Inforum, Consumer Cost Impact of U.S. Ratification of the Kigali Amendment

<sup>9</sup> See North American Sustainable Refrigeration Council, Natural Refrigerant Technology Library, at

<https://nasrc.org/nat-ref-tech-lib>

<sup>10</sup> Shecco, Accelerate, Food Retail Best Practices, 2020. <https://accelerate24.news/magazines/food-retail-best-practices/>

2-89 charge limits for flammable refrigerants and corresponding anticipated building code updates, it is anticipated the range of under 150 GWP technologies available will continue to expand for central supermarket systems in addition to light commercial refrigeration equipment under 50lbs, which should be covered under a future regulation.

#### *Cold Storage Warehouses and Industrial Process Refrigeration (except Chillers)*

Use of under 150 GWP substitutes including ammonia for industrial process refrigeration (IPR) and cold storage warehouses has been widespread for more than a century, in the U.S. and around the world. Ammonia is estimated to have a market share of between 90 to 95% of the sector in Australia<sup>11</sup> and according to the International Institute of Refrigeration, is commonly used particularly in larger plants.<sup>12</sup> The industrial refrigeration sector is very familiar with ammonia, with robust standards, codes, and safety training available to the market, including through the International Institute for Ammonia Refrigeration (IIAR)<sup>13</sup> and the American Society of Mechanical Engineers. ANSI/IIAR Standard 2 published by the IIAR is designed to serve as a guide to the design, manufacture, installation and use of ammonia mechanical refrigeration systems. This standard requires robust safety measures, machine room requirements including sensors and ventilation requirements. There has been increasing interest in CO<sub>2</sub> indirect systems for IPR and cold storage applications as well, which offers another option for managing safety and maintenance of systems using under 150 GWP substitutes.

#### *Chillers for Industrial Process Refrigeration*

CARB's Refrigerant Management Program data show that more than 50% of registered IPR facilities using HFCs utilize chillers. These systems are treated separately under the CARB regulation and this petition, allowing for a greater range of substitutes for chillers designed to meet certain minimum temperature requirements.

#### *Ice Rinks*

A majority of ice rinks utilize indirect system with refrigerant confined to a chiller and a secondary fluid such as a brine or glycol piped under the ice. Similar to many industrial refrigeration applications, ammonia has been widely used in chillers for ice rinks for many decades due to its energy efficiency and high performance in cooling. In California, more than 80% of known California ice rinks use ammonia. According to industry data provided to EIA, a majority of National Hockey League (NHL) ice arenas also employ ammonia. Similar to other applications using ammonia chillers, the ice rink sector has safely managed the risks associated with ammonia toxicity for decades, with the systems confined to machine rooms or outdoors. CO<sub>2</sub> has also become an increasingly popular substitute option for ice rinks and over the past 10 years over 75 CO<sub>2</sub> ice rink systems have been installed in North America. Under 150 GWP HFO-based refrigerants have also been identified as potential options to be used in future. Options under 750 GWP that utilize HFC-HFO blends will remain available for existing ice rinks, primarily to allow sufficient options for existing facilities such as the minority utilizing a direct expansion system with refrigerant piped under the ice sheet.

#### **Negotiated Rulemaking**

The AIM Act requires that all petitioners for technology transitions request a negotiated rulemaking. However, in keeping with the AIM Act's other provisions, we recognize EPA must make its own determination whether a negotiated rulemaking is appropriate. It is our position that a negotiated rulemaking is not needed to undertake the actions proposed in this petition given the extensive

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<sup>11</sup><https://www.ammonia21.com/articles/4462/b-ammonia-systems-with-up-to-95-market-share-in-cold-storage-and-food-manufacturing-cold-hard-facts-report-2-b>

<sup>12</sup> IIR and UNEP, <http://www.foodcoldchain.org/wp-content/uploads/2019/03/Cold-Storage-and-Refrigerated-Warehouse.pdf>

<sup>13</sup> See IIAR, Education and Standards, [https://www.iiar.org/iiar/Education/IIAR\\_Education.aspx](https://www.iiar.org/iiar/Education/IIAR_Education.aspx)

stakeholder consultation that has already been carried out during the CARB regulatory proposal process, and the additional stakeholder consultation and public comment opportunities available under a standard EPA rulemaking process.

Thank you for your consideration of our petition to enact technology transitions consistent with restoring US climate ambition and meeting the goals of the HFC phase-down under the AIM Act. We would be happy to provide any further information required to consider this petition and the requested rulemaking. Please contact Christina Starr at [cstarr@eia-global.org](mailto:cstarr@eia-global.org) for any further communication in this regard.

Sincerely,



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