



Center for Energy Efficiency & Sustainability  
800-A Beaty Street  
Davidson, NC 28036  
Tel (980) 228-1532  
[Helen.walter-terrioni@tranetechnologies.com](mailto:Helen.walter-terrioni@tranetechnologies.com)

August 29, 2023

Washington Department of Ecology  
300 Desmond Drive SE  
Lacey, WA 98503  
(Submitted via [web portal](#))

Re: Response to Proposed Changes to Chapter 173-443 WAC, Hydrofluorocarbons (HFCs)

We appreciate the opportunity to provide the following comments to provide input on the Washington State Department of Ecology (Ecology) Proposed Changes to Chapter 173-443 WAC, Hydrofluorocarbons (HFCs).

Trane Technologies (Trane) is a climate company with well-known brands such as Trane and Thermo King, which are global leaders in stationary and transport air conditioning and refrigeration products, as well as industrial process refrigeration with respect to life sciences. Trane Technologies is well known for its global leadership in transitioning away from today's high global warming potential (GWP) refrigerants. Trane began transitioning its global high-performance chiller portfolio in 2015 and Thermo King began transitioning its EU transport refrigeration products in 2014, long before regulations began taking shape. Trane Technologies has committed to reducing our customer's emissions by one gigaton (1 billion metric tonnes) CO<sub>2</sub>e between 2020 and 2030.

### **The Certainty of the Federal Transition**

By statute, the U.S. Environmental Protection Agency (EPA) has phased down the supply of hydrofluorocarbons<sup>1</sup> (HFCs) as mandated by the American Innovation and Manufacturing (AIM) Act. The Senate also ratified the Kigali Amendment, which mandates the same reductions in supply as the AIM Act. The United States government submitted its instrument of ratification to the United Nations in October 2022. Finally, EPA is about to complete a demand-side regulation (the Technology Transition (TT) rule by October 8, 2023, which will mandate national global warming potential (GWP) limits or refrigerant bans for various products using hydrofluorocarbons (HFCs).

The Climate Alliance was created in 2017 when the U.S. announced that it would withdraw from the Paris Agreement on climate mitigation<sup>2</sup>. As a backstop, governors committed to the Paris Agreement goals. Unfortunately, the Paris Agreement is a non-binding treaty allowing for the

---

<sup>1</sup> The demand phase-down will reduce the supply of the equivalent of more than 5 billion tonnes of carbon dioxide (CO<sub>2</sub>) by 2050, according to EPA.

<sup>2</sup> Trane Technologies actively supports the Paris Climate Agreement and its policies, including by making its own science-based targets (SBTs) and reporting its progress annually, with third-party verification through CDP.

United States to join and withdraw with a mere presidential signature, unlike binding treaties, such as the Montreal Protocol, which require Senate action to change the party status of the U.S.

Trane Technologies and other companies have confidence in the certainty of three federal policies. Companies are finishing their preparations for the HFC phase-down as quickly as possible to have compliant products available by the likely January 1, 2025 deadline for air conditioning, heat pumps, chillers and other products and January 1, 2026, as the likely deadline for commercial refrigeration equipment.

Trane Technologies appreciates the diligent work of the Washington State legislature and Department of Ecology to ensure certainty in the HFC transition and to create a backstop to federal policies, such as the Significant New Alternatives Policy (SNAP) rules 20 and 21, which were disrupted in court.<sup>3</sup> Trane Technologies also appreciates the effort that Ecology has made to follow their statutory guidance in setting GWP limits and timeframes to ensure replacement refrigerants are enabled in the state building codes prior to effective implementation.

In the final rule, Ecology may wish to note that this regulation is a backstop to the federal transition, which is now more certain with ratification of the binding Kigali Amendment, the AIM Act statute, and the AIM Act Allocation Rules. Ecology could also allow that provisions that mirror the federal government's HFC transitions require no additional administrative actions (e.g., labeling, reporting etc.) by the regulated community or state enforcement, unless applicable federal policies are made less stringent than those in Washington State for a particular product (including equipment).

### **Demand-side Policy Environmental Benefit**

The supply-side phase-down mandated by the Kigali Amendment and the AIM Act will reduce the supply of HFCs by more than 5 billion tonnes by 2050, given the national baseline of the equivalent (eq) of 300 million tonnes (T) of CO<sub>2</sub> and the phase-down schedule. Globally, it has been estimated that the Kigali Amendment phase-down could reduce temperature rise by 1/3 to 1/2 degree. Chemical producers and importers will reduce their production and import according to their allocations to meet this mandate.

Although demand-side policies are not necessary to achieve this important climate objective, they are helpful for the OEMs that make products that use HFCs. Instead of the disorderly, unpredictable transitions of other countries, U.S. companies and end-users will have clear deadlines to transition equipment and other products to use new refrigerants and other HFC-replacements, e.g., allowing the scheduling of investments, design and testing of new equipment etc.

---

<sup>3</sup> Fortunately, the court challenge to the AIM Act allocation framework failed, leaving the AIM Act stronger and the allocation rule indisputable.

Supply-side policy meets the environmental mandate, while the demand-side policies help companies organize their businesses for the transition. The environmental benefit would be achieved with no demand-side policies, but they are helpful to ensure an orderly transition.

### **Supporting Global Warming Potential (GWP) Limits**

Trane Technologies and other stakeholders, including environmental non-governmental organizations (E-NGOs), distributors, retailers, other original equipment manufacturers (OEMs), and state members of the Climate Alliance worked very closely together to develop petitions for the EPA to initiate the TT rulemaking process, and to request specific GWP limits. The same group assembled to develop comments to the EPA working very carefully to determine implementable regulations to maximize demand reductions.

Trane Technologies requests that Ecology harmonize mandates with the U.S. Environmental Protection Agency (EPA) Technology Transition rule. Preparations have been underway for years to achieve those commitments and the time is too short and resources too limited, including at the Nationally Recognized Testing Laboratories (NRTLs), to commercialize equipment design in this timeframe. We note that there is no negative environmental impact, given the supply-side phase-down mandates, and any HFC saved in a single state will still be available for use in another state, creating no benefit to the environment.

### **Trane Technologies supports the EPA AIM Act proposed 700 GWP limit for compliance dates related to “New Air Conditioning Equipment” and chillers on January 1, 2025, and for Variable Refrigerant Flow (VRF) equipment on January 1, 2026.**

“New Air Conditioning Equipment” should be defined aligned with EPA and California as any air-conditioning equipment or system that is one of the following: (1) First installed using new components, used components, or a combination of new and used components; (2) An existing system with a single condenser and single evaporator that has a new exterior condenser, condensing unit, or remote condensing unit; or (3) An existing system having more than one condenser and/or more than one evaporator that is modified such that the system has undergone cumulative replacements, within any three-year time period, of 75 percent or more of its indoor evaporator units (by number) and 100 percent of its air source or water source condensing units.

It would be helpful for Ecology to clarify the category of Commercial Unitary AC (CUAC), commercial unitary heat pumps (CUHPs) equipment (with capacities above 65,000 BTUs). Many direct cooling applications use R410A today and therefore need a 700GWP limit and associated high pressure substitutes (R454B, R32) enabled in the building codes for this transition to lower GWP refrigerants.

Currently, the EPA SNAP program website describes “Air-conditioning (AC) Equipment” or “Air conditioning System” as equipment that cools, heats or dehumidifies spaces in residential or non-residential settings for comfort cooling and other purposes, including, but not limited to, room air conditioning such as window units, packaged terminal air conditioners (PTACs), packaged terminal heat pumps (PTHPs), residential dehumidifiers, and portable air conditioners; ducted

central air conditioners and heat pumps; non-ducted air conditioners and heat pumps (both mini- and multi-splits); packaged rooftop units; water-source and ground-source heat pumps; and other dehumidifiers. “Air-conditioning equipment” also includes computer room and data center cooling and remote condensing units for comfort cooling applications. Chillers are defined separately from “air-conditioning equipment.” “Air conditioning equipment” refers to stationary air-conditioning equipment and does not include mobile air-conditioning equipment, including that used in vehicles, rail and trains, buses, aircraft, watercraft, recreational vehicles, recreational trailers, and campers.

The EPA definitions are unclear with their reference to “light” commercial equipment. Ecology, and EPA, could include all commercial air conditioning (AC) and heat pumps (HPs) in this definition given their duplicative designs, standards, and uses of unitary equipment. Commercial Unitary (CU) AC and HP could be included in this category to help achieve a uniform equipment transition. However, CUAC and CUHP equipment should be allowed replacement of compressors as this larger equipment is often built into building design and must have multiple compressor replacements during its lifetime.

At very least, air handlers and other components should be allowed to be replaced that are part of a data center or computer room, as defined below, or a commercial system with 62.5 tons capacity or more. These systems are oftentimes integrated into the structure of the building creating significant cost for building owners. The condenser or condensing unit is often housed outside and needs to be replaced several times during its lifetime. It would be cost-prohibitive to replace the indoor units with A2L compatible units instead of allowing for maintenance and repair.

For VRF, EPA proposed requirements for residential and light commercial, VRF equipment refer to “a period of ordinary utilization or operation of the product by an ultimate consumer.” The utilization of this additional text does not allow the specificity required to understand the servicing capabilities for VRF equipment for the consumer. When CARB completed its rule to phase down high GWP equipment, a specific tandem service capability for VRF equipment was included. This high-efficiency equipment requires a unique installation which precludes a customer from easily being able to switch from one refrigerant to another. These systems will not utilize drop-in and place refrigerant lines throughout a building. The environmentally friendly equipment requires a substantial investment for the installation of the ultimate consumer.

In the CARB requirements, up to 75% of indoor units and 100% of outdoor units can be replaced in case of significant servicing needs and for warranty purposes. AHRI requests EPA clarify the statement referencing the capability to ensure a period of ordinary utilization of a customer matches CARB requirements for harmonization and to ensure consumers who invested in high-efficiency solutions are able to service them.

**EPA asked for input on four GWP limits in the TT rulemaking (i.e., 0 GWP, 150 GWP, 300 GWP, and 700 GWP).**

“Zero” GWP should not be used as a limit for any class of product, in case current or planned alternatives are added to the list of controlled substances, including hydrocarbons. The other values (150 GWP, 300 GWP, and 700 GWP) to categorize GWP limits are reasonable, given currently available alternatives.

**Trane Technologies<sup>4</sup> continues to support the EPA proposal to limit GWP to 700 for chillers.** Trane Technologies supports EPA’s proposal to restrict the use of HFCs and blends containing HFCs that have a GWP of 700 or greater for new equipment beginning January 1, 2025, excluding equipment where the temperature of the chilled fluid leaving the equipment (i.e., the supply temperature to the facility) is less than –58 °F (-50 °C), for ultra-low temperature equipment due to continued challenges in identifying low GWP alternatives with sufficient efficacy.

Medical, scientific, laboratory, and research applications should also be exempted from any specific requirements related to this regulation, as they may require unique conditions and refrigerants to meet them in very small volumes. Innovation should not be stymied by limiting the ability to develop or research of new products or to protect medicines and vaccines. Equipment used for this purpose is well maintained with very low leak rates and refrigerant is responsibly collected at end-of-life.

Trane Technologies asks that the Ecology limit the GWP for ice skating rinks to 700 GWP as chillers are used interchangeably for ice skating rinks and other uses. GWP limits for chillers and other equipment should also apply to data centers and computer rooms uniformly to avoid confusion. Creating a specialized product class for these products would result in additional costs and delays during times of stress in the supply chain. Chillers and other large commercial equipment are well maintained with very low leak rates and refrigerant is responsibly collected at end-of-life.

**Trane Technologies recommends an approach similar to that used in the first Ecology HFC rules which banned specific refrigerants from use for industrial process refrigeration equipment and transport refrigeration.**

Manufacturers and end-users asked EPA to prohibit the following refrigerants in new IPR Equipment with a transition date of January 1, 2026.

- Industrial Process Refrigeration equipment (new) designed for chilled fluid leaving the equipment at temperatures  $\leq +35$  °F (2 °C) and  $> -10$  °F (-23 °C) ban the use of the following refrigerants: R-404A, R-507, R-507A, R-428A, R-422C, R434A, R-421B, R-408A, R-422A, R-407B, R402A, R-422D, R-421A, R-125/ R-290/R134a/R-600a (55/1/42.5/1.5), R-422B, R-424A, R-402B, GHG-X5, R-417A, R-438A, R-410B

---

<sup>4</sup> The long-term environmental benefit of the AIM Act is from the phase-down of the supply of HFCs. No technology will impact that benefit, and the HFC price increases and lack of availability of refrigerants will provide a market force to transition to lower GWP where possible, as the designed construct of the AIM Act. Technology transitions are meant to organize the transition for industry.

- Industrial Process Refrigeration equipment (new) designed for chilled fluid leaving the equipment at temperatures  $\leq -10$  °F (-23 °C) and  $> -58$  °F (-50 °C) ban the use of the following refrigerants after =: R-404A, R-507, R-507A, R-428A, R-422C, R-434A, R-421B, R-408A, R-422A, R-407B, R-402A, R-422D, R-421A, R-125/ R-290/R134a/R-600a (55/1/42.5/1.5), R-422B, R-424A, R-402B, GHG-X5, R-417A, R-438A, R-410B

Manufacturers and end-users of equipment for dairy farms asked EPA to ban the following refrigerants for use in dairy farm IPR applications as of January 1, 2025.

- Industrial Process Refrigeration equipment (new) designed for chilled fluid leaving the equipment at temperatures  $\leq +35$  °F (2 °C) and  $> -10$  °F (-23 °C) ban the use of the following refrigerants after January 1, 2025: R-404A, R-507, R-507A, R-428A, R-422C, R-434A, R-421B, R-408A, R-422A, R-407B, R-402A, R-422D, R-421A, R-125/ R-290/R134a/R-600a (55/1/42.5/1.5), R-422B, R-424A, R-402B, GHG-X5, R-417A, R-438A, R-410B

Manufacturers and end-users of equipment for transport refrigeration asked EPA to ban the following refrigerants for as of January 1, 2025.

- Proposed refrigerant bans for refrigerated transport: truck, trailer, aircraft, and rail follow, as A1 refrigerants are required for this category. R-404A, R-507, R-507A, R-428A, R-422C, R-434A, R-421B, R-408A, R-422A, R-407B, R-402A, R-422D, R-421A, R-125/R290/R134a/R-600a (55/1/42.5/1.5), R-422B, R-424A, R-402B, GHG-X5, R-417A, R-438A, and R-410B.

Trane Technologies asks that a distinct category and definition for “Stand-alone Transport Refrigeration” for stand-alone equipment that must be operational during transport (i.e., food storage on aircrafts, shipping medicines etc.). The ASHRAE classification A1 refrigerants are required for this category. The following refrigerants could be banned for “Stand-alone Transport Refrigeration” equipment.

- R-404A, R-507, R-507A, R-428A, R-422C, R-434A, R-421B, R-408A, R-422A, R-407B, R-402A, R-422D, R-421A, R-125/R-290/R134a/R-600a (55/1/42.5/1.5), R-422B, R-424A, R-402B, GHG-X5, R-417A, R-438A, R-134a, and R-410B

Harmonization is needed as shipping containers can be used for multiple modes of transportation (intermodal) both nationally and internationally. ASHRAE class A1 refrigerants must be available for transport refrigeration equipment, and R-452A must be allowed for use to prepare for this transition, especially for frozen cargo for marine containers. The listed banned refrigerants proposed could be reasonable provided R-452A is listed as approved well before the transition, so that OEMs can receive other approvals for use.

Refrigerated containers, shipped by any means, that are imported into the U.S. and intended for export, passing through the US should continue to be allowed to be serviced with existing, in-kind refrigerants, as it is unlikely that the thousands of refrigerated containers shipped around the world will transition in conformance with this timeframe globally.

Containers shipped internationally are used for essential uses (i.e. transportation of food and medicines), so there are no regulations at this time, and national regulations apply only to domestic containers which are imported by customs law. There are forecasted to be approximately 2 million intermodal refrigerated containers in service in every part of the world in 2025. Any of these containers could be used to import refrigerated products into the U.S. It is not feasible for the entire refrigerated transport industry to preemptively transition refrigerants in anticipation of a U.S. mandate. Most of the parties to the Montreal Protocol where refrigerated containers are manufactured have ratified the Kigali Amendment to phase down the supply of HFCs which means that there will be local mandates to transition to lower GWP refrigerants without further action in the U.S. Any other construct could result in perishable goods being held at customs while finding an alternate container to ship goods locally.

**Trane Technologies continues to support EPAs proposed 150 GWP limit starting January 1, 2025, for foams provided there is a caveat or enforcement discretion in the event of supply shortages.**

Enforcement discretion or some other mechanism should be incorporated into the regulation in the event of supply shortages that occurred over the past five years, for low GWP foam blowing agents and refrigerants. Foams are used as insulation in refrigeration and other equipment. Recent shortages extended to non-fluorinated refrigerants such as carbon dioxide and hydrocarbons of sufficient quality for use as a refrigerant.

We appreciate the opportunity to provide these comments. Please contact me with any questions.

Sincerely,

*Helen Walter-Terrinoni*

Helen Walter-Terrinoni  
Director – Global Policy and Advocacy  
Trane Technologies