



Lisa A. Vest, Hearing Officer
Office of the Secretary, Department of Natural Resources and Environmental Control
89 Kings Highway, Dover, DE 19901
RE: Support for Delaware Action to Phase Down High-GWP HFCs

May 6, 2020

Dear Ms. Vest,

The Institute for Governance and Sustainable Development (IGSD) is a not-for-profit organization promoting just and sustainable societies with an international reputation for excellence on the topic of the Montreal Protocol, short-lived climate pollutants, and the accelerated phase-down of super pollutant hydrofluorocarbons (HFCs).ⁱ We are writing today to congratulate you on your important work on the proposed new regulation, 7 DE Admin. Code 1151 “Prohibitions on Use of Certain Hydrofluorocarbons in Specific End-Uses”. This plan reinforces Delaware’s reputation as a leader on cost-effective, common-sense strategies to preserve our climate.

The Montreal Protocol is widely considered one of the world’s most successful multilateral environmental agreements, having phased out 97% of almost 100 ozone-depleting substances (ODSs) – placing the ozone layer on the path to recovery. Because many ODSs are also potent greenhouse gases, their phaseout under the Montreal Protocol provided an often overlooked bonus for climate mitigation: Phasing out these 100 chemicals also has provided powerful climate protection, avoiding the equivalent of an estimated 9.5 billion tonnes of CO₂ emissions per year – approximately five times more than the emissions reductions of the Kyoto Protocol’s first commitment period (2008-2012).ⁱⁱ With earlier voluntary actions and national and regional regulations, the Montreal Protocol effort to phase out of ODS has solved an amount of the climate problem that otherwise would have equaled the contribution from carbon dioxide, which is responsible for 55 to 60% of today’s warming.ⁱⁱⁱ The climate protection legacy of the Montreal Protocol continues: The legally-binding 2016 Kigali Amendment to the Protocol phasing down HFCs has the potential to avoid up to 0.5 Celsius of warming by the end of the century.¹ The initial phasedown schedule of the Kigali Amendment ensures about 90 percent of this will be captured.^{iv} Achieving those ambitious savings targets depends on robust and supportive policies—such as the HFC phase-down rules Delaware is contemplating today—that reward manufacturers and end-users for making choices that improve products’ life-cycle climate performance, taking into account not only direct emissions (refrigerant and foam insulation GWP), but indirect emissions (energy efficiency) as well.

We urge you to take fast action to reduce the threat posed by high global warming potential (GWP) HFCs. Actions taken in the next decade and a half are of paramount importance; scientists observe that we are dangerously close to triggering climate tipping points, after which feedback loops may

¹ Improved energy efficiency of refrigeration and air conditioning equipment, collection and destruction of banks of HFC or HCFCs in aging equipment at the end of its useful life, and elimination of HFC-23 byproducts by phasing out HCFC production will provide even greater climate benefits.

accelerate the worst impacts of climate change. Reducing the use and emissions of short-lived climate pollutants, and in particular potent HFCs, offer some of humanity's best hope for avoiding dangerous climate tipping points.^v This is because many HFCs have high global warming potentials and short atmospheric life: if released to the atmosphere, HFC warming impacts will be concentrated in the decade or two after their release. For example, HFC-134a, the refrigerant that until recently was most commonly used in automotive air conditioners and domestic refrigerators, has an atmospheric life of just 13.4 years and a 20-year global warming potential (GWP) of 3,710.^{vi} Fast action to reduce high GWP chemicals is a potent tool to mitigate climate change in the near term, when action is most needed.

Even greater savings can be achieved through simultaneous investments in energy efficiency. The legally-binding 2016 Kigali Amendment to the Montreal Protocol phasing down HFCs could prevent 0.5 degrees Celsius of global warming by the end of this century, and nearly double those benefits if energy efficiency is also prioritized.^{vii} In many product categories, it is possible to simultaneously improve product energy efficiency while phasing down the use of high GWP greenhouse gasses. The phaseout of CFCs under the Montreal Protocol, which began in the mid-1980s, coincided with and in many cases directly catalyzed substantial improvements in energy efficiency—up to 60% in some subsectors. These efficiency improvements were the result of end-users replacing old products and equipment with a new higher efficiency machines and manufacturer innovation: When refrigeration and air conditioning manufacturers redesigned their systems to be CFC-free, many took the opportunity to improve the efficiency of their designs as well. Similar gains can be observed with the HFC phase-down: For example, 55 out of the 96 refrigerators that earned the 2018 ENERGY STAR Most Efficient designation use low-GWP refrigerants. Not only are these refrigerators the most energy efficient on the market, but by selecting R600a (GWP=3) over the baseline refrigerant R134a (GWP=1300), manufacturers reduced the refrigerants' global warming impact by over 99%. U.S. prices for a medium-sized refrigerator using low a GWP refrigerant start in the affordable \$250-\$300 range, and super efficient low-GWP refrigerators are offered by over a dozen different brands. See appendix A for details.

Other states proposing HFC phase-downs have seen strong support from impacted industries. For example, on September 14, 2018, the Air-Conditioning, Heating and Refrigeration Institute (AHRI – 300+ member companies), was joined by the United States' major heating and cooling equipment manufacturers Carrier corporation, Daikin, Goodman, Lennox, Nortek, and Trane; chemical manufacturers Honeywell and Chemours; and the Natural Resources Defense Council to tell California Air Resources Board (CARB) Chair Mary Nichols that they support state action to limit the use of HFCs in air conditioning technologies and request, among other things, that states “Support proper installation, commissioning, maintenance, and servicing of HVACR systems to reduce refrigerant leaks and maintain energy efficiency, consistent with ACCA QI standards and original equipment manufacturer instructions.” In addition, the US Chamber of Commerce has been supportive of HFC phase-down arguing that “The Kigali Amendment is a Win for the Environment and the US Economy.”^{viii}

Delaware's HFC phase-down will provide market assurance and a clear timetable to manufacturers in the absence of certainty over US policy and the future of the Federal Significant New Alternatives

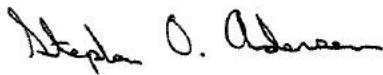
Policy (SNAP) program. Delaware's regulations will help ensure that companies that have already invested millions of dollars in research and development will be appropriately rewarded, and will help ensure that US companies remain competitive with international manufacturers and suppliers, both in the domestic and international market, as countries around the world fulfil their obligations under the 2015 Paris Climate agreement and 2016 Kigali Amendment to the Montreal Protocol.^{ix}

Thank you for your leadership on this issue.

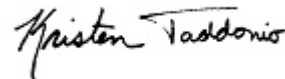
Sincerely,



Durwood Zaelke
President
Institute for Governance & Sustainable Development (IGSD)



Dr. Stephen O. Andersen
Director of Research
IGSD



Kristen N. Taddonio
Sr. Climate & Energy Advisor
IGSD

NOTES & REFERENCES

ⁱ See: <http://www.igsd.org/initiatives/hfcs/>

ⁱⁱ See: <http://www.igsd.org/initiatives/montrealprotocol/>

ⁱⁱⁱ Guus J. M. Velders, Stephen O. Andersen, John S. Daniel, David W. Fahey, & McFarland M. (2007) The importance of the Montreal Protocol in protecting climate, PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 104:4814-4819.

^{iv} Dreyfus, G., Borgford-Parnell, N., Christensen, J., Fahey, D.W., Motherway, B., Peters, T., Piccolotti, R., Shah, N., and Xu, Y. (2020) *Assessment of development and climate benefits of efficient and climate-friendly cooling*. Molina, M., and Zaelke, D., Steering Committee co-chairs. United Nations Environment Programme and International Energy Agency, Paris. Relevant quotation: “The Montreal Protocol’s latest control measure is the 2016 Kigali Amendment to phase down hydrofluorocarbons, or HFCs, primarily used as refrigerants. While HFCs do not affect the ozone layer, they are potent greenhouse gases and phasing them down has the potential to avoid up to 0.5 Celsius of warming by the end of the century. The initial phasedown schedule of the Kigali Amendment ensures about 90 percent of this will be captured. Just minutes after the Kigali Amendment was agreed, the Parties to the Montreal Protocol passed the first of a series of decisions to improve the energy efficiency of cooling equipment, in parallel with the switch from HFCs to climate-friendly refrigerants. Improving the efficiency of cooling equipment has the potential to more than double the climate benefits of the Kigali Amendment, with the combined potential to avoid the equivalent of up to 260 billion tons of carbon dioxide by 2050. This will save nearly \$3 trillion dollars in energy generation and transmission costs, in addition to reducing consumers monthly electricity bills, while also protecting public health and agricultural productivity by reducing air pollution.”

^v See: <http://www.igsd.org/wp-content/uploads/2017/09/Well-Under-2-Degrees-Celsius-Report-2017.pdf>

^{vi} GWP source: https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf

^{vii} See: <http://www.igsd.org/montreal-protocol-aims-high-in-quito-to-avoid-1o-c-of-future-warming/>

^{viii} On September 14, 2018, the Air-Conditioning, Heating and Refrigeration Institute (AHRI – 300+ member companies), was joined by the United States’ major heating and cooling equipment manufacturers Carrier corporation, Daikin, Goodman, Lennox, Nortek, and Trane; chemical manufacturers Honeywell and Chemours; and the Natural Resources Defense Council to tell California Air Resources Board (CARB) Chair Mary Nichols that they support state action to limit the use of HFCs in air conditioning technologies and request, among other things, that California “Support proper installation, commissioning, maintenance, and servicing of HVACR systems to reduce refrigerant leaks and maintain energy efficiency, consistent with ACCA QI standards and OEM instructions.” http://www.ahrinet.org/Portals/_Appleseed/documents/news/AHRI_NRDC_CARB_Letter_regarding_SLCP_HFC_measures.pdf; See also US Chamber of Commerce, “The Kigali Amendment is a Win for the Environment and the US Economy” May 8, 2018 at <https://www.uschamber.com/series/above-the-fold/the-kigali-amendment-win-the-environment-and-the-us-economy> and National Association of Manufacturers, <http://www.shopfloor.org/2018/05/new-study-shows-positive-jobs-impact-kigali-amendment/>

^{ix} See US Chamber of Commerce, “The Kigali Amendment is a Win for the Environment and the US Economy” May 8, 2018 at <https://www.uschamber.com/series/above-the-fold/the-kigali-amendment-win-the-environment-and-the-us-economy> and National Association of Manufacturers, <http://www.shopfloor.org/2018/05/new-study-shows-positive-jobs-impact-kigali-amendment/>

APPENDIX A: ENERGY STAR 2018 Most Efficient ® refrigerators using low GWP refrigerants available on the US market

Research compiled by IGSD staff May 27-28, 2018.

Note: Refrigerant sourced from product spec sheets, service manuals, owners' manuals, and retail sources.

Brand	Model	kWh	Yearly Cost at \$0.12 per kWh	Cubic Ft	Priced from	Refrigerant	GWP
Insignia	NS-RTM10WH7	296	\$35.52	9.9	\$279	R600a	3
Summit	Summit FF1085SSS	296	\$35.52	9.9	\$679	R600a	3
Daewoo	FR-1020ARW	296	\$35.52	9.9	not listed	R600a	3
Hanover	HANRT10C*	296	\$35.52	9.9	\$572	R600a	3
Summit	FF1084W	296	\$35.52	9.9	\$546	R600a	3
Frigidaire	FFET1022Q*	296	\$35.52	9.9	\$449	R600a	3
Avanti	FF99D3S	296	\$35.52	9.9	\$691	R600a	3
Avanti	FF99D0W	296	\$35.52	9.9	\$498	R600a	3
Danby	DFF100C2BSLDD	297	\$35.64	9.9	not listed	R600a	3
Danby	DFF100C2BSSDD	297	\$35.64	9.9	not listed	R600a	3
Danby	DFF100C2WDD	297	\$35.64	9.9	\$479	R600a	3
Summit	FF1386W	311	\$37.32	11.5	\$599	R600a	3
Summit	FF1387SS	311	\$37.32	11.5	\$749	R600a	3
Frigidaire	FFET1222Q*	311	\$37.32	11.5	\$494	R600a	3
Avanti	FF116D0W	311	\$37.32	11.5	\$499	R600a	3
Danby	DFF123C2BSSDD	317	\$38.04	12.3	not listed	R600a	3
Summit	FF1511SS	320	\$38.40	13	\$949	R600a	3
Bosch	B10CB80NVS	345	\$41.40	10.3	\$2,200	R600a	3
Bosch	B10CB80NVW/01	345	\$41.40	10.3	\$2,200	R600a	3
Bosch	B10CB80NVB	345	\$41.40	10.3	\$2,200	R600a	3
Bosch	B11CB50SSS/01	357	\$42.84	11.5	\$2,154	R600a	3
Impecca	RA-2185K	362	\$43.44	18	\$794	R600a	3
Impecca	RA-2185ST	362	\$43.44	18	not listed	R600a	3
Impecca	RA-2185W	362	\$43.44	18	not listed	R600a	3
Insignia	NS-RTM18SS7-C, NS-RTM18WH7	362	\$43.44	18	\$479	R600a	3
Samsung	RT18M62*3**	364	\$43.68	17.6	\$699	R600a	3
Liebherr	CS1210	370	\$44.40	11.1	\$1,819	R600a	3

Liebherr	CS1410	380	\$45.60	14.7	\$2,650	R600a	3
Liebherr	CS1400R	380	\$45.60	12.8	not listed	R600a	3
Liebherr	CS1400PC	380	\$45.60	12.8	not listed	R600a	3
Liebherr	CS1321	380	\$45.60	12.7	\$2,679	R600a	3
Summit	FF1512SSIM	400	\$48.00	12.6	\$1,175	R600a	3
Blomberg	BRFT1522SS	400	\$48.00	12.6	\$989	R600a	3
Beko	BFTF2715SSIM	400	\$48.00	12.6	not listed	R600a	3
Fisher & Paykel	RF201A****	448	\$53.76	20.2	\$2,199	R600a	3
Samsung	RT18M62*5**	448	\$53.76	17.6	\$699	R600a	3
Samsung	RT18M62*3**	448	\$53.76	17.6	\$699	R600a	3
Liebherr	CS1400R-IM	465	\$55.80	12.8	\$1,999	R600a	3
Liebherr	CS1401R-IM	465	\$55.80	12.8	\$2,139	R600a	3
Samsung	RT21M62*5**	478	\$57.36	21.1	\$799	R600a	3
Samsung	RT21M62*3**	478	\$57.36	21.1	\$849	R600a	3
Bosch	B11CB81SSS/01	482	\$57.84	11.4	not listed	R600a	3
Liebherr	CBS1660	488	\$58.56	15	\$3,500	R600a	3
Liebherr	CBS1661	488	\$58.56	15	\$3,200	R600a	3
Liebherr	CBS 2062	528	\$63.36	18.9	\$6,419	R600a	3
Liebherr	CS 2061	532	\$63.84	19.5	\$5,300	R600a	3
Liebherr	CS 2060	532	\$63.84	19.5	\$5,300	R600a	3
Liebherr	CS 2062	532	\$63.84	19.5	\$5,300	R600a	3
Fisher & Paykel	RF201A****	532	\$63.84	20.1	\$2,199	R600a	3
Dacor	DRF36750***	539	\$64.68	21.3	\$7,659	R600a	3
Dacor	DRF36C100**	554	\$66.48	22.6	\$4,089	R600a	3
Samsung	RF23M8070**	633	\$75.96	22.6	\$2,297	R600a	3
Samsung	RF23M8090**	633	\$75.96	22.6	\$2,597	R600a	3
Samsung	RF263B*AE**	637	\$76.44	24.6	\$1,291	R600a and R134a	3 or 1300
Samsung	RF263T*AE**	637	\$76.44	24.6	\$1,499	R600a or R134a	3 or 1300