



WASHINGTON WATCH

The Montreal Protocol is Amended and Strengthened

By Lynn L. Bergeson

Climate change watchers know that October 15, 2016, was a historic day for international climate action. On that day, nearly 200 countries reached an agreement to phase down use of hydrofluorocarbons (HFC) at the 28th Meeting of the Parties to the Montreal Protocol in Kigali, Rwanda. The meetings to discuss the Amendment took place from July 15-23, 2016. This seemingly impossible alignment of international interests reflects years of effort. This column summarizes this historic event and its implications.

The Montreal Protocol

The Montreal Protocol is the international treaty that was designed to protect the earth's ozone layer by requiring the phasing-out of the production and use of chlorofluorocarbons (CFC), substances believed to contribute to ozone depletion, many of which also contribute to greenhouse gas (GHG) production. By many accounts, including that of U.S. Environmental Protection Agency (EPA) Administrator Gina McCarthy, the Montreal Protocol is "the most successful environmental treaty" ever implemented. It has led to a 97 percent reduction in the production and import of ozone-depleting substances (ODS) throughout the world, a truly remarkable achievement.

While the Protocol was successful in addressing ODSs, ironically, it paved the commercial pathway for the development of HFCs, the chemical substances intended to replace CFCs. HFCs, similar to the CFCs they were intended to replace, are powerful GHGs. HFCs are synthetic chemicals that are used primarily in air conditioning, refrigeration, and foam insulation. Their efficacy and functionality have made them hugely successful and ubiquitous commercially around the world.

The Montreal Protocol can be amended to ban chemicals, even if the banned substances are not believed to impact adversely the ozone layer. It is for this reason that in November of 2015, the 197 parties that signed the Montreal Protocol recognized the utility of the Protocol to achieve a collateral purpose and signed a pledge to monitor and limit HFC usage and to amend the Montreal Protocol by the end of 2016 to phase out HFCs. Signers of the Montreal Protocol were highly motivated to carry out the pledge in light of the serious consequences associated with HFC emissions. One illustration underscores the gravity of these consequences. The most commonly used HFC is HFC-134a, a product used in refrigeration and air conditions units. According to the White House, HFCs can be 10,000 times more potent than carbon dioxide (CO₂) in terms of contributing to climate change. Experts predict a nearly 20-fold increase in HFC emissions in the coming decades, if left unchecked, chiefly due to the global increase in demand for refrigeration and air conditioning services.

Some background as to the complexity of negotiations may help illustrate the enormity of the Amendment. In 2015, Canada and Mexico joined with the United States in submitting a North American proposal for an HFC Amendment. It contemplated a phase-down in HFC production and consumption that differentiated between developing countries (A5) and non-developing (Non-A5) countries:

Non-A5 Parties		A5 Parties	
2019	90%	2021	100%
2024	65%	2026	80%
2030	30%	2032	40%
2036	15%	2046	15%

Based on estimates prepared by the United States, this proposal would reduce 90 gigatons of CO₂ emissions by 2050 and half a degree Celsius of warming by the end of the century.

The European Union (EU), India, and Island States also submitted proposals for the HFC phase out. The EU and Island States' proposals were more ambitious than the North American proposal. The Indian proposal would

have granted more discretion to developing countries to continue using HFCs over the next two decades.

Addressing these various approaches took skill, patience, and time. Needless to say, there was significant back and forth between 2015 and October 2016 regarding how best to achieve the phaseout in a way that did not unduly penalize any signer. India and other developing countries expressed concern with the possibility that replacing HFCs with newer products could adversely impact developing countries disproportionately, largely because newer products are more costly than incumbent products. Based on these concerns, Secretary of State John Kerry pledged in July 2016 that the Amendment would include financial aid from “rich countries to help poorer countries deal with the cost of transiting to the new chemicals.” This pledge was instrumental in ensuring consensus on the terms of the Amendment.

Terms of the Amendment

The Amendment contains several key elements.

Flexible Structure: The Amendment is intended to lead to near-term action, with phasedown obligations for all countries starting with a 2024 freeze for the vast majority of Article 5 parties (*i.e.*, developing countries that meet certain criteria, including China) and a first reduction in 2019 for most Article 2 parties (*i.e.*, all other countries, including the United States).

Ambitious Phasedown Schedule: The Amendment establishes a rapid pathway for the phasedown, with most Article 2 parties reducing HFCs by 10% by 2019, and by 85% by 2036 relative to production and consumption levels in 2011-2013. The majority of Article 5 Parties -- including China and Latin American, African, and island nations -- will follow on a similar trajectory, with a freeze by 2024 and then a reduction of 80 percent by 2045 relative to production and consumption levels in 2020-2022. Parties agreed to flexibilities to meet the demands of a global HFC phasedown with respect to a small number of countries. This small group of countries will freeze their consumption by 2028.

Incentive for Earlier Action: A group of donor countries and philanthropists announced last month plans to provide \$80 million in support to help Article 5 parties take early action to implement an ambitious amendment and improve energy efficiency. These funds will be provided to Article 5 parties that have chosen the freeze date of 2024.

Broad Participation: The Montreal Protocol was the first treaty in the history of the United Nations to achieve universal ratification, and signers expect similar broad participation to continue under the Amendment to address HFCs.

Enforcement and Accountability: The Montreal Protocol's accountability processes ensure regular reporting and robust review, and its efforts to help countries facing implementation problems come into compliance has historically enabled all countries to achieve the reductions agreed.

Multiple Opportunities to Increase Engagement: The Amendment calls for reviews every five years, during which a technical panel will assess the pace of technology development and adoption in affected sectors to allow countries to consider phasedown commitments and any needed adjustments. The Montreal Protocol has been adjusted several times to accelerate the phaseout of ODSs.

Other Public and Private Initiatives

The Montreal Protocol is but one platform advocates are using to reduce HFCs. EPA's Significant New Alternatives Policy (SNAP) program is another platform. It was created under Section 612 of the Clean Air Act and ensures the development and approval of alternatives to HFCs. Specifically, the SNAP program is designed to identify and evaluate substitutes in end-uses that have historically used ODSs, assess overall risk to human health and the environment of both existing and new substitutes, publish lists of acceptable and unacceptable substitutes by end-use, promote the use of acceptable substitutes, and provide the public with reliable information about the potential environmental and human health impacts of substitutes.

To determine the acceptability of substitutes, EPA performs a cross-media analysis of risks to human health and the environment from the use of

various substitutes in different industrial and consumer uses that have historically used ODSs. EPA reviews characteristics, including the following, when evaluating each proposed substitute: ozone depletion potential, global warming potential, toxicity, flammability, occupational and consumer health/safety, local air quality, and ecosystem effects.

In July of 2015, EPA issued a final rule that prohibits the use of certain HFC products where safer and more climate-friendly alternatives are available. EPA also provides a list of climate-friendly alternatives deemed acceptable by EPA to expand the range of options for businesses in selecting products that are less harmful to the environment.

The Obama Administration has deployed over the past eight years a wide range of tools to combat climate change including Executive Orders, federal policy developments, and, of course, regulatory initiatives. These tools have been used to great success to combat climate change by EPA, the U.S. Department of Energy, the U.S. Department of Defense, and other federal agencies.

A wide range of private-sector initiatives augment these regulatory efforts. These include, among many others:

Chemours announced that its Opteon™ family of low global warming potential (low-GWP) products is anticipated to reduce GHG emissions globally by 300 million tons of CO₂ equivalent by 2025, which represents more than a 20% increase from its September 2014 projections. Chemours also agreed to control and, to the extent feasible, eliminate by-product emissions of HFC-23 at all its fluorochemical production facilities worldwide. Chemours agreed to use in the United States only feedstock HCFC-22 from producers that control and, to the extent feasible, eliminate by-product emissions of HFC-23 at their production facilities in North America.

Daikin Industries Ltd. (Daikin) announced its commitment to control and, to the extent feasible, eliminate by-product emissions of HFC-23 at its fluorochemical production facilities worldwide. Daikin's plant in Decatur, Alabama, was the first plant in the United States that committed to the destruction of HFC-23 when it started operations in 1994. Daikin's commitment extends to all Daikin facilities worldwide and is estimated to

reduce global emissions by almost 7 million metric tons of CO₂ equivalent per year.

Demilec announced the planned release of its first hydrofluoroolefin (HFO)-blown spray foam insulation with availability by mid-2016. In addition, it announced that it plans to transition to HFO-blown insulation by the end of 2017. With a focus on sustainability, Demilec's closed cell products currently contain more than 20% renewable recycled content.

Dow Chemical announced its commitment to the elimination of high-GWP HFCs in its spray foam adhesive product line. More specifically, Dow Building Solutions is reformulating their one component spray foam adhesive product line for the commercial roof adhesive market to use low-GWP blowing agents instead of HFCs. In addition, its tile roof spray foam adhesive product line will be transitioned to low-GWP blowing agents in the next two to three years. Together, these actions will avoid approximately 200,000 metric tons of CO₂ equivalent per year.

Honeywell announced that its Solstice® line of low-GWP products is anticipated to reduce GHG emissions globally by 475 million tons of CO₂ equivalent by 2025, which represents a 36 percent increase from its September 2014 projections. Honeywell committed that, to the extent possible, it will use feedstock HCFC-22 from producers that strictly control and, to the extent feasible, eliminate by-product emissions of HFC-23 at their production facilities worldwide.

Implications

The real-world implications of the Montreal Protocol Amendment and the collective impact of the Obama Administration's comprehensive climate-change plan are many. In addition to an improved environment, there are commercial implications and opportunities. With the phaseout of any class of chemicals comes in its wake new chemical innovations that address the deficiencies of the incumbent products and, of course, take on the challenges confronting any new product development. The Amendment paves the way for the innovation of new chemistries and products to replace HFCs. Businesses will need to rise to the challenge to innovate new products to fill the void created by the phaseout, conform their operations to align

with the phaseout, and begin now to find alternatives in anticipation of the phaseout.

The implications of the general election on all matters relating to climate change are less clear. President-Elect Donald Trump's views on climate change are disturbing. He has publicly stated that he does not accept scientific evidence that climate change is real, has expressed interest in dismantling the Paris Agreement, and has placed a known climate-change denier, Myron Ebell, Director of the Center for Energy and Environment at the Competitive Enterprise Institute, in charge of the EPA transition team. None of this bodes well for building upon the success of the Obama Administration's climate change agenda. As with everything else in flux, stakeholders will need to wait and see how the new Administration unfolds while remaining true to commitments to protect the environment and to diminish production and use of HFCs wherever possible.

Author Biography

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