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Unpacking the Problem

Climate change and its impacts are coming faster - and are worse - than was projected just six years ago. The fifth assessment report by the Intergovernmental Panel on Climate Change, concludes that carbon dioxide concentrations are now higher than at any time in the past 800,000 years and that the world is on a path towards temperatures unprecedented in the last several million years. Yet a growing body of research shows that - with rapid and aggressive mitigation action - the worst projected impacts can still be avoided and global temperature rise can be held at or below 1.5 to 2°C by the end of the century. In that spirit, the world has just taken an important step towards solving one of the fastest growing climate problems. The leaders of the G-20 nations, joined by Ethiopia, Spain, Senegal, Brunei, Kazakhstan, and Singapore, announced their support for using the Montreal Protocol to phase down production and consumption of hydrofluorocarbons (HFCs).

Addressing HFCs under the Montreal Protocol is just part of a growing global strategy to unpack the global climate problem and address its component parts through the parallel International Cooperative Initiatives (ICIs) while keeping accounting and reporting of emission reductions under the UN climate treaty. Fast action under these 'ICIs', including the Montreal Protocol and the Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants, are helping immediately to solve pieces of the climate problem.

This diversified strategy is gaining momentum, partly through growing recognition that - while long-lived greenhouse gases such as carbon dioxide (CO₂) and nitrous oxide (N₂O) represent more than half of current climate change - the rest is driven by short-lived climate pollutants (SLCPs) such as black carbon, methane, tropospheric ozone, and HFCs. Mitigating these gases and aerosols provides climate benefits on different time scales, with SLCPs delivering significant benefits in the near-term and CO₂ providing its benefits ▶

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later. Aggressive and immediate reductions in both long-lived and short-lived pollutants are necessary for near-term climate protection and long-term climate stabilization, and the ICI approach recognizes that the fastest way to address these very different climate pollutants will often involve different fora.

The leading example of the ICI unpacking strategy is the current effort to use the Montreal Protocol to phase down production and consumption of HFCs, while leaving the accounting and reporting of HFC emissions under the jurisdiction of the climate treaty. In June we and colleagues published a new study in Atmospheric Chemistry and Physics, highlighting how important this unpacking strategy can be, and confirming the importance of immediately cutting high-GWP (global warming potential) HFCs.

HFCs are the fastest growing greenhouse gases in many countries including the US, EU, China, and India, and are increasing globally by 10 to 15% per year. They are powerful climate forcers with warming effects hundreds to thousands of times greater per tonne than CO₂. While their overall contribution to the current climate change is small, without intervention, by mid-century the climate forcing of HFCs at 2050 could increase by 20-30 fold by 2050. Equivalently, such an increase of HFC forcing would be the equivalent of up to the equivalent of 30 to 45 per cent % of the forcing increase of CO₂ increase between now and 2050..between

6-13 years of projected 2050 CO₂ emissions.

Our study shows that replacing high-GWP HFCs with available low-GWP alternatives can avoid 0.1°C of warming by 2050 and 0.5°C by the end of the century. When combined with cuts in the other three SLCPs, as much as 0.6°C of warming could be avoided by 2050 and as much as 1.5°C by the end of the century. Aggressive CO₂ mitigation, replacing high-GWP HFCs with low-GWP alternatives, and cutting black carbon, methane, and tropospheric ozone, together provide the greatest chance of keeping global temperatures below 1.5°C for the next 30 to 40 years and below the 2°C goal up to 2100.

Phasing down high-GWP HFCs under the Montreal Protocol represents the biggest, fastest, and most reliable near-term climate mitigation opportunity available. It is also likely to be the cheapest, as the cost of phasing down refrigerants under the Montreal Protocol has historically been less than 10 cents per tonne of carbon dioxide equivalent.

Two proposals have been advanced to phase down high-GWP HFCs under the Montreal Protocol; one by the Federated States of Micronesia, co-sponsored by Morocco and the Maldives; the other by the North American countries, Mexico, Canada, and the US. The proposals are similar, and each would reduce 85-90 per cent of HFC production and use, avoiding the equivalent of 100 billion tonnes of carbon dioxide by 2050,

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and substantially eliminating one of the six Kyoto Protocol greenhouse gases.

Historically, countries such as India and China have been reluctant to address HFCs under the Montreal Protocol, worrying about the availability of economically and technically available alternatives, and sufficient funding to cover the cost of a phase-down. However, this summer, in two separate agreements, both President Xi Jinping of China and Prime Minister Singh of India agreed to work with the US and the international community to phase down HFCs under the Protocol. Their commitments parallel the G20 Leaders' Declaration in early September which announced support for initiatives complimentary to efforts under the UN Framework Convention on Climate Change, including using the expertise and institutions of the Montreal Protocol to phase down the production and consumption of HFCs, while retaining HFCs within the scope of the UNFCCC and its Kyoto Protocol for accounting and reporting of emissions. Further progress was made at the Montreal Protocol's annual Meeting of the Parties in October, yet, much work remains in 2014 to finish building the consensus for the HFC phase-down.

Phasing down high-GWP HFCs under the Montreal Protocol and similar actions in other ICIs can do much more that produce immediate climate mitigation benefits. This diversified strategy can prove that fast progress on climate mitigation is possible, instill the urgent optimism needed to build political momentum to succeed with the new UN climate treaty in 2015, and succeed in the ultimate objective agreed by the world community twenty years ago to stabilize 'greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.'

