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**Open-ended Working Group of the Parties to  
the Montreal Protocol on Substances that  
Deplete the Ozone Layer  
Thirty-second meeting  
Bangkok, 23–27 July 2012  
Item 11 of the provisional agenda\***

**Proposed amendments to the Montreal Protocol**

## **Proposed amendment to the Montreal Protocol submitted by Canada, Mexico and the United States of America**

### **Note by the Secretariat**

Pursuant to paragraph 2 of Article 9 of the Vienna Convention for the Protection of the Ozone Layer, the Secretariat is circulating a joint proposal submitted by Canada, Mexico and the United States of America to amend the Montreal Protocol in respect of hydrofluorocarbon phase-down (see annex). The proposal is presented as submitted and has not been formally edited.

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\* UNEP/OzL.Pro.WG.1/32/1.

## Annex

### Text of HFC Phasedown Amendment Proposal

#### Article I: Amendment

##### A. Article 1, paragraph 4

In paragraph 4 of Article 1 of the Protocol, for the words:

“Annex C or Annex E”

there shall be substituted:

“Annex C, Annex E or Annex F”

##### B. Article 2, paragraph 5

In paragraph 5 of Article 2 of the Protocol, for the words:

“and Article 2H”

there shall be substituted:

“Articles 2H and 2J”

##### C. Article 2, paragraph 5 *ter*

The following paragraph shall be added after paragraph 5 bis of Article 2 of the Protocol:

“5 *ter*. Any Party not operating under paragraph 1 of Article 5 may, for one or more control periods, transfer to another such Party any portion of its calculated level of consumption set out in Article 2J, provided that the calculated level of consumption of controlled substances in Annex F of the Party transferring the portion of its calculated level of consumption did not exceed [1000] kilograms per capita in [2008] and that the total combined calculated levels of consumption of the Parties concerned do not exceed the consumption limits set out in Article 2J. Such transfer of consumption shall be notified to the Secretariat by each of the Parties concerned, stating the terms of such transfer and the period for which it is to apply.”

##### D. Article 2, paragraphs 8(a) and 11

In paragraphs 8(a) and 11 of Article 2 of the Protocol, for the words:

“Articles 2A to 2I”

there shall be substituted:

“Articles 2A to 2J”.

##### E. Article 2, paragraph 9

The “and” at the end of subparagraph 9(a)(i) of Article 2 of the Protocol shall be moved to the end of subparagraph 9(a)(ii).

The following subparagraph shall be inserted after subparagraph 9(a)(ii) of Article 2 of the Protocol:

“(iii) Adjustments to the global warming potentials specified in Annexes C and F should be made and, if so, what the adjustments should be;”

In paragraph 9(c) of Article 2 of the Protocol, the following language shall be inserted immediately after the words “In taking such decisions”:

“under subparagraphs 9(a)(i) and (ii)”:

For the final semi-colon of paragraph 9(c) of Article 2 of the Protocol there shall be substituted:

“. In taking such decisions under subparagraph 9(a)(iii), the Parties shall reach agreement by consensus only; ”

##### F. Article 2J

The following Article shall be inserted after Article 2I of the Protocol:

“Article 2J: Hydrofluorocarbons

1. Each Party shall ensure that for the twelve-month period commencing on 1 January [2016], and in each 12-month period thereafter, its calculated level of consumption of the controlled substances in Annex F does not exceed, annually, [ninety] per cent of the average of its calculated levels of consumption of Annex F controlled substances plus eighty five per cent of Annex C, Group I controlled substances for the years 2005, 2006, 2007 and 2008. Each Party producing one or more of these substances shall, for the same period, ensure that its calculated level of production of the substances does not exceed, annually, [ninety] per cent of the average of its calculated levels of production of Annex F controlled substances plus eighty-five per cent of Annex C, Group I controlled substances for the years 2005, 2006, 2007 and 2008. However, in order to satisfy the basic domestic needs of the Parties operating under paragraph 1 of Article 5, its calculated level of production may exceed that limit by up to ten per cent of the average of its calculated level of production of Annex F controlled substances plus eighty five per cent of Annex C, Group I controlled substances for the years 2005, 2006, 2007 and 2008.
2. Each Party shall ensure that for the twelve-month period commencing on 1 January [2020], and in each 12-month period thereafter, its calculated level of consumption of the controlled substances in Annex F does not exceed, annually, [seventy] per cent of the average of its calculated levels of consumption of Annex F controlled substances plus eighty-five per cent of Annex C Group I controlled substances for the years 2005, 2006, 2007 and 2008. Each Party producing one or more of these substances shall, for the same period, ensure that its calculated level of production of the substances does not exceed, annually, [seventy] per cent of the average of its calculated levels of production of Annex F controlled substances plus eighty-five per cent of Annex C, Group I controlled substances for the years 2005, 2006, 2007 and 2008. However, in order to satisfy the basic domestic needs of the Parties operating under paragraph 1 of Article 5, its calculated level of production may exceed that limit by up to ten per cent of the average of its calculated levels of production of Annex F controlled substances plus eighty-five per cent of Annex C, Group I controlled substances for the years 2005, 2006, 2007 and 2008.
3. Each Party shall ensure that for the twelve-month period commencing on 1 January [2025], and in each 12-month period thereafter, its calculated level of consumption of the controlled substances in Annex F does not exceed, annually, [fifty] per cent of the average of its calculated levels of consumption of Annex F controlled substances plus eighty-five per cent of Annex C, Group I controlled substances for the years 2005, 2006, 2007, and 2008. Each Party producing one or more of these substances shall, for the same period, ensure that its calculated level of production of the substances does not exceed, annually, [fifty] per cent of the average of its calculated levels of production of Annex F controlled substances plus eighty-five per cent of Annex C, Group I controlled substances for the years 2005, 2006, 2007 and 2008. However, in order to satisfy the basic domestic needs of the Parties operating under paragraph 1 of Article 5, its calculated level of production may exceed that limit by up to ten per cent of the average of its calculated levels of production of Annex F controlled substances plus eighty-five per cent of Annex C, Group I controlled substances for the years 2005, 2006, 2007, and 2008.
4. Each Party shall ensure that for the twelve-month period commencing on 1 January [2029], and in each 12-month period thereafter, its calculated level of consumption of the controlled substances in Annex F does not exceed, annually, [thirty] per cent of the average of its calculated levels of consumption of Annex F controlled substances plus eighty-five per cent of Annex C Group I controlled substances for the years 2005, 2006, 2007 and 2008. Each Party producing one or more of these substances shall, for the same period, ensure that its calculated level of production of the substances does not exceed, annually, [thirty] per cent of the average of its calculated levels of production of Annex F controlled substances plus eighty five per cent of Annex C, Group I controlled substances for the years 2005, 2006, 2007 and 2008. However, in order to satisfy the basic domestic needs of the Parties operating under paragraph 1 of Article 5, its calculated level of production may exceed that limit by up to ten per cent of the average of its calculated levels of production of Annex F controlled substances plus eighty-five per cent of Annex C, Group I controlled substances for the years 2005, 2006, 2007 and 2008.
5. Each Party shall ensure that for the twelve-month period commencing on 1 January [2033], and in each 12-month period thereafter, its calculated level of consumption of the controlled substances in Annex F does not exceed, annually, [fifteen] per cent of the average of its calculated levels of consumption of Annex F controlled substances plus eighty-five per cent of Annex C Group I controlled substances for the years 2005, 2006, 2007 and

2008. Each Party producing one or more of these substances shall, for the same period, ensure that its calculated level of production of the substances does not exceed, annually, [fifteen] per cent of the average of its calculated levels of production of Annex F controlled substances plus eighty-five per cent of Annex C, Group I controlled substances for the years 2005, 2006, 2007 and 2008. However, in order to satisfy the basic domestic needs of the Parties operating under paragraph 1 of Article 5, its calculated level of production may exceed that limit by up to ten per cent of the average of its calculated levels of production of Annex F controlled substances plus eighty-five per cent of Annex C, Group I controlled substances for the years 2005, 2006, 2007 and 2008.

6. Each party manufacturing Annex C Group I or Annex F substances shall ensure that for the 12-month period commencing on January 1, 2016, and in each 12-month period thereafter, its calculated level of emissions of Annex F, Group II substances generated as a byproduct in each production line that manufactures Annex C, Group I or Annex F substances does not exceed [0.1] per cent of the mass of Annex C, Group I or Annex F substances manufactured in that production line. The obligation under this paragraph does not apply to emissions from production lines that have an approved project under the Clean Development Mechanism to control emissions of Annex F Group II substances so long as those emissions are covered by and continue to generate emissions reduction credits under a Clean Development Mechanism project.

7. Each Party shall ensure that any destruction of Annex F, Group II substances generated by facilities that produce Annex C, Group I or Annex F substances shall occur only by technologies to be approved by the Parties.”

#### *G. Article 3*

The preamble to Article 3 of the Protocol should be replaced with the following:

“1. Except as specified in paragraph 2, for the purposes of Articles 2, 2A to 2J and 5, each Party shall, for each group of substances in Annex A, Annex B, Annex C, Annex E or Annex F determine its calculated levels of:”

For the period at the end of subparagraph (c) of Article 3 of the Protocol there shall be substituted a semi-colon, and the “and” at the end of subparagraph (b) of Article 3 of the Protocol shall be moved to the end of subparagraph (c).

The following text should be added to the end of Article 3 of the Protocol:

“(d) Emissions of Annex F, Group II substances generated as a byproduct in each production line that manufactures Annex C, Group I or Annex F substances by including, among other things, amounts emitted from equipment leaks, process vents, and destruction devices, but excluding amounts destroyed, sold for use, or stored.

2. When calculating average levels of production, consumption, imports, exports and emissions of Annex F and Annex C Group I substances for purposes of Article 2J, paragraph 5ter of Article 2, and paragraph 1(d) of Article 3, each Party shall use the global warming potentials of these substances as specified in Annexes C and F.”

#### *H. Article 4, paragraph 1 sept*

The following paragraph shall be inserted after paragraph 1 sex of Article 4 of the Protocol:

“1 sept. Within one year of the date of entry into force of this paragraph, each Party shall ban the import of the controlled substances in Annex F from any State not party to this Protocol.”

#### *I. Article 4, paragraph 2 sept*

The following paragraph shall be inserted after paragraph 2 sex of Article 4 of the Protocol:

“2 sept. Within one year of the date of entry into force of this paragraph, each Party shall ban the export of the controlled substances in Annex F to any State not party to this Protocol.”

#### *J. Article 4, paragraphs 5, 6 and 7*

In paragraphs 5, 6 and 7 of Article 4 of the Protocol, for the words:

“Annexes A, B, C and E”.

there shall be substituted:

“Annexes A, B, C, E and F”.

*K. Article 4, paragraph 8*

In paragraph 8 of Article 4 of the Protocol, for the words:

“Articles 2A to 2I”

there shall be substituted:

“Articles 2A to 2J”.

*L. Article 4B*

The following paragraph shall be inserted after paragraph 2 of Article 4B of the Protocol:

“2 bis. Each Party shall, by 1 January 2016 or within three months of the date of entry into force of this paragraph for it, whichever is later, establish and implement a system for licensing the import and export of new, used, recycled and reclaimed controlled substances in Annex F. Any Party operating under paragraph 1 of Article 5 that decides it is not in a position to establish and implement such a system by 1 January 2016 may delay taking those actions until 1 January 2018.”

*M. Article 5, paragraph 4*

In paragraph 4 of Article 5 of the Protocol, for the words:

“Articles 2A to 2I”

there shall be substituted:

“Articles 2A to 2J”.

*N. Article 5, paragraphs 5 and 6*

In paragraphs 5 and 6 of Article 5 of the Protocol, for the words:

“Article 2I”

there shall be substituted:

“Articles 2I and 2J”.

*O. Article 5, paragraph 8 qua*

The following paragraph shall be inserted after paragraph 8 ter of Article 5 of the Protocol:

“8 qua. Each Party operating under paragraph 1 of this Article shall:

(a) in order to meet its basic domestic needs, be entitled to delay its compliance with the control measures set out in paragraph 1 of Article 2J for two years, in paragraphs 2 and 3 of Article 2J for four years, in paragraph 4 of Article 2J for five years, and in paragraph 5 of Article 2J for ten years, subject to any adjustments made to the control measures in Article 2J in accordance with Article 2(9);

(b) for purposes of calculating its consumption baseline under Article 2J, use the average of its calculated levels of consumption of Annex C, Group I controlled substances in the years 2005, 2006, 2007, and 2008, instead of the average of its calculated levels of consumption of Annex F controlled substances plus eighty-five per cent of Annex C, Group I controlled substances for the years 2005, 2006, 2007, and 2008;

(c) for purposes of calculating its production baseline under Article 2J, use the average of its calculated levels of production of Annex C, Group I controlled substances in the years 2005, 2006, 2007, and 2008, instead of the average of its calculated levels of production of Annex F controlled substances plus eighty-five per cent of Annex C, Group I controlled substances for the years 2005, 2006, 2007, and 2008; and

(d) ensure that its calculated level of consumption and production:

(i) for purposes of paragraph 1 of Article 2J does not exceed [one hundred] per cent, rather than [ninety] per cent, of the average of its calculated levels of consumption and production, respectively, of Annex C, Group I controlled substances in the years 2005, 2006, 2007, and 2008;

(ii) for purposes of paragraph 2 of Article 2J does not exceed [eighty] per cent, rather than [seventy] per cent, of the average of its calculated levels of consumption and production,

respectively, of Annex C, Group I controlled substances in the years 2005, 2006, 2007, and 2008;

(iii) for purposes of paragraph 3 of Article 2J does not exceed [sixty] per cent, rather than [fifty] per cent, of the average of its calculated levels of consumption and production, respectively, of Annex C, Group I controlled substances in the years 2005, 2006, 2007, and 2008; and

(iv) for purposes of paragraph 4 of Article 2J does not exceed [forty] per cent, rather than [thirty] per cent, of the average of its calculated levels of consumption and production, respectively, of Annex C, Group I controlled substances in the years 2005, 2006, 2007, and 2008.”

*P. Article 6*

In Article 6 of the Protocol, for the words:

“Articles 2A to 2I”

there shall be substituted:

“Articles 2A to 2J”.

*Q. Article 7, paragraphs 2, 3 and 3 ter*

The following line shall be inserted after the line that reads “— in Annex E, for the year 1991,” in paragraph 2 of Article 7 of the Protocol:

“— in Annex F, for the years 2005, 2006, 2007 and 2008,”

In paragraphs 2 and 3 of Article 7 of the Protocol, for the words:

“C and E”

there shall be substituted:

“C, E and F”.

The following paragraph shall be added to Article 7 of the Protocol after paragraph 3 bis:

“3 ter. Each Party shall provide to the Secretariat statistical data of its annual emissions of Annex F, Group II controlled substances in accordance with Article 3(d) of the Protocol, as well as the amount of Annex F, Group II substances captured and destroyed by technologies to be approved by the Parties.”

*R. Article 10, paragraph 1*

In Article 10, paragraph 1 of the Protocol, for the words:

“Articles 2A to 2E and Article 2I”

There shall be substituted:

“Articles 2A to 2E, Article 2I, and Article 2J”.

The following shall be inserted at the end of Article 10, paragraph 1 of the Protocol:

“Where a Party operating under paragraph 1 of Article 5 chooses to avail itself of funding from any other financial mechanism that could result in meeting any part of its agreed incremental costs, that part shall not be met by the Financial Mechanism under Article 10 of this Protocol. If a Party has an approved project under the Clean Development Mechanism to control HFC-23 byproduct emissions for a facility or production line, then that facility or production line would not be eligible for support under the Financial Mechanism under Article 10 of this Protocol until the facility or production line is no longer covered by a Clean Development Mechanism project.”

*S. Annex C and Annex F*

Annex C, Group I is amended to add the 100-year Global Warming Potential for the following substances:

Substance	100 year Global Warming Potential
HCFC-21	151
HCFC-22	1,810

HCFC-123	77
HCFC-124	609
HCFC-141b	725
HCFC-142b	2,310
HCFC-225ca	122
HCFC-225cb	595

A new Annex F shall be added to the Protocol, following Annex E. It shall read:

Annex F: Controlled Substances

Group Substance	100 year Global Warming Potential
Group I	
HFC-32	675
HFC-41	92
HFC-125	3,500
HFC-134	1,100
HFC-134a	1,430
HFC-143	353
HFC-143a	4,470
HFC-152	53
HFC-152a	124
HFC-161	12
HFC-227ea	3,220
HFC-236cb	1,340
HFC-236ea	1,370
HFC-236fa	9,810
HFC-245ca	693
HFC-245fa	1,030
HFC-365mfc	794
HFC-43-10mee	1,640
HFC-1234yf (HFO-1234yf)	4
HFC-1234ze(E) (HFO-1234ze(E))	6
Group II	
HFC-23	14,800

**Article II: Relationship to the 1999 Amendment**

No State or regional economic integration organization may deposit an instrument of ratification, acceptance or approval of or accession to this Amendment unless it has previously, or simultaneously, deposited such an instrument to the Amendment adopted at the Eleventh Meeting of the Parties in Beijing, 3 December 1999.

**Article III: Relationship to the United Nations Framework Convention on Climate Change and Its Kyoto Protocol**

This Amendment is not intended to have the effect of excepting hydrofluorocarbons from the scope of the commitments contained in Articles 4 and 12 of the United Nations Framework Convention on Climate Change and in Articles 2, 5, 7 and 10 of its Kyoto Protocol that apply to “greenhouse gases not controlled by the Montreal Protocol.” Each party to this Amendment shall continue to apply the provisions of the United Nations Framework Convention on Climate Change and its Kyoto Protocol

identified above to HFCs as long as those provisions, respectively, remain in force with respect to such party.

**Article IV: Entry into force**

1. Except as noted in paragraph 2, below, this Amendment shall enter into force on 1 January 2014, provided that at least twenty instruments of ratification, acceptance or approval of the Amendment have been deposited by States or regional economic integration organizations that are Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer. In the event that this condition has not been fulfilled by that date, the Amendment shall enter into force on the ninetieth day following the date on which it has been fulfilled.
2. The changes in Sections H and I of Article I of this Amendment shall enter into force on 1 January 2014, provided that at least seventy instruments of ratification, acceptance or approval of the Amendment have been deposited by States or regional economic integration organizations that are Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer. In the event that this condition has not been fulfilled by that date, the Amendment shall enter into force on the ninetieth day following the date on which it has been fulfilled.
3. For purposes of paragraphs 1 and 2, any such instrument deposited by a regional economic integration organization shall not be counted as additional to those deposited by member States of such organization.
4. After the entry into force of this Amendment, as provided under paragraphs 1 and 2, it shall enter into force for any other Party to the Protocol on the ninetieth day following the date of deposit of its instrument of ratification, acceptance or approval.



## Summary Points: North American HFC Submission to the Montreal Protocol

### Key elements of the North American proposal:

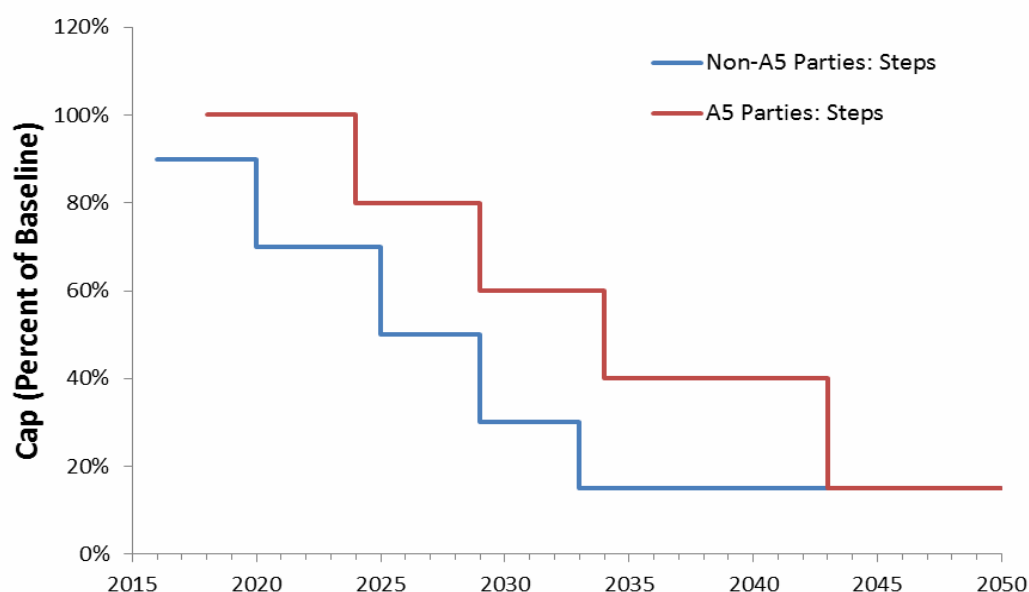
- Lists 21 HFCs as a new Annex F, including two substances sometimes referred to as HFOs.
- Recognizes that there may not be alternatives for all HFC applications and therefore utilizes a gradual phasedown mechanism with a plateau, as opposed to a phaseout.
- Establishes provisions for developed country (non-Article 5) and developing country (Article 5) phasedown of production and consumption (see figure below).

The baseline for Article 5 countries is calculated based on HCFC consumption and production respectively averaged over years 2005-2008, recognizing there are HFC data limitations in some countries.

For non-Article 5 countries, the baseline is determined from a combination of HFC plus 85% of HCFC consumption and production respectively averaged over years 2005-2008.

Uses weighting by Global Warming Potential for HCFCs and HFCs as compared to typical Montreal Protocol practice of Ozone Depleting Potential.

### HFC Reduction Steps for Article 5 and Non-Article 5 Countries (% of baseline)



- Includes provisions to limit HFC-23 byproduct emissions resulting from the production of HCFC-22 in each production line beginning in 2016. The provisions are intended for production lines that do not have an approved project under the Clean Development Mechanism to control emissions of HFC-23.
- Requires licensing of HFC imports and exports, and bans imports and exports to non-Parties.
- Requires reporting on production and consumption of HFCs, and HFC-23 byproduct emissions.
- Makes eligible for funding under the Montreal Protocol's Multilateral Fund the phasedown of HFC production and consumption as well as the reduction of HFC-23 byproduct emissions.

<i>Potential Steps for Non-A5 Parties</i>		<i>Potential Steps for A5 Parties</i>	
2016	90%	2018	100%
2020	70%	2024	80%
2025	50%	2029	60%
2029	30%	2034	40%
2033	15%	2043	15%

### **Cumulative Environmental Benefits:**

- Cumulative benefits of the HFC phasedown estimated by the U.S. Government amount to reductions of 2,200 million metric tons of carbon dioxide equivalent (MMT CO<sub>2</sub>eq) through 2020, and about 85,000 MMTCO<sub>2</sub>eq through 2050.
- Cumulative benefits from HFC-23 byproduct emissions controls as estimated by the U.S. Government amount to an additional 11,300 MMTCO<sub>2</sub>eq through 2050.

<b>Cumulative HFC Reductions (MMTCO<sub>2</sub>eq) 2016-2050</b>	
Non-Article 5	42,100
Article 5	42,900
World	85,000
Byproduct Controls (HFC-23)	11,300
World Total	96,300

### **Relationship to HCFC phaseout:**

- This amendment is designed to be compatible with the HCFC phaseout.
- The proposal recognizes that HFCs are alternatives in many existing HCFC applications, so baseline levels are set to accommodate some level of transition from HCFCs to HFCs.
- The suite of known alternative chemicals, new technologies, and improved process/handling practices can significantly reduce HFC consumption while simultaneously supporting the HCFC phaseout.

### **Relationship with the United Nations Framework Convention on Climate Change (UNFCCC):**

- The proposal is intended to support overall global efforts aimed at climate system protection.
- The proposal constitutes an amendment to the Montreal Protocol and could be complemented by a related decision by the UNFCCC confirming the Montreal Protocol approach.
- The proposal leaves unchanged the provisions of the UNFCCC/Kyoto Protocol that govern HFC emissions. Parties could follow Montreal Protocol obligations to meet certain UNFCCC obligations.