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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Eighty-sixth Meeting
Montreal, 2-6 November 2020
Postponed to 8-12 March 2021¹

**KEY ASPECTS RELATED TO HFC-23 BY-PRODUCT CONTROL TECHNOLOGIES
(DECISIONS 84/90 AND 84/91)**Background

1. At its 84th meeting, the Executive Committee considered the document on Key aspects related to HFC-23 by-product control technologies.² During its discussions, members stressed the importance of addressing the policy issues related to controlling HCF-23 by-product emissions at the 84th meeting, particularly given that the Governments of Argentina and Mexico had both ratified the Kigali Amendment and had compliance obligations to control HFC-23 by-product emissions as of 1 January 2020 and reporting thereon. A number of considerations were highlighted, including the importance of: basing the level of financial support on the most cost-effective option in situations where HFC-23 by-product emissions were not already being controlled; basing incremental operating costs (IOCs) on HCFC-22 production from prior rather than future years; taking into account production process improvements that would reduce HFC-23 by-product generation rates over time; ensuring the sustainability of the HFC-23 emissions phase-out; considering the role played by domestic policies and regulations in ensuring sustained HFC-23 by-product destruction; and considering the eligibility of destruction back-up systems, if they were needed at all. It was also noted that controlling HFC-23 emissions generated by the production of HCFC-22 that was exported to non-Article 5 countries was a new concern that needed careful consideration.

2. Several members also had concerns regarding the Ozone Secretariat's understanding of paragraph 6 of Article 2J of the Montreal Protocol reflected in the document. It was felt that the understanding could be taken to mean that Parties simply had to report their HFC-23 by-product emissions rather than making their best efforts to reduce them using approved technologies, as called for in the Protocol. At the same time, members recognized that the Executive Committee did not have the authority to decide what constituted compliance with paragraph 6 of the Protocol.

¹ Due to coronavirus disease (COVID-19)

² UNEP/OzL.Pro/ExCom/84/70.

3. The Committee agreed to establish a contact group to discuss the issues related to HFC-23 by-product emission control raised in the document. The group was, however, unable to reach consensus. One member, supported by two others, expressed concern that the Committee was not making the progress required to enable Parties to the Kigali Amendment to comply with the 1 January 2020 control measure. The Committee agreed to hold additional discussions in the contact group. Subsequently, the convener of the contact group reported that despite substantial discussions, the group had again been unable to resolve the issues.

4. Subsequently, one member made a statement, saying, that despite the Montreal Protocol's proud history of achievements, the 84th meeting would likely be remembered for the failure of the mechanism to find a solution that would enable Article 5 countries producing HCFC-22 to comply with the HFC-23 control measures. Article 10 of the Protocol contained the obligation to provide financial assistance to Article 5 countries, but the Executive Committee had failed in that regard. That was a problem not only for Article 5 countries that produced HCFC-22, but also for all Article 5 countries. The country would therefore raise that matter with the Implementation Committee and the Open-ended Working Group.

Scope of the document

5. The Secretariat has prepared the present document in response to decisions 83/67(d), 84/90, and 84/91. In line with the intersessional approval process for the 85th and 86th meetings, the present document is being presented to the 86th meeting.³

6. The document consists of the following four parts, and a recommendation:

- I Policy issues arising in the projects in Argentina and Mexico
- II Policy issues arising in the project in Argentina
- III Policy issues arising in the project in Mexico
- IV New scientific study on HFC-23 emissions
- Recommendation

7. In each part, the document explains the issues identified, and seeks guidance from the Executive Committee on how to address those issues.

I. Policy issues arising in the projects in Argentina and Mexico

Timeline for HFC-23 by-product emission control

8. The Kigali Amendment entered into force on 1 January 2019. Both Argentina and Mexico have ratified the Kigali Amendment and have continued to generate HFC-23 by-product and emit that HFC-23 without controls to the atmosphere. For the project in Argentina, such emissions would continue for six months after approval of the project in the case of refurbishment of the incinerator, and cease within weeks

³ In light of the COVID-19 pandemic, the Executive Committee agreed to postpone its 85th meeting, originally scheduled from 25 to 29 May 2020, and to hold it back-to-back with the 86th meeting in November 2020. In order to ensure continuity of compliance-related activities in Article 5 countries, and to reduce its workload when convened, the Executive Committee decided to implement an intersessional approval process for projects and activities that were to be submitted to the 85th meeting; agenda items that were not considered intersessionally would be included in the agenda of the 86th meeting. Given the evolution of the pandemic, the Executive Committee further deferred both meetings to March 2021.

of approval in the case of closure.⁴ For the project in Mexico, such emissions would continue for six months after approval of the project given the time needed to refurbish the plasma-arc destruction unit.⁵

9. At the 84th meeting, members recognized that the Executive Committee did not have the authority to decide what constituted compliance with paragraph 6 of Article 2J of the Montreal Protocol. Accordingly, the Executive Committee may wish to seek guidance from the Parties on this matter.

Duration for which funding support for HFC-23 by-product emission controls is provided

10. During the discussion of the duration for which funding support for HFC-23 by-product emission controls should be provided, the Executive Committee have expressed different views. Some members have suggested that IOCs should be provided as long as the destruction of HFC-23 is taking place; others have suggested a more limited duration. Some members have suggested that IOCs are intended to incentivize early action, and the need for such an incentive may change as the cost of adopting control measures becomes the regular cost of business. Other members have suggested that the costs of destruction should not be considered as IOCs but recurring costs. In contrast to IOCs, which are expected to decrease as the cost of the alternative to be phased in decreases and the cost of the controlled substance that is phased out increases, many of those recurring costs are not expected to change with time and, therefore, funding should continue to be provided for them.

11. The Executive Committee may wish to provide guidance on:

- (a) The duration of the IOCs; and/or
- (b) Whether to develop guidelines to determine recurring or operating costs for HFC-23 by-product control projects.

Level of agency support costs

12. In line with decision 67/15,⁶ projects amounting to US \$250,000 and above would receive agency support costs of 7.0 per cent, and for projects in the production sector, the agency support costs would be no greater than 6.5 per cent, to be determined on a case-by-case basis. The current practice in the production sector is that the costs of independent verification are included in the agency support costs. For consideration of the agency support cost, it is not clear whether HFC-23 by-product control projects would be considered as projects in the production sector or as investment projects.

13. The Secretariat considers that for HFC-23 by-product control projects where there would be continued production of HCFC-22, and hence continued generation of HFC-23 by-product that must be controlled (either on- or off-site), continued agency support would be expected. Accordingly, in such cases, the agency support costs for investment projects would be applicable. In contrast, in projects where closure of the HCFC-22 production facility is the modality used to comply with HFC-23 by-product control obligations, the agency support costs for the production sector would be applicable.

14. Since Quimobásicos, the HCFC-22 production facility in Mexico, is expected to continue producing HCFC-22, including for feedstock uses, for the foreseeable future, the Secretariat recommended agency support costs of 7.0 per cent for that project. In the case of Frio Industrias Argentinas (FIASA), the

⁴ Document UNEP/OzL.Pro/ExCom/86/95 indicates by 1 October 2021 in the case of refurbishment, and by March 2021 in the case of closure, based on the 86th meeting to be held from 8-12 March 2021.

⁵ Document UNEP/OzL.Pro/ExCom/86/96 indicates by 1 October 2021 based on the 86th meeting to be held from 8-12 March 2021.

⁶ Administrative cost regime for the 2012–2014 triennium, which has been maintained.

HCFC-22 production facility in Argentina, it is unclear whether the Executive Committee would choose the option of closure, or continued production of HCFC-22 and control of HFC-23 by-product.

15. UNIDO considers that its portfolio is more relevant in determining the agency support costs, rather than on a project-by-project basis; and that projects in the production sector always took into consideration lost profits and, in such cases, it was understandable that lower agency support costs were applied. For HCFC production swing plants where it is not yet clear whether lost profits will be eligible, UNIDO considers that 7 per cent may be appropriate.

16. The Executive Committee may wish to consider providing guidance on:

- (a) The level of agency support costs for HFC-23 by-product control projects that control HFC-23 through destruction;
- (b) The appropriate level of agency support costs for HFC-23 by-product control projects, that control HFC-23 through closure of HCFC-22 production facilities; and
- (c) Whether the costs of annual independent verification on the amounts of HFC-23 by-product generated, and amounts of HFC-23 by-product destroyed to the extent practicable using technology approved by the Parties to the Montreal Protocol, if applicable, should be included under agency support costs or in the project costs.

Verification of HFC-23 by-product emissions after the completion of the project

17. Projects to phase-out consumption of controlled substances *inter alia* require a commitment by participating enterprises to no longer consume the controlled substance phased out after completion of the project, and documentation of actions taken to ensure that specific equipment or components replaced had been destroyed or rendered unusable upon completion of the project. Similarly, the guidelines for the verification of projects to phase-out the production of controlled substances *inter alia* require verification of destruction of key components. Unlike those projects, where the consumption or production of controlled substances will cease after the completion of the project, HFC-23 by-product will continue to be generated on any HCFC-22 production line that continues to operate after the completion of the project. However, verification of HFC-23 by-product controls would cease upon completion of the project; reporting of HFC-23 by-product controls would continue to be provided through the country programme implementation report to the Executive Committee, and to the Parties under Article 7 of the Montreal Protocol.

18. Should the Executive Committee wish to ensure continued verification of HFC-23 by-product emission controls at production lines that continue to produce HCFC-22, and hence generate HFC-23 by-product after the completion of the project (e.g., continued production of HCFC-22 for feedstock uses), the Executive Committee could consider a similar approach as proposed in paragraph 21(j) of document UNEP/OzL.Pro/ExCom/84/64, Overview of current monitoring, reporting, verification and enforceable licensing and quota systems developed with support from the Multilateral Fund, wherein the government concerned could request additional funding for independent verification of HFC-23 by-product controls under the subsequent stage of its HCFC phase-out management plan (HPMP) until the approval of its HFC phase-down management plan, at which time verifications could continue under that latter plan.

19. The Executive Committee may wish to consider providing guidance on whether to invite Article 5 countries that control HFC-23 through destruction rather than through closure of HCFC-22 production facilities, to request additional funding for independent verification of HFC-23 by-product destruction after the completion of the project under the subsequent stage of the country's HPMP until the approval of its HFC phase-down management plan, at which time verifications could continue under that latter plan.

II. Policy issues arising in the project in Argentina

Basis for HCFC-22 production to be used in determining IOCs

20. At its 83rd meeting, the Executive Committee considered for the first time the project proposal from the Government of Argentina to control HFC-23 by-product emissions at the HCFC-22 production facility FIASA. Rather than using the level of production of HCFC-22 on the basis of either the year, or an average of the three years, immediately preceding project preparation, in line with the decision adopted by the Executive Committee at its 16th meeting,⁷ the proposal was based on the forecast production of HCFC-22 for the duration of the project (i.e., from 2020 to 2030), taking into account the maximum allowable levels of production under the Montreal Protocol.

21. In determining the level of the production of HCFC-22 and the associated HFC-23 by product emissions, the Secretariat has followed the decision adopted by the Executive Committee at its 16th meeting.

22. The Executive Committee may wish to provide guidance on whether the decision adopted at the 16th meeting should be used as a basis for calculating the level HCFC-22 production and associated HFC-23 by-product generated, as the basis for determining IOCs, or to use another method.

Extent to which profitability of HCFC-22 production should be based on the local or international price of HCFC-22

23. In 2018, FIASA was able to charge local consumers a price for HCFC-22 that was approximately twice the international market price. Information provided at the 85th meeting indicates that the enterprise further increased its price of HCFC-22, reaching a factor of three higher than the international market price in 2019; and further increasing its price in January 2020. The Secretariat considered a scenario based on that increased price, which was a key determinant of whether, under that scenario, the enterprise was profitable, and the extent of those profits; at international market prices, the enterprise would not be financially viable.

24. The Executive Committee may wish to provide guidance on the extent to which the profitability of HCFC-22 production should be based on the local or the international market price of HCFC-22.

III. Policy issues arising in the project in Mexico

Eligibility of HFC-23 by-product associated with HCFC-22 exported to a non-Article 5 country

25. At its 15th meeting, the Executive Committee endorsed guidelines to apply in projects which benefit enterprises that export part of their production to non-Article 5 countries.⁸ In line with those guidelines, HCFCs that were exported to non-Article 5 countries were deducted when determining the funding compensation as those exports were not considered eligible.

26. If the guidelines endorsed at the 15th meeting were to be applied to the project at Quimobásicos, the cost of the project would be reduced by 49 per cent, noting that the enterprise's average 2017-2019 exports⁹ to a non-Article 5 country was 59 per cent.¹⁰ The Government of Mexico considers that those guidelines are applicable to conversion projects in the consumption sector; in the case of the project at Quimobásicos, the substance exported is HCFC-22, not HFC-23, which is the substance that needs to be

⁷ Paragraph 32(b) of document UNEP/OzL.Pro/ExCom/16/20.

⁸ Paragraphs 146 and 147 of document UNEP/OzL.Pro/ExCom/15/45.

⁹ "The average over the three years prior to submission of the project shall be used to determine production and exports to non-Article 5 countries."

¹⁰ "Where exports to non-Article 5 countries exceed 10 per cent of production but do not exceed 70 per cent, there shall be a reduction equivalent to the percentage of total production represented by such exports less 10 per cent."

controlled under the Kigali Amendment and would be emitted in Mexico. Accordingly, the Government of Mexico does not consider the guidelines applicable to projects related to the control of HFC-23 by-product emissions.

27. HFC-23 by-product control obligations are new and different from those previously considered by the Executive Committee. HFC-23 by-product will be generated where the HCFC-22 production facility is located, and, unless controlled, will be emitted there, irrespective of whether the HCFC-22 produced was exported to a non-Article 5 country.

28. The Executive Committee may wish to provide guidance on whether or not to apply the guidelines on funding enterprises that export part of their production to non-Article 5 countries endorsed at the 15th meeting, to projects in which the beneficiary enterprise exports HCFC-22 to a non-Article 5 country.

Eligibility of HFC-23 by-product associated with HCFC-22 production for feedstock use

29. The Parties to the Montreal Protocol had determined that production (and consumption) of controlled substances for feedstock uses should be excluded from control measures, based on the understanding that the controlled substance would be transformed during the manufacture of other chemicals and, therefore, would result in insignificant emissions into the atmosphere.

30. HFC-23 by-product control measures were intended to provide climate benefits irrespective of whether the HCFC-22 production that generated the HFC-23 by-product is used for controlled or feedstock uses.

31. The Executive Committee may wish to confirm that the eligibility of HFC-23 by-product controls would be independent of whether the production of HCFC-22 is for controlled or for feedstock uses.

IV. New scientific study on HFC-23 emissions

32. At the 82nd meeting, the Executive Committee considered document UNEP/OzL.Pro/ExCom/82/68 on cost-effective options for controlling HFC-23 by-product emissions, pursuant to decision 81/68(e). In response to a question about the smaller decrease in HFC-23 emissions reported in the scientific journal article by Simmonds et al.¹¹ (which was cited in the document), the representative of the Secretariat clarified that, while the emissions data for years prior to 2016 in Simmonds et al. had been much as anticipated, a difference had started to become apparent in 2016.¹² Work was continuing in the scientific community on the matter.

33. A scientific journal article published in January 2020¹³ reported that, contrary to expected reductions of HFC-23 emissions, atmospheric observations showed that those emissions had increased and in 2018 were higher than at any point in history (15,900 ± 900 metric tonnes (mt)/yr). Given the magnitude of the discrepancy between expected and observation-inferred emissions, the authors suggest that it was likely that HFC-23 emission reductions reported since 2015 had not been successfully implemented until at least the beginning of 2019, or there was substantial, unreported production of HCFC-22 from which HFC-23 had been vented, or some combination thereof. The difference between reported and observation-inferred estimates suggested that an additional ~309 million mt CO₂-eq emissions had been added to the atmosphere between 2015 and 2017.

¹¹ Simmonds et al., “Recent increases in the atmospheric growth rate and emissions of HFC-23 (CHF₃) and the link to HCFC-22 (CHClF₂) production,” *Atmos. Chem. Phys.*, 18, 4153–4169, 2018. <https://doi.org/10.5194/acp-18-4153-2018>.

¹² Paragraph 318 of UNEP/OzL.Pro/ExCom/82/72.

¹³ Stanley et al., “Increase in global emissions of HFC-23 despite near-total expected reductions,” *Nature Communications*, 11:397, 2020. <https://doi.org/10.1038/s41467-019-13899-4>.

34. The Secretariat notes that it is unclear why emissions of HFC-23 are increasing, and that no information is available in the study by Stanley et al. to suggest where those increased emissions originate, including whether they are from Article 5 countries, non-Article 5 countries, or some combination thereof.

RECOMMENDATION

35. The Executive Committee may wish to:

- (a) Note the key aspects related to HFC-23 by-product control technologies (decisions 84/90 and 84/91) contained in document UNEP/OzL.Pro/ExCom/86/94;
- (b) Provide guidance on the following issues related to HFC-23 by-product control projects:
 - (i) Whether to seek guidance from the Parties to the Montreal Protocol on what constituted compliance with paragraph 6 of Article 2J of the Montreal Protocol, in particular in relation to the term “destroyed to the extent practicable;”
 - (ii) Whether the level of the production of HCFC-22 and the associated HFC-23 by-product emissions should be calculated on the basis of either the year, or an average of the three years, immediately preceding project preparation, in line with the decision adopted at the 16th meeting, or to use another method;
 - (iii) Whether or not to apply the guidelines endorsed by the Executive Committee at its 15th meeting to projects in which the beneficiary enterprise exports HCFC-22 to a non-Article 5 country;
 - (iv) Whether to invite Article 5 countries that control HFC-23 by-product through destruction to request additional funding for independent verification of HFC-23 by-product control after the completion of the project under the subsequent stage of the country’s HCFC phase-out management plan until the approval of its HFC phase-down management plan, at which time verifications could continue under that latter plan;
 - (v) The extent to which the profitability of HCFC-22 production should be based on the local or the international market price of HCFC-22; and
 - (vi) The duration of the incremental operating costs and/or whether to develop guidelines to determine recurring or operating costs to HFC-23 by-product control projects;
- (c) To consider the level of agency support costs for HFC-23 by-product control:
 - (i) For projects that control HFC-23 through destruction;
 - (ii) For projects that control HFC-23 through closure of HCFC-22 production facilities; and
 - (iii) Whether the costs of annual independent verification on the amounts of HFC-23 by-product generated, and amounts of HFC-23 by-product destroyed to the extent practicable using technology approved by the Parties to the Montreal Protocol, if applicable, should be included under agency support costs or in the project costs; and

- (d) Confirm that HFC-23 by-product controls would be eligible independent of whether the HCFC-22 production that generated the HFC-23 is for controlled or for feedstock uses.
