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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Ninety-seventh Meeting
Montreal, 1–5 December 2025
Item 14 of the provisional agenda¹

REPORT OF THE SUB-GROUP ON THE PRODUCTION SECTOR**Introduction**

1. The Sub-group on the Production Sector, which had been reconstituted at the 96th meeting of the Executive Committee, met on 2, 4 and 5 December 2025 in the margins of the 97th meeting. It consisted of the representatives of Argentina, Canada, Cuba, China, Italy, Lesotho, Sweden and the United States of America, with Canada acting as facilitator. Representatives of the World Bank were also present as observers.

Agenda item 1: Adoption of the agenda

2. The facilitator of the Sub-group welcomed the participants.
3. The Sub-group adopted the provisional agenda as set out in document UNEP/OzL.Pro/ExCom/97/SGP/1.

Agenda item 2: Organization of work

4. The Sub-group agreed to follow the organization of work proposed by the facilitator.

Agenda item 3(a): HCFC production phase-out management plan (HPPMP) for China: 2024 verification report of the HCFC production sector

5. The representative of the Secretariat introduced document UNEP/OzL.Pro/ExCom/97/SGP/2. The World Bank had submitted 2024 verification reports for the HCFC production sector in China in accordance with paragraph 19 of the Agreement. The verification confirmed that China was in compliance in 2024 with the Montreal Protocol control targets for HCFC production and consumption, as well as with the targets specified in the Agreements with the Executive Committee. In addition, the World Bank had provided an explanation of the differences between the verified 2023 HCFC production for controlled uses and

¹ UNEP/OzL.Pro/ExCom/97/1

consumption and that reported under Article 7 of the Montreal Protocol; an update on the status of the destruction of remaining key equipment, the environmental clean-up at an HCFC-142b production line, and the relocation of three lines; and information related to the one-time verification of the vertical integration of 15 lines that had been or were planned to be established.

6. The Secretariat noted that information had been received from the World Bank subsequent to the issuance of the document. The Sub-group agreed that while an addendum² may be made available on the in-session portal of the Sub-group, its consideration was contingent on the review of the information contained therein by members given the late provision of the information.

7. In addition, he said that the Secretariat had identified a number of differences between the 2024 verified HCFC production and consumption and that which had been reported under Article 7, and between the HFC-23 by-product generated, destroyed and emitted as reported in the verification report and that reported under Article 7. Explanations for some of those differences had been received from the World Bank, while some differences remained unexplained.

8. One member requested clarification on footnote 20 of the document, which stated that the verification report submitted by the World Bank did not include information on HFC-23 by-product generated from two HFC-23 production facilities in China. The representative of the Secretariat clarified that those facilities were excluded from the calculations in paragraph 41 of the document as those calculations made reference to the quantity of HFC-23 by-product from HCFC-22 production, and the two facilities produced HFC-23 as the intended product.

9. In response to further questions, the representative of the Secretariat clarified that while HCFCs contained in high-boiling residue (HBR) were often destroyed by incineration, they were sometimes captured and sold as feedstock; recalling decision 94/61, such a capture would count as production and would therefore be reflected in the data report. The sale by Zhonghao Chenguang Research Institute of Chemical Industry Co., Ltd. of 94.05 metric tonnes (mt) of HCFC-22 for domestic feedstock use, as noted in the verification report, should also therefore be reflected in China's Article 7 data reporting; the representative of the World Bank further clarified that the enterprise normally produced HCFC-22 for its own feedstock use, but in that instance had sold the product to a subsidiary downstream facility that it had set up for feedstock use, so this quantity was considered as production for feedstock and caused no difference in the country's Article 7 data reporting.

10. The representative of the World Bank added that in the particular case referred to in paragraph 26 of the document, the HBR had been transferred between two subsidiaries of the same enterprise without any fee or associated cost, with an agreement that the receiving subsidiary would use the HBR as feedstock for the production of CFC-113a without separation, and would not sell the material; the Government therefore deemed that the transaction did not fall under the ambit of paragraph (a)(ii) of decision 94/61 as the HCFCs in question had not been "captured and sold."

11. The representative of the Secretariat also explained that the differences between the amounts of HFC-23 by-product emissions contained in the verification report and those reported under Article 7 may be due to a difference in the method applied, where one report may be based on the measurement-based method and the other a mass balance approach. Differences in the quantity of HFC-23 by-product destroyed were in some cases caused by the difference in ability to correct for the purity of the waste stream being fed into the incinerator and in other cases for reasons unknown.

12. The representative of the World Bank added that other factors could result in the discrepancies, in particular the two producers referred to in paragraph 40 of the document, the Article 7 data included information on the management of HFC-23 by-product from both production lines established by 2010 and

² UNEP/OzL.Pro/ExCom/97/SGP/2/Add.1

those established after 2010, while the verification report provided separate information on the management of HFC-23 by-product: for production lines established by 2010, and national information for those lines established after 2010. Responding to whether there were plans to standardize reporting methodologies in the future, the World Bank indicated that the Government could not dictate that all producers use a particular methodology, given the considerable variety of production modalities; one measure that might help reduce differences was greater alignment of the World Bank and China verification schedules. The representative of the Government of China said that the Government planned to issue guidance soon that should help advise producers on the type of methodology they should use and that this was expected to minimize but not eliminate such discrepancies.

13. Responding to a question about the measurement of HFC-23 by-product generated as set out in table 3 of the document, the representative of the Secretariat explained that the figures prior to 2023 were based on a measurement-based approach derived from the flow meters in place on many HCFC-22 production lines, and that it was his understanding that additional verification reports had been available between 2015 and 2019. The increase in the by-product generation rate in 2024 to 2.12 per cent was likely an artifact of the change in methodology used by the Government to estimate HFC-23 by-product generation, where sometimes a measurement-based approach is used and other times a mass-balance approach.

14. Subsequently, the Sub-group discussed document UNEP/OzL.Pro/ExCom/97/SGP/2/Add.1, which provided information on three newly established HCFC-142b production lines that started production in 2025 and were yet to be verified as being vertically integrated, and a suggested amendment to the recommendation in the light of that information.

15. Responding to a request by a member, the representative of the Secretariat clarified that the process to verify on a one-off basis that newly established lines were vertically integrated and produced HCFCs exclusively for feedstock uses typically commenced with a visual inspection, followed by a financial verification that looked at the incoming materials and how they were used, and therefore could only be completed once production has begun. The member also requested what the total production capacity would be when including production at the three new lines, including for both consumption and feedstock uses, as well as any information available on historical production of HCFC-142b in China going back to 2011.

16. Subsequently, the Sub-group discussed the recommendation for the present agenda item, as set out in paragraph 43 of document UNEP/OzL.Pro/ExCom/97/SGP/2, along with the proposed revision in the addendum to that document.

17. One member suggested inclusion in the recommendation of a paragraph on the reporting of HCFCs in HBR. The representative of the Government of China recalled that the issue of reporting of HBR had been dealt with in decision 94/61, and the Government of China had taken action in accordance with that decision. A further decision on the matter within such a short time period could create misunderstanding in the industry. The Sub-group agreed that it would recommend to the Executive Committee that the issue of HCFCs in HBR be further considered at the 98th meeting, taking into account decision 94/61 and information provided by the Secretariat.

18. The Sub-group on the Production Sector recommended that the Executive Committee:

- (a) Note the 2024 verification report of the HCFC production sector in China considered by the Sub-group on the Production Sector;
- (b) Request the World Bank to include in the 2025 HCFC production verification:
 - (i) An explanation of the differences between the verified 2024 HCFC production for controlled uses and verified 2024 HCFC consumption and that reported under

Article 7 of the Montreal Protocol, and between the quantities of HFC-23 by-product reported to have been destroyed under Article 7 and those contained in the 2024 HCFC production verification report;

- (ii) An update on the status of:
 - a. Zhejiang Pengyou Chemical Co. Plant's HCFC-22 production line that was relocated to Jiangxi Province to be operated by Jiangxi Pengyou Chemical Co., Ltd;
 - b. Jiangsu Meilan Chemical Co. Ltd's HCFC-22 production line that was relocated to Jiangxi Province to be operated by Jiujiang JiuHong New Materials Co.;
 - c. The closure and dismantling of the second HCFC-142b line that had been established at Taixing Meilan for feedstock use and that the enterprise had decided to close;
 - d. The closure and dismantling of the HCFC-141b/HCFC-142b production line at Changshu 3F Fluorochemical Industry Co., Ltd and of the HCFC-22 production line at Shandong Dongyue;
- (c) Request the World Bank to verify, on a one-off basis, that the newly established HCFC-142b production line at Changshu 3F Fluorochemical Industry that had been reported to the 95th meeting and that was expected to start production in 2025 was vertically integrated with the downstream facility and that all HCFC-142b produced on the line would be exclusively for feedstock use and to submit a report thereon to the last meeting of 2026;
- (d) Request the World Bank to verify, on a one-off basis, that the newly established production lines identified in document UNEP/OzL.Pro/ExCom/97/SGP/2/Add.1 were vertically integrated with the downstream facilities and that all HCFCs produced on the lines would be exclusively for feedstock use, and to submit a report thereon to the last meeting of 2026;
- (e) Request the World Bank to verify, on a one-off basis, that the newly established HCFC-142b and HCFC-22 production lines at Zhejiang Sanmei that had been reported to the 95th meeting and that were expected to start production in 2026 were vertically integrated with the downstream facilities and that all HCFCs produced on those lines would be exclusively for feedstock use, and to submit a report thereon to the last meeting of 2027; and
- (f) Continue to consider the issue of HCFCs in high-boiling waste residue at the 98th meeting, taking into account decision 94/61 and information prepared by the Secretariat.

Agenda item 3(b): HPPMP for China: Matters related to HFC-23 (decisions 95/94(b)(iii), (c), (d)(ii) and 96/58(b))

19. The representative of the Secretariat introduced document UNEP/OzL.Pro/ExCom/97/SGP/3, which includes a report on the international workshop on HFC-23 emissions at the scientific level that was organized in China in September 2025; a summary of information from relevant recent scientific studies related to the matter of HFC-23 by-product emissions; and an update on the Secretariat's confirmation that the Government of China had taken appropriate measures to manage HFC-23 by-product in accordance with paragraph 10 of the Agreement. The Secretariat highlighted that irrespective of whether the emissions of HFC-23 by-product reported under Article 7 or contained in the HCFC production verification report

were used, based on the total production of HCFC-22 for all uses of 956,763 mt, the emissions of HFC-23 by product from HCFC-22 production for all uses reported would be less than the 0.1 kg per of HFC-23 by-product per 100 kg of HCFC-22 produced used by the Executive Committee to define HFC-23 by product destruction that was “to the extent practicable” in the context of Multilateral Fund-supported projects (decision 89/7(b)(i)).

20. One member who had attended the workshop on HFC-23 in China praised the organization and content of the workshop. While the number of atmospheric monitoring stations in China was increasing, it would be useful to obtain more information on the number of monitoring stations and how many of them were part of, or would join, the Advanced Global Atmospheric Gases Experiment (AGAGE) monitoring network. New measurement tools were available, including the gas chromatography and mass spectrometry (GC-MS) instrument that was similar to the Medusa GC-MS system, but high levels of consistency in the results were yet to be achieved. A key message of the workshop was the need for more data to fill the monitoring gaps and identify emission sources, including through localized monitoring to pinpoint sources of emissions. New technologies were being deployed to assist in that regard, including the use of drones to take flask samples. Finally, he asked what levels of outside independent verification were being applied in China, and what plans might be in place to increase independent verification of HFC-23 by-product control at production facilities.

21. Another member said that it was apparent from the report that there was a large number of high-frequency atmospheric monitoring stations and flask sampling stations operating in China, providing data on a wide range of HFCs, which raised the question as to why there were not more data on the key chemicals of interest, particularly HFC-23. He requested more information on the current status of HFC-23 monitoring in China, and on the availability of nationwide historical estimates of HFC-23 emissions, given the statement in paragraph 15 of the document that future work could use data from atmospheric monitoring sites in China to infer such emissions.

22. Responding to the questions raised, the representative of the Government of China said that some monitoring stations were members of the AGAGE network and others had expressed willingness to join, though the actual numbers and timeline were currently unknown. Regarding the verification process, the Government of China, through the Ministry of Ecology and Environment, would continue to undertake a country-level annual verification, while enterprises would continue to perform daily monitoring. High-frequency data on atmospheric abundances of HFC-23 had only recently been made available and analysis of the data is ongoing. Continuous historical data on HFC-23 is not available. Regarding the gaps in data on emissions, he said that both the Government and enterprises recognized the importance of improving data collection and making progress in closing the gaps, for example through enterprise-level monitoring studies and extending the coverage of atmospheric monitoring stations. Experts continued to work on the available data and would publish their findings in the future, though the timeline of such publication was not known. Given the success of the recent workshop, another workshop was planned for 2026.

23. One member requested clarification of the information provided in paragraph 15 of the document stating that HFC-23 was produced at two facilities as a feedstock to produce halon 1301, and noted that those facilities could be a source of fugitive emissions. He asked why the facilities were intentionally producing HFC-23 for halon 1301 production rather than using HFC-23 by-product from the production of HCFC-22. The representative of the Government of China clarified that the halon 1301 producer had previously purchased HFC-23 from HCFC-22 producers, but had set up its own small facility to produce HFC-23 in order to reduce costs and that the total HFC-23 production capacity of the two lines was 600-700 mt/year.

24. The representative of the Secretariat added that the conversion technology referred to would be of particular benefit to HCFC-22 producers, as they would be able to generate more of their product, whereas the economics would be different for those lines that produce HFC-23 as feedstock. Fugitive emissions

were to be expected from any facility, but it was to the benefit of an HFC-23 producer to reduce emissions of their product.

25. One member expressed some reservation about the conclusion in paragraph 22 of the document. While China had undertaken a number of positive activities, including holding the symposium, making efforts to set up additional monitoring stations, improving reporting, and reducing emissions, the evidence from atmospheric monitoring stations still showed a significant gap between reported emissions and those derived from atmospheric concentrations, indicating an ongoing problem and, therefore, his delegation had questions about whether China was meeting its commitments under paragraph 10 of the Agreement. Another member said that more should be done to improve localized monitoring of emissions.

26. The representative of the Secretariat noted that while the emissions derived from atmospheric observations were not consistent with those obtained from reporting, they did not provide conclusive evidence of the source of the emissions. Regarding decision 95/94(c), the Executive Committee had requested the Secretariat to make the necessary confirmation based on the specified information, which would allow the World Bank to release the funding that had been retained in line with decision 95/94(c).

27. Subsequently, the Sub-group further considered the matter of HFC-23 emissions. Several members highlighted the value of atmospheric monitoring close to HCFC-22 production facilities, which could provide information on the effectiveness of HFC-23 by-product controls undertaken at such facilities. One member highlighted that intensified monitoring at high-frequency monitoring stations, complemented by more localized monitoring in the vicinity of production facilities in eastern and central China, would help to shed light on the gap between top-down atmospheric monitoring of emissions and bottom-up reporting of emissions. While the efforts so far of the Government of China were appreciated, a complementary approach could add value.

28. The representative of the Government of China drew attention to the ongoing efforts in China to fulfil its obligations under the Agreement, and stressed the importance of working within the country's compliance and government management capabilities, considering that there were no current industrial emission standards for HFC-23 and no validated monitoring methodologies. Certain domestic research teams were conducting experimental research on the issue and results would be published when available. Another representative of China said that fruitful discussions on the matter had recently taken place at the Thirty-Seventh Meeting of the Parties to the Montreal Protocol that took place in November 2025. She highlighted that the emission of HFC-23 was an issue of global importance, and it behove all parties with relevant facilities to continue their efforts to identify solutions.

Agenda item 4: Other matters

29. No other matters were raised.

Agenda item 5: Adoption of the report

30. The present report was reviewed by the facilitator and submitted to the Chair of the Executive Committee for transmission to the 97th meeting of the Executive Committee.

Agenda item 6: Closure

31. The meeting of the Sub-group was closed at 9:28 a.m. on 5 December 2025.