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EXECUTIVE COMMITTEE OF  
THE MULTILATERAL FUND FOR THE  
IMPLEMENTATION OF THE MONTREAL PROTOCOL  
Ninety-fourth Meeting  
Montreal, 27-31 May 2024  
Item 9(d) of the provisional agenda<sup>1</sup>

**PROJECT PROPOSAL: MONTENEGRO**

This document consists of the comments and recommendation of the Secretariat on the following project proposal:

Phase-down

- Kigali HFC implementation plan (stage I, first tranche)

UNIDO

<sup>1</sup> UNEP/OzL.Pro/ExCom/94/1

**PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS**

**Montenegro**

|  |               |
|--|---------------|
| <b>PROJECT TITLE</b>                     | <b>AGENCY</b> |
| Kigali HFC implementation plan (stage I) | UNIDO (lead)  |

|  |                   |          |                                    |
|--|-------------------|----------|------------------------------------|
| <b>LATEST ARTICLE 7 DATA (Annex F)</b> | <b>Year: 2023</b> | 67.17 mt | 191,587 CO <sub>2</sub> -eq tonnes |
|--|-------------------|----------|------------------------------------|

| <b>SECTORAL HFC CONSUMPTION DATA (CO<sub>2</sub>-eq tonnes) AND ACTIVITIES</b> |         |      |               |                      |    |       |           |         |       |
|--|---------|------|---------------|----------------------|----|-------|-----------|---------|-------|
|  | Aerosol | Foam | Fire-fighting | AC and refrigeration |    |       | Servicing | Solvent | Other |
|  |         |      |               | Manufacturing        |    |       |           |         |       |
|  |         |      |               | Refrigeration        | AC | Other |           |         |       |
| As submitted (2022)  |         | 611  |               | 480                  |    |       | 140,248   |         |       |
| Latest CP report (2023)  |         |      |               |                      |    |       | 191,587   |         |       |
| KIP stage I activities as agreed (Y/N)   | N       | N    | N             | N                    | N  | N     | Y         | N       | N     |

|   |          |                                    |
|---|----------|------------------------------------|
| <b>AVERAGE 2020-2022 HFC CONSUMPTION IN SERVICING</b> | 51.93 mt | 138,158 CO <sub>2</sub> -eq tonnes |
|---|----------|------------------------------------|

| <b>BASELINE CONSUMPTION DATA (CO<sub>2</sub>-eq tonnes)</b> | <b>2020</b> | <b>2021</b> | <b>2022</b> | <b>Average 2020-2022</b> |
|---|-------------|-------------|-------------|--------------------------|
| HFC annual consumption                                      | 170,362     | 107,504     | 140,724     | 139,530                  |
| HCFC baseline (65%)   |             |             |             | 16,324                   |
| HFC baseline  |             |             |             | 155,854                  |

| <b>HFC CONSUMPTION ELIGIBLE FOR FUNDING</b>   |     |
|---|-----|
| Starting point for sustained aggregate reductions                                   | n/a |
| Previously approved HFC phase-down investment projects                              | No  |
| Aggregate reductions from previously approved projects (CO <sub>2</sub> -eq tonnes) | n/a |

| <b>PROJECT DATA AS AGREED</b>            |                          | <b>2024*</b>  | <b>2025</b> | <b>2026</b> | <b>2027</b> | <b>2028</b> | <b>2029</b> | <b>Total</b> |         |
|--|--------------------------|---------------|-------------|-------------|-------------|-------------|-------------|--------------|---------|
| Consumption (CO <sub>2</sub> -eq tonnes) | Montreal Protocol limits | 155,854       | 155,854     | 155,854     | 155,854     | 155,854     | 140,269     | n/a          |         |
|  | Maximum allowable        | 155,854       | 136,739     | 133,949     | 131,158     | 128,368     | 125,577     | n/a          |         |
|  | Maximum allowable (%)    | 100           | 87.74       | 85.95       | 84.15       | 82.36       | 80.57       | n/a          |         |
| Amounts recommended in principle (US \$) | UNIDO                    | Project costs | 115,050     | 0           | 0           | 74,550      | 0           | 0            | 189,600 |
|  |                          | Support costs | 14,956      | 0           | 0           | 9,692       | 0           | 0            | 24,648  |
|  | Total project costs      | 115,050       | 0           | 0           | 74,550      | 0           | 0           | 189,600      |         |
|  | Total support costs      | 14,956        | 0           | 0           | 9,692       | 0           | 0           | 24,648       |         |
|  | Total funds              | 130,006       | 0           | 0           | 84,242      | 0           | 0           | 214,248      |         |

\* Recommended for approval at the present meeting.

|  |        |
|--|--------|
| Reduction from stage I in CO <sub>2</sub> -eq tonnes | 30,277 |
|--|--------|

|                                      |  |
|--------------------------------------|--|
| <b>Secretariat's recommendation:</b> | Individual consideration (Secretariat presentation not required) |
|--------------------------------------|--|

## PROJECT DESCRIPTION

1. The present document contains the following sections:
  - I. Summary of the proposal as submitted
  - II. Background: Implementation status of the country's HCFC phase-out management plan and previous HFC-related projects
  - III. HFC consumption: Overview of the country's HFC consumption levels, trends, and sectoral uses
  - IV. Stage I of the Kigali HFC implementation plan as submitted: Overarching strategy and plan of implementation for the first tranche
  - V. Secretariat's comments, including the agreed cost of activities
  - VI. Recommendation

### I. Summary of the proposal as submitted

2. On behalf of the Government of Montenegro, UNIDO as the designated implementing agency has submitted a request for stage I of the Kigali HFC implementation plan (KIP), in the amount of US \$189,600, plus agency support costs of US \$24,648, as originally submitted.<sup>2</sup>
3. The implementation of stage I of the KIP will assist the Government of Montenegro in meeting the target of 10 per cent reduction of the average HFC consumption in the baseline years by 1 January 2029.
4. The first tranche of stage I of the KIP being requested at this meeting amounts to US \$108,970, plus agency support costs of US \$14,166, for UNIDO, as originally submitted, for the period of September 2024 to December 2026.

### II. Background

#### Status of implementation of the HCFC phase-out management plan

5. Table 1 presents information on the HPMP in Montenegro as of May 2024.

**Table 1. HPMP implementation status for Montenegro**

|  | <b>Stage I</b>                     | <b>Stage II</b>  |
|--|------------------------------------|------------------|
| Meeting(s) when HPMP was approved/updated  | 63 <sup>rd</sup> /71 <sup>st</sup> | 85 <sup>th</sup> |
| Reduction from baseline                    | 35% by 2020                        | 100% by 2025     |
| <b>Total project cost (US \$)</b>          | 404,500                            | 635,500          |
| <b>Date of completion (actual/planned)</b> | 31 December 2021                   | 31 December 2026 |

#### Status of implementation of previous HFC-related activities

6. Table 2 presents an overview of activities implemented in Montenegro in the context of the Kigali Amendment that have been funded by the Multilateral Fund.

<sup>2</sup> As per the letter of 29 January 2024 from the Environmental Protection Agency of Montenegro to the UNIDO.

**Table 2. Previously approved HFC-related activities in Montenegro**

| Approval meeting | Project title                          | Implementing agency | Cost (US \$) | Date of completion |
|------------------|--|---------------------|--------------|--------------------|
| 74 <sup>th</sup> | Survey of ODS alternatives             | UNIDO               | 40,000       | December 2016      |
| 80 <sup>th</sup> | Enabling activities for HFC phase-down | UNIDO               | 50,000       | June 2019          |

### III. HFC consumption overview

#### HFC consumption levels

7. Montenegro predominantly consumes HFCs to service refrigeration and air-conditioning (RAC) equipment; a small quantity of HFCs are consumed for the local assembly and installation of commercial and industrial refrigeration equipment, and one enterprise manufactures a small quantity of HFC-134a-based chest freezers, for which the enterprise also manufactures polyurethane foam using HFCs contained in imported pre-blended polyols. The most consumed substances in 2022 were R-404A (71.2 per cent of total HFC consumption in CO<sub>2</sub>-equivalent (CO<sub>2</sub>-eq) tonnes), HFC-134a (21.1 per cent), R-410A (6.0 per cent), and other HFCs (1.7 per cent). Table 3 presents the country's HFC consumption as reported to the Ozone Secretariat under Article 7 of the Montreal Protocol.

**Table 3. HFC consumption in Montenegro (2019–2023 Article 7 data)**

| HFC  | GWP*     | 2019           | 2020           | 2021           | 2022           | 2023           |
|--|----------|----------------|----------------|----------------|----------------|----------------|
| <b>Metric tonnes (mt)</b>                    |          |                |                |                |                |                |
| HFC-32                                       | 675.00   | 0.60           | 3.08           | 0.36           | 0.98           | 0.90           |
| HFC-134a                                     | 1,430.00 | 39.30          | 25.05          | 6.12           | 20.80          | 17.24          |
| R-404A                                       | 3,921.60 | 30.58          | 22.86          | 22.20          | 25.57          | 35.16          |
| R-407C                                       | 1,773.85 | 2.23           | 4.56           | 0.10           | 0.95           | 1.63           |
| R-410A                                       | 2,087.50 | 5.09           | 16.64          | 5.40           | 4.02           | 12.24          |
| R-507A                                       | 3,985.00 | 0.45           | 0.00           | 0.00           | 0.00           | 0.00           |
| <b>Total (mt)</b>                            |          | <b>78.25</b>   | <b>72.18</b>   | <b>34.18</b>   | <b>52.31</b>   | <b>67.17</b>   |
| HFC-365mfc imported in pre-blended polyols** | 794.00   | 2.13           | 2.45           | 1.76           | 0.77           | 0.00           |
| <b>CO<sub>2</sub>-eq tonnes</b>              |          |                |                |                |                |                |
| HFC-32                                       | 675.00   | 405            | 2,079          | 243            | 662            | 608            |
| HFC-134a                                     | 1,430.00 | 56,205         | 35,819         | 8,752          | 29,738         | 24,653         |
| R-404A                                       | 3,921.60 | 119,911        | 89,652         | 87,060         | 100,256        | 137,883        |
| R-407C                                       | 1,773.85 | 3,961          | 8,087          | 177            | 1,676          | 2,891          |
| R-410A                                       | 2,087.50 | 10,615         | 34,726         | 11,273         | 8,392          | 25,551         |
| R-507A                                       | 3,985.00 | 1,801          | 0              | 0              | 0              | 0              |
| <b>Total (CO<sub>2</sub>-eq tonnes)</b>      |          | <b>192,898</b> | <b>170,362</b> | <b>107,505</b> | <b>140,724</b> | <b>191,587</b> |
| HFC-365mfc imported in pre-blended polyols** | 794.00   | 1,691          | 1,945          | 1,397          | 611            | 0              |

\* Global warming potential

\*\* CP data

#### *Established HFC baseline*

8. The Government of Montenegro reported the Article 7 data for 2020-2022. The country's HFC consumption baseline was established at 155,854 CO<sub>2</sub>-eq tonnes by adding 65 per cent of its HCFC baseline (expressed in CO<sub>2</sub>-eq tonnes) to its average HFC consumption in 2020-2022, as shown in table 4.

**Table 4. HFC baseline calculation for Montenegro (CO<sub>2</sub>-eq tonnes)**

| Baseline calculation components      | 2020    | 2021    | 2022           |
|--------------------------------------|---------|---------|----------------|
| HFC annual consumption               | 170,362 | 107,504 | 140,724        |
| HFC average consumption in 2020-2022 |         |         | 139,530        |
| HCFC baseline (65%)                  |         |         | 16,324         |
| <b>HFC baseline</b>                  |         |         | <b>155,854</b> |

### Country programme implementation report

9. The sectoral HFC consumption data provided by the Government of Montenegro in its country programme (CP) implementation report for 2023 is consistent with the data reported under Article 7 of the Montreal Protocol. While the HFC consumption reported in previous years under Article 7 of the Montreal Protocol and the CP implementation report are similarly consistent when measured in metric tonnes, there are small differences when consumption is reported in CO<sub>2</sub>-eq tonnes due to rounding.

### HFC consumption trends

10. Between 2019 and 2020, HFC consumption decreased due to the increased price of refrigerants and given information shared with importers on planned restrictions. Consumption in 2021 decreased further due to the impact of the COVID-19 pandemic, and the implementation of new legislative provisions, including a ban on the import of controlled substances in non-refillable cylinders, and a requirement that ODS and fluorinated gases (F-gases) can only be sold to licenced enterprises that install, maintain, and decommission equipment and products containing controlled substances. Increases in consumption in 2022 and 2023 were attributable to the COVID-19 recovery, including an increased demand in the tourism sector. Consumption in 2023 may also have been affected by the 2024 control measure. Imports of HFC-365mfc contained in imported pre-blended polyols have decreased steadily since 2020 due to the reduced manufacturing of refrigeration equipment by the sole enterprise manufacturing foam in the country.

### HFC consumption by sector

11. The RAC servicing sector consumes HFC-134a, HFC-32, R-404A, R-407C and R-410A. HFC-134a and a small quantity of HFC-365mfc imported in pre-blended polyols are used by one enterprise to manufacture chest freezers, and HFC-134a and R-404A are used in the assembly of commercial and industrial refrigeration equipment. The country neither produces nor exports HFCs.

12. Overall, HFCs are mainly consumed for servicing in the commercial refrigeration subsector (31.5 per cent in mt and 42.5 per cent in CO<sub>2</sub>-eq tonnes), followed by industrial refrigeration (15.1 per cent in mt and 17.2 per cent in CO<sub>2</sub>-eq tonnes), mobile air-conditioning (MAC) (22.3 per cent in mt and 11.8 per cent in CO<sub>2</sub>-eq tonnes), and other subsectors, as shown in tables 5 and 6.

**Table 5. HFC consumption in Montenegro by sector in mt (2022)**

| Sector                                | HFC-134a    | HFC-32      | R-404A      | R-407C      | R-410A      | Total        | Share of total (%) |
|---------------------------------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------------|
| <b>Manufacturing</b>                  |             |             |             |             |             |              |                    |
| Domestic refrigeration                | 0.34        | 0.00        | 0.00        | 0.00        | 0.00        | 0.34*        | 0.6                |
| <b>Subtotal for manufacturing</b>     | <b>0.34</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.34*</b> | <b>0.6</b>         |
| <b>Refrigeration and AC servicing</b> |             |             |             |             |             |              |                    |
| <b>Refrigeration subsectors</b>       |             |             |             |             |             |              |                    |
| Domestic                              | 0.55        | 0.00        | 0.00        | 0.00        | 0.00        | 0.55         | 1.1                |
| Commercial                            | 1.95        | 0.00        | 14.53       | 0.00        | 0.00        | 16.47        | 31.5               |
| Industrial                            | 2.73        | 0.00        | 5.20        | 0.00        | 0.00        | 7.92         | 15.1               |

| Sector                             | HFC-134a     | HFC-32      | R-404A       | R-407C      | R-410A      | Total        | Share of total (%) |
|------------------------------------|--------------|-------------|--------------|-------------|-------------|--------------|--------------------|
| Transport                          | 0.16         | 0.00        | 0.34         | 0.00        | 0.00        | 0.50         | 1.0                |
| <b>Air-conditioning subsectors</b> |              |             |              |             |             |              |                    |
| Residential                        | 0.00         | 0.98        | 0.00         | 0.51        | 1.94        | 3.43         | 6.5                |
| Mobile                             | 11.65        | 0.00        | 0.00         | 0.00        | 0.00        | 11.65        | 22.3               |
| Other                              | 2.97         | 0.00        | 0.00         | 0.44        | 2.09        | 5.49         | 10.5               |
| <b>Subtotal for servicing</b>      | <b>20.01</b> | <b>0.98</b> | <b>20.07</b> | <b>0.95</b> | <b>4.02</b> | <b>46.02</b> | <b>88.0</b>        |
| Local installation and assembly    | 0.45         | 0.00        | 5.50         | 0.00        | 0.00        | 5.96         | 11.4               |
| <b>Total</b>                       | <b>20.80</b> | <b>0.98</b> | <b>25.57</b> | <b>0.95</b> | <b>4.02</b> | <b>52.31</b> | <b>100</b>         |

\* Consumption in the manufacturing sector also includes 0.77 mt of HFC-365mfc contained in imported pre-blended polyols.

**Table 6. HFC consumption in Montenegro by sector in CO<sub>2</sub>-eq tonnes (2022)**

| Sector                                | HFC-134a      | HFC-32     | R-404A         | R-407C       | R-410A       | Total          | Share of total (%) |
|---------------------------------------|---------------|------------|----------------|--------------|--------------|----------------|--------------------|
| <b>Manufacturing</b>                  |               |            |                |              |              |                |                    |
| Domestic refrigeration                | 480           | 0          | 0              | 0            | 0            | 480*           | 0.3                |
| <b>Subtotal for manufacturing</b>     | <b>480</b>    | <b>0</b>   | <b>0</b>       | <b>0</b>     | <b>0</b>     | <b>480*</b>    | <b>0.3</b>         |
| <b>Refrigeration and AC servicing</b> |               |            |                |              |              |                |                    |
| <b>Refrigeration subsectors</b>       |               |            |                |              |              |                |                    |
| Domestic                              | 791           | 0          | 0              | 0            | 0            | 791            | 0.6                |
| Commercial                            | 2,783         | 0          | 56,965         | 0            | 0            | 59,748         | 42.5               |
| Industrial                            | 3,898         | 0          | 20,373         | 0            | 0            | 24,271         | 17.2               |
| Transport                             | 229           | 0          | 1,349          | 0            | 0            | 1,578          | 1.1                |
| <b>Air-conditioning subsectors</b>    |               |            |                |              |              |                |                    |
| Residential                           | 0             | 662        | 0              | 905          | 4,039        | 5,605          | 4.0                |
| Mobile                                | 16,655        | 0          | 0              | 0            | 0            | 16,655         | 11.8               |
| Other                                 | 4,251         | 0          | 0              | 772          | 4,355        | 9,378          | 6.7                |
| <b>Subtotal for servicing</b>         | <b>28,607</b> | <b>662</b> | <b>78,687</b>  | <b>1,676</b> | <b>8,394</b> | <b>118,026</b> | <b>83.9</b>        |
| Local installation and assembly       | 649           | 0          | 21,573         | 0            | 0            | 22,222         | 15.8               |
| <b>Total</b>                          | <b>29,737</b> | <b>662</b> | <b>100,260</b> | <b>1,676</b> | <b>8,394</b> | <b>140,728</b> | <b>100.0</b>       |

\* Consumption in the manufacturing sector also includes 611 CO<sub>2</sub>-eq tonnes of HFC-365mfc contained in imported pre-blended polyols.

#### *Manufacturing sector*

13. There is one manufacturer in the country consuming HFC-134a and HFC-365mfc in imported pre-blended polyols to manufacturer chest freezers. The HFC-365mfc in polyols is imported in small quantities to produce the insulation foam of the freezers; this is also the only HFC consumption in the foam sector. In 2022, the enterprise manufactured 2,100 units, down from 8,300 and 7,590 units in 2020 and 2021.

#### *Refrigeration and air-conditioning servicing sector*

14. There are 467 certified technicians and 69 licenced workshops consuming HFCs in Montenegro. The licences allow for the installation, maintenance, repair, and decommissioning of equipment and products containing controlled substances.

15. HFCs are used to service commercial refrigeration equipment (stand-alone equipment, condensing units, and centralized systems); industrial refrigeration equipment (small- and medium-sized systems); residential and commercial air-conditioning (AC) equipment (small-split, large single and multi-split, and portable units, and variable refrigerant flow (VRF) and ducted and packaged rooftop systems); chillers (small, medium, and large); transport refrigeration (road vehicles, trailers); domestic refrigerators and freezers; domestic and commercial heat pumps and heating systems; and MAC (cars, small vans, trucks, buses). As shown in tables 5 and 6 above, HFC-134a and R-404A represented the majority (87 per cent in mt and 91 per cent in CO<sub>2</sub>-eq tonnes) of total HFCs used for servicing in 2022, followed by R-410A, HFC-32, and R-407C.

*Domestic, commercial, industrial and transport refrigeration servicing*

16. The highest use of HFCs in the country are in the commercial refrigeration subsector, consuming R-404A and HFC-134a to service stand-alone equipment, condensing units, and large centralized systems. Compared to other subsectors, equipment in the commercial refrigeration has a higher average refrigerant charge (up to 35 kg for large centralized systems) and higher leakage rates (up to 12 per cent). Most equipment in this subsector is charged with HFCs, and a minority (under 10 per cent) charged with HCFC-22 or R-290. From 2020-2022, imports of R-404A-based units have increased slightly while those based on HFC-134a have decreased.

17. Industrial refrigeration is the second highest consuming subsector of HFCs in CO<sub>2</sub>-eq tonnes and third highest in metric tonnes (behind MAC), consuming HFCs to service small- and medium-sized systems. Equipment serviced in this subsector also has a high average refrigerant charge (up to 80 kg for small- and medium-sized systems) and higher leakage rates (up to 8 per cent). Most existing equipment in the subsector are charged with HFCs, mainly HFC-134a and R-404A; R-507A is also used but in very small quantities, with the last import of R-507A being in 2019. A small and decreasing amount of equipment is charged with HCFC-22, and some of the large systems are charged with ammonia and have low servicing needs.

18. Transport refrigeration, which includes road vehicles (vans, trucks) and trailers, consumes R-404A and HFC-134a and is responsible for approximately 1 per cent of HFC consumption in the country.

19. The domestic refrigeration subsector consumes HFC-134a to service 35 per cent of existing refrigerators and freezers (27 per cent residential and 8 per cent non-residential), with the remaining 65 per cent using R-600a; since 2020, all units imported in this subsector have been charged with R-600a.

*Residential and commercial air-conditioning servicing*

20. Residential AC comprises small-split and small self-contained units. Small-split AC (under 12 kW) consumes the largest amount of HFCs in the stationary AC sector, the majority using R-410A, followed by HFC-32 and R-407C; there has been a recent increase of imported units based on HFC-32 and decrease on imported units based on R-410A. Use of HCFC-22 in small-split units has been decreasing by approximately 5 per cent annually, and a negligible amount use R-290; approximately 79 per cent of existing units are HFC-based. Small self-contained AC includes portable systems, window units, through-the-wall units, and packed terminal units, and has the lower use of HFCs in the AC sector; 75 per cent of equipment is serviced using R-410A, with a smaller portion using R-407C. There has been a recent increase of HFC-based-units in this subsector at approximately 1 per cent per year. A small and decreasing number of existing units (older window units) are charged with HCFC-22. Portable systems charged with R-290 were imported in 2021 and 2022, comprising five per cent of these units.

21. Large split and multi-split, VRF, and ducted and packaged rooftop AC systems consume approximately 3 per cent of HFCs in the servicing sector, consuming approximately 85 per cent R-410A and 15 per cent R-407C.

22. The heat pumps and heating systems subsector, which includes domestic and commercial space heating, water heating, and water-cooling systems, consume HFC-134a and R-410A and represent approximately 2 per cent of HFC consumption in the servicing sector.

23. The chiller subsector, including small, medium, and large units, consumes HFC-134a (55 per cent), R-410A (37 per cent), and R-407C (8 per cent); chillers represent approximately 7 per cent of HFC consumption in servicing in mt and 5 per cent in CO<sub>2</sub>-eq tonnes.

*Mobile air-conditioning servicing*

24. MAC, covering cars, small vans, trucks, and buses, is the largest consumer of HFCs in the AC servicing sector, consuming HFC-134a to service light vehicles such as cars and small vans, and larger vehicles including trucks and buses. Light vehicles have an average charge of 0.72 kg per vehicle, and larger vehicles 2.45 kg per vehicle.

*Local installation and assembly subsector*

25. There are five enterprises in the country consuming HFC-134a and R-404A in the local assembly and installation of commercial and industrial refrigeration equipment, including condensing units based on HFC-134a and R-404A, centralized systems based on R-404A, and small and medium-sized industrial refrigeration systems based on R-404A, as shown in table 7. These enterprises also use HFC-134a and R-404A to service existing systems.

**Table 7. Local assembly and installation of commercial and industrial refrigeration equipment**

|                          |                                 | 2020 | 2021 | 2022 |
|--------------------------|---------------------------------|------|------|------|
| <b>Number of units</b>   |                                 |      |      |      |
| Commercial refrigeration | Condensing unit                 | 283  | 392  | 262  |
|                          | Centralized                     | 47   | 67   | 50   |
| Industrial refrigeration | Small- and medium-sized systems | 30   | 25   | 28   |
| <b>Consumption (mt)</b>  |                                 |      |      |      |
| <i>HFC-134a</i>          |                                 |      |      |      |
| Commercial refrigeration | Condensing unit                 | 0.67 | 0.59 | 0.45 |
| <i>R-404A</i>            |                                 |      |      |      |
| Commercial refrigeration | Condensing unit                 | 1.46 | 1.74 | 1.51 |
|                          | Centralized                     | 1.65 | 2.39 | 1.75 |
| Industrial refrigeration | Small- and medium-sized systems | 2.40 | 2.07 | 2.24 |

**IV. Stage I of the Kigali HFC implementation plan as submitted**

Institutional, policy and regulatory framework

26. The national ozone unit (NOU), under the Environmental Protection Agency, is responsible for coordinating the country’s ozone layer protection action plan and implementing projects under the Montreal Protocol. As of November 2023, the NOU is also accountable to the Ministry of Tourism, Ecology, Sustainable Development and Northern Region Development as a decision-making body. The NOU will oversee and monitor the implementation of activities under the KIP in cooperation with UNIDO as the designated implementing agency.

27. The Law on the Protection against Adverse Impacts of Climate Change, in effect since January 2020, established several bans on ODS and ODS-based equipment import/export, trade, and handling. Subsequently, many related regulations, rulebooks and decisions were issued, including the regulation on ODS and F-gases, adopted in July 2021. This regulation includes establishing the HFC phase-down schedule in accordance with the Kigali Amendment and limiting the sale of ODS/F-gases to licenced enterprises, and requires ODS- and HFC-based equipment registration, record-keeping through



logbooks, and mandatory leak checks for equipment containing more than 5 CO<sub>2</sub>-eq tonnes of refrigerant.<sup>3</sup> Several rulebooks are in place that set out the detailed processes and necessary documents required under this regulation, including import/export permits, RAC licences, and skills development for RAC personnel.

28. The Government of Montenegro has an HFC licensing system that has been operational since 2011 and, since 1 January 2024, an operational HFC quota system, as required under the regulation on ODS and F-gases. Quotas are in CO<sub>2</sub>-eq tonnes and by substance, with 90 per cent of the national quota allocated to regular importers and 10 per cent set aside for new importers; the quota allocation for existing importers is based on each importers' average imports over the previous three years. The harmonized system (HS), including tariff codes for ODS and F-gases, was adopted at the end of 2021.

29. A new law on waste management is expected to be adopted and enter into force in May 2024, which will support the preparation for the national inventories of banks of used or unwanted controlled substances and plan for the collection, transport, and disposal of such substances.<sup>4</sup>

### Phase-down strategy for stage I of the Kigali HFC implementation plan

#### *Overarching strategy*

30. Stage I of the KIP aims to reduce the country's demand for HFCs by building the capacity of RAC technicians to improve servicing practices, reduce leakage, and promote recovery and reuse (R&R); strengthening the regulatory framework to reduce the import and consumption of HFCs, improve safety of their handling, and build the capacity of customs; promoting low-GWP alternative technologies; and encouraging stakeholders to integrate the HFC phase-down into their business plans. The focus of stage I will be on reducing the servicing demand in the commercial refrigeration subsector, followed by industrial RAC.

#### *Proposed activities*

31. The overall HFC phase-down strategy for stage I of the KIP builds on the activities of the HPMP. It focuses on strengthening the legal framework to support the HFC phase down, capacity-building of customs officers and importers of HFCs, capacity-building of trainers and technicians in handling flammable refrigerants, provision of equipment to support refrigerant R&R, and technical assistance to facilitate the introduction of low-GWP technologies, with a breakdown for UNIDO as follows:

- (a) Strengthening of the legal and regulatory framework: Update the licensing and quota system and strengthen implementation (incorporate HFCs, update permit system, introduce environmental import fees for HFCs, meetings and workshops with importers, awareness-raising) (US \$20,000); strengthen data collection, analysis and reporting of HFC consumption, including workshops for stakeholders on reporting obligations and upgrading the NOU's internal database (US \$6,500); further update the legal framework to reflect obligations under the Kigali Amendment, including legislation for the certification scheme and for the establishment of training centres (US \$12,000); and further development of codes of practice and standards on handling low-GWP technologies (update study to assess current needs, meetings with stakeholders, develop and disseminate manual for the safe handling of flammable refrigerants), including an awareness-raising campaign on these codes and standards (US \$12,000);
- (b) Capacity-building of customs: Three workshops to train 50 customs and enforcement officers on the control and identification of HFCs and HFC-based equipment, HFC import

<sup>3</sup> Equivalent to, for example, 3.50 kg of HFC-134a, 1.27 kg of R-404A, and 2.40 kg of R-410A.

<sup>4</sup> The law will support the implementation of a project approved at the 93<sup>rd</sup> meeting for the preparation of a national inventory of banks of used or unwanted controlled substances and a plan for their management.

legislation, the licensing and quota system, prevention of illegal trade through risk profiling and proper labelling of refrigerant cylinders, use of HS codes for HFCs and HFC-based equipment, and monitoring and reporting of data (US \$4,500); and two information and awareness-raising workshops to train 20 importers and distributors on the safe handling, storage, and repackaging of flammable refrigerants (US \$3,200);

- (c) Capacity-building of RAC technicians: Four workshops to train 80 RAC technicians on safe practices working with flammable refrigerants, covering alternative technologies, safety standards, leakage control, energy efficiency, and refrigerant R&R (US \$30,000); one workshop to train five trainers on the new curricula (US \$6,000); and one set of tools<sup>5</sup> for a training centre to conduct the training (US \$12,000);
- (d) Refrigerant R&R: Ten sets of refrigerant R&R equipment and tools<sup>6</sup> (additional to those procured under the HPMP) (US \$45,400);
- (e) Technical assistance: HFC sectoral surveys, including a study on the consumption and use of HFCs in the RAC local assembly and installation subsector and firefighting sector, and preparation of public awareness materials (US \$12,000); and a safety inspection and modifications to a training room at one vocational centre to ensure compliance to safety standards in handling flammable refrigerants (US \$15,000); and
- (f) Project monitoring and coordination (US \$11,000).

#### *Project implementation, coordination and monitoring*

32. The coordination, monitoring and evaluation approach under the HPMP will continue into stage I of the KIP, with the NOU and UNIDO monitoring activities, reporting on progress, and working with stakeholders to phase out HFCs. The cost of those activities for UNIDO amounts to US \$11,000 and includes local consultants (US \$3,000), monitoring travel (US \$5,000), meetings and workshops (US \$2,000), and miscellaneous costs (US \$1,000).

#### *Gender policy implementation*

33. The Government of Montenegro and UNIDO are committed to implementing the Multilateral Fund's gender policy. The implementation of stage II of the HPMP addressed several gender issues identified under decision 84/92(d). Building on the achievements from the HPMP, and in line with the country's progress on gender equality, stage I of the KIP will collect gender-disaggregated data and promote gender-balanced participation in Government and industry as well as in vocational school trainings and awareness-raising. Gender mainstreaming has been considered under all stage I activities.

#### *Coordination of activities in the servicing sector under HCFC phase-out and HFC phase-down plans*

34. Stage I of the KIP will be implemented simultaneously with stage II of the HPMP until 2026, at which time the HPMP will be completed and HCFCs phased-out in the country. Many planned activities of the KIP do not duplicate efforts of the HPMP. The Government will identify opportunities for coordinated

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<sup>5</sup> Including a refrigerant analyzer, 4-way digital manifold set, vacuum pump, charging station, weigh scale, leak detector, recovery unit, contamination test kits, ATEX air blower, recovery cylinders, locking tool, and personal refrigerant monitor.

<sup>6</sup> Each kit includes an electronic leak detector, a recovery unit, a vacuum pump, a personal refrigerant monitor, an ATEX fan module, two hydrocarbon drain hoses, two recovery cylinders, a 4-way digital manifold set, and two sets of consumables (e.g., filters, small parts, sealings).

activities between the two projects, such as in training and certification of technicians and customs officers, refrigerant R&R, and project coordination, while making efforts to avoid duplication.

Total cost of stage I of the Kigali HFC implementation plan

35. The budget for stage I has been proposed at US \$189,600. The costs of activities in the refrigeration servicing sector have been proposed in line with decision 92/37.

36. The proposed activities and cost of stage I of the KIP are summarized in table 8.

**Table 8. Proposed cost of activities to be implemented in stage I of the KIP for Montenegro**

| Activity  | Cost (US \$)   |
|---|----------------|
| Strengthening of the legal and regulatory framework | 50,500         |
| Capacity-building of customs                        | 7,700          |
| Capacity-building of RAC technicians                | 48,000         |
| Refrigerant R&R                                     | 45,400         |
| Technical assistance                                | 27,000         |
| Project monitoring and coordination                 | 11,000         |
| <b>Total</b>  | <b>189,600</b> |

Implementation of the first tranche of stage I of the Kigali HFC implementation plan

37. The first funding tranche of stage I of the KIP, in the total amount of US \$108,970, will be implemented between September 2024 and December 2026 and will include the following activities:

- (a) Strengthening of the legal and regulatory framework: Begin updates to the licensing and quota system and strengthening the data collection, analysis, and reporting of HFC consumption (US \$13,250); initiate updating the legal framework, including legislation for the certification scheme and for the establishment of training centres (US \$8,000); and undertake the study to assess needs for safe handling of flammable refrigerants, meetings with stakeholders, and develop a manual for the safe handling of flammable refrigerants (US \$8,000);
- (b) Capacity-building of customs: Two workshops to train 35 customs and enforcement officers (US \$3,000); and one information and awareness-raising workshop to train 10 importers and distributors on the safe handling, storage, and repackaging of flammable refrigerants (US \$1,600);
- (c) Capacity-building of RAC technicians: Two workshops to train 40 RAC technicians (US \$15,000); one workshop to train five trainers (US \$6,000); and one set of tools for a training centre to conduct the training (US \$12,000);
- (d) Refrigerant R&R: Three sets of refrigerant R&R equipment and tools (US \$13,620);
- (e) Technical assistance: HFC sectoral surveys, including a study on the consumption and use of HFCs in the RAC local assembly and installation subsector and firefighting sector (US \$8,000); and a safety inspection and modifications to a training room at one vocational centre to ensure compliance to safety standards in handling flammable refrigerants (US \$15,000); and
- (f) Project monitoring and coordination (US \$5,500).

## SECRETARIAT'S COMMENTS AND RECOMMENDATION

### V. Comments

#### Overarching strategy

38. In line with decision 92/44, the Government of Montenegro has submitted a letter demonstrating its strong commitment to support reductions in advance of the Montreal Protocol targets.

#### Institutional, policy and regulatory framework

##### *HFC licensing and quota system*

39. In line with decision 87/50(g), UNIDO has confirmed that Montenegro has an established and enforceable system of licensing and quotas for monitoring HFC imports/exports in place. The 2024 and 2025 quotas are 155,854 CO<sub>2</sub>-eq tonnes and 136,739 CO<sub>2</sub>-eq tonnes. Subsequent quotas will be reduced by approximately 2 per cent per year to reach the 2029 target of 125,577 CO<sub>2</sub>-eq tonnes.

##### *Policy and regulatory frameworks*

40. The Secretariat noted that since 2020, only R-600a-based domestic refrigerators and freezers have been imported into the country, and that R-290-based stand-alone commercial refrigeration equipment was already being imported and is readily available in neighboring markets, and enquired whether the Government had considered banning the import of HFC-based domestic refrigerators and stand-alone commercial refrigeration equipment. UNIDO explained that while such bans would be considered within stage I, it was difficult to specify a timeline for their implementation given ongoing revisions to the Law on Protection from the Negative Impacts of Climate Change. Accordingly, the Government would continue to explore the possibility of establishing a ban on HFC-134a-based domestic refrigerators and HFC-based stand-alone commercial refrigeration equipment, and to report on progress thereon in the country's tranche progress reports.

#### Technical and cost-related issues

##### *Manufacturing sector*

41. UNIDO and the Secretariat discussed the merit of including a project to convert the only RAC manufacturing enterprise in the country under stage I. However, noting the very small consumption at the enterprise, which had been steadily decreasing and appeared to be zero in 2023, it was agreed that the Government would continue to monitor the enterprise's operations such that if at a later time the Government wished to submit a project to convert the enterprise, it could do so. Similarly, at that time, and once the Executive Committee has agreed on a policy related to projects to address the imports of HFCs contained in pre-blended polyols, a project to phase out such imports could be submitted if the enterprise was still in operation and importing HFCs contained in pre-blended polyols. If the enterprise decided to cease manufacturing HFC-134a-based chest freezers, the Secretariat encouraged the Government to consider implementing a ban on the import and manufacture of such equipment.

##### *Servicing sector*

42. The Secretariat noted that MAC technicians had not been trained under the HPMP, usually only have on-the-job training, and would benefit from a dedicated training programme to improve their practices and control of HFC use, and suggested the Government consider including some training and certification of, and equipment procurement for, MAC technicians under the KIP, perhaps by rationalizing other planned activities. The Government concurred with this suggestion, and it was agreed to include two trainings for

30 MAC technicians and to procure one R&R MAC station capable of working with HFC-134a and HFO-1234yf for training MAC service technicians. Funding to enable those activities was found by rationalizing the number of sets of refrigerant R&R equipment and tools from 10 to eight.

43. The environmental fee planned to be imposed for the import of HFCs will likely inter alia depend on the GWP of the HFC refrigerant imported. The Secretariat considers that based on previous experience under the country's HPMP, under which importers must pay an environmental fee of €0.90/kg to import HCFC-22, such a fee is likely to be effective. UNIDO will include an update on progress toward the implementation of the fee as part of the second tranche request.

44. Regarding the HFC sectoral survey in the firefighting sector, the Secretariat noted that while the country had not imported HFCs for use in that sector in 2019-2023, it had imported HFC-227ea for that use from 2013 through 2017. Based on the survey conducted during preparation of the KIP and interviews with the largest enterprise working in the firefighting sector, FK-5-1-12 (commonly known as 3M Novec 1230) was already in use in the firefighting sector for several years in the country. However, the Secretariat understands the manufacturer of that alternative has announced it would cease its manufacture by the end of 2025; that the European Chemicals Agency is considering restrictions related to FK-5-1-12; and that Montenegro is a candidate country for membership in the European Union (EU) since 2010 and was seeking to harmonize its legislation with the *acquis communautaire* of the EU. Accordingly, the Secretariat supports and considers valuable the proposed study of the consumption and use of HFCs in firefighting.

#### Total project cost

45. The total cost for stage I of the KIP for Montenegro (without agency support costs) amounts to US \$189,600, as summarized in table 9 below. This is in line with decision 92/37 based on a 10 per cent reduction from the HFC consumption in the baseline years. The level of funds recommended remained as requested, with some internal reallocation of funding among activities, as explained in the sections above.

46. Stage I of the KIP will be implemented in two tranches. The schedule of HFC phase-down and HCFC phase-out commitments and of the KIP and HPMP tranches is presented in annex I to the present document.

47. In line with decision 93/105, the Secretariat considered the tranche distribution proposed by UNIDO on a case-by-case basis. The dual-tranche modality is consistent with the tranche distribution modalities for KIPs proposed in document UNEP/OzL.Pro/ExCom/94/59. In the event that the country does not comply with the maximum allowable consumption target for any year following the approval of the last tranche, the issues would be considered in line with Appendix 7-A of the future KIP Agreement ("Reductions in funding for failure to comply with the targets in the Agreement"), noting that any reduction in funding, if applicable, would be applied at the time of approval of stage II of the KIP.

**Table 9. Agreed cost of activities to be implemented in stage I of the KIP for Montenegro**

| <b>Activity</b>                                     | <b>Cost (US \$)</b> |
|---|---------------------|
| Strengthening of the legal and regulatory framework | 50,500              |
| Capacity-building of customs                        | 7,700               |
| Capacity-building of RAC technicians                | 48,000              |
| Capacity-building of MAC technicians                | 9,080               |
| Refrigerant R&R                                     | 36,320              |
| Technical assistance                                | 27,000              |
| Project monitoring and coordination                 | 11,000              |
| <b>Total</b>  | <b>189,600</b>      |

### Implementation plan for the first tranche of the Kigali HFC implementation plan

48. The funding for the first tranche was increased by US \$6,080 to allow the organization of one workshop for 15 MAC technicians and procurement of the R&R MAC station. Funding for the second tranche was reduced accordingly.

### 2024-2026 business plan of the Multilateral Fund

49. UNIDO is requesting US \$189,600, plus agency support costs, for the implementation of stage I of the KIP for Montenegro. The total value of US \$130,006, including agency support costs, requested for the period of 2024–2026, is US \$76,444 above the amount in the business plan.

### Sustainability of the HFC phase-down and assessment of risks

50. The country's HFC consumption in 2018 and 2019 was 289,449 CO<sub>2</sub>-eq tonnes and 192,898 CO<sub>2</sub>-eq tonnes, well above the country's HFC baseline of 155,854 CO<sub>2</sub>-eq tonnes and the 2025 to 2029 targets, which are in advance of the Montreal Protocol control schedule. Notwithstanding the high 2018 and 2019 consumption, the Secretariat considers the risk that the country would not meet the proposed targets to be small given the country's strong regulatory controls, including inter alia an effective licensing and quota system, and other regulations;<sup>7</sup> an effective R&R scheme<sup>8</sup> supported by well-trained technicians; and the country's demonstrated commitment to the Montreal Protocol, including the country's accelerated phase-out of HCFCs. Moreover, the level of detailed information on the number and type of equipment using HFCs in the country is both exemplary and gives confidence that the NOU has a comprehensive understanding of the country's servicing needs. Finally, given the EU's influence on the country's market, the recent revisions to the EU's F-gas regulations are likely to support the ambitious reductions proposed by the country.

51. Given the ongoing HCFC phase-out, which includes a ban on imports of HCFCs by 1 January 2025, there is a risk of uptake of HFCs in the coming years; however, the Secretariat considers this risk to be small given the very small consumption of HCFC-22 in the country (0.63 mt and 0.48 mt in 2022 and 2023), the effective R&R scheme being implemented in the country, and the application of the import quota system.

### Impact on the climate

52. The activities proposed, including the enforcement of the HFC quota system, building RAC and MAC technician capacity for good servicing practices, promoting refrigerant R&R, indicate that the implementation of stage I of the KIP will reduce refrigerant emissions into the atmosphere, resulting in climate benefits. While the Secretariat is not able to provide an estimate of the avoided emissions from the implementation of the KIP at the present meeting,<sup>9</sup> by 2029 Montenegro will have reduced its annual HFC

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<sup>7</sup> Including inter alia a requirement that importers may only sell HFCs to enterprises that have a licence to install, maintain, repair, and decommission HFC-based equipment; a mandatory RAC technician certification scheme; a requirement to recover controlled substances during the servicing of RAC equipment; prohibition on venting of controlled substances during installation, servicing, and decommissioning of RAC equipment; required leak checks and record-keeping practices; mandatory recovery of controlled substances from equipment and containers at their end-of-life; and a prohibition on the import of controlled substances in disposable cylinders.

<sup>8</sup> The total quantity of recovered and recycled refrigerants was 28.76 mt for the period 2010–2019 and 7.81 mt for the period 2020–2022.

<sup>9</sup> As noted in document UNEP/OzL.Pro/ExCom/94/14, Overview of issues identified during project review, the Secretariat is in the process of developing a methodology to estimate the avoided emissions from the implementation of HFC phase-down projects supported by the Multilateral Fund.

emissions by approximately 30,277 CO<sub>2</sub>-eq tonnes, calculated as the difference between the HFC baseline for compliance and the 2029 target, assuming that all consumed HFCs will have eventually been emitted.

#### Draft Agreement

53. A draft Agreement between the Government of Montenegro and the Executive Committee for stage I of the KIP has not been prepared as the Agreement template is still under consideration by the Executive Committee.

54. If the Executive Committee so wishes, the funds for stage I of the KIP for Montenegro could be approved in principle, and funds for the first tranche could be approved on the understanding that the Agreement would be prepared and presented at a future meeting, before the submission of the second tranche, and once the Agreement template has been approved.

### **VI. Recommendation**

55. The Executive Committee may wish to consider:

- (a) Approving, in principle, stage I of the Kigali HFC implementation plan (KIP) for Montenegro for the period 2024-2029 to reduce HFC consumption by 10 per cent of the country's average HFC consumption in the baseline years (i.e., 19.43 per cent of the country's baseline) by 2029, in the amount of US \$189,600, plus agency support costs of US \$24,648 for UNIDO, as reflected in the schedule contained in annex I to the present document;
- (b) Noting the strong commitment of the Government of Montenegro to support reductions in HFC consumption in advance of the Montreal Protocol targets;
- (c) Approving the first tranche of stage I of the KIP for Montenegro and the corresponding tranche implementation plan, in the amount of US \$115,050, plus agency support costs of US \$14,956, for UNIDO; and
- (d) Requesting the Government of Montenegro, UNIDO and the Secretariat to finalize the draft Agreement between the Government of Montenegro and the Executive Committee for the reduction in consumption of HFCs, including the information contained in the annex referred to in subparagraph (a) above, and to submit it to a future meeting once the KIP Agreement template has been approved by the Executive Committee.





## Annex I

**SCHEDULE OF HFC PHASE-DOWN AND HCFC PHASE-OUT COMMITMENTS AND FUNDING TRANCHES  
UNDER THE KIGALI HFC IMPLEMENTATION PLAN AND THE HCFC PHASE-OUT MANAGEMENT PLAN FOR MONTENEGRO**

**Kigali HFC implementation plan (stage I)**

| Row | Particulars   | 2024    | 2025    | 2026    | 2027    | 2028    | 2029    | Total   |
|-----|---|---------|---------|---------|---------|---------|---------|---------|
| 1.1 | Montreal Protocol reduction schedule of Annex F substances (CO <sub>2</sub> -eq tonnes) | 155,854 | 155,854 | 155,854 | 155,854 | 155,854 | 140,269 | n/a     |
| 1.2 | Maximum allowable total consumption of Annex F substances (CO <sub>2</sub> -eq tonnes)  | 155,854 | 136,739 | 133,949 | 131,158 | 128,368 | 125,577 | n/a     |
| 2.1 | Lead IA (UNIDO) agreed funding (US \$)  | 115,050 | 0       | 0       | 74,550  | 0       | 0       | 189,600 |
| 2.2 | Support costs for Lead IA (US \$)   | 14,957  | 0       | 0       | 9,692   | 0       | 0       | 24,648  |
| 3.1 | Total agreed funding (US \$)  | 115,050 | 0       | 0       | 74,550  | 0       | 0       | 189,600 |
| 3.2 | Total support costs (US \$)   | 14,956  | 0       | 0       | 9,692   | 0       | 0       | 24,648  |
| 3.3 | Total agreed costs (US \$)  | 130,006 | 0       | 0       | 84,242  | 0       | 0       | 214,248 |

**HCFC phase-out management plan (stage II)**

| Row | Particulars  | 2024 | 2025   | 2026 | 2027 | 2028 | 2029 | 2030 | Total  |
|-----|--|------|--------|------|------|------|------|------|--------|
| 1.1 | Montreal Protocol reduction schedule of Annex C, Group I substances (ODP tonnes) | 0.52 | 0.26   | 0.26 | 0.26 | 0.26 | 0.26 | 0.00 | n/a    |
| 1.2 | Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)  | 0.08 | 0.00   | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | n/a    |
| 2.1 | Lead IA (UNIDO) agreed funding (US \$)   | 0    | 64,000 | 0    | 0    | 0    | 0    | 0    | 64,000 |
| 2.2 | Support costs for Lead IA (US \$)  | 0    | 4,480  | 0    | 0    | 0    | 0    | 0    | 4,480  |
| 3.1 | Total agreed funding (US \$)   | 0    | 64,000 | 0    | 0    | 0    | 0    | 0    | 64,000 |
| 3.2 | Total support costs (US \$)  | 0    | 4,480  | 0    | 0    | 0    | 0    | 0    | 4,480  |
| 3.3 | Total agreed costs (US \$)   | 0    | 68,480 | 0    | 0    | 0    | 0    | 0    | 68,480 |