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**United Nations  
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**Eleventh meeting of the Conference of  
the Parties to the Vienna Convention  
for the Protection of the Ozone Layer**

**Twenty-Ninth Meeting of the Parties to  
the Montreal Protocol on Substances  
that Deplete the Ozone Layer**

Montreal, Canada, 20–24 November 2017

**Issues for discussion by and information for the attention of the  
Conference of the Parties to the Vienna Convention at its  
eleventh meeting and the Twenty-Ninth Meeting of the Parties  
to the Montreal Protocol**

**Note by the Secretariat**

**Addendum**

**I. Introduction**

1. The present addendum to the note by the Secretariat on issues for discussion by and information for the joint attention of the Conference of the Parties to the Vienna Convention for the Protection of the Ozone Layer at its eleventh meeting and the Twenty-Ninth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer (UNEP/OzL.Conv.11/2-UNEP/OzL.Pro.29/2) contains information that has become available since the preparation of that note. The additional information is set out in sections II and III of the addendum.
2. Section II includes brief summaries of information provided by the Technology and Economic Assessment Panel in its October 2017 report, which consists of three volumes:<sup>1</sup>
  - (a) Volume I: Evaluation of 2017 critical use nominations for methyl bromide and related matters – final report;
  - (b) Volume II: Supplement to the May 2017 Technology and Economic Assessment Panel Replenishment Task Force report “Assessment of the funding requirement for the replenishment of the Multilateral Fund for the period 2018–2020”;
  - (c) Volume III: Technology and Economic Assessment Panel Decision XXVIII/3 Working Group report on energy efficiency.
3. Section III contains additional information related to the high-level segment of the joint meeting pertaining to a scheduled high-level round table, a science event and the venues and dates of future meetings.

<sup>1</sup> Available on the Ozone Secretariat meeting portal at: <http://conf.montreal-protocol.org/meeting/mop/cop11-mop29/presession/SitePages/Home.aspx>.

## **II. Overview of items on the agenda for the eleventh meeting of the Conference of the Parties to the Vienna Convention and the Twenty-Ninth Meeting of the Parties to the Montreal Protocol**

### **A. Montreal Protocol issues (item 4 of the provisional agenda for the preparatory segment)**

#### **1. Replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol (item 4 (a) of the provisional agenda for the preparatory segment)**

4. As indicated in the note by the Secretariat,<sup>2</sup> in accordance with decision XXVIII/5, the replenishment task force of the Technology and Economic Assessment Panel presented to the Open-ended Working Group at its thirty-ninth meeting its May 2017 report on the replenishment of the Multilateral Fund for the period 2018–2020, along with indicative amounts of funding needed for the trienniums 2021–2023 and 2024–2026.<sup>3</sup> Those estimated figures were derived from calculations of the funding requirements of the following components:

- (a) Hydrochlorofluorocarbon (HCFC) consumption phase-out activities, comprising existing commitments from in-principle approved stage I and stage II of HCFC phase-out management plans (HPMPs) and new planned activities for stage II and later stage HPMPs;
- (b) HCFC production phase-out;
- (c) Non-investment components and supporting activities;
- (d) Enabling activities for hydrofluorocarbon (HFC) phase-down;
- (e) HFC-23 mitigation activities.

5. Upon consideration of that report, the Open-ended Working Group agreed to request the Panel to elaborate on a number of issues related to the replenishment for 2018–2020, some of which pertained to general questions and some to specific elements under the components listed above (see the annex to the note by the Secretariat on issues for discussion at the joint meetings, in document UNEP/OzL.Conv.11/2-UNEP/OzL.Pro.29/2). In response to the parties' requests, the replenishment task force addressed all those issues in a report supplementary to its May 2017 report on the assessment of the funding requirement for the replenishment of the Multilateral Fund for the period 2018–2020. With regard to the general questions, the supplementary report of the task force includes:

- (a) An elaboration of paragraph 3 of its terms of reference as expressed in decision XXVIII/5,<sup>4</sup> highlighting its earlier finding that funding for additional HPMP demonstration projects are estimated to be in a range of \$0–\$10 million, while estimates of HFC enabling activities, including a certain number of demonstration projects, are in the range of \$13.5 million–\$20.2 million.
- (b) Estimates of cost effectiveness figures for low volume consuming countries (LVCs) and non-low volume consuming countries (non-LVCs) expressed in three different metrics: United States dollars per ozone-depleting potential kilogram, United States dollars per kilogram and United States dollars per tonne of carbon dioxide equivalent;
- (c) Estimates of funding for approved versus planned HPMPs, showing that, averaged over the period 2005–2016, phase-out activities in HPMPs have been funded at a level in the range of 70–97 per cent of the forecast planned funding;
- (d) Accounting for HPMP funding approved at the seventy-ninth meeting of the Executive Committee of the Multilateral Fund resulting in a reduction of the average total funding requirement (excluding HPMP stage III) in the triennium 2018–2020 of \$16.4 million, compared to the funding indicated in the Panel's May 2017 report.

<sup>2</sup> UNEP/OzL.Conv.11/2-UNEP/OzL.Pro.29/2, paras. 15–16.

<sup>3</sup> Available at: [http://conf.montreal-protocol.org/meeting/mop/cop11-mop29/presession/Background-Documents/TEAP-XXVIII\\_5-TF-Report-May%202017.pdf](http://conf.montreal-protocol.org/meeting/mop/cop11-mop29/presession/Background-Documents/TEAP-XXVIII_5-TF-Report-May%202017.pdf).

<sup>4</sup> "That the Technology and Economic Assessment Panel should provide indicative figures of the resources within the estimated funding required for phasing out HCFCs that could be associated with enabling Article 5 parties to encourage the use of low-GWP or zero-GWP alternatives and indicative figures for any additional resources that would be needed to further encourage the use of low-GWP or zero-GWP alternatives".

6. With regard to the elaboration of more specific elements under the components (a)–(e) listed in paragraph 4 above, the replenishment task force provided various funding scenarios, including the following:

- (a) **Scenario affecting only the range of total funding requirement:** This scenario incorporates the following changes to the approach used in the May 2017 report:
- (i) No stage III HPMPs (originally estimated to be in the range of \$0–\$70.95 million);
  - (ii) No demonstration projects (originally estimated to be in the range of \$0–\$10 million);
  - (iii) Two funding tranches for one HCFC production phase-out plan (HPPMP) in the triennium 2018–2020 (estimated at a total of either \$47.2 million or \$51.0 million, depending on when the approval decision would be taken and on how the funding tranches would be specified), rather than the amount of \$65.6 million indicated in the May 2017 report;
- (b) **Scenarios affecting both the HPMP funding and the total funding requirement:**
- (i) Scenario 1: This scenario includes rescaling of the planned activities included in the May 2017 report based on all the differences between planned and approved funding for the years in the period 2015–2016. Rescaling of planned activities results in a reduction of the funding requirement of \$17.9 million compared with the corresponding estimate included in the May 2017 report;
  - (ii) Scenario 2: This is scenario 1 plus the funding impact of the decisions approved at the seventy-ninth meeting of the Executive Committee (corresponding to a reduction of \$12.5 million), estimated to result in a cumulative reduction of \$30.4 million compared with the May 2017 report;
  - (iii) Scenario 3: This is scenario 2 plus the funding for countries that have no approvals to achieve a 35 per cent reduction from their HCFC baseline, in order for them to be able to do so (corresponding to a reduction of \$34 million), estimated to result in a cumulative reduction of \$64.9 million compared with the May 2017 report;
  - (iv) Scenario 4: This is scenario 3 including only funding for the planned activities that are strictly needed for the countries concerned to reach a reduction of precisely 35 per cent (corresponding to a reduction of \$16.4 million), estimated to result in a total cumulative reduction of \$81.3 million compared with the May 2017 report.

7. The sequential, cumulative impacts of the above scenarios on the funding requirement for the HPMPs and for the total 2018–2020 funding requirement ranges are presented in table 1 below, starting with the total funding requirement determined in the May 2017 report.

Table 1  
Scenarios for the 2018–2020 funding requirements

Sequential, cumulative impacts of requested funding scenarios from OEWG-39 to the May 2017 RTF report estimates	HPMP funding (US\$ million) (reduction compared with May 2017 report)	Range of total funding requirement (US\$ million)
Funding determined in the May 2017 report	<b>406.3</b>	<b>602.7–748.9</b>
Various changes compared with May 2017 report (no stage III HPMPs, no HCFC demonstration projects, 2 HPPMP tranches)		<b>584.2–653.4</b>
1. Rescaling of planned activities as determined in the May 2017 report	<b>388.4</b> (17.9)	<b>568.7–632.8</b>
2. Impact of ExCom-79 decisions on the (rescaled) funding as determined in the May 2017 report	<b>375.9</b> (30.4)	<b>558.9–617.8</b>
3. Maintain sets of planned activities for countries with approvals not achieving 35 per cent reduction	<b>341.4</b> (64.9)	<b>529.0–578.5</b>
4. Additional planned activities for a precise 35 per cent reduction for these countries (in row above)	<b>325.0</b> (81.3)	<b>514.7–560.0</b>

8. In respect of the non-investment and supporting activities, the above scenarios include the same funding estimates included in the May 2017 report for HFC enabling activities (\$21.5 million–\$44.2 million), HFC-23 mitigation (\$8.0 million–\$21.5 million) and an annual funding increase for the Compliance Assistance Programme of 3 per cent, corresponding to a total increase of \$34.8 million for the triennium 2018–2020. The impact of those elements is included in the range of total funding displayed in table 1.

9. In addition to the 3 per cent annual increase in Compliance Assistance Programme funding for the triennium 2018–2020 (at \$34.8 million), the task force provides funding estimates corresponding to percentage increases of 0 per cent (\$32.8 million), 4.5 per cent (\$35.8 million) and 6 per cent (\$36.9 million).

10. The executive summary of the task force's supplementary report is set out in annex I to the present addendum, presented as received from the Panel without formal editing by the Secretariat. The full supplementary report is available on the meeting portal of the Secretariat's website.<sup>5</sup>

11. The parties may wish to consider the information contained in the initial and the supplemental report of the replenishment task force in their discussions on the replenishment of the Multilateral Fund.

**2. Issues related to exemptions from Article 2 of the Montreal Protocol (item 4 (c) of the provisional agenda for the preparatory segment):**

**Nominations for critical-use exemptions for 2018 and 2019**

12. As mentioned in the note by the Secretariat,<sup>6</sup> in 2017 three parties operating under paragraph 1 of Article 5, Argentina, China and South Africa, submitted six nominations for critical-use exemptions for methyl bromide for 2018, while two parties not so operating, Australia and Canada, submitted one nomination each for 2019 and 2018 respectively.

13. The Methyl Bromide Technical Options Committee evaluated the nominations and presented its interim recommendations at the thirty-ninth meeting of the Open-ended Working Group, during which bilateral discussions took place. Discussions continued thereafter between the nominating parties and the Committee on the information needed for any re-evaluation of the nominations in order for the Committee to make final recommendations for consideration by the Twenty-Ninth Meeting of the Parties. Two parties, Canada and Australia, requested the Methyl Bromide Technical Options Committee to reassess their nominations and provided additional information on the regulatory and technical issues related to their inability to use alternatives to methyl bromide. South Africa had indicated that reassessment of its nominations might be required, but no formal request or further information was provided at the time of reassessment and preparation of the final report.

14. In the light of the above, the Methyl Bromide Technical Options Committee prepared its final report recommending the full amounts nominated by Australia, Canada and China. With regard to the nominations by China, the Committee has noted the progress made by the party towards the phase-out of methyl bromide and its intention to cease applying for critical-use exemptions for all of its uses in 2018. Nominations put forward by Argentina and South Africa were reduced by the Committee to account for alternatives that are considered suitable, emissions reduction practices or reduction of dosage rates required for methyl bromide.

15. The report of the Committee, containing detailed information on the final recommendations, is set out in volume I of the October 2017 report of the Technology and Economic Assessment Panel. The final recommendations are outlined in table 2 below. The reasons given by the Committee for not recommending the full nominated amounts for some parties are summarized in the footnotes to the table where relevant.

<sup>5</sup> Available at: <http://conf.montreal-protocol.org/meeting/mop/cop11-mop29/presession/Background-Documents/TEAP-%20XXVIII-5-RTF-supplement-report-october2017.pdf>.

<sup>6</sup> UNEP/OzL.Conv.11/2-UNEP/OzL.Pro.29/2, paras. 30–32.

Table 2

**Summary of the nominations for 2018 and 2019 critical-use exemptions for methyl bromide submitted in 2017 and final recommendations of the Methyl Bromide Technical Options Committee**

(tonnes)

<i>Party</i>	<i>Nomination for 2018</i>	<i>Final recommendation</i>	<i>Nomination for 2019</i>	<i>Final recommendation</i>
<b>Parties not operating under paragraph 1 of Article 5 and sector</b>				
1. Australia Strawberry runners			28.980	[28.980]
2. Canada Strawberry runners	5.261	[5.261]		
<b>Subtotal</b>	<b>5.261</b>	<b>[5.261]</b>	<b>28.980</b>	<b>[28.980]</b>
<b>Parties operating under paragraph 1 of Article 5 and sector</b>				
3. Argentina Strawberry fruit Tomato	45.300 75.400	[29.000] <sup>a</sup> [47.700] <sup>b</sup>		
4. China Ginger open field Ginger protected	74.617 18.360	[68.880] <sup>c</sup> [18.360]		
5. South Africa Mills Structures	5.000 45.000	[2.900] <sup>d</sup> [42.750] <sup>e</sup>		
<b>Subtotal</b>	<b>263.677</b>	<b>[209.590]</b>		
<b>Total</b>	<b>268.938</b>	<b>[214.851]</b>	<b>28.980</b>	<b>[28.980]</b>

<sup>a</sup> The reduction in the nomination is based on uptake of barrier films (for example, totally impermeable film [TIF]) for use with remaining methyl bromide treatments and a subsequent decrease in dosage rate from 26.0 to 15.0 g/m<sup>2</sup> for adoption thereof, and a reduction by 10 per cent for the adoption of available alternatives applied using best practice (i.e. 1,3-D/Pic rotations, improved application techniques for fumigants) over a transition period of three years.

<sup>b</sup> The reduction in the nomination is based on a reduction, for the second year, of dosage rates from 26.0 to 15.0 g/m<sup>2</sup> for adoption of barrier films (for example, TIF), for a total of 54.1 tonnes (including 10.8 tonnes for Mar Del Plata and 43.3 tonnes for La Plata). The nomination was further reduced by 10 per cent (6.41 tonnes) to accommodate the uptake of other chemical and non-chemical alternatives, such as integrated pest management (nematicides, biofumigation with chicken manure, steam and 1,3-D/Pic (Agrocelhone)).

<sup>c</sup> The reduction in the nomination is derived from the MBTOC calculation, based on the adoption of barrier films in the total nominated area at the rate of 30 g/m<sup>2</sup> (229.59 ha x 30 g/m<sup>2</sup>= 68.88 tonnes).

<sup>d</sup> The reduction in the nomination is based on the amount of methyl bromide sufficient for one fumigation per year and per mill as a transitional measure to allow time for adoption and optimization of alternatives in an integrated pest management system. The recommendation is based on a dosage of 20 g/m<sup>3</sup> (MBTOC standard presumptions), applied to well-sealed structures.

<sup>e</sup> The nomination has been reduced by 5 per cent to account for the planned implementation of control measures involving application of heat.

16. In addition to the final recommendations on parties' critical use nominations, the report of the Methyl Bromide Technical Options Committee recalls the reporting requirements under relevant decisions and includes information on trends in methyl bromide critical-use nominations and exemptions in all nominating parties to date, and also on accounting frameworks for critical use and stocks of methyl bromide.

17. The parties may wish to consider the report and final recommendations of the Methyl Bromide Technical Options Committee and adopt decisions as appropriate.

**3. Energy efficiency (decision XXVIII/3) (item 4 (g) of the provisional agenda for the preparatory segment): Report by the Technology and Economic Assessment Panel on information submitted by parties on energy efficiency opportunities in the refrigeration and air-conditioning sector**

18. As indicated in the note by the Secretariat,<sup>7</sup> in decision XXVIII/3 the Technology and Economic Assessment Panel was requested to prepare a report for consideration by the Twenty-Ninth Meeting of the Parties in which it would review energy efficiency opportunities in the refrigeration, air-conditioning and heat pump (RACHP) sectors related to a transition to climate-friendly alternatives. The Panel was also requested to assess relevant information submitted by parties. A working group, set up by the Panel (consisting of Panel members only), produced the requested report.

19. The report of the working group describes the approach followed in its preparation of the report and provides background and additional information on issues related to energy efficiency in the RACHP sector, including the impact of future trends in the sector on energy use, definitions of energy efficiency terms commonly used and basic elements of the science of energy efficiency. Energy efficiency opportunities in the RACHP sectors related to the transition to climate-friendly alternatives, including not-in-kind technologies, are classified into three broad categories:

(a) Technology opportunities: these can be realized through improved design and quality of components in RACHP equipment and systems. Improvement in energy efficiency can also be enabled by other measures that reduce overall energy consumption (such as reduction in cooling or heating loads through improved insulation, better building design and better technical procedures for installation and maintenance);

(b) Policy, regulatory and information opportunities: these relate to encouraging the transition to both low-global warming potential (GWP) alternatives and more energy-efficient equipment. There are many examples of existing regulations and policies promoting energy management, including minimum energy performance standards and energy labelling. Strengthening minimum energy performance standards and energy labelling in Article 5 parties could present an opportunity to increase the energy efficiency of available RACHP equipment;

(c) Financial and related incentives: these provide opportunities for supporting the introduction of low-GWP refrigerants in RACHP equipment with higher energy efficiency by offsetting higher initial costs through a variety of mechanisms (such as rebates and credits, taxes and loans) and sources of funding (for example the Global Environment Facility, the Multilateral Fund, the World Bank Group and non-governmental organizations). Related incentives could include parallel efforts for realizing energy efficiency opportunities in the RACHP sectors through support for technology innovation, legislation, minimum energy performance standards, labelling and public campaigning, where such measures may not already be in place.

20. The full report of the working group is available on the meeting portal.<sup>8</sup> The executive summary of the task force's supplementary report is set out in annex II to the present addendum, presented as received from the Panel without formal editing by the Secretariat. An overview of the submissions received from parties is included in an annex to the report of the Panel.

## **II. High-level segment (23 and 24 November 2017)**

### **A. Statements by heads of delegation and discussion on key topics (item 5 of the provisional agenda for the high-level segment)**

#### **1. Identifying future opportunities and priorities (high-level round table) (item 5 (a) of the provisional agenda for the high-level segment)**

21. In commemoration of the thirtieth anniversary of the Montreal Protocol, a round-table discussion will take place on the theme "Montreal Protocol at 30: identifying future opportunities and priorities". The discussion, scheduled to take place in the morning session of the high-level segment on 23 November, will focus on opportunities and new issues that the parties to the Montreal Protocol

<sup>7</sup> UNEP/OzL.Conv.11/2-UNEP/OzL.Pro.29/2, paras. 43–45.

<sup>8</sup> <http://conf.montreal-protocol.org/meeting/mop/cop11-mop29/presession/Background-Documents/TEAP-EEWG-Report-october2017.pdf>.

identify as being important to pursue after 2017 to ensure the Protocol's continued success in the coming years. A provisional agenda for the event has been posted on the meeting portal.<sup>9</sup>

**2. Science of ozone layer depletion and recovery: reflections on the past, present and future (science event) (item 5 (b) of the provisional agenda for the high-level segment)**

22. A science panel discussion will be held on 23 November 2017 from 2.30 p.m. to 4.00 p.m. during the high-level segment of the joint eleventh meeting of the Conference of the Parties to the Vienna Convention and Twenty-Ninth Meeting of the Parties to the Montreal Protocol. The theme of the panel discussion is "The scientific foundation of the Montreal Protocol: past, present, and future". The event is planned by Environment and Climate Change Canada and the Ozone Secretariat, with the advice of the co-chairs of the Scientific Assessment Panel. The discussion will focus on four major topics related to the effect of changing atmospheric composition on the ozone layer over time; ozone depletion and climate change; HFCs and climate protection; and observations and monitoring needs for ozone layer protection and recovery.

23. The panel discussion will be opened by a representative of the Government of Canada. Panellists will then make short presentations, followed by discussions between the panellists and the audience. At the end of the discussion, a moderator will provide a summary of the main points raised. A short concept note and provisional agenda for the event has been posted on the meeting portal.<sup>10</sup>

**B. Dates and venues for the twelfth meeting of the Conference of the Parties to the Vienna Convention and the Thirtieth Meeting of the Parties to the Montreal Protocol**

24. In order to assist parties in planning their attendance at future meetings well ahead of time, the Secretariat has posted on its website and on the meeting portal tentative dates for the Thirtieth and Thirty-First Meetings of the Parties to the Montreal Protocol in 2018 and 2019 respectively, and the joint twelfth meeting of the Conference of the Parties to the Vienna Convention and Thirty-Second Meeting of the Parties to the Montreal Protocol in 2020. In addition, the Secretariat has posted on its website information regarding the meetings of the Open-ended Working Group of the Parties to the Montreal Protocol in 2018, 2019 and 2020. The tentative dates for the meetings appear on the Secretariat's website and the meeting portal at the following link: <http://conf.montreal-protocol.org/SitePages/Home.aspx>.

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<sup>9</sup> UNEP/OzL.Conv.11/INF/2-UNEP/OzL.Pro.29/INF/6, <http://conf.montreal-protocol.org/meeting/mop/cop11-mop29/presession/Information-Documents/COP-11-INF-2-MOP-29-INF-6.pdf>.

<sup>10</sup> UNEP/OzL.Conv.11/INF/3-UNEP/OzL.Pro.29/INF/7, <http://conf.montreal-protocol.org/meeting/mop/cop11-mop29/presession/Information-Documents/COP11-INF3-MOP29-INF7.pdf>.

## Annex I

### Supplement to the May 2017 Technology and Economic Assessment Panel replenishment task force report: Assessment of the funding requirement for the replenishment of the Multilateral Fund for the period 2018–2020

#### Executive summary

- On the basis of the discussions in the Contact Group, the Open-ended Working Group at its thirty-ninth meeting (OEWG-39) requested the TEAP to elaborate on specific groups of elements in the form of a supplementary report to its May 2017 Replenishment Task Force (RTF) Report. The specific elements, for which elaboration was requested, are given in the report of OEWG-39 and are attached to this document as Annex 1.
- At the OEWG-39, the following overall questions were raised:
  - Elaboration on paragraph 3 of the Terms of Reference as expressed in decision XXVIII/5;
  - To present cost effectiveness figures in ODP-tonnes, metric tonnes and tonnes CO<sub>2</sub> equivalent;
  - To give a clearer distinction between costs associated with HCFC-related and HFC-related activities;
  - To present a scenario comparing previously approved projects with business plan estimates on an annual basis in relation to determining uncertainty for planned activities; and
  - To account for recent ExCom (ExCom-79) decisions.

In addition, OEWG-39 requested specific elaboration on the following elements of the total funding requirement:

- The funding components for HCFC Phase-out Management Plans;
  - The HCFC production phase-out;
  - Non-investment and supporting activities;
  - HFC phase-down enabling activities; and
  - HFC-23 mitigation.
- The above elements are elaborated and addressed in this Supplement Report. Based on certain requests from OEWG-39, below is a summary of elaborations for specific elements of the total funding requirement for the MLF for the triennium 2018-2020:

#### 1) *Approved versus planned funding for HPMPs*

The average percentage of funding for approvals for all years from 2005 through 2016 equals 83.24% of the funding for planned activities from the Business Plan. This implies that the average funding agreed to by the Executive Committee for each activity was at a level that is 16.76% lower than the amount in the Business Plan. The RTF has also looked at the uncertainty of the average value. By taking all the differences between planned and approved funding for the years 2005-2016, an average deviation of 13.5% can be calculated for the uncertainty range. Using this value, a rescaling is applied, i.e., funding for (HPMP) activities is, in principle, approved, for a range of about 70-97% of the funding for planned activities.

#### 2) *Accounting for ExCom-79 decisions on HPMP approvals<sup>11</sup>*

Funding decisions from ExCom-79 reduced the funding requirement for the planned activities for non-LVC countries from a total of US\$ 97.1 to US\$ 74.1 million for the triennium 2018-2020, a reduction of US\$ 23.0 million, and of US\$ 0.23 million for LVC countries, by bringing the latter amount to the approved funding amount for 2017. Due to approvals, the funding requirement for approved HPMP activities for non-LVC countries increased from US\$ 289.4 to US\$ 296.2 million (i.e., a difference of US\$ 6.8 million). It did

<sup>11</sup> Funding numbers in the text have been rounded up or down to make the text easier to read. Please refer to the tables for the actual numbers.



not change for LVC countries, because the planned funding became approved funding for the year 2017, a year outside the 2018-2020 triennium.

Taking into account the decisions from ExCom-79 compared to the rescaled activities, the average total funding requirement for HPMPs (excluding any HPMPs stage III) in the triennium 2018-2020 has decreased by US\$ 12.5 million from US\$ 388.4 to US\$ 375.9 million.

3) *Deferring stage III HPMPs*

Deferring HPMP stage III activities to the triennium 2021-2023 would reduce the funding requirement presented in the May 2017 report (US\$ 0-70.95 million) to zero.

4) *Cost effectiveness values of HPMPs (including agency support costs)*

An average (country-weighted) cost effectiveness value has been calculated based on the ODP-tonnes approvals for a representative number of non-LVC countries (where the approvals usually concern one, or a mix of two or three HCFCs). This value is US\$ 5.18 per kg ODS for non-LVC countries when including China, and US\$ 5.79 per kg ODS when excluding China. The calculated cost effectiveness value of a representative sample of LVC countries is US\$ 9.23 per kg ODS. In climate terms, the cost effectiveness value is US\$ 3.75 t CO<sub>2</sub>-eq. for non-LVC countries when including China, and US\$ 5.05 t CO<sub>2</sub>-eq. when excluding China. For a representative sample of LVC countries it is US\$ 7.08 t CO<sub>2</sub>-eq.

5) *Various tranches for HCFC Production Phase-out Management Plans (HPPMPs)*

In the May 2017 report, the RTF assumed equal funding tranches for the 14 years for the Chinese HPPMP in the period 2017-2030, leading to a funding requirement of US\$ 65.62 million (US\$ 21.87 million for each of the three years) for the triennium 2018-2020. This assumes a first tranche of US\$ 21.87 in the year 2017. In considering two funding tranches for the Chinese HPPMP in the triennium 2018-2020, the total funding for the next triennium is estimated at US\$ 47.15 or US\$ 51.04 million, depending on when the approval decision would be taken and on how the funding tranches would be specified.

6) *Funding for the Compliance Assistance Programme (CAP) dependent on annual increase*

The CAP funding (including support costs) in the May 2017 report was estimated at US\$ 34.8 million for the triennium 2018-2020, based on an annual 3% increase. CAP funding for the triennium 2018-2020 would be US\$ 32.8 million with zero percent increase per annum, and US\$ 36.9 million with 6% increase per annum, i.e., each 3% increase in CAP funding would add about US\$ 2 million to the total funding requirement

- Based on the specific requests for scenarios from OEWG-39, the RTF estimated the cumulative impacts of the following scenarios to the total funding requirement for the period 2018-2020:
  - For HPMPs/HPPMPs:
    - Planned versus actual funding reduction
    - ExCom-79 decisions
    - Planned HPMPs exceeding 35% reduction target cancelled
  - For Non-Investment and Supporting Activities:
    - Deferring any further HCFC demonstration projects
    - Varying CAP increases

The financial implications of a number of changes for the total funding requirement range are given in the table below, starting with the total funding requirement determined in the May 2017 report. In a first instance certain activities are subtracted, resulting in a different total funding requirement range. This is followed by a number of steps or scenarios (1, 2, 3 and 4) for HPMP stage II activities (with the average value for HPMP funding and the decrease in comparison to the May 2017 HPMP funding also given in the table).

<b>Sequential, cumulative impacts of requested funding scenarios from OEWG-39 to the May 2017 RTF report estimates</b>	<b>HPMP funding (US\$ million) (reduction compared to May 2017 report)</b>	<b>Range of total funding requirement (US\$ million)</b>
Funding determined in the May 2017 report	<b>406.3</b>	<b>602.7-748.9</b>
Various changes compared to May 2017 report (no stage III, no demo HCFC, 2 tranches HPPMP)		<b>584.2-653.4</b>
1) Rescaling of planned activities as determined in the May 2017 report	<b>388.4</b> (17.9)	<b>568.7-632.8</b>
2) Impact of ExCom-79 decisions on the (rescaled) funding as determined in the May 2017 report	<b>375.9</b> (30.4)	<b>558.9-617.8</b>
3) Maintain sets of planned activities for countries with approvals not achieving 35% reduction	<b>341.4</b> (64.9)	<b>529.0-578.5</b>
4) Additional planned activities for a precise 35% reduction for these countries (in row above)	<b>325.0</b> (81.3)	<b>514.7-560.0</b>

## Annex II

### Technology and Economic Assessment Panel Decision XXVIII/3 Working Group report on Energy Efficiency, October 2017 report (volume III)

#### Executive summary

- In response to Decision XXVIII/3 on energy efficiency (EE), this report considers the following categories of energy efficiency opportunities in the refrigeration and air conditioning and heat pump (RACHP) sector related to the transition to climate-friendly alternatives, including not-in-kind (NIK) technologies:
  - Technology opportunities;
  - Policy, regulatory and information opportunities; and
  - Financial and related incentives.
- In response to Paragraph 2 of Decision XXVIII/3 inviting “parties to submit...relevant information on energy efficiency innovations in the [RACHP] sectors,” the following parties provided information: Armenia, Australia, Canada, China, Colombia, Egypt, El Salvador, Estonia, European Union, Ghana, Grenada, Guinea on behalf of the African Group, Japan, Mexico, Morocco, Paraguay, Rwanda, Switzerland, United States of America and Vietnam. The Ozone Secretariat compiled these submissions and provided to OEWG-39 (UNEP/OzL.Pro.WG.1/39/INF/5). TEAP reviewed the information submitted by parties, which varied in detail from narrow focus to wide-ranging overviews of EE incentive programmes, policies and regulations, and technology developments and case studies. TEAP incorporated some of this information, where appropriate, into this report. A summary is included in Annex A.
- Refrigeration, Air Conditioning and Heat Pumps (RACHP) are increasing rapidly, and in 2015, they were estimated to consume 17% of electricity worldwide. Over 80% of the global warming impact of RACHP systems is associated with the generation of the electricity to operate the equipment (indirect emissions), with a decreasing proportion coming from the use/release (direct emissions) of high Global Warming Potential (GWP) hydrofluorocarbons (HFCs) and hydrochlorofluorocarbons (HCFCs) as their use declines. A decrease in the global warming impact of RACHP can be achieved through increased EE combined with a transition to low-GWP refrigerants.
  - In developed (non-Article 5 or non-A5) countries, policies, regulations and programmes already require or support improved energy use and higher efficiency equipment. The implementation of some policies and regulations specific to a transition away from high GWP refrigerants are also driving the change to new RACHP equipment containing low GWP refrigerants. There is an opportunity to maximise the EE of this new low GWP RACHP equipment.
  - Similarly, in developing (A5) countries, more and more policies, regulations and programmes are in place supporting energy management and use of more energy efficient equipment. With the rapid growth of A5 demand for RAC equipment, there is also an opportunity to maximise the EE of new RAC equipment in parallel with the introduction of low GWP refrigerants.

#### Technology opportunities:

- The transition to climate-friendly alternatives in the RACHP sector has the potential to reduce both ozone-depleting substances (ODS) and direct greenhouse gas (GHG) emissions through the choice of refrigerant. But more significantly, the parallel implementation of new technologies could provide synergy to reduce indirect GHG emissions through improved EE of RACHP equipment and systems during the transition. The improvement of EE of RACHP equipment and systems would be better achieved with improved technologies, which are compatible with the use of low GWP refrigerants.
- The greatest potential for improving the EE of RACHP equipment is through improved design and quality of components. The current best RACHP equipment is operating at around 50-60% of the theoretical maximum EE. In the coming decades, technological innovation could improve

performance to approximately 70-80% of the theoretical limit. Currently, going beyond 70-80% has proved to be prohibitively expensive, and very difficult to achieve in commercial equipment.

- The improvement in EE also interacts with other measures (outside the scope of this report, but including reduction in cooling/heating load through better insulation, better building design, and better technical procedures for installation and maintenance) to reduce overall energy consumption. Moving forward, it would be important to better understand the synergy between replacement of controlled refrigerants at the manufacturing stage, together with improved technologies through design and components, and the specific opportunity to improve EE.

**Policy, regulatory and information opportunities:**

- There are many examples of how policy and regulation are already driving the adoption of RACHP equipment with higher EE. These have included broad energy management regulations as well as specific regulations with requirements for many categories of RACHP equipment to meet minimum energy performance standards (MEPS) and in some countries, mandatory labelling.
- In the context of a transition to climate-friendly alternatives in the RACHP sectors, both for new equipment, and replacement of old equipment containing high GWP refrigerants, there is an opportunity for policy and regulations to encourage the transition to low GWP refrigerants and more EE equipment.
- Many developing countries do not have MEPS in place, and where they are in place, the MEPS are set at a lower standard than developed countries. RAC equipment in developing countries is often less efficient than in developed countries. There is an opportunity to strengthen MEPS and labelling in developing countries, and as a consequence increase the EE of available RACHP equipment.

**Financial and related incentives:**

- Financial incentives are well established and widely used to drive use of RACHP with higher EE. These are often in the context of parties' national energy management strategies. There is an opportunity for financial incentives to support the introduction of low GWP refrigerants simultaneously with higher EE RAC equipment. Financial incentives can offset the higher initial cost of new low GWP/high EE equipment, through a variety of mechanisms, and sources of funding.
- EE has been a side benefit of the Montreal Protocol. The parties to the Montreal Protocol have led three successful transitions of refrigerants over 30 years and are initiating the fourth transition to phase down the use of high GWP HFCs. Several project completion reports to the Executive Committee (ExCom) of the Multilateral Fund (MLF), have noted that the projects that led to the phase-out of ozone depleting refrigerants, also resulted in EE improvements due to new designs and new components.
- Along with financial incentives, a coordinated domestic transition strategy to low GWP refrigerants could include a parallel effort on realizing EE opportunities in the RACHP sectors, with support for technology innovations, supporting legislation, MEPS, labelling, and public campaigning where these measures may not already be in place.