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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
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PROJECT PROPOSALS: INDONESIA

This document consists of the comments and recommendations of the Fund Secretariat on the following sub-sectoral phase-out plans:

Phase-out

- | | |
|--|------------|
| • HCFC phase-out management plan (stage I, first tranche) (Sector plan for phase-out of HCFC-141b in the foam sector, phase I) | World Bank |
| • HCFC phase-out management plan (stage I, first tranche) (Umbrella project to phase-out HCFC-141b from the manufacturing of rigid polyurethane foam at Isotech Jaya Makmur, Airtekindo, Sinar Lentera Kencana and Mayer Jaya) | UNIDO |
| • HCFC phase-out management plan (stage I, first tranche) (Sector plans for HCFC phase-out in the air-conditioning, refrigeration and fire fighting sectors) | UNDP |

PROJECT DESCRIPTION

1. On behalf of the Government of Indonesia, UNDP, as the lead implementing agency, has submitted to the 62nd Meeting of the Executive Committee an HCFC phase-out management plan (HPMP) at a total funding of US \$28,061,804 plus agency support costs of US \$2,104,636 for UNDP, UNIDO and the World Bank. The Government of Australia will also be assisting in the implementation of some of the activities as a cooperating agency. The Indonesia HPMP (Stage I) will result in the phase-out of 140.7 ODP tonnes of HCFCs by 2015.

Scope of the document

2. Together with the HPMP, the Government of Indonesia submitted the following four sub-sectoral phase-out plans for which funding is being requested:

- (a) Sector plan for HCFC phase-out in the foam sector (World Bank) and an umbrella project for the phase-out of HCFCs by four foam enterprises (UNIDO);
- (b) Sector plan for HCFC phase-out in the air-conditioning sector (UNDP);
- (c) Sector plan for HCFC phase-out in the refrigeration sector (UNDP); and
- (d) Sector plan for HCFC phase-out in the fire fighting sector (UNDP).

3. To facilitate the review of the HPMP for Indonesia and the associated sub-sectoral phase-out plans, this document presents an overview of the HPMP itself, followed by a description of each of the sub-sectors mentioned in the above paragraph. The section on comments and recommendations has also been arranged similarly.

Section 1. HPMP document

Background

4. Indonesia's Environmental Law 23/1997 provided the legal framework for the regulations controlling the use and imports of ODS issued by individual ministries (Agriculture, Environment, Health, Industry or Trade). Since 2006, Indonesia has had a licensing system for HCFCs which allows the Government to mandate import quotas when needed.

5. The Ozone Unit, established within the Ministry of Environment, coordinates activities related to the implementation of the Montreal Protocol. A National Ozone Committee established in the mid-1990s and comprised of high-level representation from other ministries plus a number of other stakeholders provides strategic and policy guidance. Four Technical Working Groups (TWGs) were formed for each of the four main HCFC consuming sectors in Indonesia (air-conditioning, foam, refrigeration and fire fighting) in April 2009 to develop an HCFC phase-out strategy for each of the sectors.

HCFC consumption and sectoral distribution

6. Indonesia has no HCFC production or exports. The total HCFC consumption is shown in Table 1. HCFC consumption increased from 1,261 metric tonnes (mt) in 1996 to 3,949 mt in 2006, indicating an average annual growth rate of over 12 per cent over the 1996 to 2006 period. However, the growth in HCFC consumption since 2007 has been at 15.3 per cent on a metric tonne basis and 14.3 per cent on ODP-tonne basis. HCFC-22 and HCFC-141b account for the majority of HCFCs consumed by Indonesia.

Table 1: HCFC Consumption (Article 7) by type of HCFC

| HCFC | 2005 | | 2006 | | 2007 | | 2008 | | 2009 | |
|-----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|
| | ODP t | mt | ODP | mt |
| HCFC-22 | 128.67 | 2,339.91 | 131.33 | 2,387.81 | 170.17 | 3,094 | 201.76 | 3,668.35 | 237.99 | 4,327.01 |
| HCFC-141b | 179.94 | 1,635.8 | 167.86 | 1,526 | 110.83 | 1,007.52 | 96.17 | 874.24 | 130.46 | 1,186.00 |
| HCFC-123 | | | 0.69 | 34.71 | 5.77 | 288.35 | 1.83 | 91.48 | 6.36 | 318.00 |
| HCFC-124 | | | | | 0 | 0.06 | | | 0 | 0.14 |
| HCFC-225 | | | | | 0.01 | 0.5 | 0.03 | 1.38 | 0.01 | 0.58 |
| Total | 308.61 | 3,975.71 | 299.88 | 3,948.52 | 286.78 | 4,390.43 | 299.79 | 4,635.45 | 374.82 | 5,831.73 |

7. The sectoral distribution of HCFCs used in 2009 in Indonesia is shown in Table 2. About 47 per cent of the total HCFC consumption (in ODP tonne) was used in the manufacturing sector. HCFC-141b accounts for almost 35 per cent of the total HCFC consumption (measured in ODP tonnes).

Table 2: Sectoral distribution by type of HCFC used in 2009 (ODP tonnes)

| Sector | HCFC-22 | HCFC-141b | HCFC-123 | Total |
|----------------------|---------|-----------|----------|--------|
| Manufacturing | | | | |
| Air conditioning | 32.30 | | | 32.30 |
| Refrigeration | 9.08 | 45.43 | | 54.51 |
| Foam sector | | 85.03 | | 85.03 |
| Fire fighting | | | 3.04 | 3.04 |
| Subtotal | 41.38 | 130.46 | 3.04 | 174.88 |
| Servicing | 196.61 | - | 3.32 | 199.93 |
| Total | 237.99 | 130.46 | 6.36 | 374.81 |

8. There are four manufacturers of HCFC-123-based fire extinguishing systems in Indonesia. A detailed survey and analysis of the solvent sector is still underway, but due to the small quantities of HCFC-225 used and its low ODP and global warming potential (GWP) value, it is not considered a priority for reaching the 2015 compliance target.

An overview of the HCFC phase-out strategy

9. The baseline level of HCFC consumption is estimated at 402.16 ODP tonnes based on the average of the 2009 data (Article 7) and the 2010 data (forecasted). Stage I of the HPMP proposes to phase out 140.7 ODP tonnes of HCFCs by 2015, representing 35 per cent of the estimated baseline for compliance. Of this amount, 90.5 ODP tonnes would be phased out from the refrigeration manufacturing sector, 49.93 ODP tonnes from the foam sector and 0.25 ODP tonnes from the fire fighting sector. The refrigeration servicing sector would be addressed in stage II of the HPMP.

10. HCFC consumption in the air-conditioning and refrigeration manufacturing subsectors will be completely phased out by 2015. In the foam sector, HCFC-141b will be phased out completely in the refrigeration, thermoware, transportation, and integral skin foam applications by 2015, achieving a total reduction of 39.53 ODP tonnes. In addition, HCFC-141b consumption will be phased out in four enterprises making sandwich panels and commercial refrigeration equipment, resulting in a phase-out of 10.4 ODP tonnes (group project). The only unaddressed manufacturing sectors that would remain after 2015 would be part of the rigid foam sub-sector, part of the fire fighting sector and the solvent sector.

11. In support of the investment component of the HPMP, the following regulatory measures are foreseen: raising import taxes for HCFCs in 2011; a ban on import of HCFC-based refrigeration and air-conditioning equipment from 1 January 2015; and, a ban on manufacturing/assembly of HCFC-22 based refrigeration and air-conditioning equipment from 1 January 2015. The establishment of new HCFC-141b-based foam enterprises and any expansion of existing production facilities will be banned by 2011. Import of HCFC-141b will be strictly controlled through an import quota system to be put in place

by January 2011 by the Ministry of Trade and monitored by the Ministry of Environment. The Ministry of Environment will set the policy agenda for tackling HCFC consumption in the foam sector, in line with the overall objectives of the HPMP. The Foam TWG, established by the Ministry of Environment with representatives of key foam industry members from all sub-sectors, will be delineating feasible technologies and approaches for the sector in the early stages of implementation, and providing advice to the Ozone Unit on phasing out HCFCs nationwide in order to meet the agreed phase-out targets.

12. Technical support will be provided, including the establishment and/or revising of existing product standards, technology assistance and information dissemination on alternative technologies. Technical assistance will also be provided to the servicing sector, including establishment of a product stewardship programme for effective management of refrigerants and reclaim equipment supply for demonstration purposes. An awareness programme will also be implemented.

Section 2. Sector plan for HCFC phase-out in the foam sector (World Bank) and an umbrella project for the phase-out of HCFCs by four foam enterprises (UNIDO)

Background

13. The sector plan for HCFC phase-out in the foam sector in Indonesia includes the following two components:

- (a) A sector plan for the phase-out of HCFC-141b in the foam sector (Foam Sector Plan (phase 1)), at a total cost of US \$5,233,557 plus agency support costs of US \$392,517 for the World Bank as submitted. Implementation of the project will result in the phase-out of 39.5 ODP tonnes (359.4 mt) of HCFC-141b, at a cost-effectiveness of US \$14.56/kg; and
- (b) Umbrella project to phase-out 10.4 ODP tonnes (94.1 tonnes) of HCFC-141b from the manufacturing of rigid polyurethane (PU) foam at Isotech Jaya Makmur, Airtekindo, Sinar Lentera Kencana and Mayer Jaya, at a total cost of US \$814,247 plus agency support costs of US \$61,069 for UNIDO, at a cost-effectiveness of US \$8.65/kg.

14. The overall cost of the Foam Sector Plan (including the umbrella project submitted by UNIDO) is US \$6,047,804 plus agency supports costs of US \$453,586 to phase out 49.9 ODP tonnes (453.5 tonnes) of HCFC-141b, at a cost-effectiveness of US \$13.33/kg.

15. The Foam Sector Plan represents part of the Government of Indonesia's strategy to meet its 2013 and 2015 Protocol compliance targets. The plan will ensure compliance with the interim HCFC-141b consumption reduction steps, establish an implementation mechanism to support the long-term sustainability of the HCFC-141b phase-out in the foam sector, and create a private-public sector partnership to foster and promote the overall HCFC phase-out programme. In order to meet phase-out deadlines, the Foam Sector Plan focuses on the subsectors with a manageable number of enterprises and sufficient technical and financial capacity to undertake conversions rapidly.

16. Additional HCFC-141b phase-out will be addressed in subsequent stages to be submitted at a later date (i.e., HFC-141b phase-out in the thermoware and water heater sub-sectors in 2016 and HCFC-141b phase-out in the sandwich panel sub-sector in 2020). A total ban on the use of HCFC-141b in the foam sector will be put in place in 2030.

HCFC-141b consumption

17. Of the total amount of HCFC-141b imported into the country, 80.2 ODP tonnes are used as a blowing agent in the manufacturing of foams and 16.1 ODP tonnes in the manufacturing of insulation

foam in the refrigeration manufacturing sector. Of this total, 65.5 ODP tonnes are used by 70 enterprises manufacturing insulation foam for appliances, refrigerated trucks, water heaters, sandwich panels, slabstock, spray thermoware and integral skin foam for the automotive and furniture industries (Table 3). The remaining 14.7 ODP tonnes are used by enterprises manufacturing commercial refrigeration equipment and/or by small companies, and would be addressed in phase 2 of the HPMP. Based on annual growth rate of 12 per cent for rigid foam and 20 per cent for integral skin foam for 2009 and 2010, the 2009-2010 average consumption of HCFC-141b in the foam sector has been estimated at 78.9 ODP tonnes (717.7 mt). This amount excludes some 8.8 ODP tonnes (80 tonnes) of HCFC-141b contained in imported pre-blended polyols mainly used by small and medium size enterprises (both locally mixed and imported pre-blended polyols are sold to the same customers).

Table 3. Main foam applications in Indonesia

| HCFC-141b foam application | Mt | ODP tonnes |
|-----------------------------------|--------------|-------------------|
| Freezers | 51.6 | 5.7 |
| Domestic refrigerators | 117.2 | 12.9 |
| Thermoware | 106.7 | 11.7 |
| Boardstock, laminate | 37.5 | 4.1 |
| Water heaters | 11.1 | 1.2 |
| Imitation wood | 0.0 | 0.0 |
| Sandwich panel continuous | 38.1 | 4.2 |
| Sandwich panel discontinuous | 105.8 | 11.6 |
| Block foams | 32.3 | 3.6 |
| Spray | 0.6 | 0.1 |
| Refrigerated trucks | 5.9 | 0.7 |
| Spray | 4.9 | 0.5 |
| Integral skin automotive | 48.8 | 5.4 |
| Integral skin furniture | 34.8 | 3.8 |
| Total | 595.2 | 65.5 |

18. Fifty-three foam enterprises covered under the Foam Sector Plan were converted from CFC-11 to HCFC-141b with the assistance from the Multilateral Fund. The HCFC-141b consumption of these enterprises was 49.7 ODP tonnes (452 mt) in 2008, representing 76 per cent of the total consumption in the sector. The remaining 17 enterprises (manufacturing thermoware, water heaters, imitation wood, sandwich panels, slabstock, and integral skin foam) have not received assistance from the Fund. Also, 49 enterprises used HCFC-141b pre-blended polyols, which are locally blended by six domestic systems houses; the remaining 21 enterprises purchase HCFC-141b directly from chemical suppliers and mix it with polyols *in situ*.

Technology selection

19. The baseline equipment of 53 rigid foam manufacturing plants consists of 42 high pressure dispensers, 12 low pressure dispensers (some enterprises having more than one dispenser), and 7 pieces of spray equipment; 8 enterprises use the hand-pouring method. The 17 integral skin foam manufacturers have 13 high pressure dispensers and 4 low pressure dispensers.

20. The Foam Sector Plan will promote the adoption of hydrocarbon technology, where possible, to maximize climate benefits. However, for those small and medium size enterprises where hydrocarbon technology is not a technically and economically viable option (due to domestic safety regulations and relocation costs), technologies with higher global warming potential (GWP) would be introduced.

21. With their existing business relationship and distribution channels, systems houses are expected to channel technical and financial assistance to their customers. The enterprises covered under the Foam Sector Plan will be assisted by the Ministry of Environment with policy actions that will keep them operational.

Cost of the foam sector

22. Phase 1 of the Foam Sector Plan will phase out 50.0 ODP tonnes (453.5 mt) of HCFC-141b used by 30 enterprises, as shown in Table 4.

Table 4. HCFC-141b consumption by enterprises covered under phase 1 of the Foam Sector Plan

| Sub-sector | No. of enterprises | mt | ODP tonnes |
|--------------------------|--------------------|-------|------------|
| Freezer | 3 | 26.9 | 3.0 |
| Domestic refrigeration | 2 | 177.8 | 19.6 |
| Refrigerated trucks | 3 | 9.0 | 1.0 |
| Integral skin automotive | 11 | 85.0 | 9.3 |
| Integral skin furniture | 7 | 60.7 | 6.7 |
| Panels | 4 | 94.1 | 10.4 |
| Total | 30 | 453.5 | 50.0 |

23. The estimated cost of the Foam Sector Plan is US \$16.8 million, of which US \$9.8 million is considered eligible for funding (Table 5). The calculation of the total cost has been based on the following assumptions: the cost for conversion to hydrocarbon technology is based on retrofitting existing foaming dispensers; the cost for conversion to HFC-245fa and water-based technologies is based on retrofitting baseline equipment; and incremental operating costs for HFC-245fa are based on US \$1.6/kg. The conversion of the four enterprises under the umbrella project includes, at each plant, hydrocarbon storage system, retrofit or replacement of foam dispensers, safety systems, civil works, technology transfer, trials and training. Conversion of these four enterprises results in operating savings of US \$2,107.

Table 5. Total cost of the Foam Sector Plan in Indonesia

| Sub-sector | Technology | Mt* | Total cost (US \$) | CE (US \$/kg) | | Total funding (US \$) | |
|-------------------------|------------|----------|--------------------|---------------|-----------|-----------------------|-------------|
| | | | | Actual | Threshold | MLF | Counterpart |
| Freezers | HFC, HC | 78.2 | 780,109 | 9.97 | 7.83 | 612,306 | 167,803 |
| Household refrigerators | HC | 177.8 | 2,096,641 | 11.79 | 9.79 | 1,740,662 | 355,979 |
| Thermoware | HFC | 161.9 | 2,384,618 | 14.73 | 7.83 | 1,267,677 | 1,116,941 |
| Boardstock/laminated | HFC | 56.9 | 421,759 | 7.41 | 7.83 | 421,759 | |
| Water heaters | HFC | 16.8 | 506,033 | 30.15 | 7.83 | 131,544 | 374,489 |
| Panels continuous | HC | 57.8 | 1,112,806 | 19.26 | 9.79 | 565,862 | 546,944 |
| Panels discontinuous | HFC | 160.6 | 2,839,729 | 17.68 | 7.83 | 1,257,498 | 1,582,231 |
| Block foam | HFC | 49.1 | 404,416 | 8.24 | 7.83 | 384,453 | 19,963 |
| Spay foam | HFC | 0.9 | 320,496 | 351.93 | 7.83 | 7,047 | 313,449 |
| Transportation | HFC | 9 | 489,876 | 54.29 | 7.83 | 70,470 | 419,406 |
| Transportation, spray | HFC | 7.5 | 502,441 | 67.42 | 7.83 | 58,725 | 443,716 |
| Automotive | HFC | 85 | 2,380,355 | 28.02 | 16.86 | 1,433,100 | 947,255 |
| Furniture | HFC | 60.7 | 1,381,274 | 22.77 | 16.86 | 1,023,402 | 357,872 |
| Umbrella project** | HFC | 94.1 | 1,203,147 | 12.78 | 8.65 | 813,965 | 389,182 |
| Total | | 1,016.30 | 16,823,700 | | | 9,788,470 | 7,035,230 |

* Estimated HCFC consumption in 2012.

**Submitted by UNIDO. HCFC consumption is for 2009.

24. To support implementation of investment interventions under phase 1 of the Foam Sector Plan, US \$250,000 is requested for technical assistance, including: training workshops for foam enterprises (US \$50,000); technical consultant services (US \$100,000); revision of technical standards and formulation (US \$50,000); and public awareness activities (US \$50,000). An additional US \$453,051 is requested for a Project Management Office with full responsibility to implement the Foam Sector Plan. The total funding requested from the Multilateral Fund for phase 1 of the Foam Sector Plan is US \$6,047,804 with the breakdown shown in Table 6.

Table 6. Funding level requested from the Multilateral Fund for phase 1 of the Foam Sector Plan

| Technology/sub-sector | HCFC-141b (tonnes) | CE (US \$/kg) | Funding (US \$) |
|----------------------------------|--------------------|---------------|-----------------|
| Rigid foam (hydrocarbon) | 204.8 | 9.79 | 2,004,796 |
| Integral skin sector (HFC-245fa) | 145.6 | 16.86 | 2,455,052 |
| Other subsectors | 9.0 | 7.83 | 70,658 |
| Umbrella project (hydrocarbon) | 94.1 | | 814,247 |
| Total investment cost | | | 5,344,753 |
| Technical assistance | | | 250,000 |
| Management fee | | | 453,051 |
| Total cost of phase 1 | 453.5 | | 6,047,804 |

Section 3. Sector plan for HCFC phase-out in the air-conditioning sector (UNDP)

Background

25. The air conditioning sector plan represents part of the Government of Indonesia's strategy to meet its 2013 and 2015 Protocol compliance levels, and includes conversion activities for one manufacturer of residential air-conditioners, and 4 major and 18 smaller enterprises manufacturing other air-conditioning products. The sector plan proposes to phase out the entire consumption of HCFCs in the manufacturing of air-conditioning products, through the use of HFC-410A, while at the same time suggesting that the companies could at a later stage convert further to HFC-32 by introducing the necessary changes relating to the flammability of this refrigerant; however, this is not part of the proposal.

26. The air conditioning sector in Indonesia has experienced very high growth, especially in the past decade due to an initial low market penetration of air conditioning equipment followed by a combination of steady economic development and increasing purchasing power of the population. Since most air conditioning equipment uses HCFC-22 as refrigerant, its consumption has also grown at a high rate.

HCFC-22 consumption

27. The total HCFC consumption in the air-conditioning sector in 2009 was estimated to be 3,114 mt (171.3 ODP tonnes) of which about 587.3 mt (32.3 ODP tonnes) was consumed in manufacturing and the remainder in servicing. The estimated baseline of the air-conditioning manufacturing sector is 34.9 ODP tonnes (634.5 mt)

Cost of the air-conditioning sector plan

28. The sector plan establishes the costing for three groups of enterprises. Group I relates to the residential air conditioning sector and consists of one enterprise. The second group is related to light commercial refrigeration equipment manufactured by the four next largest enterprises, with a consumption between 9.8 (0.5 ODP tonne) and 68.5 mt (3.8 ODP tonnes) of HCFC-22. The third group comprises 18 SMEs that assembly equipment, with a total consumption of 233.5 mt (12.8 ODP tonnes) of refrigerant, i.e. an average of 13 mt (0.7 ODP tonnes) per enterprise.

29. For each of the three groups, a generalized approach was taken, establishing a list of equipment necessary to operate the enterprises using HFC-410A refrigerant as a replacement of HCFC-22. Possibilities for retrofitting equipment in enterprises of Groups II and III were not explored. The cost requested for the conversion of the manufacture of residential air-conditioners (Group I) is US \$4,660,000; however, due to a 60 per cent foreign ownership of the single enterprise concerned, the funding requested from the Multilateral Fund is US \$1,864,000. The incremental capital costs for Group II are US \$1,276,000 per enterprise; in addition incremental operating costs of US \$115 per unit produced are requested. The capital costs for the conversion of the 18 smaller enterprises in Group III are US \$110,000, and incremental operating costs of US \$100 per unit produced.

30. It is intended to enact sector-specific regulations on the national level. UNDP informed the Secretariat that in order for the regulations to be effective, interaction with stakeholders in industry and the production of extension materials (publications) would be needed. The related measures are subsumed in the budget under "socialization of regulatory measures". Alternative technologies for air conditioning applications, which would need to meet a broad range of requirements including safe handling and environmental friendliness, are currently neither mature nor commercialized fully. Therefore Indonesia proposes to undertake specific information sharing and exchange activities: the related measures are subsumed in the budget under "technology information dissemination/awareness". An overview over the total cost for the conversion of the enterprises is provided in Table 7.

Table 7. Incremental costs for the conversion of 23 enterprises in the air-conditioning sector in Indonesia

| Description | Total costs (US \$) | Counterpart funding (US \$) | Funding request (US \$) | Phase-out (HCFC-22 mt) | CE (US \$/kg) |
|---|------------------------|--------------------------------|----------------------------|---------------------------|------------------|
| Residential air conditioning (1 enterprise) | 4,660,000 | 2,796,000 | 1,864,000 | 184.34 | 10.11 |
| Light commercial and other (about 4 enterprises) | 8,342,000 | - | 8,342,000 | 169.12 | 49.33 |
| SMEs and assembly (about 18 enterprises) | 3,060,000 | - | 3,060,000 | 233.51 | 13.10 |
| Socialization of regulatory measures | 180,000 | - | 180,000 | 40.00 | 4.50 |
| Technology information dissemination/awareness | 240,000 | - | 240,000 | 53.33 | 4.50 |
| Total | 16,482,000 | 2,796,000 | 13,686,000 | 680.3 | 20.12 |

Section 4. Sector plan for HCFC phase-out in the refrigeration sector (UNDP)

Background

31. The sector plan for HCFC phase-out in the refrigeration sector in Indonesia covers refrigeration equipment in the commercial, industrial and transport sub-sectors. For these sub-sectors, a total cost of US \$6.198 million plus agency support costs is requested. The implementation of the project will result in the phase-out of the entire consumption of HCFCs in the manufacturing of commercial, industrial and transport refrigeration equipment of 54.5 ODP tonnes, based on a consumption of 165 mt of HCFC-22 and 413 mt of HCFC-141b.

32. The refrigeration sector plan represents part of the Government of Indonesia's strategy to meet its 2013 and 2015 protocol compliance levels. The market for residential, commercial, industrial and transport refrigeration equipment had expanded significantly in Indonesia in recent years due to the increasing demand for processing, preservation, transport and storage of perishable foods.

HCFC-22 consumption

33. The refrigeration sector plan states that the total 2009 HCFC consumption in the sector was 1,703 mt (116.4 ODP tonnes), with 165 mt (9.1 ODP tonnes) of HCFC-22 consumption in the manufacturing of refrigeration equipment and 1,125 mt (61.9 ODP tonnes) of HCFC-22 consumed in servicing. For the manufacturing of the equipment, also 413 mt of HCFC-141b (45.5 ODP tonnes) has been consumed.

Technology selection

34. The refrigeration sector plan reviewed a number of alternative technologies in the commercial refrigeration sector. Ammonia technology is proposed where feasible, particularly in large systems. Other viable alternatives such as HFC-134a and HFC-410A are proposed for the medium term, where no low-GWP options are immediately available, and to prepare for the development of other low-GWP technologies. Specific information on the proportion of the different alternative technologies to be adopted has not been provided. For the conversion of foam blowing operations, a number of alternatives have been investigated. The sector plan comes to the conclusion that large and organized enterprises in the sector will convert to hydrocarbon technology, while small and medium-sized enterprises will select HFC-245fa.

Costs of the refrigeration sector plan

35. Table 8 provides an overview of the costs for the three different groups of enterprises as well as three additional technical assistance activities foreseen for the sector. The refrigeration sector plan will phase out 116.4 ODP tonnes of HCFC-141b and HCFC-22 in 27 enterprises (Groups I, II and III). There are 6 further enterprises in Group I which appear to need no assistance.

Table 8: Project costs for the conversion of 27 enterprises in the refrigeration sector

| Group of enterprises | Total cost (US \$) |
|--|---------------------------|
| Group I (3 enterprises) | 1,878,000 |
| Group II (12 enterprises) | 3,060,000 |
| Group III (about 12 enterprises) | 660,000 |
| Technical assistance to fisheries sector | 180,000 |
| Socialization of regulatory measures | 180,000 |
| Technology information dissemination/awareness | 240,000 |
| Total | 6,198,000 |

36. For each of the three groups, the costs for the equipment necessary to use alternative technology has been determined, and the total of those costs is the requested funding. The amount of details provided about the enterprises and the equipment in the baseline was limited (i.e., the submission did not contain names, size, consumption, information about the product manufactured, year of establishment or ownership). However, the refrigeration sector plan stated that all companies are fully Indonesian-owned and were established before 2007.

37. For the foaming operations, three large enterprises belonging to Group I and five of the medium-sized enterprises of Group II have high-pressure foam dispensing equipment. All remaining enterprises have low or medium pressure foam dispensing equipment. According to the project proposal, the HCFC-141b used is almost entirely due to earlier conversion from CFC-11 with assistance from the Multilateral Fund. A pilot programme to redesign the refrigeration systems for the onboard refrigerated storage in fishing vessels will be carried out. The redesigned systems will use ammonia to the extent possible or HFC-134a as the refrigerant. These redesigned systems will be initially applied to about ten vessels to gain credibility. The results will be widely disseminated to promote transition to the new systems by existing vessels. This early initiative is meant to cost-effectively control the avoidable HCFC-22 consumption in this application.

38. It is intended to enact sector-specific regulations on the national level and familiarize stakeholders with them through industry interaction meetings and publications. The related measures are subsumed in the budget under "socialization of regulatory measures". Alternative technologies for air conditioning applications which would meet a broad range of requirements including safe handling and environmental friendliness are presently neither mature nor commercialized fully. Indonesia proposes therefore to undertake specific information sharing and exchange activities; the related measures are subsumed in the budget under "technology information dissemination/awareness".

Section 5. Sector plan for HCFC phase-out in the fire fighting sector (UNDP)

Background

39. A technical working group for the fire fighting sector was established in April 2009 by the decree of the Ministry of Environment, to carry out data collection and analysis and to develop a medium and long term strategy for HCFC phase-out in the sector. Data on the sector was collected from the four existing manufacturers and from major end-users. HCFC-123 has been a preferred blend component in fire extinguishing systems because of its ability to counter combustion chemically, without use of water, foam or powder. Since HCFC-123 is inert and stable it provides a long or unlimited shelf life, and furthermore, it has a low GWP value (60 to 80).

40. There are two types of fire extinguishing systems manufactured in Indonesia with HCFC-123 as the key blend component: portable fire extinguishers and total flooding systems. The sector consumed about 240 mt (4.8 ODP tonnes) of HCFC-123 in proprietary blends in 2009, in the manufacturing (152 mt or 3.0 ODP tonnes) and servicing (88 mt or 1.8 ODP tonnes) of fire extinguishing equipment. There are four manufacturers of HCFC-123 based fire extinguishing systems in Indonesia (all manufacture portable systems and three manufacture total flooding systems). Due to the proliferation of end-point consumer outlets and regulations on consumer safety, the demand for portable fire extinguishing systems has been consistently increasing in the past few years. It is expected that the consumption of HCFC-123 in the fire fighting sector will grow at least at 5 per cent annually until 2015.

Alternative technologies

41. The main commercially available alternative blends to HCFC-123 are HFC-based. For portable systems, HFC-136 and HFC-227 are commercially available. For total flooding systems, available options are HFC-227, HFC-125, FK-1230, and inert gases and their blends. These options are not drop-in replacements for HCFC-123; therefore their introduction requires new equipment or modification to existing equipment in manufacturing. The main challenges foreseen by the sector for introducing non-HCFC alternatives are obtaining certifications for performance, toxicity and other environmental impacts. Resources are also a constraint for field testing and end-user training to convince users about alternatives.

Phase-out strategy

42. To contribute to the reductions in HCFC consumption, the Government of Indonesia is proposing to sustainably reduce its consumption of HCFC-123 by about 12.5 mt (0.25 ODP tonnes) by 2015. The main elements of the strategy for achieving reductions include: technical assistance to the four manufacturers for transitioning to alternatives, certifications and regulatory approvals, field testing and training, and information dissemination.

Phase-out cost

43. The overall cost for phasing out 12.5 mt (0.25 ODP tonnes) of HCFC-123 prior to 2015 has been estimated at US \$400,000 as shown in Table 9.

Table 9. Cost for the phase-out of HCFC-123 in the fire fighting sector in Indonesia

| Component | Total cost (US \$) | | |
|---|--------------------|-------------|-----------|
| | Total | Counterpart | Requested |
| Technical assistance to manufacturers | 170,000 | 20,000 | 150,000 |
| Certifications and regulatory approvals | 110,000 | 20,000 | 90,000 |
| Field trials and testing | 30,000 | 0 | 30,000 |
| User training | 30,000 | 0 | 30,000 |
| Stakeholder interactions | 60,000 | 0 | 60,000 |
| Total | 400,000 | 40,000 | 360,000 |

Implementation modalities

44. This sector plan will be implemented as a part of the overall Stage-I of the HPMP. The Ministry of Environment will coordinate the implementation. UNDP is the implementing agency.

Section 6. Overall cost of the HPMP

45. The overall cost of achieving reductions as articulated in Stage I of the HPMP is US \$32,734,247. Of this amount, US \$28,061,804 is requested from the Multilateral Fund (i.e., US \$26,291,804 for investment projects and US \$1,770,000 for non-investment activities) and US \$4,672,443 will be borne by the industry and the country. The summary of the costs is shown in Table 10.

Table 10. Overall cost of the HPMP for Indonesia

| Sector | Agency | Cost (US \$) | | |
|---|------------|--------------|------------|------------|
| | | Total | Requested | Co-funding |
| Investment components | | | | |
| Air-conditioning sector plan | UNDP | 16,482,000 | 13,686,000 | 2,796,000 |
| Refrigeration sector plan | UNDP | 6,198,000 | 6,198,000 | 0 |
| Fire fighting sector plan | UNDP | 400,000 | 360,000 | 40,000 |
| Group project in foam | UNIDO | 814,247 | 814,247 | 0 |
| Foam sector plan | World Bank | 6,800,000 | 5,233,557 | 1,566,443 |
| Non-investment components | | | | |
| Policies and regulations | UNDP | 180,000 | 120,000 | 60,000 |
| Management and monitoring | UNDP | 450,000 | 360,000 | 90,000 |
| Technical support | UNDP | 300,000 | 300,000 | 0 |
| Technical assistance for servicing sector | UNDP | 750,000 | 750,000 | 0 |
| Awareness and capacity-building | UNDP | 360,000 | 240,000 | 120,000 |
| Total | | 32,734,247 | 28,061,804 | 4,672,443 |

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

46. The Secretariat reviewed the HPMP for Indonesia and the sector phase-out plans in the context of the guidelines for the preparation of HPMPs (decision 54/39), the criteria for funding HCFC phase-out in the consumption sector agreed at the 60th Meeting (decision 60/44) and the adjusted 2010-2014 consolidated business plan as noted by the Executive Committee at its 61st Meeting.

Section 1. HPMP document

HCFC data

47. Explaining the 26 per cent increase in HCFC consumption between 2008 (4,635 tonnes) and 2009 (5,832 tonnes), UNDP (as the lead implementing agency for the HPMP for Indonesia) said that Indonesia

has shown consistent economic growth since 1999, particularly in the HCFC consuming sectors, as noted in the HCFC survey carried out from 2005 to 2007. Although Indonesia was less impacted by the recession in 2008 than many other countries, it may be noted that the HCFC-141b consumption dropped by about 13.3 per cent from 2007 to 2008. The increase in consumption in 2009 from 2008 levels is not a net increase, but rather the result of markets recouping after the relative slump in 2008 coupled with a rapid growth in demand for air conditioning and refrigeration equipment.

48. UNDP also indicated that the HCFC import data for 2007 to 2009 has been collated and reconciled between the Department of Customs, Central Bureau of Statistics, Ministry of Trade and Ministry of Environment and reflects the results of painstaking work to ensure its accuracy and consistency.

Phase-out strategy

Amount of HCFCs to be phase-out to meet the 2013 and 2015 control targets

49. To meet the 2013 and 2015 phase-out targets, the Government of Indonesia is proposing the phase out of 140.7 ODP tonnes. This amount is equivalent to 35 per cent of the HCFC baseline estimated in the HPMP (402.2 ODP tonnes) or 40.9 per cent of the HCFC baseline used in the 2010-2014 consolidated business plan noted by Executive Committee at its 61st Meeting (344.1 ODP tonnes). In addressing this issue, UNDP indicated that the feasible of conversions of enterprises within each sector/sub-sector, which could be carried out in 2-3 years, were established. A complete phase-out at a sub-sector or application level was required, to enable effective and enforceable regulations, while maintaining a level playing field without market distortion. This was one of the important lessons learnt during CFC phase-out. Using a bottom-up analysis for all sub-sectors, taking into account several factors and potential measures to control HCFC consumption, it was concluded that the consumption arising from unaddressed sectors/sub-sectors would need to be controlled at no higher than 6.7 per cent annually, if 140.7 ODP tonnes could be addressed in Stage I.

Prioritization of HCFC phase-out

50. The 2009/2010 average consumption of HCFC-141b used in the foam sector alone (i.e., excluding that used for the manufacturing of refrigeration equipment) in Indonesia amounted to 90.61 ODP tonnes, equivalent to 22.5 per cent of the estimated HCFC baseline consumption in the country. Accordingly, Indonesia might be able to meet the 2015 control target by addressing only the consumption of HCFC-141b in the foam sector. However, the Government is proposing to meet the 2013 and 2015 control measures by phasing out not only consumption of HCFC-141b, but also HCFC-22 used in the refrigeration/air conditioning manufacturing and servicing sectors and HCFC-123 used in the fire fighting sector. UNDP responded that HCFC-141b and the foam sector have indeed been prioritized, contributing 47 per cent to the overall phase-out target. The barriers for further reductions in this sector mainly include: availability of cost-effective, safe and environmentally benign alternatives; and the extent to which conversions can be implemented in small and medium size enterprises (SMEs). As for HCFC-22, converting refrigeration systems to alternative technologies will lead to lower consumption of HCFC-22 in the servicing sector, and cancel out demand for HCFC-22 based equipment post-2015. This approach allows for a sustainable phase-out with ease of regulations and effective enforcement.

Second-stage conversion

51. During the phase-out of CFCs, the Executive Committee approved 41 foam projects for the phase-out of 886.7 ODP tonnes of CFC-11. The projects were converted to HCFC-141b technology. Additionally, 26 projects were approved in the manufacturing of domestic and commercial refrigeration units, resulting in the replacement of 1,541.6 ODP tonnes of CFC-11 with HCFC-141b. As a result, 2,695.4 tonnes (296.5 ODP tonnes) of HCFC-141b were phased in. However, the Foam Sector Plan has

estimated the 2009 HCFC-141b consumption in Indonesia at 1,186.3 metric tonnes (130.5 ODP tonnes). In explaining the difference between the HCFCs that were phased in and the estimated amount consumed in 2009, the World Bank stated that during the preparation of the foam and refrigeration components of the HPMP, some enterprises that were previously converted to HCFC-141b technology were closed or moved to other countries; others changed their business products and others converted to a final solution on their own. Furthermore, the levels of production have decreased significantly due to the economic crisis.

52. In spite of the fact that, during the conversion from CFCs to HCFC-141b, due consideration was given to enhancing the baseline equipment so that enterprises could introduce a final technology at a minimum cost, the overall cost-effectiveness of the conversion from HCFC-141b to a final technology has been estimated at US \$13.33/kg. The World Bank has indicated that, aside from a few larger enterprises manufacturing refrigeration equipment, the foam enterprises have low levels of HCFC-141b consumption. The alternative technologies are too expensive, either due to high up-front investment costs (hydrocarbon), or because the blowing agents are either too expensive (HFC-245fa) or not yet proven (methyl formate).

53. The World Bank also indicated that, during the preparation of the Foam Sector Plan, consideration was given to selecting more enterprises that had not received assistance from the Fund. Since commitments to phase-out HCFC-141b consumption were secured only from enterprises manufacturing domestic refrigerators and freezers and integral skin products, it was necessary to include second-stage conversion enterprises in phase 1 of the Foam Sector Plan to comply with the Protocol's HCFC phase-out targets.

Activities in the servicing sector

54. In regard to the justification for the submission of phase-out activities in the refrigeration servicing sector (decision 60/44(f)(xv)) UNDP indicated that Indonesia's strategy for compliance with the 2013 and 2015 targets, prioritizes manufacturing. The proposed technical assistance for the servicing sector is an important element in controlling the HCFC consumption (and growth thereof) until 2015 in that sector and is an integral component of the overall strategy; however, no actual phase-out is being targeted. It proposes a novel approach through the establishment of a product stewardship programme, learning from experiences with similar programmes in the region, which will lay the foundation for actual phase-out in the servicing sector in subsequent stages of the HPMP.

Additional funding for policies and regulations

55. In regard to the request for support for policies and regulations (US \$120,000), it was noted that US \$173,750 was approved at the 55th Meeting for the preparation of the HPMP including assistance for inter alia, policy and legislation; survey of HCFC use and analysis of data; and, US \$200,000 was approved for the preparation of projects in the manufacturing sector. UNDP indicated that the understanding of decision 56/16(b)(i) is that the funding levels agreed through that decision pertained to HPMP preparation. The activities carried out with those funds led to the HPMP document that is a framework policy document, and to Indonesia's national-level controls on HCFC imports through an operating licensing system. The support requested under "policies and regulations" is for targeted regulatory actions that involve government processes and costs. These elements have been included in the guidance provided by decision 54/39

Section 2. Sector plan for HCFC phase-out in the foam sector (World Bank) and an umbrella project for the phase-out of HCFCs by four foam enterprises (UNIDO)

Technology selection

56. The selection of hydrocarbon and HFC-245fa technologies will result in major counterpart contributions (US \$7,035,230, representing 42 per cent of the total cost) from the majority of the enterprises, particularly SMEs, which usually have low investment capacity (the smaller the size of the enterprise, the larger the counterpart contribution, in some cases reaching more than 90 per cent of the cost of the conversion). From the information presented in the Foam Sector Plan, it appears that the enterprises have not been fully informed of the provision of counterpart contributions (in decision 24/49 the Committee decided, *inter alia*, that in cases where counterpart contributions were needed to ensure implementation, in order to avoid delays in the projects' implementation, those counterpart contributions should be known to the implementing agency to be in place before the projects were submitted). The World Bank informed that the issue of counterpart funding has been the major issue discussed by the TWG. The main justification for selecting the automotive and furniture sub-sectors as a priority was that they have sufficient profit margins to allow for the increasing costs of alternative technology. Because of this fact, the TWG agreed with the Ministry's proposal to phase out the use of HCFC-141b completely by 1 January 2016. The umbrella project submitted by UNIDO proposes to convert four foam plants to hydrocarbon technology as one umbrella project, rationalizing costs. The enterprises were informed about estimated cost-sharing and they agreed to bear the costs. It is stated in the project document: "Selection of pentane technology would result in additional investment costs. However, all the companies' owners decided to convert to pentane technology". The companies agreed with the provision.

57. Limited information was provided on latest developments in emerging technologies. The technology selection procedure should also consider the potential for utilization of new technologies, such as methyl formate, that could be more cost-effective, particularly as the majority of the foam enterprises in Indonesia use relatively small amounts of HCFCs. It was pointed out that the demonstration project for the use of methyl formate as a blowing agent under UNDP implementation has been completed and that foam projects submitted by several Article 5 countries had selected methyl formate as the most cost-effective and sustainable replacement technology. With regard to the selection of HFC-245fa, it was indicated that HFCs are among the gases controlled by the Kyoto Protocol and that the Parties to the Montreal Protocol are considering proposals to include these gases under the Montreal Protocol. The World Bank responded that the methyl formate alternative had been discussed extensively by the TWG. However, due to a lack of published technical documents on this alternative, the TWG felt that the technology was not appropriate for Indonesia. There are concerns pertaining to the stability of the foam; foam density may have to be increased significantly, resulting in higher operating costs; methyl formate is flammable; long-term effects of methyl formate concentration in the air are unknown, and could pose a health impact to workers. While there are a few systems houses that offer methyl formate-based formulations, most systems houses have not selected this alternative. Therefore, the market availability of this alternative could pose a major problem for Indonesia, particularly in the short and medium terms.

58. In spite of the existence of a number of systems houses in Indonesia that are supplying systems to a large number of customers (SMEs), they have not been included in the Foam Sector Plan. The World Bank indicated that systems houses are members of the TWG. At this point, none of the systems houses have expressed their interest in exploring methyl formate as a blowing agent. However, the Government of Indonesia and the World Bank agree with the Secretariat's view that it is important to involve systems houses. Therefore, the Foam Sector Plan does propose to include system houses during the implementation of phase 1, in the interest of flexibility.

Methodology for calculating incremental costs

59. For the purpose of calculating the incremental capital costs, the Foam Sector Plan classified the enterprises according to their HCFC consumption: small enterprises (0–5 tonnes), medium enterprises (5-10 tonnes) and large enterprises (>10 tonnes). These categories, however, are not consistent with the classifications normally used by the Multilateral Fund to determine project size, especially when it comes to the cut-off consumption for cost-effective use of hydrocarbon technology. The cut-off HCFC consumption for conversion to hydrocarbon is in the order of 50 tonnes to allow for a cost-effective conversion of the equipment in the baseline, including safety related items, although in the past there have been some cases where consumption in the range of 30-50 tonnes has been accommodated since the project was designed to be relatively cost-effective. Only two out of all of the enterprises covered under phase 1 (with a consumption of 108 tonnes and 40 tonnes) could be considered to qualify for use of hydrocarbon technology. However, nearly 300 metric tonnes (33 ODP tonnes) of the 453.5 metric tonnes (49.9 ODP tonnes) will be converted to full-scale use of hydrocarbon technology, with enterprise counterpart contributions of over US \$7 million. The World Bank indicated that the classification presented in the Foam Sector Plan reflects the industry set-up in Indonesia, which is characterized by a large number of small enterprises. With regard to the cut-off consumption for cost-effective use of hydrocarbon technology, changes in the policy and financial environment should be taken into account. In the past, the cut-off consumption of 50 tonnes was established when HCFC-141b could still be considered as an alternative and when the cost-effectiveness threshold was lower. At present, those factors have changed as cost-effectiveness thresholds have been increased to allow the introduction of low global warming potential (GWP) alternatives. Furthermore, additional pressure from the impact on the climate has also influenced the selection of technology. It is believed that conversion to hydrocarbon blowing is the most sustainable solution for these companies, from both an environmental and technological point of view.

60. The cost calculations presented in the Foam Sector Plan were based on the assumption that all enterprises are the same size, and using average consumption of HCFC-141b to be phased out for each of the subsectors identified. The amount of HCFC-141b to be phased-out was that forecast up to 2012. For instance, the capital costs for the conversion of boardstock and thermoware foam applications were each estimated to be US \$95,000; virtually all subsectors follow the same level of cost, including spray foam, which is known to be much cheaper than other applications. The domestic refrigeration sub-sector consists of only 2 enterprises, one very large (108 metric tonnes or 11.9 ODP tonnes of HCFC-141b) and the other very small (22 metric tonnes or 2.4 ODP tonnes of HCFC-141b). The cost for the conversion of the two enterprises was estimated on the basis of the average consumption of the two plants (i.e., 65 metric tonnes or 7.2 ODP tonnes) resulting in funding of US \$689,700 for each enterprise. In regard to the introduction of HFC-245fa, it was noted that it would only require minor modifications to the existing baseline equipment and possibly the need for a chiller for cooling buffer and day tanks due to the low boiling point of HFC-245fa. The requests for new premixing equipment, new metering unit and new foam equipment would not be eligible, as this equipment should be in the baseline.

61. The World Bank reported that the approach used for calculating both the cost to Indonesia and the cost to the Multilateral Fund was justified. With regard to the boardstock and thermoware comments, the cost presented in the Foam Sector Plan was reviewed and agreed to by the industrial expert. This cost reflects the actual cost of changing over to the proposed substitutes. As the funding is dictated by the CFC-based threshold, the problem is more on the side of implementation, with the Government responsible for meeting the reduction targets through a combination of financial incentives and policies to control the supply of HCFCs. This will force the industry to make the necessary investments, and ensure that companies are able to provide the necessary co-funding. It is important to note that the choices of alternative technologies have been identified and agreed to by the industry through its TWG. The Government is also promoting hydrocarbon technology where possible. With regard to the conversion to HFC-245fa, the incremental costs were calculated based on the lowest cost taking into account the equipment baseline.

Section 3. Sector plan for HCFC phase-out in the air-conditioning sector (UNDP)

Technology selection

62. The selection of HFC-410A technology is meant as an interim technology, prior to a second conversion to HFC-32. Technically, this is a logical step; both technologies share a number of important design characteristics of the equipment, and a conversion from HFC-410A to HFC-32 should be feasible if the related equipment has been designed from the outset with the use of HFC-32 technology and its flammability in mind. The reason for a two-step approach has been that currently suitable compressors for the use with HFC-32 are not available, and therefore the conversion to HFC-32 cannot be ensured. However, the conversion to HFC-410A is not the most advantageous choice in terms of climate impact.

Methodology for calculating incremental costs

63. The Secretariat had expressed concern about the limited level of information regarding enterprises and products provided in conjunction with the sector plan. At the time of the writing of this document, information was under preparation by UNDP, but had not been received timely and could not yet be assessed. The information submitted has not allowed the assessment of the eligibility of the enterprises, their baseline in terms of existing equipment and, thus, the need for technological upgrade in order to be able to use HFC-410A technology.

Section 4. Sector plan for HCFC phase-out in the refrigeration sector (UNDP)

Technology selection

64. The technology selection is proposed along the lines of conventional, well known refrigerants, in particular HFC-134a and ammonia. However, the impact of the application of ammonia is possibly limited because for cost reasons ammonia tends to be used in larger equipment. There might be only a limited field of applications where ammonia had not been used in the past and can be used in the future. Consequently, at this stage is likely that the majority of equipment will convert to HFC-134a. However, the sector plan contained no information about specific technology choices or how much HCFC-22 consumption would be converted to which refrigerant choice. Consequently, it is currently difficult to assess the impact of the technology selection. It is foreseen to convert subsequently HFC applications to other substances with a lower GWP including HFC-32, once these become available.

Methodology for calculating incremental costs

65. The Secretariat had expressed concern about the originally limited level of information regarding enterprises and products provided in conjunction with the sector plan. UNDP provided information about enterprise-level baseline equipment and products manufactured. Regarding the refrigeration part, the information submitted has not included a clear enterprise level indication of the technology that would be selected; however, only one set of standard equipment was foreseen to be supplied. Since the subsequent information indicated both a flammable as well as a non-flammable alternative, cost assessment was not possible at this point in time. For the foam part information about baseline equipment and eligibility has been submitted.

66. In regard to the refrigeration manufacturing sector, UNDP indicated that, given the need to target more than 10 per cent of the baseline consumption for 2013 and 2015 compliance, the refrigeration sector plan aims to maximize environmental benefits (complete phase-out in manufacturing by 2015 and controlling HCFC-based equipment population and future consumption in servicing). It also aims to maximize cost-effectiveness by consolidating and rationalizing the manufacturing capacity in Indonesia, although this approach was not detailed in the costing provided. To that extent UNDP felt that, this proposal is a strategic plan, rather than a project covering a group of assorted enterprises involving

individually funded conversions. The necessary degree of flexibility therefore needs to be built into the plan in terms of the level of detail in information and for application of funding.

67. It was also pointed out that, depending on the alternatives selected as refrigerant, it might be more meaningful to concentrate conversion exclusively on the foam component, which alone can phase-out 45.4 ODP tonnes of HCFCs, equivalent to more than 10 per cent of the estimated baseline consumption. In addressing this issue, UNDP indicated that the refrigeration sector plan, which is an integral part of Indonesia's HPMP, targets the complete phase-out of HCFC consumption in manufacturing in this sector. Therefore, it in fact addresses all the manufacturing consumption, both for HCFC-141b and HCFC-22 in this sector. This approach is based on lessons learnt during CFC phase-out. It allows for effective regulations prohibiting manufacturing and imports of HCFC-based refrigeration equipment from 2015, without distorting the market and reducing enforcement burdens. This will also lead to controlling the increase in HCFC-based equipment, and resulting HCFC demand for servicing. If left uncontrolled, the growth in HCFC consumption in the servicing sector could nullify the reductions achieved through piecemeal interventions and jeopardize compliance.

Section 5. Sector plan for HCFC phase-out in the fire fighting sector (UNDP)

68. In regard to the activities for the phase-out of 12.5 mt (0.25 ODP tonnes) of HCFC-123, at a cost-effectiveness of US \$28.8/kg, it was pointed out that HCFC-123 has the lowest ODP of all common HCFCs and at this stage, phase-out in the sector could not be considered as a priority to meet the 2013 and 2015 control targets. UNDP indicated that early intervention in the sector would allow Indonesia to prohibit HCFC-123-based fire fighting equipment sooner by providing early incentives to the industry to adopt safer alternatives. This will effectively control the growth in equipment containing HCFC-123 and the use of HCFC-123 in both manufacturing and servicing of this equipment.

Section 6. Overall cost of the HPMP

69. The Government of Indonesia requested US \$1,770,000 for non-investment activities (as shown in Table 10 above), with an associated phase-out equivalent to 21.6 ODP tonnes of HCFC-22 (or 5.4 per cent of the estimated HCFC baseline for compliance). In addition to this request, the sectoral plans also includes funding request for non-investment activities (i.e., US \$453,051 as a management fee in the foam sector phase-out plan; US \$180,000 for "socialization" of regulatory measures and US \$240,000 for technology information dissemination/awareness in the air conditioning sector plan; US \$30,000 for each large organized enterprise and US \$20,000 for each SMEs and other enterprises for technical assistance; US \$180,000 for technical assistance for fisheries sectors; US \$180,000 for "socialization" of regulatory measures and US \$240,000 for technology information dissemination/awareness in the refrigeration sector plan; US \$35,000 for each Group I and Group II enterprises, and US \$10,000 for each Group III enterprises for technical assistance).

70. UNDP indicated that the non-investment activities proposed are required to support the implementation of phase-out actions targeted for stage I. This is consistent with the HPMP guidelines from decision 54/39. Except for the technical assistance component for the refrigeration servicing sector (US \$750,000), which does not aim at phase-out, none of the proposed non-investment activities intervene in the servicing sector. Therefore, the rationale for linking them to servicing or HCFC-22 is not clear. Furthermore, for compliance with the 2013 and 2015 control targets, the volumetric phase-out and the associated actions needed are enormous and not encountered at this scale during any stage of CFC phase-out. The timeframe available for carrying out these actions is also very limited. These activities and related costs will facilitate the necessary support to achieve compliance; similar activities have been previously approved in context of sector and national plans.

Outstanding technical and cost issues

71. The Secretariat is still discussing outstanding technical and cost-related issues on the sector plans with relevant implementing agency. The Secretariat will make every effort to complete this task and communicate the results of the discussions to the Executive Committee prior to the 62nd Meeting.

RECOMMENDATIONS

72. Pending.