

**United Nations Development Programme**  
**Country: Brunei Darussalam**  
**Project Document**

**Project Title**

Implementation of a Nationwide Incentive Program to Encourage the Retrofit of CFC-12 based MAC Units and to Build Capacity of Local Refrigerant Service Industry on Retrofitting and Recycling Products

**Expected CP Outcome(s):**

*(Those linked to the project and extracted from the GPAP)*

Improved environmental stewardship through sustainable energy development and environmental management

**Expected Output(s):**

*(Those that will result from the project and extracted from the GPAP)*

**Implementing Partner:**

Department of Environment, Parks and Recreation  
 Ministry of Development, Brunei Darussalam

**Responsible Parties:**

**Brief Description**

The objective of this project is to implement a nation wide incentive program to encourage the retrofit of CFC-12 based mobile air-conditioning (MAC) units and to supply equipment suitable for assuring correct servicing, retrofitting and recovery and recycling of refrigerants to the MAC and refrigeration service sub-sectors.

Programme Period:	2009 - 2011
Key Result Area (Strategic Plan):	
Atlas Award ID:	TBD
Start date:	TBD
End Date:	TBD
PAC Meeting Date	
Management Arrangements	NEX Execution

2009 AWP budget:	USD 250,000
2010 AWP budget:	USD 140,000
Total resources required	USD390,000
Total allocated resources:	
• Regular	
• Other:	
◦ MLF	USD390,000
In-kind Contributions	

Agreed by (Implementing Partner):

*Hakeemul Sma*

HAJI MOHD ZAKARIA BIN HAJI SARUDIN  
 DIRECTOR OF ENVIRONMENT, PARKS AND RECREATION  
 MINISTRY OF DEVELOPMENT, BRUNEI DARUSSALAM

Agreed by UNDP:

*Kamal Malhotra*

Kamal Malhotra  
 Resident Representative

**AGREEMENT ON  
TECHNICAL ASSISTANCE PROJECT FOR THE REFRIGERATION  
SERVICE AND MAC SECTORS**

**THIS AGREEMENT is made and entered into this ..... day of February 2009**

**BETWEEN**

- (1) The Government of His Majesty The Sultan and Yang Di-Pertuan of Brunei Darussalam represented by the Department of Environment, Parks and Recreation, Ministry of Development whose address is Ministry of Development Building, Old Airport Road, BB3510, Negara Brunei Darussalam (hereinafter referred to as 'the Government');

**AND**

- (2) United Nations Development Programme, whose address is Wisma UN, Block C, Kompleks Pejabat Damansara, Jalan Dungun, Damansara Heights, 50490, Kuala Lumpur, Malaysia. (hereinafter referred to as 'UNDP')

(both abovementioned parties are hereinafter singularly referred to as 'the Party' and collectively referred to as 'the Parties')

**WHEREAS**

- (1) The Refrigerant Management Plan (hereinafter referred to as RMP) for Brunei Darussalam was approved at the 44<sup>th</sup> Meeting of the Executive Committee of the Multilateral Fund.
- (2) UNDP has been designated as the implementing agency for the Technical Assistance Project (hereinafter referred to as the 'Project') for the reduction of consumption of CFC for the refrigeration service and mobile air-conditioning (MAC) sectors which is a component of the RMP for Brunei Darussalam.
- (3) The Project aims to implement a nation-wide Incentive Programme to encourage the retrofit of CFC-12 based MAC units and to supply equipment suitable for assuring correct servicing, retrofitting and recovery and recycling of refrigerants to the MAC and refrigeration service sub-sectors.
- (4) The Project also aims to reduce consumption of CFC refrigerant by 16 ODP tonnes (8 ODP tonnes/year).

**NOW IT IS AGREED as follows:**

**1. DEFINITION AND INTERPRETATION**

In this Agreement, unless the context otherwise requires:

- 1.1 “Multilateral Fund” means The Multilateral Fund for the Implementation of the Montreal Protocol. Established in 1990 to assist Article 5 countries financially and technically to eliminate controlled substances. It is directed by an Executive Committee, served by the Fund Secretariat, and implemented by four Implementing Agencies, namely UNDP, UNEP, UNIDO and the World Bank.
- 1.2 Headings are inserted for convenience only and shall not affect the construction of this Agreement.
- 1.3 The annexes to this Agreement shall be deemed to form part of this Agreement.
- 1.4 This Agreement shall bind each Party’s legal personal representatives, successors and assigns.

**3. VALIDITY**

This Agreement shall come into effect on the date of signature and shall remain valid for a period of twenty-four (24) months or until satisfactory completion of the work under this Agreement.

**1. PROJECT SUMMARY**

- 4.1 The aim of the Project is to implement a nation-wide Incentive Programme to encourage the retrofit of CFC-12 based mobile air-conditioning (MAC) units and to supply equipment suitable for assuring correct servicing, retrofitting and recovery and recycling of refrigerants to the MAC and refrigeration service sub-sectors.
- 4.2 A Workshop for the larger vehicle fleet owners and MAC and refrigeration service technicians shall be held to familiarise these with the RMP and to publicise and explain the MAC Retrofit Incentive Programme. 2 Training Workshops shall be conducted on the correct retrofitting of MAC from CFC-12 to HFC-134a and the correct use and employment of the Recovery and Recycling (R&R) and other equipment supplied.
- 4.3 The Project shall provide funding to incentivate the replacement or retrofit of existing CFC-12 based MAC units to HFC-134a and to purchase MAC recovery and recycling machines and tools and equipment to assure that these retrofit

operations are carried out correctly and without emissions of Ozone Depleting Substance (ODS).

4.4 The co-ordination of the Programme and the overseeing of the monitoring of the RMP, with periodic reports, as provided for within the RMP, shall be carried out by the National Ozone Unit (NOU), of the Department of Environment, Parks and Recreation of the Ministry of Development.

## **5. OBJECTIVES**

5.1 The Project's objectives are:

- (i) To achieve an ever more accurate inventory of vehicles with ODS based MAC units and of ODS based commercial refrigeration and air-conditioning installations and their equipment;
- (ii) Diffusion of information to MAC owners and MAC service enterprises in Brunei Darussalam concerning the existence of the MAC Retrofit Incentive Programme and follow up on applications for incentives received from MAC owners;
- (iii) To provide financial incentives and other support measures to facilitate the replacement or retrofit of MAC units to employ HFC134a refrigerant;
- (iv) To provide 8 MAC R&R machines and other ancillary tools and equipment necessary to the undertaking of a correct retrofit;
- (v) To provide advice and training in the correct procedure for retrofitting MAC units from CFC-12 to HFC134a refrigerants and the employment of the equipment provided through the Project;
- (vi) To provide 2 portable recovery machines, 1 recycling machine and other ancillary tools and equipment for employment within the commercial service sector, and
- (vii) To provide training in correct recovery and recycling of refrigerants and the employment of the equipment provided through the Project.

5.2 Though the above mentioned activities could appear to be independent, they shall need to be carried out simultaneously.

## 6. THE PROJECT JUSTIFICATION

6.1 The Project shall be an integral part of the overall RMP which has been prepared by the Government for the refrigeration sector. One of the first priorities of this is to stop the discharge of CFC refrigerants into the atmosphere, due to leaks and servicing emissions. In order to achieve this, the Government has incorporated within the Project a Retrofit Incentive Programme for the MAC Sector and a Refrigerant Recovery and Recycling Programme.

6.2 In order to meet the Montreal Protocol requirements as to the freeze and subsequent reduction of ODS consumption, all the traditional importers of CFC refrigerants have been identified and shall be registered and shall require permits, which shall be restricted to diminishing annual quotas.

6.3 The Parties acknowledge the following:

- i. During the preparation of the Project a survey was carried out, under the supervision of the NOU, of 113 R&A/C and/or MAC service enterprises situated in the principle commercial and industrial regions of Brunei Darussalam. Of the 105 enterprises that volunteered information, 90 serviced MAC units, 15 serviced exclusively industrial and commercial R&A/C installations or domestic appliances. Some of the enterprises servicing MAC also serviced commercial and domestic equipment. The survey indicated that, in 2002, the 90 enterprises servicing MAC consumed a total of 24.950 ODP tonnes of CFC-12, an average of 277 ODP kg for each MAC servicing enterprise.
- ii. It could be expected that, of the CFC-12 employed in servicing MAC, more than 50% could be for replenishment, as a result of leakage experienced prior to entering the service shop. As an example, this could account for 12.475 ODP tonnes of the CFC-12 consumption declared by the 90 enterprises servicing MAC. If this were the case and as it is generally due to external factors, such as age and engine vibrations, the project to train refrigeration technicians in better servicing practises that is also envisioned within the RMP, shall probably have little effect upon this consumption need.
- iii. The 90 enterprises servicing MAC reported a total consumption of 24,950 Mtonnes of CFC-12 and 10,959 Mtonnes of HFC-134a. A proportion of 2.28 to 1, in favour of CFC-12.
- iv. The statistics on vehicles registered annually show that a total of 167,400 new or used four-wheel vehicles were registered prior to 1997 and 44,988 between 1997 and 2002.

v. Of the registered vehicles, 192,525 are passenger cars or taxis, 1,896 are minibuses, coaches or buses and 17,967 are goods vehicles. Reliable sources such as the Automobile Association, car dealers and MAC service centres have indicated that the vast majority of four-wheel vehicles currently on the roads in Brunei Darussalam are equipped with air-conditioning, though not all were necessarily functional.

vi. In Brunei Darussalam, the price of CFC-12 refrigerant (US\$6/kg) has risen steadily in recent years and is presently converging on that of HFC-134a (US\$10/kg). It is to be assumed that, due to import controls and increased world-wide restrictions in supply of CFC-12, this tendency shall continue and that HFC-134a shall become the more economical of the two in the near future.

6.4 On account of the above a MAC Retrofit Incentive Programme, that shall offer limited funding assistance and the duration of which shall be extended throughout 2009, shall be implemented within the Project. Under the MAC Retrofit Incentive Programme any owner of a vehicle registered in Brunei Darussalam that wishes to apply for an incentive payment towards a permanent retrofit of a MAC unit from CFC-12 to HFC134a, may do so at any time between the commencement of the programme and 31<sup>st</sup> December 2009 or as long as available funds allow.

6.5 The MAC Retrofit Incentive Programme shall be operated on a 'first come-first served' basis and it is expected that it shall lead to early reductions in ODS consumption.

## **7. TECHNOLOGY OVERVIEW AND SELECTION**

7.1 The following three options are potentially available to a vehicle owner with MAC unit to eliminate CFC consumption:

- (i) Replacement of the existing CFC-12 based MAC unit with a unit designed to employ HFC-134a refrigerant. This option requires a major investment in new equipment. New MAC units based on zero-ODP refrigerants such as HFC-134a are commercially available and may be considered as a "once off" permanent replacement with no further change in refrigerant necessary during the lifetime of the unit.
- (ii) Retrofit of existing CFC12 based MAC unit to employ HFC134a refrigerant. This option, that shall prolong the useful working lifetime of existing unit, is technically feasible for virtually all existing MAC units designed to employ CFC-12 and in most cases would be more cost effective than replacement with a new unit.
- (iii) Drop-in Ternary Blend Replacement Refrigerants. The objective of this option is also to prolong the useful lifetime of the existing unit. This would be achieved by the employment of ternary refrigerant blends,

typically containing a mixture of HFCs and sometimes HCFCs or Hydrocarbons. Some blends have been especially designed to replace CFC-12 in MAC units. However, in most cases the employment of these blends shall also require similar system changes as in a HFC-134a retrofit, namely a change of the refrigerant, compressor oil and filter dryer. Whilst, during the period when HFC-134a was expensive or in short supply, the lower initial cost of using a "drop-in" blend rather than performing a retrofit to HFC-134a might have been attractive, even in these cases both the operating cost and the future availability of the refrigerant blend had to be considered. Conversion from a CFC refrigerant to a low-ODP refrigerant blend, particularly those containing HCFCs may only be considered as an "interim" conversion that shall require a further change to a zero-ODP refrigerant in the future. In the case of Brunei Darussalam, "drop-in" blends are expensive and not readily available, where as HFC-134a is presently readily available and its price is rapidly converging with that of CFC-12.

7.2 The Parties noted that:

(i) By definition, a "drop-in" refrigerant implies minimal system changes and little more than simple replacement of one refrigerant with another. In this case the conversion can easily be reversed and the elimination of CFC consumption cannot be considered permanent as it may not be sustained.

(ii) "Drop-in" retrofits of MAC units from CFC-12 to ternary refrigerant blends have seen limited application in Article 5 countries due to the poor availability and relatively high cost of these refrigerants, especially considering the high refrigerant loss rates typically found with MAC units in ageing vehicles.

(iii) In many cases, after a leak of a ternary refrigerant blend has occurred, it is necessary to completely replace the full charge, rather than simply replenish the lost refrigerant. Extra care is also necessary in the handling, use, and recovery of ternary refrigerant blends containing HCFCs or hydrocarbons and recycling is rarely possible.

(iv) The employment of a "drop-in" may not be obvious or indicated and appropriate steps must be taken to avoid possible contamination of CFC-12 or HFC-134a refrigerant recovered from other MAC units for recycling.

7.3 The Parties concluded that:

(i) the equipment replacement option is relatively expensive in most cases and the level of funding that could be obtained from the Multilateral Fund would only be sufficient to cover the costs of replacing a fraction

of the estimated number of CFC-12 MAC units presently in use in Brunei Darussalam;

- (ii) The permanent retrofit of a CFC-12 based MAC unit to employ HFC-134a refrigerant shall be a technically, environmentally, and sound financial proposition for a large majority of vehicle owners, and
- (iii) The sustainability of CFC-12 replacement by “drop-in” refrigerants based on ternary blends is uncertain and highly dependent on refrigerant loss rates and the replacement refrigerant's availability. Considering this, the potential for accidental contamination of CFC-12 during recovery and recycling activities, and the limited MLF resource that is available, the funding of “drop-in” conversions to eliminate CFC consumption is not considered the best use of available MLF funds.

7.4 Based on the foregoing technology review and in order to make the best use of the potentially available MLF funding to eliminate the CFC consumption of maximum of vehicle owners, a MAC Retrofit Incentive Programme shall be implemented within the Project and shall cover up to, and not exceeding, 50% of the cost of a basic MAC retrofit.

## **8. END RESULT**

8.1 The Project shall result in a reduction in the present ODS consumption by the MAC and R&A/C service sector.

8.2 The reduction in consumption shall be due to the number of CFC-12 based MAC units that shall no longer require to be serviced, less emissions during servicing, through the supply and employment pertinent and correct tools and equipment and through recovery and recycling to permit the reuse of existing CFC-12 refrigerant.

8.3 The Parties noted the following:

- i. It is expected that the Project could encourage the retrofitting of the CFC-12 MAC units of 10,000 vehicles and that the MAC Retrofit Incentive Programme shall have caused a permanent effect on ODS consumption of 10 ODP tonnes (5 ODP tonnes/year).
- ii. It is also expected that the Project, due to reduction in servicing emissions brought about by the employment of correct tools and equipment, better servicing practices learnt from the training workshops and reuse of CFC-12 refrigerant resultant from the Refrigerant Recovery and Recycling Programme, could have a permanent effect on ODS consumption of a further 6 ODP tonnes (3 ODP tonnes/year).



- iii. It is expected that the Project shall, in total, have a permanent effect on ODS consumption of 16 ODP tonnes (8 ODP tonnes/year).

8.4 Indirectly, the Project shall assist the Government to meet its scheduled complete phase out of the ODS consumption in 2010.

8.5 The Project shall provide:

- i. 8 CFC-12 MAC R&R machines and sets of retrofit tools and equipment;
- ii. 2 portable refrigerant recovery machines and ancillary equipment, to be used in the servicing of commercial R&A/C installations, and
- iii. 1 recycling machine to allow all CFC-12 refrigerant that is recovered by the recovery machines or any other means to be purified at a public recycling facility.

8.6 All the recovery and recycling machines purchased shall be capable of being converted, with a field service kit, to allow their employment with HFC-134a, at a later date.

## **8 PROJECT ACTIVITY**

8.1 The seven basic components of the Project are:

- i. Information dissemination.
- ii. Equipping of participating MAC service centres.
- iii. Training in retrofitting.
- iv. MAC Retrofit Incentive Programme.
- v. Monitoring activities.
- vi. Setting up recovery and recycling infrastructure.
- vii. Training in recovery and recycling.

8.2 The Project incorporates a MAC Retrofit Incentive Programme. Under this Programme, any vehicle owner with a CFC-12 based MAC unit that decides to retrofit this to employ HFC-134a can apply to receive an incentive payment towards the cost of the operation. Only enterprises that select replacement equipment, or retrofit based on HFC-134a shall be eligible to receive an incentive payment.

8.3 The first component of the Project focuses on informing vehicle owners and MAC servicing enterprises in Brunei Darussalam concerning the existence of the MAC Retrofit Incentive Programme and follow-up on applications for incentives received from vehicle owners.

8.4 These activities shall include:

- i. Media announcements and placement of advertisements in newspapers;

- ii. Printing and distribution of info-leaflets about the programme through the participating MAC Service Centres;
- iii. Holding of national workshops targeting the vehicle owners and MAC service enterprises, and
- iv. Review and evaluation of the applications received by vehicle owners.

8.5 The second component shall assure that participating MAC service centres are correctly equipped and are supplied with CFC-12 recovery and recycling units.

8.6 The third component shall be the holding of training workshops by an international consultant to assure that the participating enterprises are correctly trained in retrofit procedure and related good practices, including the correct employment of the MAC recovery and recycling machines.

8.7 The fourth component consists of the grants to be provided to vehicle owners applying for an incentive payment. Any vehicle owner with a CFC-12 based MAC unit that decides to retrofit this to employ HFC-134a can apply to receive an incentive payment towards the cost of the operation. Only enterprises that select replacement equipment, or retrofit based on HFC-134a shall be eligible to receive an incentive payment. The conditions whereby vehicle owners may receive an incentive payment and the calculation of the grant amount are given in the Annex of this Agreement.

8.8 The fifth component consists of assuring that all the retrofits are carried out correctly and assuring that the withdrawal from the use of CFC-12 has been permanent. The monitoring of the programme shall include quarterly reports from a national consultant and the holding of annual meetings to report on the progress of the MAC Retrofit Incentive Programme.

8.9 The sixth component shall be the holding of training workshops by an international consultant for technicians servicing commercial refrigerant on correct recovery and recycling of refrigerant and related good practices.

8.10 The seventh component consists of constituting a Public Refrigerant Recovery and Recycling Facility. A publicity campaign shall be undertaken to advise R&A/C service enterprises of the availability of recovery equipment and recycling facilities.

8.11 Though management of the Recovery and Recycling Programme and the Recovery and Recycling Facility shall be the responsibility of the NOU, monitoring the amounts of refrigerant recovered and recycled shall be covered under a specific Monitoring Project that is also a component of the RMP.

## **9. THE MAC RETROFIT INCENTIVE PROGRAMME**

The MAC Retrofit Incentive Programme shall be carried out as follows:

### **(i) Awareness generation through open discussions with the equipment users.**

To begin with, the NOU shall undertake awareness activities concerning the Project and assist vehicle owners and MAC service enterprises to better understand the impact of ODS phase out and how the Project shall benefit them. In parallel, meetings shall be held on the Project's objectives and the proposed implementation plan for the Programme with vehicle fleet owners, such as taxi or mini-bus companies, and related sector associations and Government Ministries and Departments, such as the Automobile Association or the Department of Transport, as well as MAC and R&A/C Service Centres.

### **(ii) Preparation of funding support mechanism**

- (a) The funding support mechanism shall then be prepared. This may involve the formation of a Technical Committee consisting of one or more refrigeration experts and representatives of related Government Ministries or Departments, such as Transport, Tourism, or Commerce, and related entities, such as the Automobile Association or the National Refrigeration Association.
- (b) For the purpose of the Programme, a partial funding support to a maximum level of 50% shall be adopted. This shall ensure interest and commitment on the part of the recipients.

### **(iii) Implementation of the Programme**

- (a) A selection shall be made by the NOU, with the assistance of the Technical Committee, of qualified MAC Service Centres and garages to be authorised to undertake the retrofits and an agreement made with these on a single price for performing a basic MAC retrofit.
- (b) After the selected enterprise had received appropriate training, the MAC R&R machines and other equipment and tools shall be distributed to them.
- (c) Those successfully applying for incentive funding shall be presented with a voucher for the amount agreed by the NOU.

The voucher shall be turned over to an authorised Retrofit Centre in part payment for the work carried out.

- (d) The national technical consultant and the Technical Committee shall assist the NOU to instigate the Programme and to evaluate its progress and results.

## **10. RECOVERY AND RECYCLING PROGRAMME**

The Recovery and Recycling Programme shall be carried out as follows:

### **(i) Awareness generation.**

The constitution of the Public Refrigerant Recovery and Recycling Facility shall be broadcast and made known to the general R&A/C service sector by the NOU through a campaign that shall attempt to enlist the co-operation of refrigerant and spare parts distributors.

### **(ii) Implementation of the Recovery and Recycling Programme.**

- (a) R&A/C enterprises or technicians not participating in the MAC Retrofit Incentive Programme shall be invited to attend a R&R Training Workshop conducted by an international expert.
- (b) A suitable site for the R&R facility shall be selected by the NOU, within Brunei Darussalam, and the recycling and recovery machines and appropriate ancillary equipment shall be entrusted to the enterprise selected to manage this.
- (c) The portable recovery machines and ancillary equipment deposited at the R&R facility shall be made available, on a "first-come first-serve" basis, to any R&A/C service enterprise that was registered with the NOU and employing technicians trained in its correct use. A financial deposit shall be asked for, to assure the return, and a penalty payment shall be requested for non-return after a stipulated period.
- (d) The R&R facility shall accept to purify apt CFC-12 refrigerant presented by anyone, no matter how it had been recovered.
- (e) If so requested, the CFC-12 recycled by the R&R facility or the MAC R&R machines shall be returned, as such, to its original owner at a price which shall be not more than that which would reasonably cover the operational costs of the

Recycling Centre, including collection of recovered refrigerant, energy, recycling filters, maintenance, operating space, storage areas, man hours, redistribution of the recycled refrigerant and, if considered necessary, product purity analysis. This price shall be agreed upon under the supervision of the NOU.

- (f) The NOU shall assure the timely changing of the recycling filters incorporated in the recycling machine and the MAC R&R machines.

## **11. PURCHASE OF EQUIPMENT**

11.1 The Parties noted that virtually none of the garages or MAC Service Centres that would be carrying out the retrofits are correctly equipped to assure that the retrofit operations would be undertaken with a complete recovery of the CFC-12 and the use of good servicing practises. To assure that the retrofits are carried out correctly, MAC recovery/recycling units and ancillary equipment and tools shall be purchased and supplied to the service enterprises as an integral part of the Programme.

11.2 Each MAC Service Centre or garage selected to participate in the Programme shall be provided with:

- (i) 1, CFC-12 MAC recovery/recycling/evacuation/charging machine incorporating an OFP device and with capacity to fill automatically in one single pass and a continuous process an internal or external cylinder. The unit shall incorporate an oil separator, 2 independent filters (1 for acid and 1 for moisture), automatic purging of non-condensable gases, an hour counter and appropriate refrigerant gauges and hoses. The machine shall be capable of being field converted to recycle HFC-134a, using a factory-supplied kit;
- (ii) 1, portable multi-refrigerant analyser to identify recovered refrigerants as well as the proportional content of refrigerant mixtures and to assure that only CFC-12 is processed by the recycling machine;
- (iii) 1, DOT standard refillable 50-lb. CFC-12 refrigerant cylinder with two ports and an OFP switch;
- (iv) 1, two-stage vacuum pump;
- (v) 1, digital vacuum gauge;
- (vi) 1, MAC retrofit equipment kit, including;
- (vii) 1, electronic leak detector;

- (viii) 1, manifold gauge for CFC-12;
- (ix) 1, manifold gauge for HFC-134a;
- (x) 1, hi-side adapter kit (including a GM 1991, etc.);
- (xi) 1, set of HFC-134a MAC service couplings;
- (xii) 1, electronic weighing/charging scale;
- (xiii) 1, valve-core removers;
- (xiv) 2, sets of gloves and goggles; and
- (xv) Related spare parts for all of the above.

11.3 The Public Refrigerant Recovery and Recycling Facility shall be provided with:

- (i) 1, mobile single-cycle CFC-12 recycling machine incorporating an Overfill Protection (OFP) device and with capacity to fill automatically in one single pass and a continuous process a 120-lb. cylinder. The unit shall incorporate an oil separator, 2 independent filters (1 for acid and 1 for moisture), automatic purging of non-condensable gases, an hour counter and appropriate refrigerant gauges and hoses. The machine shall be capable of being field converted to recycle HFC-134a, using a factory-supplied kit;
- (ii) 2, portable recovery machine suitable for medium pressure CFC, HCFC and HFC refrigerant;
- (iii) 1, portable multi-refrigerant analyser to identify recovered refrigerants as well as the proportional content of refrigerant mixtures and to assure that only CFC-12 is processed by the recycling machine;
- (iv) 2, two-stage vacuum pumps;
- (v) 2, digital vacuum gauges;
- (vi) 10, DOT standard refillable 30lb. CFC-12 refrigerant cylinders with two ports and an OFP switch;
- (vii) 5, DOT standard refillable 100lb. CFC-12 refrigerant cylinders with two ports and an OFP switch;

- (viii) 2, recovery equipment kits, each including;
- (ix) 2, refrigerant recovery bags;
- (x) 1, electronic leak detector;
- (xi) 1, manifold gauge for CFC-12;
- (xii) 1, manifold gauge for HFC-134<sup>a</sup>;
- (xiii) 1, sight glass;
- (xiv) 1, set of service couplings;
- (xv) 1, electronic weighing/charging scale;
- (xvi) 2, valve-core removers;
- (xvii) 2, sets of tube piercing pliers;
- (xviii) 3, service hoses;
- (xix) 2, sets of gloves and goggles, and
- (xx) Related spare parts for all of the above.

## **12. MONITORING MECHANISM**

12.1 A national consultant shall monitor the service enterprises undertaking the MAC retrofits and shall provide a detailed statement of the units retrofitted by them on a quarterly basis to NOU and the Technical Committee. The garages and MAC Centres shall inform the national consultant each month as to the vehicles which have been retrofitted along with the identity of the owner and the registration numbers of the vehicles. The possibility of including checks on class of refrigerant employed in MACs during the roadworthiness certificate inspections shall also be examined.

12.2 Surprise checks might be conducted by the national consultant and/or NOU personnel to verify that the vehicles with retrofitted MAC units have not returned to employing CFC-12.

12.3 Milestones for the Project monitoring shall be as follows;

<i>Task</i>	<i>Month*</i>
(a) Project document submitted to beneficiary	1
(b) Project document signature	2
(c) Contracts awarded	4
(d) Equipment delivered	6
(e) MAC Incentive Awareness and Training Workshops held	6
(f) MAC Retrofit Incentive and R&R Programmes	6-25
(g) Submission of Project Completion Report	30

\* as measured from Technical Assistance Project approval

### **13. IMPLEMENTATION**

The implementation of this Agreement shall be carried out immediately after the signature of this Agreement in accordance with the time frame described below;

<b>Activities</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
Discussions with Stakeholders, Workshop and Advertising			
Purchase and Distribution of Equipment			
Retrofit and R&R Training Workshops			
Implementation of MAC Retrofit Incentive and R&R Programmes			
Monitoring and Reporting			

### **14. PROJECT COSTS**

14.1 The costs for the purpose of the implementation of the Project shall be as follows;

<b>N</b>	<b>ITEM</b>	<b>US\$</b>
8	MAC recovery/recycling/evacuation/charging machine incorporating an OFP device that shall fill automatically in one single pass and a continuous process an internal or external cylinder. The unit shall incorporate an oil separator, independent acid and moisture filters, automatic purging of non-condensable gases, an hour counter and appropriate refrigerant gauges and hoses. The machine shall be capable of being field converted to recycle HFC-134a, with a factory-supplied kit	22,800
2	Portable recovery machine suitable for CFC-12, HFC-134a and HCFC-22 refrigerant	2,000
1	Mobile single-cycle CFC-12 recycling machine incorporating an OFP device	3,000



	and with capacity to fill automatically in one single pass and a continuous process a 120-lb. cylinder. The unit shall incorporate an oil separator, 2 independent filters (1 for acid and 1 for moisture), automatic purging of non-condensable gases, an hour counter and appropriate refrigerant gauges and hoses. The machine shall be capable of being field converted to recycle HFC-134a, using a factory-supplied kit.	
9	Portable multi-refrigerant analyser to identify recovered refrigerants as well as the proportional content of refrigerant mixtures and to assure that only CFC-12 is processed by the recycling machine	7,200
1	Two-stage vacuum pump	3,250
1	Digital vacuum gauge	1,500
8	MAC retrofit equipment kit	4,680
2	recovery equipment kit	1,500
1	DOT standard refillable 30-lb. CFC-12 refrigerant cylinders with two ports and an OFP switch	750
8	DOT standard refillable 50-lb. CFC-12 refrigerant cylinders with two ports and an OFP switch	800
5	DOT standard refillable 100-lb. CFC-12 refrigerant cylinders with two ports and an OFP switch	1,320
	Related spare parts for the above	2,500
	<b>SUB-TOTAL</b>	<b>51,300</b>
	Contingencies 10%	5,130
	Packaging and Freight	7,000
	<b>TOTAL</b>	<b>63,430</b>

ACTIVITIES	US\$
International Expert to provide overall guidance and evaluation, conduct all 3 Workshops and follow up on the reports and activities of the National Consultant. (2 1/2 years, comprising 2 missions to Brunei Darussalam for workshops plus home base work)	27,000
National Consultant for advice to the NOU, information to service enterprises, applicants and the Technical Committee, monitoring activities and reporting on progress and results of the MAC Retrofit Incentive Programme. (2 1/2 years)	17,000
Translator for International Consultant during Workshops	1,000
National Workshop for informing vehicle owners, MAC service enterprises and concerned parties.	6,000
2 Workshops, 1 for training in retrofitting and correct working practices and 1 for recovery and recycling	12,000
Translation of retrofit training manuals	3,000
Local Travel within the country	2,000
Sundries (local telephone, fax, advertisements in papers, reporting)	3,000

Contingencies	0
<b>TOTAL</b>	<b>71,000</b>

14.2 The services of the consultants shall be on a part time basis throughout the duration of the Technical Project.

14.3 Contingencies are only being requested for equipment in the Project.

#### **15. INCREMENTAL CAPITAL COST**

<b>ITEM OR ACTIVITY</b>	<b>US\$</b>
Equipment for service centres	63,430
Implementation activities	71,000
Incentives to vehicle owners	255,570
<b>TOTAL</b>	<b>390,000</b>

#### **16. COST EFFECTIVENESS**

16.1 The cost effectiveness for the Project is calculated for information only, as Brunei Darussalam is a Low Value Consumption Country. (LVCC).

16.2 It is expected that the Project shall result in a lasting effect on consumption of 16 ODP tonnes (8 ODP tonnes/year).

16.3 The Cost effectiveness for the Project shall be:  
**US\$390,000 ÷ 16.0 ODP tonnes = US\$24.38/kg.**

#### **17. DISBURSEMENT**

17.1 UNDP shall pay the Government, a sum not exceeding US Dollars Three Hundred and Ninety Thousand (US\$390, 000) as provided by the Executive Committee of the Multilateral Fund for Montreal Protocol.

17.2 UNDP shall disburse such funds to the Government either by:

- a) Via direct payment – UNDP makes direct payment to vendors for all expense incurred by the implementing agency (Department of Environment, Parks and Recreation, Brunei). Original Vouchers for the expenses and ‘a request from the Government’ for UNDP to make the payment is required.
- b) Cash Advances – Government sends request for cash advance (in reasonable amount) with a work plan. UNDP will send via electronic fund transfer to Brunei. Cash advances are in local currency. However, every

quarter (3 months) the government has to report to UNDP of the expenditures, known as financial reporting, as this is a UNDP requirement. UNDP executed projects are subject to audit, which can be undertaken by a private entity or by a government body.

17.3 Disbursement shall be made to the following bank account:

Bank Name: HSBC  
Bank ABA/Swift Code: HSBCBNBB  
Beneficiary Name: Brunei Darussalam Government Account  
Beneficiary Account Number: 001-010016-001  
Address of the Bank: Bandar Seri Begawan

17.4 The Government shall maintain a separate financial account for any disbursements pertaining to this Agreement and shall submit to UNDP one month after the completion of the work, a detailed breakdown of expenditures, duly certified by an authorized official of the Government.

17.5 Any portion of cash advances remaining unspent or uncommitted by the Government on the completion of the activities under this Agreement shall be reimbursed to UNDP within one month of the presentation of the expenditure report. In the event of any delay in such reimbursement, the Government shall be financially responsible for any adverse movement in exchange rates.

## **18. CORRESPONDENCE**

18.1 The Parties decided that all correspondence regarding the following matters shall be addressed to the following contact persons:

### **For the Government**

18.1.1 All matters regarding this Agreement

Permanent Secretary (Technical and Professional)  
Ministry of Development,  
Bandar Seri Begawan BE3510  
Brunei Darussalam  
(Attn: Director of Environment, Parks and Recreation)

Tel: +673 2 383 222 / 382 102

Fax: +673 2 383 644

Email: [info\\_env@env.gov.bn](mailto:info_env@env.gov.bn)

For UNDP

18.1.2 All matters regarding substantive and technical, administrative and financial matters to:

Resident Representative,  
United Nations Development Programme  
Wisma UN, Block C,  
Kompleks Pejabat Damansara,  
Jalan Dungun, Damansara Heights,  
50490 Kuala Lumpur, Malaysia  
(Attention: Pn Norzilla Mohamed)

**19. TERMINATION**

19.1 Either Party may terminate this Agreement before its expiry date by giving fourteen (14) days notice in writing.

19.2 In the event of such termination, the Government shall be compensated on a pro-rata basis for no more than the actual amount of work performed to the satisfaction of UNDP. Any additional costs incurred by UNDP resulting from the termination of this Agreement by the Government may be withheld from any amount otherwise due to the Government from UNDP.

**20. AMENDMENT**

No amendment or modification to this Agreement shall be effective unless in writing and signed by both Parties and/or their duly authorised representatives.

**21. SEVERABILITY**

In the event that any provision of this Agreement is declared by any judicial or competent authority to be void, voidable, illegal or otherwise unenforceable or indications of this is received by either of the Parties from any relevant competent authority the Parties shall amend the provision in such reasonable manner as it achieves the intention of the Parties without illegality, or at the discretion of the Parties it may be severed from this Agreement and in either event the remaining provisions of this Agreement shall remain in full force and effect.

## **22. CONFIDENTIALITY**

22.1 UNDP agrees and undertakes to keep confidential all information whether written or oral relating to this Agreement and/or concerning the business or affairs of the Government that it may obtain or receive as a result or in the course of the discussions leading up to execution of this Agreement and/or performance of its obligations under this Agreement save in so far as such information is already in the public domain.

22.2 UNDP further agrees and undertakes to take all such steps as are necessary to ensure that any of its employees agents, advisers, sub-contractors, agents representatives to whom such confidential information is disclosed are made aware of the confidential nature thereof and keep the same confidential at all times.

## **23. WAIVER**

No failure or delay by any Party in exercising any right power or remedy under this Agreement shall operate as a waiver hereof nor shall any single partial exercise of the same preclude any further exercise thereof or the exercise of any other right, power or remedy. Without limiting the foregoing no waiver by any Party of any breach of any provision hereof shall be deemed to be a waiver of any subsequent breach of that or any other provision hereof.

## **24. ASSIGNMENT**

The Government shall not assign, transfer, pledge, sub-contract or make other disposition of this Agreement or any part thereof, or of any of the Government's rights, claims or obligations under this Agreement except with the prior consent of UNDP.

## **25. RESOLUTION OF DISPUTE**

Any dispute, controversy, or claim between the Parties arising out of this Agreement or the breach, termination, or invalidity thereof, unless settled amicably within sixty (60) days after receipt by one Party of the other Party's written request for such amicable settlement, shall be referred by either Party to arbitration in accordance with the UNCITRAL Arbitration Rules then obtaining. The decisions of the arbitral tribunal shall be based on general principles of international commercial law. For all evidentiary questions, the arbitral tribunal shall be guided by the Supplementary Rules Governing the Presentation and Reception of Evidence in International Commercial Arbitration of the International Bar Association, 28 May 1983 edition. The arbitral tribunal shall be

empowered to order the return or destruction of goods or any property, whether tangible or intangible, or of any confidential information provided under this Agreement, order the termination of this Agreement, or order that any other protective measures be taken with respect to the goods, services or any other property, whether tangible or intangible, or of any confidential information provided under this Agreement, as appropriate, all in accordance with the authority of the arbitral tribunal pursuant to Article 26 ("Interim Measures of Protection") and Article 32 ("Form and Effect of the Award") of the UNCITRAL Arbitration Rules. The arbitral tribunal shall have no authority to award punitive damages. In addition, unless otherwise expressly provided in this Agreement, the arbitral tribunal shall have no authority to award interest in excess of the London Inter-Bank Offered Rate ("LIBOR") then prevailing, and any such interest shall be simple interest only. The Parties shall be bound by any arbitration award rendered as a result of such arbitration as the final adjudication of any such dispute, controversy, or claim.

**IN WITNESS WHEREOF** this Agreement has been executed by the authorised representatives of the Parties as on the day and year first above written.

SIGNED by **Haji Mohd Zin bin Haji Salleh**

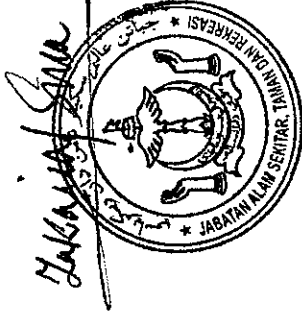
Deputy Permanent Secretary  
Ministry of Development

For and on behalf of  
THE GOVERNMENT OF  
HIS MAJESTY THE SULTAN AND  
YANG DI PERTUAN OF  
BRUNEI DARUSSALAM



In the presence of **Haji Mohd Zakaria bin Haji Sarudin**

Director of Environment, Parks and Recreation  
Ministry of Development  
Date:



SIGNED by  
For and on behalf of  
UNITED NATIONS  
DEVELOPMENT PROGRAMME

In the presence of

**Kamal Malhotra**  
Resident Representative

**Asfaazam Kasbani**  
Assistant/Resident Representative  
Environment & Energy  
UNDP Malaysia

**RETROFIT INCENTIVE PROGRAMME FOR THE MAC SECTOR**  
**GUIDELINES FOR THE RETROFIT OF MOBILE AIR-CONDITIONING (MAC)**  
**FOR VEHICLE OWNERS ON COMPLETING APPLICATIONS & CONDITIONS**  
**TO BE MET TO RECEIVE AN INCENTIVE PAYMENT**

**1. Objective & Eligibility**

- (i) The objective of the Technical Assistance Project, through this MAC Retrofit Incentive Programme, is to eliminate as much as possible of the consumption of CFC-12 (R12), in vehicles incorporating MAC units, through the payment of a financial incentive to those vehicle owners that have existing MAC equipment employing R12 refrigerant.
- (ii) Vehicle owners with MAC units shall be eligible to apply for an incentive payment if:
  - (a) They replace the existing MAC equipment with new equipment that employs HFC-134a (R134a) refrigerant.
  - Or
  - (b) They permanently retrofit the existing MAC equipment to employ R134a.
- (iii) Though vehicle owners may select their preferred MAC replacement or retrofit technology, only replacement units or retrofits based on R134a refrigerant shall be accepted as eligible for consideration for an incentive payment. R134a refrigerant is proven and a range of MAC units based on it is commercially available.
- (iv) The retrofit of existing R12 MAC units to employ a commercial “drop-in” refrigerant blend containing a proportion of CFC or HCFC shall not be eligible for an incentive payment, as the sustainability of the replacement cannot be guaranteed, and the introduction of such blends could have a negative impact on R12 refrigerant recovery and recycling activities.
- (iv) All vehicle models shall be eligible. Vehicles shall only be eligible for an incentive payment if they were manufactured prior to 1<sup>st</sup> January 1997. Proof of this must be attached to the application.

- (v) The replacements or retrofits shall only be carried out by those authorised MAC Service Centres that have been selected by the NOU through an official selection process.
- (vi) The United Nations Development Programme (UNDP) and the Department of Environment, Parks and Recreation, of the Ministry of Development, through the National Ozone Unit (NOU), shall implement the Technical Assistance Project, including the MAC Retrofit Incentive Programme and shall evaluate the applications for incentive payments and make final recommendations on eligibility.

## 2. Application for an Incentive Payment

- (i) Applications shall be made by completing the official MAC Replacement and Retrofit Application Form that can be obtained from the NOU or a MAC Service Centre approved and authorised by the NOU. An individual application shall be completed for each vehicle.
- (ii) Completed applications for an incentive payment, together with all the necessary supporting documentation, shall be submitted to the NOU for approval.
- (iii) All vehicle owners wishing to apply for an incentive payment shall include the following information in its application for an incentive payment:
  - (a) Details concerning the owner of the vehicle. These should include the applicants' full name, address, telephone number and ID card number;
  - (b) Details of the existing vehicle and the MAC equipment that is to be replaced and/or permanently retrofitted. These should include the make, model, year of manufacture, year of purchase and registration number of the vehicle, and
  - (c) Technical details of the proposed replacement equipment and/or permanent retrofit technology, which must be based on proven and mature technology, if this is to be other than that offered below.
- (iv) The Retrofit Incentive Programme for the owners vehicles incorporating R12 based MAC shall operate until [please insert *relevant date*] or until the approved funds have been exhausted.



Applications shall be evaluated on a "first-come, first-served" basis and a vehicle owner may only apply once, even if he or she has several vehicles. However, a vehicle owner may include the MAC replacement or retrofit of more than one or all of their vehicles in a single request for an incentive payment.

### 3. Incentive Payments

- (i) The amount of the incentive payments may not be more than half the costs of the MAC equipment replacement or the price charged for the basic retrofit and shall be set by the NOU. The incentive payment shall be limited to a maximum of US\$30.00 per vehicle.
- (ii) In the case that the total costs for a MAC equipment replacement or retrofit are less than US\$60.00, the incentive payment shall be limited to the verified eligible costs incurred in the existing equipment replacement and/or retrofit divided by two.
- (iii) The approved amount of the incentive payment shall be indicated on a voucher supplied to the successful applicant by the NOU. This amount shall be discounted from the invoice presented to the applicant by the authorised MAC Centre or garage.
- (iv) Following completion of the existing MAC unit's replacement or permanent retrofit, the MAC Service Centre shall submit details to the NOU, including the identity of the owner and the vehicle and a signed agreement from the owner to not reverse the replacement or retrofit to employ R12 again, and shall be reimbursed with the corresponding incentive payment.
- (v) It should be noted that the incentive payment is restricted to vehicles registered in Brunei.

4. **Selection of Authorised MAC Centres, Retrofit Equipment and Instruction** - The authorised MAC Service Centres or garages shall be selected by the NOU, through an official selection process. The selected MAC Service Centres or garages shall be supplied with a minimum of equipment consisting of, 1 MAC R&R machine, 1 50lb. refillable storage cylinders, 1 refrigerant identifier, 1 vacuum pump, 1 leak detector, 1 valve core remover, 1 set of hi-side adapters and other assorted MAC related service tools. At least two technicians or mechanics from each of the selected MAC Service Centres or garages shall be obliged to attend a Workshop conducted by an International Consultant on correct retrofit procedure and shall be supplied with appropriate MAC retrofit training material, selected by the International Consultant.

5. **Basic MAC Retrofit** - The retrofit shall only be carried out by MAC Service Centres or garages authorised by the NOU. The authorised MAC Service Centres

or garages shall offer vehicle owners a basic permanent retrofit of existing R12 MAC system to employ R134a refrigerant, consisting of the recovery of the existing charge of R12 and mineral oil, the change of the dryer filter for one corresponding to the system and compatible with R134a, the evacuation of the air-conditioning circuit, the charging of correct amount of R134a and the correct corresponding amount of compressor oil (e.g. Ester or PAG) and a leak test.

**6. Cost of Basic MAC Retrofit**

(i) The price for the basic MAC retrofit described above, including labour, replacement filter, charge of R134a and Ester or PAG oil, shall be set by the NOU and shall be agreed to by the selected authorised MAC Service Centres or garages. The vehicle owner shall be charged the agreed price less the incentive payment which shall be set by the NOU. The amount of the incentive payment shall be reimbursed to the MAC Service Centre by the NOU.

(ii) Any servicing or changed parts other than those included in the basic retrofit described above, even if essential to a correct and complete retrofit, shall be invoiced to the vehicle owner, as supplementary to the basic retrofit, at the MAC Service Centre's published rates and shall not be considered for any further incentive payment.

**7. Existing R12 Refrigerant and Mineral Oil Charges** - All the existing R12 refrigerant charge within the MAC equipment that is replaced or retrofitted under the MAC Retrofit Incentive Programme must be correctly recovered by a recovery machine and recycled or securely stored in refillable cylinder, under the auspices of the NOU. As much as possible of the existing compressor oil charge shall be extracted and shall be stored in a secure container for disposal. If necessary, flushing shall be performed in a closed circuit manner and flushing substance shall be correctly recovered and stored. To the extent possible, the recovered CFC-12 refrigerant shall be processed by a MAC R&R machine, on site, or at an authorised Recycling Centre and may only be reused in other equipment, if previously processed to an acceptable level of purity.

**8. Destruction of Replaced Equipment** - All R12 dryer filters and other replaced parts must be destroyed or dismantled and rendered unusable with CFCs, according to MLF policy decisions and guidelines, and handed over to the NOU. The replaced equipment may not be sold to another enterprise within Brunei or abroad.

**9. Review of Retrofit Completions and Payments** -

(i) The Authorised MAC Centres and the replacement or retrofit work may be inspected by the national consultant or the NOU. Three-monthly reports shall be drafted by the NOU and submitted to the

Technical Committee and UNDP International Consultant's for their review and comments.

(ii) Upon completion of the basic MAC retrofit and prior to the MAC Centre being reimbursed for the work done, the vehicle owner shall sign a statement confirming that R12 shall no longer be used in the related MAC equipment.

10. **Post-retrofit Monitoring** - The NOU, may sporadically conduct post-retrofit inspection of vehicles that have taken advantage of the MAC Retrofit Incentive Programme, to ensure that the vehicle owner does not return to the use of refrigerants consisting of or containing CFC.