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EXECUTIVE COMMITTEE OF  
THE MULTILATERAL FUND FOR THE  
IMPLEMENTATION OF THE MONTREAL PROTOCOL  
Ninety-third Meeting  
Montreal, 15-19 December 2023  
Item 9(d) of the provisional agenda<sup>1</sup>

**PROJECT PROPOSALS: NICARAGUA**

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

Phase-down

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

Energy efficiency

- Pilot project to maintain and/or enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities) UNIDO and UNEP

<sup>1</sup> UNEP/OzL.Pro/ExCom/93/1

## PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

## Nicaragua

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

<b>(II) LATEST ARTICLE 7 DATA (Annex F)</b>	Year: 2022	187.31 mt	384,738 CO <sub>2</sub> -eq tonnes
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<b>(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (CO<sub>2</sub>-eq tonnes)</b>								<b>Year: 2022</b>	
Chemical	Aerosol	Foam	Firefighting	AC and refrigeration			Solvent	Other	Total sector consumption
				Manufacturing		Servicing			
				AC	Other				
HFC-125			210						210
HFC-134a						144,130			144,130
R-404A						109,141			109,141
R-407C						4,542			4,542
R-410A						84,296			84,296
R-507A						32,120			32,120
R-407F						511			511
R-438A						3,600			3,600
R-437A						36			36
Aquion Limpieza							5,832		5,832
HFC-365mfc/ HFC-227ea in imported pre-blended polyol		320							320

<b>(IV) AVERAGE 2020-2022 HFC CONSUMPTION IN SERVICING</b>	216.36 mt	448,435 CO <sub>2</sub> -eq tonnes
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<b>(V) CONSUMPTION DATA (CO<sub>2</sub>-eq tonnes)</b>			
Baseline: average 2020-2022 HFC consumption plus 65% of HCFC baseline	582,295	Starting point for sustained aggregate reductions	[n/a]*
<b>CONSUMPTION ELIGIBLE FOR FUNDING</b>			
Already approved	0	Remaining	[n/a]*

\* For countries with 2020-2022 HFC consumption in servicing only and below 360 mt.

<b>(VI) ENDORSED BUSINESS PLAN</b>		<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>Total</b>
UNIDO	HFC phase-down (CO <sub>2</sub> -eq tonnes)				
	Funding (US \$)	57,780	0	0	57,780
UNEP	HFC phase-down (CO <sub>2</sub> -eq tonnes)				
	Funding (US \$)	0	0	0	0

<b>(VII) PROJECT DATA</b>		<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>Total</b>	
Consumption (CO <sub>2</sub> -eq tonnes)	Montreal Protocol limits	n/a	582,513	582,513	582,513	582,513	582,513	524,262	524,262	n/a	
	Maximum allowable	n/a	582,513	582,513	582,513	582,513	582,513	524,262	524,262	n/a	
Amounts requested in principle (US \$)	UNIDO	Project costs	159,000	0	0	41,000		0	0	25,000	225,000
		Support costs	14,310	0	0	3,690		0	0	2,250	20,250
	UNEP	Project costs	40,000	0	0	47,500		0	0	12,500	100,000
		Support costs	5,200	0	0	6,175		0	0	1,625	13,000
Amounts recommended in principle (US \$)	Total project costs	199,000	0	0	88,500		0	0	37,500	325,000	
	Total support costs	19,510	0	0	9,865		0	0	3,875	33,250	
	Total funds	218,510	0	0	98,365		0	0	41,375	358,250	

<b>(VIII) Request for approval of funding for the first tranche (2023)</b>		
<b>Implementing agency</b>	<b>Funds recommended (US \$)</b>	<b>Support costs (US \$)</b>
UNIDO	159,000	14,310
UNEP	40,000	5,200
<b>Total</b>	<b>199,000</b>	<b>19,510</b>

<b>Secretariat's recommendation:</b>	Individual consideration
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## PROJECT DESCRIPTION

1. On behalf of the Government of Nicaragua, UNIDO as the lead implementing agency has submitted a request for stage I of the Kigali HFC implementation plan (KIP), at a total cost of US \$483,780, consisting of US \$299,000, plus agency support costs of US \$20,930 for UNIDO and US \$145,000, plus agency support costs of US \$18,850 for UNEP, as originally submitted.<sup>2</sup>
2. The implementation of stage I of the KIP will assist Nicaragua in meeting the target of 10 per cent reduction from its HFC baseline consumption by 1 January 2029.
3. The first tranche of stage I of the KIP being requested at this meeting amounts to US \$273,090, consisting of US \$194,500, plus agency support costs of US \$13,615 for UNIDO and US \$57,500, plus agency support costs of US \$7,475 for UNEP, as originally submitted, for the period of January 2024 to December 2026.
4. As part of stage I of the KIP, a pilot project for maintaining and/or enhancing the energy efficiency of replacement technologies and equipment in the context of HFC phase-down, in line with decision 91/65, has also been submitted, at a total amount of US \$106,000, plus agency support costs. The project is presented separately from stage I of the KIP, in paragraphs 62 to 78 of the document.

### Background

5. The Government of Nicaragua ratified all the amendments to the Montreal Protocol, including the Kigali Amendment on 30 September 2020. Nicaragua has an HCFC consumption baseline of 6.8 ODP tonnes or 118.39 metric tonnes (mt) and is set to completely phase out consumption of HCFCs by 1 January 2030.<sup>3</sup>

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

6. Stage I of the HCFC phase-out management plan (HPMP) for Nicaragua was approved at the 66<sup>th</sup> meeting<sup>4</sup> to meet the 35 per cent reduction from the baseline by 2020, resulting in the phase-out of 2.69 ODP tonnes of HCFCs, at a total cost of US \$330,000, plus agency support costs.
7. Stage II of the HPMP for Nicaragua was originally approved at the 86<sup>th</sup> meeting<sup>5</sup> and revised at the 92<sup>nd</sup> meeting<sup>6</sup> to reduce HCFC consumption by 100 per cent from the baseline by 2030, at a total cost of US \$685,000, plus agency support costs. Stage II of the HPMP will be completed by December 2030, as stipulated in the Agreement between the Government of Nicaragua and the Executive Committee.

### Status of implementation of HFC-related activities

8. At the 74<sup>th</sup> meeting, Nicaragua received funding to conduct a survey on the use of alternatives to ozone-depleting substances (ODSs) (US \$70,000), which was completed in May 2017. At the 81<sup>st</sup> meeting, Nicaragua received funding to implement the enabling activities for HFC phase-down (US \$150,000), which were completed in January 2021. These activities assisted the country in ratifying the Kigali Amendment; updating its licensing system to include HFCs; introducing an HFC quota system (expected to be operational by 1 January 2024); analyzing policy options to facilitate HFC phase-down; sensitizing

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<sup>2</sup> As per the letter of 18 August 2023 from the Ministry of Environment and Natural Resources of Nicaragua to UNIDO.

<sup>3</sup> Except for those HCFCs allowed for a servicing tail between 2030 and 2040, where required, consistent with the provisions of the Montreal Protocol.

<sup>4</sup> Decision 66/39

<sup>5</sup> Decision 86/76

<sup>6</sup> Annex XII of UNEP/OzL.Pro/ExCom/92/56

national stakeholders including the public on the significance of the Kigali Amendment and their roles and responsibilities in its implementation; and strengthening the partnership between the National Ozone Unit (NOU) and the Ministry of Energy and Mines to identify the connection between HFC phase-down and energy efficiency, and raising awareness on this.

### **Stage I of the Kigali HFC implementation plan**

#### Policy, regulatory and institutional frameworks

9. The Ministry of Environment and Natural Resources (MARENA) is the national body responsible for the implementation of the Montreal Protocol. The MARENA, the NOU, the National Ozone Commission, the National Commission for Registration and Control of Toxic Substances (NCRCTS) and the General Directorate of Customs Services (DGSA) are responsible for the enforcement of the Regulation for the Control of Substances that Deplete the Ozone Layer, which was updated following the ratification of the Kigali Amendment to establish control measures for the import, export, production, and consumption of Ozone-Depleting Substances (ODS) and HFCs.

10. The NOU, within the General Directorate of Environmental Quality of the MARENA, is responsible for overseeing the import quota for each importer, authorising import licenses and implementing all projects funded by the Multilateral Fund.

11. The Government has established an operational licensing system for controlling the import of HFCs through the updated regulation, Presidential Decree (No. 09-2022) incorporating HFCs into the import licensing and control system. The same decree would be the basis for the HFC quota system which will be applied by 1 January 2024. The national import quota for HFCs will be issued for each substance in metric tonnes and monitored based on CO<sub>2</sub>-equivalent (CO<sub>2</sub>-eq) tonnes, to ensure that individual importers do not exceed their assigned quotas. The initial quota for 2024 would be set according to the compliance target of the freeze in the baseline for HFCs.

#### HFC consumption

12. Nicaragua only imports HFCs mainly for use in the refrigeration and air-conditioning (RAC) servicing sector. In 2022, Nicaragua consumed HFC-134a (37.5 per cent of total HFC consumption in CO<sub>2</sub>-equivalent tonnes), R-404A (28.4 per cent), R-410A (21.9 per cent), R-507A (8.4 per cent), and other HFCs (3.8 per cent). Table 1 presents the country's HFC consumption as reported under Article 7 to the Ozone Secretariat.

**Table 1. HFC consumption in Nicaragua (2019–2022 Article 7 data)**

HFC	GWP*	2019	2020	2021	2022	Share of HFC consumption in 2022 (%)
<b>Metric tonnes (mt)</b>						
HFC-32	675	0	0	0.60	0	0.00
HFC-125	3,500	0.08	0	0.02	0.06	0.03
HFC-134a	1,430	130.61	141.45	118.7	100.79	53.81
HFC-152a	124	0.52	0	0	0	0.00
HFC-227ea	3,220	0.06	0	0	0	0.00
HFC-23	14,800	0.01	0	0	0	0.00
R-404A	3,922	49.96	32.59	45.05	27.83	14.86
R-407C	1,774	1.76	2.08	1.25	2.56	1.37
R-407F	1,825	0	2.43	1.02	0.28	0.15
R-410A	2,088	51.17	44.21	48.87	40.38	21.56
R-437A	1,805	0.07	0.03	0.09	0.02	0.01
R-438A	2,264	2.04	2.61	1.65	1.59	0.85

HFC	GWP*	2019	2020	2021	2022	Share of HFC consumption in 2022 (%)
R-448A	1,386	0	0	3.58	0	0.00
R-449A	1,396	0.01	0.14	0.03	0	0.00
R-452A	2,139	0	0.01	0.15	0	0.00
R-507A	3,985	15.09	6.35	9.21	8.06	4.30
Aquion Limpieza (HFC-245fa=87.5 %, HFC-134a=12.5%)	1,080	0	0	0	5.4	2.88
HFC-365mfc / HFC-227ea in imported pre-blended polyol	794	0	0	3.6	3.6	0.18
<b>Total (mt)</b>		<b>251.38</b>	<b>231.9</b>	<b>233.82</b>	<b>190.57</b>	<b>100.0</b>
<b>CO<sub>2</sub>-eq tonnes</b>						
HFC-32	675	0	0	405	0	0.00
HFC-125	3,500	280	0	70	210	0.05
HFC-134a	1,430	186,772	202,274	169,742	144,130	37.46
HFC-152a	124	65	0	0	0	0.00
HFC-227ea	3,220	193	0	0	0	0.00
HFC-23	14,800	148	0	0	0	0.00
R-404A	3,922	195,923	127,805	176,669	109,141	28.37
R-407C	1,774	3,122	3,690	2,219	4,542	1.18
R-407F	1,825	0	4,434	1,861	511	0.13
R-410A	2,088	106,817	92,288	102,017	84,296	21.91
R-437A	1,805	126	54	163	36	0.01
R-438A	2,264	4,619	5,910	3,737	3,600	0.94
R-448A	1,386	0	0	4,962	0	0.00
R-449A	1,396	14	195	42	0	0.00
R-452A	2,139	0	21	321	0	0.00
R-507A	3,985	60,134	25,305	36,703	32,120	8.35
Aquion Limpieza (HFC-245fa=87.5 %, HFC-134a=12.5%)	1,080	0	0	0	5,832	1.52
HFC-365mfc / HFC-227ea in imported pre-blended polyol		0	0	320	320	0.08
<b>Total (CO<sub>2</sub>-eq tonnes)</b>		<b>558,214</b>	<b>461,976</b>	<b>499,231</b>	<b>384,738</b>	<b>100.0</b>

\*Global warming potential

13. The total HFC consumption showed a decreasing trend from 2019 to 2022. The consumption in 2021 slightly increased compared to 2020, consistent with the upward trend in the economy for that year; in 2022, the HFC consumption decreased by 18 per cent in mt and 23 per cent in CO<sub>2</sub>-eq tonnes compared to 2021 levels. The low HFC consumption in Nicaragua in 2022 is attributed to the slow recovery from the effects of the COVID-19 pandemic; it is expected that consumption in 2023 will be closer to pre-pandemic levels.

#### *Country programme implementation report*

14. The Government of Nicaragua reported its HFC sector consumption data in the 2022 country programme implementation report that is consistent with the data reported under Article 7 of the Montreal Protocol.

### HFC distribution by sector

15. Nicaragua consumes HFCs primarily in the RAC servicing sector; in 2022, HFCs were mainly used for servicing in mobile air-conditioning (MAC) (30 per cent in mt and 21 per cent in CO<sub>2</sub>-eq tonnes), followed by stationary air-conditioning (AC) (24 per cent in mt and 23 per cent in CO<sub>2</sub>-eq tonnes), domestic refrigeration (19 per cent in mt and 13 in CO<sub>2</sub>-eq tonnes) and commercial refrigeration (17 per cent in mt and 28 in CO<sub>2</sub>-eq tonnes). Negligible amount of HFCs was also consumed in other Sectors (fire fighting, foam and solvents) as shown in in table 2.

**Table 2. HFC consumption in the refrigeration and air-conditioning servicing subsectors and other sectors (2022)**

Sector	HFC-134a	R-404A	R-410A	R-507A	Other HFC blends	HFC-125	CustMix-316	Poliol 9721-M-LX	Total	Share of total (%)
<b>Metric tonnes (mt)</b>										
<b>Refrigeration and AC servicing subsectors</b>										
Domestic refrigeration	34.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.84	18.60
Commercial refrigeration	5.07	16.40	0.00	7.82	1.89	0.00	0.00	0.00	31.18	16.70
Industrial refrigeration	3.04	5.87	0.00	0.24	0.03	0.00	0.00	0.00	9.18	4.90
Refrigerated transport	0.00	1.46	0.00	0.00	0.01	0.00	0.00	0.00	1.47	0.80
Stationary air-conditioning	1.01	0.00	40.38	0.00	2.52	0.00	0.00	0.00	43.91	23.50
Mobile air-conditioning	56.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	56.82	30.40
<i>Subtotal servicing</i>	<i>100.79</i>	<i>23.73</i>	<i>40.38</i>	<i>8.06</i>	<i>4.45</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>177.40</i>	
<b>Local installation and assembly</b>	0.00	4.10	0.00	0.00	0.00	0.00	0.00	0.00	4.1	2.20
<b>Other subsectors</b>										
<b>PU foam</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.60	3.60	0.18
<i>Subtotal</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>3.60</i>	<i>3.60</i>	
<b>Fire fighting</b>	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.06	0.03
<i>Subtotal</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.06</i>	<i>0.00</i>	<i>0.00</i>	<i>0.06</i>	
<b>Solvents</b>	0.00	0.00	0.00	0.00	0.00	0.00	5.40	0.00	5.40	2.90
<i>Subtotal</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>5.40</i>	<i>0.00</i>	<i>5.40</i>	
<b>Total</b>	<b>100.79</b>	<b>27.83</b>	<b>40.38</b>	<b>8.06</b>	<b>4.45</b>	<b>0.06</b>	<b>5.40</b>	<b>3.60</b>	<b>190.56</b>	<b>100.00</b>
<b>CO<sub>2</sub>-eq tonnes</b>										
<b>Refrigeration and AC servicing subsectors</b>										
Domestic refrigeration	49,825	0.00	0.00	0.00	0.00	0.00	0.00	0.00	49,825	12.95
Commercial refrigeration	7,250	64,315	0.00	31,163	4,160	0.00	0.00	0.00	106,888	27.78
Industrial refrigeration	4,350	23,020	0.00	957	30	0.00	0.00	0.00	28,357	7.37
Refrigerated transport	0.00	5,726	0.00	0.00	15	0.00	0.00	0.00	5,741	1.49
Stationary air-conditioning	1,450	0.00	84,296	0.00	4,484	0.00	0.00	0.00	90,230	23.47
Mobile air-conditioning	81,255	0.00	0.00	0.00	0.00	0.00	0.00	0.00	81,255	21.14
<i>Subtotal servicing</i>	<i>144,130</i>	<i>93,061</i>	<i>84,296</i>	<i>32,120</i>	<i>8,689</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>362,296</i>	
<b>Local installation and assembly</b>	0.00	16,080	0.00	0.00	0.00	0.00	0.00	0.00	16,080	4.18

Sector	HFC-134a	R-404A	R-410A	R-507A	Other HFC blends	HFC-125	CustMix-316	Poliol 9721-M-LX	Total	Share of total (%)
<i>Other subsectors</i>										
<b>PU foam</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	320.00	320.00	0.08
<i>Subtotal</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>320.00</i>	<i>320.00</i>	
<b>Firefighting</b>	0.00	0.00	0.00	0.00	0.00	210	0.00	0.00	210	0.05
<i>Subtotal</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>210</i>	<i>0.00</i>	<i>0.00</i>	<i>210</i>	
<b>Solvent</b>	0.00	0.00	0.00	0.00	0.00	0.00	5,832	0.00	5,832	1.52
<i>Subtotal</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>5,832</i>	<i>0.00</i>	<i>5,832</i>	
<b>Total</b>	<b>144,130</b>	<b>109,141</b>	<b>84,296</b>	<b>32,120</b>	<b>8,689</b>	<b>210</b>	<b>5,832</b>	<b>320</b>	<b>384,738</b>	<b>100.00</b>

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

16. Based on the survey for the preparation of the KIP, there are approximately 1,200 technicians and 600 workshops consuming HFCs in Nicaragua. Around 10 per cent of the workshops provide services to big industries, mainly in the commercial and industrial RAC subsectors, and the remaining 90 per cent are small, independent workshops that service the residential air-conditioning (AC) and MAC subsectors. Around 200 technicians are part of well-established workshops where around 190 are trained. There are 1,080 RAC independent technicians, of which 80 are trained and around 1,000 have not received any training related to A3 and A2L new refrigerants. Some of them are not fully equipped with tools for handling HFC refrigerants and most do not have tools for proper handling of refrigerants based on HFCs and HFOs. A brief description of consumption by servicing subsector is presented below.

#### *Domestic, commercial, industrial and transport refrigeration servicing*

17. Domestic and commercial refrigeration consume 13 and 28 per cent of the HFCs in the country (in CO<sub>2</sub>-eq tonnes), respectively. HFC-134a makes up 98 per cent of the domestic refrigeration stock in 2022, while 2 per cent is based on R-600a. Although R-600a-based equipment is growing in the country, HFC-134a is still the main refrigerant used thus required for servicing. HFC-134a is also used for servicing stand-alone commercial refrigeration units while R-404A and R-507A are used for condensing units and in centralized systems in supermarkets. Data showed that R-290-based stand-alone commercial refrigeration equipment is now being imported into the country.

18. Most of the industrial refrigeration equipment works with ammonia (R-717); however, R-404A, HFC-134a and R-507A are used for servicing and maintenance of refrigeration chambers, process coolers and, to a lesser extent, distributed systems.

19. The survey found that there are about 458 equipment in the transport refrigeration subsector, 94 per cent of which still operates on HCFC-22. R-404A is used to service refrigerated transport, containers, and ships and vessels that make up this subsector.

#### *Residential and commercial air-conditioning servicing*

20. Self-contained and split residential AC equipment use HCFC-22 (21 per cent) and R-410A (79 per cent); while rooftop, packaged units and split commercial equipment use R-410A (54 per cent) and 46 per cent are HCFC-22-based. HFC-134a is used in some commercial applications while R-410A and other blends are used in servicing both residential and commercial AC units.

#### *Mobile air-conditioning servicing*

21. The MAC sector is the third largest subsector in terms of its consumption of HFCs in CO<sub>2</sub>-eq tonnes (22 per cent) and the highest in mt (30.4 per cent). HFC-134a is the only refrigerant used in MAC systems in Nicaragua. About 64 per cent of the estimated 375,000 light vehicles including sports utility vehicles and



pickup trucks are air-conditioned and the estimated leakage rate is 35 per cent per system; older vehicles (10 years and above) which make up 20 per cent of the total number require annual charges of HFC-134a refrigerant. There are about 81,000 large vehicles (trucks, buses and trailers) and 5 per cent of these vehicles are serviced annually.

#### Local installation and assembly subsector

22. Nicaragua has an installation and assembly sector that uses HFCs for assembly and initial charge of new equipment in commercial refrigeration. In 2022, 4.10 mt (16,080 CO<sub>2</sub>-eq tonnes) of R-404A was used for assembly of centralized systems (2.24 mt) and condensing units (1.86 mt).

23. Local installation of commercial refrigeration systems includes medium- and low-temperature equipment, based primarily on direct expansion vapor compression refrigeration cycles. Typically installed condensing units have refrigeration capacities up to 5 tons of refrigeration (TR) and charges ranging from 1 to 10 kg of refrigerant, while centralized systems range from 10 to 50 TR and with charges from 200 to 800 kg (considering the complete design). Most of this equipment is found in supermarkets and convenience stores, as well as in some cold room applications. It is estimated that during 2022, approximately three new centralized systems and between 100 and 120 condensing units were installed in Nicaragua, all of them based on HFCs.

#### Other subsectors

##### *Fire suppression equipment servicing, solvents, and foams*

24. A small amount of HFC-125 (210 CO<sub>2</sub>-eq tonnes, 0.06 mt) was identified to be consumed for servicing fire suppression systems, accounting for 0.03 per cent of total consumption.

25. In 2022, the solvent sector consumed about 5.40 mt (5,832 CO<sub>2</sub>-eq tonnes), representing 2.9 per cent of total consumption. Two substances that are primarily used in this sector are a blend of HFC-245fa and HFC-134a. This blend of HFCs used as solvents contains 87.5 per cent of HFC-245fa and 12.5 per cent of HFC-134a.

26. There is also a small consumption of HFC-365mfc/HFC-227ea (320 CO<sub>2</sub>-eq tonnes, 3.6 mt), representing 0.18 per cent of total consumption, contained in pre-blended polyols, registered for the manufacture of panels based on HFCs.

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

##### *Overarching strategy*

27. The Government of Nicaragua is proposing three stages for the KIP implementation. Stage I is proposed to be implemented simultaneously with the HPMP until 2030. Stage II is expected to cover a period of 10 years (from 2031 to 2040), and stage III is expected to cover a period of 5 years until 2045.

##### *Established HFC baseline and proposed reductions*

28. The Government of Nicaragua reported its Article 7 data for 2020-2022. By adding 65 per cent of the HCFC baseline (in CO<sub>2</sub>-eq tonnes) to the average HFC consumption in 2020-2022, the established HFC baseline is 582,513 CO<sub>2</sub>-eq tonnes, as shown in table 3.

**Table 3. HFC baseline for Nicaragua (CO<sub>2</sub>-eq tonnes)**

Baseline calculation	2020	2021	2022
HFC annual consumption	461,976	499,231	384,738
HFC average consumption 2020-2022	448,648		
HCFC baseline (65%)	133,865		
HFC baseline	<b>582,513</b>		

29. The Government of Nicaragua and UNIDO projected HFC consumption based on annual average economic growth of 4.3 per cent and that HFC consumption will reach 538,815 CO<sub>2</sub>-eq tonnes by 2030. The Government noted that without any action, HFC consumption for servicing would continue to grow because of the import of HFC-based equipment. In light of this, stage I of the KIP is being proposed to control the growth of HFCs and ensure that HFC consumption stay within the Montreal Protocol limits throughout stage I and lay a foundation for sustained HFC reduction in future stages. The Government proposes to follow the Montreal Protocol control targets to phase down HFCs in stage I of the KIP.

30. The strategies for stage I were developed based on national circumstances and in consultation with industrial stakeholders, targeting the subsectors where alternative technologies are technically and economically viable and the subsectors where high-GWP refrigerants are used. The strategic areas to be addressed in stage I of the KIP will focus on the reduction of HFC-134a consumption in domestic refrigeration, stand-alone commercial refrigeration, and MAC subsectors; and the reduction of R-404A and R-507A in condensing units and centralized systems in commercial refrigeration and small- and medium-sized systems for industrial refrigeration. In the original submission, UNIDO proposed specific reductions per subsector and substance which totaled 58,838 CO<sub>2</sub>-eq tonnes which corresponded to the 10 per cent reduction from the baseline.

#### *Proposed activities*

31. Nicaragua developed its overarching strategy and proposed funding based on sectoral analysis of HFC consumption, the availability of alternatives with low-GWP and the practicality of their potential application in the country and other cross-sectoral activities. The proposed plan includes policy and regulatory mechanisms to strengthen national institutions for the control and monitoring of HFCs, capacity building for the servicing sector particularly for MAC and domestic and commercial refrigeration, enhancing refrigerant reclaiming activities, and awareness-raising. The following activities are proposed:

32. The elements of the KIP for Nicaragua with their cost breakdown are presented below:

- (a) *Cross-sectoral activities to address supply and demand for HFCs*: HFC quota and licensing system including development of an online platform allowing the three institutions involved in the licensing, quota and permit system of all Montreal Protocol-controlled substances to track these information in real time, and monitoring of the system (UNEP) (US \$30,000); customs control support including updating the Customs handbook and training materials; two training sessions for 20 customs officers, and a regional workshop for the national ozone officers and customs officers of SICA member states to share experiences on control and prevention of illicit traffic of Montreal Protocol-controlled substances, control measures to address second-hand RAC equipment using controlled substances, and the RTCA regulations on energy efficiency for RAC sectors (UNEP) (US \$35,000); and provision of three refrigerant identifiers, one each for Customs offices at the border with Honduras and Costa Rica and one for the main maritime Customs office in Chinandega (UNIDO) (US \$15,000); and a communication strategy including design and implementation of media campaigns and educational material design for MAC and

residential and commercial refrigeration; four workshops/seminars on different topics related to the Kigali Amendment and recruitment of a communication specialist (UNEP) (US \$40,000);

- (b) *RAC management programme*: development of a training course including handbooks and training materials on proper handling of flammable refrigerants and good practices for R-600a and R-290, signing of collaboration agreements with training institutes; study tour at an international training centre for two instructors to have practical and theoretical training in management and handling of low-GWP alternatives; provision of equipment for two training institutions for MAC and residential and commercial refrigeration; train-the-trainers course in MAC and residential and commercial refrigeration and for 10 instructors from selected training centres; training and certification process for 400 RAC technicians in residential and commercial stand-alone equipment with flammable refrigerants and for the MAC sector (UNIDO) (US \$180,000); development of an online training course for MAC technicians (UNEP) (US \$10,000); description of one competence labor standard for the handling of flammable refrigerants (A3) for stand-alone domestic and commercial refrigeration and one standard for handling new refrigerants in MAC (UNEP) (US \$30,000); and
- (c) *Refrigerant recovery and reclamation*: design and implementation of onsite refrigerant reclamation including operation of two mobile reclaiming units; refrigerants to be reclaimed include HFC-134a, R-404A, R-507 and HCFC-22, and potential yearly quantities of reclaimed substances will be determined in the first year of implementation (UNIDO) (US \$40,000).

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

33. The MARENA through the NOU will coordinate the overall implementation of stage I of the KIP. One national consultant, one HFC expert and one gender specialist will be recruited to support the NOU on project implementation. The total cost for project management and monitoring for stage I of the KIP amounts to US \$64,000.

#### *Gender policy implementation*

34. The Government of Nicaragua has in place policies, strategies and transformative actions that promote gender equality and women's empowerment and to increase the role of women in sustainable human development. During the implementation of the KIP, it is anticipated to have a considerable participation of women by hiring female consultants, supervisors, trainers and designers to develop the activities of each component, and to strengthen technical capacities of female technicians through the training courses. Approximately 30 females are envisioned to be trained in the different cross-sectoral training sessions planned for stage I of the KIP.

#### Total cost of stage I of the Kigali HFC implementation plan

35. The budget for stage I has been established at US \$444,000. The proposed activities and cost breakdown are summarized in paragraphs 32 and 33.

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

36. Stage I of the KIP will be implemented in three tranches. The schedule of HFC phase-down and HCFC phase-out commitments, and the activities and associated cost of stage I of the KIP and stage III of the HPMP are presented in annexes I and II, respectively, to the present document.

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

37. The first funding tranche of stage I of the KIP requested at US \$252,000 will be implemented between January 2024 and December 2026 and will include the following activities:

- (a) *Cross-sectoral activities to address supply and demand for HFCs*: Establishing a group for institutions related with HFC import rules and user profiles and procedures required to develop a tracking system; analysis and design, construction, testing, and start-up, continuous monitoring and trials of the online HFC quota and licensing and monitoring systems with MARENA (UNEP) (US \$20,000); design and elaboration of the customs handbook and training course and materials, and organization of a training workshop to train 20 customs officers and agents, and laboratory staff in the topics concerning customs actions related to risk management and tariff codifications derived from the Seventh Amendment to the HS for HFCs (UNEP) (US \$17,500); and purchase and delivery of a refrigerant identifier for the customs located at the border with Honduras (UNIDO) (US \$5,000);
- (b) Design and implementation of the public awareness campaign to promote the proper use of flammable, toxic and high-pressure alternatives to HFCs and the proper disposal of end-of-life RAC appliances; design of media kit for social networks and educational materials for MAC and residential commercial refrigeration RAC technicians; and development of one communication workshop with schools (UNEP) (US \$20,000)
- (c) Signing of collaboration agreements with 2 vocational training centers; elaboration of two manuals on the safety use of flammable refrigerants in residential and commercial stand-alone refrigeration and MAC sectors; design of a training programme and teaching materials; one study tour at an international training center in the use of flammable refrigerants to train two lead trainers; and tools and equipment for the selected training institution for the correct hands-on training for residential and commercial refrigeration and MAC sectors (UNIDO) (US \$138,000);
- (d) Design of an initial draft of actions for the promotion of recovery and reclamation activities; and implementation of a one mobile reclaiming unit to provide services for end-users, training, and equipment (UNIDO) (US \$22,500); and
- (e) Project coordination and monitoring: including two annual project reports, two meetings with stakeholders, inclusion of action lines in project implementation, articulation of the strategy with other agendas, and monitoring of tranche implementation for the different sub-components (UNIDO) (US \$29,000).

**SECRETARIAT'S COMMENTS AND RECOMMENDATION**

**COMMENTS**

38. The Secretariat reviewed stage I of the KIP for Nicaragua in light of the existing policies and guidelines of the Multilateral Fund, including decision and 92/37,<sup>7</sup> stage II of the HPMP, and the 2023-2025 business plan of the Multilateral Fund.

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<sup>7</sup> Level and modalities of funding for HFC phase-down in the refrigeration servicing sector.

HFC consumption and the control targets in stage I

39. Noting that the HFC consumption in Nicaragua in 2022 is 23 per cent below that of 2021, 34 per cent below the baseline and 14 per cent below the HFC component of the baseline, the Secretariat discussed with UNIDO whether the country might be willing to consider reducing HFC consumption by 10 per cent of the country's average HFC consumption in the baseline years with additional 20 per cent funding in line with decision 92/37(b)(ii). UNIDO explained that the low HFC consumption in Nicaragua in 2022 was due to the fact that despite the reactivation of different economic activities, some were still struggling with recovery; that the Government would like to take a very precautionary approach for setting the targets for stage I of the KIP as the low-GWP alternative technologies needed for HFC phase-down were not easily available or accessible for all RAC applications at present the country has already experienced increased consumption in 2023 close to pre-pandemic levels and this growth might continue in the coming years. To prevent consumption from growing further, the Government of Nicaragua has structured a pathway which would give the country the best options and flexibility as an LVC and an equipment importing country, to reach the 10 per cent reduction commitment in line with the Kigali Amendment. However, the Government would make the best effort to control HFCs and review the situation and then decide on any additional actions during the implementation of stage I of the KIP.

40. Despite being small amounts, the Secretariat sought clarification on the HFC consumption contained in imported pre-blended polyols reported in 2022. UNIDO indicated that the reported pre-blended polyols contained 9.51 per cent of HFCs (approximately 8.84 per cent of HFC-365mfc and 0.67 per cent of HFC-227ea) and was reported for a single user in the country that had not been assisted under the HPMP.

HFC licensing and quota system

41. Decision 87/50(g) requests the bilateral and implementing agencies, when submitting stage I of the KIPs, to include confirmation that the country has established an enforceable national system of licensing and quotas for monitoring HFC imports/exports, consistent with decision 63/17. Accordingly, the Government confirmed that the licensing system for HFCs and HFC blends has been established through a Presidential Decree (No.09-2022). The national quota for 2024 will be issued starting from 1 January 2024 in compliance with the Montreal Protocol control target.

42. The Secretariat sought additional information on the development and implementation of the online licensing, quota and permit, and monitoring system for controlled substances. UNIDO indicated that the main purpose of the monitoring system is to connect in real time the three institutions involved in the licensing, quota and permit system of controlled substances, including HCFCs. The administration of the online platform will be the responsibility of MARENA, the NOU will initiate the process for the quota register, then the National Commission for Registration and Control of Toxic Substances will register the approved license issued in line with the quota to import controlled substances, and the General Directorate of Customs Services will verify in the customs terminal the quota and permit to allow the import into the country. The online system is expected to be functional at the end of the first tranche of the KIP.

Regulatory measures to support the transition to low-GWP technologies

43. The Secretariat and UNIDO discussed the possibility of establishing a ban on the import of HFC-134a-based domestic refrigeration and stand-alone commercial refrigeration given that R-600a-based equipment is available on the market and the technology is mature. UNIDO explained that as noted in the sector consumption, HFC-134a is the predominant refrigerant used in domestic refrigeration and that the uptake of R-600a equipment is still very low therefore the Government considers it premature to prohibit the import of HFC-134a-based domestic refrigeration and stand-alone commercial refrigeration in stage I. UNIDO noted that the Government is willing to consider the possibility of a ban on the import of this equipment to be implemented at the end of stage I or in stage II depending on how the imports of R-600a

equipment will be demonstrated in the market, and will report thereon in the tranche implementation progress reports of stage I.

44. The Secretariat also noted that a small amount of HFC-23 (10kg) was imported in 2019 to service cryogenic cooling equipment in the agricultural industry and discussed with UNIDO whether it is feasible for the Government to implement a ban on the import of HFC-23-based equipment. The Government considers that there is no legal basis to do that in line with the Kigali Amendment, and it is also premature to have a commitment in stage I of the KIP.

#### Technical and cost-related issues

45. The certification of technicians was proposed under both stage II of the HPMP and stage I of the KIP. It was clarified that the certification of technicians under the HPMP focuses on good practices in the installation, maintenance, and servicing of RAC equipment in general; while the programme under the KIP focuses on strengthening the competency of technicians in servicing residential and commercial stand-alone equipment using flammable refrigerants and certification for technicians in the MAC sector. This will ensure that these certified technicians will achieve a higher degree of specialization in the sectors where HFC reductions are planned. It was also clarified that the first tranche of stage I of the KIP will focus on developing the manuals, training materials and training programmes and providing equipment to two centers. In the meantime, training and certification activities will be covered under stage II of the HPMP and the proposed energy efficiency pilot project submitted under decision 91/65.

46. With regard to the refrigerant recovery and reclamation activity, UNIDO indicated it would first identify the initial actions to increasing reclamation activities for large users (i.e., two supermarkets) in the first year for refrigerants including R-134a, R-404A, R-507, and HCFC-22; however, potential yearly quantities of controlled substances could only be determined in the first year of implementation and it is expected that the quantities reclaimed will increase during the first stage of the KIP. UNIDO further indicated that the proposal seeks to find alternatives to increase the recovery rates for reclaiming services.

47. With regard to the activities in the MAC sector, in particular, whether HFO-1234yf-based vehicles that are imported into the country are subsequently serviced with HFC-134a, UNIDO indicated that although HFO-1234yf is already available in the country, it will take some time for it to become a competitive alternative, specifically for servicing activities. Therefore, stage I of the KIP will concentrate on disseminating information on the alternatives among end-users, and on the servicing side, will provide training in good practices in the handling and recovery of HFC-134a from the MAC sector and avoiding the use of HFC-134a in AC systems originally designed for HFOs. With regard to the use of HFO-1234yf, it is estimated that the sustained import of new vehicles with HFO-1234yf would occur most likely, after 2029. The Government of Nicaragua and UNIDO will continue to monitor and evaluate the situation based on market growth and will consider any actions required in the subsequent stage of the KIP.

48. Upon request, UNIDO provided a detailed list of equipment to be procured during stage I of the KIP; the purchase of the equipment will be carried out under the first tranche.

#### Total project cost

49. In accordance with decision 92/37(b)(ii) and noting that Nicaragua has an average HFC consumption of 216.36 mt in the servicing sector in the baseline years (2020-2022), the total cost of stage I of the KIP has been agreed in the amount of US \$325,000. The requested funding was adjusted as shown in table 5.

**Table 5. Agreed cost of activities in stage I of the KIP for Nicaragua (US \$)**

Project component	Original Cost (US \$)	Revised cost (US \$)	Note
<b>Cross-sectoral activities to address supply and demand for HFCs</b>			
HFC quota and licensing system	30,000	22,500	Costs adjusted.
Customs control support	50,000	50,000	No change
Communication strategy	40,000	20,000	Costs for design of content for social networking was removed, and workshops/seminars reduced.
<b>RAC management programme for domestic and commercial stand-alone refrigeration, MAC and commercial refrigeration</b>			
Training of trainers, equipping of two training institutions, description of competence labor standards, training and certification of technicians, online MAC training course	220,000	185,500	Funding for equipping two training institutions reduced; cost adjustments in design of training programme and manuals, and for competence labor standards
Refrigerant recovery and reclaiming	40,000	22,000	Adjusted for only one mobile reclaiming unit instead of two.
Project implementation and monitoring	64,000	25,000	Hiring of gender specialist removed; funding for coordination and monitoring has been adjusted.
<b>Total KIP stage I</b>	<b>444,000</b>	<b>325,000</b>	

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

50. The first funding tranche of stage I of the KIP, in the total amount of US \$199,000 as agreed, will be implemented between January 2024 and December 2026 and will include the following activities:

- (a) *Cross-sectoral activities to address supply and demand for HFCs*: HFC quota and licensing system including development of an online platform allowing the three institutions involved in the licensing, quota and permit system of all Montreal Protocol controlled substances to track these information in real time, and monitoring of the system (UNEP) (US \$12,500); Customs control support including updating the Customs handbook and training materials and conduct of two training sessions for 20 customs officers (UNEP) (US \$17,500); provision of one refrigerant identifier to Customs office located at the border with Honduras (UNIDO) (US \$5,000); and a communication strategy for the Kigali Amendment including design of educational materials for MAC and residential and commercial refrigeration, and one stakeholder workshop/seminar (UNEP) (US \$10,000);
- (b) *Refrigerant management programme*: strengthening the competence of technicians in domestic and commercial stand-alone refrigeration and in the MAC subsectors through development of two manuals on the safe use of flammable refrigerants in the RAC and MAC sectors and design of a training programme and teaching materials; signing of agreements; study tour at an international training centre for two instructors; provision of equipment for two training institutions for MAC and residential and commercial refrigeration (UNIDO) (US \$121,000);
- (c) *Refrigerant recovery and reclamation*: identifying initial actions to support HFC reclaiming activities with large users, aiming to work with two supermarkets on the first year; purchase and delivery of one mobile reclaiming unit (UNIDO) (US \$22,000); and
- (d) *Project monitoring and coordination*: (UNIDO) (US \$11,000).

### Tranche distribution

51. The last funding tranche under the KIP originally planned in 2028, was moved to 2030 in line with decision 62/17 to ensure that the last tranche is scheduled for the last year of the plan, the last funding tranche. In order to reduce the administrative cost and workload associated with tranche submissions of the HPMP and the KIP, the funding tranches under the KIP would be presented for approval at the first meeting of the year, to coincide with tranches of the HPMP.

### Impact on the climate

52. The activities proposed by Nicaragua, including training and certification of technicians in good refrigeration practices and safe handling of flammable refrigerants, provision of tools and equipment for training and recovery and reclaiming of refrigerants, as well as promoting low-GWP alternatives, indicate that the implementation of stage I of the KIP will reduce the emission of HFCs into the atmosphere, resulting in climate benefits. A preliminary calculation of the impact on the climate of the activities in the KIP indicates that Nicaragua will achieve an annual emission reduction of 58,251 CO<sub>2</sub>-eq tonnes of HFCs when the final target in stage I of the KIP is achieved, calculated based on the difference between the HFC baseline and the final target set in stage I.

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

53. As part of the KIP preparation, a risk analysis has been carried out to ensure the successful implementation of the KIP and the sustainability of the results achieved.

54. To ensure that the 10 per cent reduction of HFC consumption from the baseline level will be achieved taking into account the significant recovery from the pandemic expected in 2023 and coming years, the Government of Nicaragua commits to implementing the control measures proposed in stage I of the KIP, including the strict implementation of the HFC licensing and quota system, training customs officials and initiating actions to regulate HFC-containing RAC equipment, with priority given to sectors that already have technically and economically viable alternatives.

55. To mitigate the risk associated with the lack of adequate training and tools for handling flammable refrigerants, the refrigerant management component under the KIP proposes to work closely with public technical training institutes from different regions of the country to provide servicing technicians the necessary tools and training on handling flammable refrigerants.

56. With regard to any delays foreseen in implementation, UNIDO and UNEP indicated that they have been working without any delayed implementation issues under the HPMP when there was political and social unrest in the country and would therefore not expect any delays in stage I of the KIP.

### Co-financing

57. The Government of Nicaragua is willing to seek co-financing opportunities for the KIP; however, at the time of preparation of the KIP, no such additional funding source has been identified.

### 2023-2025 business plan of the Multilateral Fund

58. UNIDO and UNEP are requesting US \$325,000, plus agency support costs, for the implementation of stage I of the KIP for Nicaragua. The total value of US \$218,510, including agency support costs, requested for the period of 2023–2025, is US \$160,730 above the amount in the business plan.



Draft Agreement

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

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

**RECOMMENDATION**

61. The Executive Committee may wish to consider:

- (a) Approving, in principle, stage I of the Kigali HFC implementation plan (KIP) for Nicaragua for the period 2023-2030 to reduce HFC consumption by 10 per cent of the country's baseline in 2029, in the amount of US \$358,250, consisting of US \$225,000, plus agency support costs of US \$20,250, for UNIDO and US \$100,000, plus agency support costs of US \$13,000, for UNEP, as reflected in the schedule contained in annex I of the present document;
- (b) Approving the first tranche of stage I of the KIP for Nicaragua, and the corresponding tranche implementation plan, in the amount of US \$218,510, consisting of US \$159,000, plus agency support costs of US \$14,310, for UNIDO and US \$40,000, plus agency support costs of US \$5,200, for UNEP; and
- (c) Requesting the Government of Nicaragua, UNIDO, UNEP and the Secretariat to finalize the draft Agreement between the Government of Nicaragua and the Executive Committee for the reduction in consumption of HFCs, including the information contained in the Annex referred to in subparagraph (a) above, and to submit it to a future meeting once the KIP Agreement template has been approved by the Executive Committee.

**PILOT PROJECT TO MAINTAIN AND/OR ENHANCE THE ENERGY EFFICIENCY  
OF REPLACEMENT TECHNOLOGIES AND EQUIPMENT IN THE CONTEXT OF  
HFC PHASE-DOWN (NON-INVESTMENT ACTIVITIES)**

**PROJECT DESCRIPTION**

**Background**

62. On behalf of the Government of Nicaragua, UNIDO as the lead implementing agency has submitted, in line with decision 91/65, a request for a pilot project to maintain and/or enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities), in the amount of US \$116,340, consisting of US \$86,000, plus agency support costs of US \$7,740 for UNIDO and US \$20,000, plus agency support costs of US \$2,600 for UNEP, as originally submitted.<sup>8</sup>

Status of implementation of energy efficiency-related activities funded by the Multilateral Fund

63. Under the enabling activities approved at the 81<sup>st</sup> meeting, the NOU has strengthened the alliance with the Ministry of Energy and Mines to identify the link between the phase-down of HFC and energy efficiency. Awareness was also raised on advantages of energy efficiency among RAC technicians, end users and academia.

64. The second tranche of stage II of the HPMP for Nicaragua, approved at the 92<sup>nd</sup> meeting included additional activities to maintain energy efficiency in the refrigeration servicing sector (decision 89/6). These additional activities, approved in the amount of US \$100,000 include the following:

- (a) Two information sessions for 40 energy-efficiency policymakers on how to promote low-GWP-based equipment, the labelling programme, and the adoption of minimum energy performance standards (MEPS) for RAC equipment; developing strategies for improving energy-efficiency labelling and MEPS in the RAC sector; two workshops for 30 importers on the inspection of RAC equipment and energy-efficiency classification; and two training workshops for 60 customs officers on the monitoring and inspection of labelled low-GWP-based equipment and their energy efficiency classification;
- (b) Updating of the training curriculum for training institutes to include energy-efficiency considerations and the handling of low-GWP technologies (i.e., CO<sub>2</sub>, NH<sub>3</sub>, and hydrocarbons) in the servicing, installation, and maintenance of RAC equipment; providing five tool kits to support the training related to energy efficiency; and eight workshops to train 10 trainers and 160 technicians on maintaining EE in the installation, servicing, and maintenance of RAC equipment; and
- (c) An awareness and outreach campaign aimed at RAC technicians, distributors, retailers, and end-users on the importance and advantages of using energy-efficient RAC equipment using low-GWP technologies, including an awareness video and two infographics on reading energy-efficiency labels and refrigerant ODP and GWP values; and developing and distributing a guide to servicing technicians on assessing RAC system performance and good practices to improve energy efficiency.

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<sup>8</sup> The project proposal has originally been included in the KIP. See paragraph 4 above.

## Energy efficiency pilot project

65. Information on the country's status of ratification to the Kigali Amendment, the policy, regulatory and institutional frameworks for the implementation of the Montreal Protocol, HFC consumption and its distribution by sector, the established HFC baseline, and relevant activities from the request for stage I of the KIP and the first tranche submitted to the current meeting, is available in paragraphs 5 to 51 of the present document.

### Policy, regulatory and institutional framework

66. In 2017, the Government of Nicaragua approved Law 956 on Energy Efficiency, which promotes the efficient use of energy and the adoption of measures that seek the sustainable development of the country. In addition, the country is a member of the Central American Integration System (SICA),<sup>9</sup> which has developed the Central American Technical Regulations (RTCA) that establish the minimum levels of energy efficiency or maximum electricity consumption that RAC equipment must meet to be manufactured, imported and marketed at the borders of the Central American region of the SICA countries. Three RTCA for the RAC sector have been prepared for mandatory compliance in the Central American region; these regulations must be included in the national legislation of SICA member countries.

67. In Nicaragua, the Energy Efficiency Directorate of the Ministry of Energy and Mines is responsible for proposing the legal and regulatory framework on national energy efficiency for approval, and control for compliance. Relative to the RTCA established for SICA member countries, it has issued mandatory technical standards on labelling requirements, limits of energy consumption and testing methods for domestic and commercial refrigeration equipment, and requirements for energy efficiency ranges, labelling and testing methods for air conditioners. The Ministry of Energy and Mines is expected to update the technical standards based on new technical regulations for the RAC sector that SICA will develop. The NOU and the Energy Efficiency Directorate will collaborate on the implementation of the pilot project.

### Project objective

68. The proposed pilot project is designed to complement the activities already approved for Nicaragua in line with decision 89/6. It aims to promote energy efficiency of RAC equipment to enhance the climate and environmental benefits through the acceleration of penetration of new, more energy efficient low-GWP alternative technologies and strengthening of the servicing sector.

### Proposed activities

69. The proposed activities and their corresponding costs are summarized below:

- (a) *Demonstration of a commercial refrigeration didactic module with high energy efficiency and low-GWP technology*: a study tour for energy efficiency policymakers and large end users will be organized to demonstrate on practical ways to promote energy efficient, low-GWP refrigerants-based RAC equipment and how updating/adoption of energy efficiency standards of the RAC equipment in other countries facilitate market penetration of new technologies. A CO<sub>2</sub> commercial refrigeration simulator system will be installed in one training institute. The demonstration system will have a compact design for easy maintenance and transport, for closed and open environments; it will have several measurement points with digitally viewable data (UNIDO) (US \$60,000);

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<sup>9</sup> Other member countries include Belize, Costa Rica, El Salvador, Guatemala, Honduras, Panama, and the Dominican Republic.

- (b) *Courses for teachers and large end-users on energy efficiency calculation and maintenance practices to improve or maintain energy efficiency:* two practical training courses for 30 teachers and large end-users on energy efficiency calculation using the didactic module installed in previous activity will be organized; this activity will include the development of a training course based on CO<sub>2</sub> technology (UNEP) (US \$20,000); and
- (c) *Field study and Zero-leaks project:* conduct a field study to identify one demonstration project for HFC conversion to low-GWP alternatives and enhanced energy efficiency; and one zero-leaks project in the dairy industry (UNIDO) (US \$26,000).

Total cost of the pilot project

70. The budget for the pilot project to maintain and/or enhance energy efficiency of replacement technologies and equipment in the context of HFC phase-down amounts to US \$106,000, plus agency support costs. The project is expected to be implemented between 2024 and 2026.

## **SECRETARIAT'S COMMENTS AND RECOMMENDATIONS**

### **COMMENTS**

71. The Secretariat has reviewed the project proposal in light of decisions 89/6 and 91/65. Annex III presents a comparison of the activities and associated cost approved under decision 89/6 and those submitted under decision 91/65.

72. In line with decision 91/65, confirmation from the Government of Nicaragua has been received: that the national ozone unit will coordinate with relevant energy-efficiency authorities and national standards bodies to facilitate consideration of refrigerant transition when developing energy-efficiency standards in the relevant sectors/applications; that, if Nicaragua has mobilized or are to mobilize funding from sources other than the Multilateral Fund for energy-efficiency components when phasing down HFCs, the project will not result in the duplication of activities among those funded by the Multilateral Fund and those funded from other sources; that the information on project progress, results and key learning will be made available, as appropriate; and that the date of completion of the project will be set as no more than 36 months after the date of approval by the Executive Committee and a detailed project report will be submitted to the Executive Committee within six months of the date of completion of the project.

Policy, regulatory and institutional framework

73. The activities proposed for reducing leakage and improving the energy efficiency of existing systems in the commercial refrigeration sector, in combination with the training and awareness activities, will incentivize opportunities for the adoption of more energy-efficient components and good practices in the design, installation, and servicing of commercial refrigeration systems to avoid the continued growth in use of controlled substances.

Technical and cost-related issues

74. The Secretariat sought additional information on the need for a didactic module with high energy efficiency and low-GWP technology, and its difference from the existing training module. UNIDO indicated that the demonstration of a didactic refrigeration module with CO<sub>2</sub> system would include a CO<sub>2</sub> commercial refrigeration simulator system, and a cold room with a CO<sub>2</sub> condensing unit. In Nicaragua, there is limited experience in the use of CO<sub>2</sub> technology in large commercial refrigeration systems like supermarkets and this demonstration will help familiarize the sector with the technology. Further the demonstration unit will also be used to conduct practical courses for teachers and large end-users on energy

efficiency calculation and maintenance practices to improve or maintain energy efficiency. Training activities under stage I of the KIP will not include commercial refrigeration, and all the activities in this sector were developed and proposed under decision 91/65. The training activities approved under decision 89/6 are different as they are separate tool kits for good practices to maintain the energy performance of equipment.

75. With regard to the zero-leaks project, UNIDO clarified on what is proposed as part of the project is to include the basic theoretical concepts of energy efficiency, that technicians also carry out practices and measurements of electrical consumption, associating it with the economic costs of the correct operation of the equipment, and the associated carbon footprint to that electricity consumption. These actions will help to emphasize the importance of energy efficiency, particularly for new RAC technologies that require a higher degree of knowledge and specialization among technicians.

76. The Secretariat noted that the field study to identify a demonstration project for conversion from HFC to low-GWP alternatives (US \$10,000) is not an eligible activity under decision 91/65(b)(i) and was therefore removed from the pilot project. The funding for a study tour was reallocated to the training component to include one additional course for 15 teachers and large end-users. The total cost was agreed at US \$96,000 to implement the pilot project for maintaining and enhancing energy efficiency of replacement technologies for Nicaragua, as shown in table 6 below.

**Table 6. Total cost of the energy efficiency pilot project for Nicaragua as agreed**

<b>Activities</b>	<b>Cost (US \$)</b>
Establishing a didactic module for training in maintaining and enhancing energy efficiency of commercial refrigeration equipment using CO <sub>2</sub> technology	51,000
Conduct of practical courses (3 courses) for a total of 45 teachers and large end-users on energy efficiency calculation and maintenance practices to maintaining and/or enhancing energy efficiency	30,000
Implementing one zero-leaks project in the dairy industry, including a training workshop for RAC technicians on energy efficiency, leak detection and low-GWP refrigerants, as well as reinforcement of good practices and the correct maintenance in the commercial refrigeration sector	15,000
<b>Total</b>	<b>96,000</b>

#### Agreed cost of the pilot project

77. The cost of the project was agreed at US \$96,000, plus agency support costs.

#### Sustainability of the pilot project and assessment of risks

78. The technical assistance for leakage reduction and energy efficiency improvement will support the development of technician capacity in designing, installing, maintaining and operating commercial refrigeration systems with reduced leakage and improved energy efficiency. The proposed updated energy efficiency standard for commercial self-contained equipment would encourage sustainable uptake of energy efficient, low GWP-based technologies.

## **RECOMMENDATION**

79. The Executive Committee may wish to consider:

- (a) Approving the pilot project to maintain and/or enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities) for Nicaragua, in the amount of US \$105,840, consisting of US \$66,000, plus agency support costs of US \$5,940 for UNIDO and US \$30,000, plus

agency support costs of US \$3,900 for UNEP, noting:

- (i) That the Government of Nicaragua has committed to the conditions referred to in decision 91/65(b)(iv)b. to b(iv)d.; and
- (ii) That the project would be operationally completed no later than December 2026 and a detailed project report would be submitted to the Executive Committee within six months of the date of completion of the project.

## Annex I

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

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

Row	Particulars	2023	2024	2025	2026	2027	2028	2029	2030	Total
1.1	Montreal Protocol reduction schedule of Annex F (CO <sub>2</sub> -eq tonnes)	n/a	582,513	582,513	582,513	582,513	582,513	524,262	524,262	n/a
1.2	Maximum allowable total consumption of Annex F (CO <sub>2</sub> -eq tonnes)	n/a	582,513	582,513	582,513	582,513	582,513	524,262	524,262	n/a
2.1	Lead IA (UNIDO) agreed funding (US \$)	159,000			41,000				25,000	225,000
2.2	Support costs for Lead IA (US \$)	14,310			3,690				2,250	20,250
2.3	Cooperating IA (UNEP) agreed funding (US \$)	40,000			47,500				12,500	100,000
2.4	Support costs for Cooperating IA (US \$)	5,200			6,175				1,625	13,000
3.1	Total agreed funding (US \$)	199,000			88,500				37,500	325,000
3.2	Total support costs (US \$)	19,510			9,865				3,875	33,250
3.3	Total agreed costs (US \$)	218,510			98,365				41,375	358,250

\* Based on established HFC baseline

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

Row	Particulars	2020	2021	2022	2023	2024	2025	2026	2027	2028-2029	2030	Total
1.1	Montreal Protocol reduction schedule of Annex C, Group I substances (ODP tonnes)	4.42	4.42	4.42	4.42	4.42	2.21	2.21	2.21	2.21	0	n/a
1.2	Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)	4.42	4.42	4.00	3.80	3.80	2.21	1.90	1.90	1.00	0	n/a
2.1	Lead IA (UNEP) agreed funding (US \$)	46,158	0	0	106,932	0	0	61,224	0	0	19,617	233,931
2.2	Support costs for Lead IA (US \$)	6,001	0	0	13,901	0	0	7,959	0	0	2,550	30,411
2.3	Cooperating IA (UNIDO) agreed funding (US \$)	100,092	0	0	197,817	0	0	114,276	0	0	38,884	451,069
2.4	Support costs for Cooperating IA (US \$)	7,006	0	0	13,847	0	0	7,999	0	0	2,722	31,574
3.1	Total agreed funding (US \$)	146,250	0	0	304,749	0	0	175,500	0	0	58,501	685,000
3.2	Total support costs (US \$)	13,007	0	0	27,748	0	0	15,958	0	0	5,272	61,985
3.3	Total agreed costs (US \$)	159,257	0	0	332,497	0	0	191,458	0	0	63,773	746,985





Annex II

**SIMULTANEOUS IMPLEMENTATION OF THE HCFC PHASE-OUT MANAGEMENT PLAN AND THE KIGALI HFC IMPLEMENTATION PLAN IN NICARAGUA**

HPMP – stage II			KIP – stage I			
Project component	Activities	Cost (US \$)	Project component	Activities	Cost (US \$)	Combined cost for HPMP+KIP (US \$)
<i>Strengthening of the legal and institutional framework for trade control</i>			<i>Component 1: measures to control supply and demand of HFCs</i>			
Technical assistance for improved control of HCFC trade	Three courses for approximately 90 customs officers and other stakeholders (e.g., environment officers, police officers), two training courses for approximately 60 brokers, distributors and importers, and development of a statistical model to track imported HCFCs and their uses to prevent illegal trade; and seven meetings with stakeholders, including end-users and importers, on the development of a ban on the import of HCFC-based equipment, and training for customs to enable the implementation of the ban	58,000	Policy and regulation instruments	Update and strengthen the national institutions through the creation of an automated system for registering, monitoring, and tracking the HFC quota and license permits.  Customs training and provision of refrigerant identifier to prevent the illegal traffic of HFCs; and arrangement of a regional workshop.	72,500	130,500
<i>Strengthening the RAC servicing sector to eliminate HCFC consumption</i>			<i>Component 2: Refrigerant management programme</i>			
Technical assistance for the RAC service sector and certification scheme for technicians	Technical assistance for the RAC service sector and certification scheme for technicians, including finalization of the labour competency standard on good refrigeration servicing practices including safe handling of flammable refrigerants; development of an online system to register certified technicians, and support for the certification of at least 160 technicians; design and implementation of an online training course and an on-site training programme focused on recovery, recycling, and good servicing practices, and the safe handling of flammable	192,500	Training, equipping and certification for MAC and residential /commercial refrigeration	Signing of collaboration agreements, manuals design, elaboration training programme and teaching materials; Equipment for two training institutions for MAC and residential/commercial refrigeration; Study tour at an international training centre for two participants; One train-the-trainers' courses for MAC and residential/commercial refrigeration; Training and certification of 400 technicians for MAC and residential/commercial refrigeration; Certification competence standards for handling flammable refrigerants in residential and commercial stand-alone appliances and for	185,500	378,000

HPMP – stage II			KIP – stage I			Combined cost for HPMP+KIP (US \$)
Project component	Activities	Cost (US \$)	Project component	Activities	Cost (US \$)	
	refrigerants; design and printing of a technical manual on good servicing practices; a course for approximately 20 trainers, and 25 training courses for approximately 500 technicians			MAC; and online training course for MAC technicians.		
Development of the refrigerant RRR network	Training programme for technicians focused on the safe use of flammable, toxic and high-pressure refrigerants, including refrigerant identification, safety measures, tools, servicing requirements and equipment diagnosis, through the provision of 15 courses for 300 technicians, provision of 50 tool kits <sup>8</sup> for trained technicians, and printed brochures and factsheets	143,568	RRR actions	Design and implementation of actions for reclaiming refrigerants in situ and mobile reclaiming unit project.	22,000	165,568
<i>Awareness-raising</i>			<i>Component 1: measures to control supply and demand of HFCs</i>			
Dissemination and awareness-raising for HCFC phase-out	Education and awareness-raising for the general public on the Montreal Protocol and the HCFC phase-out, and a separate awareness campaign targeting technicians to encourage certification and promote the use of mobile apps developed by UNEP (e.g., “WhatGas?” and “GWP-ODP Calculator”)  Awareness campaign focused on large RAC end-users, including commercial facilities, supermarkets, and hotels, on low-GWP technologies, including costs of installation and maintenance, availability, and technical requirements through five training seminars and distribution of brochures	29,932  50,000	Public awareness campaign	Educational material design for MAC and residential and commercial refrigeration; and organization of workshops and/or seminars with expert guests on different topics related to the Kigali Amendment.	20,000	99,932
<i>Strengthening the RAC servicing sector to eliminate HCFC consumption</i>						
Technical assistance to RAC end-users and awareness	Implementation of two pilot projects at large refrigeration end-users to demonstrate low-GWP alternatives,	66,000				66,000

HPMP – stage II			KIP – stage I			
Project component	Activities	Cost (US \$)	Project component	Activities	Cost (US \$)	Combined cost for HPMP+KIP (US \$)
	from the pre-feasibility study to select the project beneficiaries and alternative low-GWP technology; equipment procurement and commissioning, to training of the technical staff and start up; and three dissemination workshops.					
<i>HPMP monitoring and assessment</i>			<i>KIP supervision</i>			
Project implementation and monitoring	The system established under stage I of the HPMP will continue into stage II, where the NOU, with the assistance of UNEP, monitors activities, reports progress, and works with stakeholders to phase out HCFCs.	45,000	Project coordination and monitoring	The system established under HPMP will continue into stage I of the KIP, where the NOU, with the assistance of UNIDO and consultants will monitor the activities, arrange visits, and prepare reports.	25,000	70,000
<b>Total</b>		<b>585,000</b>	<b>Total</b>		<b>325,000</b>	<b>910,000</b>
<b>Percentage of total (%)</b>		<b>64.3</b>	<b>Percentage of total (%)</b>		<b>35.7</b>	<b>100.0</b>



**Annex III**

**SIMULTANEOUS IMPLEMENTATION OF THE ENERGY EFFICIENCY-RELATED  
ACTIVITIES UNDER THE HCFC PHASE-OUT MANAGEMENT PLAN  
AND THE KIGALI HFC IMPLEMENTATION PLAN IN NICARAGUA**

Stage II HPMP decision 89/6	Cost (US \$)	Stage I KIP decision 91/65	Cost (US \$)
Conducting two information sessions for 40 energy efficiency policymakers on how to promote low-GWP-based equipment, the labelling programme, and the adoption of minimum energy performance standards (MEPS) for RAC equipment; developing strategies for improving energy-efficiency labelling and MEPS in the RAC sector; organizing two workshops for 30 importers on the inspection of RAC equipment and energy-efficiency classification; and conducting two training workshops for 60 customs officers on the monitoring and inspection of labelled low-GWP-based equipment and their energy efficiency classification	20,000		
Updating the training curriculum for training institutes to include energy-efficiency considerations and the handling of low-GWP technologies (i.e., CO <sub>2</sub> , NH <sub>3</sub> , and hydrocarbons) in the servicing, installation, and maintenance of RAC equipment; providing five tool kits (each containing two multimeters, wattmeters, anemometers, laser thermometers, and contact thermometers) to support the training related to energy efficiency; and organizing eight workshops to train 10 trainers and 160 technicians on maintaining energy efficiency in the installation, servicing, and maintenance of RAC equipment	49,000	Installation in one training institution of a CO <sub>2</sub> commercial refrigeration simulator system. It is expected to build a cold room with a CO <sub>2</sub> condensing unit. The demonstration unit will be operational first to conduct practical courses for teachers and large end-users on energy efficiency calculation and maintenance practices to improve or maintain energy efficiency. The training activities approved under decision 89/6 are different since they are separate tool kits for good practices to maintain the energy performance of equipments.	51,000
		Three courses for a total of 45 teachers and large end-users on energy efficiency calculation and maintenance practices to maintaining and/or enhancing energy efficiency	30,000
Implementing an awareness and outreach campaign aimed at RAC technicians, distributors, retailers, and end-users on the importance and advantages of using energy-efficient RAC equipment using low-GWP technologies, including an awareness video and two infographics on reading energy-efficiency labels and refrigerant ODP and GWP values; and developing and distributing a guide to servicing technicians on assessing RAC system performance and good practices to improve energy efficiency	31,000		
		Implement one Zero-leaks project in the dairy industry.	15,000
<b>Total</b>	<b>100,000</b>	<b>Total</b>	<b>96,000</b>