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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Ninety-ninth Meeting
Montreal, 7–11 December 2026
Item 9(d) of the provisional agenda[1]

PROJECT PROPOSAL: NIGERIA

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

Energy efficiency

• Project to enhance the energy efficiency of domestic refrigerators, chest freezers and residential air conditioners manufactured by five enterprises in the context of HFC phase-down	UNIDO	Individual consideration

[1] UNEP/OzL.Pro/ExCom/99/1

Pre-session documents of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol are without prejudice to any decision that the Executive Committee might take following issuance of the document.

PROJECT EVALUATION SHEET – NON-MULTI-YEAR PROJECT

Nigeria

PROJECT TITLE	AGENCY
Project to enhance the energy efficiency of domestic refrigerators, chest freezers and residential air conditioners manufactured by five[2] enterprises in the context of HFC phase-down	UNIDO

PROJECT OBJECTIVE
The project aims to raise the energy efficiency of appliances in the domestic refrigeration, chest freezer, and residential AC manufacturing subsectors, as well as to optimize MEPS in these sectors to the targeted energy efficiency levels. The project targets five enterprises with a total of 13 manufacturing lines.[2]

NATIONAL COORDINATING AGENCY	National ozone unit and Federal Ministry of Environment

ARTICLE 7 DATA (Annex F)	Year: 2025	15,364.17 mt	24,924,704 CO_2-eq tonnes

PROJECT DETAILS		
HFC consumption in the refrigeration manufacturing sector in 2025 (country programme data)	mt	186.20
	CO_2-eq tonnes	454,382
HFC consumption in the air-conditioning manufacturing sector in 2025 (country programme data)	mt	567.12
	CO_2-eq tonnes	1,165,648
Project duration	months	36
Initial amount requested from the Multilateral Fund	US $	6,368,216
Final project costs	US $	4,507,752
Project support costs for UNIDO	US $	315,543
Total cost of project to Multilateral Fund	US $	4,823,295
Energy-efficiency savings to be achieved through the project	kWh/year	298,360,529
Counterpart funding		Yes
Project monitoring milestones included		Yes
Minimum energy performance standards available for the relevant sector (Y/N)		Partially*

* Minimum energy performance standards have been developed for domestic refrigerators, chest freezers, and residential air conditioners but are not yet being enforced.

SECRETARIAT'S RECOMMENDATION	Individual consideration

[2] As submitted to the 98th meeting, the project included six enterprises with 15 manufacturing lines. The enterprise Koolboks was subsequently withdrawn from the project.

PROJECT DESCRIPTION

1. On behalf of the Government of Nigeria, UNIDO as the designated implementing agency has submitted, in line with decision 94/60, a request for a project to enhance energy efficiency of appliances in the domestic refrigeration, chest freezer, and residential air-conditioning (AC) manufacturing subsectors in the context of HFC phase-down, in the amount of US $6,368,216, plus agency support costs of US $445,775, as originally submitted.[3]

2. The project was submitted in March 2026 to the 98th meeting of the Executive Committee. Notwithstanding constructive discussions and a careful review of the information provided, additional time was required to address issues that could not be resolved in the limited time available for project review.[4] Consequently, the project is being presented to the 99th meeting for the Executive Committee's consideration.

Background

3. Nigeria ratified the Kigali Amendment in December 2018. Stage I of its Kigali HFC implementation plan (KIP) was approved at the 95th and 98th meetings[5] for the period 2024–2030 to reduce HFC consumption by 16.85 per cent of the country's baseline by 2029. Approved activities in the manufacturing sector cover the phase-out of 860.37 metric tonnes (mt) (1,117,864 CO_2-eq tonnes) of R-410A, HFC-134a, and HFC-365mfc through the conversion of two polyurethane (PU) foam, three residential AC, and two domestic refrigeration manufacturers and technical assistance to 15 small commercial refrigeration enterprises manufacturing ice machines and cold rooms.[6]

4. The Government also committed to ban the import and manufacture of R-410A-based residential AC equipment upon completion of the conversion projects included in stage I of the KIP, no later than June 2030; a ban on the import and manufacture of HFC-134a-based domestic refrigeration equipment upon completion of the conversion projects included in stage I of the KIP, no later than June 2030; and a ban on the import and manufacture of foams containing HFCs once the conversion project in the foam sector under stage I of the KIP is completed, no later than 1 January 2028;[7] the Government was also invited to submit a proposal by the 100th meeting to convert any remaining eligible enterprises manufacturing residential AC units using R-410A and domestic refrigerators using HFC-134a.[8]

5. The complete phase-out of HCFCs in the country will be supported by a number of bans initiated under stages II and III of the HPMP, including on the import of all HCFCs except HCFC-22, on the import of HCFC-22-based equipment, and on the use of HCFC-22 in the manufacture of HCFC-22-based equipment, as well as a related tax reduction policy for equipment using R-290 and HFC-32, further detailed in document UNEP/OzL.Pro/ExCom/98/43.

6. At its 93rd meeting, the Executive Committee approved Nigeria's 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) under decision 91/65.[9] The project was designed to remove the barriers to enforcing MEPS in the refrigeration and air-conditioning (RAC) sector by establishing labelling and updating MEPS; upgrading the national testing laboratory and providing training in verification testing; and coordinating capacity-building, monitoring, regulatory enforcement, and awareness-raising activities.[10]

[3] As per the letter of 27 February 2026 from the Federal Ministry of Environment of Nigeria to UNIDO.
[4] UNEP/OzL.Pro/ExCom/98/10
[5] Decisions 95/69 and 98/49
[6] UNEP/OzL.Pro/ExCom/98/43
[7] Decision 98/49(c)
[8] Decision 98/49(g)
[9] Decision 93/85
[10] UNEP/OzL.Pro/ExCom/93/77

Policy, regulatory and institutional framework

7. The Federal Ministry of Environment is the designated national authority in Nigeria for the implementation of the Montreal Protocol and Kigali Amendment. The national ozone unit (NOU) is established within the Ministry and is responsible for implementing activities at the operational level.

8. The NOU coordinates with the Standards Organization of Nigeria (SON) on energy efficiency standards, and with the National Agency for Food and Drug Administration and Control (NAFDAC) and the Nigerian Customs Service (NCS) for licensing and border enforcement of both controlled substances and energy labelling standards. The Energy Commission of Nigeria (ECN) supports data collection and analysis for development of the minimum energy performance standards (MEPS).

9. Nigeria has an established and enforceable licensing and quota system in place for monitoring HCFC and HFC imports/exports that includes provisions addressing energy efficiency. The National Environmental (Ozone Layer Protection) regulations and the Ozone Layer Protection and Hydrofluorocarbons Phase Down Regulation were updated in 2022 and 2023 to include HFCs and HFC control measures, stipulate guidelines for the manufacture, import, sale, and use of ODS and HFCs, and mandate technicians to promote energy-efficient servicing practices.

Minimum energy performance standards and energy labelling

10. SON is responsible for the development, adoption, and enforcement of standards, including MEPS and energy labelling certification.

11. Nigeria developed its National Cooling Action Plan in 2022 to define the roadmap to phase out controlled substances under the Montreal Protocol while reducing emissions through the enforcement of energy-efficiency requirements in the RAC sector. The action plan targets reductions in electricity demand and greenhouse gas emissions to be achieved through the enforcement of MEPS, mandates a labelling scheme, sets a timeline for adopting international efficiency metrics (SEER), and includes actions to strengthen market surveillance.

12. In 2017, Nigeria adopted the MEPS for domestic refrigeration (refrigerators, refrigerator-freezers, and freezers) and residential AC developed by the African Union and the Economic Community of West African States (ECOWAS). These have since been domesticated by SON:

(a) Domestic refrigeration: MEPS follow the Nigeria Industrial Standard (NIS) ECOSTAND 071-1:2017EE (Part 1: Refrigerating Appliances). SON domesticated this standard as NIS 942:2017 and began voluntary implementation in 2018; it has since been revised and superseded by NIS 942-1:2026 in September 2026, with mandatory compliance planned by 1 January 2027. The standard also applies to chest freezers, which are used in residential and commercial applications; and

(b) Residential AC: NIS 943:2024 superseded NIS 943:2017 and was approved by the Federal Government in June 2024, with enforcement expected by 1 January 2027.

13. The energy labelling system aims to provide consumers with information on the energy efficiency of appliances, rated on a scale of one to five stars, and to encourage manufacturers to improve the energy efficiency of their appliances. MEPS require manufacturers to affix energy labels to products and to use refrigerants with zero ODP. The Government is working with UNIDO to strengthen operationalization and enforcement of MEPS and labelling across RAC appliances.

HFC consumption and sector background

14. The HFC consumption baseline for Nigeria has been established at 24,986,406 CO_2-equivalent (CO_2-eq) tonnes, which the country has committed to reducing by 16.85 per cent by 2029. The Government of Nigeria reported a consumption of 24,924,704 CO_2-eq tonnes of HFCs in 2025, which is 0.2 per cent below the HFC baseline for compliance.

15. Table 1 provides a breakdown of the HFC consumption in the refrigeration and AC manufacturing sectors as reported in the 2020-2025 country programme (CP) implementation reports.

Table 1. Baseline average and 2020-2025 HFC consumption in RAC manufacturing sectors in Nigeria

HFC	GWP	Refrigeration				Air-conditioning			
		Average 2020-2022	2023	2024	2025	Average 2020-2022	2023	2024	2025
Metric tonnes (mt)									
HFC-32	675	0.00	0.00	0.00	0.00	16.73	5.16	6.71	8.52
HFC-134a	1,430	101.87	90.77	94.10	110.70	4.22	8.39	9.40	9.40
R-404A	3,922	45.97	73.91	*80.10	75.50	0.00	0.00	0.00	0.00
R-407C	1,774	5.74	10.13	0.00	0.00	0.00	0.00	10.84	0.00
R-410A	2,088	47.00	0.00	0.00	0.00	286.00	519.63	600.70	549.20
Total (mt)		**200.57**	**174.81**	**174.20**	**186.20**	**306.95**	**533.18**	**627.65**	**567.12**
CO_2-eq tonnes									
HFC-32	675	0	0	0	0	11,295	3,483	4,529	5,751
HFC-134a	1,430	145,669	129,801	134,563	158,301	6,035	11,998	13,442	13,442
R-404A	3,922	180,263	289,845	*314,120	296,081	0	0	0	0
R-407C	1,774	10,182	17,969	0	0	0	0	19,229	0
R-410A	2,088	98,113	0	0	0	597,025	1,084,728	1,253,961	1,146,455
Total (CO_2-eq tonnes)		**434,227**	**437,616**	**448,683**	**454,382**	**614,355**	**1,100,208**	**1,291,161**	**1,165,648**

* Reported in the 2024 CP reports under "Other unidentified manufacturing."

Project overview

Project objectives and coordination with stage I of the Kigali HFC implementation plan

16. The project will be implemented in conjunction with the implementation plan for the first two tranches of stage I of the KIP approved through decisions 95/69 and 98/49, which includes inter alia the conversion from R-410A to HFC-32 of three residential AC manufacturers,[11] the conversion from HFC-134a to R-600a of two domestic refrigeration manufacturers,[12] and technical assistance to 15 small commercial refrigeration enterprises manufacturing ice machines and cold rooms, by June 2030.

17. The project aims to raise the energy efficiency of appliances in the domestic refrigeration, chest freezer, and residential AC manufacturing subsectors, as well as to optimize MEPS in these sectors to the targeted energy efficiency levels. The project includes six enterprises[13] with a total of 15 manufacturing lines

[11] Haier Paterson Zochonis Nigeria Limited (HPZ), SIMS Nigeria Limited (SIMS), and Care Global Consumer Limited (Care Global)

[12] SIMS and Somotex Nigeria Ltd. (Somotex)

[13] Subsequent to the 98th meeting, one of the six enterprises, Koolboks Limited (Koolboks), was removed from the project.

of which eight have received funding for conversions to phase out HCFCs [14] or high-global-warming-potential (GWP) HFCs.

18. The project objectives and expected impacts for the facilities in each subsector are presented in table 2.

Table 2. Summary of project objectives, costs, and impact targets per subsector, as submitted

Target/category	Subsector			Total
	Domestic refrigerators	Chest freezers	Residential AC	
Number of manufacturing lines	5	5	5	15
Improve energy efficiency (EE)	- EE surpasses U4E model regulation[15] - Reduce kWh/yr/l from 1.356 to 0.908	- EE surpasses U4E model regulation - Reduce kWh/yr/l from 1.826 to 1.241	- Coefficient of performance (COP) increases up to two times baseline level - Improve average COP from 3.161 to 3.633	-
Additional capital cost per facility	Up to US $250,000	Up to US $180,000	Up to US $250,000	-
Additional capital cost total (US $)	1,050,000	760,000	1,250,000	3,060,000
Additional component cost per unit	Up to US $20	Up to US $20	Up to US $45	-
Additional component cost total	2,978,204	2,500,730	2,945,713	8,424,647
Additional component incentive* (US $)	992,735	833,577	981,904	2,808,216
Total incentive** (US $)	2,042,735	1,593,577	2,231,904	5,868,216
Annual energy efficiency savings (GWh/year)	26.66	38.40	98.19	163.25
Cost effectiveness (US $/kWh/year)	0.08	0.04	0.02	0.04

* The additional component incentive is one third of the additional component cost.
** Total incentive is equal to the additional component incentive plus the additional capital cost.

Proposed activities as submitted

Additional capital costs and additional component costs and incentives

19. The calculation for additional capital costs and component costs was based on the methodology described in document UNEP/OzL.Pro/ExCom/94/61 for participating room AC and domestic refrigeration and freezer manufacturers in Nigeria.

20. Additional capital costs were based on the manufacturing capacities for different cooling equipment manufactured by each enterprise as shown in table 3.

[14] The enterprises Sacral Industries Ltd. (Sacral) and Somotex were funded to convert their residential AC manufacturing lines from HCFC-22 to HFC-32 under stage III of the HPMP.
[15] 2019 United for Efficiency (U4E) model regulation for domestic refrigerators

Table 3. Additional capital costs based on enterprise manufacturing capacities (US $)

Capacity (no. of units)	Care Global	Sacral	Somotex	Koolboks*	SIMS	HPZ	Total
Domestic refrigerators							
< 30,000	0	0	0	**0	0	0	0
30,000 to 100,000	0	150,000	0	0	0	150,000	300,000
> 100,000	250,000	0	**250,000	0	250,000	0	750,000
Chest freezers							
< 25,000	0	0	0	**100,000	0	0	100,000
25,000 to 75,000	0	120,000	0	0	0	0	120,000
> 75,000	180,000	0	**0	0	180,000	180,000	540,000
Residential AC							
< 30,000	0	0	0	0	0	0	0
30,000 to 100,000	0	0	0	0	0	0	0
> 100,000	250,000	250,000	250,000	0	250,000	250,000	1,250,000
All							
Total	*680,000*	*520,000*	*500,000*	*100,000*	*680,000*	*580,000*	*3,060,000*

* Subsequent to the 98th meeting, the enterprise Koolboks was removed from the project.

** Somotex and Koolboks each manufacture domestic refrigerators and chest freezers on a single production line; the additional capital costs for each enterprise have therefore been counted only once to cover both types of equipment.

21. Additional component costs were determined based on the energy performance of each manufacturer's equipment compared to the national MEPS as a baseline, as well as their target performance and the average 2022-2024 manufacturing volume. The total incentive was then calculated as the sum of the additional capital costs plus one third of the additional component costs. Participating enterprises have 100 per cent Article 5 ownership. As submitted, no adjustment was made for foreign ownership; the adjustment subsequently applied to one enterprise is discussed in paragraph 33.

22. Results of the calculations, as submitted, for each subsector are shown in tables 4 to 6.

Table 4. Capacity, manufacturing, performance and requested funding for domestic refrigerator manufacturers

Particulars	Care Global	Sacral	Somotex	Koolboks*	SIMS	HPZ
Capacity (units/year)	144,000	60,000	120,000	1,200	574,700	35,000
2022-2024 manufacturing (units/year)	21,450	14,748	25,774	23	279,533	6,638
Performance (kWh/year/litre)						
Baseline	1.299	3.535	1.959	1.367	1.199	0.985
U4E model regulation	1.077	2.357	1.598	1.136	1.445	1.073
Target	1.007	2.211	1.371	0.957	0.790	0.884
Improvement (%) of target energy performance relative to						
Baseline	22.5	37.5	30.0	30.0	34.1	10.2
U4E model regulation	6.5	6.2	14.2	15.8	45.3	17.6
Funding (US $)						
Additional component cost	81,534	57,197	279,524	263	2,523,849	35,836
Additional capital cost	250,000	150,000	250,000	**0	250,000	150,000

Particulars	Care Global	Sacral	Somotex	Koolboks*	SIMS	HPZ
Total incentive***	277,178	169,066	343,175	88	1,091,283	161,945
Annual energy savings (kWh/year)	2,183,340	1,656,176	2,524,080	2,061	20,122,813	174,172

* Subsequent to the 98th meeting, the enterprise Koolboks was removed from the project.
** Koolboks manufactures domestic refrigerators on the same line used for chest freezers.
*** Total incentive = additional capital cost + (additional component cost / 3)

Table 5. Capacity, manufacturing, performance and requested funding for chest freezer manufacturers

Particulars	Care Global	Sacral	Somotex	Koolboks*	SIMS	HPZ
Capacity (units/year)	129,000	60,000	120,000	6,000	450,200	150,000
2022-2024 manufacturing (units/year)	13,264	21,929	31,738	1,817	162,933	78,834
Performance (kWh/year/litre)						
Baseline	2.125	4.010	2.235	1.291	1.386	1.926
U4E model regulation	1.400	1.604	1.542	1.279	1.294	1.467
Target	1.317	1.584	1.564	0.743	1.002	1.508
Improvement (%) of target energy performance relative to						
Baseline	38.0	60.5	30.0	42.4	27.7	21.7
U4E model regulation	6.0	1.3	-1.4	41.9	22.6	-2.8
Funding (US $)						
Additional component cost	63,799	24,546	262,215	11,568	2,092,799	45,803
Additional capital cost	180,000	120,000	**0	100,000	180,000	180,000
Total incentive***	201,266	128,182	87,405	103,856	877,600	195,268
Annual energy savings (kWh/year)	3,347,220	9,327,037	3,917,488	279,942	15,086,600	6,441,599

* Subsequent to the 98th meeting, the enterprise Koolboks was removed from the project.
** Somotex manufactures chest freezers on the same line used for domestic refrigerators.
*** Total incentive = additional capital cost + (additional component cost / 3)

Table 6. Capacity, manufacturing, performance and requested funding for residential AC manufacturers

Particulars	Care Global	Sacral	Somotex	SIMS	HPZ
Capacity (units/year)	172,800	120,000	135,000	*101,400	105,000
2022-2024 manufacturing (units/year)	16,685	43,017	39,328	278,084	27,145
*Performance (NSEER** or COP)*					
MEPS (NSEER)	3.100	3.100	3.100	3.087	3.100
Baseline (COP)	2.989	2.800	3.101	3.271	2.800
Target (NSEER)	4.030	3.500	4.460	3.487	3.896
Improvement (%) of target energy performance relative to					
Baseline	34.8	25.0	43.8	6.6	39.1
MEPS	30.0	12.9	43.9	13.0	25.7
Funding (US $)					
Additional component cost	298,369	257,282	722,498	1,370,347	297,217
Additional capital cost	250,000	250,000	250,000	250,000	250,000
Total incentive***	349,456	335,761	490,833	706,782	349,072

Particulars	Care Global	Sacral	Somotex	SIMS	HPZ
Annual energy savings (kWh/year)	8,265,858	15,469,143	18,991,531	42,752,609	12,708,189

* As submitted. During project review this initial capacity was determined to be underestimated.
** Nigeria Seasonal Energy Efficiency Ratio
*** Total incentive = additional capital cost + (additional component cost / 3)

23. The total funding requested amounts to US $5,868,216 for the six manufacturers, as shown in table 7.

Table 7. Summary of requested funding by enterprise and subsector (US $)

Particulars	Care Global	Sacral	Somotex	Koolboks*	SIMS	HPZ	Total
Domestic refrigerators							
Capital cost	250,000	150,000	250,000	**0	250,000	150,000	1,050,000
Component incentive	27,178	19,066	93,175	88	841,283	11,945	992,735
Subtotal	*277,178*	*169,066*	*343,175*	*88*	*1,091,283*	*161,945*	*2,042,735*
Chest freezers							
Capital cost	180,000	120,000	**0	100,000	180,000	180,000	760,000
Component incentive	21,266	8,182	87,405	3,856	697,600	15,268	833,577
Subtotal	*201,266*	*128,182*	*87,405*	*103,856*	*877,600*	*195,268*	*1,593,577*
Residential AC							
Capital cost	250,000	250,000	250,000	-	250,000	250,000	1,250,000
Component incentive	99,456	85,761	240,833	-	456,782	99,072	981,904
Subtotal	*349,456*	*335,761*	*490,833*	-	*706,782*	*349,072*	*2,231,904*
Total requested funding							
Capital cost	680,000	520,000	500,000	100,000	680,000	580,000	3,060,000
Component incentive	147,901	113,009	421,412	3,944	1,995,665	126,285	2,808,216
Total	***827,901***	***633,009***	***921,412***	***103,944***	***2,675,665***	***706,285***	***5,868,216***

* Subsequent to the 98th meeting, the enterprise Koolboks was removed from the project.
** Somotex and Koolboks each have a line that manufactures both chest freezers and domestic refrigerators.

Institutional support

24. Nigeria is requesting US $250,000 to continue activities for the coordination between the NOU and the regulatory framework comprising SON for standard-setting, ECN for policy coordination, and NCS and NAFDAC for border control. Activities include:

(a) A national steering committee on room AC and domestic refrigeration and chest freezer standards meeting twice per year (six meetings total);

(b) The monitoring and evaluation by SON of MEPS implementation on the market, including the upgraded energy efficiency products entering the market under this project;

(c) Evaluating current testing facilities on upgrades needed to meet the requirements for the testing of flammable higher efficiency equipment;

(d) Using solar photovoltaic technology to alleviate power issues associated with the operations of the testing laboratories;

(e) Organizing two national stakeholder meetings on MEPS in the RAC sector;

(f) Developing an assessment for testing the capacity of energy efficiency in the RAC sector;

(g) Developing a capacity-building programme on MEPS for energy efficiency policy makers; and

(h) Implementing SON's mandatory energy labelling scheme.

Monitoring, verification and reporting

25. Nigeria is requesting US $250,000 for project implementation, monitoring, verification, and reporting, based on an allocation of US $15,000 per facility for four enterprises with three facilities each (US $180,000), US $20,000 per facility for one enterprise with two facilities (US $40,000), and US $30,000 for one enterprise with one facility (US $30,000). The funding will cover technical consultation and oversight throughout the three-year implementation period and continued follow-up and reporting for an additional two years following project completion, which extends the support through 2031, comprising the following activities:

(a) Specialized consultants who will provide hands-on technical support to each enterprise, guide the implementation of energy efficiency measures, and ensure compliance with performance benchmarks;

(b) Regular site visits, data collection, performance verification, capacity-building for local staff, and the preparation of detailed progress and final reports; and

(c) Transportation, travel, meetings, and ancillary expenses.

Cost of the project as submitted[16]

26. At a total cost of US $6,368,216, plus agency support costs, as initially submitted to the 98th meeting, the project is expected to be completed within 36 months of approval, between January 2027 and December 2029. Table 8 presents the proposed activities and costs for the project.

Table 8. Summary of activities and costs of the project, as submitted (US $)

Project component	Cost
Additional capital costs	3,060,000
Additional component incentive	2,808,216
Institutional support	250,000
Monitoring, verification and reporting	250,000
Total	**6,368,216**

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

27. Notwithstanding constructive discussions and a careful review of the information provided, the Secretariat had been unable to finalize its review of the project at the 98th meeting, including due to the need to ensure the entry into force of the 2024 MEPS for residential AC and the completion of the revision and entry into force of MEPS for domestic refrigerators and chest freezers. Consequently, UNIDO and the Secretariat continued discussing the project so that it could be presented to the 99th meeting for the Executive Committee's consideration.

[16] Subsequent to the 98th meeting, the enterprise Koolboks was removed from the project.

Institutional, policy and regulatory framework

Minimum energy performance standards

28. During its review at the 98th meeting, the Secretariat had noted that the MEPS for domestic refrigerators that had been adopted in 2017 were not yet enforced, that those MEPS would allow for approximately twice the annual energy consumption of the 2019 U4E model regulations,[17] and that a number of models manufactured by the participating enterprises did not meet the (voluntary) MEPS. Similarly, the Secretariat had noted that the MEPS for residential air conditioners (i.e., NIS 943:2024) were not yet being enforced.

29. Subsequent to the 98th meeting, and with the support of the project on energy efficiency approved at the 93rd meeting, UNIDO informed that:

(a) The 2017 MEPS for domestic refrigeration (NIS 942:2017) were revised and superseded by NIS 942-1:2026, which were approved by the Standards Council of Nigeria on 18 September 2026, with mandatory compliance planned by 1 January 2027;

(b) NIS 942-1:2026 keeps the scope of NIS 942:2017 (appliances up to 1,500 litres, covering domestic refrigerators and chest freezers, tested in accordance with IEC 62552-1:2015) and improves the minimum acceptable energy efficiency index from 90 to 75; and

(c) NIS 943:2024 for residential air conditioners will be enforced by 1 January 2027. Moreover, in line with NIS 943:2024, the stringency of the MEPS will be strengthened by 1 January 2030, as specified in table 9.

Table 9. MEPS to be updated in line with NIS 943:2024 for residential air conditioners and enforced by 1 January 2030

Product category	Capacity range (kW)	MEPS	
		EER	NSEER
All types, excluding single and double duct	Below 4.5	-	4.50
	Between 4.5 and 9.5	-	4.30
	Between 9.5 and 20.0	-	3.90
Single and double duct (portable and wall-mounted)	Below 20.0	3.00	-

30. UNIDO further clarified that Nigerian industrial standards are subject to a statutory review within five years, and SON had committed to a comprehensive review of the MEPS for domestic refrigerators and chest freezers within that period. In particular, SON anticipated receiving financial support outside the Multilateral Fund to strengthen its MEPS, including a baseline market assessment, the development of MEPS for commercial refrigerating appliances (NIS 942-2) and off-grid refrigerating appliances (NIS 942-3), training of SON laboratory staff, and a further review of NIS 942-1:2026 to bring it to the U4E model regulation level before 2030.

31. In light of that considerable progress, it was agreed that:

(a) Funding for the project would be transferred from the Treasurer to UNIDO upon confirmation from UNIDO that NIS 942-1:2026 and NIS 943:2024 are in force and being enforced. Should this confirmation come prior to the 99th meeting, the Secretariat would inform the Executive Committee accordingly so that this understanding could be removed from the recommendation;

[17] https://united4efficiency.org/wp-content/uploads/2019/11/U4E_Refrigerators_Model-Regulation_20191029.pdf

(b) In line with paragraph 37 of document UNEP/OzL.Pro/ExCom/94/61, the enterprises committed to manufacturing equipment with at least the target energy efficiency performance after project completion, and to make their best efforts to continue to improve the energy efficiency of those products beyond the project duration at their own cost;

(c) In line with paragraph 38 of document UNEP/OzL.Pro/ExCom/94/61, the Government committed to periodically upgrading MEPS, labelling programmes and awareness and outreach activities to ensure that the target energy-efficiency levels under the project for the equipment were publicized among different stakeholders;

(d) The Government committed to implement and make best efforts to enforce the following MEPS:

(i) For residential AC, by 1 January 2030 the MEPS in table 9;

(ii) For domestic refrigerators and chest freezers, by 1 January 2030 at least the 2019 U4E model regulations for refrigerating appliances, applied to chest freezers with the corresponding freezer values; and

(e) If the Government did not comply with the conditions specified in subparagraphs (c) and (d) above, the Executive Committee would take that into account when considering future projects submitted by Nigeria not related to compliance.

Participating enterprises

32. In line with the discussions at the 98th meeting, the enterprise Koolboks was removed from the project. In addition, the enterprise Sacral decided not to include the chest freezers it manufactures in the project, and UNIDO identified an additional manufacturer, Fouani, which manufactures domestic refrigerators, chest freezers and residential air conditioners, that decided not to participate in the project. UNIDO confirmed that the country's MEPS will apply to all equipment placed on the Nigerian market, whether locally manufactured or imported, and that the enterprises not participating in the project will have to meet the MEPS with their own resources. Compliance will be verified by SON through factory inspection and market surveillance through its Mandatory Conformity Assessment Programme, while compliance of imported equipment will be verified through the SON Conformity Assessment Programme in collaboration with NCS. In addition, UNIDO confirmed the commitment of the Government to ensure that the upgrading of MEPS will not be conditional on the agreement of individual manufacturers.

33. Care Global has 37 per cent ownership by an enterprise based in the United Arab Emirates; accordingly, the agreed funding was adjusted to reflect local ownership, in line with decision 23/14.

34. UNIDO confirmed that none of the five participating enterprises have received funding from other sources to improve the energy efficiency of its equipment. Care Global, HPZ, and SIMS had received funding under stage I of the KIP to convert from R-410A to HFC-32 in their manufacturing of residential air conditioners, and SIMS and Somotex were converting their domestic refrigeration manufacturing from HFC-134a to R-600a also with support from stage I.

35. Under stage III of the HPMP, Sacral and Somotex had received funding to convert their AC manufacturing from HCFC-22 to HFC-32.[18] As reported to the 98th meeting, the enterprises had been manufacturing with HCFC-22 and R-410A and the manufacturing with HFC-32 was very low. In line with decision 77/35(a)(ii), the Executive Committee had inter alia noted that the two enterprises for which conversion to an alternative with low GWP had been approved were temporarily using R-410A to maintain

[18] Somotex had the option of choosing either HFC-32 or R-290.

business viability and that the two enterprises had committed to ceasing the use of R-410A in AC manufacturing by 31 December 2026; and requested UNIDO to report to the 99th meeting on the status of use of the interim technology and the cessation of HCFC-22 use by Somotex (decision 98/34(b) and (c)). As further discussed in document UNEP/OzL.Pro/ExCom/99/19, UNIDO confirmed the enterprises would cease manufacturing with R-410A by 1 January 2027, and that Somotex had ceased manufacturing with HCFC-22 and the HCFC-22 baseline equipment had been destroyed. It was agreed that UNIDO would not transfer funding to the enterprises until they had ceased manufacturing with R-410A, consistent with their commitment to do so by 1 January 2027.

Technical and cost-related issues

36. Chest freezers are tested in accordance with IEC 62552-1:2015 in Nigeria but are used in both domestic and commercial applications. Chest freezers comply with the same performance and safety standards, and follow comparable design specifications and technology pathways, as domestic refrigerators. Accordingly, NIS 942-1:2026 is applicable to chest freezers notwithstanding that their operational characteristics, such as higher utilization rates, exposure to elevated ambient conditions, and continuous duty cycles, are more consistent with those of commercial refrigeration equipment. In light of these considerations, it was agreed to consider chest freezers within the commercial refrigeration subsector for the purposes of the energy-efficiency project classification under decision 94/60.

Target energy performance

37. While UNIDO and the Government had encouraged the enterprises to ensure that the target energy efficiency of domestic refrigerators and chest freezers achieved at least the 2019 U4E model regulations for domestic refrigerators, some models had not achieved that standard; accordingly, the Secretariat encouraged UNIDO to work with the enterprises to explore whether additional energy-efficiency improvements might be possible. Subsequently, UNIDO reported that, with the exception of Somotex, the target energy efficiency of all chest freezers manufactured by the participating enterprises would meet the 2019 U4E model regulations, which will be the MEPS by 1 January 2030. Similarly, UNIDO confirmed that, weighted by the 2025 manufacturing volume, 100 per cent of the domestic refrigerators manufactured by Sacral and SIMS, 93 per cent manufactured by Care Global, and 77 per cent manufactured by HPZ met or exceeded the 2019 U4E model regulations. The target energy efficiency of chest freezers and domestic refrigerators manufactured by Somotex was considerably lower than that of the other enterprises, with less than half (43 per cent for chest freezers and 37 per cent for domestic refrigerators) meeting or exceeding the 2019 U4E model regulations, as shown in table 10. Accordingly, and in line with decision 97/32, Somotex will provide the NOU periodic implementation reports on progress towards meeting the project targets, including MEPS, for domestic refrigerators and chest freezers; the Government committed to prohibit the manufacture and sale of models manufactured by the enterprise that do not achieve the agreed energy-efficiency targets, which will be backed by factory inspection and market surveillance by the SON; and UNIDO will provide periodic reports to the Executive Committee on the matter.

Table 10. Percentage of models with target energy efficiency meeting or exceeding 2019 U4E model regulations, weighted by 2025 manufacturing volume

Enterprise	Percentage (%)	
	Domestic refrigerators	Chest freezers
Care Global	93	100
Sacral	100	n/a
Somotex	37	43
SIMS	100	100
HPZ	77	100

Additional component costs and incentives

38. Given the changes to the country's MEPS, particularly for residential air conditioners, and adjustments to the models manufactured by the enterprises, it was agreed to use the enterprises' 2025 manufacturing volume as the basis to calculate the additional component costs. Table 11 shows the updated manufacturing volume, performance, and improvement, by category of equipment and by enterprise.

Table 11. Updated baseline energy performance, MEPS, target energy performance, and improvement by equipment category

Particulars	Care Global	Sacral	Somotex	SIMS	HPZ
Domestic refrigerators					
2025 manufacturing	68,641	6,733	32,356	262,900	29,004
Performance (kWh/year/litre)					
Baseline	1.372	3.547	2.110*	1.058	2.260
U4E model regulation	1.064	2.365	1.762*	1.284	1.534
Target	0.953	2.223	1.477*	0.704	1.453
Improvement (%) of target energy performance relative to					
Baseline	31	37	30	33	36
U4E model regulation	11	6	16	45	5
Chest freezers					
2025 manufacturing	13,261	0	19,173	110,100	137,762
Performance (kWh/year/litre)					
Baseline	1.238	n/a	2.218	1.256	1.868
U4E model regulation	1.259	n/a	1.490	1.320	1.382
Target	0.965	n/a	1.560	0.860	1.126
Improvement (%) of target energy performance relative to					
Baseline	22	n/a	30	31	40
U4E model regulation	23	n/a	-5	35	19
Residential air conditioners					
2025 manufacturing	65,460	33,628	22,006	172,720	29,075
Performance (COP or NSEER)					
Baseline (COP)	2.990	2.800	3.214	3.100	3.004
2024 MEPS (NSEER)	3.575	3.610	3.529	3.438	3.899
Target (NSEER)	4.522	4.689	4.690	4.500	4.924
Improvement (%) of target energy performance relative to					
2024 MEPS (NSEER)**	26	30	33	31	26

***** Excluding seven unrated models that will be replaced with NIS 942-1:2026 compliant models and for which additional component costs were not requested.

** A comparison between the baseline and target is not presented given the different metrics used.

39. As further detailed in annex I, the additional component costs for domestic refrigerators and chest freezers were calculated in line with the methodology in the operational framework on energy efficiency and on the understanding that no funding was provided for models whose baseline does not meet NIS 942:2017. The determination of additional component costs for residential air conditioners was more complex as the baseline energy performance of each model was available as a coefficient of performance (COP) while the MEPS that will enter into force by 1 January 2027 is based on the NSEER. In order to use consistent metrics and ensure that the funding level of the target is assessed against the target MEPS criterion (i.e., NSEER) and the funding level of the baseline against the baseline MEPS criterion (i.e., COP), so that where the baseline COP is higher than the MEPS COP the enterprise's existing capability is recognised, the following methodology was used to calculate the additional component costs for air conditioners (see also annex I):

(a) The additional component cost is the difference between the cost at the target performance and the cost at the baseline performance;

(b) The target additional component cost was calculated based on the target energy performance measured as a NSEER, relative to the MEPS that will enter into force by 1 January 2027 (i.e., NIS 943:2024), noting that no funding was provided for any model that did not meet the MEPS that were expected to enter into force by 2030;

(c) The baseline additional component cost was calculated based on the baseline energy performance (COP) relative to NIS 943:2017 (that is provided as a COP), noting that there were no models that did not meet the 2017 MEPS; and

(d) The additional component incentive is the difference between (b) and (c) above, adjusted for capacity (relative to 1.5 TR) and divided by three, in line with the operational framework on energy efficiency.

40. Table 12 summarizes the additional component incentive, as agreed, for each enterprise by category of equipment.

Table 12. Agreed additional component incentive (US $) by category of equipment

Category of equipment	Care Global*	Sacral	Somotex	SIMS	HPZ	Total
Domestic refrigerators	107,810	8,540	47,616	745,113	38,759	947,838
Chest freezers	28,670	0	34,687	354,751	537,488	955,596
Residential AC	149,052	159,148	68,756	672,604	82,359	1,131,919
Total	**285,532**	**167,688**	**151,059**	**1,772,468**	**658,606**	**3,035,353**

* Agreed funding reflects adjustment in line with decision 23/14.

41. The enterprises participating in the project use either complete-knock-down (CKD) or semi-knock-down (SKD) kits, and since the price of each model's baseline kit was unavailable, UNIDO provided an estimate of those prices; similarly, the price of the target kit was estimated based on the necessary components needed to improve the energy efficiency of the model sufficiently. The Secretariat and UNIDO discussed the price of those kits in detail. It was agreed that the price of the baseline and target kits would be part of the project report submitted to the Executive Committee following completion of the project, noting that this information may be submitted confidentially.

Additional capital costs

42. The Secretariat noted a considerable difference between the nominal capacity of each manufacturing line reported by UNIDO and the number of units manufactured and, further to a discussion, it was agreed to use the 2025 manufacturing volume to assess the additional capital costs. In addition, the Secretariat noted that there may be efficiencies that should be considered when assessing the additional capital costs for an enterprise that manufactures two or three of the product classes in question (i.e., domestic refrigerators, chest freezers, and residential air conditioners) at the same manufacturing facility; in particular, while efficiencies are unlikely to be significant for product design and third-party testing and validation, costs associated with training, factory upgrades, and lab upgrades could be rationalized when two or three product classes were manufactured on different lines at the same manufacturing facility.

43. UNIDO and the Secretariat had detailed and constructive discussions, where it was noted that several enterprises manufacture more than one category of equipment at the same industrial site, creating opportunities to share engineering resources, testing infrastructure, training, and other supporting facilities; that the enterprises rely on CKD and SKD kits, which may reduce the need for certain manufacturing-equipment upgrades compared with more vertically integrated manufacturing operations; and that the differences in manufacturing volumes and manufacturing capabilities may provide further

opportunities to rationalize eligible capital costs. Following those discussions, it was agreed to use a project-specific rationalization methodology that recognizes potential cost synergies in shared manufacturing infrastructure and opportunities for additional rationalization for low-volume manufacturing lines. Noting that such an approach was based on the particular circumstances in the country, and without setting a precedent, the additional capital costs shown in table 13 were agreed.

Table 13. Agreed additional capital costs (US $)

	Care Global*	Sacral	Somotex	SIMS	HPZ	Total
Domestic refrigerators	72,135	74,667	130,000**	190,833	76,333	543,968
Chest freezers	48,090	n/a***	0**	137,400	137,400	322,890
Residential AC	57,708	104,000	86,667	190,833	76,333	515,541
Total	**177,933**	**178,667**	**216,667**	**519,066**	**290,066**	**1,382,399**

* Agreed funding reflects adjustment in line with decision 23/14.
** Line used to manufacture both domestic refrigerators and chest freezers.
*** Not participating in the project.

44. At the 97th meeting, the Executive Committee agreed to defer, to a future meeting, consideration of the provision of additional capital costs to manufacturers that used CKD kits in projects submitted under the operational framework on energy efficiency. As noted at that meeting, the Secretariat considers that RAC manufacturing enterprises that use CKD or SKD kits should be treated differently from enterprises that do not. The latter manufacture some components (e.g., in some cases, heat exchangers) and purchase others and are therefore expected to need more support for their capital costs, for example, related to product design and development. However, the Secretariat considers it likely that purchasing CKD or SKD kits that provide a specified level of energy-efficiency enhancement would be more expensive than purchasing components individually, which, when assembled by the manufacturer, result in the same enhancement. In other words, enterprises that use CKD or SKD kits will have lower additional capital costs but are likely to have higher additional component costs. Accordingly, and following constructive discussions with UNIDO, it was agreed not to change the level of eligible funding provided to enterprises that manufacture using SKD or CKD kits but instead to change how the additional capital costs are provided, with half of the eligible additional capital costs provided following approval of the project and upon the transfer of funds to UNIDO, and the remaining half one year thereafter and once UNIDO had confirmed to the Secretariat that the enterprises have manufactured the RAC units at least at the proposed targets, as reflected in table 14. The Secretariat noted that this agreement is without prejudice to any decision the Executive Committee may take on consideration of the provision of additional capital costs to manufacturers that used CKD kits in projects submitted under the operational framework on energy efficiency. The Secretariat will include the matter of the provision of additional capital costs to enterprises that use CKD or SKD kits in their manufacturing as part of the review of the operational framework that will be considered by the Executive Committee at the 100th meeting, in line with decision 95/87(c).

Table 14. Agreed additional capital costs and component incentives (US $)

	Care Global*	Sacral	Somotex	SIMS	HPZ	Total
Additional capital cost provided upon transfer to UNIDO	88,967	89,334	108,334	259,533	145,033	691,201
Additional capital cost provided after one year	88,966	89,333	108,333	259,533	145,033	691,198
Additional component incentive	285,532	167,688	151,059	1,772,468	658,606	3,035,353
Total	**463,465**	**346,355**	**367,726**	**2,291,534**	**948,672**	**4,417,752**

* Agreed funding reflects adjustment in line with decision 23/14.

Institutional support

45. The Secretariat sought to better understand how the additional assistance for institutional support related to activities on energy efficiency funded outside the Multilateral Fund, in particular the activities

undertaken under the Abating Greenhouse Gas Emissions from Obsolete RAC Equipment in Ghana and Nigeria (AGORA) project funded by the Government of France and the activities focused on air conditioners funded by a philanthropic organization.

46. UNIDO clarified that the AGORA project, funded by the French Facility for Global Environment (FFEM), was implemented in Ghana and Nigeria with the assistance of UNDP, U4E, and the NOUs and Energy Commissions of both countries. It was launched in Nigeria on 25 November 2024 with an estimated date of completion of 31 December 2028. The project's components include policies, regulations and partnerships for RAC equipment replacement (rebate or discount) schemes with environmentally sound end-of-life management; market transformation through replacement programmes towards energy-efficient, low-GWP domestic equipment; the promotion of R-290-based air conditioners; and the development of financial instruments. Nigeria's NOU was mainly responsible for establishing or strengthening the policy, regulations and partnerships needed for the success of the RAC rebate schemes, including the financial analysis for a rebate scheme, the legal analysis on a ban on second-hand equipment, workshops, training and awareness-raising; ECN was responsible for developing and implementing a communication strategy for the rebate scheme, implementing the reinforced financial mechanism and developing a monitoring, reporting and verification toolkit, among others. UNDP and UNEP were mainly responsible for recruiting consultants for the analyses and studies, supporting the implementation of the rebate scheme, and facilitating meetings, awareness activities and South-South exchanges. Between January 2025 and September 2026, the activities undertaken included the establishment of a working group for project implementation, the completion of the legal analysis of existing regulations towards a ban on second-hand equipment and of a financial mechanism for the rebate scheme, and four stakeholder consultations that led to the finalization of the implementation plan for the ban and of the preferred financial mechanisms for the rebate scheme. Remaining activities include training for relevant stakeholders on the implementation of the ban and the financial mechanism; the implementation of the ban and the rebate scheme; awareness-raising; monitoring, reporting, and verification activities; and South-South exchanges between Nigeria and Ghana. Preparations for the training and awareness activities were ongoing. UNIDO emphasized that AGORA focused on the demand side (consumer replacement and end-of-life management of old equipment), whereas the present project acts on the supply side (local manufacturing) and on MEPS enforcement, and that the two projects were thus mutually reinforcing, wherein the efficient models manufactured under the present project and registered under SON's mandatory energy labelling scheme can become eligible for AGORA replacement schemes. Coordination is ensured by the NOU, which is a partner in both projects.

47. Regarding the latter, UNIDO clarified that the project funded from a philanthropic organization, Scaling Up Energy-Efficient and Climate-Friendly Cooling in Nigeria's NDC Revision, was implemented by ECN with technical support from U4E and in collaboration with SON.[19] The project, which focused on air conditioners and did not address domestic refrigerators or chest freezers, was launched in February 2022 and included inter alia a market assessment of air conditioners (results presented in November 2023); the inauguration of a National Technical Committee (March 2023); support for strengthening the AC MEPS and labels based on the U4E model regulation, which led to NIS 943:2024, approved by the Federal Government in June 2024; training on monitoring, verification and enforcement (November 2023); training of technicians on the end-of-life management of air conditioners (November 2024); a communications strategy and an awareness campaign on the new AC MEPS held with SON in Lagos and Kano (2025); and inputs on cooling to the country's Nationally Determined Contribution (NDC) and the National Cooling Action Plan.

48. While no further activities remain under the project, SON was in advanced discussions with U4E, which has secured funding from a philanthropic organization for a 24-month project starting in 2027 with ECN as the coordinating agency, SON to lead the standard-setting process, and the NOU and other agencies participating through the National Technical Committee established under the philanthropy-supported project described above. The planned project would address MEPS of household refrigerating appliances (NIS 942-1) and the development of MEPS for commercial refrigerating appliances (NIS 942-2), and

[19] https://united4efficiency.org/nigerian-government-approves-new-meps-for-air-conditioners-to-boost-energy-efficiency/

includes stakeholder consultations and an inception workshop; a baseline market assessment of domestic and commercial refrigerators; development of the energy performance metrics and the draft MEPS for commercial refrigerators; stakeholder validation, working group and Technical Committee review; support to the SON Standards Council for the consideration of the MEPS; awareness creation; training of SON technical and laboratory staff on enforcement; and, subject to available resources, facilitation of the accreditation of SON's refrigerator testing laboratory.

49. In view of the planned activities, the Government decided to withdraw the request for institutional support requested under the present project, while noting the country might wish to submit a request for additional support under decision 91/65 to the 100th meeting. The Secretariat considered the withdrawal of the requested funding for institutional coordination at the present meeting prudent as additional time would allow the Government to better understand the scope of activities to be undertaken in the planned project to be funded by a philanthropic organization and ensure that a project submitted under decision 91/65 to the 100th meeting was tailored to addressing key needs and maximizing complementarity.

50. UNIDO also noted the following activities related to energy efficiency that were supported with resources outside the Multilateral Fund and that would be taken into consideration in any future submission under decision 91/65: the power supply of SON's air conditioner testing laboratory was upgraded with a 200 kW solar power system; a U4E pilot project with the Rural Electrification Agency on energy-efficient, climate-friendly off-grid refrigeration (2025); and the IFC Sustainable Cooling Initiative, supported by the United Kingdom, which engages with the National Council on Climate Change on cooling finance. Beyond the RAC sector, SON has indicated that the Government of Germany supported the development of the recently published MEPS for comfort fans (NIS 919:2026), household electric water heaters (NIS 921:2026), and televisions (NIS 957:2026), and that the Collaborative Labeling and Appliance Standards Program (CLASP) supported the development of the MEPS for electric motors (NIS 1236:2026). SON's refrigerator testing facility (an environmentally controlled chamber with six test stations) was installed in 2014 with support from the Global Environment Facility (GEF).

51. As noted in document UNEP/OzL.Pro/ExCom/99/17, while the activities planned as part of the project approved under decision 91/65[20] have largely been completed, UNIDO requested to extend the date of completion of the project from 31 December 2026 to 30 June 2027 to ensure the smooth implementation and enforcement of NIS 943:2024. The Secretariat supports that extension.

Monitoring, verification and reporting

52. UNIDO and the Secretariat had detailed discussions on the budget for monitoring, verification and reporting. The five enterprises participating in the project each had two or three manufacturing lines at their facility and each enterprise manufactured either two or three categories of equipment (i.e., domestic refrigerators, chest freezers and residential air conditioners). UNIDO emphasized that monitoring and reporting for projects approved under decision 94/60 involved enterprise site visits and inspections; collection, verification and evaluation of manufacturing records and technical performance data; and preparation of technical monitoring and verification reports. While synergies can be achieved through coordinated site visits and shared administrative arrangements, the verification of energy-efficiency improvements, manufacturing records and achievement of agreed performance targets was specific to each product line rather than solely to the enterprise. Consequently, enterprises manufacturing multiple equipment categories require additional technical verification relative to an enterprise that manufactures a single equipment category. While reporting efforts may not be fully covered by monitoring activities undertaken under other projects, UNIDO recognized that cost rationalization and potential synergies with monitoring and reporting under ongoing projects was possible. Accordingly, and without setting a precedent, it was agreed to allocate US $90,000 for monitoring, verification and reporting, noting also that there may be a

[20] Nigeria's 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), approved at the 93rd meeting (decision 93/85).

need to ensure appropriate coordination between the enterprises, SON, and other stakeholders, particularly in view of the expected changes in MEPS.

Cost of the project as agreed

53. The agreed cost of the project to enhance the energy efficiency of domestic refrigerators, chest freezers and residential air conditioners manufactured by five enterprises in the context of HFC phase-down in Nigeria amounts to US $4,507,752, as shown in table 15.

Table 15. Summary of activities and costs of the project, as agreed (US $)

Project component	Costs (US $)	
	As submitted	As agreed
Additional capital costs	3,060,000	1,382,399
Additional component incentive	2,808,216	3,035,353
Institutional support	250,000	0
Monitoring, verification and reporting	250,000	90,000
Total	**6,368,216**	**4,507,752**

Energy-efficiency enhancements and estimated savings

54. Based on the baseline energy consumption per model, target energy efficiency, and number of units of each model manufactured by the enterprises [21] the cumulative energy savings amount to 298.36 million kWh/year, resulting in a cost-effectiveness of US $0.015/kWh/year for the project. At an average electricity price of US $0.04/kWh in Nigeria, the project would result in annual savings to Nigerian consumers of approximately US $11.93 million.

Sustainability, replicability and assessment of risks

55. The implementation and enforcement of MEPS, which is critical to ensuring the sustainability of the project, has been a challenge for the country, as reflected in the voluntary implementation of MEPS that were finalized for domestic refrigerators and freezers in 2017 and for residential air conditioners in 2024. Activities supported by the Multilateral Fund as well as those funded outside the Fund have strengthened the country's capacity to implement and enforce MEPS, enabling the Government to commit to their implementation and enforcement by 1 January 2027. Funding under the project would not be transferred to UNIDO until that was the case.

56. The sustainability of the energy efficiency gains for domestic refrigerators and chest freezers will further be sustained by the commitment of the Government to upgrade the MEPS for domestic refrigerators and chest freezers to at least the 2019 U4E model regulations for refrigerating appliances, applied to chest freezers with the corresponding freezer values; the enforcement mechanisms being put in place through the SON's mandatory energy labelling regulations, the upgraded SON laboratory, the market surveillance mechanism and the cooperation with NCS, all supported under the previously funded decision 91/65 project; and given that the project ensures that, weighted by 2025 manufacturing volume, 92 per cent of the refrigerators and 96 per cent of the chest freezers covered by the project will meet or exceed the U4E model regulations at their target efficiency, so the upgraded MEPS would be set at a level that the national industry can meet. The Government, through UNIDO, will submit to the last meeting of each year an update on the status of its revision to the MEPS for domestic refrigerators, chest freezers and air conditioners until the MEPS achieve at least the levels specified in paragraph 31(d) of the present document. The Secretariat further notes that UNIDO had confirmed that the upgrading of the MEPS will not be conditional on the agreement of individual manufacturers.

[21] Information considered confidential.

57. The enterprises participating in this project are committed to manufacturing equipment with improved energy performance with the incentive support provided through this project, thereby making their products more attractive to consumers and ensuring the sustainability of the HFC phase-down. Only one local manufacturer (Fouani) was not participating in the project, and one enterprise (Sacral) had withdrawn its chest freezer manufacturing line from the project. UNIDO confirmed that the country's MEPS will apply to all equipment placed on the Nigerian market, whether locally manufactured or imported, and that enterprises with lines not participating in the project will have to meet the MEPS with their own resources. While the target energy efficiency of equipment manufactured by Somotex is limited, the enterprise will provide the NOU periodic implementation reports on progress towards meeting the project targets, including MEPS, for domestic refrigerators and chest freezers. Moreover, the Government committed to prohibit the manufacture and sale of models manufactured by the enterprise that do not achieve the agreed energy efficiency targets, which will be backed by factory inspection and market surveillance by SON, and UNIDO would provide periodic reports to the Executive Committee on the matter.

58. In addition to the present project, the following projects supported by the Multilateral Fund were being implemented in the country: the fourth and final tranche of stage II of the HPMP (to be completed by December 2027), the second and final tranche of stage III of the HPMP (to be completed by December 2027), the first tranche of stage IV of the HPMP (with the stage to be completed by December 2031), the first and second tranche of the updated stage I of the KIP (with the stage to be completed by December 2031), the pilot project to maintain and/or enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (to be completed by 30 June 2027), and the project for the national inventory of banks of waste controlled substances and development of a national plan for management of these substances (to be completed by June 2027). The Secretariat and UNIDO had detailed discussions of the capacity of the country to implement the project in view of the breadth of activities being undertaken with the support of the Multilateral Fund, as well as activities related to energy efficiency supported by funding sources outside the Multilateral Fund.

59. UNIDO emphasized that the NOU has a fully functional unit within Nigeria's Federal Ministry of Environment. In addition, UNDP and UNIDO have separate PMU staff who support the NOU on a day-to-day basis, while UNEP provides additional support for specific activities. Consultants and experts are also engaged, as needed, to support particular activities. UNIDO further noted that several projects are nearing completion, with remaining activities largely limited to equipment deliveries and training. Funding provided under the present project for monitoring, reporting and verification can both help ensure the implementation of the present project and coordination with other activities being undertaken in the country.

RECOMMENDATION

60. The Executive Committee may wish to consider approving the project to enhance the energy efficiency of domestic refrigerators, chest freezers and residential air conditioners manufactured by five enterprises in the context of HFC phase-down in Nigeria, in the amount of US $4,507,752, plus agency support costs of US $315,543, for UNIDO, [on the understanding that the Treasurer would transfer the approved funding to UNIDO upon confirmation by UNIDO to the Secretariat that the updated minimum energy performance standards (MEPS) NIS 942-1:2026 and NIS 943:2024 are in force and being enforced, which is expected by 1 January 2027], and noting:

(a) The commitment of the Government of Nigeria:

(i) In line with paragraph 37 of document UNEP/OzL.Pro/ExCom/94/61, to ensure that the enterprises would manufacture equipment, after project completion, with at least the target energy efficiency performance, and would make their best efforts to continue to improve the energy efficiency of those products beyond the project duration at their own cost;

(ii) In line with paragraph 38 of document UNEP/OzL.Pro/ExCom/94/61, to ensure the periodic upgrading of minimum energy performance standards (MEPS), labelling programmes and awareness and outreach activities to ensure that the target energy-efficiency levels under the project for the equipment were publicized among different stakeholders;

(iii) To implement and make best efforts to enforce the following MEPS:

a. For residential air-conditioning, by 1 January 2030, as shown in the table below:

Product category	Capacity range (kW)	MEPS	
		EER	NSEER
All types, excluding single and double duct	Below 4.5	-	4.50
	Between 4.5 and 9.5	-	4.30
	Between 9.5 and 20.0	-	3.90
Single and double duct (portable and wall-mounted)	Below 20.0	3.00	-

b. For domestic refrigerators and chest freezers, by 1 January 2030, at least the 2019 United for Efficiency model regulations for refrigerating appliances, applied to chest freezers with the corresponding freezer values;

(iv) That the upgrading and implementation of the MEPS noted in subparagraph (a)(iii) above will not be conditional on the agreement of individual manufacturers;

(v) To ensure that the enterprises provide the necessary counterpart financing to implement the projects;

(vi) To ensure timely implementation of both stage I of the Kigali HFC implementation plan and the projects to improve energy efficiency of domestic refrigerators, chest freezers and air conditioners funded by the Multilateral Fund, in accordance with agreed timelines, policies, and regulatory frameworks;

(b) That no funding would be provided to Sacral Industries Ltd. and Somotex Nigeria Ltd. (Somotex) until UNIDO had confirmed to the Secretariat that the enterprises had ceased manufacturing air conditioners with R-410A;

(c) With regard to the enterprise Somotex:

(i) That, in line with decision 97/32, the enterprise will provide the national ozone unit periodic implementation reports on progress towards meeting the project targets, including the applicable MEPS, for domestic refrigerators and chest freezers;

(ii) The commitment of the Government of Nigeria to ban the manufacture and sale of models manufactured by the enterprise that do not achieve the agreed energy efficiency targets;

(iii) That UNIDO would provide periodic reports to the Executive Committee on the matter;

(d) That the provision of additional capital costs to manufacturers using complete-knock-down (CKD) or semi-knock-down (SKD) kits is without prejudice to any decision that the Executive Committee might take on the matter;

(e) That the project would be operationally completed no later than December 2029, and that a detailed project report, including information on the additional capital and component costs incurred for the models covered in the project, including the price of the baseline and target SKD or CKD kits, the energy efficiency gains accrued, and challenges faced while implementing the project, would be submitted to the Executive Committee within six months of the date of completion of the project;

(f) That, after the submission of the report referred to in subparagraph (e) above, the Government of Nigeria, through UNIDO, will submit to the last meeting of each year an update on the status of its revision to the MEPS for domestic refrigerators, chest freezers and air conditioners until the MEPS achieve at least the levels specified in subparagraph (a)(iii) above; and

(g) That should Nigeria not comply with the conditions specified in subparagraphs (a)(ii) and (a)(iii) above, the Executive Committee would take that into account when considering future projects submitted by Nigeria not related to compliance.

Annex I

METHODOLOGY TO CALCULATE ADDITIONAL COMPONENT COSTS

Domestic refrigerators

1. UNIDO provided detailed information for each model of domestic refrigerator and chest freezer manufactured by the five enterprises, including (by model) the number of units sold between 2022 and 2025; volume (in litres); refrigerant and refrigerant charge; and the baseline and target energy consumption (in kWh/year). The information provided by UNIDO is considered confidential and is available upon request by Executive Committee members on the understanding that the information will not be shared and will only be used to evaluate the project.

2. The Secretariat used the information provided by UNIDO to calculate the eligible additional component costs following the methodology described in table 2 of document UNEP/OzL.Pro/ExCom/94/61. The present annex provides further explanation of the methodology and presents the calculations for two models of domestic refrigerators; for reasons of confidentiality, no information is provided on which enterprise manufactured the models, nor the quantity of each model manufactured.

3. Table 2 of document UNEP/OzL.Pro/ExCom/94/61 specifies three levels (E-low, E-medium, and E-high) based on which additional component cost per unit is provided (US $0/unit, US $15/unit, and US $20/unit, respectively), noting that the eligible additional component cost per unit is determined by the baseline and target energy performance of the model, as described in paragraph 28 and the associated graphs of that document. The levels of E-low, E-medium, and E-high were determined based on the 2019 United for Efficiency (U4E) model regulations as follows:

(a) For each model, based on the methodology explained in the 2019 U4E model regulations for domestic refrigerators,[1] the value for the maximum annual energy consumption (AEC_{Max}) was calculated according to the following equation: $AEC_{Max} = 0.230 \times AV + 167.4$, where AV is the adjusted volume and is calculated according to $AV = \sum_{i=1}^{n}(V_i \times K_i \times F_i)$ and Vi is the volume in the ith compartment, K_i is the volume adjustment factor, and F_i is 1.1 for frost-free frozen food compartments and 1.0 otherwise;

(b) AEC_{Max}, which is in kWh/yr, was adjusted to kWh/yr/litre by dividing by the capacity of the equipment (in litres); and

(c) This maximum value was used as E-low, with E-medium and E-high adjusted to 0.795 and 0.59 respectively of that value. For example, for a domestic refrigerator-freezer with an adjusted volume of 330.21 litres and a capacity of 220 liters, AEC_{Max} is equal to 243.3 kWh/year, resulting in E-low, E-medium, and E-high of 1.106, 0.879, and 0.652 kWh/yr/litre. This methodology was applied to each of the models of domestic refrigerators manufactured, noting that if the baseline energy performance did not meet the minimum energy performance standards (MEPS) specified in NIS 942:2017 or the target energy performance did not meet the U4E model regulation, no incentive was provided.

4. Two illustrative examples for the calculation of the eligible additional component incentive for domestic refrigerators are given in table 1.

[1] https://united4efficiency.org/wp-content/uploads/2019/11/U4E_Refrigerators_Model-Regulation_20191029.pdf

Table 1. Examples for the calculation of the eligible additional component incentive for domestic refrigerators

Particulars	Unit	Reference	Model A	Model B
Adjusted volume	Litre	-	330.21	316.70
Capacity	Litre	-	220	211
Baseline energy consumption	kWh/year/litre	A1	1.091	1.464
Target energy consumption	kWh/year/litre	A2	0.582	1.024
E-low	kWh/year/litre	A3	1.106	1.138
E-medium	kWh/year/litre	A4	0.879	0.905
E-high	kWh/year/litre	A5	0.652	0.672
Additional component cost	US $/unit	A*	19.01	7.34
Eligible additional component incentive	US $/unit	B=A*/3	6.34	2.45

Chest freezers

5. The same methodology explained above for domestic refrigerators was used for chest freezers, noting that for chest freezers AEC_{Max} = 0.438 x V + 196.83, where AEC_{Max} is in kWh/yr and is converted to kWh/yr/litre by dividing by the capacity (V) of the equipment (in litres). This maximum value was used as E-low, with E-medium and E-high adjusted to 0.775 and 0.55 respectively of that value. For example, for a chest freezer with a capacity of 100 litres, AEC_{Max} is equal to 240.6 kWh/year, resulting in E-low, E-medium, and E-high of 2.406, 1.865, and 1.323 kWh/yr/litre. This methodology was applied to each of the models of chest freezer manufactured, noting that if the baseline energy performance did not meet the MEPS specified in NIS 942:2017 or the target energy performance did not meet the U4E model regulation, no incentive was provided.

6. Two illustrative examples for the calculation of the eligible additional component incentive for chest freezers are given in table 2.

Table 2. Examples for the calculation of the eligible additional component incentive for chest freezers

Particulars	Unit	Reference	Model A	Model B
Capacity	Litre	-	100	600
Baseline energy consumption	kWh/year/litre	A1	1.960	0.813
Target energy consumption	kWh/year/litre	A2	1.820	0.562
E-low	kWh/year/litre	A3	2.406	0.766
E-medium	kWh/year/litre	A4	1.865	0.594
E-high	kWh/year/litre	A5	1.323	0.421
Additional component cost	US $/unit	A*	3.05	15.92
Eligible additional component incentive	US $/unit	B=A*/3	1.02	5.31

Residential air conditioners

7. UNIDO provided detailed information for each air conditioner model manufactured by the five enterprises, including (by model) the number of units sold between 2022 and 2025; capacity (in kW); the baseline energy performance (coefficient of performance, COP) and the target energy performance (Nigeria seasonal energy efficiency ratio, NSEER); the current MEPS (i.e., NIS 943:2017, measured as COP), the MEPS that will be enforced by 1 January 2027 (i.e., NIS 943:2024, measured as NSEER) and future MEPS, which are expected to be enforced by 1 January 2030 (measured as NSEER). The information provided by UNIDO is considered confidential and is available upon request by Executive Committee members on the understanding that the information will not be shared and will only be used to evaluate the project.

8. The methodology described in document UNEP/OzL.Pro/ExCom/94/61 to calculate the additional component costs assumes the baseline energy performance, target energy performance and MEPS are measured using the same metric. Because the baseline energy performance was measured as a COP and the upgraded MEPS that will enter into force by 1 January 2027 are measured in NSEER, as is the target energy performance, the methodology was modified as follows:

(a) The additional component cost is the difference between the cost at the target performance (*Funding level*$_{model\text{-}target}$) and the cost at the baseline performance (*Funding level*$_{model\text{-}baseline}$) for each model;

(b) The target additional component cost was calculated based on the target energy performance measured as a NSEER ($NSEER_{target}$), relative to the MEPS that will enter into force by 1 January 2027 (denoted as $NSEER_{MEPS}$ below and specified in NIS 943:2024), noting that no funding was provided for any model that did not meet the MEPS expected to enter into force by 1 January 2030 ($NSEER_{MEPS2030}$);

(c) The baseline additional component cost was calculated based on the baseline energy performance ($COP_{baseline}$) relative to the MEPS specified in NIS 943:2017 that is provided as a COP (COP_{MEPS}), noting that there were no models that did not meet the 2017 MEPS; and

(d) The additional component incentive ($C_{e,model}$) is the difference between (b) and (c) above, adjusted for capacity (relative to 1.5 TR) and divided by three, in line with the operational framework on energy efficiency.

9. Accordingly:

$$C_{e,model} = \left(Funding\ Level_{model-target} - Funding\ level_{model-baseline}\right) \times \frac{Model\ Capacity(TR)}{1.5\ TR} /3$$

This equation ensures that the funding level requirement of the target is evaluated relative to the target MEPS criteria (NSEER) and the funding level requirement of the baseline is based on the baseline MEPS criteria (COP). For example, if the baseline is higher than COP_{MEPS}, the enterprise already has some capability above the MEPS, the value of which is deducted so that only the improvement beyond that existing capability is funded.

10. The funding level is calculated as follows:

$$Funding\ Level_{model-target} = \begin{cases} if\ 1.0 < \dfrac{NSEER_{target}}{NSEER_{MEPS}} \leq 1.5, Funding\ Level_{model-target} = \dfrac{\dfrac{NSEER_{target}}{NSEER_{MEPS}} - 1}{1.5 - 1} \times 34 \\ if\ 1.5 < \dfrac{NSEER_{target}}{NSEER_{MEPS}}, Funding\ Level_{model-target} = Min\left(45, \dfrac{\dfrac{NSEER_{target}}{NSEER_{MEPS}} - 1.5}{2.0 - 1.5} \times (45 - 34) + 34\right) \end{cases}$$

$$Funding\ Level_{model-baseline}$$
$$= \begin{cases} if\ 1.0 < \dfrac{COP_{baseline}}{COP_{MEPS}} \leq 1.5, Funding\ Level_{model-baseline} = \dfrac{\dfrac{COP_{baseline}}{COP_{MEPS}} - 1}{1.5 - 1} \times 34 \\ if\ 1.5 < \dfrac{COP_{baseline}}{COP_{MEPS}}, Funding\ Level_{model-baseline} = Min\left(45, \dfrac{\dfrac{COP_{baseline}}{COP_{MEPS}} - 1.5}{2.0 - 1.5} \times (45 - 34) + 34\right) \end{cases}$$

11. Two illustrative examples for the calculation of the eligible additional component incentive for residential air conditioners are given in table 3.

Table 3. Examples for the calculation of the eligible additional component incentive for residential air conditioners

Particulars	Unit	Model A*	Model B**
Capacity	TR	0.75	0.75
Baseline energy performance	COP	2.8	2.9
2017 MEPS	COP	2.8	2.8
Target energy performance	NSEER	4.6	4.8
2024 MEPS	NSEER	3.1*	4.0**
$Funding\ level_{model\text{-}baseline}$	US $/unit	0.00	2.43
$Funding\ level_{model\text{-}target}$	US $/unit	32.90	13.60
Eligible additional component incentive ($C_{e,model}$)	US $/unit	5.48	1.86

* Fixed-speed model, where NIS 943:2024 specifies $NSEER_{MEPS}$ is 3.1
** Inverter model, where NIS 943:2024 specifies $NSEER_{MEPS}$ is 4.0