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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Ninety-seventh Meeting
Montreal, 1-5 December 2025
Item 9(d) of the provisional agenda[1]

PROJECT PROPOSALS: MOROCCO

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

Energy efficiency

• Pilot project to enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities)	UNIDO	Individual consideration
• Pilot project to enhance energy efficiency in the domestic refrigeration manufacturing sector in the context of HFC phase-down	UNIDO	Individual consideration

[1] UNEP/OzL.Pro/ExCom/97/1

PROJECT EVALUATION SHEET – NON-MULTI-YEAR PROJECT

Morocco

PROJECT TITLE	BILATERAL/IMPLEMENTING AGENCY
Pilot project to enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities)	UNIDO

PROJECT OBJECTIVE

The project aims to create an enabling environment for the uptake of energy-efficient refrigeration and air-conditioning (RAC) equipment in Morocco through effective enforcement of the minimum energy performance standards (MEPS) amongst all relevant stakeholders, support the national testing laboratory, study the needs of upgrading MEPS, and offer necessary training and outreach activities.

NATIONAL COORDINATING AGENCY	National Ozone Unit, Ministry of Energy, Mines, Water and Environment

LATEST ARTICLE 7 DATA (Annex F)	**Year:** 2024	1,198.91 metric tonnes (mt)	2,645,559 CO_2-eq tonnes

Particular	Non-investment activities
HFC used by the servicing sector (2024 country programme data)	1,067.53 mt
	2,457,036 CO_2-eq tonnes
Project duration (months):	36
Initial amount requested (US $):	347,600
Final project costs (US $):	266,000
Requested grant (US $):	266,000
Implementing agency support cost (US $):	18,620
Total cost of project to Multilateral Fund (US $):	284,620
Co-financing (US $):	n/a
Energy-efficiency savings (kWh/year):	n/a
Status of counterpart funding (Y/N):	N
Project monitoring milestones included (Y/N):	Y
Minimum energy performance standards (MEPS) available for the relevant sector (Y/N):	Y

SECRETARIAT'S RECOMMENDATION	Individual consideration

PROJECT DESCRIPTION

Background

1. On behalf of the Government of Morocco, UNIDO has submitted, in line with decision 91/65, a request for a pilot project to enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities), in the amount of US $347,600, plus agency support costs of US $24,332, as originally submitted.[2]

Energy-efficiency pilot project

2. Morocco ratified the Kigali Amendment on 22 April 2022, with tariff codes fully applied to HFCs as of January 2024. Under stage I of the Kigali HFC implementation plan (KIP) approved at the 96th meeting,[3] the country has committed to reducing HFC consumption by 30 per cent by 2030. Morocco also established an operational licensing and quota system for HFCs through Order of the Minister of Industry and Trade No. 2367-22.

Policy, regulatory and institutional framework

3. Morocco published the first minimum energy performance standard (MEPS) for domestic refrigerators and air-conditioning (AC) equipment in September 2024, which will come into force in September 2025. The implementation of this standard is expected to be the starting point in the reduction of energy consumption related to refrigeration and air-conditioning (RAC) equipment and systems.

4. The national ozone unit (NOU) under the Ministry of Energy, Mines, Water and Environment will coordinate with other public entities on the implementation of the project, including the Moroccan Agency for Energy Efficiency (AMEE), and the National Office for Professional Training and the Promotion of Work (OFPPT). Representatives from the private sector, like the Moroccan Association of Refrigeration Professionals (AMPF), the manufacturers and importers of RAC equipment for the domestic and small commercial sectors, the importers of controlled substances, and relevant end users in the commercial and industrial sectors will also be involved in this long-term strategy.

HFC consumption and sector background

5. The HFC consumption baseline for Morocco has been established at 2,134,520 CO_2-equivalent (CO_2-eq) tonnes. The 2020-2024 HFC consumption is shown in table 1.

Table 1. Consumption of HFCs in Morocco (2020–2024 Article 7 data)

HFC consumption	2020	2021	2022	2023	2024
Mt	879.5	769.13	387.17	2,495.26	1,198.91
CO_2-eq tonnes	1,687,148	1,475,421	590,302	6,270,836	2,645,559

6. The country had submitted a request to revise its HFC consumption for the baseline years to the Ozone Secretariat which was considered by the 75th meeting of the Implementation Committee for the Montreal Protocol. The revision resulted in changing the HFC baseline data for 2020, 2021 and 2022, to 2,602,515 CO_2-eq tonnes, 1,648,604 CO2-eq tonnes and 2,169,487CO_2-eq tonnes, respectively.[4]

[2] As per the letter of 25 July 2025 from the Ministry of Industry and Trade of Morocco to UNIDO.
[3] Decision 96/43
[4] The 37th Meeting of the Parties approved the revision request (document UNEP/OzL.Pro.37/L.2).

Project objectives

7. During the preparation of the KIP, the Government of Morocco and UNIDO developed a study on the energy consumption of RAC equipment and systems in the country. The study shows that in 2023, the energy consumption of RAC systems reached 13,864 GWh, representing approximately 31.5 per cent of national electricity consumption (43,950 GWh); domestic refrigeration and commercial AC constitute the main consumption items, with 27 per cent and 24 per cent, respectively, of total RAC electricity consumption.

8. The study concluded with three main action items to reduce energy consumption in the RAC sector: well-sized and optimized installations for best performance; promotion of high energy-efficient equipment; and best operation and service practices by end users and servicing sector. The report also concluded that potential reductions of energy consumption (in kWh) and emissions (in CO_2-eq tonnes) in RAC services can reach 16,242 GWh compared to 20,823 GWh between the years 2025 to 2045 and 11,909,443 CO_2-eq tonnes compared to 15,286,516 CO_2-eq tonnes for the same period.

9. The pilot project is designed in line with the outcomes of the above-mentioned study and will mainly focus on activities supporting the enforcement of MEPS among all relevant stakeholders including government enforcement authorities, industry, RAC service providers (installers, suppliers, contractors, etc.), RAC technicians, operators and end users, and the public sector. In addition, the project will provide support to local energy efficiency testing centre. This overarching approach aims to create an enabling environment for the uptake of energy-efficient RAC equipment in Morocco.

Proposed activities

10. Activities with their cost breakdown (as initially submitted) are described below:

(a) *MEPS planning and regulatory alignment (US $58,500)*: (i) Train 50 customs officers on the application of MEPS to the imported domestic RAC equipment (US 19,500); (ii) train 70 government inspection officers on MEPS and related codes, standards, and regulations applied to domestic RAC equipment (US $29,000); (iii) conduct a study on the relevance and possibilities to develop and implement new MEPS related to the commercial RAC sector (US $10,000);

(b) *Capacity-building in RAC sector (US $147,000)*: (i) Update training manuals of the professional training programme and the certification system to integrate good practices in energy efficiency of RAC systems in collaboration with OFPPT and AMPF (US $15,000); (ii) train 100 trainers of the OFPPT and 400 RAC technicians on good practices including design and selection of energy-efficient equipment, preventative maintenance, monitoring and automatization, heat recovery, and optimization of parameters including inter alia temperature, refrigerant charge, and functioning time (US $110,000); (iii) in collaboration with the AMPF, conduct training sessions for 50 companies (up to 100 trainees) designing and installing large RAC systems, mainly used in the commercial and industrial sectors, on the application of related standards like building codes, general technical measures and parameters that can have an impact on the energy performance of the systems (US $22,000);

(c) *Testing infrastructure (US $50,000)*: (i) Conduct technical assessment of the public accredited laboratory (US $10,000); (ii) upgrade equipment to allow for measurement and testing with flammable refrigerants, including items like fire detectors, fire extinguishers, anti-spark switches, emergency exit and creation of a muster point, and other related equipment and measures to allow the laboratory to operate safely and meet the required new testing standards (US $30,000); (iii) train personnel on safe operations of the

calorimetric laboratories (US $5,000); (iv) conduct a study tour for two representatives to a reference laboratory in Europe (US $5,000);

(d) *Awareness-raising and outreach (US $60,500)*: (i) Organization of three energy efficiency events targeting 200 representatives of end users of large RAC systems in the commercial and industrial sectors, and production and distribution of 1,000 brochures and other similar materials among the participants (US $37,500); (ii) organization of two awareness events for importers and distributors of domestic and small commercial RAC equipment and production and distribution of 500 brochures for distributors of RAC equipment that can distribute this material to end users (US $23,000); and

(e) *Project management, monitoring and reporting (US $31,600)*: In collaboration between UNIDO and the NOU, costs include recruiting a project consultant to coordinate the activities, monitor implementation, produce progress reports and a final summary report on the results of the pilot project (US $22,000), travel (US $6,000) and operational costs (US $3,600).

Total cost of the pilot project

11. The project is expected to be completed in 36 months after approval, between January 2026 and December 2028, for a total cost of US $347,600, as initially submitted.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

12. The Secretariat has reviewed the project proposal in light of the activities and criteria described under decisions 89/6 and 91/65 as well as those being implemented under stage I of the KIP.

Eligibility under decision 91/65

13. In line with decision 91/65(b)(iv), confirmation has been obtained from the Government of Morocco that if the country has mobilized or were 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 information on project progress, results and key learning will be made available, as appropriate; and that the date of completion of the project would be set as no more than 36 months after the date of approval by the Executive Committee and that 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

14. The Secretariat inquired about the capacities and level of energy efficiency established by the national MEPS. UNIDO provided a detailed update showing that the national MEPS are covering air-to-air equipment with a capacity of up to 12 kW where EER[5] is applied to portable AC equipment, while SEER[6] is applied to all other types of AC equipment reaching levels of 2.6 for the portable equipment and up to 4.6 for other types over a two-stage implementation plan. The national MEPS also covers domestic refrigeration with capacities ranging from 10 to 1,500 litres but using the minimum energy efficiency index

[5] Energy Efficiency Ratio
[6] Seasonal Energy Efficiency Ratio

(EEI) as a measuring reference moving from less than 55 EEI in the first year of implementation to less than 42 EEI by the third year.

15. The Secretariat also inquired whether the established MEPS are supported by a labelling programme and how the Government of Morocco intends to ensure their enforcement. UNIDO responded that labelling of electrical products and household appliances was established in 2012 by standard NM 14.2.300, revised in 2018 and accompanied by specific standards 14.2.301 and 14.2.302 to operationalize the labelling of refrigerators and air conditioners, respectively. The MEPS entered into force in March 2025 where manufacturers, importers and distributors should only place into local market RAC equipment that comply with the MEPS. The Ministry of Industry and Trade and the Ministry of Energy Transition and Sustainable Development are cooperating and coordinating in the implementation of the MEPS. The Government is also planning, by 2026, to start updating the green procurement policy to integrate MEPS in the public procurement procedures.

16. Regarding the Government's plan to address MEPS for large-sized RAC systems noting their significant HFC consumption, UNIDO explained that the commercial and industrial RAC systems represent a smaller share of the total energy consumption.[7] However, the planned study for updating MEPS will explore how support can be provided to designers, installers and owners of large RAC systems to maximize energy efficiency during selection of equipment, installation, and operation.

Relationship to HFC phase-down and the Kigali HFC implementation plan

17. The Secretariat inquired about the relationship of the objectives and components of this project and those of the KIP, and the outcomes of the national study on energy consumption in RAC equipment and systems. UNIDO explained that the pilot project will be implemented in coordination with the activities under stage I of the KIP. In relation to the training activities, whether for customs and inspection officers or for the RAC sector, the training will be conducted in a complementary approach through addressing the MEPS, codes, and best practices within the training manuals and the professional training and certification programmes for RAC trainers and technicians. Based on the consultation during project preparation, the trainings under the KIP and the energy efficiency pilot project would need to be organized separately and cannot be merged due to the rich content of each and the limitation in organizing lengthy training sessions.

18. UNIDO further clarified that the import control of RAC equipment that respect Moroccan MEPS will reinforce the goals of the KIP investment component (conversion at MANAR).[8] The study on the evaluation of new MEPS will address a larger variety of products, especially in the commercial RAC sector, which is currently not covered within the local MEPS. This would facilitate the update and adoption of codes and standards for RAC equipment and systems, including safety standards.

19. Training for designers and installers of large RAC systems will set the groundwork for the training workshops for installers of large RAC systems on low-global-warming-potential (GWP) alternatives to HFCs in the relevant sectors, to be organized under the KIP.

20. Upon the Secretariat's request, UNIDO developed an overarching summary table of the pilot project activities with expected outcomes, target groups and the linkage to stage I of the KIP, as related to the three main action items identified in the national energy consumption study in Morocco. This table is included in annex I to the present document.

[7] As per the study on the energy consumption of RAC equipment and systems in Morocco, developed during KIP preparation.

[8] Conversion of enterprise, MANAR, to move from HFC-134a to R-600a in domestic refrigeration manufacturing (decision 95/68).

Technical and cost related issues

21. Regarding the component on support to the laboratory for testing of RAC equipment with flammable refrigerants, while the Secretariat acknowledges the merit to the component, it is not eligible under decision 91/65, as upgrading the laboratory would primarily be used by manufacturers and technology providers and does not constitute a servicing activity pursuant to decision 95/87(d). However, noting the importance of the component to the enforcement of the national MEPS while the country is committed to move to low-GWP alternatives as per stage I of the KIP, it was agreed with UNIDO to discuss this component within the proposal to enhance the energy efficiency in the domestic refrigeration manufacturing sector, also submitted to the present meeting, under decision 94/60.

22. Regarding the awareness components, UNIDO explained that it will address two groups of stakeholders: (i) manufacturers, importers and distributors of domestic RAC equipment covered by MEPS to support the uptake of energy-efficient equipment and implementation of MEPS and to promote energy-efficient technologies; and (ii) end users, operators and servicing sector where large RAC systems are used and no MEPS are yet in place, particularly the commercial and industrial sectors. The awareness campaign will include the development of informational materials as well as the organization of workshops and special sessions to reach out to public.

Monitoring

23. The Secretariat enquired how the project will be monitored within the coordination and management component, and what indicators are set to measure the effectiveness of implementation. UNIDO explained that the NOU and UNIDO staff with support of an international consultant will monitor the project in cooperation and support of other entities like the AMEE, the Moroccan Standardization Institute (IMANOR), the OFPPT and the local RAC association. The performance indicators are summarized in table 3 below.

24. The Secretariat also discussed with UNIDO on the cost of this component and explained that this cost should be directly covered by the project management unit of the KIP, noting the similar nature of the pilot project activities to the ones being coordinated under KIP. UNIDO, in consultation with the Government of Morocco, confirmed the removal of this component from the final cost of the project.

Agreed cost of the pilot project

25. The agreed costs to implement the pilot project to enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities) amounts to US $266,000 after removing the support to the testing laboratory and the project management, monitoring and reporting component. Table 3 summarizes the agreed costs and the performance indicators for each activity.

Table 3. Agreed costs and performance indicators

Component	Performance indicators	MLF funding (US $)
Support to national MEPS		
Training 50 customs officers	50 customs officers and inspectors (50 per cent trainers, 20 per cent women) are trained, and MEPS enforcement and control measures are actively implemented.	19,500
Training 70 Government inspection officers	70 market controllers (50 per cent trainers, 20 per cent women) are trained and reinforcement of the control mechanisms on the distribution of RAC equipment in the local market and ensuring their compliance with the current MEPS.	29,000

Component	Performance indicators	MLF funding (US $)
Study for the evaluation of new MEPS	All types of equipment and systems in the commercial refrigeration and air-conditioning sectors are evaluated for the potential application of new MEPS.	10,000
Subtotal		*58,500*
Training of the RAC sector		
Updating training manuals to integrate the topic of energy efficiency	The professional RAC training programme and the certification system officially integrate the topic of energy efficiency in their respective training manuals.	15,000
Training for 100 RAC trainers	100 trainers (20 per cent women) of the OFPPT from different training centres in Morocco are trained	39,000
Training for 400 RAC technicians	400 technicians (20 per cent women) from different regions of Morocco are trained.	71,000
Training for 100 designers and installers of large RAC systems from 50 relevant companies	50 relevant companies from different regions of Morocco participate in the sessions on the application of related standards like building codes, general technical measures and parameters that can have an impact on the energy performance of the systems. Feedback on the needs and challenges for investing in energy efficiency options is collected.	22,000
Subtotal		*147,000*
Awareness-raising		
Awareness workshops and production and distribution of awareness materials for owners of large installations	200 representatives (20 per cent women) of the targeted companies attend the three events; 1,000 brochures are produced and distributed among relevant actors; and targeted owners of the commercial and industrial sectors are aware of the benefits of MEPS-compliant RAC systems, to foster investment in such systems.	37,500
Awareness workshops and production and distribution of awareness materials for manufacturers, importers and distributors of domestic and small commercial RAC	100 representatives (20 per cent women) of the targeted companies attend the two events; 500 brochures are produced and distributed among relevant actors, including distributors of RAC equipment to share this material with end-users; and relevant companies introducing domestic RAC equipment in Morocco are informed on the government strategy about MEPS, to help define their business models and ensure proper application of MEPS.	23,000
Subtotal		*60,500*
GRAND TOTAL		**266,000**

Sustainability, replicability and assessment of risks

26. Regarding the sustainability of the training and outreach activities after the completion of the project, UNIDO informed that the training of customs officers and inspectors that are themselves trainers in their routine internal training schemes will ensure the sustainability of these trainings and will create a pool of qualified trainers.

27. Furthermore, updating the training manuals for the professional training programme and the certification system to integrate the topic of energy efficiency will ensure the sustainability of the training activities for RAC trainers and technicians. The outreach activities will help identify the needs and challenges of end-users, manufacturers, importers and distributors regarding the investment in energy-efficient RAC technologies, which could be used by the Government to explore the possibility of implementing future policies and incentives in this respect.

28. The pilot project includes targeted activities to strengthen the Government's capacity in finalizing laws and regulations related to energy efficiency. It supports the development of new MEPS, the implementation of labelling for specific equipment types, the strengthening of technical training centres to better address energy efficiency considerations in their regular trainings, ensuring that energy efficiency considerations are incorporated in existing technician training programmes, and raising the awareness of the new regulations among relevant stakeholders facilitating their compliance. Other than ensuring sustainability of the project's objectives and outputs as addressed above, no other risks are foreseeable.

RECOMMENDATION

29. The Executive Committee may wish to consider approving the pilot project to enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities), in the amount of US $266,000, plus agency support costs of US $18,620 for UNIDO, noting:

(a) That the Government of Morocco has committed to the conditions referred to in decision 91/65(b)(iv)b to b(iv)d.; and

(b) That the project would be operationally completed no later than 31 December 2028 and a detailed project report would be submitted to the Executive Committee within six months of the date of completion of the project.

PROJECT EVALUATION SHEET – NON-MULTI-YEAR PROJECTS

Morocco

PROJECT TITLE	BILATERAL/IMPLEMENTING AGENCY
Pilot project to enhance energy efficiency in the domestic refrigeration manufacturing sector in the context of HFC phase-down	UNIDO

PROJECT OBJECTIVE

The project is to support MANAR, the only manufacturer of domestic refrigerators and freezer in Morocco, in transitioning to manufacturing energy-efficient refrigeration equipment that meet or exceed Class A++ standards under Morocco's national energy labelling scheme.

NATIONAL CO-ORDINATING AGENCY	Ministry of Industry and Trade

LATEST ARTICLE 7 DATA (Annex F)	**Year:** 2024	1,198.91 mt	2,645,559 CO_2-eq tonnes

Particular	Investment activities
HFC-134a used by the manufacturing of domestic refrigeration (2024 country programme data)	25.65 mt
	36,680 CO_2-eq tonnes
Project duration (months):	36
Initial amount requested (US $):	1,399,911
Final project costs (US $)	1,234,756
Implementing agency support cost (US $):	86,433
Total cost of project to Multilateral Fund (US $):	1,321,189
Energy efficiency savings* (US $/kWh/year):	0.06
Status of counterpart funding (Y/N):	Y
Project monitoring milestones included (Y/N):	N
Minimum energy performance standards available for the relevant sector (Y/N):	Y

* For the first year of the project following project completion. Additional benefits will be accrued each subsequent year, based on the operation of equipment manufactured in that and in subsequent years.

SECRETARIAT'S RECOMMENDATION	Individual consideration

PROJECT DESCRIPTION

Background

30. On behalf of the Government of Morocco, UNIDO has submitted, in line with decision 94/60, a request for a pilot project to enhance the energy efficiency in the domestic refrigeration manufacturing sector in the context of HFC phase-down, in the amount of US $1,399,911, plus agency support costs of US $97,994 as originally submitted.[9]

Energy efficiency pilot project

Policy, regulatory and institutional framework

31. Morocco has developed a robust institutional and regulatory framework to support the phase-out of ozone-depleting substances (ODS) and the transition to low-GWP, energy-efficient technologies. After ratifying the Kigali Amendment, the country launched stage I of the KIP, coordinated by the NOU under the Ministry of Industry and Trade. The KIP aims to phase down HFCs in line with Montreal Protocol commitments while facilitating technology transfer, improving safety standards, and strengthening national capacity.

32. Energy efficiency in domestic refrigeration is governed by the national standard NM 14.2.301, which aligns with EU Directive 94/2/CE and uses the energy efficiency index (EEI) to classify appliances from Class A+++ (most efficient) to Class G (least efficient). Current MEPS set an EEI threshold of <55, which will tighten to <42 (Class A+ or higher) within three years. Compliance is mandatory, supported by labelling requirements and enforced through regular market surveillance. Morocco's testing methodologies are harmonized with international standards such as IEC 62552 and ISO 15502, ensuring accuracy and comparability in performance assessments.

33. The AMEE leads national energy efficiency initiatives, working closely with the Ministry of Industry and Trade, the Customs Authority, and accredited testing laboratories. These institutions collaborate to enforce MEPS, control refrigerant and equipment imports, and verify appliance performance. Effective implementation of the energy efficiency project requires close coordination between the NOU and the Department of Energy Transition, with the NOU overseeing refrigerant conversion activities and reporting, while the Department is responsible for updating MEPS, monitoring compliance, and managing national programmes.

34. To operationalize collaboration, Morocco has established joint technical working groups, periodic stakeholder meetings, and capacity-building programmes for technicians, regulators, and market actors. The Centre of Studies and Research of Metallurgical, Mechanical, Electrical and Electronical Industries, hosting the country's only calorimetric laboratory, plays a key role in testing and verification. Additionally, coordination with the Customs Administration ensures that refrigerant imports and appliance compliance are monitored effectively. Together, these mechanisms ensure that refrigerant transition and energy efficiency improvements are not only achieved at the enterprise level but also integrated into national policies, supporting Morocco's long-term sustainability and climate objectives under the Montreal Protocol and Kigali Amendment.

HFC consumption and sector background

35. The HFC consumption and baseline of Morocco, including the country's request to change the HFC baseline are explained above in paragraphs 5 and 6.

[9] As per the letter of 25 July 2025 from the Ministry of Industry and Trade in Morocco to UNIDO.

Project objective

36. The objective of the project is to support MANAR, the only manufacturer of domestic refrigerators and freezer in Morocco, in transitioning to manufacturing energy-efficient refrigeration equipment that meet or exceed Class A++ standards under Morocco's national energy labelling scheme. This objective will be achieved by enhancing the energy performance of MANAR's products through the integration of advanced technologies, including variable-speed compressors, high-efficiency fan motors, optimized heat exchangers, advanced door gaskets, and vacuum insulation panels (VIPs).

Industry and enterprise background

37. MANAR, is the only manufacturer producing domestic refrigerators and freezers in Morocco that operates in a fully integrated manufacturing facility, handling cabinet assembly, foaming, refrigerant charging, performance testing, and nationwide distribution across the country. The enterprise has two manufacturing lines of domestic refrigerators, that received support from the Multilateral Fund for a conversion project[10] to move from the use of HFC-134a to R-600a. A third line for chest freezers was commissioned and started production in 2024. The annual manufacturing volume shows growth, over the past few years, from 152,761 to 181,987 units of 14 models of domestic refrigerators between 2022 and 2024, while the manufacturing capacity of chest freezers was 6,591 units in 2024.

38. UNIDO provided detailed information for each of the 14 models of the domestic refrigerators including fixed-speed compressors, standard insulation, conventional heat exchangers, mechanical fans, currently manufactured by MANAR, and rated A or B under Morocco's energy labelling scheme. This information 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.

39. MANAR's internal energy testing follows recognized protocols and is carried out in dedicated test chambers. The enterprise is expected to confirm the specific testing standards applied (e.g., IEC 62552 or ISO 15502) and the calibration/certification status of its laboratory equipment. In terms of innovation, MANAR continues to invest in product development, focusing on the integration of advanced energy-efficient components, including variable-speed compressors, upgraded heat exchangers, and vacuum insulation panels.

Proposed activities and costs requested

40. The project involves additional capital and component costs aimed at enhancing energy efficiency across MANAR's two manufacturing lines of domestic refrigerators as follows:

(a) Product design and testing for engineering improvement, including design optimization, prototype development, internal testing, and validation; modification to the manufacturing facility involving the installation of new thermoforming, foaming, and plastic injection molds, as well as the calibration of testing benches and labor for installation; capacity-building and certification, through training workshops, calibration and standards sessions, external energy certification, and staff support; and instrumentation and data tools for process integration and performance verification, by procuring and deploying instrumentation and data tools such as thermocouple kits, data analysis software, calibration equipment, backup meters, and related accessories (US $250,000);

(b) Components including high-efficiency compressors, VIPs, improved gaskets, and control systems for the initial manufacturing volume (US $1,129,911); and

[10] Approved by the Executive Committee at the 95th meeting (decision 95/68).

(c) Technical consultation and oversight throughout the three-year implementation period, as well as continued follow-up and reporting for an additional two years' post-completion period (US $20,000).

41. The planned upgraded models will be designed to go beyond established MEPS of Morocco, which is evolving to reach an EEI threshold of less than 42 within three years. Based on MANAR's internal testing data and international benchmarks for similar capacities of refrigerators and freezers, the average electricity consumption of current baseline models is approximately 336.0 kWh/year. The improved energy-efficient 14 models of refrigerators, included in the project proposal, are expected to reduce annual energy consumption to approximately 226.0 kWh/year, consistent with high-performing refrigerators currently available in the Moroccan market.

42. This results in an estimated electricity saving of 110 kWh/year per unit. Considering the 2024 overall production capacity of 188,569 units the overall annual energy savings is estimated at 20,742,590 kWh/year and using Morocco's national grid emission factor of 0.7 kg CO_2/kWh, the indirect greenhouse gas emission reduction is calculated as 14,520 CO_2-eq tonnes/year.

43. The additional capital cost was calculated based on the annual manufacturing capacity as per table 1 of document UNEP/OzL.Pro/ExCom/94/61, while the additional component cost was calculated based on table 2. The enterprise (MANAR) also provided estimate of the overall actual additional capital and component costs needed for upgrading the energy performance of all models. Summary of baseline and target energy performance as well as capital and additional component costs, as submitted, is included in table 4 below.

Table 4. Baseline, target energy performance, and capital and additional component costs, as submitted

Concept	As submitted
Additional capital costs	
Actual[11]	607,000
Requested	250,000
Additional component costs	
Average additional cost of components (US $/unit) *	35.11
Average baseline performance level (EEI)**	51.9
Baseline EEI/MEPS	1.11
Average target performance level (EEI)***	35
Target EEI/MEPS	0.76
Actual additional component cost (US $/unit)[12]	6,390,492
Requested additional component cost (US $)	1,129,911
Requested incentive (US $)	
Additional capital cost	250,000
Additional component cost	1,129,911
Total	1,379,911

* Based on total manufacturing capacity of 181,978 units of domestic refrigerators

** Average of 14 models of domestic refrigerators

*** The lower the number the more efficient the equipment is when using EEI as an energy performance metric.

[11] Including product design and engineering, manufacturing line modification (molds for thermoforming, foaming, and plastic injection), calibration testing benches, energy loggers and power analyzers, software, tools, calibration, training and labor.

[12] Calculated for high-efficiency compressors, improved heat-exchangers, VIPs, high performance door gaskets, and advanced control systems of 181,978 unit each.

Co-financing

44. MANAR has not yet secured external co-financing for the energy efficiency enhancement or HFC phase-down components of the project, which currently relies entirely on Multilateral Fund support under the KIP. However, the enterprise is actively pursuing complementary financing for broader activities beyond the Multilateral Fund scope. The co-financing part as estimated by the enterprise includes US $357,000 for additional capital cost for energy-performance testing equipment, calibration, certification of the enterprise's laboratory; and US $5,617,581 to cover two-thirds of the additional component cost, internal research and development effort, retooling, and staff time allocation. While no additional funding has been confirmed, MANAR remains committed to mobilizing resources to ensure a successful and sustainable transition to low-GWP, high-efficiency refrigeration manufacturing.

Total cost of the pilot project

45. The project is expected to be completed in 36 months after approval, between January 2026 and December 2028, for a total cost of US $1,399,911, as initially submitted.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Progress in implementing stage I of the KIP

46. In response to the Secretariat's request for an update on the progress of the project for the conversion of two manufacturing lines at MANAR, from HFC-134a to R-600a, UNIDO explained that a contract has been signed with the enterprise for the implementation of the conversion under UNIDO's technical supervision. MANAR has since initiated the procurement process for the required equipment, with the selection of the supplier expected to be finalized by the end of 2025.

Regulatory and policy framework

47. The Secretariat enquired about the operational modality for monitoring the local market in relation to the enforcement of the national standard NM 14.2.301, UNIDO explained that the operational modality of Morocco's market surveillance scheme for enforcing MEPS energy efficiency labelling requirements is implemented by market control officers under the Ministry of Industry and Trade. These controllers are authorized to perform on-site verifications of the products both prior to their distribution and sale as well as those already available on the domestic market, ensuring that they comply with the applicable codes, standards, and mandatory labelling requirements established under the MEPS framework.

Enterprise background

48. Regarding the increase in manufacturing volume for the years 2025-2030 as presented in the project proposal, UNIDO explained that the increase from 2023 to 2024 reflects a return to normal operating levels after temporary disruptions caused by supply-chain disruptions, component shortages, and post-pandemic market recovery effects. The 2024 figure represents a stabilized manufacturing baseline and does not indicate added capacity. MANAR expects to reach annual manufacturing capacity of 195,000 units by 2030, with minor fluctuations in the yearly growth driven by domestic market. The project focuses solely on improving energy performance and reducing energy consumption per unit, without expanding manufacturing.

49. Regarding the expected manufacturing volume of chest freezers in 2025, UNIDO clarified that the Moroccan market was affected by the cancellation of the Eid holiday,[13] which disrupted freezer sales in 2025. As a result, MANAR expects to manufacture up to 10,000 chest freezers on its new manufacturing line that year. The line's full manufacturing capacity is projected to reach 40,000 units.

Technical and cost-related issues

50. The Secretariat confirmed with UNIDO that the project should only address the eligible manufacturing lines for domestic refrigerators and not to include that of the chest freezers which will be manufactured in compliance with the NM 14.2.301 standard.

51. The Secretariat also noted the project proposal included the request of US $250,000 as additional capital cost which is consistent with decision 94/60 and the guidelines included in table 1 of document UNEP/OzL.Pro/ExCom/94/61. However, the requested additional component cost of US $1,129,911 was not in line with the same guidelines. The difference, as discussed with UNIDO, resulted from the way the project calculated the cost through using a weighted average cost across all refrigerator models included in the project. The correct calculation as presented by the Secretariat, and agreed by UNIDO and MANAR, results in a total additional component cost of US $914,756. Furthermore, UNIDO clarified that the additional capital costs include external energy certification, meaning MANAR will need to use an external laboratory to test and certify the energy efficiency of its newly produced refrigerators.

National laboratory for testing RAC equipment

52. In line with decision 95/87(d), the request for funding the upgrade of the national laboratory for testing of RAC equipment with flammable refrigerants was reviewed and is considered ineligible under decision 91/65, as the laboratory is used by the RAC equipment manufacturers and importers which is not a servicing sector activity. However, the Secretariat considers that having a well-functioning laboratory will help Morocco to implement the project submitted under decision 94/60 especially that local industry and the market, are moving towards low-GWP-based equipment which requires the existence of a national independent laboratory capable of validating the energy performance of RAC equipment operating with flammable refrigerants. The requested funding is not to establish a new laboratory, but rather to upgrade the national laboratory to be able to test RAC equipment that operate with flammable refrigerants. Moreover, the laboratory will help the Government ensure that equipment imported into the country meets the country's MEPS and support meaningful periodic market surveillance of the energy efficiency of equipment in the market, which will also help ensure the successful implementation of the project under decision 94/60. The Secretariat, in discussion with UNIDO, agreed that the national laboratory should be examined under this project, understanding its importance to strengthen the enforcement of the implementation of the MEPS and energy labelling scheme in Morocco.

53. The agreed support to a local testing laboratory to strengthen the implementation of the national energy labelling scheme with a total cost of US $50,000 includes (i) conducting technical assessment of the public accredited laboratory (US $10,000); (ii) upgrading equipment to allow for measurement and testing with flammable refrigerants, including items like fire detectors, fire extinguishers, anti-spark switches, emergency exit and creation of a muster point, and other related equipment and measures to allow the laboratory to operate safely and meet the required new testing standards (US $30,000); (iii) training personnel on safe operations of the calorimetric laboratory (US $5,000); and (iv) conducting a study tour for two representatives to a reference laboratory in Europe (US $5,000).

[13] Eid al-Adha in Morocco was cancelled in 2025 due to a severe drought and livestock shortage.

Project monitoring and consultation activities

54. As for the potential overlap between the consultancy services requested for the monitoring, verification, and reporting component of this proposed project and the technical support required for additional capital costs, UNIDO clarified that the two functions have different purposes. Technical services are focused on implementing project activities within a three-years period, while the monitoring and verification component extends for an additional two years, until 2030, to ensure project results are achieved across all stages. While a project management unit established under stage I of the KIP is well-positioned to conduct periodic monitoring and site visits for the same enterprise already funded for conversion, the energy efficiency project demands specialized expertise and additional time beyond the KIP's scope. Consequently, the proposed component is designed specifically to meet the unique monitoring and verification requirements associated exclusively with the energy efficiency activities.

55. The agreed incentive for enhancing energy efficiency in the domestic refrigeration manufacturing sector amounts to US $1,234,756 as detailed in table 5 below:

Table 5: Agreed incentive for enhancing energy efficiency in the domestic refrigeration manufacturing sector (US $)

Source	Costs as submitted (US $)	Agreed costs based on decision 94/60 (US $)
Additional capital cost	250,000	250,000
Additional component cost	1,129,911	914,756
Support to local laboratory for testing of RAC equipment with flammable refrigerants	N/A	50,000*
Project monitoring and verification	20,000	20,000
Total	**1,399,911**	**1,234,756**

* Moved from Morocco's pilot project to enhance energy efficiency under decision 91/65.

56. Based on the baseline energy consumption per model, target energy efficiency, and number of units of each model manufactured by the enterprise,[14] the cumulative energy savings are 20,260,854 kWh/year. Based on the agreed costs of US $1,234,756, this results in a cost-effectiveness of US $0.06/kWh/year.

Co-financing

57. UNIDO indicated that the additional contribution proposed in this project reflects MANAR's planned investment in advanced components, product design improvements, and tooling or laboratory upgrades that exceed the scope of Multilateral Fund-eligible incremental costs. The cost-sharing structure between Multilateral Fund support and MANAR's co-financing is based on the principle that Multilateral Fund funding covers only the minimum incremental costs necessary to achieve the targeted energy-efficiency improvements.

58. UNIDO also explained that the complementary resources are not essential for completing the conversion to energy-efficient, hydrocarbon-based manufacturing lines supported by the Multilateral Fund project. MANAR has confirmed its commitment to fully implement the conversion and meet the agreed energy-efficiency targets using its own resources and the Multilateral Fund funding, even if the additional financing is delayed or only partially secured. Any complementary funding obtained would mainly serve to accelerate the rollout of high-efficiency product models and shorten payback periods, without impacting MANAR's ability or determination to complete the conversion within the approved timeframe. UNIDO also confirmed that MANAR does not export its products and it does not plan to export in the coming years.

[14] Information considered confidential.

Sustainability of the pilot project and assessment of risks

59. In line with decision 94/60 (b)(i), the enterprise (MANAR) has confirmed its commitment to sustain the production of energy-efficient equipment beyond the project duration and will integrate energy efficient components into standard models and pursue further product improvements using its in-house research and development capabilities. The Government of Morocco also committed that the energy labelling scheme will continue to tighten over time, requiring manufacturers to maintain and exceed baseline energy performance standards.

60. The project's sustainability is also ensured through strong alignment with Morocco's national climate goals, industrial modernization plans, and market transformation initiatives. The attractive energy saving and reduction in household energy bills will build up the market demand for high-efficient equipment. Continuous monitoring by the NOU and government agencies will ensure transparency, while MANAR's role as the country's only domestic appliance manufacturer provides a model for replication and broader adoption of energy-efficient technologies not only in the country but in the region as well.

61. Several risks could affect the successful implementation of MANAR's energy efficiency enhancement project, including potential delays in energy efficiency equipment delivery and installation, unforeseen technical integration challenges, insufficient staff training, and possible market resistance to higher product costs. Mitigation measures include working with pre-qualified vendors and incorporating contingency time, conducting detailed engineering assessments and pilot testing, implementing comprehensive training programs covering manufacturing, quality control, and maintenance, and promoting total cost of ownership benefits while leveraging government support for energy efficiency labelling to encourage market acceptance.

Recommendation

62. The Executive Committee may wish to consider approving the pilot project to enhance energy efficiency in the domestic refrigeration manufacturing sector in Morocco in the context of HFC phase down, in the amount of US $1,234,756 plus agency support costs of US $86,433 for UNIDO, noting:

(a) That the agreed funding would be allocated under the funding window established by decision 94/60, including US $50,000, plus agency support costs of US $3,500 for UNIDO, associated with further upgrades to the local laboratory for testing of refrigeration and air-conditioning equipment with flammable refrigerants; and

(b) That the project would be operationally completed no later than December 2028, and a detailed project report would be submitted to the Executive Committee within six months of the date of completion of project.

Annex I

SUMMARY OF THE PILOT PROJECT ACTIVITIES WITH EXPECTED OUTCOMES, TARGET GROUPS AND THE LINKAGE TO STAGE I OF THE KIP, AS RELATED TO THE THREE MAIN ACTION ITEMS IDENTIFIED IN THE NATIONAL ENERGY CONSUMPTION STUDY IN MOROCCO

	Action lines identified in the national energy study		
Activity	**Energy efficient products in local market**	**Optimized and well-sized installation**	**Efficient operation and servicing practices**
Activity 1	**Training for customs officers**		
Expected Outcome	Inefficient technologies imported in Morocco will be better identified by customs officers.	n.a.	n.a.
Target Groups	Customs officers.	n.a.	n.a.
Linkage to KIP	-This activity will be complementary to the training of customs officers on the import control of HFCs under KIP. -The control of imports of RAC equipment that respect Moroccan MEPS will reinforce the goals of the KIP investment component (MANAR's conversion).	n.a.	n.a.
Activity 2	**Training for Government inspection officers**		
Expected Outcome	Inefficient technologies introduced in the Moroccan market will be better identified by market inspectors.	n.a.	n.a.
Target Groups	Market controllers of the Moroccan public administration.	n.a.	n.a.
Linkage to KIP	-This activity will be complementary to the training sessions for 70 inspectors of RAC systems to monitor the correct application of the relevant codes, standards, and regulations related to HFC phased-down. -The control of RAC equipment introduced in the local market based on Moroccan MEPS will reinforce the goals of the KIP investment component (MANAR's conversion).	n.a.	n.a.
Activity 3	**Study for the evaluation of new MEPS**		
Expected Outcome	New MEPS will apply to a larger variety of products introduced in the local market, like those used in the commercial refrigeration and air-conditioning sectors.	New MEPS may have an impact on RAC equipment and systems that require tailored design and installation.	New MEPS will imply the introduction of new technologies that will require particular servicing skills.
Target Groups	Government decision makers.		
Linkage to KIP	This will be complementary to the update and adoption of codes and standards for RAC equipment and systems, including safety standards.		
Activity 4	**Updating training manuals in professional training and in the certification system, to integrate the topic of energy efficiency**		
Expected Outcome	The topic of energy efficient products is duly introduced in the training manuals.	The topic of optimized and well-sized installations is duly introduced in the training manuals.	The topic of operation and servicing practices to enhance energy efficiency is duly

Activity	Action lines identified in the national energy study		
	Energy efficient products in local market	**Optimized and well-sized installation**	**Efficient operation and servicing practices**
			introduced in the training manuals.
Target Groups	Training centres and their students in the domain of refrigeration and air-conditioning; technicians and companies of the RAC servicing sector.		
Linkage to KIP	This activity is complementary to training activities focused on good practices under the HPMP and the KIP, and to the certification system developed under the HPMP and supported by the KIP.		
Activity 5	**Training for RAC trainers**		
Expected Outcome	The topic of energy efficient products is duly transmitted to students of RAC training centres.	The topic of optimized and well-sized installations is duly transmitted to students of RAC training centres.	The topic of operation and servicing practices to enhance energy efficiency is duly transmitted to students of RAC training centres.
Target Groups	Training centres and their students in the domain of refrigeration and air-conditioning.		
Linkage to KIP	This activity is complementary to training activities focused on good practices and other related support provided to training centres under the HPMP and the KIP.		
Activity 6	**Training for RAC technicians**		
Expected Outcome	The knowledge and skills on energy efficient products are duly strengthened amongst RAC technicians.	The knowledge and skills on optimized and well-sized installations are duly strengthened amongst RAC technicians.	The knowledge and skills on operation and servicing practices to enhance energy efficiency are duly strengthened amongst RAC technicians.
Target Groups	Technicians of the RAC servicing sector.		
Linkage to KIP	This activity is complementary to training activities focused on good practices and other related support provided to the RAC servicing sector under the HPMP and the KIP.		
Activity 7	**Training for designers and installers of large RAC systems**		
Expected Outcome	Designers and installers reinforce their knowledge about new energy efficient products for large RAC installations.	Designers and installers reinforce their knowledge about the optimization and appropriate dimensioning of large RAC installations.	Designers and installers better transmit to servicing companies the necessary practices for the correct maintenance of large RAC installations to ensure an optimal energy efficiency of the systems.
Target Groups	Designers and installers of large RAC systems.		
Linkage to KIP	This activity is complementary to the training workshops for installers of large RAC systems on low-GWP alternatives to HFCs in the relevant sectors, to be organized under the KIP.		
Activity 8	**Support to laboratories for correct testing of RAC equipment**		
Expected Outcome	The enforcement of current MEPS for domestic refrigerators and ACequipment is strengthened.	n.a.	n.a.
Target Groups	Accredited calorimetric laboratories for RAC equipment.	n.a.	n.a.
Linkage to KIP	This activity will be complementary to the establishment of a licensing system to control the import of domestic and commercial AC equipment based on their GWP value, included in the KIP. The laboratory	n.a.	n.a.

	Action lines identified in the national energy study		
Activity	**Energy efficient products in local market**	**Optimized and well-sized installation**	**Efficient operation and servicing practices**
	will be prepared to conduct appropriate and complete assessments to new equipment introduced in the local market.		
Activity 9	**Awareness workshops and production and distribution of awareness materials for owners of large installations**		
Expected Outcome	The awareness on energy efficient options is duly raised amongst owners of large installations.	The awareness on the importance of optimized and well-sized installations is duly raised amongst owners of large installations.	The awareness on the importance of efficient operation and servicing practices is duly raised amongst owners of large installations.
Target Groups	Owners of large RAC installations of the commercial and industrial sectors.		
Linkage to KIP	This activity is complementary to the awareness raising activity for end users to be organized under the KIP.		
Activity 10	**Awareness workshops and production and distribution of awareness materials for manufacturers, importers and distributors of domestic and small commercial RAC equipment**		
Expected Outcome	The awareness on energy efficient products is duly raised amongst manufacturers, importers and distributors.	n.a.	n.a.
Target Groups	Manufacturers, importers and distributors of domestic and small commercial RAC equipment.	n.a.	n.a.
Linkage to KIP	-This will be complementary to the establishment of a licensing system to control the import of domestic and commercial AC equipment based on their GWP value. -It can also be considered as complementary to the KIP investment component.	n.a.	n.a.