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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 agenda¹

PROJECT PROPOSAL: BOSNIA AND HERZEGOVINA

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

Energy efficiency

- | | | |
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| <ul style="list-style-type: none">• Pilot project to improve the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities): Improving minimum energy performance standards and two demonstration projects on introducing low-global-warming-potential alternatives for enhancing energy efficiency in small stand-alone equipment used in the commercial refrigeration sector, and on introducing leak detection systems in stationary refrigeration, air-conditioning equipment | UNIDO | Individual
consideration |
|---|-------|-----------------------------|

¹ UNEP/OzL.Pro/ExCom/97/1

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**Bosnia and Herzegovina****PROJECT TITLE****BILATERAL/IMPLEMENTING AGENCY**

Pilot project to improve the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities): Improving minimum energy performance standards (MEPS) and two demonstration projects on introducing low-global-warming-potential (GWP) alternatives for enhancing energy efficiency in small stand-alone equipment used in the commercial refrigeration sector and on introducing leak detection systems in stationary refrigeration, air-conditioning and heat pump (RACHP) equipment.	UNIDO
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PROJECT OBJECTIVE

The pilot project aims to improve MEPS and energy labelling in the refrigeration and air-conditioning sector in Bosnia and Herzegovina and to demonstrate energy efficiency through two pilot projects. The first pilot project aims to test market acceptance of R-290 in small stand-alone equipment within the commercial refrigeration sub-sector, offering an energy efficient alternative to equipment that currently relies mainly on R-404A as a refrigerant. The second pilot project focuses on introducing leak detection systems in stationary RACHP equipment containing 500 CO ₂ -equivalent tonnes or more of HFCs. The objective is to improve the energy efficiency of RACHP equipment through leakage control to maintain appropriate refrigerant levels for optimum equipment efficiency and operational conditions.
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NATIONAL COORDINATING AGENCY	National Ozone Unit, Ministry of Foreign Trade and Economic Relations
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LATEST ARTICLE 7 DATA (Annex F)	Year: 2024	585.64 metric tonnes (mt)	1,081,601 CO ₂ -eq tonnes
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Particular	Non-investment activities
HFC used by the servicing sector (2024 country programme data)	585.64 mt
	1,081,601 CO ₂ -eq tonnes
Project duration (months):	36
Initial amount requested (US \$):	280,000
Final project costs (US \$):	278,000
Requested grant (US \$):	278,000
Implementing agency support cost (US \$):	19,460
Total cost of project to Multilateral Fund (US \$):	297,460
Co-financing (US \$):	n/a
Energy-efficiency savings (kWh/year):	6,480
Status of counterpart funding (Y/N):	Y
Project monitoring milestones included (Y/N):	Y
Minimum energy performance standards (MEPS) available for the relevant sector (Y/N):	Y*

*voluntary

SECRETARIAT'S RECOMMENDATION	Individual consideration
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PROJECT DESCRIPTION

Background

1. On behalf of the Government of Bosnia and Herzegovina, 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 \$280,000, plus agency support costs of US \$19,600, as originally submitted.²

Energy-efficiency pilot project

2. Bosnia and Herzegovina ratified the Kigali Amendment on 26 May 2021, with HFC quotas allocated to importers 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 10 per cent of its baseline consumption by 2029.

Policy, regulatory and institutional framework

3. The Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina (MoFTER) is the responsible institution for energy efficiency at the state level, and along with the national ozone unit (NOU), as part of the Ministry, it is also responsible for the implementation of Montreal Protocol in Bosnia and Herzegovina. At the entity level, the Ministry of Energy, Mining and Industry of the Federation of Bosnia and Herzegovina and the Ministry of Energy and Mining of the Republika Srpska are the responsible institutions for energy efficiency in their respective entity in Bosnia and Herzegovina.

4. Through the Energy Community Treaty, ratified in 2006, Bosnia and Herzegovina committed to gradually adopting parts of the European Union (EU) legislation by transposing the requirements and rules of relevant EU directives and regulations into its national legislation in the areas of security of supply, competition, environmental protection, energy infrastructure, energy efficiency, and the use of renewable energy sources. The strategic directions for the development of the country's energy sector are based on sustainable development policies that encompass three aspects: security of supply, price competitiveness and energy accessibility, and decarbonization policies.

5. Bosnia and Herzegovina has committed to becoming climate-neutral by 2050. However, renewable energy sources are still more expensive than fossil fuels although rising energy prices are expected to stimulate their greater use. Consumption of electrical energy in the country is significantly higher than the EU average, and it is crucial to focus on removing barriers to ensure unhindered deployment of renewable energy options and maintaining the high performance of energy efficiency.

6. The main institution in the country working on standards is the Institute for Standardization of Bosnia and Herzegovina (ISBIH), whose main role is adopting the EU and international standards (ISO) as national ones. Many of the standards for refrigeration, air-conditioning and heat pump (RACHP) equipment have either been published or adopted as national standards from the related ISO and European standards; however, some standards remain for which the adoption process has not yet been initiated. Although the majority of minimum energy performance standards (MEPS) and energy efficiency standards related to RACHP equipment are published or accepted as national standards by ISBIH, they are not related with the national regulation, and their implementation is on a voluntary basis. There are rulebooks on the labelling of the energy efficiency class for different types of appliances, but further improvement focused on RACHP equipment is required.

² As per the letter of 25 August 2025 from the Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina to UNIDO.

³ Decision 96/37

HFC consumption and sector background

7. The HFC consumption baseline for Bosnia and Herzegovina has been established at the level of 1,066,653 CO₂-equivalent (CO₂-eq) tonnes. Table 1 presents HFC consumption in Bosnia and Herzegovina.

Table 1. Consumption of HFCs in Bosnia and Herzegovina (2020–2024)

HFC consumption	2020	2021	2022	2023	2024
mt	410.99	243.87	566.62	942.22	585.64
CO ₂ -eq tonnes	1,039,114	599,128	1,340,919	1,854,872	1,081,601

8. From the first year of data in 2020, HFC consumption in CO₂-eq tonnes decreased by 42 per cent in 2021 due to the COVID-19 pandemic, increased 124 per cent in 2022 and further increased 38 per cent in 2023. These increases are attributable to postponed projects which commenced in 2023 and stockpiling in anticipation of the 2024 quota established in line with the Montreal Protocol targets. The country anticipates that they will use the stockpile to normalize their consumption. The complete phase-out of HCFCs is scheduled to occur in 2026 and HFCs are used as the main alternative to ODS.

9. HFCs were 100 per cent consumed in the refrigeration and air conditioning (RAC) servicing sector with the exception of HFCs used in the foam manufacturing sector only in 2021, as reported in the country programme (CP) data. In 2023, 264.17mt (674,975 CO₂-eq tonnes) of HFCs were used for commercial refrigeration systems, representing 28 per cent of the total HFC consumption in mt or 36 per cent in CO₂-eq tonnes.

Project objectives

10. The project objective aims to improve MEPS and energy labelling in the RACHP sector in Bosnia and Herzegovina and to demonstrate how to enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down through two pilot projects. The project also aims to strengthen institutional coordination between the NOU as part of MoFTER, and responsible entity-level institutions to facilitate the integration of relevant provisions into Kigali Amendment activities related to energy efficiency in the RACHP sector.

11. The first demonstration project aims to test market acceptance of R-290 as an energy-efficient alternative to R-404A in supermarket plug-in display cabinets and small cooling capacity cold storages (walk-in cold rooms) where monoblock plug-in refrigeration units can be installed in the commercial refrigeration subsector.

12. The second demonstration project focuses on introducing leak detection systems in stationary RACHP equipment containing 500 CO₂-eq tonnes or more of HFCs. The objective is to improve the energy efficiency of RACHP equipment through leakage control to maintain appropriate refrigerant levels for optimum equipment efficiency and operational conditions.

Proposed activities

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

- (a) *Institutional strengthening for the improvement of MEPS and energy efficiency standards including energy labelling for RACHP equipment (UNIDO) (US \$98,000):* Gap analysis of existing national, international, and EU legislation on energy efficiency, detailed report with findings and recommendations for improving existing regulations or adopting new ones, and stakeholder workshops on findings, focusing on RACHP equipment (US \$20,000); study on regional and EU MEPS standards and energy-efficiency labelling

schemes for RACHP equipment (US \$10,000); preparation and organization of four working group meetings for at least 20 participants and consultation workshops (US \$45,000); engaging legal experts to draft proposals for upgrading/introducing regulations, at the state and entity levels (US \$15,000); development of awareness materials and organization of one workshop on national regulations and obligations, MEPS and energy efficiency standards including labelling and on safe use of low-GWP refrigerants in RACHP equipment (US \$8,000);

- (b) *Pilot project on introducing low-global-warming-potential (GWP) alternatives in small stand-alone equipment used in commercial refrigeration sector (UNIDO) (US \$92,000):*
 - (i) Market study on relevant technical specifications of low-GWP equipment and pricing (US \$10,000);
 - (ii) Developing technical specifications for commercial refrigeration equipment using R-290 as a refrigerant, adapted to local market and standards (US \$8,000);
 - (iii) *Installation of R-290 display cabinets, energy monitoring equipment and training (US \$60,000):* Organization of the project and selection of end users at three different locations, purchase, delivery and installation of equipment⁴ for measuring the energy consumption (US \$29,000); measuring monitoring, data collection and analysis on energy savings and operational cost (US \$21,000); development of training materials and organization of training sessions for 40 RAC technicians on installation, maintenance and servicing equipment using R-290 as refrigerants (US \$10,000);
 - (iv) De-commissioning, refrigerant recovery and disposal of existing equipment and preparation of awareness leaflets on the same (US \$6,000);
 - (v) Development of awareness materials on the pilot project, providing information related to performance of the equipment in real working conditions, energy savings, investment and operational costs; printing and distributing awareness materials; and organization of two workshops related to energy efficiency, proper refrigerant management, decommissioning and final disposal of this replaced equipment in commercial refrigeration small stand-alone equipment for key stakeholders (US \$8,000);
- (c) *Pilot project on installation of leak detection systems in stationary RACHP equipment for improving energy efficiency of RACHP equipment through leakage control (UNIDO) (US \$90,000):*
 - (i) *Installation of leak detection systems in stationary RACHP equipment (US \$80,000):* Organization and selection of end users at 10 different locations geographically dispersed within the country for the leak detection systems including development of technical specifications (one for each location) for equipment containing 500 CO₂-eq tonnes or more (US \$6,000); procurement, delivery, installation, (US \$68,000); training for each beneficiary on installation, operation and maintenance of leak detection systems (US \$6,000); and

⁴ Power/energy meter (to measure voltage, current, power factor, and energy consumption in kWh), clamp-on ammeter for non-invasive current measurement, data logger or interface for recording and downloading measurements, necessary cables and connectors, carrying case for portability and protection.

- (ii) *Awareness activities on leak detection systems (US \$10,000):* Development, printing and distribution of awareness materials providing information on leak detection systems and the impact of refrigerant leakages on energy efficiency targeting RACHP equipment with charges of 500 CO₂-eq tonnes and above, and organization of two workshops for promotion of the awareness materials, covering RACHP equipment optimization, influence of leakages on energy efficiency and best practices for leak detection and reduction, targeting RAC service technicians, end users, auditors, and other relevant stakeholders.

Total cost of the pilot project

14. The project is expected to be completed in 36 months after approval, between January 2026 and December 2028 for a total cost of US \$280,000, as initially submitted.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

15. The Secretariat has reviewed the project proposal in light of the activities described under decisions 89/6, 91/65, and 95/87 as well as those being implemented under stage I of the KIP.

Eligibility under decisions 91/65, 95/87, and 89/6

16. This proposal has met the eligibility criteria under decision 95/87(d) since it is submitted as a servicing sector project prior to the 100th meeting. Proposed activities are in line with the eligibility criteria under decision 91/65(b)(i)d since it is a project in the servicing sector and was not funded previously; 91/65(b)(iii) since the activity incentivizes the opportunity to avoid the continued growth in use of HFCs in similar markets; 91/65(b)(v) since the project is intended for replicability within the country; and since the Government of Bosnia and Herzegovina commits to the conditions referred to in decision 91/65(b)(iv)b. to b(iv)e.

17. Proposed activities are in line with the eligibility criteria under decision 89/6(b)(i) since it includes activities for an end-user pilot project in the commercial refrigeration sector to replace three R-404A systems with R-290 stand-alone display cabinets and a pilot project on the installation of leak detection systems in stationary RACHP equipment for improving energy efficiency of RACHP equipment through leakage control; 89/6(b)(ii) since it includes the development of training materials to strengthen RAC technicians on installation, maintenance and servicing including energy efficiency focused on small stand-alone commercial refrigeration equipment using hydrocarbons; 89/6(b)(iii) since it includes the creation of a working group⁵ to consider MEPS and energy efficiency standards and labelling schemes applied in other neighboring countries and the EU, and the preparation of a draft proposal for upgrading the current national regulation, improvement of MEPS and energy efficiency standards and energy efficiency labelling focused on RACHP equipment; and 89/6(b)(v) since it includes various awareness campaigns for the promotion of the energy-efficient RAC equipment operating with low- or zero-GWP refrigerants and benefits of installing leak detection systems, energy efficiency in RACHP equipment covering RACHP equipment optimization, impact of refrigerant leakage on energy efficiency and best practices for leak detection and reduction.

18. UNIDO confirmed that MoFTER, which is the responsible institution for both energy efficiency and Montreal Protocol implementation, will be directly involved in the implementation of the pilot project.

⁵ Consisting of the NOU, relevant state- and entity-level institutions, the customs administration, the Foreign Trade Chamber of Bosnia and Herzegovina and representatives of the RAC association, along with relevant national and international experts as necessary.

The NOU is housed under the MoFTER and will coordinate close cooperation at the entity level with the Ministry of Energy, Mining and Industry of the Federation of Bosnia and Herzegovina and the Ministry of Energy and Mining of the Republika Srpska. Other stakeholders involved in the project include the ISBIH, RAC associations, and RAC technicians.

19. In line with decision 91/65(b)(iv), the Government of Bosnia and Herzegovina has also confirmed that if Bosnia and Herzegovina were to mobilize funding from sources other than the Multilateral Fund for energy-efficiency components when phasing down HFCs, the project would not result in the duplication of activities among those funded by the Multilateral Fund and those funded from other sources; the information on project progress, results and key learning would be made available, as appropriate; 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 a detailed project report would be submitted to the Executive Committee within six months of the date of completion of the project.

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

20. The pilot project will be implemented in coordination with the activities under stage I of the KIP. At present, the majority of the RACHP equipment relies on HFC refrigerants, except in domestic refrigeration where R-600a has been used for several years in new imported equipment. The introduction of high-efficiency modern technologies using zero- or low-GWP refrigerants will reduce not only direct greenhouse gas emissions but also indirect emissions resulting from the higher energy consumption of conventional RACHP equipment. However, several challenges hinder such implementation, including low awareness of the possibilities and advantages of modern systems using zero- or low-GWP refrigerants, as well as lack of experience and technical skills needed to work effectively and safely with such systems. The implementation of the demonstration projects in facilities under actual operating conditions will help overcome the existing barriers and challenges to the wider adoption of zero- or low-GWP refrigerants in RACHP equipment, alongside the improvement of MEPS and energy efficiency standards, and the expansion of the RAC service technician training on both the safe handling of low-GWP refrigerants and on the improved energy efficiency of systems using low-GWP refrigerants. Activities related to improving the skills of RAC service technicians are part of stage I of the KIP of Bosnia and Herzegovina.

Technical and cost-related issues

Institutional strengthening activities

21. Upon enquiry about the status of MEPS in the country and the anticipated impact of this project, UNIDO explained that the project envisions the enhancement of the group of standards (BAS EN 14511) which are for air conditioners, liquid chilling packages and heat pumps for space heating and cooling, and process chillers, with electrically driven compressors. UNIDO also explained that even though rulebooks on the labelling of the energy efficiency class for different types of appliances have been adopted, their enforcement is not at the expected level. Project activities are expected to strengthen the enforcement of the existing rulebooks and support their further development as part of the harmonization of national legislation with EU requirements. UNIDO confirmed that while MEPS for RACHP equipment is not yet integrated into the government's workplan, it is expected that the project will accelerate the government's timeline for their adoption.

Technology selection

22. For the demonstration project on small stand-alone equipment used in the commercial refrigeration sector, UNIDO explained that during the preparation of the project, CO₂ (R-744) was also considered for the selected application, but R-290 is more accessible and financially more affordable. The leak detection systems will include sensors for detecting refrigerant leaks, leakage warning alarms, and an option for data

transmission to a central control system as well as providing continuous monitoring to identify leaks and alerting the operator in a timely manner.

Selection of beneficiaries

23. UNIDO explained that they have not selected beneficiaries yet, and that the selection will occur during the bidding process. It is planned that beneficiaries will contribute to covering the costs of site preparation and installation works. Co-financing from beneficiaries will be considered as one of the criteria for selection and prioritization of final beneficiaries.

Type of equipment to be replaced and calculation of cost

24. Regarding the type of systems to be replaced under the demonstration project on small stand-alone equipment used in the commercial refrigeration sector, UNIDO explained that three R-290 small stand-alone units (display cabinets) at three different locations will be installed to work in parallel with existing R-404A display cabinets or refrigeration plug-in units where capacity of the units are comparable. Measuring equipment to monitor energy consumption under real operating conditions will be installed and existing units will remain in use alongside new ones to enable parallel measurement, for a defined period. The analysis will assess potential energy savings, investment and operational costs, as well as the payback period.

25. UNIDO agreed to reduce the public awareness activities on leak detection systems and the impact of refrigerant leakages on energy efficiency from US \$10,000 to US \$8,000 to be more consistent with the cost of other awareness activities.

Monitoring

26. To ensure proper reporting to the Executive Committee on the results of the project, the funding recommended includes the energy measurement and leak detection instruments needed for beneficiaries to collect and share information on energy consumption, leak control and savings. Upon enquiry from the Secretariat regarding the demonstration project on small stand-alone equipment used in the commercial refrigeration sector, UNIDO agreed that in order to strengthen the quality and relevance of the dataset, the monitoring period will be extended from the initial 60 days of daily monitoring, to a full calendar year with monthly data collected after installation for both new and existing equipment. UNIDO also agreed to collect baseline data and post installation monthly monitoring for at least one year for the leak detection systems pilot.

Agreed cost of the pilot project

27. The agreed costs to implement institutional strengthening and MEPS improvement, and the two demonstration pilot projects on introducing (i) low-GWP alternatives for enhancing energy efficiency in small stand-alone equipment used in the commercial refrigeration sector and (ii) leak detection systems in stationary RACHP equipment in Bosnia and Herzegovina amount to US \$278,000, plus agency support costs of US \$19,460.

Energy-efficiency improvements and preliminary estimate of electricity savings

28. UNIDO calculated on an indicative basis the potential energy savings of the demonstration project on small stand-alone equipment used in the commercial refrigeration sector where the estimated energy demand for a new R-290 unit is 0.35 kWh, compared to 0.60 kWh for an existing R-404A unit, based on manufacturers' catalogues. The cost of electricity is estimated at US \$0.40/kWh. The energy demand is estimated to run 24 hours which is then extrapolated to calculate the energy demand over one year. The projected cost savings are approximately US \$50 to US \$72 per unit per month or annual savings of

US \$600 to US \$864 per unit on the electricity bill. However, these values may vary depending on the specific characteristics of the plant and final setup of the installation as well as the supplied equipment.

29. With regard to the demonstration on leak detection systems, UNIDO explained that by monitoring refrigerant leakage and ensuring timely repairs, the project aims to support the overall goal of improving energy efficiency in the refrigeration sector by demonstrating reduced servicing needs through early detection of leakages, maintaining the correct refrigerant charge in the system, and ensuring operation at optimal capacity and efficiency.

Sustainability, replicability and assessment of risks

30. UNIDO explained that the demonstration project on small stand-alone equipment used in the commercial refrigeration sector has a strong potential for replication, with projections indicating that 12,000 to 15,000 units could be replaced each year, contributing to substantial market transformation. The main risk factor influencing sustainability and replication is the investment cost and the return on investment period. By measuring energy savings and operational costs during project implementation, the project will help raise awareness among end users of the benefits of investing in alternative technologies using low-GWP substances. This activity should help introduce a ban on the import and placing on the market of types of small stand-alone commercial refrigeration equipment, since energy efficient and affordable solutions using low-GWP are already available on the market.

31. For the demonstration on leak detection systems, UNIDO clarified that as part of the negotiations with the EU, Bosnia and Herzegovina is required to harmonize its national legislation with EU regulations. Under the F-gas Regulation, equipment containing more than 500 CO₂-eq tonnes must be equipped with a leak detection system, and the functionality of the system must be checked at least once per year. Since leak detection systems are indirectly linked to energy efficiency, an analysis of servicing costs for beneficiaries before and after installation will be carried out. Sharing this information is expected to encourage other equipment owners to adopt leak detection systems.

32. By operating under real working conditions, the demonstration projects will also highlight potential energy savings and provide analyses of investment costs and payback periods.

RECOMMENDATION

33. The Executive Committee may wish to consider approving the pilot project to maintain and enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities): Improving minimum energy performance standards and two demonstration pilot projects on introducing low-global-warming-potential alternatives for enhancing energy efficiency in small stand-alone equipment used in the commercial refrigeration sector, and on introducing leak detection systems in stationary refrigeration, air-conditioning and heat pump (RACHP) equipment in Bosnia and Herzegovina, in the amount of US \$278,000, plus agency support costs of US \$19,460 for UNIDO, noting:

- (a) That the Government of Bosnia and Herzegovina has committed to the conditions referred to in decision 91/65(b)(iv)b. to b(iv)d.;
- (b) That the Government of Bosnia and Herzegovina would enhance the standards and energy labelling for RACHP equipment upon the completion of the project; and
- (c) 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, including a detailed description of the activities

undertaken to disseminate the results of the technology demonstration and to promote the adoption of the selected energy-efficient alternative technologies.
