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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Ninety-fifth Meeting
Montreal, 4-8 December 2024
Item 9(d) of the provisional agenda¹

PROJECT PROPOSAL: MALAYSIA

Energy efficiency

- Pilot project to project to enhance the energy efficiency of stand-alone commercial refrigeration equipment in Malaysia in the context of the HFC phase-down (investment and non-investment activities)

World Bank

Individual
consideration

¹ UNEP/OzL.Pro/ExCom/95/1

PROJECT EVALUATION SHEET – NON-MULTI-YEAR PROJECTS

Malaysia

PROJECT TITLE

BILATERAL/IMPLEMENTING AGENCY

(a) Pilot project to enhance the energy efficiency of stand-alone commercial refrigeration equipment in Malaysia in the context of the HFC phase-down (investment and non-investment activities)	World Bank
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PROJECT OBJECTIVE

Pilot project to enhance energy efficiency and further reduce CO ₂ emissions in the stand-alone commercial refrigeration sector in the context of HFC phase-down under stage I of the KIP (investment and non-investment activities)

NATIONAL CO-ORDINATING AGENCY	Department of Environment (DOE)
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LATEST ARTICLE 7 DATA (Annex F)	Year: 2023	5,440.303 mt	5,043,404 CO ₂ -eq tonnes
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Particular	Investment and non-investment activities
	Units
HFC used by the servicing sector (2023 country programme data)	624.98 mt
	1,346,410 CO ₂ -eq tonnes
Project duration (months):	36 months
Initial amount requested (US \$):	1,148,215
Final project costs (US \$)	915,689
Implementing agency support cost (US \$):	64,098
Total cost of project to Multilateral Fund (US \$):	979,787
Energy efficiency savings* (US \$/kWh/year):	0.007 (2.47/day)
Status of counterpart funding (Y/N):	Y
Project monitoring milestones included (Y/N):	Y
Minimum energy performance standards available for the relevant sector (Y/N):	N

* Only considering the energy savings and funding associated with enterprise-level activities and excluding those associated with policy-level activities.

SECRETARIAT'S RECOMMENDATION	Individual consideration
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PILOT PROJECT TO ENHANCE THE ENERGY EFFICIENCY OF STAND-ALONE COMMERCIAL REFRIGERATION EQUIPMENT IN MALAYSIA IN THE CONTEXT OF THE HFC PHASE-DOWN (INVESTMENT AND NON-INVESTMENT ACTIVITIES)

PROJECT DESCRIPTION

Background

1. On behalf of the Government of Malaysia, the World Bank has submitted, in line with decisions 91/65 and 94/60, a request for a pilot project to maintain and/or enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (investment and non-investment activities), in the amount of US \$1,148,215, plus agency support costs of US \$80,375, as originally submitted.²

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

2. The implementation of the enabling activities for the implementation of the Kigali Amendment for HFC phase-down³ included activities to determine the average consumption and HFC baseline, to support development of the quota allocation system, and lead to the Government specifying HFCs as “prohibited substances” subject to controls and introducing a new system of HFC tariff codes. Stage I of the Kigali HFC implementation plan (KIP) approved at the 93rd meeting⁴ includes a ban on the installation of new HFC-23- and HFC-125-based fire suppression systems by 1 January 2026; and by 1 January 2029, a ban on the manufacture and import of HFC-based stand-alone commercial refrigeration equipment, HFC-based domestic refrigeration, HFC-134a-, R-452A-, and R404A-based components for refrigerated transport, and R-407C-based split AC equipment and heat pumps, and a ban on new installations of R407C-based chillers.

Energy efficiency pilot project

3. Malaysia has ratified all the amendments to the Montreal Protocol, including the Kigali Amendment on 20 October 2020. The HFC baseline for Malaysia has been established at 26,703,717 CO₂-equivalent tonnes (CO₂-eq tonnes), which the country has committed to reducing by 10 per cent in 2029. The Government of Malaysia reported a consumption of 5,043,404 CO₂-eq tonnes of HFCs in 2023, which is 81 per cent lower than the established baseline.

Policy, regulatory and institutional framework

4. Since 2014, minimum energy performance standards (MEPS) and labelling are mandatory for household electrical appliances (less than 300 litres per unit) in Malaysia and regulated by the Energy Commission (EC) under the Ministry of Energy. However, Malaysia currently does not have MEPS for stand-alone commercial refrigeration such as chest freezers, drink dispensers or display cases, nor any type of voluntary standard or guideline.

5. On 11 October 2023, the Malaysia parliament passed the Energy Efficiency Conservation Act, under which the EC has expanded its mandate to regulate the energy performance of all electrical equipment (beyond appliances). The current schedule of priority actions of the EC is to extend the MEPS and star-rating programme to cover electrical motors and commercial air conditioners by 2026 and 2027, respectively, as these types of equipment have the highest energy consumption. With support from this project, the EC will include commercial refrigerators and freezers in its MEPS and star-rating programme

² As per the letter of 4 September 2024 from the Department of Environment, Ministry of Natural Resources and Environmental Sustainability of Malaysia to the World Bank.

³ Decision 80/52

⁴ Decision 93/67

by early 2029, instead of 2030 or later, allowing the HFC phase-down in the commercial refrigeration sector under the KIP to be synced with energy improvement to increase the overall climate benefits.

Project objective

6. The objective of the project is to improve energy efficiency in stand-alone commercial refrigeration in Malaysia by 20 to 40 per cent, in parallel with the complete HFC phase-out in the subsector planned under stage I of the country's KIP.

7. There are approximately 30 manufacturers and assemblers of commercial refrigerators and industrial refrigeration systems in Malaysia, out of which four actively supply stand-alone commercial refrigerators. The two largest are the beneficiaries of this project, Berjaya Steel Product Sdn Bhd (Berjaya Steel) and Zun Utara Industry Sdn Bhd (Zun Utara), representing a cumulative 80 per cent of the stand-alone commercial refrigeration market. These enterprises have agreed to cease using HFCs (HFC-134a and R-404A) for manufacturing with the support of the Multilateral Fund under Malaysia's stage I KIP, as shown in table 1. The remaining stand-alone refrigeration subsector will also be obligated to phase out HFCs by 2029 when the ban on the manufacture of HFC-based stand-alone commercial refrigeration equipment is implemented under the KIP.

Table 1. Annual reduction in commercial refrigeration activities under the KIP

Enterprise	HFC consumption		Consumption of alternatives		Reduction
	mt	CO ₂ -eq tonnes	mt	CO ₂ -eq tonnes	CO ₂ -eq tonnes
Zun Utara	6.57	9,664	3.29	10	9,654
Berjaya Steel	8.92	25,448	4.46	13	25,435
Total	15.49	35,112	7.75	23	35,089

8. Based on current experience in the country, the manufacture of more energy-efficient commercial refrigerators and freezers would not require any change to the manufacturing process; more efficient condensing and evaporator units, fan motors, double-layered glass doors, variable speed compressors and drivers could be mounted to bodies of the commercial refrigerators and freezers in the same manner with the same tooling.

Equipment manufactured by Berjaya Steel and Zun Utara

9. Berjaya Steel currently manufactures 25 models of commercial refrigerators and freezers, including display chillers, display freezers, upright chillers, upright freezers, counter chillers, counter freezers, and showcase chillers. It offers chillers and freezers from single-door model to four-door models. All products use single-speed compressor technology without applying energy efficiency fans for evaporator and condenser units.

10. Zun Utara has also manufactured 25 models of commercial refrigerators and freezers, of which 22 are based on HFC-134a and three are based on R-404A; two HFC-134a models have recently been discontinued. The remaining 23 models comprise lifting-lid chest freezers, sliding glass lid display chest freezers, display chillers, and display freezers. Due to market competition from imported products in both performance and cost, the enterprise has repeatedly updated its product line to improve the energy efficiency of its products. Most existing models use skin evaporators and condensers, which do not require fan coils. In addition, the enterprise reduced the thermal load by improving the insulation property of the foam and replaced glass doors with double-layered glass. Those changes have allowed Zun Utara to manufacture products that are more energy-efficient than those of other suppliers in the market. However, the enterprise has not implemented the use of inverter compressor technology.

Proposed activities

11. The project includes enterprise-level activities, to enable the two beneficiary enterprises to improve the energy efficiency of the products they manufacture, and policy-level activities, to enable the implementation of MEPS and voluntary labeling for stand-alone commercial refrigeration equipment as well as strengthen capacity for its testing and certification.

Enterprise-level activities

12. Both enterprises will improve the average energy efficiency of their models by at least 30 per cent by implementing inverter technology for all the models they currently manufacture as well as implementing other measures depending on the model (e.g., double-layer glass doors, for applicable display cabinets; more energy-efficient evaporator and condenser fan coils for models without skin evaporators and condensers; replacing the electric motors of fans with more energy efficient motors; and other measures.)

13. Variable speed compressors are equipped with compressors and a speed controller or a drive board. The speed controller works in two different modes: pulse width modulation (PWM) mode and automatic mode. For typical controllers, the drive board adjusts the compressor speed through the PWM signal from the control board. Under the automatic mode, the drive board controls the compressor on or off through a relay signal. The drive board is pre-programmed to have compressors run at three or four distinct speeds. To operate under the PWM mode, an additional frequency generator is required to provide signals for controlling the compressor speed. The frequency generator is optional if the compressors work on the automatic board. Variable speed compressors with driver boards and frequency generators consume less energy with higher manufacturing costs. As both enterprises have limited technical capacity, particularly with the electronic control technology, they would depend more on compressor suppliers. Maintenance of compressors and electronic add-ons could be higher as most compressor manufacturers prefer to sell them as a package.

14. The project therefore proposes to introduce the variable speed compressors with a drive board that runs on the automatic board. The project will include technical assistance to enhance the capacity of technicians and design engineers of both enterprises to adopt this technology and enable them to perform basic repair on drive boards. Since the same drive board could be used in both automatic and PWM modes, the proposed technical assistance would also address basic repair and calibration of frequency generators. With enhanced technical capacity, both enterprises could carry out further energy performance improvement for their products in the future, including adopting the frequency generator needed to operate in PWM mode.

15. The World Bank proposed incremental capital costs (ICCs) based on the additional costs incurred by the enterprises undertaking the pilot project, including costs for testing of inverter units (US \$2,332 per model at Berjaya and US \$2,032 per model at Zun Utara), energy efficiency certification (US \$2,000 per model), upgrading existing testing rooms at both enterprises to accommodate larger units (US \$18,000 per enterprise), and technology transfer (US \$25,000 per transfer), resulting in requested ICCs for the two enterprises of US \$283,004.

16. The World Bank also proposed incremental operating costs (IOCs) based on the weighted average of the cost difference between respective components (i.e., compressor, evaporator fan coil, condenser fan coil, body heating system, and glass) used by single- and variable-speed chillers and freezers. For example, the weighted average incremental cost for compressors is calculated by summing up the product of the cost difference of each model with the average number of units of the respective model manufactured and sold during the 2021-2023 period and divided by the average number of the total chillers and freezers manufactured during the same period. The total IOCs requested for each enterprise was determined by multiplying the weighted average of each component with the average number of units manufactured during the three-year period (2021-2023), resulting in IOCs of US \$1,011,852 for Berjaya Steel and US \$1,067,045

for Zun Utara. Under the project, funding is only requested to support the IOCs related to variable-speed compressors and drive boards; IOCs associated with replacing other components (i.e. evaporator fan coil, condenser fan coil, body heating system, and glass), will be co-financed by the respective enterprises, resulting in IOCs of US \$539,768 for Berjaya Steel and US \$811,698 for Zun Utara. Of those IOCs, Berjaya Steel will co-finance US \$373,712 and Zun Utara US \$650,843, resulting in requested IOCs of US \$166,056 and US \$160,855, as further summarized in table 2 below.

17. The World Bank provided detailed information for each model manufactured by the two enterprises, including number of units sold between 2020 and 2023, volume, operating temperature, testing temperature, effective volume, total display area (for display units), refrigerant and refrigerant charge, compressor, and baseline and target energy consumption. 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.

Policy-level activities

18. Commercial refrigerators and freezers, which are not considered as household appliances, are currently not regulated under the MEPS scheme. The testing facility of the Standard and Industrial Research Institute of Malaysia Quality Assurance Services (SIRIM QAS), established to support MEPS implementation, does not have the capacity for refrigerators and freezers with volumes greater than 300 liters. To expand the MEPS scheme to cover commercial refrigeration and freezers, the existing testing facility (environmental chamber room) needs to be upgraded. Support provided under the project will enable SIRIM QAS to offer testing services to local manufacturers and importers of commercial refrigerators and freezers.

19. Under the current MEPS scheme for electrical appliances, the energy performance certification issued by the EC⁵ remains valid only for five years. To renew the energy performance certification, new testing is required. Having a testing facility available within the country would expedite the testing and certification process and would reduce costs to manufacturers and importers as there would no longer be a need to ship units for testing out of the country.

20. Before upgrading the environmental chamber, the EC needs to carry out a market survey to determine the potential energy conservation impact of including commercial refrigeration and freezers in the MEPS scheme. Results would be used to determine which commercial refrigeration and freezer models should be subject to MEPS; those considered not cost-effective to be covered by MEPS (a mandatory scheme) due to scale of demand/use could be instead included on a voluntary basis under the international environmental technology verification (ETV) scheme and be administered by SIRIM ETV.

21. As such, funding is requested to support both the EC and SIRIM ETV to develop guidelines and testing protocols for MEPS and ETV. Addressing commercial chillers and freezers under the mandatory and voluntary measures will help improve energy performance of all products in this sector. To ensure that the guidelines and testing protocols for both mandatory and voluntary schemes comply with international standards, the project proposes study tours for both the EC and SIRIM ETV to familiarize each with similar schemes that have already been established in neighbouring countries. Details of the cost for those activities are also outlined in table 2.

⁵ The EC under the Ministry of Energy has the mandate to regulate energy performance of household electrical appliances.

Table 2. Proposed cost of energy efficiency activities

Activity	No. of units	Cost (US \$)
<i>ICCs (US \$311,304)</i>		
Testing room upgrade to cover larger units (>300 litres)	2	36,000
Prototypes development of each model stand-alone units produced by the enterprises for testing and certification	47*	103,004
Energy efficiency certification by a third-party laboratory	47*	94,000
Technology transfer for adoption of energy efficiency measures in the unit design	2	50,000
Contingency		28,300
<i>IOCs (US \$326,911)</i>		
Berjaya Steel		166,056
Zun Utara		160,855
<i>Technical assistance and policy development (US \$480,000)</i>		
Environmental chamber upgrade (testing facility)	1	300,000
Market survey and analysis for MEPS development (consultancy service)	1	50,000
Development of MEPS guidelines and testing protocols, a mandatory scheme for specific commercial refrigeration and freezers	1	50,000
Development of ETV guidelines and testing protocols, a voluntary scheme for models not cost-effective to be covered by MEPS	1	20,000
Study tours for reviewing MEPS and ETV testing protocols already established in neighbouring countries	2	60,000
<i>Monitoring market penetration and climate impact (US \$30,000)</i>		
Evaluation consulting services (hired by PMU)	3	30,000
Total		1,148,215

* Includes 25 units for Berjaya Steel and 22 units for Zun Utara (one unit for each model of commercial refrigerators and freezers manufactured at the enterprise).

Total cost of the pilot project

22. The total cost of the project to maintain and enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down amounts to US \$1,148,215, plus agency support costs, and would be implemented between January 2025 and December 2027.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

23. The project includes both enterprise-level activities and policy-level activities. Both are required for the successful implementation of the project. The Secretariat reviewed the former under decision 94/60 and the latter under decision 91/65.

24. In line with decision 91/65, confirmation has been obtained from the Government of Malaysia that the NOU will coordinate with relevant energy-efficiency authorities and national standards bodies to facilitate the consideration of refrigerant transition when developing energy efficiency standards in the relevant sectors/applications; that, if Malaysia 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 will 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

Development and implementation of MEPS

25. The World Bank explained that the country's National Energy Efficiency Action Plan (NEEAP) 2016-2025 presents an implementation strategy for energy efficiency measures in the industrial, commercial and residential sectors, including promotion of 5-star rated appliances. Notwithstanding that strategy, Malaysia currently does not have MEPS for stand-alone commercial refrigeration equipment, nor does the country have a voluntary standard or guideline. The NOU was in close contact with the EC and SIRIM ETV on the development of MEPS and voluntary labeling scheme for commercial refrigeration equipment. Given the steps required for the finalisation of MEPS for the specific categories of equipment, including stakeholder consultations, it would be difficult or impossible for the Government to implement MEPS by 1 January 2026 or 2027 as initially proposed by the Secretariat.

26. In line with decision 94/60(b)(i), and paragraph 34 of document UNEP/OzL.Pro/ExCom/94/61 as amended in that decision, no incentive would be available for equipment that does not have an established mandatory MEPS in the country. The rationale behind the Secretariat's recommendation in paragraph 34 of document UNEP/OzL.Pro/ExCom/94/61 was to ensure the sustainability of the energy efficiency gains achieved under projects submitted under decision 94/60; moreover, MEPS allowed the calculation of the additional component costs. However, the Secretariat recognizes that the circumstances in Malaysia are unlikely to be unique across Article 5 countries; indeed, it is likely that many Article 5 countries have not yet implemented MEPS for stand-alone commercial refrigeration equipment, which could create an impediment to the near-term submission of additional projects under decision 94/60 for manufacturers of such equipment.

27. Accordingly, and noting decision 94/60(b)(ii), and on an exceptional basis, it was agreed to align the date of implementation of MEPS with the date the country will ban HFCs in the manufacture and import of stand-alone commercial refrigeration equipment (i.e., by 1 January 2029), on the understanding that the enterprises would meet the energy efficiency targets proposed under the project by the date of completion of the project (i.e., within three years, or by 31 December 2027), and thereafter would report on their manufacturing of equipment at the proposed energy efficiency targets (or better) annually until the MEPS were in place.

28. The MEPS would not cover all stand-alone commercial refrigeration equipment. For example, equipment that is tailor-made for specific applications would not be covered. While the World Bank was not able to quantify the number of units manufactured or imported into the country that would fall under the voluntary standard rather than the MEPS, the number of such units is expected to be limited. In particular, the World Bank clarified that the scope of equipment that would not fall under the MEPS and would instead only be covered by the voluntary standard will be determined once data is collected from all manufacturers and importers. Equipment that is manufactured or imported in small quantities in aggregate and do not generate significant benefits/energy savings would be subject to voluntary energy performance guidelines. Most likely this is larger, more specialized equipment that is in low demand.

Technical and cost-related issues

Enterprise-level activities

29. The Secretariat assessed the eligible incentive for the enterprises in line with decision 94/60. In particular, the Secretariat determined the incentive following the methodology outlined in annex II and based on the additional capital cost and additional component costs specified in tables 1 and 2, of document UNEP/OzL.Pro/ExCom/94/61.

30. Table 1 of the document specifies additional capital costs to be provided to enterprises based on the annual manufacturing capacity (units per annum) of the specified class of equipment. Both Berjaya Steel and Zun Utara manufacture both commercial refrigeration chest chillers and freezers, and display cabinets. To assess the additional capital costs for enterprises that manufacture and are eligible to receive an incentive for both classes of equipment (i.e., chest chillers and freezers, or display cabinets), the Secretariat considered the number of units of each class of equipment eligible for an incentive to determine the respective capacity.⁶ The additional capital cost is then 90 per cent of the sum of additional capital cost for the respective eligible capacity for chest chillers and freezers and the eligible capacity for display cabinets.⁷ Based on the eligible capacity⁸ of Berjaya Steel and Zun Utara, this results in additional capital costs of US \$225,000 and US \$150,000, respectively.

31. The additional component costs specified in table 2 of the document is based on energy levels specified in U4E's model regulation guidelines for energy-efficient and climate-friendly commercial refrigeration equipment (revised July 2023).⁹ Those guidelines specify measurement standards, which include test conditions, depending on the type of commercial refrigeration equipment. The enterprises test their equipment at a higher test temperature (30-32 °C, or 38 °C, depending on the type of equipment) than that specified in the measurement standards identified by U4E. The Secretariat is not able to adjust the test results based on those different test conditions.

32. Based on the additional component costs specified in table 2 of the document, the baseline and target energy consumption per model, and number of units manufactured by the enterprises, the additional component incentive is US \$32,911 for Berjaya Steel and US \$7,778 for Zun Utara.

33. Following consultations, the costs calculated by the Secretariat were agreed as summarized in table 3 below. In line with decision 94/60, the additional capital costs would be made available to the beneficiaries upon approval of the project by the Executive Committee, and the additional component costs would be made available based on performance of the equipment verified after completion of the project in line with decision 94/60.

Table 3: Agreed additional capital and component incentive (US \$)

	Total costs as submitted	Additional capital costs	Additional component incentive	Total agreed costs
Zun Utara	292,356	150,000	7,778	157,778
Berjaya	267,559	225,000	32,911	257,911
Technology transfer	78,300	n/a	n/a	n/a
Total	638,215	375,000	40,689	415,689

34. Based on the baseline energy consumption per model, target energy efficiency, and number of units of each model manufactured by the enterprises,¹⁰ the cumulative energy savings are 61,331,361 kWh/year. Based on the agreed costs of US \$415,689, this results in a cost-effectiveness of this component of the project of US \$0.007/kWh/year or US \$2.47/kWh/day.

35. The Secretariat and the World Bank had detailed discussions regarding the condition specified in paragraph 36 UNEP/OzL.Pro/ExCom/94/61 that required that if the project takes longer than three years from the end of the month during which the project is approved by the Executive Committee, the incentive

⁶ For example, an enterprise that manufactured 80,000 chest chillers and freezers per annum, of which 60,000 were eligible for an incentive, would be eligible to receive US \$120,000 in additional capital costs.

⁷ For example, an enterprise that manufactured 60,000 chest chillers and freezers and 10,000 display cabinets per year that are eligible for an incentive would be eligible to receive US \$243,000 in additional capital costs.

⁸ Information considered confidential

⁹ https://united4efficiency.org/wp-content/uploads/2021/11/U4E_CommercialRefrig_ModelRegulation_20230728_EN.pdf

¹⁰ Information considered confidential.

would not be available, and any funding provided to the enterprise would be returned to the Multilateral Fund. On an exceptional basis, and taking into consideration the information provided by the World Bank on the expected implementation timelines, the Secretariat proposed that if there is a delay in the project and the enterprises are not able to manufacture equipment at the proposed energy efficiency targets (or better) within three years, the following steps would be followed:

- (a) At the end of the first year after 36 months: the enterprises would submit an annual report on the status of the project, including the energy efficiency of the equipment manufactured, the reasons for the delay, and planned measures to get the project back on track;
- (b) At the end of the second year after 36 months: if the enterprises are not able to meet the proposed energy efficiency levels by the end of the second year after the date of completion of the project (i.e., 31 December 2029), the agreed additional component incentive will not be provided to the enterprises and will instead be returned to the Multilateral Fund.

36. In addition, the Secretariat considered that some of the additional capital costs provided to the enterprises should be returned to the Multilateral Fund, noting that it is likely that over the five years since the approval of the project the enterprises would have invested their own resources to improve the energy efficiency of the equipment they manufacture under a business-as-usual scenario in order to remain competitive. Effectively, this would be a mechanism to share the risks associated with the investment of the additional capital costs, which in this case constitute the majority of the funding for the project submitted under decision 94/60. The Secretariat had suggested that in such case, 50 per cent of the additional capital costs be returned to the Multilateral Fund.

37. The World Bank explained that a performance condition that requires any return of approved and disbursed additional capital costs is not acceptable due to challenges in convincing the enterprises that are taking the risks associated with adoption of new technology, including the investment of time and resources in adopting these technologies. In addition, the World Bank considered it did not have a mechanism in place to enable any such return and that the request for a return of disbursed funding is unprecedented for Multilateral Fund-supported projects; rather, only remaining (unspent) balances are returned for projects that are completed or cancelled.

38. As there was no agreement on this matter, the Secretariat is seeking the Executive Committee's guidance on whether a return of the additional capital costs in case the enterprises were not able to meet the energy efficiency targets by 31 December 2029 would be appropriate and, if so, an appropriate level for that return.

Policy-level activities

39. The Secretariat and the World Bank had detailed discussions on the cost of the proposed activities. Regarding the upgrade to the environmental test chamber, which the Secretariat considers is required for the long-term sustainability of the project, the World Bank explained that the costs for the upgrade were estimated based on test systems previously purchased by SIRIM;¹¹ and based on consultations with test equipment providers, which suggested that costs for a test system that can accommodate plug-in commercial refrigeration equipment in the range of US \$500,000 to US \$700,000. A lower amount was being requested as the existing test chamber, which is already suitable for testing equipment with the R-290 charge in question, can be modified rather than purchasing a new test chamber. Noting that the costs were uncertain, the Secretariat proposed that the Multilateral Fund provide three quarters of the requested funding (i.e., US \$225,000), and that the Government co-finance the remaining quarter (i.e., US \$75,000), if such additional funding was necessary. The World Bank disagreed, noting that the costs were conservatively

¹¹ Lump sum cost, including hardware and software between approximately US \$450,000 and US \$625,000 per test system.

estimated and could be higher. The Secretariat understands that the World Bank considers the estimated cost of US \$300,000 to be the best estimate available. The Secretariat agreed to the costs as submitted, noting that those costs are uncertain.

40. Regarding the cost of the market survey and analysis for MEPS development, development of MEPS, guidelines, testing protocol, and development of ETV guidelines and testing protocol, the World Bank had estimated those costs based on previous projects to develop MEPS for other applications in other countries. The Secretariat considers the aggregated costs for those activities reasonable. Regarding the need for study tours, the World Bank clarified that this is needed for understanding regional standards, implementation issues faced by other countries, and to coordinate the development of MEPS and voluntary standards with ASEAN¹² and regional partners. Accordingly, US \$50,000 was agreed for technical assistance to enable such coordination, as summarized in table 4 below. Those costs would be funded under the funding window established under decision 91/65.

Table 4: Agreed costs of policy-level activities to enhance energy efficiency of stand-alone commercial refrigeration equipment in Malaysia (US \$)

Item	Activity	As submitted	Activity	Agreed
1	Environmental test chamber upgrade	300,000	Environmental test chamber upgrade	300,000
2	Market survey and analysis for MEPS development	50,000	Market survey, development of MEPS, ETV, guidelines and testing protocols	120,000
3	Development of MEPS, guidelines, testing protocol	50,000		
4	Development of ETV guidelines and testing protocol	20,000		
5	Study tours for reviewing MEPS and ETV testing protocols	60,000	Technical assistance for ASEAN and regional coordination of MEPS and voluntary standards	50,000
6	Evaluation consulting services	30,000	Evaluation consulting services	30,000
Total for project under decision 91/65		510,000		500,000

Sustainability of the pilot project and assessment of risks

41. The project, the first submitted under decision 94/60, is expected to result in manufacturing of energy efficient commercial refrigeration equipment in and Berjaya and Zun Utara, and to enable the Government to develop and implement MEPS for stand-alone commercial refrigeration equipment. Two factors that contribute to the risk associated with the project are that not all stand-alone commercial refrigeration equipment would be covered by the MEPS, and the timeline for the implementation of the MEPS. Regarding the former, the Secretariat considers the risk small as only equipment manufactured or imported in small quantities would not be covered by the MEPS. Regarding the latter, the Secretariat considers the safeguards agreed with the World Bank, in particular the annual reporting that will be provided after completion of the project and until the implementation of the MEPS, to be a reasonable approach to monitoring the sustainability of the project given the time needed by the Government to implement MEPS.

¹² Association of Southeast Asian Nations

Recommendation

42. The Executive Committee may wish to consider:

- (a) Providing guidance on whether a return of the additional capital costs in case the enterprises Berjaya Steel and Zun Utara were not able to meet the energy efficiency targets by 31 December 2029 would be appropriate and, if so, an appropriate level for that return;
 - (b) Approving the pilot project to enhance the energy efficiency of stand-alone commercial refrigeration equipment in Malaysia in the context of the HFC phase-down (investment and non-investment activities), in the amount of US \$915,689, plus agency support costs of US \$64,098, for the World Bank, noting:
 - (i) That the Government of Malaysia has committed to the conditions referred to in decision 91/65(b)(iv)b. to (b)(iv)d.; and
 - (ii) That the Government of Malaysia had committed to implementing minimum energy performance standards (MEPS) for stand-alone commercial refrigeration equipment by 1 January 2029;
 - (iii) That, of the agreed funding, US \$415,689, plus agency support costs of US \$29,098 for the World Bank, would be allocated to the funding window approved under decision 94/60, and that US \$500,000, plus agency support costs of US \$35,000 for the World Bank, would be allocated to the funding window approved under decision 91/65; and
 - (iv) That the project would be operationally completed no later than December 2027, and a detailed project report would be submitted to the Executive Committee within six months of the date of completion of the project.
-