



1. Project Data

Project ID P115761	Project Name Thailand HCFC Phase-out Project	
Country Thailand	Practice Area(Lead) Environment, Natural Resources & the Blue Economy	
L/C/TF Number(s) TF-16701	Closing Date (Original) 31-Dec-2018	Total Project Cost (USD) 17,865,448.00
Bank Approval Date 07-Apr-2014	Closing Date (Actual) 31-Dec-2019	
	IBRD/IDA (USD)	Grants (USD)
Original Commitment	23,918,707.00	23,918,707.00
Revised Commitment	17,865,448.00	17,865,448.00
Actual	17,865,448.00	17,865,448.00

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2. Project Objectives and Components

a. Objectives

According to the Project Appraisal Document (PAD) (p. 4) and the Trust Fund Agreement of November 13, 2014 (p. 6) the objective of the project was “to reduce Hydrochlorofluorocarbon (HCFC) consumption in the air-conditioning and foam sectors in order to contribute to Thailand’s efforts to meet its HCFC consumption phase -out obligations under the first phase of the program (2014-2018).”



The PAD further stated that the Project was to be the first in a Series of Projects (SOP) whose overarching objective was to contribute to Thailand's efforts to reduce its HCFC consumption in accordance with the Montreal Protocol phase-out schedule leading to a complete phase-out by 2040."

The project is part of a Series of Projects (SOP) with four phases (spanning over approximately 26 years) and an approximate cost of US\$83.0 million.

b. Were the project objectives/key associated outcome targets revised during implementation?

No

c. Will a split evaluation be undertaken?

No

d. Components

The project included four components:

Component 1: Investment in HCFC Consumption Reductions (appraisal estimate US\$30.95 million, actual US\$25.26 million): This component was to finance:

- a) Provision of sub-grants to beneficiary enterprises in the foam sector to carry out HCFC consumption reduction subprojects;
- b) Carry out demonstration sub-projects to perform in-house testing of new non-HCFC-141b foam systems;
- c) Provision of sub-grants to 12 beneficiary enterprises in the air-conditioning (AC) sector to carry out HCFC consumption reduction subprojects; and
- d) Provision of sub-grants to beneficiary enterprises for the development of non-ozone depleting substances compressors for refrigeration and air-conditioning equipment.

Component 2: Technical Assistance (appraisal estimate US\$0.63 million, actual US\$1.61 million): This component was to finance:

- a) Provision of technical assistance to support HCFC-22 phase-out in the air-conditioning sector through, inter alia, technical workshops on climate friendly refrigerants for large and small AC systems;
- b) Development and provision of train-the-trainer programs on good servicing practice for Hydrofluorocarbons 32 (HFC-32) air-conditioning units and inclusion of said programs in the curricula of training institutes in the territory of the Recipient;
- c) Carry out of public awareness programs to promote energy efficiency and low global warming potential technology in the air-conditioning and foam sectors;
- d) Provision of technical assistance to 12 air-conditioning manufacturers to convert their production facilities to HFC-32 technology and to develop proper installation and servicing procedures; and



e) Provision of technical assistance to support HCFC-141b phase-out in the foam sector through, inter alia, marketing of non-HCFC-141b formulation by foam system houses and introduction of the use of non-HCFC-141b formulations by micro enterprises.

Component 3: Project Management (US\$1.38 million, actual US\$0.78 million) : This component was to finance:

a) Provision of technical assistance to the Department of Industrial Work Project Management Unit (DIW-PMU) for managing, supervising, monitoring and reporting on the implementation of activities under Component 2 a) – c) of the project;

b) Provision of technical assistance to the DIW-PMU for the development of sector-specific regulations and policy, such as, inter alia, rules governing HCFC imports and exports and a ban on the use of HCFC in the air-conditioning and foam manufacturing sectors; and

c) Provision of technical assistance to the Government Savings Bank-Project Management Unit (GSB-PMU) for managing, supervising, monitoring and reporting on the implementation of Components 1 and 2 d) and e) of the project.

Component 4: Institutional Strengthening (appraisal estimate US\$0.87 million, actual US\$0.78 million): This component was to finance:

Provision of technical assistance to strengthen the capacity of the National Ozone Unit (NOU) to fulfill the obligations of the recipient under the Montreal Protocol.

e. **Comments on Project Cost, Financing, Borrower Contribution, and Dates**

Project Cost: The project was estimated to cost US\$23.92 million. Actual cost was US\$17.86 million due to a cancellation of US\$4.65 million due to some foam enterprises financing their own conversions and limited participation of a number of Small Medium Enterprises (SMEs).

Financing: The project was to be financed by a World Bank Trust Fund in the amount of US\$23.91 million of which US\$17.86 million was disbursed.

Borrower Contributions: The Borrower was not to make any contributions.

Dates: The project was restructured twice:

- On June 8, 2018 the project was restructured to cancel the grant fund from US\$23.92 million to US\$19.5 million and to reallocate funds between disbursement categories. The cancellation was due to some foam enterprises financing their own conversions and limited participation of a number of Small Medium Enterprises (SMEs).



- On November 30, 2018 the project was restructured to change the closing date from December 31, 2018 to December 31, 2019 to allow for the inflow of additional funds approved by the Multilateral Fund for the Implementation of the Montreal Protocol (MLF) for the National Ozone Unit (NOU) component until the new HCFC project was to become effective.

3. Relevance of Objectives

Rationale

According to the PAD (p. 1) Hydrochlorofluorocarbons (HCFCs) are ozone-depleting substances (ODS) subject to consumption and production control measures of the Montreal Protocol on substances that deplete the ozone layer. The Montreal Protocol requires developing countries such as Thailand to initiate the gradual phase out of HCFC consumption and production from 2013 resulting in a complete phase-out by 2040. Thailand has no production capacity for any HCFCs controlled by the Montreal Protocol. However, Thailand is one of the largest manufacturers and exporters of residential air-conditioners, which consumed more than 12,000 metric tons of HCFCs in 2010. According to the PAD (p. 2) Thailand has already successfully phased out HCFC141b on its own in domestic refrigeration and eliminated a large part of HCFC-22 in cold storage.

However, other sectors have faced technological, economic and financial obstacles, especially the local small-and-medium scale industries, from transitioning to the latest technologies, which has resulted in a significant challenge to the government in order to be able to comply with the 2013, 2015 and 2018 Montreal Protocol obligations.

The PAD (p. 2) states that Thailand received funding from the Multilateral Fund for the Implementation of the Montreal Protocol (MLF) to prepare an HCFC Phase-out Management Plan (HPMP), which provides information on HCFC consumption and uses by substance and product. The HPMP identified that Thailand's HCFC use is concentrated in manufacturing foam products and air-conditioning and refrigeration equipment, and for servicing installed equipment.

According to the Bank team (July 28, 2020) the Department of Industrial Works announced in 2013 policies to ban the use of HCFC-22 for manufacturing air-conditioners and the use of HCFC-141b for manufacturing of all foam products (except spray foam) by 2018 as part of the commitment to the Multilateral Fund for the HCFC phase-out Project (Phase I). The project also supported Thailand's Nationally Determined Contribution goal of reducing greenhouse gas emission by 20 percent by 2030.

The objective of the project was in line with the Bank's Country Partnership Framework (CPF) (FY19-22) and its focus area 1 "promoting resilient and sustainable growth" and objective 1 "improve Thailand's competitiveness and ease of doing business" and objective 4 "address climate change and improve water resource management". Also, the objective of the project was linked to the Bank's Interim Strategy Note (October 30, 2010) "Cluster III Infrastructure and Climate Change" under the second prong "Improving Competitiveness, and Inclusive and Sustainable Development".



Given the importance of the objective and its alignment with supporting the 2013 policies to ban the use of HCFC-22 as well as its alignment with the Bank's most recent CPF, the relevance of objective rating is High.

Rating

High

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1

Objective

Reduce HCFC consumption in the air-conditioning sector in order to contribute to Thailand's efforts to meet its HCFC consumption phase -out obligations under the first phase of the program (2014-2018)

Rationale

The project's theory of change envisioned that project activities such as investments in the air-conditioning (AC) sector through sub-grants to AC enterprises to reduce HCFC-22 to HFC-32 and sub-grants to develop non-ODS compressors for AC and refrigeration were to result in outputs such as 11 Thai AC enterprises being converted to HFC-32 and non-ODS compressors being developed. Also, the project's theory of change envisioned that technical assistance for the AC sector was to result in outputs such as the AC sector being transformed to HFC-32 as a non-HCFC alternative and 325 AC service technicians being trained. These outputs were to result in outcomes that contributed to the reduction of HCFC consumption in the AC sector.

Finally, the project's theory of change envisioned that project activities such as developing regulations and policies for sup-tracking HCFC imports and exports, and banning of HCFCs in AC and foam sectors was to result in outputs such as the establishment of a licensing and quota system, banning of imports of HCFC-22-based AC equipment with cooling capacity under 50,000 BTU/hr and banning of HCFC-141b in all foam applications except spray foam. These outputs were to result in the reduction of HCFC consumption.

Outputs:

- The project worked with a leading private sector player, which provided technical assistance to the participating enterprises to improve production quality and strengthen technical capacity for proper installation and maintenance of HFC-32 AC units.
- The Department of Skill Development (DSD) and the office of Vocational Education Commission (OVEC) was provided with training to strengthen capacity of their trainers/instructors to comply with good practices for installation and servicing of HFC-32 AC units (which were included in the DSD's and OVEC's training curriculum). Also, a certification program was developed for service technicians who complete the training of HFC-32 servicing.



- 11 beneficiaries in the AC sector were successfully converted, but not achieving the target of 12 beneficiaries. However, according to the ICR (p. 36) the actual phase-out under the project was contributed by 12 beneficiaries. The additional (12th) enterprise stopped producing small AC units and participated in the technical assistance component financed by the project.

Outputs that supported both objectives included:

- Five system houses (organizations that develop custom software) offered lower GWP pre-blended formulation technologies, surpassing the target of four system houses.
- A total of four annual work programs were submitted to the ExCom, achieving the target of annual work programs being submitted to the ExCom.
- Five verification reports on annual HCFC consumption were submitted, surpassing the target of four verification reports being submitted.
- Annual HCFC import quotas were issued timely and enforced, achieving the target.
- Montreal Protocol Article 7 data is being submitted on a timely basis, achieving the target and complying with the Protocol obligations on an annual basis.

Outcomes:

- 11 sub-projects were completed with 951.64 MR (53.34 ODP tons) phased out of HCFC-22.
- HCFC consumption from AC sector was reduced by 57 ODP tons, achieving the target of 57 ODP tons.
- GHG emission reduction from replacement of baseline refrigerant with low/lower GWP alternative in the air-conditioning sector was 1,456,091 tCO₂ equivalent per year, surpassing the target of a GHG emission reduction of 1,232,535, tCO₂.
- The implementation of the regulation to ban manufacturing and importing of HCFC-22 AC units and technical assistance provided by the project (such as a technology transfer between the owner of new HFC-32 technology in Japan and the local AC manufacturers) resulted in the additional phase-out of 290.1 ODP tons.

The project successfully achieved completing the phasing out of the targeted ODP as well as the GHG emission reduction. Also, the project supported the implementation of the regulation to ban manufacturing and importing of HCFC-22 AC units, which resulted in the additional phasing-out of ODP. There being no reported shortcomings and given credible evidence that outcomes and outputs exceeded or achieved targets, which can be attributed to project interventions, the rating of efficacy for this objective is High.

Rating
High

OBJECTIVE 2
Objective



Reduce HCFC consumption in the foam sector in order to contribute to Thailand's efforts to meet its HCFC consumption phase -out obligations under the first phase of the program (2014-2018)

Rationale

The project's theory of change envisioned that project activities such as investments in the foam sector including sub-grants to foam enterprises to reduce HCFC 141b and technical assistance to raise public awareness to promote EE & low GWO alternatives were to result in outputs such as foam enterprise being converted to non HCFC alternatives and the foam sector being transformed to non-HCCFC. Also, support to HCFC-141b phase-out in the foam sector by foam system houses was to result in outputs such as foam enterprise being converted to non HCFC alternatives and the foam sector being transformed to non-HCCFC alternatives. These outputs were to result in outcomes that contributed to the reduction of HCFC consumption in the foam sector.

Outputs:

- Technical assistance was provided to strengthen the safety measures for operating a cyclopentane foaming line and proper handling of cyclopentane. Also, workshops related to health, safety, and environmental requirements were conducted.
- The DIW-PMU conducted safety trainings for cyclopentane foam production workers in each foam enterprise. Also, enterprises developed operating procedures/work instructions and trained staff in cyclopentane storage, handling, mixing, and operating system.

Outcomes:

- Direct investments (sub-grants) for the conversion of 45 foam enterprises contributed to a reduction of 740.13 MT (81.41 ODP tons) of HCFC-141b. Out of these 45 enterprises, 15 enterprises adopted HC technology, 27 selected reduced HFC-245fa formulations, and one enterprise adopted a combination of HFC-245fa/water blown technologies, and two enterprises adopted water-blown technology. The project provided technical assistance to local system house to develop new foam formulations using non-HCFC foam blowing agents. Also, technical support from the Federation of Thai Industries (FTI) and the government's policy to ban the use of HCFC-141b in the foam sector resulted in the additional phase-out of 750.82 MT (82.59 ODP tons). In total the HCFC phase-out in the foam sector amounted to 164 ODP tons surpassing the target of 152 ODP tons.
- Approximately 57 percent of HCFC-141b was replaced by HC, 35 percent by reduced HFC-245fa formulation, and 8 percent by water blown technology. The new blowing agents have Global Warming Potential (GWP) lower than HCFC-22. This outcome did not have a target.
- Reduction in HCFC consumption from the foam sector was 164 ODP tons, surpassing the target of a 152 ODP tons reduction. Adding the reduction from the foam sector and the AC sector results in a total of 511.1 ODP ton reduction and therefore surpassing the target of a 209 ODP tons reduction in the AC and foam sectors.
- GHG emission reduction from replacement of baseline foam blowing agent with low/lower GWO alternative in the foam sector was 803,579 tCO₂ equivalent per year, surpassing the target of 740,499 tCO₂ equivalent per year.

The reduction in HCFC consumption from the foam sector and the reduction in GHG emission from replacement of baseline foam blowing agent with low/lower GWO alternative surpassed the targets substantially. There being no reported shortcomings and given credible evidence that outcomes and outputs



exceeded or achieved targets, which can be attributed to project interventions, the rating of efficacy for this objective is High.

Rating
High

OVERALL EFFICACY

Rationale

The achievement of both objectives was High. Therefore, the overall efficacy rating is High.

Overall Efficacy Rating

High

5. Efficiency

Economic efficiency:

The PAD (p. 14) states that it was not possible to conduct an economic analysis since it would have required measurement of the impact of the project, besides foam and air-conditioning manufactures, on the entire economy including consumers, the government, and other aspects of risks and benefits to the population. However, the necessary data was not available. Instead, the PAD conducted a financial analysis, which assessed the financial cost of phasing out HCFC- 141b at 132 foam enterprises and the cost of phasing out of HCFC-22 at 12 air-conditioner manufacturers under the “with project” scenario in comparison with “the without project” scenario. The analysis provided an estimated incremental cost to these enterprises in terms of investments in new equipment based on the type of alternative technologies to be selected by these enterprises. The analysis estimated that under the “with project” scenario, the net incremental cost was about US\$136 million over a 20-year period for 144 enterprises. The PAD did not provide any estimate for the “without project” scenario, making a comparison virtually impossible.

The ICR conducted a cost-effectiveness analysis, which compared the cost per kilogram of HCFC consumption phased out with the net project cost (appraisal cost against the actual cost at project closure).

At appraisal, the total cost was estimated at US\$23.92 million with 209 ODP tons to be phased out. The actual project cost was US\$19.25 million with a total phase out of 5.11 ODP tons. The cost-effectiveness at appraisal was estimated at US\$10.25 per kg of HCFC and the actual cost-effectiveness at project closure was US\$2.47 per kg of HCFC. According to the ICR (p. 19), the project’s cost-effectiveness was slightly better than a similar project in China, which achieved a cost-effectiveness of US\$2.67 per kg of HCFC. This indicates that the project was a worthwhile investment



Operational efficiency:

During the first restructuring in 2018, US\$4.42 million was cancelled due to some foam enterprises financing their own conversions and limited participation of a number of SMEs, which might indicate an inefficient use of project resources. The project’s closing date was extended from December 31, 2018 to December 31, 2019 to allow for the inflow of additional funds approved by the Multilateral Fund for the Implementation of the Montreal Protocol (MLF) for the NOU component until the new HCFC project was to become effective. This extension was not indicative of any inefficiency.

Taking everything together, the project’s overall efficiency was Substantial

Efficiency Rating

Substantial

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal		0	0 <input type="checkbox"/> Not Applicable
ICR Estimate		0	0 <input type="checkbox"/> Not Applicable

* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome

Relevance of the objective was High given the objective’s alignment with the Bank’s Country Partnership Framework (CPF) (FY19-22). Efficacy was High and Efficiency was Substantial resulting in an overall outcome rating of Highly Satisfactory.

a. Outcome Rating

Highly Satisfactory

7. Risk to Development Outcome

According to the ICR (p. 31) the government continued to control the borders to avoid any illegal import and export of ODS. Also, the ODS import quota set by the NOU and its compliance with the defined quota is being reviewed regularly.



Also, investments into new alternative technologies, which are offered at a lower price as well as the destruction of HCFC-consuming production facilities, provide little incentive for the consumption of illegal HCFC. All this indicates a low risk to the sustainability of project outcomes. According to the Bank team (July 28, 2020) the government faces the challenge of enforcing the ban on the use of HCFC-141b in the foam sector as import of HCFC-141b is still allowed if it is destined for the spray foam application. Importers of HCF-41b may direct their import to other foam applications, instead of the spray foam.

The project is being followed by the phase 2 project (HCFC phase-out project stage II (P165235), financing amount US\$5.9 million), which has been approved and will focus on technical assistance activities to support training related to the new HFC-32 air-conditioners at training centers of the Department of Skills Development and vocational schools.

8. Assessment of Bank Performance

a. Quality-at-Entry

The project was a continuation of the Bank's involvement in the sector. According to the PAD (p. 8) like the previous ODS project the SOP approach was to be built as part of the government's long-term commitment as a party to the Montreal Protocol to phase out HCFCs. The ICR (p. 24) stated that the project built on the overall HCFC quota system, which had been established under the CFC project.

The Bank identified relevant risks. The PAD (p.13) stated that the preparation risk was rated Moderate mainly because air-conditioning enterprises were new to Bank project requirements and the project was to start after the first control measure of the Montreal Protocol entered into force. Also, the implementation risk was rated Moderate due to the introduction of new technologies and the use of substances with a risk of flammability in the beneficiary enterprises. In order to mitigate these risks an implementation support plan was developed in order to monitor project implementation closely and identify implementation bottlenecks. According to the Bank team (July 28, 2020) none of these risks materialized.

While there was insufficient supply of HFC-32 compressors for larger cooling capacity, the Bank was assured by compressor manufacturers during project preparation that this would not be an issue. Therefore, as pointed out by the Bank team, it would have been inappropriate for the Bank to second guess those assurances, especially in a public document such as the PAD.

While there were some shortcomings, this was the first project dealing with converting the *whole* A/C sector to HFC-32 technology, so the team argue it was not realistic to be able to foresee all possible risks upfront. Importantly, the Bank team, together with the counterparts, was able to adequately address the risks that arose during implementation.

According to the ICR (p. 23) during project preparation policies and regulations to phase out HCFCs and the HCFC import quota reduction schedule were presented to stakeholders. Also, the Bank team identified any constraints stakeholders might face and possible support to address them.

The Results Framework was adequate (see section 9a for more details).



Taking everything together, the Quality at Entry rating is Highly Satisfactory.

Quality-at-Entry Rating
Highly Satisfactory

b. Quality of supervision

According to the ICR (p. 29) the Bank team had the adequate expertise and provided the PMUs with timely and consistent implementation and technical advice. Also, the Bank team provided biannual supervision missions, conducted training workshops and was in constant communication with the PMUs. Furthermore, the ICR (p. 30) stated that the Bank team provided financial management and procurement training for the PMU staff and participating enterprises. The team also diligently monitored the project's compliance with the Bank's fiduciary and safeguard policies. Also, procurement disbursement procedures and financial audit reports were reviewed. The Bank team filed a total of 22 aide-memoires and ten Implementation Status and Results Reports, indicating consistent project supervision. Finally, the Bank team supervised the preparation of tranches implementation progress reports and planned and fulfilled its role as interlocutor between ExCom and the government.

There were no obvious shortcomings; therefore the Bank's supervision performance was Highly Satisfactory.

Quality of Supervision Rating
Highly Satisfactory

Overall Bank Performance Rating
Highly Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

The project's theory of change and how key activities and outputs were to lead to outcomes was logical and reflected in the Results Framework. Also, the project's objective was clearly specified. The selected indicators encompassed all outcomes of the PDO statement and the intermediate outcome indicators were adequate to measure the project's contribution to achieving the objective. Also, the selected indicators were sufficiently specific and measurable. However, the majority of indicators lacked a baseline, which made it difficult to assess the significance of output and outcome results, even when targets were indicated.

The Department of Industrial Works (DIW) was to closely monitor HCFC imports and exports, if any, against the allowable quotas within the calendar year.



According to the ICR (p. 25) when the Excom approved the financing of the project, the 2012 HCFC consumption level was not known. The phase-out commitment according to the ExCom agreement was formulated in accordance with the consumption projection derived from historical import data from 2006 to 2011. The ICR further states that in 2012, actual imports increased much higher than the committed phase out quantity since industry had stockpiled additional imports before the first control measures of the Montreal Protocol and the ExCom agreement were implemented.

According to the ICR (p. 26) the PMU used the national management information system (MIS), which had been established under a previous Chlorofluorocarbon project, and which included all data related to ODS imports and uses in Thailand. The MIS tracked and reported implementation progress of aggregate HCFC phase-out on a yearly basis through integrating licensing and import and usage data by sector.

b. M&E Implementation

According to the ICR (p. 26) the PMU kept and reported data effectively and used the project's Results Framework to track progress towards the achievement of the PDO. The PMU submitted the verification reports on national HCFC consumption from 2013 to 2016 to ExCom through the Bank.

On a bi-annual basis, the PMU submitted to the Bank project progress reports, which included information on implementation progress and disbursement status. Also, annual third-party verification of import data submitted by the DIW was compared with actual import data from the Customs Department. The ICR (p. 27) stated that the MIS, third-party verification process, bi-annual progress reports, and the Progress Completion Report provided a consistent and transparent M&E process.

According to the Bank team (July 28, 2020) the Bank found the quality and accuracy of the M&E data satisfactory.

c. M&E Utilization

According to the ICR (p. 27), the PMUs and the project team used the Results Framework to monitor implementation progress. Also, at the national and sector levels, the project's M&E data was used to inform national/sectoral-level compliance and the phase-out strategy for Phase II and HFC phasedown.

There were moderate shortcomings in the M&E design. Overall, the M&E system was sufficient to assess the project's progress towards achieving the objective. Therefore, the project's overall M&E quality was Substantial.

M&E Quality Rating

Substantial

10. Other Issues

a. Safeguards



The project was classified as category B and triggered the Bank's safeguard policy OP/BP 4.01 (Environmental Assessment). According to the ICR (p. 27) for the A/C sector, an Environmental Management Plan (EMP) was prepared and publicly disclosed for each of the 11 participating manufactures. In addition, trainings on the safe use of HFC-32 were provided to all participating A/C enterprises. Furthermore, an Environmental Management Framework (EMF) was prepared for the foam sector to provide guidance on effectively identifying and addressing environmental and social safeguard issues resulting from site-specific sub-project investments.

The ICR (p. 28) stated that both, the EMP and EMF, were in compliance with OP/BP 4.01 and local laws and regulations.

Since safety practice and capacity in especially small foam enterprises was weak, the Bank team provided due diligence to ensure the installation of safety equipment, safety inspection, and safety trainings. EMPs were prepared for those 15 enterprises converted to cyclopentane.

According to the ICR (p. 28) the Bank's environmental specialist provided support during project appraisal, implementation support and supervision missions and ensured that sector-relevant health and safety issues were addressed appropriately and that ozone-depleting substance equipment was disposed properly.

b. Fiduciary Compliance

Financial Management:

According to the ICR (p. 28), the project's Financial Management performance was Satisfactory throughout implementation.

During project appraisal, the project's Financial Management risk was assessed as Substantial. The Bank conducted a Financial Management capacity assessment, which identified several actions to mitigate this risk. According to the ICR (p. 29) these included: i) developing a Financial Management Manual and Sub-grants Manual included in the Project Implementation Manual; ii) appointing Financial Management consultants as a disbursement condition for the DIW and the GSB; iii) installing acceptable accounting software; iv) appointing an external auditor accepted by the Bank; and v) training project staff on the Bank's financial requirements, disbursement arrangements as well as the project's financial management processes and procedures.

The ICR (p. 29) stated that interim financial reports were submitted on a timely basis. The external auditor's opinions were unqualified.

Procurement:

According to the Bank team (July 28, 2020) based on post-procurement reviews, the project did comply with the Bank guidelines. The Bank team also stated that the project experienced procurement delays on the part of the Department of Industrial Works - PMU. In order to address these delays, procurement trainings were provided regularly throughout project implementation.



c. Unintended impacts (Positive or Negative)

NA

d. Other

11. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Highly Satisfactory	Highly Satisfactory	
Bank Performance	Highly Satisfactory	Highly Satisfactory	
Quality of M&E	Substantial	Substantial	
Quality of ICR	---	Substantial	

12. Lessons

The ICR (p. 31-32) included several useful lessons learned, including:

- **Combining investment incentives with policy and future market demand is critical for phasing out the use of HCFC in the foam and AC sectors.** This project provided sub-grants for enterprises willing to phase out HCFC which resulted in obtaining buy-in for the introduction of the HCFC-141b ban. The introduction of a ban then resulted in larger foam enterprises and system houses to prepare to decrease their demand for HCFC-141b.
- **Providing examples for adopting new technologies is useful for getting the stakeholders' buy in.** In this project evidence for the adoption of technologies by one of the leading manufactures in Japan supported consensus building among stakeholders. Also, the collaboration between the FTI and Japan's Ministry of Economy, international Trade and Industry was critical for triggering private sector investment in promoting HCFC-32.

13. Assessment Recommended?

No

14. Comments on Quality of ICR



The ICR provides an adequate overview of project preparation and implementation and is internally consistent and relatively concise. Also, the ICR complies with the guidelines and provides a solid economic analysis and is outcome driven. Furthermore, the included lessons learned are useful for similar future Bank operations. However, the ICR does not provide any information on procurement and would have benefited from pointing out any implementation challenges if there were any. Overall, the quality of the ICR is rated Substantial.

a. Quality of ICR Rating
Substantial