Combined Project Information Documents / Integrated Safeguards Datasheet (PID/ISDS)

Appraisal Stage | Date Prepared/Updated: 22-Mar-2018 | Report No: PIDISDSA23924

BASIC INFORMATION

A. Basic Project Data

Country	Project ID	Project Name	Parent Project ID (if any)
China	P156397	China HCFC Phaseout Project Stage II	
Region	**Estimated Appraisal Date**	**Estimated Board Date**	**Practice Area (Lead)**
EAST ASIA AND PACIFIC	30-Mar-2018	30-Apr-2018	Environment & Natural Resources
Financing Instrument	**Borrower(s)**	**Implementing Agency**	
Investment Project Financing	People's Republic of China	Ministry of Environmental Protection, Foreign Economic Cooperation Office	

Proposed Development Objective(s)

The project development objective is to reduce HCFC production and consumption, as well as to avoid and reduce the use of high global warming controlled substances in the consumption sector and the emissions of greenhouse gases from the production sector.

Components

Investment in the Reduction of the Consumption of Controlled Substances
Investment in the Reduction of the Production of Controlled Substances
Technical Assistance and Policy Support
Project Management
Preparation of Phase-out and Emissions Reduction Activities

Financing (in USD Million)

SUMMARY

Total Project Cost	573.39
Total Financing	573.39
Financing Gap	0.00

DETAILS

Total Government Contribution	431.92

Environmental Assessment Category

B - Partial Assessment

Decision

The review did authorize the preparation to continue

B. Introduction and Context

Despite HCFC phase-out in developed countries and first stage of phase-out in developing countries, HCFC production and HCFC-based manufacturing are still important to China's economy. China produces about 90% of the global HCFC supply and is responsible for 60% of the global HCFC consumed for manufacturing foam and cooling and refrigeration products, for specialty applications (degreasing, fire protection, etc.), and servicing existing equipment.

HCFC production in China continues to include HCFC-22, HCFC-141b, HCFC-142b, HCFC-123, and HCFC-124, with the first three used primarily as refrigerants, foam blowing agents and feedstock[1], accounting for 99% of production. HCFCs are also used in China as a feedstock for its large production of PTFE (polytetrafluoroethylene, or Teflon), VDF (vinylidene fluoride), and pesticides, among others.

HCFC consumption, according to the definition of the Montreal Protocol[2], is captured in China by six major industrial sectors: refrigeration and air-conditioning (RAC) manufacturing; industrial and commercial refrigeration (ICR); servicing of equipment; solvents; polyurethane (PU) foam manufacturing; and extruded polystyrene (XPS) foam manufacturing. China's relatively high rate of economic growth (6.7% in 2016) is powering demand for both pure HCFCs as well as HCFC-based products such as HCFC-141b pre-blended polyol (used by importing countries to make foam products) and HCFC-22 based air-conditioners.

Consequently, China's production and consumption baseline levels, and the subsequent reductions required dwarf that of all other countries and leave China with the burden of the work in global elimination of remaining HCFCs (see Table 1 for China's MP Obligations). Given the relatively low ODP of HCFCs, converting what China must eliminate during the Protocol's compliance period from an ODP tons measurement into a measure of physical metric tons, the amount of product that need to be reduced is very large – 434,297 MT of HCFCs produced at baseline alone.

Table 1. Montreal Protocol (MP) Obligations for China

Allowed Level of Annex C Substances under the Montreal Protocol	Production Limit (ODP tons)	Consumption Limit (ODP tons)
Reported Baseline (2009-2010 average)	29,122	19,269
2013 – Freeze on baseline levels	29,122	19,269
2015 – 90% of the baseline	26,210	17,342
2020 – 65% of the baseline	18,929	12,525
2025 – 32.5% of the baseline	9,464	6,262
2030 – 2.5% of the baseline*	728	482
2040 – No consumption	--	--

*Per the MP, the annual consumption averaged over 10 years from 2030-2040 should not exceed 2.5% of the baseline and this quantity is allowed only for the purpose of servicing the remaining fleet of HCFC-dependent equipment.

To meet the agreed phase-out schedule, China developed an overarching Stage I HCFC Phase-out Management Plan (HPMP) in 2009 that was partially financed by the MLF ($365 million total). The objective of the overarching Stage I HPMP was to enable China to limit the demand and supply of HCFCs to the baseline level in 2013 and 90% of that level by 2015 in line with the MP phase-out schedule. In fact, China made a more ambitious pledge to the MLF, having committed to limit consumption to 16,979 ODP tons in 2015 and succeeded at that.

[1] Feedstock applications are the applications where ozone depleting substances are chemically converted to other chemicals. Use of HCFC-22 for feedstock applications is not controlled by the MP.

Sectoral and Institutional Context

China's US$168 million HCFC Phase-out Project (P115561) implemented with the Bank's assistance is one of the projects under the Stage I Overarching HPMP undertaken by China with the four MLF Implementing Agencies to support it in meeting its 2013 and 2015 MP obligations. The HCFC Phase-out Project with the Bank targeted the major consumers of HCFC-141b in the PU foam sector and producers of HCFC-22, HCFC-141b, HCFC-142b, HCFC-123 and HCFC-124. According to independent verification by the Bank, HCFC reduction from this intervention has contributed to China's full compliance with its 2013 freeze obligation and the 10% consumption and production reductions on January 1, 2015. With less than a year until the project completes, all development objectives have been reached with a disbursement ratio over 96%. Disbursement to beneficiaries by the Foreign Economic Cooperation Office of the Ministry of Environmental Protection (FECO) is at 66%.

Total HCFC-141b consumption in the PU foam sector has been reduced below the 40,455 MT target under the project, similarly to total production of HCFCs which was in 2015 at 85% of the maximum amount allowed. Sixty subgrants for foam enterprises and 9 production closure contracts were signed. Production reduction contracts through quotas were done for 12 enterprises.

Through subgrants in the foam sector, 11,383 MT of HCFC-141b have been phased out and another 1,586 MT will be phased out in the foam sector before the closing date. GHG emission reduction achieved to date by the consumption sector is about 9 million tons of carbon dioxide equivalent (tCO2 eq) against the target of 11 million tCO2e.

A total production reduction of 58,864 MT has already been achieved. Results of the production sector component of the Stage I HCFC Phase-out Project are depicted below in Table 2. In addition, the project has resulted in production capacity closures of almost 110,000 MT per annum, including idle capacity.

Table 2. Stage I HCFC Production Sector Results

	Beginning of Stage I			After Stage I implementation		
	No. of producers	No. of production lines	Production capacity (MT/y)	No. of producers	No. of production lines	Production capacity (MT/y)
HCFC-22	16	33	742,000	14	29	699,500
HCFC-141b	8	12	161,000	5	5	116,000
HCFC-142b	12	15	105,290	11	11	98,750
HCFC-123	1	2	9,900	1	2	9,900
HCFC-124	1	2	5,400	1	2	5,400
Total	28	64	1,023,590	23	49	929,550

Another notable achievement of the Stage I Project is to have successfully mitigated a risk identified at appraisal, namely increased HFC-23 byproduct emissions from HCFC-22 production given the end of the crediting period of the Clean Development Mechanism (CDM). Relevant Government agencies worked together to develop a program of support to producers that not only picked up where the CDM activities ended, but allowed emissions to be reduced from 62.5% in 2013 to only 2.2% in 2016. As the GWP of HFC-23 is 14,800, the emissions avoided by this action amount to 63.9 million tons CO2 eq.

Achievements of the Stage I project are expected to be sustained in large part due to the technical assistance

[2] Consumption is equal to production plus imports, minus exports of ODS.

(TA) and policy work that made up 5% of the total grant. For foam consumption, three planned subsector bans (by 2018) in the use of HCFC-141b will ensure that the converted enterprises continue to use alternative foam blowing agents and additional enterprises in the sector transition at their own costs. These enterprises still have benefitted from the sector level research and technical work on alternatives, delivered through workshops and training. In production, Government action, including efficient application of the production quota, has resulted in the permanent closure of five producers.

The Government of China decided to continue to address HCFC phase-out obligations in each of its major consumption sectors and the production sector. This approach is captured in China's 2016 Stage II HCFC Phase-out Strategy in its HPMP and an HCFC Production Phase-out Management Plan (HPPMP) that identify measures required to control supply (HCFC producers) and consumption of HCFCs at target levels. Subsequent MP targets for China will amount to an elimination of 4,817 and 6,263 ODP tons in consumption respectively for 2020 and 2025.

Additional HCFC phase-out in China will be a significant step towards climate mitigation because HCFCs are not only ODS, but are also GHGs with GWP values ranging from several hundred to several thousand times that of carbon dioxide. It is expected that the MP HCFC phase-out schedules will eventually lead to the cumulative emission reduction of HCFCs equivalent to 12–15 gigatons of CO2e worldwide.[3] Moreover, because China's HCFC phase-out strategy is grounded on a climate-friendly transition (where technically feasible and in line with decision of the MP Parties), it is avoiding the introduction of large amounts of high-GWP HFCs in the foam sector. This is complementary to the future HFC controls that the Kigali Amendment will introduce starting in 2024 for most Article 5 countries, including China.

China received MLF approval of $500 million for its Stage II HPMP in December 2016 to be channeled through the implementing agencies, including the World Bank, UNDP, UNIDO and UNEP, and bilateral agencies, on a sector-by-sector basis. The Bank will support China in a Stage II HCFC Phase-out Project, again through the PU foam consumption and production and sectors.

Consumption Sector – PU Foam. The strategy taken to achieve the required phase-out was to target HCFC-141b consumption in three of ten subsectors because of the availability of viable, low-GWP alternatives and due to a concentration of HCFC-141b consumption in several larger enterprises allowing for cost-effective conversion with capacity to safely manage the alternatives, primarily hydrocarbon (HC).

Subsectors that continue to use HCFC-141b are now the focus of China's attention for most effectively reducing overall HCFC consumption in manufacturing sectors. All HCFC-141b used in the remaining PU foam subsectors is addressed in China's Stage II HPMP strategy and foam sector plan through a mix of actions paced by interim phase-out targets. Interim targets have been set in the Stage II HPMP China-ExCom agreement (2018, '20, '23, '25) to be achieved through an HCFC consumption ban in two priority subsectors, solar water heaters and pipe insulation.

The Stage II project will thus be aligned with China's 1) interim foam sector plan goals and the 2020 MP consumption reduction target requiring an equivalent of 13,490 MT of phase-out, as well as 2) final foam sector goals of the 2025 MP consumption reduction target requiring 14,164 MT of phase-out from the 2023 interim target. and 100% phase-out by 2026 (another 300 MT from the spray foam subsector). It is expected that there will be an increased number of small-and-medium size enterprises (SMEs) in Stage II with lower HCFC consumption, as well as lower technical and financial capacity.

[3] *Guus Velders et al., PNAS paper, 2009*

As China concludes Stage I implementation, remaining HCFC consumption in the PU foam sector after 2015 of 40,451 MT will be the starting point for immediate future action in the sector in accordance with the MLF approved Stage II HPMP.

Table 3. Actual and targeted HCFC-141b consumption in the PU foam sector 2015 - 2026

Milestone	Baseline	2015	2018	2020	2023	2025	2026
Max. HCFC consumption (MT)	49,020*	40,451	34,314	26,961	9,800	3,000	0
Max. HCFC consumption (ODP tons)	5,392	4,450	3,775	2,966	1078	330	0
Phase-out amount (MT)	-	8,569**	6,137	7,353	17,163	6,800	3,000
Phase-out amount (ODP tons)	-	943	675	809	1,888	748	330
Phase-out %	-	17.5%	30%	45%	80%	94%	100%

* The PU foam sector baseline as indicated in Stage I HCFC phase-out agreement
**8,569 MT of HCFC-141b was eliminated under Stage I along with 6,116 MT of reductions from 2012 to 2013.

Production Sector. Similar to the Stage I Project, reduction and elimination of HCFCs in China will employ a balanced approach to supply and demand. On the supply side, the remaining 23 out of 28 original HCFC producers is made up of HCFC production for controlled uses under the Montreal Protocol and for feedstock use that is not controlled, but monitored for the purposes of ensuring compliance with China's commitment to the MLF.

China finalized the preparation of the next stage of its HPPMP in 2017 in cooperation with the World Bank. This plan, that is to support China in meeting required 2018 through 2025 production reductions, is expected to be approved by the MLF Executive Committee in 2018. As China is the main producer of HCFCs worldwide, the balance of HCFC supply with global demand is a critical part of further implementation of China's HPPMP. A decreased demand can result in an oversupply of HCFCs and lower prices, and consequently unwillingness of HCFC users to phase-out, while an insufficient supply can result in illegal production. This project will co-finance the implementation of the yet-to-be approved HPPMP.

Table 4. Total HCFC Production Reductions by 2025 (in ODP tons)

2015 Maximum Allowed (a)	2016 Verified Production	2017 Quota	2020 Reduction Target	2025 Target (b)	Estimated Reductions needed to meet 2025 Target of 67.5% (a)-(b)	Million tCO_2 equivalent eliminated*
26,210	22,514	23,930	18,929	9,465	16,745	363.8

* Depending on the production phase-out percentage of HCFC-22, HCFC-141b, and HCFC-142b

Bank Involvement and Rationale. The Bank has been engaged in ODS phase-out work in China for nearly 25 years. It served as China's partner in both CFC (chlorofluorocarbon) Production Closure and Foam CFC Phase-out Sector Plans under the ODS IV Project. Since 2012 the Bank has initiated an HCFC phase-out program to assist China to meet its complete HCFC phase-out by 2030 in both production and consumption sectors. The Bank's support is given to China in phases consistent with the MLF practice. The program starts with the Stage I HCFC Phase-out Project from 2012 – 2019. This proposed project will address the same sectors cover under the Stage I Project with the objectives to meet the subsequent obligations of the Montreal Protocol. The Bank is committed to supporting China's efforts to transition industry to environmentally friendlier substances, while minimizing climate impact. This project will channel the investments and policy and technical support needed to continue China's impressive track record of compliance with its international environmental obligations.

C. Proposed Development Objective(s)

Development Objective(s) (From PAD)

The project development objective is to reduce HCFC production and consumption, as well as to avoid and reduce the use of high global warming controlled substances in the consumption sector and the emissions of greenhouse gases from the production sector.

Key Results

The PDO level results indicators are**:** (a) Consumption of HCFC-141b within the allowable limits in 2020 and 2025; (b) Production of HCFCs (HCFC-141b, HCFC-142b, HCFC-22, HCFC-123 and HCFC-124) within the allowable limits in 2020 and 2025**;** (c) Reduction of GHG emissions in the PU foam sector; and (d) Reduction of GHG emissions in the production sector.

D. Project Description

The HCFC Stage II project is $573.39 million of which $352.07 million will be financed by the Bank's Ozone Trust Fund (OTF). The MLF support will cover part of the project costs of the consumption and production sectors. The Project description covers the full project, including all tranches of financing. The funds for the consumption sector amounting to $141.47 million has been approved by the Multilateral Fund. An application for the funding request of $210 million for the production sector, has been submitted to the Multilateral Fund, with an approval schedule of June 2018. The remaining $0.6 million for developing the next Stage of the project will be submitted to the Multilateral Fund towards the later part of the implementation of this Project.

Part of the approved funding for each sector will be allocated for financing investment in reduction of HCFC consumption and production. The balance of each approval will be used to jointly financed technical assistance and project management. The Project has been prepared with the understanding that at Bank approval, there will be partial project funding available for the Project. Once the funding for the production sector is determined, an additional financing package will be processed.

Component 1: Investment in the Reduction of the Consumption of Controlled Substances (US$229.04 million; OTF: US$128.95 million; Beneficiaries: US$100.09 million)

i. Financing the foam enterprises converting to in-house mixing of hydrocarbon and polyol from the use of Controlled Substances.

ii. Financing foam enterprises converting to the use of hydrocarbon pre-blended polyol from the use of Controlled Substances.

iii. Financing foam enterprises converting to CO_2/water-blown, HFO or other low-GWP alternative technology from the use of Controlled Substances.

iv. Conversion of foam system houses in order to develop new, low GWP foam formulations that meet the needs of downstream foam enterprises, and to scale-up the supply of hydrocarbon pre-blended polyol.

Financial assistance through subgrant agreements (SGAs) for foam manufacturing line conversions will be provided to beneficiary enterprises on a rolling basis. To incentivize foam enterprises to come forward, the maximum allowable HCFC-141b consumption for the sector will be gradually reduced from 2018 onwards. Use of HCFC-141b in solar water heater and pipe insulation subsectors will be prohibited in 2020. HCFC-141b consumption in other subsectors will be permitted through the 2025 MP obligations albeit with a reduced supply of HCFC-141b as a result of Component 2 activities. Complete phase-out will occur by 1 January 2026. Hence, phase-out subprojects in remaining subsectors will be added on a need basis. An estimated 200 individual conversion subprojects at enterprises that consume more than 20 MT of HCFC-141b are expected.

The implementation modality to be adopted for small enterprises to switch to an alternative foam blowing agent will be key to advancing the phase-out in the latter years of the Stage II Project, given that the largest proportion of HCFC consumption rests with these SMEs.

Component 2: Investment in the Reduction of the Production of Controlled Substances (US$303.93 million; OTF: US$194.25 million[4]; Beneficiaries: US$ 109.68 million)

i. Compensation of HCFC producers to reduce HCFC production according to annual production quotas.

ii. Compensation to HCFC producers to partially close their HCFC production capacity.

iii. Compensation to HCFC producers to completely close and/or dismantle their HCFC production capacity.

Funding under Component 2 will be used to compensate select producers of HCFCs for controlled uses that surrender their production rights in part or in full in order to contribute to national compliance with 35% production reductions in 2020 and 67.5% requirements in 2025, ensuring that China's HCFC production does not exceed 18,929 ODP tons in 2020 and does not exceed 9,465 ODP tons in 2025. Those producers that partially or completely close production capacity in line with the Stage II HPPMP agreement between China and the ExCom will also receive compensation. A pre-determined compensation level on a US$/kg basis will be applied as was the case in Stage I.

As in the Stage I project, grant funds will be disbursed to producers based on milestones met. Achievement of the overall agreed annual reduction targets will be verified on an annual basis by an independent consultant appointed by the Bank (as mandated by the MLF ExCom). Levels of compensation, penalty provisions, detailed milestones and targets, and enterprise reporting obligations of production data will be described in the project implementation manual (PIM) upon ExCom approval of Stage II production sector funding.

Component 3: Technical Assistance and Policy Support (US$ 12.26 million; OTF: US$9.35 million[5]; Beneficiaries: US$ 2.91 million)

i. Provision of TA to support the phase-out of controlled substances in the foam sector including support related to research, identification and testing of potential substitutes for HCFCs, revision or development of technical and safety standards, and training of stakeholders to develop technical capacity for the conversion to new alternative technologies.

[4] The OTF contribution is pending the approval of the Multilateral Fund in June 2018.
[5] Part of the OTF contribution (US$5.15 million) has already been approved by the Multilateral Fund. The balance is pending the approval in June 2018.

ii. Generation of surveys, analyses, and research and feasibility studies on HCFC production-related matters including on prevention of site contamination, on alternatives and feedstock uses, and for promoting and managing HCFC production reduction.

iii. Development of policy impact assessments for implementing bans on HCFC usage in the solar water heater and piping subsectors by 2020 and remaining sectors by 2025, and, strengthening and developing policies on controlled substances for the Ministry of Environmental Protection's consideration and approval.

iv. Financing performance and baseline verification, satisfaction surveys, and other studies to evaluate the effectiveness of support, determine the degree of compliance with guidelines, plans and targets, and improve performance.

v. Building capacity for monitoring HCFC consuming and producing enterprises in key provinces and cities by provincial and local Environmental Protection Bureaus, with support of FECO and FECO consultants.

vi. Generation of research, studies and analyses, training, and, information exchange and dissemination.

vii. Provision of technical support for project implementation.

Component 4: Project Management (US$ 27.56 million; OTF: US$18.92 million[6]; Beneficiaries: US$ 8.64 million)

The project will provide a 5% management fee to FECO for the continued operation and capacity building of the Project Management Office which will oversee day to day operations of the project, supervise and coordinate the implementation of the project.

Component 5: Preparation of Phase-out and Emissions Reduction Activities (US$ 0.6 million; OTF US$ 0.6 million[7])

Scoping and preparation of activities and relevant studies for follow-on projects will be commissioned as needed on HCFC phase-out as well as HFC phase down in order to avoid the use of high GWP controlled substances consistent with the Kigali Amendment.

E. Implementation

II. IMPLEMENTATION

The Ministry of Environmental Protection is empowered by the State Council to be the national lead agency for the implementation of the Montreal Protocol in China. MEP has appointed FECO to serve as a national focal point and implementing agency. It carries out its role and responsibilities as the national implementing agency under overall guidance of the National Leading Group (NLG) for the Implementation of the Montreal Protocol. The NLG is represented by officials and experts from 17 ministries.

[6] Part of the OTF contribution (US$7.37 million) has already been approved by the Multilateral Fund. The balance is pending the approval in June 2018.
[7] The OTF contribution is expected at the later part of the implementation of this Project.

A PMO established for the HCFC Stage I Project will continue to facilitate day-to-day functions as required by the project. The PMO will be supported by a technical consulting team (an implementation support agency).

The Ministry of Finance (MOF) will initially enter into a US$141.47 million grant agreement with the World Bank with the understanding that additional financing will be processed after the ExCom's approval of China's Stage II HCFC Phase-out Production Management Plan (Component 2) by 2018. The additional financing will amend the level of funding under the Grant Agreement to enable the Bank to channel funds to finance all activities of Component 2, and those related to the production sector in Components 3 and 4, as described in this document.

Upon receipt of grant proceeds, FECO will finance costs in part or in full of eligible enterprises. For HCFC foam and process conversions, SGAs will be signed. For HCFC producers, quota reduction contracts and/or closure and dismantling contracts will be signed. Grant funds will be disbursed in tranches to eligible producers upon achieving agreed implementation milestones.

A PIM has been prepared to provide operational guidance. The guidance covers criteria, procedures and arrangements for implementing the Project, including in respect of procurement, financial management, environmental management, sub-grant processing, verification and payment mechanisms, and monitoring and evaluation.

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F. Project location and Salient physical characteristics relevant to the safeguard analysis (if known)

Project supported enterprises will be selected nationwide. They are located usually in urban or suburban areas or industrial parks.

G. Environmental and Social Safeguards Specialists on the Team

Feng Ji, Environmental Safeguards Specialist
Shuang Zhou, Social Safeguards Specialist
Jianliang Xiao, Social Safeguards Specialist

SAFEGUARD POLICIES THAT MIGHT APPLY

Safeguard Policies	Triggered?	Explanation (Optional)
Environmental Assessment OP/BP 4.01	Yes	The EMF for the HCFC Stage I (P115561) has been updated and used for this project. The existing EMF includes an environmental screening process by dividing project activities into six categories. The screening process has been updated to address

potential job losses/displacement/retrenchment and technical assistance (TA) activities. The integrated framework will provide procedures for conducting environmental and social due diligence/audit for each category of project activities. The Stage II project will support TA activities to: encourage enterprises to convert to new alternative technology; strengthen capacity of FECO and Environmental Protection Bureaus; develop new policies to support sustainable phase-out of HCFCs in China, and etc. The project does not anticipate supporting any feasibility studies/technical design, or employee compensation plan/resources management plan.

The HCFC Phase-out Stage II Project aims to reduce HCFC emission that damages the ozone layer and contributes to the global climate change. Similar to the HCFC Phaseout Stage I project (P115561), the Stage II Project will include a combination of investment, technical assistance, and policy and regulatory interventions. Component 1 of the Stage II project entails replacement of HCFC-141b with alternatives that could be flammable.

Under the HCFC Phase-out Stage I Project, any companies opting for cyclopentane, which is a flammable material, must ensure that safety equipment is properly installed, safety training must be provided to workers, and existing facilities must be upgraded to ensure conformity with the domestic regulations and fire codes.

The EMF developed under the Stage I Project in 2011 includes the procedures for managing the environmental aspects of subprojects (i.e. subproject screening and categorization, preparation of EA safeguards documents, public consultation and disclosure, grievance mechanism, review and approval, monitoring and reporting), and institutional responsibilities for environmental and social management of subprojects.

While the EMF for Stage I, which was prepared in 2011, did not include the screening of Technical Assistance for environment and social issues, the

Stage I Project, however, strengthened capacity of FECO and local EPBs.

The Stage II Project adopts the Environmental Management Framework (EMF) that was prepared for the Stage I project with addition of the screening process for environment and social issues that may arise if job loss and TA activities as mentioned above.

During implementation of Stage I Project, FECO and the selected enterprises were in compliance with the requirement of EMF, including preparation, implementation and monitoring of the required safeguards documents (e.g. EMP). The EMF for Stage I is deemed adequate to address the environmental issues (e.g. safety) of the project during project implementation. The Stage I Project included project activities which caused site specific, minor to moderate adverse environmental impacts within the enterprises.

On the social impact aspect, the Stage I Project activities caused economic displacement of approximately 1,400 enterprise employees, arising from: 1) closure of five production lines in the production sector (~400 employees); 2) relocation of one PU foam enterprise (~1,000 employees). The PU foam enterprise was relocated to another province about 50 kilometer from the original site. These employees were laid off on a voluntary basis and were compensated by the enterprise in accordance with the Chinese regulations. FECO conducted a retrospective study of these enterprises, and found no non-compliance with regulations, nor non-conformance with World Bank requirements on mitigating and compensating associated social impacts.

The Stage II project implementation will have similar social impacts, attributing to 1) closure of approximately 10 HCFC production lines; 2) possible needs of relocation for 10-15 PU foam enterprises. Both activities may result in retrenchment of workers. Based on experience from the Stage I Project, it is estimated that approximately 700-1,000

		employees may be affected by worker retrenchment, including 500-800 employees from the production sector and 200 employees from the foam sector. The project developed an Employee Compensation Framework (ECF), consistent with the Framework employed by the Stage I Project, to provide guidance for conducting the employee retrenchment process and mitigating potential social impacts, such as reduced livelihood and income. Any enterprises with plans to lay off workers as result of production reduction, conversion and relocation activities should develop and implement an Employee Compensation Plan (ECP) in compliance with the ECF. Relevant monitoring and grievance scheme are also included. The ECF will provide guidance to both sub-project sponsors and FECO/MEP for assessing social impacts and determine proper mitigation measures and plans to address those impacts.
Natural Habitats OP/BP 4.04	No	Stage I project activities did not have impacts on natural habitats. Like the Stage I project, the project will not affect any protected areas, known natural habitats, or established or proposed critical natural habitats. The project activities will be either in existing enterprise premises or industrial parks.
Forests OP/BP 4.36	No	Stage I project activities did not have impacts on forests. Like the Stage I project, the project will not finance activities that would involve significant conversion or degradation of critical forest areas or related critical natural habitats as defined under the policy. The project activities will be either in existing enterprise premises or industrial parks where there are adequate infrastructure to support industrial activities.
Pest Management OP 4.09	No	Stage I project activities did not have impacts on Pest Management. Like the Stage I project, the project will not finance procurement of pesticides or pesticide application equipment (either directly or indirectly). In addition, the project will not affect pest management in a way that harm could be done, nor lead to increased pesticide use and subsequent increase in health and environmental risk.
Physical Cultural Resources OP/BP 4.11	No	Stage I project activities did not have impacts on the PCRs. Like the Stage I project, the project will not

		adversely affect sites with archeological, paleontological, historical, religious, or unique natural values. The enterprises to be supported are located in urban or peri-urban areas where they are unlikely to be nearby physical cultural resources.
Indigenous Peoples OP/BP 4.10	No	Enterprises to be supported are located in urban or peri-urban areas where they are unlikely to have any presence of any issues related to indigenous peoples by the criteria of the Bank IP term. In case enterprises have to relocate to new areas, they are expected to move to industrial parks within urban or nearby peri-urban areas since the industry needs basic infrastructure support. Such kind of areas are unlikely to have any issues related to indigenous people either. This policy will not be triggered in this project.
Involuntary Resettlement OP/BP 4.12	Yes	The Stage I project implementation has not resulted in any involuntary resettlement. None HCFC production plants have required relocation as reduction and shut-down activities happened at the same sites. Four out of the 54 participant PU foam enterprises have been relocated to industry parks, following government urban planning requirements. None of them have given rise to land acquisition of rural collectively-owned land or involuntary resettlement of affected communities. The Stage II project implementation will likely follow the same path. Besides participant enterprises are either already in industry parks, or will relocate to industry parks, if they are required to move out of current sites of urban/peri-urban areas. It is expected 10-15 enterprises may need to relocate. Additionally, expectantly 2-5 enterprises already sit in industry parks may need to acquire more land for the conversion. As all activities are expected to happen in industry parks, the Stage II project is unlikely to trigger involuntary resettlement. However, given the long period (10 years) for project implementation and in response to any unexpected events in the future, the project team has updated the Stage I Resettlement Policy Framework (RPF) for application of HCFC Stage II project.

		The RPF highlights principles, procedures, grievance redress mechanism for involuntary resettlement under this project. It will provide guidance to both sub-project sponsors and FECO/MEP for the social assessment and social action taking process to be followed in evaluating individual sub-projects to be considered for financial support under the Project. Due diligence review will be done when and as required for land acquisition and resettlement for the selected project enterprise site.
Safety of Dams OP/BP 4.37	No	Stage I project activities did not have impacts on dam safety. Like the Stage I project, the project will not finance construction or rehabilitation of any dams as defined under this policy. This polices is not triggered.
Projects on International Waterways OP/BP 7.50	No	There are no international waterways in the project area.
Projects in Disputed Areas OP/BP 7.60	No	The project area is not in disputed area.

KEY SAFEGUARD POLICY ISSUES AND THEIR MANAGEMENT

A. Summary of Key Safeguard Issues

1. Describe any safeguard issues and impacts associated with the proposed project. Identify and describe any potential large scale, significant and/or irreversible impacts:
Environmental Assessment:

The project, which is classified as a Category B project, is an extension of HCFC Stage I Project. Like the Stage I Project, the Stage II Project entails project activities similar to the Stage I Project plus an additional type of subprojects: partial and complete closure of HCFC facilities. Environmental impact of these activities proposed for the Stage II Project is site specific, minor to moderate adverse impacts. The environmental benefits of the project greatly outweigh the negative impacts, as the project will phase out HCFCs which have both ozone depleting and global warming potential. Applicable environmental safeguard policies for the project include Environmental Assessment (OP 4.01).

Subprojects to be financed by the Project include six (6) types of activities: (a) foam enterprises whose conversions to alternatives such as hydrocarbon technology will take place at their present location; (b) foam enterprises whose conversion to hydrocarbon technology will involve relocation of their facilities; (c) Existing polyol system houses providing technical support on low GWP alternatives that may be flammable and will provide the polyol pre-blended with hydrocarbon to smaller foam enterprises; (d) foam enterprises engaging in identification and testing of potential substitutes; (e) HCFC production reduction; and (f) closure of HCFC production facilities. The Project aims to contribute to the overall reduction of HCFC consumption and production as per the Montreal Protocol, by adopting low carbon technologies, as replacement to HCFCs.

As the project has multiple subprojects and the locations of subprojects were not known at the time of appraisal, the Environmental Management Framework (EMF) for the HCFC Stage I Project has been updated by the PMO. Like the HCFC Phase-out Stage I project, any companies opting for cyclopentane (a replacement to HCFCs), which is a flammable material, must ensure that safety equipment is properly installed, safety training must be provided to workers, and existing facilities must be upgraded to ensure conformity with the domestic regulations and fire codes. Based on the experience of the Stage I project, the project will provide TA to encourage enterprises to convert to the new alternative technologies; and to strengthen the capacity of FECO and Environmental Protection Bureaus to promulgate and enforce new HCFC phase-out policies in China.

In addition, the newly proposed type of subprojects: partial and complete closure of HCFC facilities may have legacy issues such as contaminated sites, for which due diligence would be conducted and a relevant site management plan proposed, in order to mitigate the risks. The project will not support any feasibility studies/technical design, or land use plan/resources management plan. Given that there was no specific screening of TA and policies for the HCFC Stage I project, the updated EMF includes the screening of TA and policies and regulatory interventions for environmental and social issues.

Social Assessment:

The Stage II Project is an expansion of the Stage I Project, in a larger scale involving more small-medium enterprises (SMEs). Therefore, the Stage II Project is expected to have similar social impacts to Stage I.

The Stage I Project closed five production lines of five HCFC enterprises. It gave rise to retrenchment of approximately 400 employees. The Stage I Project also included conversion of 54 PU foam enterprises, among them four were relocated due to urban planning requirements of local government. Three relocated enterprises keep their workers as the new sites are within less than 10 kilometer from the original sites. Only one of 54 PU foam enterprises had worker retrenchment, as it was relocated to approximately 50km away from the original site. A total of 1,027 employees of this company chose to leave.

In total approximately 1,400 employees were laid off by the Stage I Project. They were compensated according to Chinese labor laws and local compensation standards. FECO commissioned a third party to conduct a retrospective study of the Stage I social impacts in July 2017. The study has not identified any significant social impacts associated with the worker retrenchment. Most retrenchment affected workers ofthe entire production line or the enterprise. The same compensation package was offered to the workers. Affected woman and elderly workers were not found to be particularly disadvantaged in comparison with other groups. They participated in the consultation and negotiation processes for the retrenchment, and received the same compensation package. Yet it is hard to track whether women or elderly workers are more vulnerable to find alternative jobs in the labor market, as it has not been covered by the existing project monitoring scheme hence there is no available data.

The Stage II Project involves production reduction of 23 remaining HCFC production enterprises, including shut-down of approximately ten production lines, and conversion of 500 PU foam SMEs. The conversion processes may require 10-15 enterprises to relocate due to safety concerns or urban planning requirements. If the SME is relocated to a far distance from the original site, retrenchment may be unavoidable. Given that enterprises and SMEs to be addressed by the Stage II Project have smaller production scales than those of the Stage I Project, it is estimated that the Stage II Project may cause retrenchment of 500-800 employees in the production sector and 200 employees in the PU foam sector, i.e. 700-1,000 in total. Improper compensation scheme may lead to reduced livelihoods and incomes, particularly for vulnerable groups such as women and elderly employees that may face challenges to find alternative

jobs.

OP4.12 Involuntary Resettlement.

The Stage I Project implementation has not resulted in any land acquisition of collectively-owned land or resettlement of urban or rural residents. The production sector did not need land acquisition as the project activity only involved reduction of production or shut-down of production lines at the same sites. The relocation of the four PU foam enterprises did not trigger involuntary resettlement since all of them moved to industrial parks which had been established more than two years. In summary, the Stage I Project did not result in any involuntary resettlement or associated social risks.

The Stage II Project is not likely to trigger involuntary resettlement either. The reduction or shut-down of production lines for the production sector does not involve land acquisition. The 200-300 PU foam enterprises in the consumption sector are either already in industrial parks, or will relocate to industrial parks, if they are ever required to move out of current sites of urban/suburb areas. Stage II SMEs have smaller production scales and the needs for relocation due to change of production are therefore expected to be less than that of Stage I. It is estimated 10-15 PU SMEs may be relocated as a result of the Stage II Project implementation, but they are not likely to result in involuntary resettlement as mostly likely they will only be allowed to take land in industrial parks. There is a possibility that 2-5 SMEs already in industry parks may need to acquire additional land for the conversion. That however will not lead to involuntary resettlement. However, given the long period (10 years) for project implementation, there may be a possibility of unlikely events that can result in involuntary resettlement, though the chance is very low.

2. Describe any potential indirect and/or long term impacts due to anticipated future activities in the project area:
The project contributes very positively to mitigating the climate change effects by phasing out HCFCs.

Besides, the project will have positive social benefits as it will reduce HCFC emissions and enhance public health by reducing impacts on the ozone layer.

3. Describe any project alternatives (if relevant) considered to help avoid or minimize adverse impacts.
Alternatives for HCFCs have been widely studied in China and in other countries. Beneficiary enterprises will be selected with suitable and well-proven technology based on the alternatives studies and the relevant guidelines from the Executive Committee of the Montreal Protocol's Multilateral Fund.

Possible project alternatives to avoid or minimize adverse social impacts of employee retrenchment include avoidance of enterprise closure, provision of job retaining training or alternative employment to affected workers. Consultation is essential for the success of this process, in particular to affected women and elder workers who may face difficulties to find alternative jobs.

Possible project alternatives to avoid or minimize adverse social impacts of involuntary resettlement include avoidance of relocation and avoidance of land acquisition outside of industry parks.

4. Describe measures taken by the borrower to address safeguard policy issues. Provide an assessment of borrower capacity to plan and implement the measures described.
Environmental Safeguard.

As mentioned above, the project has multiple subprojects and their locations of subprojects are not known at the time

of the appraisal, the Environmental Management Framework (EMF) for the HCFC Stage I project has been updated by the PMO. The updated EMF will be used to provide guidance to both beneficiary enterprises and the Project Management Office-Foreign Economic Cooperation Office (FECO) in evaluating individual subprojects. It defines the contents, procedures and institutional responsibilities for environmental management of subprojects to ensure that environmental management is in compliance with both Chinese environmental assessment (EA) laws and regulations and in accordance with World Bank EA policies and procedures as specified in OP/BP4.01 (Environmental Assessment). More details on preparation and implementation are as follows:

Preparation Phase

i) Subproject Screening. FECO is responsible for project screening. The enterprise will submit the application materials to FECO, which will in turn review materials. It will exclude from financing any proposed subproject that includes, or is linked or connected to any production facility or manufacturer included in the Exclusion List. The screening will include identification of potential job losses/displacement/retrenchment risks.

(ii) Documentation of EA, due diligence report, employee compensation plan (ECP) or resettlement action plan (RAP) for land taking. The enterprise is responsible for preparing safeguards documentation (e.g. EA/EMP, ECP, RAP or due diligence report). It will be required to submit to FECO a document package consisting of items outlined in the EMF, ECF or RPF.

(iii) Public Consultation and Disclosure. The enterprise is responsible for conducting public consultation(s). These responsibilities include: (a) public notification, (b) conducting the consultation and (c) recording the significant findings, conclusions, recommendations and next steps. Public disclosure provides affected groups or individuals the opportunity to examine the safeguards documents so that they can review the mitigating measures agreed upon and the responsibilities for implementing them. Such final safeguards documents will be locally disclosed. Details of the documentation required for the public consultation are presented in the EMF, ECF and the RPF.

(iv) Grievance Mechanism. In order to ensure that consultation, disclosure, and community engagement continues throughout project implementation, the enterprises will establish a grievance mechanism. This should allow the enterprises to receive and facilitate resolution of concerns and grievance about the subprojects environmental performance, land taking and involuntary resettlement concerns raised by the affected communities or individuals.

(v) Review and Approval of Subprojects. FECO will review the document package submitted by enterprise to ensure it is consistent in terms of environmental and social issues, mitigating measures, monitoring requirements and institutional responsibilities for mitigation and monitoring. If necessary, FECO will request additional supplementary information from the enterprise to ensure that the World Bank EA and involuntary resettlement procedures are also followed.

(vi) Related Conditions and Responsibilities. FECO will ensure that an appropriate clause is included in the enterprise's contract obligating the enterprises to implement the mitigation, monitoring, and reporting measures specified in the EMP, ECP or RAP and to strictly follow the procedures according to related Chinese laws and regulations. It is the responsibility of the enterprises to ensure that relevant tender documents and contracts include requirements put forward in the EMP, ECP RAP or due diligence report. During subproject implementation, FECO has the right to check the documents and contracts to verify that this condition has been satisfied.

Social Safeguard

Based on Stage I project experience, it is estimated that 10-15 PU foam SMEs may be relocated to industrial parks due to safety concerns or government urban planning requirements. And 2-5 SMEs may need to acquire additional land to meet the conversion needs, in existing industrial parks. It is unlikely those activities will result in involuntary resettlement of urban and rural residents. However, in order to address potential project impacts in case sub-projects may result in acquisition of rural collectively-owned land, FECO updated the Resettlement Policy Framework (RPF) based on experiences obtained from Stage I implementation. In case land acquisition is required, a Resettlement Action Plan (RAP) or an Abbreviated Resettlement Action Plan (ARAP) will be prepared by the SME, depending on the number of resettled people and the significance of impacts. If the number of affected people is greater than 200, a RAP is needed; if the number of affected people is less than 200 and the impacts to affected people is less than 10%, then an ARAP is required. If land acquisition has already happened within two years of project involvement or since appraisal of the Stage II project, a retrospective Resettlement Due Diligence will be conducted to identify and address potential legacy resettlement issues.

In response to social impacts arising from worker retrenchment as a resulting of closure of production lines or relocation of PU foam SMEs, FECO prepared an Employee Compensation Framework (ECF) in November 2017. The ECF sets out procedures and safeguard measures for labor redundancy and requires the preparation and implementation of a detailed Employee Compensation Plan (ERP) for sub-projects that will lay off workers. It also emphasizes the importance of the consultation process, and assistance to vulnerable groups (e.g. job retaining training).

Preparation and implementation of social safeguard instruments will be funded by the beneficiary enterprises.

Implementation Phase

Monitoring and Reporting. FECO will work with local environmental authorities to ensure that subproject implementation meets the requirements of all specified safeguards instruments (e.g. EA/EMP, due diligence review report, ECP or ARAP/RAP). FECO will require each enterprise to report on the implementation of its safeguards instruments. FECO will send a progress report on the safeguards instruments at least on an annual basis to the Bank.

Enterprises. The enterprises will carefully document monitoring results in accordance with the Monitoring Plan included in the safeguards instrument and identify any necessary corrective or preventive actions taken during the monitoring period, as well as the results/outcome of similar actions that may have been taken in the previous reporting period.

The project is by and large an extension of China ODS Program, which has been implemented satisfactorily. The same Project Management Office-Foreign Economic Cooperation Office (FECO) under the Ministry of Environmental Protection (MEP) will be managing this project. FECO/MEP has been working with the Bank team on ODS phase-out projects since early 1990s and has sufficient staff who are familiar with the Bank's safeguards policies and have received trainings on the Bank project management. FECO will designate staff to manage environmental and social risks and assure that procedures specified in the EMF, ECF and RPF are properly followed during implementation. In addition, qualified Chinese environmental and social consultants will be contracted to support FECO to perform the tasks required under the EMF, ECF and RPF in the identification and management of environmental and social risk in project evaluation and implementation. Therefore, the institutional capacity is deemed sufficient for the Bank's project.

5. Identify the key stakeholders and describe the mechanisms for consultation and disclosure on safeguard policies, with an emphasis on potentially affected people.

FECO consulted some enterprises during the process of updating the safeguards documents in 2016-2017. Public consultations will be conducted in accordance with the safeguards documents (EMF, ECF and RPF) after individual enterprises and their specific activities are identified during project implementation. The updated safeguards documents were locally disclosed in November 2, 2017 on the websites of FECO. The Safeguard documents were disclosed on the Bank's website in December 18, 2017.

B. Disclosure Requirements

Environmental Assessment/Audit/Management Plan/Other

Date of receipt by the Bank	Date of submission for disclosure	For category A projects, date of distributing the Executive Summary of the EA to the Executive Directors
26-Oct-2017	18-Dec-2017	

"In country" Disclosure

China

02-Nov-2017

Comments

Resettlement Action Plan/Framework/Policy Process

Date of receipt by the Bank	Date of submission for disclosure
30-Oct-2017	18-Dec-2017

"In country" Disclosure

China

02-Nov-2017

Comments

C. Compliance Monitoring Indicators at the Corporate Level (to be filled in when the ISDS is finalized by the project decision meeting)

OP/BP/GP 4.01 - Environment Assessment

Does the project require a stand-alone EA (including EMP) report?

Yes

If yes, then did the Regional Environment Unit or Practice Manager (PM) review and approve the EA report?
Yes
Are the cost and the accountabilities for the EMP incorporated in the credit/loan?
Yes

OP/BP 4.12 - Involuntary Resettlement

Has a resettlement plan/abbreviated plan/policy framework/process framework (as appropriate) been prepared?
Yes
If yes, then did the Regional unit responsible for safeguards or Practice Manager review the plan?
Yes

The World Bank Policy on Disclosure of Information

Have relevant safeguard policies documents been sent to the World Bank for disclosure?
Yes
Have relevant documents been disclosed in-country in a public place in a form and language that are understandable and accessible to project-affected groups and local NGOs?
Yes

All Safeguard Policies

Have satisfactory calendar, budget and clear institutional responsibilities been prepared for the implementation of measures related to safeguard policies?
Yes
Have costs related to safeguard policy measures been included in the project cost?
Yes
Does the Monitoring and Evaluation system of the project include the monitoring of safeguard impacts and measures related to safeguard policies?
Yes
Have satisfactory implementation arrangements been agreed with the borrower and the same been adequately reflected in the project legal documents?
Yes

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APPROVAL

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