PROJECT INFORMATION DOCUMENT (PID)
CONCEPT STAGE

Report No.: PIDC54053

Project Name	Vietnam HCFC Phaseout Project Stage II (P152232)
Region	EAST ASIA AND PACIFIC
Country	Vietnam
Sector(s)	Other industry (91%), Public administration- Industry and trade (9%)
Theme(s)	Pollution management and environmental health (47%), Climate change (47%), Environmental policies and institutions (6%)
Lending Instrument	Investment Project Financing
Project ID	P152232
Borrower(s)	State Bank of Vietnam
Implementing Agency	Ministry of Environment and Natural resources
Environmental Category	B-Partial Assessment
Date PID Prepared/ Updated	22-Apr-2016
Date PID Approved/ Disclosed	25-Apr-2016
Estimated Date of Appraisal Completion	30-Dec-2016
Estimated Date of Board Approval	29-Sep-2017
Concept Review Decision	Track II - The review did authorize the preparation to continue

I. Introduction and Context

Country Context

Vietnam is a Party to the Montreal Protocol (MP) on Substances that Deplete the Ozone Layer and as such is required to phase out ozone depleting substances (ODS) in accordance with the schedules laid out by the Protocol for developing ("Article 5") countries. With support of the financial mechanism of the MP, the Multilateral Fund (MLF) through the HCFC Phase-out Project Stage I (P115762), Vietnam has successfully met its phase-out obligation for HCFCs (hydrochlorofluorocarbons, a group of chemicals in the ODS family) by January 1, 2013, a freeze in consumption at its baseline level of 221.2 tons of ozone depleting potential (ODP). It is also on its way to meeting the January 1, 2015 10% reduction target. Vietnam's next obligation is to meet the 35% reduction target by January 1, 2020, amounting to 55.3 ODP tons (1,006 MT) of HCFCs to be phased out from 2015. Levels at which Vietnam's HCFC consumption must be capped according to the MP phase-out schedule are shown in the Table 1 below.

Table 1: MP Obligations for Vietnam

Montreal Protocol Maximum Allowed Level of Consumption of Annex C Substances	
Consumption Limit (ODP tons)	
Baseline (2009-2010 average)	221.2
2013 – Freeze on baseline levels	221.2
2015 – 90% of the baseline	199.1
2020 – 65% of the baseline	143.8
2025 – 32.5% of the baseline	71.9
2030 –2.5% of the baseline*	5.5
2040 – No consumption	0

*Per the MP, the sum of calculated consumption levels from 2030 to 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.

Table 2: ODP and GWP of Some HCFCs and Substitutes HFCs (hydrofluorocarbons)

HCFCs	ODP*	GWP**	HFCs	ODP*	GWP**
HCFC-123	0.02	77	HFC-134a	0	1,430
HCFC-141b	0.11	725	HFC-245fa	0	1,030
HCFC-22	0.055	1,810	HFC-32	0	675

* ODP values from the 2006Montreal Protocol Handbook
** GWP values of all chemicals are from IPCC Third Assessment Report: Climate Change 2001

HCFCs are used mainly as refrigerants in refrigeration and air-conditioning (AC) equipment and as blowing agents in insulation foam manufacturing by mostly small to medium-size enterprises (SMEs) in Vietnam. HCFCs are also potent greenhouse gases (GHGs) with global warming potential (GWP) ranging from a several hundred to a thousand times that of carbon dioxide (CO2) (Table 2), consequently having an impact on both the ozone layer and the climate. HCFC phase-out presents an opportunity to reduce direct and indirect CO2 equivalent (eq.) emissions not only through the introduction of no- to low-GWP alternatives but also through more technology advanced, energy efficient refrigeration and AC equipment. This is reflected in the 2007 MP decision to accelerate HCFC phase-out and to phase out HCFCs in a manner that takes into account climate and energy efficiency (EE).

The dual benefits of HCFC phase-out is particularly important for Vietnam which as a coastal country is one of the most vulnerable countries to climate change and part of the newly formed “V20” group. The Government is responding to climate change through a range of national policies including concrete GHG mitigation measures that have been undertaken throughout the past decade, as stated in its Intended Nationally Determined Contribution (INDC) of September 2015. Amongst the most pioneering countries in the Region on green growth, Vietnam issued its Green Growth Strategy in 2012 and related action plan in 2014 to among others, efficiently and effectively use energy and reduce GHG emissions in energy consuming industrial sectors while improving energy management capacity, and to promote consumer uptake of green products through minimum energy performance standards and energy labeling.

Sectoral and Institutional Context

AC Sector. Vietnam manufacturers AC equipment by six companies according to the 2015 survey and consumed 251 MT of HCFC-22 in 2014, a relatively small but growing amount compared to 2012 and 2013. Vietnam is seen as one of the countries where the demand for air conditioners will

increase rapidly in the coming years as a result of its growing economy and increasing living standards. In addition to the residential AC market, ACs are widely used in office buildings, shops, restaurants, and hotels. The annual sales of AC in 2014 was 1.26 million units of which around 35% were produced locally and the rest imported from mostly China, Japan, Korea, and Thailand. This is creating a large demand for not only downstream servicing (where additional HCFCs are consumed) but for electricity.

Refrigeration Sector. HCFCs continue to be used in the industrial refrigeration subsector. The majority of industrial refrigeration products include stand-alone factory sealed equipment, condensing units and centralized systems, which are mainly used in food processing, storing and distribution and cooling in industrial processes (including ice-making). HCFC-22 use in industrial refrigeration manufacturing is declining because of industrial rationalization (e.g. an EU requirement precluding use of HCFC in seafood processing) and a shift to ammonia, a widely used refrigerant, in newly installed large distributed systems. Remaining HCFC-based production mostly relies on second-hand components and thus offers a price advantage, especially for small and medium urban users with limited space and capacity to handle ammonia. A 2015 HCFC consumption survey identified 71 Vietnamese industrial refrigeration manufacturers and collected HCFC-22 consumption data from 59. These 59 consumed 505 MT of HCFC-22 in 2014 for refrigeration manufacturing.

Servicing Sector. Large and growing amounts of HCFC-22 are used to service installed refrigeration and AC equipment that is subject to periodic leaks and repair – more than 70% of all HCFC-22 consumed in Vietnam in 2014. As in many developing countries, Vietnam's servicing sector is subject to wasteful use of HCFC-22 due to lack of policies on recovery and recycling, insufficient technical capacity and tools for identifying and repairing leakage, lack of recordkeeping and reporting requirements of adding refrigerant to a system by industrial refrigeration equipment end-users (e.g. food processing enterprises), and the low cost of HCFC-22. It is cheaper and easier for service technicians in service shops and end-users to top-off refrigerant than identify leakage and repair faulty equipment. The 2015 survey identified 1,642 MT of HCFC-22 consumed in 2014 from about 2,380 servicing shops, 420 food processing enterprises, 150 pharmaceutical enterprises, and 210 ice-maker users, representing about 67% of the total estimated HCFC-22 consumption for servicing in 2014.

Foam Sector. Vietnam prioritized the phase-out of controlled, or "bulk" consumption of HCFC-141b in the foam sector in the Stage I HCFC phase-out project given HCFC-141b's high GWP and the availability of a viable low-GWP alternative technology. A total of 462 MT of bulk HCFC-141b was phased out at twelve of the largest foam enterprises and the country has instituted a ban on the import of bulk HCFC-141b since January 1, 2015. HCFC-141b in imported pre-blended polyol which is not controlled by the MP but is linked to the sustainability of controlled bulk HCFC-141 phase-out, however, continues to rise in the foam sector. This is primarily a reflection of economic growth, particularly in construction. The Ministry of Environment and Natural Resources (MONRE) issued a regulation in 2012 requiring registration of imported HCFC pre-blended polyol, meaning that established enterprises that had operated under the radar screen are now being accounted for as HCFC-141b users. The 2015 survey confirmed 71 foam producers using HCFC-based polyol with about 2,035 MT of HCFC-141b in 2014, representing 70% of the total estimated pre-blended HCFC-141b consumption. The 2015 survey also identified one foam enterprise using HCFC-22 of 100 MT in 2014 for XPS (extruded polystyrene) foam production.

Institutional context. MONRE hosts the National Ozone Office (NOO) which acts as the focal point for MP implementation and which is responsible for HCFC quota allocation and regulation. The Stage I project employs a project management unit (PMU), which works directly with the NOO and has been facilitating and coordinating preparation of this proposed Stage II HCFC project.

Relationship to CAS

The proposed Stage II HCFC project would support "Pillar 2" of the FY12-FY16 Country Partnership Strategy (CPS) for the Socialist Republic of Vietnam primarily through the ushering in of measures and investments that reduce ozone depleting and global warming HCFCs and avoid the introduction of high GWP alternatives, therefore protecting ozone and mitigating climate change. The CPS Pillar 2 on sustainability includes a focus on pollution control which meshes with the MP's brown agenda of eliminating harmful chemical substances, and a focus on the related issue of mitigation given Vietnam's increasing risk exposure posed by the effects of climate change. The proposed project will strive to improve EE in refrigeration and air-conditioning products of converted manufacturing enterprises to avoid additional CO2 emissions in addition to that associated with HCFC elimination itself.

The call for addressing enforcement of environmental regulation and improving information access under Pillar 2 is in line with the historical and future role of ODS phase-out projects to equip Vietnam with the technical knowledge base required to make informed policy decisions that are conducive to implementation and enforcement by related bodies: MONRE, Ministry of Industry and Trade (MOIT), Ministry of Agriculture and Rural Development (MARD), their provincial departments and Customs.

II. Proposed Development Objective(s)

Proposed Development Objective(s) (From PCN)

11. The project development objective is to reduce HCFC consumption in order to contribute to Vietnam's efforts to meet its 2020 HCFC consumption phase-out obligations under the Montreal Protocol, as well as to reduce emissions of greenhouse gases in the manufacturing and use of refrigeration and air-conditioning equipment.

Key Results (From PCN)

12. The PDO indicators are (1) national HCFC consumption limited to a level not exceeding 199.08 ODP tons annually in 2016 through 2019, and 143.78 ODP tons from 2020 through 2024; and (2) CO2 emission reduced from the use of lower GWP alternatives and improved EE in refrigeration and AC equipment. Total phase-out amounts expected at the enterprise level will be captured by intermediate results indicators as will key sector-based policies and regulations.

13. The main project beneficiaries will be selected refrigeration, AC and foam manufacturers. Service shops and end-users of refrigeration and AC equipment will be indirect beneficiaries of training and technical assistance. Other project stakeholders will include government agencies including, among others, MONRE, MOIT, MARD and Customs, and, the public who will benefit from more energy efficient, environmentally-friendly residential AC.

III. Preliminary Description

Concept Description

The proposed Stage II project is a direct continuation of the ongoing Stage I project and the project

duration is expected to be from 2017 to 2022. The funding is expected to be approved by the MLF Executive Committee in 2016. The project consists of three proposed components described below.

Component 1: HCFC Consumption Reduction

AC sector. The project will finance incremental capital costs (ICC) needed for converting to alternative technologies including new production equipment, new AC model performance testing, and training for installing and servicing technicians, and incremental operating cost (IOC) based on MLF financing guidelines at four enterprises which are eligible for MLF and consumed 176 MT of HCFC-22 in 2014. After completion of conversion at the four enterprises, no HCFC-22 should be used for AC production in the whole sector, i.e. about 251 MT of HCFC-22 presently used. The estimated investment funding is about US$2 million. The potential low GWP alternatives to HCFC-22 in the AC sector are HFC-32 with a GWP 675 or R-290 with a GWP of 5, however both are flammable. In addition, EE financing will be explored during project preparation for supporting the uptake of non-HCFC more energy efficient AC (such as EE regulations and awareness, energy star labelling, technical assistance, demand-side initiatives, etc.).

Refrigeration sector. There is no single refrigerant which can replace HCFC-22, making the HCFC phase-out in the refrigerant sector very challenging. The project will finance conversion of priority industrial refrigerating systems where cost-effective and low GWP alternatives (e.g. ammonia, hydrocarbons, HFC-32 etc.) are available, by providing ICC (system, component and process redesign, new equipment, performance verification, safety training, etc.) and IOC for conversion at about 30 enterprises which are eligible for MLF funding . The estimated cost to the project is about US$ 1.5 million. In addition, EE financing for refrigeration manufacturing in conjunction with the Vietnam Energy Efficiency Financing for Industrial Enterprises project (EE in end users) will be explored during project preparation to offset the climate impacts of interim alternatives with high GWP that may have to be used if low GWP alternatives are not yet available.

Servicing sector. The project will finance the following activities: training and certification in good servicing and maintenance practices, provision of servicing tools to selected vocational training centers to enable training in the handling of alternative flammable refrigerants, technical assistance demonstration for 10 selected industrial refrigeration end users on HCFC leakage management, and bilateral TA from Japan Ministry of Economy, Trade and Industry (METI) for using HFC-32 in the AC sector. The estimated cost for these activities is US$1.7 million for a HCFC-22 phase-out impact of 352 MT.

Foam sector. The project will finance ICC needed for foam production conversion to hydrocarbon, methyl formate or HFO (hydrofluoroolefin) alternatives at about 40 enterprises eligible for funding. In order to allow SMEs (consuming HCFC-141 less than 20MT) to convert to non-HCFC production in a cost-effective way, the project will also finance upgrading of two or three system houses to be competitively selected among existing foam producers or chemical suppliers that have established the basic system house infrastructure. These system houses would supply non-HCFC pre-blended polyol to SMEs. In addition, the project will finance conversion at an enterprise which uses HCFC-22 for XPS foam production. The estimated investment funding request from MLF for the sector is about US$6.6 million.

Component 2: Technical Assistance and Policy Actions

This component aims to support sector-wide technology and knowledge transfer, TA and exchange

of best practices, as well as to create a policy and market environment that will enable and sustain sector transformation. TA activities focused on the refrigeration and AC manufacturing sectors will include training workshops on sub-projects preparation, international and national technical consultant services, development of technical standards of alternatives, training for government officials, training on safe use of alternatives, study tours on HCFC alternatives, a joint study on integrating HCFC phase-out and EE improvement in the industrial refrigeration manufacturing and food process sectors, TA onfoaming formulation using non-HCFC pre-blended polyol for the system houses, and others as needed. TA for the servicing sector is included in Component 1 as it results in HCFC phase-out impact.

On policies, this component will cover the annual HCFC import quota issuance and the development and issuance of sector-specific policy and regulations by project completion, including bans on local production and import of HCFC-22 based ACs, ban on import and use of pre-blended HCFC-141b polyol in foam production, and ban on installation of selected out-of-date HCFC-22 refrigeration applications.

Component 3: Project Management
It is proposed that the PMU currently implementing the Stage I HCFC Phase-out Project continues in this new project, including financial, procurement, and safeguard management as well as monitoring and reporting. However, MONRE will formally announce establishment of the PMU for the Stage II project. This component will finance hiring of PMU staff, project launch and completion workshops, financial audits, annual HCFC consumption verification, public awareness activities, and incremental operating cost.

IV. Safeguard Policies that might apply

Safeguard Policies Triggered by the Project	Yes	No	TBD
Environmental Assessment OP/BP 4.01	×		
Natural Habitats OP/BP 4.04		×	
Forests OP/BP 4.36		×	
Pest Management OP 4.09		×	
Physical Cultural Resources OP/BP 4.11		×	
Indigenous Peoples OP/BP 4.10		×	
Involuntary Resettlement OP/BP 4.12	×		
Safety of Dams OP/BP 4.37		×	
Projects on International Waterways OP/BP 7.50		×	
Projects in Disputed Areas OP/BP 7.60		×	

V. Financing (in USD Million)

Total Project Cost:	12.98	Total Bank Financing:	0.00
Financing Gap:	0.00		

Financing Source	Amount
Borrower	0.00
Montreal Protocol Investment Fund	12.98

Total	12.98

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