



GEF-6 PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: FSP

TYPE OF TRUST FUND: GEF TRUST FUND

For more information about GEF, visit TheGEF.org

PART I: PROJECT INFORMATION

Project Title:	Demonstration of Mercury Reduction and Minimization in the Production of Vinyl Chloride Monomer in China		
Country(ies):	China	GEF Project ID: ¹	6921
GEF Agency(ies):	UNIDO (select) (select)	GEF Agency Project ID:	140214
Other Executing Partner(s):	Foreign Economic Cooperation Office, Ministry of Environmental Protection, China	Submission Date:	08/08/2014
		Resubmission Date:	08/21/2014 02/27/2015
GEF Focal Area(s):	Chemicals and Wastes	Project Duration (Months)	60
Integrated Approach Pilot	IAP-Cities <input type="checkbox"/> IAP-Commodities <input type="checkbox"/> IAP-Food Security <input type="checkbox"/>	Corporate Program: SGP <input type="checkbox"/>	
Name of parent program:	[if applicable]	Agency Fee (\$)	1,458,000

A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES²

Objectives/Programs (Focal Areas, Integrated Approach Pilot, Corporate Programs)	Trust Fund	(in \$)	
		GEF Project Financing	Co-financing
(select) CW-1 Program 1 (select)	GEFTF	1,000,000	6,000,000
(select) CW-2 Program 4 (select)	GEFTF	15,200,000	93,000,000
(select) (select) (select)	(select)		
(select) (select) (select)	(select)		
(select) (select) (select)	(select)		
(select) (select) (select)	(select)		
(select) (select) (select)	(select)		
(select) (select) (select)	(select)		
(select) (select) (select)	(select)		
Total Project Cost		16,200,000	99,000,000

B. INDICATIVE PROJECT DESCRIPTION SUMMARY

Project Objective: To reduce risks of mercury on human health and the environment from industrial production of Vinyl Chloride Monomers in China.						
Project Components	Financing Type ³	Project Outcomes	Project Outputs	Trust Fund	(in \$)	
					GEF Project Financing	Co-financing
1. Strengthen institutional, regulatory, and enforcement (IRE) capacity in VCM production in China	TA	1. Institutional, regulatory, and enforcement capacity to fulfill obligations concerning VCM production sector under the Minamata Convention	Output: 1.1 National regulatory policy and regulatory frameworks developed to reduce and eliminate mercury use in industrial VCM production, with focus on mandatory policy to ban the use of high-mercury catalyst ; Output: 1.2 National managerial capacity	GEFTF	550,000	3,300,000

¹ Project ID number will be assigned by GEFSEC and to be entered by Agency in subsequent document submissions.

² When completing Table A, refer to the excerpts on [GEF 6 Results Frameworks for GETF, LDCF and SCCF](#).

³ Financing type can be either investment or technical assistance.

			and enforcement capacity strengthened to coordinate and monitor the VCM production sector ;			
2. Promote technology transfer and investment for the widespread application of BAT/BEP	Inv	2. Mercury emission and dioxin release reduced from VCM production through promotion of BAT/BEPs	<p>Output 2.1 Private Public Partnership (PPP) established to promote R&D, venture capital investment and technology transfer;</p> <p>Output 2.2 Environmental Technology Verification (ETV) methodology established to verify the performance of low-mercury and mercury-free alternatives by an expert panel established;</p> <p>Output 2.3 Demonstration low mercury BAT/BEPs in 3-4 coal-based VCM companies and trial application mercury-free alternatives in 1-2 coal-based VCM companies;</p> <p>Output 2.4 Incentive program designed and implementation of major green instruments (fiscal, monetary, venture capital, insurance etc.) to allow the private sectors to access the technologies and experience gained from demonstrations;</p> <p>Output 2.5 BAT/BEPs replication in 15 coal-based VCM companies national wide;</p>	GEFTF	10,780,000	66,480,000

3. Promote the recovery of mercury in mercury containing waste from VCM production	Inv	3. Promote the recovery of mercury from mercury-containing waste in VCM production process.	Output 3.1 Development of a national inventory for high mercury containing waste; Output 3.2 Mercury recovery rate enhanced on mercury-containing waste nationwide;	GEFTF	2,400,000	14,400,000
4. Contaminated site identification and risk reduction associated with VCM production	TA	4. Appropriate strategies developed for identifying and assessing mercury contaminated sites from VCM production	Output 4.1 Inventory of mercury contaminated sites developed from VCM production plants; Output 4.2 Preliminary risk assessment (level and scope) on typical mercury contaminated sites from VCM production; Output 4.3 Strategy proposal for the reduction of the health risk and environmental impact and remediation;	GEFTF	1,200,000	7,200,000
5. Information dissemination and awareness raising among stakeholders	TA	5. Promotion of knowledge, experience and lesson sharing and environmental awareness raising among stakeholder groups	Output 5.1 Training provided to disseminate project results (concerning component 1, 2 ,3); Output 5.2 Awareness raised among government, private and civil society stakeholder groups;	GEFTF	200,000	1,200,000
6.Mornitoring & Evaluation	TA	M&E	Output 6.1 Periodic monitoring and evaluation; Output 6.2 Midterm and terminal evaluation report;	GEFTF	300,000	1,800,000
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
Subtotal					15,430,000	94,380,000

Project Management Cost (PMC) ⁴	GEFTF	770,000	4,620,000
Total Project Cost		16,200,000	99,000,000

For multi-trust fund projects, provide the total amount of PMC in Table B, and indicate the split of PMC among the different trust funds here: ()

C. INDICATIVE SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE, IF AVAILABLE

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount (\$)
GEF Agency	UNIDO	Grants	200,000
Recipient Government	The Ministry of Environmental Protection	Grants	200,000
Recipient Government	The Ministry of Environmental Protection	In-kind	800,000
Private Sector	Dezhou Shihua Chemical Co., Ltd.	Grants	500,000
Private Sector	Dezhou Shihua Chemical Co., Ltd.	In-kind	6,300,000
Private Sector	Dezhou Shihua Chemical Co., Ltd.	Equity	4,200,000
Private Sector	Zhongke Yigong (Xiamen) Chemical Technology Co., Ltd.	Grants	300,000
Private Sector	Zhongke Yigong (Xiamen) Chemical Technology Co., Ltd.	In-kind	2,340,000
Private Sector	Zhongke Yigong (Xiamen) Chemical Technology Co., Ltd.	Equity	1,560,000
Private Sector	Nixia Jinhai Chuangke Chemical Technology Co., Ltd.	Grants	1,100,000
Private Sector	Nixia Jinhai Chuangke Chemical Technology Co., Ltd. Nixia Jinhai Chuangke Chemical Technology Co., Ltd.	In-kind	9,540,000
(select)	Nixia Jinhai Chuangke Chemical Technology Co., Ltd.	Equity	6,360,000
Private Sector	Xinjiang Tianye group Co., Ltd.	Grants	1,100,000
Private Sector	Xinjiang Tianye group Co., Ltd.	In-kind	16,140,000
Private Sector	Xinjiang Tianye group Co., Ltd.	Equity	10,760,000
Private Sector	Xinjiang Zhongtai chemical Co., Ltd.	Grants	1,100,000
Private Sector	Xinjiang Zhongtai chemical Co., Ltd.	In-kind	16,140,000
Private Sector	Xinjiang Zhongtai chemical Co., Ltd.	Equity	10,760,000
Private Sector	Unknown	Unknown	6,600,000
Others	Beijing University of Chemical Technology	Grants	200,000
Others	Beijing University of Chemical Technology	In-kind	800,000
Others	Shenyang Academy of Environmental Sciences	Grants	200,000
Others	Shenyang Academy of Environmental Sciences	In-kind	800,000
Others	The Institute of High Energy Physics of the Chinese Academy of Sciences	Grants	300,000
Others	The Institute of High Energy Physics of the Chinese Academy of Sciences	In-kind	700,000
(select)		(select)	
Total Co-financing			99,000,000

D. INDICATIVE TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES) AND THE PROGRAMMING OF FUNDS ^{a)}

GEF Agency	Trust Fund	Country/Regional/Global	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing (a)	Agency Fee (b) ^{b)}	Total (c)=a+b

⁴ For GEF Project Financing up to \$2 million, PMC could be up to 10% of the subtotal; above \$2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

UNIDO	GEFTF	China	Chemicals and Wastes	Mercury	16,200,000	1,458,000	17,658,000
(select)	(select)		(select)	(select as applicable)			0
(select)	(select)		(select)	(select as applicable)			0
(select)	(select)		(select)	(select as applicable)			0
(select)	(select)		(select)	(select as applicable)			0
Total GEF Resources					16,200,000	1,458,000	17,658,000

a) Refer to the [Fee Policy for GEF Partner Agencies](#).

E. PROJECT PREPARATION GRANT (PPG)⁵

Is Project Preparation Grant requested? Yes No If no, skip item E.

PPG AMOUNT REQUESTED BY AGENCY(IES), TRUST FUND, COUNTRY(IES) AND THE PROGRAMMING OF FUNDS

Project Preparation Grant amount requested: \$					PPG Agency Fee:		
GEF Agency	Trust Fund	Country/ Regional/Global	Focal Area	Programming of Funds	(in \$)		
					PPG (a)	Agency Fee ⁶ (b)	Total c = a + b
UNIDO	GEF TF	China	Chemicals and Waste	Mercury	300,000	27,000	327,000
(select)	(select)		(select)	(select as applicable)			0
(select)	(select)		(select)	(select as applicable)			0
Total PPG Amount					300,000	27,000	327,000

⁵ PPG requested amount is determined by the size of the GEF Project Financing (PF) as follows: Up to \$50k for PF up to \$2m (for MSP); up to \$100k for PF up to \$3m; \$150k for PF up to \$6m; \$200k for PF up to \$10m; and \$300k for PF above \$10m. On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

⁶ PPG fee percentage follows the percentage of the Agency fee over the GEF Project Financing amount requested.

F. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS⁷

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
1. Maintain globally significant biodiversity and the ecosystem goods and services that it provides to society	Improved management of landscapes and seascapes covering 300 million hectares	<i>hectares</i>
2. Sustainable land management in production systems (agriculture, rangelands, and forest landscapes)	120 million hectares under sustainable land management	<i>hectares</i>
3. Promotion of collective management of transboundary water systems and implementation of the full range of policy, legal, and institutional reforms and investments contributing to sustainable use and maintenance of ecosystem services	Water-food-ecosystems security and conjunctive management of surface and groundwater in at least 10 freshwater basins;	<i>Number of freshwater basins</i>
	20% of globally over-exploited fisheries (by volume) moved to more sustainable levels	<i>Percent of fisheries, by volume</i>
4. Support to transformational shifts towards a low-emission and resilient development path	750 million tons of CO _{2e} mitigated (include both direct and indirect)	<i>metric tons</i>
5. Increase in phase-out, disposal and reduction of releases of POPs, ODS, mercury and other chemicals of global concern	Disposal of 80,000 tons of POPs (PCB, obsolete pesticides)	<i>metric tons</i>
	Reduction of 1000 tons of Mercury	<i>360 metric tons</i>
	Phase-out of 303.44 tons of ODP (HCFC)	<i>ODP tons</i>
6. Enhance capacity of countries to implement MEAs (multilateral environmental agreements) and mainstream into national and sub-national policy, planning financial and legal frameworks	Development and sectoral planning frameworks integrate measurable targets drawn from the MEAs in at least 10 countries	<i>Number of Countries:</i>
	Functional environmental information systems are established to support decision-making in at least 10 countries	<i>Number of Countries:</i>

PART II: PROJECT JUSTIFICATION

1. *Project Description.* Briefly describe: 1) the global environmental and/or adaptation problems, root causes and barriers that need to be addressed; 2) the baseline scenario or any associated baseline projects, 3) the proposed alternative scenario, with a brief description of expected outcomes and components of the project, 4) [incremental/additional cost reasoning](#) and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and [co-financing](#); 5) [global environmental benefits](#) (GEFTF) and/or [adaptation benefits](#) (LDCF/SCCF); and 6) innovation, sustainability and potential for scaling up.

D) the global environmental problems, root causes and barriers that need to be addressed;

1. The Minamata Convention (MC) on Mercury was signed on October 10, 2013, with the objective to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. The Parties agreed in Article 5 to take measures to restrict the use of mercury or mercury compounds, in the processes listed in Part II of Annex B in accordance with the provisions set out therein, specifically to (1) reduce the use of mercury in terms of per unit production in the Vinyl Chloride Monomer (VCM) production by 50 per cent by the year 2020 against 2010 use; (2) to take measures to reduce emissions and releases of mercury to the environment; (3) not to allow the use of mercury five years after the Conference of the Parties has established that mercury-free catalysts based on existing processes have become technically and economically feasible;

2. China signed the MC on Oct. 10, 2013 in Kumamoto, Japan. In line with the MC, the activities for the reduction and phase out of mercury production and usage, introduction of alternative technologies have also been identified as high priority actions for mercury reduction in China.

⁷ Provide those indicator values in this table to the extent applicable to your proposed project. Progress in programming against these targets for the projects per the *Corporate Results Framework* in the [GEF-6 Programming Directions](#), will be aggregated and reported during mid-term and at the conclusion of the replenishment period. There is no need to complete this table for climate adaptation projects financed solely through LDCF and/or SCCF.

3. China has a long history of use of mercury (Hg), as early as the 6th century BC. At present, China's total amount of mercury usage is about 1200 tons which accounts for about 50% of the world's total. Thus, China has become the world's largest producer and consumer of mercury. The emission and release of the mercury in China could potentially cause local, regional and global impact.

4. China is the only one country in the world that uses calcium carbide based VCM production to produce polyvinyl chloride (PVC). The VCM/PVC sector consumes more than half of the total mercury supply in the country, accounting for 30% of world's total mercury consumption. Currently, high-mercury catalyst (HMC) that contains of about 10-12.5% mercuric chloride ($HgCl_2$) is still the mainstream technology in the VCM/PVC sector. This technology has been very matured and cost effective in the past decades because the coal and limestone reserves are abundant and oil resources are scarce. So far, there are about 100 VCM/PVC plants and even countless relevant enterprises at up and down-streams. The dominant position of the VCM/PVC sector is unshakable. Nevertheless China is in the meantime encouraging the production of PVC by ethylene based EDC (ethylene dichloride) processes. Considering the emission of dioxin from EDC/PVC, this project will also address this issue in line with the requirements of Stockholm Convention.

5. Although the government is aware of China's mercury use and release in VCM production, the country still faces major barriers for the phase-out of high-mercury catalysts and the shift to alternatives. Such barriers include:

- 1) Lack of relevant policy;
- 2) Insufficient capacity of implementing, regulation, and monitoring the existed policy or rules;
- 3) Low-mercury catalyst (containing of about 4.0-6.0% mercuric chloride) shows less cost-effectiveness than high-mercury catalyst, and the mercury-free catalyst technology is still in the stage of experiment;
- 4) Few technology of conducting mercury containing waste and mercury contaminated sites;
- 5) The plants' weak awareness of implementing Mercury Convention and low resistance to the risks;
- 6) R&D has been organized and programmed unsystematically, lacking the risk allocation instrument and international cooperation;
- 7) Lack of fiscal, financial, tax and other incentives to encourage the BAT/BEP to remove market barriers.

II) the baseline scenario and any associated baseline projects,

6. According to the statistic of China Chlor-Alkali Industry Association, mercury-based carbide production technology is still the prevailing process for PVC production in China. Currently, 94 companies are using calcium carbide process with about 10.0 million tons of PVC production and about 720 tons of mercury usage in 2012, accounting for 60% of the total use of mercury in China. The PVC production capacity is mainly in the northern parts of the country in Shandong, Inner Mongolia, Henna, Tianjin and Xinjiang. There were seven provinces and autonomous regions where the PVC capacity exceeded 1 megaton. According to the requirement of the MC, the use of Hg as catalyst in VCM production is not considered an acceptable use. The production of VCM with Hg as catalyst can cause the discharge of hundreds tons of mercury containing waste catalyst, activated carbon, sludge, hydrochloric acid and alkali liquid in the process. There are 4 companies using the ethylene-based processes to synthesize EDC and VCM, facing a big challenge to reduce their dioxin releases. The dioxin by-products of the ethylene-based vinyl lifecycle are of great concern in China, because of their persistent bio accumulative toxicity. Both of the mercury and dioxin releases cause harm to the local and global ecosystem and human health.



Figure 1: Distribution of PVC Capacity in China

7. Because of the threats of mercury on human health and environment, mercury pollution control has been considered as one of the priorities in the 12th five-year plan of heavy metal pollution prevention and control (2011-2015), which was approved by the State Council in February 2011. This plan calls for the establishment of three kinds of environmental protection systems including pollution prevention system, emergency response system as well as environmental and health risk assessment system to ensure the sustainable control on heavy metal pollution including mercury. Chinese government has made high efforts to control the mercury pollution: a national mercury pollution program was prepared and promulgated by MIIT in 2009 and a country-scale investigation and assessment on the mercury emission sources was organized and implemented by MEP in 2001. The application of high mercury catalyst in VCM production will be restricted and lead to phase out in near future. Chinese government encourages development and demonstration of new low-mercury and mercury-free alternatives, which are environment friendly, with high efficacy and low toxicity. This project will help china to strengthen the capacity for the elimination of high mercury industrial products and promotion of alternatives; gain valuable experience to achieve sound management of chemicals.

8. Facing with mercury emission of acetylene-based PVC industry, China Petroleum and Chemical Industry Federation(CPCIF), China chlor alkali industry association(CCAIA), some VCM producers and catalyst producers have already carried out action to prevent mercury pollution. Xinjiang Tianye, as a biggest VCM producer in China developed the long-term cooperative joint research with Tsinghua University and Nankai University to promote the R&D of low mercury technology and mercury free alternatives and a test platform for mercury-free catalyst research was established.

9. On mercury control, there are two ongoing UNIDO/GEF projects in China. The project Reduction of Mercury Emissions and Promotion of Sound Chemical Management in Zinc Smelting Operations aims to reduce the atmospheric emission of mercury the impacts of mercury on human health and the environment from zinc smelting operations in China through sound chemical management. It also can increase China's capability on mercury pollution control. Another project titled with "Pilot Project on the Development of Mercury Inventory in China" will preliminarily build the capacity of local and national stakeholders to implement the components of this proposed FSP project, and assist the Chinese governments in developing a national action plan for sound mercury in preparation for implementation convention.

III) The proposed alternative scenario, with a brief description of expected outcomes and components of the project

10. The objective of the proposal is to reduce risks of mercury on human health and the environmental impact from industrial production of Vinyl Chloride Monomers to achieve 50% reduction of mercury use in per unit production by the year 2020 (reference year 2010) through optimization the existing production and achieving 90% recovery of mercury in production processes. Promote mercury-free catalyst R&D and trial application as the initial step of commercialization.

11. Component 1 : Strengthen institutional, regulatory, and enforcement (IRE) capacity in VCM production in China. It is helpful to develop policy and regulatory frameworks for internalizing the environment external costs. This component will pay attention to the issues on mercury emission, as well as make recommendations to research and improve emission standards and standards of product quality in relevant sectors. During the PPG stage, the project will systematically assess measures (including administrative, legal and economic instruments, such as a quota system) to control and reduce the usage of Mercury in VCM sectors. Given the current policy implementation is difficult and weak. The project will demonstrate the environmental policy enforcement and hold some experience summarizing activities around areas where the pilot plants are located, in order to enhance the effect of policy implementation.

Expected outcome: Institutional, regulatory, and enforcement capacity to fulfill obligations concerning VCM production sector under the Minamata Convention

Expected Outputs

Output: 1.1 National regulatory policy and regulatory frameworks developed to reduce and eliminate mercury use in industrial VCM production, with focus on mandatory policy to ban the use of high-mercury catalyst ;

Output: 1.2 National managerial capacity and enforcement capacity strengthened to coordinate and monitor the VCM production sector ;

12. Component 2: Promote technology transfer and investment for the widespread application of BAT/BEP. This component will emphasize the technology accessibility and removing the market barriers from applying BAT/BEP across the industry sector. Currently smaller PVC producers are reluctant to make the conversion to low mercury processes due to perceived high costs and technical uncertainties. Until now, there are some potential low-mercury complex catalysts (with other metals) in several domestic companies. Low mercury technology could also be achieved with a new catalyst carrier, such as zeolite framework. Zeolite-based catalyst has high activity and long life because it does not rise with the temperature sublimation process of using mercury chloride. However, the heat transfer conditions in existing reactor cannot meet the requirements. So development and application of zeolite-based catalyst would be accelerated with the development of novel reactor such as large-scale fixed bed and fluidized bed. The fluidized bed reactor is also an emerging technical innovation to reduce mercury use during VCM production due to its high heat transfer efficiency, good reaction rate, and high production capacity of VCM. Volatilization of mercuric chloride also can be avoided in fluidized bed reactor. Mercury-free alternative is still in the early stage of the laboratory stage. The project will further introduce PPP model of venture capital to foster a wide range of domestic and international exchanges and cooperation partners participation (including the VCM producers, catalyst producers, academic institutions and public sectors such as the MEP and MIIT), promoting the technology transfer and exchange.

Expected Outcome: Mercury emission and dioxin release reduced from VCM production through promotion of BAT/BEPs

Expected Output:

Output 2.1 Private Public Partnership (PPP) established to promote R&D, venture capital investment and technology transfer;

Output 2.2 Environmental Technology Verification (ETV) methodology established to verify the performance of low-mercury and mercury-free alternatives by an expert panel established;

Output 2.3 Demonstration low mercury BAT/BEPs in 3-4 coal-based VCM companies and trial application mercury-free alternatives in 1-2 coal-based VCM companies.

Output 2.4 Incentive program designed and implementation of major green instruments (fiscal, monetary, venture capital, insurance etc.) to allow the private sectors to access the technologies and experience gained from demonstrations;

Output 2.5 BAT/BEPs replication in 15 coal-based VCM companies national wide;

13. Component 3: Promote the recovery of mercury in mercury containing waste from VCM production. Cooperating with the first and the second component, this component will strengthen the sound management of

mercury-containing waste, including waste liquid, waste mercury catalysts, waste activated carbon, mercury content in waste residue is relatively high, the effective reduction of such wastes will call for wide participation of government, plants, and the public. This component will promote the cooperation among the department of policy formulation and administration, R&D institutions and production plants, boost the application of waste disposal technologies, as well as the introduction of mercury residue standards.

Expected Outcome: Promote the recovery of mercury from mercury-containing waste in VCM production process.

Expected Output:

Output 3.1 Development of a national inventory for high mercury containing waste;

Output 3.2 Mercury recovery rate enhanced on mercury-containing waste nationwide;

14. Component 4: Identifying, assessing and prioritizing contaminated sites associated with VCM production. This component will promote VCM / PVC production plants to conduct mercury contaminated site investigations, map associated risks and develop a mercury contaminated site inventory for future intervention and remediation planning. Meanwhile, this component will engage an independent third party to conduct environmental risk assessments, provide geographically explicit mapping of contaminated sites and propose options for managing environmental and human health risks posed by contaminated sites. Recommendations for remediation will be provided to national counterparts, who will evaluate options and develop a strategy in line with national chemicals management priorities and initiatives.

Expected Outcome: Appropriate strategies developed for identifying and assessing mercury contaminated sites from VCM production

Expected Output:

Output 4.1 Inventory of mercury contaminated sites developed from VCM production plants;

Output 4.2 Preliminary risk assessment (level and scope) on typical mercury contaminated sites from VCM production;

Output 4.3 Strategy proposal for the reduction of the health risk and environmental impact and remediation;

15. Component 5: Information dissemination and awareness raising among stakeholders. This component will encourage the sharing of experience based on the project results among the stakeholders through activities include training, dissemination, promoting the occupational groups to raise environmental awareness, reducing exposure, and promote relevant administrative departments to develop security measures. This component will promote broad public participation by systematically using mass media such as internet, television, newspapers etc.

Expected Outcome: Promotion of knowledge, experience and lesson sharing and environmental awareness raising among stakeholder groups

Expected Output:

Output 5.1 Training provided to disseminate project results (concerning component 1, 2 ,3);

Output 5.2 Awareness raised among government, private and civil society stakeholder groups;

16. Component 6 Monitoring & Evaluation. Besides, this component will ensure the smooth implementation of project activities through internal periodical communication, evaluation and external review.

Expected Outcome: Monitoring & Evaluation

Expected Output:

Output 6.1 Periodic monitoring and evaluation;

Output 6.2 Midterm and terminal evaluation report;

IV) Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCE/SCCF and co-financing;

17. The project is designed to respond to the requirement of the mercury convention to reduce the risks of mercury on human health and the environment. Through technology transfer of low mercury catalyst and mercury free technologies from industrial production of Vinyl Chloride Monomers, the intervention of GEF fund will help China to achieve 50% reduction of mercury use in term of per unit production by the year 2020 in the sector of VCM/PVC. Without GEF's involvement, China's VCM/PVC producers' efforts for mercury

pollution control are only initial and simultaneous. With GEF's funding support, the industry will pay more attention to implementing the Convention, and take active part in relevant activities. GEF funding can help mobilize all relevant resources (e.g. capital, land, labor and technology) to phase out mercury with alternatives and control pollution.

18. GEF assistance is needed to support the investment components of the project to address the immediate, high priority need to mitigate the imminent local, regional, and global environmental risk posed by the HMC and mercury emission identified during project preparation phase stage. Financial assistance for technical components is essential to improve the regulatory framework on mercury, strengthen the institutional capacity, and technical capacity.

19. GEF assistance is needed to address the obstacles to technical accessibility. GEF funding will support exchanges and cooperation with international and Chinese experts and institutions to fulfill the requirement of article 19 in mercury convention relevant to research, development, and monitoring.

20. GEF fund is a must to leverage domestic co-finance. It will also play a significant role as catalyst in promoting the mobilization of social resources. Chinese government commits highly to support the implementation of Minamata Convention. State council designates MEP as the leading agency representing China for the Convention negotiation and implementation. FECO affiliated to MEP established a special division in April 2010 to offer technical assistance and daily routine coordination and management.

21. The major contribution will be from VCM industries that will be the largest contribution of both switching to low Hg and overall cleaner production in Hg waste and catalysts recycling as well as BAT/BEP for dioxin reduction. The co-financing letters from private sector and academic institutions are attached in the Annex.

V) Global environmental benefits (GEFTF, NPIF) and/or adaptation benefits (LDCAF/SCCF);

22. Because China's VCM production contributes to up to 30% of the total global mercury consumption and production, this project will significantly contribute to global efforts to reduce mercury production, use and emissions to the environment.

23. The project aims to decrease the production and use of Hg by 50% per ton of VCM production in 2020, resulting the reduction of at least 360 tons of Hg usage in PVC industries. The Hg discharge to the off-gas, liquid and solid waste generated in per ton of VCM production will be controlled to less than 10% of the current level. The project will also reduce 3 g I-TEQ dioxin/Furan emission to air and 4 g I-TEQ dioxin/Furan release to residue depending on prevailing technology in selected demonstration facility (ies)

24. With this respect, this project will be the first initiative to demonstrate low mercury catalyst technologies and mercury free alternatives in China and will provide the basis for the duplication of these environmentally sound techniques nationwide. The reduction of potential risks of mercury on the human health and environment will be reduced by the promotion of new technologies to the private sector and awareness raising among the general public. The lessons learned will be shared nationwide and through forums such as the UNIDO Green Industry platform and UNIDO mercury initiatives.

25. This project will seek and promote technologies that bring about the syndetic benefits in controlling GHG emission. For example, The new mercury free technology such as liquid phase mercury-free catalyst might be low carbon technology that will reduce the emission of the CO₂. Because the liquid phase catalytic reaction system does not use the solid carrier, so it has great heat transfer effect, avoids the local overheating and reduces the catalyst sublimation, thus prolonging the service life of the catalyst, reducing the consumption, saving the costs and realizing the environmental protection. While it is difficult to quantify the CO₂ reduction potential from outset, targets will be developed during PPG.

VI) Innovativeness, sustainability and potential for scaling up

26. This project promotes innovation at operational, managerial and strategic levels to reduce the use of mercury in VCM production. At the operational level, the promotion of R&D and technology transfer to low-mercury catalysts and mercury-free alternatives will assist private sector companies to improve environmental

performance and reduce mercury emissions and releases. At the managerial level, removal of market barriers to the adoption of new technologies will be encouraged through novel incentive programmes. At the strategic level, national policy reform will promote green industrial development in China, through specific regulations and legal frameworks to impose increasing financial costs as a result of non-compliance for private companies.

27. Project sustainability will be based on regulatory enhancement and strengthening of China’s capacity on Minamata Convention implementation, making necessary policies changes and raising public awareness. Technological sustainability will be ensured through environmental technology verification methodology, incentive program established and demonstration and replication of low-mercury technologies and mercury free alternatives. Cost effective technologies will be promoted throughout this project to ensure involvement, information and awareness among the private sectors. It should in this respect be noted that the co-financing of the project will be considerably higher when the yet unconfirmed companies taking advantage of the incentive scheme will convert to lower mercury processes. Social sustainability will be ensured by strengthening information disclosure and public ensuring access to project outcomes to the general public and private sectors.

28. This proposed project attaches high importance to technology innovation. The novel calcium carbide based VCM production technologies with mercury free catalyst will be also scaled up and replicated in China through the China Petroleum and Chemical Industry Federation and China Chlor-Alkali Industry Association. The project will also focus on dioxin emission during the ethylene-based PVC production process. The experiences gained will benefit other countries and regions through replication activities. The project promotes public participation and cooperation with stakeholders, public participation will be ensured through engagement of government staff, entrepreneur, technical researchers, investors by way of workshops, training, academic communication and consultation.

2. *Stakeholders.* Will project design include the participation of relevant stakeholders from [civil society](#) and [indigenous people](#)? (yes /no) If yes, identify key stakeholders and briefly describe how they will be engaged in project design/preparation.

29. UNIDO will be the GEF Implementing Agency (IA) for the project.

30. The project will be implemented under National Execution (NEX) modality and will involve a wide range of stakeholders. The roles and responsibilities of various stakeholders directly involved in project implementation are described in Figure 2.

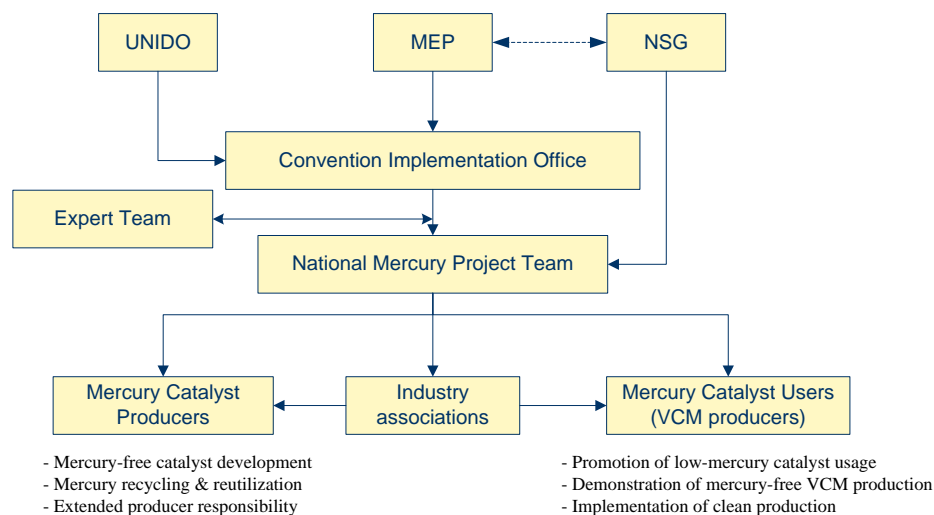


Figure 2: Project Stockholder Arrangement

31. Ministry of Environmental Protection (MEP), as the administrative authority on environmental protection, is designated by the State Council as the core agency for coordination of all mercury related activities in China and

the focal point for the implementation of the Minamata Convention in China. MEP is national implementing agency for this project.

32. The National Steering Group (NSG) is an Inter-ministerial Steering Group and will comprise of MEP and Ministry of Industry and Information Technology (MIIT). It will be established to provide overall guidance and coordination for the implementation of relevant activities and to ensure the committed inputs and contribution are available as needed.

33. The National Project Team comprising of staff from MEP and MIIT will be established and based in Foreign Economic Cooperation Office (FECO) of MEP. China Petroleum and Chemical Industry Federation and the China Chlor-Alkali Industry Association are responsible for coordinating government institutes, experts, and industries to help implanting related industrial policies, coordinating between the mercury catalyst producers and users (VCM producers), promoting technology transfer and facility updating to achieve the project objectives. It will assist FECO in coordination and organization of project activities by providing technical / policy consultation and service. All relevant research institutes will further identify and confirm their responsibilities during the project preparation stage.

34. NGOs and civil society organizations will be engaged in consultation for the regulatory framework, as well as awareness raising and environmental risk assessment of contaminated sites, information dissemination strategy activities to ensure the proper handling of hazardous substances, including mercury, during the use in manufacturing processes. The project also seeks public participation by consulting those potentially affected by the production, use and management of mercury, e.g. residents close to mercury-related industries and occupational workers.

3. *Gender Considerations.* Are [gender considerations](#) taken into account? (yes /no). If yes, briefly describe how gender considerations will be mainstreamed into project preparation, taken into account the differences, needs, roles and priorities of men and women.

35. Gender dimensions will also be a critical component of this FSP. Recognizing that the level of exposure to mercury and its related impacts on human health are determined by social and biological factors, women, children and men might be exposed to different kinds, levels and frequency of mercury, therefore, gender mainstreaming will be an integral part of this project. Particularly component 1 and national strategies under those activities will consider gender and especially gender related health issues in detail with gender based societies developed. The concepts of gender mainstreaming, which is a globally agreed strategy for achieving gender equality and women empowerment, defined by the United Nations Economic and Social Council in 1997 as "a strategy for making women's as well men's concerns and experiences an integral dimensions of policies and programmes in all political, economic and societal spheres' so that women and men benefit equally and inequality is not perpetuated.." will be the basis for practical gender activities, especially by identifying gaps in gender equality, throughout the project. Outcomes of the gender problem areas such as allocation of sufficient funds, gender equality, gender 'soft' areas such as gender health and education, or "gender-neutral" areas such as infrastructure and political commitment identified in the UN Secretary-General's Review and Appraisal of the implementation of the Beijing Platform for Action" will provide a basis for the gender assessment during this project. Further, the CEN System-wide policy on gender equality and the empowerment of women, UNIDO's internally adopted gender policies such as the UNIDO's policy on gender equality and the empowerment of women or the Revised Gender mainstreaming Steering Committee composition will be used as guidance materials. The specific gender analysis for this project will be conducted in PPG stage in consultation with the UNIDO gender advisor.

4 *Risks.* Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design (table format acceptable).

Risks	Level	Mitigation measures
Key agencies and stakeholders might not attach sufficient importance and allocate sufficient resources to mercury	Low	Focus on stakeholder awareness rising as a priority.

supervision		
NGOs and enterprises might not be willing to actively participate.	Low	Arise public awareness, enforce monitoring and inspection and provide sufficient trainings.
Mercury catalyst producers might not be willing to recycle the mercury and transfer to low-mercury catalyst production.	Low	A policy for extend mercury producer responsibility will be issued and the enhancement of monitoring will be implemented under the support of industry associates.
VCM producers might not be willing to cooperate and transfer to the low-mercury catalyst	Low	The low mercury technology is technically ready to be adopted by the industry. Further policy support in form of r limiting high-mercury catalyst's production and its use will be issued, combined with introduction of a proper price mechanism. An incentive program and PPP model will be establish to promote the R&D and technology transfer of low-mercury technology.
Delayed demonstration of mercury-free alternatives in VCM sector due to higher cost than expected and low efficiency.	Medium	A step-by-step strategy will be implemented from small to big scale to ensure the cost-effectiveness of the mercury-free alternatives in VCM sector through the transferring of international experience.
Climate change might affect the mobility of mercury to the atmosphere and sea.	Low	Selected technologies will be used to reduce mercury emissions and release to the river and the soil

5. *Coordination.* Outline the coordination with other relevant GEF-financed and other initiatives.

37. Three GEF projects were approved during GEF5: Reduction of Mercury Emissions and Promotion of Sound Management in Zinc Smelting Operations (2013-2014), Development of Mercury Inventory in China (2013-2014) and Minamata Convention Initial Assessment in the People's Republic of China (2014-2016). The FECO/MEP, as the execution agency for the three projects is moving forward as planned to ensure the expected outcomes achieved.

38. One component of the Pilot Project on the Development of Mercury Inventory in China is to build the mercury inventory in PVC industry in two demonstration provinces (Guizhou and Hunan) and draft action plan to reduce mercury emission, which is closely related to this project. The mercury inventory in PVC industry will help to know better of the current situation of PVC industry in two demonstration provinces, and also increase China's capacity to control mercury pollution in PVC industry. Also the proposed project was identified as the priority mercury emission and source for intervention in the MIA project. Based on the results of MIA activities, technical and financial needs for successful mercury reductions in PVC sector will be assessed to support efficient implementation of Minamata Convention at the national level.

6. *Consistency with National Priorities.* Is the project consistent with the National strategies and plans or reports and assessments under relevant conventions? (yes /no). If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, etc.

39. The project is highly consistent with the national strategies of environmental protection in China. In 2010, the Ministry of Industry and Information Technology issued "Cleaner Production Technologies in Calcium Carbide Process PVC industry," which listed low-mercury catalyst, hydrochloric acid desorption technology and mercuric chloride sodium hydrosulfide processing technology as cleaner production technologies in the promotion category. In 2011, the State Council issued "State Council Notification on the Issuance of Industrial Transition and Upgrading Plan (2011-2015)," which defined the phasing out of high-mercury catalyst of calcium carbide process in the PVC production. In 2011, the Development and Reform Commission issued the "Guiding Catalogue of Industrial Structure Adjustment (2011 version)," which listed high-mercury catalysts and facilities using high-mercury catalyst in PVC production as the preferred elimination technology. In 2012, the Ministry of Environmental Protection issued the "Catalogue of Environmental Protection Technology Encouraged by the

Nation in 2012," and listed low-mercury catalyst technology as the preferred environmental protection technology. In 2013, the Ministry of Environmental Protection issued "The Twelfth Five Year Plan on the Chemical Environmental Risk Prevention ", which highlighted the promotion of low-mercury catalyst technologies in PVC industries and highly effective mercury recovery technologies as one of the main priority areas.

40. Chinese government has made high efforts to control the mercury pollution and signed the Minamata Convention on October 10, 2013. UNIDO/GEF MIA project will set China in the right path to fulfilling its obligation under the Minamata Convention and place sound chemicals management at the forefront of the national sustainable development agenda. The proposed project will be fully aligned with priorities identified in MIA, which the VCM production is the most important manufacturing processes in which mercury are used.

7. *Knowledge Management.* Outline the knowledge management approach for the project, including, if any, plans for the project to learn from other relevant projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.

41. UNIDO is actively coordinating with the Minamata Convention secretarial on technical consultation aspects of project implementation and will learn from their experiences gained. Also the project involves demonstrations of BAT/BEPs and related policies in China, and the results will be shared with the public through awareness raising campaigns, e.g. publications, presentations, gender and children-related publications. For governmental and industrial stakeholders the results will be summarized and distributed for replication. Lessons learned from introducing environmental sound production patterns in the VCM sector and its integration in global commodity chains can be shared with other production sectors, regions and countries to take sound environmental practices already in consideration during initial production steps (e.g. technology selection phase etc.).

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

A. RECORD OF ENDORSEMENT⁸ OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):

(Please attach the [Operational Focal Point endorsement letter](#)(s) with this template. For SGP, use this [SGP OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
GUO Wensong	Director of the International Department	THE MINISTRY OF FINANCE, P.R.C	08/06/2014

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF policies⁹ and procedures and meets the GEF criteria for project identification and preparation under GEF-6.

Agency Coordinator, Agency name	Signature	Date (MM/dd/yyyy)	Project Contact Person	Telephone	Email
Philippe R. Scholtès, Managing Director, Programme Development		02/27/2015	Zhengyou PENG Environment Branch	+43 01 26026 3831	z.peng@unido.org

⁸ For regional and/or global projects in which participating countries are identified, OFP endorsement letters from these countries are required even though there may not be a STAR allocation associated with the project.

⁹ GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, and SCCF

and Technical Cooperation Division (PTC), UNIDO GEF Focal Point					
--	--	--	--	--	--

C. ADDITIONAL GEF PROJECT AGENCY CERTIFICATION (APPLICABLE ONLY TO NEWLY ACCREDITED GEF PROJECT AGENCIES)

For newly accredited GEF Project Agencies, please download and fill up the required [GEF Project Agency Certification of Ceiling Information Template](#) to be attached as an annex to the PIF.