

Document of
The World Bank

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Report No:

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED GRANT FROM THE
GLOBAL ENVIRONMENT FACILITY TRUST FUND

IN THE AMOUNT OF
US\$15.0 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR THE

DIOXINS REDUCTION FROM THE PULP AND PAPER INDUSTRY PROJECT

January 16, 2012

China and Mongolia Sustainable Development Unit
Sustainable Development Department
East Asia and Pacific Region

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CURRENCY EQUIVALENTS
(Exchange Rate Effective {Date})

Currency Unit = CNY
CNY 6.31 = US\$1

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

ADt	Air Dry tone	MEP	Ministry of Environmental Protection
AOX	Absorbable Organic Halides	MOF	Ministry of Finance
BAT/BEP	Best Available Techniques/ Best Environmental Practices	NDRC	National Development and Reform Commission
BOD	Biochemical Oxygen Demand	NCG	National Coordination Group
CAS	Country Assistance Strategy	NIP	National Implementation Plan
CNAO	China National Audit Office	ODS	Ozone Depleting Substances
COD	Chemical Oxygen Demand	OP/BP	Operation Policies/Bank Procedures
CPA	China Paper Association	PBF	Performance Based Financing
CQS	Consultants' Qualifications	PDO	Project Development Objective
DA	Designated Account	PIM	Project Implementation Manual
ECF	Elemental Chlorine Free bleaching	POP	Persistent Organic Pollutant
EHS	Environment, Health and Safety	QCBS	Quality and Cost Based Selection
EIA	Environmental Impact Assessment	CNY	Chinese yuan
EMP	Environmental Management Plan	SIDA	Swedish International Development Cooperation Agency
EPB	Environmental Protection Bureau	SOE	State Owned Enterprise
FECO	Foreign Economic Cooperation Office	TCF	Total Chlorine Free bleaching
FMM	Financial Management Manual	TEQ	(Dioxin) Toxic Equivalent
GEF	Global Environment Facility	TSS	Total Suspended Solids
ICB	International Competitive Bidding	UNEP	United Nations Environment Programme
ISP	Implementation Support Plan	UPOPs	Unintentionally Produced POPs
IVE	Independent Verification Entity		
M&E	Monitoring and Evaluation		

Regional Vice President:	James W. Adams, EAPVP
Country Director:	Klaus Roland, EACCF
Sector Director:	John Roome, EASSD
Sector Managers:	Paul Kriss, EASCS; Magda Lovei, EASER
Task Team Leaders:	Jiang Ru, EASER; Ning Yang, EASCS

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PAD DATA SHEET

China

Dioxins Reduction from the Pulp and Paper Industry (P125528)

PROJECT APPRAISAL DOCUMENT

EAST ASIA AND PACIFIC

EASCS

Basic Information					
Date:	16-Jan-2012	Sectors:	Public administration- Water, sanitation and flood protection (50%), Public administration- Industry and trade (30%), Other industry (20%)		
Country Director:	Klaus Rohland	Themes:	Pollution management and environmental health (60%), Environmental policies and institutions (20%), Other environment and natural resources management (20%)		
Sector Manager/Director:	Paul Kriss/John A. Roome	EA Category:	A - Full Assessment		
Project ID:	P125528	Focal Area:	Persistent Organic Pollutants		
Lending Instrument:	Specific Investment Loan				
Team Leader(s):	Jiang Ru/Ning Yang				
Joint IFC: No					
Borrower: International Department, Ministry of Finance					
Responsible Agency: Foreign Economic Cooperation office, Ministry of Environmental Protection					
Contact:	Ms. Qiong Ding	Title:	Division Chief		
Telephone No.:	86108226-8810	Email:	ding.qiong@mepfeco.org.cn		
Project Implementation Period:	Start Date:	30-Mar-2012	End Date: 30-Jun-2017		
Expected Effectiveness Date:	31-Aug-2012				
Expected Closing Date:	30-Jun-2017				
Project Financing Data(US\$M)					
<input type="checkbox"/>	Loan	<input checked="" type="checkbox"/>	Grant	<input type="checkbox"/>	Other

<input type="checkbox"/>	Credit	<input type="checkbox"/>	Guarantee							
For Loans/Credits/Others										
Total Project Cost (US\$M):		81.00								
Total Bank Financing (US\$M):		0.00								
Financing Source										
Financing Source					Amount(US\$M)					
BORROWER/RECIPIENT					66.00					
Global Environment Facility (GEF)					15.00					
Total					81.00					
Expected Disbursements (in USD Million)										
Fiscal Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Annual	0.00	2.00	4.00	4.00	2.00	2.00	1.00	0.00	0.00	
Cumulative	0.00	2.00	6.00	10.00	12.00	14.00	15.00	15.00	15.00	
Global Environmental Objective(s)										
The project development objectives are to: (a) demonstrate the result of adoption of best available techniques and best environmental practices (BAT/BEP) in four selected non-wood pulp mills; and (b) support China in developing and adopting a long-term action plan to guide the promotion of a sector-wide BAT/BEP adoption.										
Components										
Component Name						Cost (USD Millions)				
BAT/BEP Investment in Participating Mills.						73.64				
National Action Plan for Sector-Wide Replication						2.56				
Monitoring and Evaluation						1.20				
Project Management						3.60				
Compliance										
Policy										
Does the project depart from the CAS in content or in other significant respects?							Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>
Does the project require any exceptions from Bank policies?							Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>
Have these been approved by Bank management?							Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>
Is approval for any policy exception sought from the Board?							Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>
Does the project meet the Regional criteria for readiness for implementation?							Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>

Safeguard Policies Triggered by the Project				Yes	No
Environmental Assessment OP/BP 4.01				X	
Natural Habitats OP/BP 4.04					X
Forests OP/BP 4.36					X
Pest Management OP 4.09					X
Physical Cultural Resources OP/BP 4.11					X
Indigenous Peoples OP/BP 4.10					X
Involuntary Resettlement OP/BP 4.12				X	
Safety of Dams OP/BP 4.37					X
Projects on International Waterways OP/BP 7.50					X
Projects in Disputed Areas OP/BP 7.60					X
Legal Covenants					
Name		Recurrent	Due Date	Frequency	
Sch.2.F.2			31-Dec-2016		
Description of Covenant					
Formulate national action plan to promote BAT/BEP for wood and non wood based mills and facilitate its adoption and implementation					
Name		Recurrent	Due Date	Frequency	
Sch. 2.F.4		X		Yearly	
Description of Covenant					
Cause EPBs to prepare and implement action plan for monitoring dioxins releases from pulp and paper sector in the project provinces					
Name		Recurrent	Due Date	Frequency	
Annex 2 to Schedule 2 Section B.5		X		Yearly	
Description of Covenant					
Each participating mill shall undertake to provide its counterpart contribution for the Mill BAT/BEP Investment Plan in a timely manner.					
Name		Recurrent	Due Date	Frequency	
Annex 2 to Schedule 2 Section B.9		X		Yearly	
Description of Covenant					
FECO shall inspect completed BAT/BEP investments to determine if activities were completed according to agreed quality and technical standards before issuing verification certification					
Team Composition					
Bank Staff					

Name	Title	Specialization	Unit
Bernardita Ledesma	Operations Analyst	Operations Analyst	EASER
Yan Zhang	Program Assistant	Program Assistant	EACCF
Jiang Ru	Senior Environmental Specialist	Team Lead	EASER
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Ning Yang	Environmental Specialist	Environmental Specialist	EASCS
Guoping Yu	Procurement Specialist	Procurement Specialist	EAPPR
Meixiang Zhou	Social Development Specialist	Social Development Specialist	EASCS
Dominique Isabelle Kayser	Operations Officer	Operations Officer	ENVGC

Non Bank Staff

Name	Title	Office Phone	City

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments

I. STRATEGIC CONTEXT

A. Country Context

1. The rapid economic development in China since 1978 has led to significant environmental pollution and ecological degradation. Committed to reversing this downward environmental trend, the Government has made environmental protection a national policy. Internationally, China has ratified numerous conventions including the Stockholm Convention on Persistent Organic Pollutants (POPs) for which China has prepared a National Implementation Program (NIP). POPs are a group of chemical substances that persist in the environment, can be transported far from their sources and bio-accumulated through the food web, and can “lead to serious health effects, including certain cancers, birth defects, dysfunctional immune and reproductive systems, greater susceptibility to disease and even diminished intelligence.”¹ Under the Stockholm Convention, a total of 21 chemical substances are listed as POPs, including pesticides (such as dichlorodiphenyltrichloroethane), industrial chemicals (such as polychlorinated biphenyls) and unintentional by-products of industrial processes (such as dioxins and furans). The last group of chemicals is often called unintentionally produced POPs (UPOPs).²

2. According to the China NIP, the pulp and paper sector is one of the priority sectors for control and reduction of UPOPs releases because the sector is: (a) a major source of water pollution in 2006, accounting for about 15% of national industrial wastewater and about 33% of national industrial chemical oxygen demand (COD) discharge; (b) one of the industrial sectors with the highest energy consumption; (c) expected to have high growth rates in the next decade; and (d) the largest source of UPOPs release under the Source Category of Production and Use of Chemicals and Consumer Goods. Among all pulp and paper production processes, the NIP identifies the elemental chlorine-based pulp bleaching process as the main source of UPOPs formation and releases, and proposes to adopt a series of measures before 2015 to control and reduce UPOPs release from China’s pulp and paper industries. To facilitate implementation of the NIP in this sector, the Chinese Government has requested the Bank to prepare and implement the proposed project to be financed by the Global Environment Facility (GEF), the financial mechanism of the Stockholm Convention. In March 2011, the GEF Council approved a \$15.0 million grant to support this proposed project.

B. Sectoral and Institutional Context

3. In 2009 China had about 3,700 pulp and paper mills, including many of small capacity, with a total pulp production of 66.74 million tons.³ In contrast to many other countries, China has relied heavily on non-wood fiber materials to produce its virgin pulp, as the country has limited production capacity for wood fiber materials. As China promotes development of wood pulp production and consumes more imported wood and waste fiber, the share of non-wood pulp consumption over total pulp consumption has decreased from 40% in 2000 to about 15% in

¹ Stockholm Convention on POPs, at <http://chm.pops.int/Convention/tabid/54/language/en-US/Default.aspx>.

² China has yet to approve the 2009 amendments to the Stockholm Convention, which have added nine new POPs into the Convention.

³ China Paper Association, 2009 Annual Report.

2009. There has also been a corresponding decrease in the share of total virgin pulp consumption from non-fiber materials, from 84% in 2000 to about 68% in 2009. These statistics, and an estimate that the non-wood pulp industry provides direct or indirect employment to over eight million people, show the strategic importance of non-wood fiber materials in China.⁴

4. Traditionally the pulp and paper sector produces or releases UPOPs into the environment as a result of the elemental chlorine-based pulp production processes widely used in the sector. To improve the environmental performance of this sector, China has initiated industry restructuring efforts since 1996 to encourage concentration of production capacity, support closure of inefficient small mills, and very recently ban the use of elemental chlorine-based technology of new mills and promote the development of large wood pulp based modern mills. China has issued a series of cleaner production guidelines since 2007, and the Wastewater Discharge Standards for the Pulp and Paper Industry (GB3544-2008) in 2008. The 2008 Standard requires all new mills established after August 1, 2008 to meet stricter discharge standards, including a water consumption standard, and for the first time an effluent standard on dioxins. This new standard further requires all existing mills to meet the discharge standards for the new mills starting July 1, 2011.

5. The pulp and paper sector, as a key source of water pollution in China, has been under strict environmental monitoring and enforcement by the municipal or provincial environmental protection bureaus (EPBs) since the mid 1990s. Data from online monitoring equipment (measuring COD concentration, volume of discharged wastewater, and in some cases, SO₂ concentration and volume of discharged flue gas) at the mills are transmitted directly to the EPBs and sub-standard readings would result in an onsite visit by EPB agents. Non-compliance with environment standards triggers significant penalties in addition to the mandatory discharge fee.

6. As a result of these government initiatives, there has been a significant improvement in the sector's environmental performance (e.g., reducing COD discharge from about 3.1 million tons in 2000 to about 1.3 million tons in 2008). The positive results of these policy measures and active environmental monitoring and enforcement have provided a sound policy basis for the sector to eliminate elemental chlorine bleaching based production to comply with the 2008 Standards. Many large wood pulp mills have adopted BAT/BEP that are based on elemental chlorine free technologies. In contrast, few large existing non-wood mills have followed the national policy and acted on their own to adopt BAT/BEP for their non-wood pulp production lines.

7. Two challenges face the Government in encouraging sector wide adoption of BAT/BEP: (a) high investment cost and yet-to be demonstrated benefits of BAT/BEP adoption in the non-wood sector; and (b) limited dioxin monitoring and enforcement capacity at the local level to ensure compliance of exiting mills with the 2008 discharge standards. To respond to these challenges, the Ministry of Environmental Protection (MEP), in consultation with other stakeholders, proposed to focus this project on (a) demonstrating BAT/BEP in four existing non-wood mills which typify the most commonly used non-wood fiber material in China: straw, reed, bamboo and bagasse; and (b) strengthen the government's capacity in monitoring and

⁴ This is estimated by an IFC funded report, China: Technical Assistance for the Sustainable Development of the Non-Wood Pulp and Paper Industry (2006).

enforcement of the 2008 dioxin standard. Based on the results of the demonstration projects, MEP will develop a long-term national action plan to scale up BAT/BEP adoption and further control the formation and release of UPOPs from both the wood and non-wood pulp sectors.

C. Higher Level Objectives to which the Project Contributes

8. The project is consistent with the third pillar of the Bank's Country Partnership Strategy (2006-2010, Report No. 35435-CN), *Managing Resource Scarcity and Environmental Challenges*, by targeting the reduction of UPOPs release and improving water consumption and quality management within the pulp and paper industry. The proposed project is also consistent with the objectives of the Environment Strategies of the EAP Region and the World Bank, and would help China meet its obligations under the Stockholm Convention. In addition, the project contributes to achievements of the objective of the Convention, i.e. to protect human health and the environment from persistent organic pollutants.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

9. The project development objectives are to (a) demonstrate the result of best available techniques and best environmental practices (BAT/BEP) adoption in four selected non-wood pulp mills; and (b) support China in developing and adopting a long-term action plan to guide the promotion of a sector-wide BAT/BEP adoption.

Project Beneficiaries

10. Beneficiaries of the project include: (a) the four demonstration mills; (b) the public (about 250,000) living in downstream of the demonstration; and (c) the global public, because of reduced UPOPs releases to the global environment. The project will also benefit the environmental authorities in the four provinces whose capacity for monitoring and enforcement will be enhanced.

PDO Level Results Indicators

11. The key results of this proposed project are (a) reduced UPOPs releases in the four non-wood fiber mills supported by the Project; and (b) adoption of a long-term action plan for the sector's UPOPs reduction.

III. PROJECT DESCRIPTION

A. Project components

12. The project has four components as described below.

Component 1: BAT/BEP Investment in Participating Mills (Total Cost: US\$73.64M; GEF Grant: US\$11.18M)

13. This component will support adoption of BAT/BEP in the four selected non-wood pulp mills by replacing the current elemental chlorine-based bleaching process by the elemental chlorine-free (ECF) process in order to minimize releases of dioxins and furans. In doing so, construction, renovation and rehabilitations of production processes and facilities (and associated engineering and design works and civil works and acquisition and installation of equipment) will be carried out in the participating mills to improve their overall environmental performance, including reducing pollution load in effluents and increasing water conservation. Technical assistance to the participating mills will be provided to support review of technical proposals and design of BAT/BEP and during trial operations after the completion of the technological upgrades. An assessment of the results of the BAT/BEP investment will also be performed. The selected four mills are the Zhongye Meili Paper Mill (Ningxia); Leshan Jinfu Paper Mill (Sichuan), Nanning Sugar Company Pumiao Paper Mill (Nanning) and Yueyang Paper Mill (Hunan), each typifying the most common non-wood fiber, straw, bamboo, bagasse and reed, respectively. A performance based financing (PBF) scheme has been designed to incentivize the mills to carry out the agreed BAT/BEP investments, complete needed trial operations to adjust the system to the specific production conditions, operate the new facility for a one year period and achieve agreed performance targets (details see Annex 2).

Component 2: National Action Plan for Sector-Wide Replication (Total Cost: US\$2.56M; GEF Grant: US\$1.8M, SIDA Grant: US\$0.5M)

14. The objective of this component is to establish an enabling environment for the replication of the BAT/BEP techniques and practices tested under Component 1, including the development and implementation of a national action plan to promote BAT/BEP for both wood and non-wood pulp based production in pulp and paper mills. Based on the experience learned in the four demonstration projects, the component will support (a) development, dissemination and implementation of general sectoral technical guidelines on BAT/BEP and specific guidelines for the non-wood pulp sector of China; (b) development and promotion of implementation of a National Action Plan setting out a detailed approach for the pulp and paper sector in China to progressively eliminate elemental chlorine based bleaching production process, promote updated assessment standard of cleaner technology and carry out a SIDA (Swedish International Development Cooperation Agency) supported research of integrated permit and its case study; (c) adoptions of measures to encourage sector-wide BAT/BEP adoption, including awareness-raising activities and promotion of good practices for wood-based mills, and training of governmental officials and representatives of industrial institutions on BAT/BEP adoption in the pulp and paper sector; (d) provision of capacity-building support and training to local EPBs to conduct sampling and monitoring of dioxin release from the operation of paper and pulp mills using rapid assessment methods; and (e) carrying out of public awareness and outreach activities to raise awareness on good production practices for both the non-wood and wood-based pulp and paper sectors, as well as among the general public.

Component 3: Monitoring and Evaluation (Total Cost: US\$1.2M; GEF Grant: US\$0.87 M)

15. Due to the pilot nature of the project, particular monitoring and evaluation emphasis will be placed on evaluating the results of the investments supported by the project. This component will carry out independent verification of baseline and sample results at the four mills to quantify reduction of dioxins releases as well as water quality parameters and water savings achieved. In addition, dioxin monitoring activities will be performed at selected wood mills that have adopted BAT/BEP to evaluate BAT/BEP options for the wood pulp sector. In the four project provinces, the project will support the four provincial EPBs' efforts to promote UPOP monitoring based on the 2008 standards in their provinces. Such monitoring and subsequent enforcement will provide a fair regulatory environment so that additional mills will be incentivized to take actions to adopt BAT/BEP for non-wood mills demonstrated under this project or commercially available BAT/BEP options for wood mills. Project monitoring and evaluation activities will be carried out during the course of project implementation.

Component 4: Project Management (Total Cost: US\$3.6M; GEF Grant US\$0.78M)

16. This component will support provision of technical assistance to improve the capacity of FECO to manage the implementation of the Project.

B. Project Financing

Lending Instrument

17. The proposed project will be financed by a US\$15 million GEF Grant, complemented by counterpart funding of US\$66 million, drawn from the participating pulp and paper mills, with support from central and local governments.

Project Cost and Financing

Table 1. Project Cost and Financing

Project Components	Project Cost (US\$M)	GEF Financing (US\$M)	Financing (%)
1. BAT/BEP Investment in Selected Non-wood Fiber Mills	73.64	11.55	15.7
2. National Action Plan for Sector-Wide Replication	2.56	1.8	70.3
3. Monitoring and Evaluation	1.2	0.87	72.5
4. Project Management	3.6	0.78	21.7
Total Project Costs	81.0	15.0	18.5

C. Lessons Learned and Reflected in the Project Design

18. This project is the first GEF co-financed project worldwide to promote BAT/BEP for non-wood based paper pulp production. A number of lessons learned and experience gained from related projects in China and elsewhere are reflected in project design.

19. **Mainstreaming.** POP issues must be addressed within the client countries' existing environmental management framework, and avoid the creation of a separate regulatory regime solely designed for POP issues. This project takes an integrated environmental management approach to mainstream POPs reduction with broader environmental concerns. Water consumption and effluent quality for dioxin and all other traditional pollutants are all taken into account under this approach.

20. **Performance based financing.** The use of a PBF modality is rooted in the experience of the Bank in output based aid operations globally and in working with MEP and the industries to implement the program for phasing out ozone depleting substances (ODS) in China. The latter has provided grant, policy and technical support to incentivise industrial sectors to deliver agreed. Experience from these operations helped the design of the PBF scheme of this project.

21. **Demonstration first.** The “demonstrate and disseminate” approach has been proven very effective when new technologies are introduced to a new sector. It has also been highlighted in the China NIP as a main strategy to address POPs issues. The project relies on support to ground level demonstrations with a depth of analysis that will provide a strong technical and economic basis for the further development of a national action plan for sector-wide adoption and implementation.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

22. MEP is the lead national agency responsible for project implementation. MEP is the designated national lead implementing agency for all POPs activities and for implementation of the POPs Convention. The inter-ministerial National Coordination Group (NCG) for Stockholm Convention's implementation, under the leadership of the MEP, is the national coordination mechanism of the Chinese government for implementation of the Stockholm Convention, responsible for reviewing and implementing national guidelines and policies on POPs management and control, and coordinating all issues related to POPs management and Convention implementation. The NCG – or a sub-committee thereof, as appropriate - complemented with membership from the local Environmental Protection Bureaus (EPBs) and China Paper Association (CPA), will serve as the project Advisory Committee to provide the overall guidance and advice on project implementation.

23. Within MEP, the Foreign Economic Cooperation Office (FECO), in addition to hosting the office of the NCG, has managed preparation of the project and will be responsible for overall project implementation. It will be the signatory on the project's PBF agreements. In the four project provinces, provincial and municipal EPBs are responsible for monitoring environmental performance of the pulp and paper industry within their specific local jurisdiction, issuing

provincial/municipal environmental policies and standards, enforcing environmental policies, and disclosing environmental information. Within the scope of this project's implementation, the provincial EPBs will be responsible for the routine monitoring of the four participating mills, as well as all the mills in the provinces in question. They will also contribute to the development of capacity on UPOPs monitoring, including rapid assessment monitoring, as required, and assume responsibility for disclosure of information, as well as project level reporting to the MEP/FECO on all their provincial level project activities.

24. The four pulp and paper mills selected for participation in the project activities will carry out BAT/BEP investments, in compliance with national and local environmental policies and standards. They will enter into a PBF agreement with MEP/FECO to convert their current chlorine-based technology to elemental chlorine free based BAT/BEP production. Based on the PBF agreement, the mills will accept inspections carried out by MEP/FECO and provincial and municipal EPBs, dioxin baseline and post-BAT/BEP adoption monitoring by a qualified dioxin laboratory, and verification carried out by an independent verification entity (IVE) recruited by MEP/FECO. The mills will receive grant support from the project after their performance is verified as satisfactory by the IVE.

25. CPA, a nationwide industrial association, coordinates and supports compliance actions within the pulp and paper sector, facilitates information exchanges among members of the Association, serves as liaison between its member enterprises and the government, and contributes to the formulation of sector development strategies based on its membership's inputs. CPA will assist the project by: (a) acting as liaison for the Chinese pulp and paper industry in the coordination and development of the national action plan for BAT/BEP implementation; and (b) facilitating policy implementation, and BAT/BEP promotion throughout the sector.

B. Results Monitoring and Evaluation

26. The project will carry out three levels of monitoring and evaluation (M & E) activities: M&E on dioxins reduction; M&E on overall environmental performance of the project financed mills; and project implementation M&E. A qualified independent dioxin laboratory will monitor dioxin results from the four project financed mills. The project will also support the four provincial EPBs to carry out rapid dioxin monitoring. In addition, the project will support dioxin monitoring at selected BAT/BEP adopted wood mills to evaluate demonstrated BAT/BEP options for the wood pulp sector. The project will also collect dioxin monitoring results of non-project financed mills from the four provincial EPBs.

27. M&E activities to monitor the overall environmental performance of the four project financed mills will be based on information already collected by the four provincial EPBs. The project will support FECO/MEP to monitor and evaluate project progress with all stakeholders and take necessary action to ensure proper and timely implementation of all agreed project activities. This project will provide training on various project management topics and support for routine M&E reviews to all concerned parties.

C. Sustainability

28. The project’s sustainability rests on the strong commitment of the Government of China to the Stockholm Convention and to further improve the environmental performance of the sector. The government has recently included POPs in its 12th Five-Year Plan as one group of key pollutants to be strictly controlled. Together with the government’s continued efforts to promote restructuring and cleaner production of the sector, pulp mills will eventually have to either upgrade production technology to improve environmental performance or exit from the sector. For interested non-wood mills, ECF based BAT/BEP options demonstrated under this project will then provide sufficient and first handed technical, financial and operating information to facilitate decision making on technology upgrades.

V. Key Risks and Mitigation Measures

A. Risk Ratings Summary Table

Table 2. Risk Ratings Summary Table

	Rating
Stakeholder Risk	Moderate
Implementing Agency Risk	
- Capacity	Moderate
- Governance	Low
Project Risk	
- Design	Substantial
- Social and Environmental	Low
- Program and Donor	N/A
- Implementation and Sustainability	Substantial
Overall Implementation Risk	Substantial

B. Overall Risk Rating Explanation

29. The project’s overall risk for implementation is substantial. The main risks associated with the project are related to project design (introduction of new technologies and a PBF scheme) and associated implementation risks. To mitigate technological risk, a group of experts carried out detailed reviews of each mill’s feasibility study before appraisal. The reviews confirmed that the proposed technologies are technically sound and financially affordable, and are in line with BAT/BEP guidelines issued by the Stockholm Convention. The project will provide continued technical support to the four mills to address technical issues they may experience during their BAT/BEP demonstration. The PBF scheme design has been discussed and agreed with all stakeholders, including the four concerned mills. A PBF agreement will be signed by the mills and FECO/MEP to mitigate risks associated with the PBF scheme. In addition to financing a qualified IVE to carry out performance monitoring, the project will provide technical assistance to FECO/MEP to help incorporate UPOPs monitoring into the existing environmental management system, and further strengthen capacity for UPOP monitoring and enforcement in the pulp and paper sector.

VI. Appraisal Summary

A. Economic and Financial Analysis

30. **Economic Analysis.** The cost effectiveness method has been used for the economic analysis of this project, as it is difficult to quantify the potential environmental and health benefits. Two technical options were compared: ECF and total chlorine free (TCF) bleaching technologies. Both ECF and TCF are accepted technical options worldwide for the wood pulp production while ECF has a dominant market share.

31. The ECF process demonstrates complementarities with the existing assets of the four mills, whereas TCF would require much higher investments for the replacement of the bleaching lines. ECF will also lead to higher yield and quality. In addition, there was no available data on the TCF option for non-wood pulp production. As discussed in the Technical Appraisal section below, ECF has been recognized as a better option for non-wood fiber materials. ECF is therefore considered as being the most cost effective measure for BAT/BEP application for the non-wood mills in China.

32. **Financial Analysis.** Financial analyses were conducted to estimate the profits of the four participating mills due to the conversion processes. Table below summarizes the results of the analysis and the related sensitivity analysis. It demonstrates that the returns of these conversion processes are better than their weighted average costs of capital, but they are very sensitive to increase in operating costs and decrease in pulp prices. This is mainly due to the strong competition within the sector.

Table 3: Summary of Financial Analyses Results

	Zhongye Paper	Jinfu Paper	Nanning Sugar	Yueyang Paper
WACC* (%)	3.58%	3.61%	5.59%	3.15%
FIRR** (%)	8.16%	5.95%	11.64%	39.9%
Switching Value for Revenue (%)	2.49%	0.93%	1.56%	2.10%
Switching Value for Operating Costs (%)	2.89%	1.14%	1.69%	1.07%
Switching Value for both (%)	1.34%	0.51%	0.88%	1.07%

* WACC: Weighted Average Cost of Capital

** FIRR: Financial Internal Rate of Return

33. The financial viability of each mill was also analyzed. It confirmed that overall the four mills are in good financial standing and demonstrate favorable annual profits. The mills also have stable current and quick ratios which point to an underlying financial stability.

B. Technical

34. As noted above, the two BAT/BEP options available are ECF and TCF; the ECF option is more cost effective than the TCF option. Technically, the Stockholm Convention BAT/BEP guidelines define “primary measures” and “secondary measures” for best available techniques – chief amongst them the elimination of elemental chlorine by replacing it with chlorine dioxide – the “elemental chlorine-free process” (ECF). The “totally chlorine-free” process (TCF) is

presented as an alternative. Moreover, the guidelines note that TCF *“has gradually lost its attraction because of its weaknesses in fiber characteristics, lower pulp yield and higher energy consumption. The elemental chlorine-free (ECF) process has taken over as the leading bleaching method. Some TCF processes have started to lose their shares in the market and a number of TCF mills are converting to ECF pulp production. The operating costs of TCF pulping are usually higher than those of ECF pulping due to the higher chemical costs required to reach the same level of pulp brightness.”* Finally, referring specifically to non-wood pulp, the guidelines further note that *“Because of their poor bleachability, non-wood pulps cannot be satisfactorily bleached without chlorine chemicals if the traditional alkaline non-wood process is used”*. Following these guidelines, this project supports China to demonstrate ECF based BAT/BEP in the selected four mills.

C. Financial Management

35. MEP/FECO will be responsible for overall project implementation and management as well as the project accounting and financial management. GEF grant proceeds, including overseeing the Designated Account (DA), will be managed by the Ministry of Finance (MOF). A financial management capacity assessment has been conducted by the Bank and found that the financial management risk due to the inexperience of the four selected mills with Bank financed projects and the use of the PBF scheme is offset by the extensive experience of FECO in implementing and managing Bank projects. Actions agreed to strengthen project financial management capacity include the development of a Financial Management Manual (FMM) for use during project implementation and financial management training for project staff. The financial management assessment concluded that with the implementation of these proposed actions, the financial management arrangements will satisfy the Bank’s minimum requirements under OP/BP 10.02.

D. Procurement

36. MEP/FECO is responsible for preparing the procurement plan and the bidding documents, as well as initiating the request for proposals, organizing the bidding process, and complying with all necessary domestic and the Bank review procedures. The procurement capacity assessment concluded that MEP/FECO has adequate experience and capacity to carry out procurement activities for the proposed project. Measures to further strengthen MEP/FECO’s procurement capacity and to mitigate potential procurement risks have been agreed and will be implemented during project implementation (see details in Annex 3). These measures include procurement training for project staff and preparation of a Project Implementation Manual. All project procurement activities have been documented in a Procurement Plan, which has been reviewed and cleared by the Bank.

E. Social (including safeguards)

37. The project has positive social benefits as it improves environment protection through the reduction of UPOPs emissions, thus minimizing potential health impacts associated with such pollutants. The mills provided assurances that no jobs will be lost due to the conversion to the new technology.

38. There is no need for land acquisition and involuntary resettlement as project activities will be implemented in the existing mills' premises. A due diligence review report was prepared for the 80 mu land on a hill already acquired by Guangxi Nanning Sugar Company Pumiao Paper Mill in 2010 prior to project identification. The Bank's OP4.12 is triggered as the land acquired is used for the mill's BAT/BEP investment activities. The due diligence review confirmed that there is no legacy or adverse affect on local villagers and the affected village/villagers are satisfied with the compensation arrangements.

F. Environment (including safeguards)

39. The project will result in significant environmental benefits through the support for four selected non-wood pulp and paper mills to adopt ECF based BAT/BEP which will help minimize UPOPs (dioxins and furans) release, reduce water consumption and pollutant load in effluents, including COD, BOD and TSS, etc. Key environmental issues identified include wastewater and waste management, accidental breakdown and environmental risks, as well as safety and health issues during operation and construction. Due to the scale and risk level of potential environmental impacts, the project is categorized as Category A for environmental assessment, in accordance with OP/BP4.01.

40. Site-specific environmental assessments have been conducted by accredited EIA institutes for each mill. Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for each mill and the EA Executive Summary for the entire project are found in compliance with Bank requirements. A stand-alone EMP, developed based on the findings of the EIA report, details the environmental management and supervision organizations and their responsibilities, mitigation measures, a capacity training plan, a monitoring plan, risk management plan, and budget estimates for EMP implementation for construction and operation stages.

41. Public consultations and information disclosure were held following domestic and Bank requirements during the preparation of the EA for each mill. A combination of opinion surveys and public meetings within the project's area of influence were conducted. Public concerns have been incorporated either in the project design or in the EA. Two rounds of information disclosure were carried out during EA preparation stage, through public bulletins, local newspapers, and the internet. All EIAs were made available locally and in the Infoshop, and as such, are accessible to the general public.

Annex 1: Results Framework and Monitoring

CHINA: DIOXINS REDUCTIONS FROM THE PULP AND PAPER INDUSTRY Results Framework

Project Development Objective (PDO):												
The project development objectives are to (a) demonstrate the result of BAT/BEP adoption in four selected non-wood pulp mills, (and (b) support China to develop and adopt its long-term action plan to guide the promotion of a sector-wide BAT/BEP adoption.												
PDO Level Results Indicators	Core	Unit of Measure	Baseline*	Cumulative Target Values**					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (indicator definition etc.)
				YR 1	YR 2	YR3	YR 4	YR5				
Indicator One: Reduced UPOPs releases in the four non-wood fiber mills supported by the Project.	<input type="checkbox"/>	g TEQ/a UPOPs released	TBD			TBD	TBD	TBD	Semi-annually	Independent dioxin laboratory monitoring data	Independent verification entity to be recruited	
Indicator Two: Adoption of a long-term action plan for the sector's UPOPs reduction.	<input type="checkbox"/>	National Action Plan	0	0	0	Drafted	Finalized	Issued	YR3, YR4 and YR5	FECO/MEP	FECO/MEP	
INTERMEDIATE RESULTS												
Intermediate Result (Component One): BAT/BEP Investment in Participating Mills***												
<i>Intermediate Result indicator One:</i> Completion of BAT/BEP investment.	<input type="checkbox"/>	Number of mills	0	0	0	4	4	4	Yearly	IVE	FECO/MEP	
<i>Intermediate Result indicator Two:</i> COD discharge per unit of non-wood pulp production from the four mills.	<input type="checkbox"/>	Kg COD discharged/ air dry ton of pulp	HN:11.7 GX: 13.5 NX: 27.4 SC:10.2			HN:4.68 GX: 4.43 NX:4.36 SC: 4.83	HN:4.68 GX: 4.43 NX:4.36 SC: 4.83	HN:4.68 GX:4.43 NX:4.36 SC: 4.83	Semi-annually	IVE and Provincial EPB's Environmental Monitoring data	Provincial EPBs	NOTE: annual but not cumulative.
<i>Intermediate Result indicator Three:</i> NH3-N discharge per unit of non-wood pulp production from the four mills.	<input type="checkbox"/>	Kg NH3-N discharged/ air dry ton of pulp	HN: 0.62 GX: 0.18 NX: 0.13 SC:0.72			HN:0.36 GX: 0.13 NX:0.09 SC: 0.43	HN:0.36 GX: 0.13 NX:0.09 SC: 0.43	HN:0.36 GX: 0.13 NX:0.09 SC: 0.43	Semi-annually	IVE and Provincial EPB's Environmental Monitoring data	Provincial EPBs	NOTE: annual but not cumulative.
<i>Intermediate Result indicator Four:</i> Water consumption per unit of non-wood pulp production from the mills.	<input type="checkbox"/>	Tons water consumed / air dry ton of pulp	HN:85.8 GX: 94.4 NX: 78.2 SC: 72.0			HN:48.9 GX: 55.4 NX:53.8 SC: 53.6	HN: 48.9 GX: 55.4 NX:53.8 SC: 53.6	HN: 48.9 GX: 55.4 NX:53.8 SC: 53.6	Semi-annually	IVE and Provincial EPB's Environmental Monitoring data	Provincial EPBs	NOTE: annual but not cumulative.
Intermediate Result (Component Two): National Action Plan for Sector Wide Replication												
<i>Intermediate Result indicator</i>	<input type="checkbox"/>	Guideline	0	0	Drafted	Finalized	Issued		Yearly	FECO/MEP	FECO/MEP	

<i>One:</i> Sector Wide BAT/BEP Guideline developed.												
<i>Intermediate Result indicator Two:</i> UPOPs monitoring guideline for the pulp and paper sector developed.	<input type="checkbox"/>	Guideline	0	0	Drafted	Finalized	Issued	Implemented	Yearly	FECO/MEP	FECO/MEP	
<i>Intermediate Result indicator Three:</i> National workshops on BAT/BEP knowledge dissemination to mills.	<input type="checkbox"/>	Number of workshops // number of mills	0	0	0	2 // 20	4 // 60	6 // 100	Semi-annually	FECO/MEP	FECO/MEP	
<i>Intermediate Result indicator Four:</i> National training on BAT/BEP for design institutes.	<input type="checkbox"/>	Number of training courses// participants	0	0	0	1 // 20	2 //40	2//40	Semi-annually	FECO/MEP	FECO/MEP	
<i>Intermediate Result indicator Five:</i> Training on Rapid method dioxins monitoring for Provincial EPBs.	<input type="checkbox"/>	Number of training courses // number of EPBs	0	0	0	1//4	2 // 8	3//12	Semi-annually	FECO/MEP	FECO/MEP	
Intermediate Result (Component Three): Monitoring and Evaluation												
Indicator Two: Improved UPOPs monitoring for pulp and paper mills that have converted to BAT/BEP in the four participating provinces.	<input type="checkbox"/>	Number of mills' dioxin emissions monitored, enforced	0	4	4	4	8	10	Yearly	Four Provincial EPBs	FECO/MEP	NOTE: not cumulative. And, for yrs 1-3, only the 4 mills will be monitored.

* The baseline will be determined 6-12 months after project approval.

** The target will be determined after the confirmation of baseline and will, at the very least meet the national standard for dioxin emissions.

*** It is expected that the mills will need up to two years to complete their BAT/BEP investments. During the two years, the second, third and fourth intermediate result indicators of Component 1 will have no target values.

Annex 2: Detailed Project Description

China: Dioxins Reduction from the Pulp and Paper Industry (P125528)

1. The project comprises four components described below.

Component 1: BAT/BEP Investment in Participating Mills

2. To address sector issues comprehensively while allowing flexibility to fine tune the interventions along the way, a demonstration approach has been selected for this component. Four non-wood mills have been selected to pilot the BAT/BEP technology. Criteria used to select the demonstration projects were:

- Representative production scale.
- Typical process using elemental chlorine or hypochlorite as the bleaching agent.
- Compatibility with the national industry policy.
- Good reputation and record in pollution control.
- Commitment to adopt BAT/BEP measures to minimize the release of UPOPs and prove the performance before the end of the project.

3. Based on the above criteria, six enterprises were shortlisted, and following a review by FECO, in consultation with leading industry experts, four mills were selected: Zhongye Meili Paper Mill (Ningxia); Leshan Jinfu Paper Mill (Sichuan), Nanning Sugar Company Pumiao Paper Mill (Nanning) and Yueyang Paper Mill (Hunan), each typifying the most common non-wood fiber, straw, bamboo, bagasse and reed. The BAT/BEP Investment Plans for each mill will cover the following activities:

- The Ningxia Zhongye Meili Paper Mill, a state owned enterprise (SOE) listed in the Shenzhen Stock Exchange, will renovate the current straw-based elemental chlorine bleaching lines into one Element Chlorine Free (ECF) line. Proposed activities include 68,000 ton/year straw pulp bleaching and associated raw material preparation, cooking, alkaline recovery, pulp screening, and chlorine dioxide production systems. The current wastewater treatment plant will also be renovated to ensure that effluent quality meets GB3544-2008 wastewater discharge standards.
- The Sichuan Jinfu Paper Mill, a private enterprise, will renovate the current bamboo-based elemental chlorine bleaching to an ECF line. Proposed activities include renovating the 52000 ton/year bamboo pulp line and associated material preparation, cooking, screening process, gas collection and washing, and chlorine dioxide production systems.
- The Nanning Sugar Company Pumiao Paper Mill, an SOE listed in the Shenzhen Stock Exchange, completed the installation of a new 98,000 ton/year ECF bamboo pulp line and an eight ton/day chlorine dioxide generation facilities and an anaerobic wastewater treatment facility for bagasse preparation wastewater in May 2011. At appraisal, it was performing testing operations of its new line and was still using its old elemental chlorine line when the new line stopped for technical adjustments. In addition to on-going activities to complete commissioning of the new line, the mill's proposed investment activities include construction of a new fenton-oxidation based tertiary wastewater treatment facility.

- The Hunan Yueyang Paper Mill, an SOE listed in the Shanghai Stock Exchange, will renovate the current reed-based elemental chlorine bleaching to ECF line. Proposed activities include a 180 ton/day reed pulp bleaching and associated chlorine peroxide production system.

4. Main outputs from Component 1 include:

- Grams TEQ (toxic equivalent) of dioxins yearly release reduction from pulp production at the four participating mills - in the order of 6g TEQ based on UNEP emission factors.⁵
- COD reduction at the participating mills in terms of per ton of pulp production.
- Tons of water saved in terms of per ton of pulp production.

5. The project will provide specialised technical assistance before and during implementation of the technology upgrades at the four participating mills for: (a) the review of the technical proposals and engineering designs; (b) preparation of technical operation manuals to guide the demonstrations; (c) oversight and troubleshooting; and (d) operational performance monitoring during trial production. A report will be prepared reviewing and analyzing experience gained in preparing for and implementing the four demonstration investments. The report will cover the full range of technical, operational, financial and environmental issues experienced by the four demonstration mills.

6. This Component will use a PBF scheme, wherein disbursements will be linked to completion of an agreed delivery/milestone in addition to the submission of the standard expenditure report. This financing will incentivize the mills to carry out the BAT/BEP investment, complete the needed trial operations to adjust the production process to the specific production conditions, operate the new facility for one year, and achieve agreed performance targets. The mills will enter into a PBF Agreement with FECO, which will specify: (a) the scope of work and quantities, if any, as well as the expected output by milestones; (b) total financing and source of financing for each activity; (c) the implementation schedule; (d) technical requirements; (e) supervision; (f) milestones, verification, and advances; (g) commissioning; (h) independent verification; (i) final acceptance; (j) the PBF payments; (k) anti-corruption requirements; and (l) penalties for non compliance. Specifically, the implementation schedule will be clearly defined to ensure that the contract will be completed within a reasonable timeframe (expected to be within the first three years of project implementation) so that follow-up activities (such as the national action plan development and BAT/BEP dissemination activities) can be carried out in a timely manner. Disbursements under this component will be linked to the achievement of agreed targets which are verified by an independent verification entity (IVE).

Component 2: National Action Plan for Sector-Wide Replication

7. This component will support the development and promote the implementation of a

⁵ Emissions in Sweden are estimated at less than 6.3 g TEQ dioxins for a total pulp production of 11 million tons per year. (Sweden's Dioxins Inventory, 2004)

national action plan to promote BAT/BEP for both wood and non-wood production. Activities will include:

- **Development and dissemination of general sectoral technical guidance on BAT/BEP.** Based on lessons learned in the four demonstration projects, emission factors and guidelines specific to the non-wood pulp production sector and directly applicable to the Chinese context will be developed, including updates of industrial and environmental guidelines and standards as appropriate.
- **Development and Promotion of implementation of the National Action Plan.** FECO will lead the preparation of a National Action Plan to provide a detailed approach for China's pulp and paper sector to progressively adopt BAT/BEP to eliminate elemental chlorine-based pulp production. For both wood and non-wood sectors, the promoted BAT/BEP options will be based on international best practices such as the Stockholm Convention's BAT/BEP guidelines and the Bank's Environment, Health and Safety (EHS) Guidelines. For the non-wood sector, it will also be based on the demonstrated BAT/BEP options at the four mills. For the wood sector, it will also incorporate the BAT/BEP information based on an evaluation of BAT/BEP in domestic wood mills (supported under Component 3). This Component will also support a policy review to identify gaps in regulation and enforcement in China's pulp and paper sector, and provide recommendations to address the gaps. The project will work with CPA to introduce measures to encourage sector-wide BAT/BEP adoption, including awareness-raising activities. It will also promote good practices for wood-based mills as well. Training will be provided to government and industry institutions on BAT/BEP guidelines.
- **Capacity-building on dioxin rapid assessment methods.** The project will provide support and training to local EPBs to conduct sampling and monitoring of dioxins in water effluents using bioassay-based rapid assessment methods, based on an updated monitoring plan for pulp mills releases to be implemented initially in the four demonstration provinces. Consistent with world-wide practice, this is expected to rely on proxy parameters such as AOX, supplemented by dioxins analysis as appropriate, as well as bioassay-based rapid assessment techniques. Training will be provided to relevant agencies on enforcement of UPOPs-related regulations, incorporating UPOPs monitoring and enforcement into the current environmental monitoring, reporting and enforcement system as appropriate.
- **Public awareness and outreach.** Communications materials, including print and video, will be prepared to raise awareness on good production practices for both the non-wood and wood-based sectors, as well as for the general public.

Component 3: Monitoring and Evaluation

8. An independent dioxin laboratory, recruited by MEP/FECO, will perform detailed monitoring of the four participating mills' dioxin releases before and after investments (for a performance period of a year) to quantify baseline and reduction of dioxins releases. An IVE recruited by MEP/FECO then will verify overall environmental performance of the four mills. Selected wood mills that have adopted BAT/BEP will be monitored to evaluate existing BAT/BEP options for China's wood pulp sector. In the four project provinces, the project will support the provincial EPBs' efforts to promote UPOP monitoring by following the 2008

standards in their provinces. Project level monitoring activities will be carried out on a routine basis by FECO in coordination with the four provincial EPBs.

Component 4: Project Management

9. This component will support MEP/FECO and the four provincial EPBs in managing project implementation. Specifically, project management consultants will be recruited to support routine project management tasks, and technical consultants will be recruited to provide technical inputs/comments on technical issues of contracts and technical reports. In addition, this component will support incremental operating costs of MEP/FECO and the provincial EPBs associated with project implementation.

Annex 3: Implementation Arrangements

China: Dioxins Reduction from the Pulp and Paper Industry (P125528)

Project Administration Mechanism

1. **MEP.** MEP is the designated national lead agency for implementation of all POPs activities under the Stockholm Convention. Upon ratification of the Stockholm Convention in August 2004, China established its NCG.⁶ The NCG – or a sub-committee thereof, as assigned by NCG – complemented with membership from the local EPBs and the CPA, will serve as the Project Advisory Committee and will provide overall guidance and advice on project implementation. MEP supervised overall project preparation and will supervise overall implementation of the project.
2. **FECO.** FECO hosts the office of the NCG and works under MEP's instructions on all POPs activities in China. FECO has managed preparation of the project and will be responsible for the management of project implementation, including signing PBF agreements with the four mills.
3. **MOF.** MOF is China's GEF Focal Point, responsible for the review, endorsement and oversight of all GEF activities in the country. In addition to its role within the NCG's Project Advisory Committee, MOF will manage the project's DA and supervise project disbursements.
4. **National Development and Reform Commission (NDRC).** As a key member of NCG, NDRC was fully informed about the preparation of this project. During project implementation, as a member of NCG and the Project Advisory Committee, NDRC will be consulted on all industrial policy related issues.
5. **Provincial EPBs.** Provincial EPBs of the four project provinces will be responsible for the routine monitoring of the four participating mills, as well as all the mills in the provinces. They will also contribute to the development of capacity on UPOPs monitoring, including rapid assessment monitoring, as required, and assume responsibility for disclosure of information, as well as project level reporting to MEP/FECO on their provincial level project activities.
6. **CPA.** CPA, a nationwide organization, coordinates and supports compliance actions within the pulp and paper sector, facilitates information exchanges among members of the Association, serves as liaison between its member enterprises and government, and contributes to the formulation of sector development strategies based on its membership's inputs. The CPA will assist the project by: (a) acting as liaison for the Chinese pulp and paper industry in the coordination and development of the national action plan for BAT/BEP implementation; and (b) facilitating policy implementation, and BAT/BEP implementation throughout the sector.

⁶ Membership of the NCG includes: MEP; MOF; National Development and Reform Commission; Ministry of Foreign Affairs; Ministry of Commerce; Ministry of Science and Technology; Ministry of Agriculture; Ministry of Health; General Administration of Customs; State Electricity Regulatory Commission; Ministry of Industry and Information Technology; Ministry of Housing and Urban-Rural Development; General Administration of Quality Supervision, Inspection and Quarantine; and General Administration of Security Supervision.

7. **Participating Mills.** The four pulp mills selected for participation in the project activities will carry out UPOPs reduction investments, in compliance with national and local environmental policies and standards.

Financial Management, Disbursements and Procurement

Financial Management

8. Overall, the residual financial management risk after mitigation is assessed as **Moderate**. This assessment noted that (a) FECO has extensive experience with Bank operations; (b) the four selected pulp mills are inexperienced on Bank financed projects; and (c) the disbursement approach under the PBF scheme may bring additional risks. To address these risks, the following action plan has been agreed for addressing the weaknesses.

Table 3.1 Action Plan for Improving Financial Management

Significant weaknesses	Actions	Responsible Entity	Completion Date
Performance based disbursement approach will be used for some project activities.	An FMM, including the detailed disbursement mechanism used for performance based disbursement will be prepared and issued to project financial staff	FECO	Completed
The four selected pulp mills are new to the Bank operations and will be responsible for the financial management work for the activities executed by them.	Financial management training plan will be prepared and all project staff will be trained before and during project implementation.	FECO	Before and during project implementation

9. **Budgeting.** The annual project implementation plan will be prepared by FECO, which will conduct a budget variance analysis on semi-annual basis and take necessary actions to implement the project as planned.

10. **Accounting and financial reporting.** The administration, accounting and reporting of the project will be set up in accordance with Circular #13: “Accounting Regulations for World Bank Financed Projects” issued in January 2000 by MOF. The standard set of project financial statements has been agreed between the Bank and MOF. FECO and each of the selected pulp mills will manage, monitor and maintain their respective project accounting records. Consolidated financial statements for the project will be prepared by FECO, with assistance from MOF, and will be submitted to the Bank for review and comment on a regular basis. The consolidated unaudited project interim financial reports (in formats in accordance with the financial and accounting regulation agreed with MOF) will be prepared and furnished to the Bank by FECO no later than 45 days following each semester (the due dates will be August 15th and February 15th), in form and substance satisfactory to the Bank.

11. **Internal Control.** The related accounting policy, procedures and regulations were issued by MOF and a FMM will be prepared and issued to standardize the financial management and disbursement.

12. **Audit.** The Audit Service Center of the China National Audit Office (CNAO) for Foreign Loan and Assistance Projects has been identified as the auditor for the grant. FECO will submit its annual audit report of project financial statements to the Bank within six months after the end of each calendar year.

13. **Funds flow.** GEF grant proceeds will flow from the Bank into the project DA to be set up at and managed by MOF. MOF will be directly responsible for the management, maintenance and reconciliation of the DA activities. Supporting documents required for Bank disbursements will be prepared and submitted by FECO (or the four pulp mills through FECO) to MOF for review and disbursement processing.

Disbursements

14. Four disbursement methods – advance, reimbursement, direct payment and special commitment – are available for this project. Supporting documents required for Bank disbursement under different disbursement methods will be documented in the Disbursement Letter issued by the Bank. Up to 20% of the grant will be available for retroactive financing for eligible expenditures incurred after June 18, 2011.

15. One DA in US dollar will be opened at a commercial bank acceptable to the Bank and will be managed by MOF. The ceiling of the DA will be determined and documented in the Disbursement Letter. Table 3.2 below shows the two disbursement categories of the project.

Table 3.2 Disbursement Categories

Category	GEF Grant	
	Allocated Amount (USD)	Percentage of Expenditures to be financed
Goods, non-consulting services, consultants' services, training and workshops, and incremental operating costs	3,820,000	100%
Sub-grants for BAT/BEP demonstration projects at the four selected pulp mills.	11,180,000	100%
Total	15,000,000	

16. For Category (2) “Sub-grants for BAT/BEP demonstration”, disbursement made to the beneficiaries will be made on the basis of expenditures reported through SOE, but limited with agreed sub-grant amount and the verifications certified by FECO. The sub-grants and independent verification procedures are included in the FMM.

17. FECO shall undertake to make payments under the Sub-grant to the Participating Mill based on disbursement of the proceeds thereof from the World Bank upon receipt by the World Bank of verification certification from FECO and supported by appropriate documents from the Participating Mill evidencing eligible expenditures in respects of the Mill BAT/BEP Investment Plan, in accordance with the following three stage process:

- a. The first payment (20%) may be disbursed to the mill after the first stage verification conducted by FECO which certifies that: (a) FECO has signed the PBF Agreement with the mill; (b) the design of the Investment Plan has been prepared by qualified engineers and other technical personnel per PBF Agreement; (c) environmental clearance for said Plan has been provided by appropriate authorities of the Recipient and the relevant EPBs; and (d) the mill submit a statement of expenditures (SOE) to report the incurred eligible investment expenditures that equal to, or more than 20% of the sub-grant amount.
- b. The second payment (70%) may be disbursed to the mill after second verification conducted by FECO will certify that: (a) procurement of all goods, works and services required for the Mill BAT/BEP Investment Plan has been carried out in accordance with the PBF Agreement; (b) the construction of said Plan has been completed and all equipment delivered and installed according to its detailed design and procurement contracts; (c) the relevant Mill has obtained from the relevant authorities and relevant EPB a permit to commence trial operation under its renovated structure and said mill has commenced and is continuing such operations in a satisfactory manner; (d) the mill submit a statement of expenditures (SOE) to report the incurred cumulative investment expenditures that equal to, or more than 90% of the sub-grant amount; The verification certificate issued by FECO is subject to on-site supervision and review of a final account report issued by the qualified agencies, procurement contracts, invoices etc. which should be well maintained at the pulp mills for the use of internal review, project audit and supervision conducted by the Bank.
- c. The third payment (10%) may be disbursed to the mill after third verification shall certify that: (a) the mill submit a statement of expenditures (SOE) to report the incurred cumulative investment expenditures that equal to, or more than 100% of the sub-grant amount; (b) the relevant mill after commencing its trial operations as certified and has been in continuous operation for at least one year, its environmental performance has improved and meets the applicable regulatory requirements and standards with no non-compliance reported by the relevant authorities and the relevant EPBs; and (c) said Mill has obtained commissioning certificate approving its regular operations from the relevant authorities of the Recipient and the relevant EPBs. The third verification will be provided by the IVE who will confirm compliance with both national standards.

18. When requesting disbursements under the PBF scheme from the Bank, the Statement of Expenditures (SOEs) will be required to be submitted together with the verification certificates from the IVE and FECO. Other supporting documents such as contracts, invoices, and the IVE's verification reports need to be well maintained at FECO and the pulp mills. Reimbursements from the Bank will be suspended or terminated if the agreed activities are not carried out in accordance with the provisions of legal agreements and the IA agreed upon by the Bank.

19. Reimbursement from Bank will be suspended or terminated if the agreed activities are not carried out in accordance with the provisions of legal agreements and the IA agreed upon by the Bank.

Procurement

20. The procurement capacity assessment concluded that FECO has adequate experience and capacity to carry out procurement activities for the proposed Project. To strengthen the procurement capacity of the agency and to mitigate potential procurement risks, the following measures have been agreed:

- a. FECO will send its procurement staff to attend workshops on procurement of the Bank financed projects, especially in the selection of consulting services.
- b. FECO has prepared a Project Implementation Manual (PIM). The PIM includes how the mills will procure works, goods and non-consulting services under Component 1, the Bank's requirements on selection of consultants and procurement of goods under the remaining three components, as well as a mechanism to be established with detailed processing requirements and supporting documents for disbursements, including the conditions to be fulfilled to be eligible for the PBF based disbursements.
- c. Procurement for the Project will be carried out in accordance with the World Bank's "Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants" dated January 2011; "Guidelines: Selection and Employment of Consultants Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" dated January 2011, and the provisions stipulated in the grant agreement.

21. **Procurement Plan.** FECO has developed an acceptable Procurement Plan for project implementation following the Bank template. It is available at the Implementing Agency, in the Project's database and in the Bank's external website. The Procurement Plan will be updated, reviewed and agreed with the Bank annually, or as required, to reflect project implementation needs.

22. **Goods, works and non-consulting services under Component 1 (the proposed PBF scheme)** shall be procured in accordance with procedures and arrangements acceptable to the Bank, including those set out in the PIM, i.e. the mills shall procure goods, works and non-consulting services by comparing quotations, performance and quality from different vendors in the market with due attention to economy and efficiency. Moreover, the agreed due diligence procedures proposed under the PBF scheme will be followed prior to disbursing grant funds to each mill. The PBF scheme includes a sufficient number of fiduciary controls, which are expected to provide reasonable assurance that the beneficiary would comply with the principles of economy and efficiency; in case it is determined not to be the case, the mills have to refund the disbursed grant. Finally, the Bank Anticorruption Guidelines will be enforced.

23. **Selection and Procurement Methods and Prior Review Thresholds.** Tables 3.3 and 3.4 below indicate the selection methods and prior review thresholds for consultant selection and goods procured by the Implementing Agency under the Grant.

Table 3.3 Selection Method and Prior Review Threshold for Consultants Procured by Implementing Agency

	Selection Method	Prior Review Threshold (US\$)	Selection Method Threshold (US\$)
1.	Competitive Methods (Firms)	≥100,000;	QCBS/ QBS; SSS (Firms); CQS may be only used for small assignment contracts (i.e. <300,000); Individual Consultant (IC); Sole Source Selection for IC
2.	Single Source (Firms)	All SSS	
3.	Individual Consultant	≥50,000; All Sole-Source Selection for IC	
4.	Other	All terms of reference for consultant contracts, regardless of contract value, will be subject to Bank prior review	

Table 3.4 Procurement Methods and Prior Review Thresholds for Goods Procured by Implementing Agency

	Procurement Method	Prior Review Threshold (US\$)	Procurement Method Threshold (US\$)
1.	ICB	All ICB	For a goods contract, ≥1,000,000, ICB shall be used; <1,000,000, NCB may be used; <100,000, shopping may be used; DC
2.	NCB	≥500,000	
3.	Shopping	NA	
4.	Direct Contracting (DC)	All DC	

24. **Frequency of Procurement Supervision.** In addition to the prior review supervision to be carried out from the Bank offices, Bank procurement supervision missions will visit the field to carry out post review of procurement actions every 12 months. The post review sampling ratio will be one out of five contracts.

Environmental and Social (including safeguards)

Environmental

25. In accordance with World Bank OP/BP4.01, the project is categorized as Category A for environmental assessment due to the scale and risk of potential environmental impacts. Accordingly, an EIA and EMP for each participating mill and an EA Executive Summary have been developed following domestic regulations as well as Bank safeguards requirements.

26. **Environmental Impacts.** The project will result in significant environmental benefits by helping minimize UPOPs (dioxins and furans) release, reduce water consumption and pollutant load in effluents, including COD, BOD and TSS, etc. The project will also strengthen UPOPs monitoring and enforcement in four participating provinces. Potential environmental, health and

safety (EHS) issues include, *inter alia*, the environmental performance of the mills before and after the project, wastewater management, air emissions, residuals and waste, decommissioning of old facilities, health and safety, and accidental breakdown of facilities and environmental risks.

27. **Environmental Assessment.** Environmental Assessment has been conducted in compliance with Chinese EIA regulations and OP/BP 4.01 Environmental Assessment. EIAs adequately address key environmental issues through reviews of current mill operations and their EHS management systems and performance, reviews of environmental baselines, alternative analyses, proper impact assessments and development of mitigation plans.

28. **Wastewater discharge before and after the project.** The primary driver for the mill to implement the project is to ensure compliance with wastewater discharge standards (Table 2, GB3544-2008) that come into effective on July 1st, 2011. Before the project, most of the pollutant parameters in the mills would not meet the new national standards. After the project, the mills will be able to substantially avoid or reduce the generation of AOX and dioxins that otherwise can be produced in the elemental chlorine based bleaching process. The effluent quality fully meets the Chinese standards, which in general are comparable to or more stringent than the applicable Bank's EHS Guidelines.

29. **Waste management.** Management of other wastes, including air emission, solid waste, and noise were carefully looked into during EA process. The air emissions such as flue gases, particulate matters, SO₂, NO_x, and malodorous gases are dealt with dust removal facilities, desulfurizing agents, and other collection or removal measures. Solid wastes such as white sludge (lime mud) and wastewater sludge are non-hazardous, and will either be dewatered, reused or landfilled. Noises are dealt with through proper engineering and other reduction measures. These measures comply with national regulations and are in line with the EHS guidelines recommendations.

30. **Construction impacts.** Construction impacts are limited and can be effectively mitigated through proper design, construction schedule, and implementation of generic construction specifications. The four EIAs have confirmed that there are no asbestos or PCB capacitors in the mill. Dismantled equipments will be collected by certified waste management companies for safe disposal or reuse. Chemicals and wastes will be handled in accordance with national regulations in a safe manner. A decommissioning plan has been incorporated into the EMP.

31. **Risks.** Risk analysis shows that the main potential environmental risk during operation would be: (a) the accidental leakage of black liquid and cooking liquid; (b) leakage of chemicals such as methanol; (c) accidental breakdown of waste management system, and (d) fire or explosion. Risk prevention and mitigation measures and emergency response plans have been incorporated into the mills' regular management system and in the EMPs. Overall, the risk levels are considered low.

32. **EHS management system.** Each mill has an existing EHS system in place, including environmental and safety office and dedicated staff, occupational safety regulations, operational monitoring, wastewater and air emission sampling and analysis. These mills are also closely

monitored and supervised by local EPBs whose environmental monitoring stations carry out regular monitoring, including grab sampling and online monitoring of both air emission and wastewater discharges.

33. **EMP and Implementation Arrangements.** A stand-alone EMP has been prepared based on the findings of the EIA report. The EMP details the institutional arrangements for environmental management and supervision, responsibilities of all concerned parties, mitigation measures for potential environmental risks, “emergency preparedness plan”, capacity training plan, monitoring plan, and budget estimates of EMP implementation for both construction and operation stages. MEP/FECO, through the provincial EPBs, will be responsible for overall environmental management during project implementation. Each participating paper mill will be responsible for the implementation of its site-specific EMP. Environmental management responsibility will be built into the project management structure within MEP/FECO, provincial EPBs, and participating mill management, through their existing environmental management office and dedicated staff. Environmental mitigation measures developed in the EMP will be fully incorporated into the bidding documents and contracts, as well as the environmental management systems of the participating mills.

33. **Public Consultation and Information Disclosure.** Public consultations were conducted during the preparation of the EAs, in accordance with Bank OP 4.01. A combination of surveys and public meetings within the project’s area of influence were conducted during the public consultation process. Public concerns have been incorporated either in the project design or in the EIA. Two rounds of information disclosure have been carried out during the EA preparation stage through public bulletins, local newspaper, and the internet. All draft EIAs were disclosed locally and in the Infoshop, and as such, are accessible to the general public.

Social

34. This project involves low social risks. All four mills will carry out project activities within their existing facilities and do not require any land acquisition for the project. Workers working on existing chlorine based pulp production lines will not lose their jobs. The mills will provide them training on new production facilities and production processes and livelihood maintenance during project implementation. Monitoring these or any other unexpected social risks will be integrated in overall project supervision.

35. The Nanning Sugar Company Pumiao Paper Mill acquired a piece of barren and hilly land (about 80 mu, equivalent to 5.3 hectares) in 2010 before the project identification. As the land is now being used for BAT/BEP activities, Bank OP 4.12 is triggered. A due diligence review for this piece of land was conducted, which found that 45 households and 150 villagers from Nolipo, a sub-village under Liangxin Village in Pumiao Township of Yongning District of Nanning, were affected by the 2010 land acquisition. Field interviews with a representative sample of one third of the total affected people and reviews of government authorities’ approval documents on the land acquisition confirmed that there are no legacy issues or adverse effects on the local villagers. The affected village/villagers are satisfied with the compensation received. As such, no additional action is needed.

Monitoring and Evaluation (M&E)

36. M&E activities are an integral part of this demonstration project. An independent and accredited dioxin laboratory will be hired under the project to monitor and verify whether the four pulp and paper mills have achieved their performance target on reduction in UPOPs formation and releases, one of the PDO level results indicators. In addition, the IVE will carry out independent performance verification to verify whether the mills have achieved agreed performance targets.

37. The project itself will support the development of monitoring and enforcement capacity of local EPBs. Monitoring results of the provincial EPBs on dioxin and other conventional pollutant discharges in all pulp and paper mills in the four provinces will be used to collaborate with the IVE's verification results of the four demonstration mills. Monitoring data at the mills will be used to help MEP/FECO evaluate the effectiveness of the proposed BAT/BEP, identify areas for further improvement, and develop the national action plan and related BAT/BEP guidelines. It will also support the local EPBs to carry out enforcement activities to ensure successful achievement of project objectives.

38. Project management related M&E activities will be performed on a routine basis by MEP/FECO with the support of the provincial EPBs.

Annex 4: Operational Risk Assessment Framework (ORAF)

China: Dioxins Reduction from the Pulp and Paper Industry (P125528)

Stage: Negotiation and Board Approval

Risks				
Project Stakeholder Risks				
Stakeholder Risk	Rating	Moderate		
<p>Description:</p> <p>Regulations require non-wood fiber mills to adopt BAT/BEP to comply with the 2008 Wastewater Discharge Standards for the Pulp and Paper Industry (GB3544-2008). The four mills are selected based on willingness to participate. However, they may be hesitant to adopt BAT/BEP technologies because of high up-front capital investment, potentially increased operating costs, and unproven product quality improvement and related revenue increase</p>	<p>Risk Management:</p> <p>The project is designed to enable non-wood fiber mills to comply with the national standards and will demonstrate that adopting the technology is financially viable and sustainable. Grant and technical support under the project provide additional incentive for the demonstration mills to carry out their BAT/BEP investments. FECO will be regular contact with the mills to confirm their continued interest in the project. Bank missions will meet with the mills on a regular basis.</p>	<p>Resp: FECO and Bank</p>		<p>Stage: Implementation</p>
		<p>Due Date: ongoing</p>	<p>Status:</p>	
Implementing Agency (IA) Risks (including fiduciary risks)				
Capacity	Rating	Moderate		
<p>Description:</p> <p>The four paper mills are well established firms, but have no experience in a project that is implemented under Bank requirements, in particular with a Performance Based Financing system.</p>	<p>Risk Management:</p> <p>A well-designed FMM, including the details and controls over the performance-based disbursement mechanism will be circulated to project financial staff. A PIM has been developed to clarify roles and responsibilities, as well as types of financial management and procurement procedures and review/reporting requirements. Periodic audits, prior reviews and ex-post reviews will be conducted. MEP/FECO and the project management consultants will provide guidance in developing the mills' capacity to meet the Bank's financial management requirements. Regular Bank missions will review the capacity of the mills' staff, and provide additional training and guidance as needed.</p>	<p>Resp: FECO, project management consultants, and Bank.</p>		<p>Stage: Preparation and Implementation</p>
		<p>Due Date: Ongoing</p>	<p>Status: ongoing</p>	
Governance	Rating	Low		
<p>Description:</p> <p>China has established a well-functioning national coordination mechanism for its NIP implementation, which will apply to this project. However, lack of clear mandate between MEP/FECO and other national agencies, and between MEP/FECO and provincial EPBs may affect timely project implementation.</p>	<p>Risk Management:</p> <p>Responsibilities and accountabilities of each stakeholder will be clarified and documented in the PIM. MEP/FECO will implement the PIM and resolve issues in this regard. Bank missions will confirm that project implementation arrangements are functioning effectively and work with MEP/FECO to resolve any issues identified.</p>	<p>Resp: MEP/FECO and Bank.</p>		<p>Stage: Implementation</p>
		<p>Due Date: Ongoing</p>	<p>Status:</p>	
Project Risks				

Design	Rating	Substantial			
<p>Description:</p> <p>China has gained rich experience in BAT/BEP adoption in wood pulp and paper mills. Also, a few non-wood fiber mills have adopted BAT/BEP technologies. Initial information collected indicates positive results. Nevertheless, identified BAT/BEP options may fail to generate desired outcomes for the project mills.</p> <p>Performance based disbursement as a new financing scheme might not be well understood and accepted by the demonstration mills.</p>	<p>Risk Management:</p> <p>BAT/BEP proposals and feasibility studies of the demonstration mills have been reviewed carefully by a group of sector experts before appraisal to minimize design risks and to ensure that they are technically and financially sound. Periodic monitoring and evaluation will be undertaken by local and national authorities and adjustments made to the BAT/BEP to ensure success.</p> <p>The PBF scheme has been presented to the mills and revised based on their comments/suggestions. Bank missions will monitor implementation of PBF financing, and agree with MEP/FECO on any adjustments required.</p>				
		Resp: MEP/FECO and Bank	Stage: Preparation and implementation	Due Date: Ongoing	Status: Ongoing
Social and Environmental	Rating	Low			
<p>Description:</p> <p>Non-wood pulping and paper making process often consumes large amounts of water and produces wastewater, process and flue gases, residues and waste, and noise. Its production also presents other health and safety concerns. In addition, during renovation, the application of BAT/BEP will entail decommissioning of old elemental chlorine-based facilities and installation of new elemental chlorine free bleaching process. Auxiliary facilities will need to be build or renovated. These practices will also present EHS threats if not well planned or managed.</p> <p>BAT/BEP adoption might lead to job changes associated with the technology and production equipment upgrade.</p>	<p>Risk Management:</p> <p>Each candidate paper mill has prepared EIA/EMP in accordance with domestic EA regulations and Bank safeguard policies, which address EHS issues associated with the renovation and operation of the paper mills. Implementation of the EMPs will be monitored by MEP/FECO. Bank missions will review EMP implementation on a regular basis.</p> <p>Participating mills have committed to provide necessary training for affected workers and will help them to transfer to new jobs in the mills, if required. Bank missions will monitor status on an on-going basis.</p>				
		Resp: PMU, Mills, central and local EPBs; Bank	Stage: Preparation and implementation	Due Date: Ongoing	Status: ongoing
3.3 Program and Donor	Rating	n/a			
<p>Description:</p> <p>N/A</p>	<p>Risk Management:</p>				
		Resp: n/a	Stage:	Due Date:	Status:
3.4 Implementation and Sustainability	Rating	Substantial			
<p>Description:</p>	<p>Risk Management:</p>				

<p>Failure to fully implement the M&E system.</p> <p>Low uptake of demonstrated BAT/BEP options in other mills.</p>	<p>Technical assistance is included in the project for establishing the M & E system for UPOPs monitoring and incorporating it with the existing system, as well as for building capacity in monitoring and enforcement in the various environmental agencies.</p> <p>The proposed National Action Plan will address the question of sustainability and scale up of BAT/BEP investments. Component 2 of the project will promote sector-wide replication through its four sub-components.</p>		
<p>Resp: PMU, central and local EPBs</p>	<p>Stage: Implementation</p>	<p>Due Date: Ongoing</p>	<p>Status:</p>

Overall Risk Rating During Implementation	Comments
<p>Substantial</p>	<p>The overall risk rating is substantial because of design risks and implementation and sustainability risks. Project design addresses these risks through technical assistance. MEP/FECO and Bank missions will focus on the management of these risks during implementation.</p>

Annex 5: Implementation Support Plan

China: Dioxins Reduction from the Pulp and Paper Industry (P125528)

1. The implementation support plan (ISP) has been designed to take into consideration the project's technical nature, its risk profile and the use of performance based financing for Component 1. The ISP will ensure that the implementation support to the client will focus on addressing the key risks identified and the agreed risk mitigation measures described in the ORAF. The principal risks are: (a) design risks associated with demonstrated BAT/BEP investments and the innovative PBF scheme; and (b) implementation and sustainability risks associated with poor monitoring results and lack of incentives for sector-wide adoption of demonstrated BAT/BEP.

Implementation Support Strategy

2. Implementation support strategy for the project will focus on:
- **Technical support.** Three levels of technical support will be provided to address the key risks mentioned above: (a) technical expert(s) will be mobilized to support the four mills to address key technical difficulties they may face; (b) the dioxin monitoring specialist in the Bank (?) team has helped MEP/FECO draft a dioxin monitoring plan and will support proper implementation of dioxin monitoring activities; and (c) the task team will support MEP/FECO to design proper incentives for sector-wide BAT/BEP adoption.
 - **PBF Support.** The task team has supported MEP/FECO in drafting the PBF agreement and will provide on-going support to MEP/FECO in implementing the PBF scheme.
3. In addition, Bank implementation support missions will monitor adherence to Bank requirements on procurement, financial management, and safeguards.

Implementation Support Plan

4. Most of the Bank team members, including the co-TTL, are based in the Beijing Office to ensure timely, efficient and effective implementation support to the client. The Bank team will provide implementation support, including field visits, on a semi-annual basis to review implementation status and address any potential issues related to other risks identified in the ORAF. In addition, on-going on demand support will be provided by the Beijing Office based members of the task team. Table below summarizes the skills needed for implementation support during the various stages of project implementation.

Table 5-1: Skills Mix Required

Skills Needed	Number of Staff Weeks per Year	Number of Trips	Comments
Technical specialist(s)/technical consultant(s)	2	1	BAT/BEP, dioxin monitoring, and policy development
Financial management specialist	0.5	1	PBF scheme
Procurement Specialist	0.5	1	Procurement practices
Social Safeguards Specialist	1	1	Social safeguard review
Administrative client support	2		General support
TTL	4	2	Overall project implementation, policy development
Co-TTL/Environmental Safeguard Specialist	6	2	Overall project implementation, safeguard review