



1. Project Data

Project ID

P125528

Project Name

CN-Dioxins Reduc. from Pulp and Paper

Country

China

Practice Area(Lead)

Environment, Natural Resources & the Blue Economy

L/C/TF Number(s)

TF-11898

Closing Date (Original)

30-Jun-2017

Total Project Cost (USD)

14,823,651.59

Bank Approval Date

29-Mar-2012

Closing Date (Actual)

30-Jun-2019

IBRD/IDA (USD)**Grants (USD)**

Original Commitment

15,000,000.00

15,000,000.00

Revised Commitment

15,000,000.00

14,823,651.59

Actual

14,855,211.65

14,823,651.59

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2. Project Objectives and Components

a. Objectives

The Project Development Objectives (PDOs) as stated in the Global Environmental Facility (GEF) Grant Agreement (Schedule 1, page 6) and the Project Appraisal Document (PAD, page 3) were:

(a) to demonstrate the result of the Best Available Techniques/ Best Environmental Practices (BAT/BEPs) adoption in four selected non-wood pulp mills: and



(b) to support China in developing and adopting a long-term action plan to guide the promotion of a sector-wide BAT/BEPs adoption.

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

Yes

Did the Board approve the revised objectives/key associated outcome targets?

No

c. Will a split evaluation be undertaken?

No

d. Components

There were four components (PAD, pages 4 -5).

1. BAT and BEP Investment in participating mills. The estimated cost at appraisal was US\$73.6 million. The actual cost was US\$67.6 million. This component aimed at supporting adoption of BAT/BEP in four selected non-wood pulp mills (in Guangxi, Hunan, Ningxia and Sichuan provinces), by replacing the existing elemental chlorine-based bleaching process with the elemental chlorine-free process, for minimizing releases of dioxins and furans (discussed in section three). Activities in this component, included construction of production processes and facilities and technical assistance to the participating mills. A performance-based financing scheme was to be used to incentivize the mills to carry out BAT/BEP investments, complete trial operations and operate the new facility for one-year.

2. National Action Plan for sector- wide replication. The estimated cost at appraisal was US\$2.5 million. The actual cost was 5.2 million. This component aimed at creating an enabling environment for replicating the BAT/BEP techniques and implementing an action plan for promoting BAT/BEPs, for both wood and non-wood-based production in pulp and paper mills.

3. Monitoring and Evaluation. The estimated cost at appraisal was US\$1.2 million. The actual cost was US\$1.3 million. This component aimed at independent verification of the sample results at the mills.

4. Project Management. The estimated cost at appraisal was US\$3.6 million. The actual cost was US\$2.3 million. This component aimed at providing technical assistance to the Foreign Environmental Cooperation Center of the Ministry of Ecology and Environment and the four Environmental Protection Bureaus in provinces.

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

Project cost. The estimated cost at appraisal was US\$81.0 million. The actual cost was US\$76.5 million.



Project financing. The project was financed by an GEF Trust Fund of US\$15.0 million. The amount disbursed was US\$14.8 million. There was parallel financing of US\$0.50 million from the Swedish International Development Cooperation Agency (SIDA). Of this, US\$0.30 million was disbursed.

Borrower contribution. The borrower contribution was estimated at US\$65.5 million at appraisal (This included US\$3.5 million from the Ministry of Ecology and Environment (MEE) protection authorities in the participating provinces and US\$62.0 million from the participating enterprises). Their actual contribution at closure was US\$61.7 million (including US\$3.7 million from MEE and US\$57.7 million from the participating enterprises).

Dates. The project was approved on March 29, 2012, became effective on June 19, 2012 and was scheduled to close on June 30, 2017. The project closed two years later on June 30, 2019.

Other changes. There were four Level 2 restructurings.

These changes were made with the first restructuring on November 14, 2014: Two of the originally selected mills, the Ningxia Zhongye Meili straw-based mill and the Hunan Yueyang reed-based mill, withdrew from the project for reasons associated with market conditions. These mills were replaced by two other mills, the Henan Baiyun straw-based mill and the Hunan Linyuan reed-based mill. Intermediate indicators were revised to set baselines and targets for these mills.

A third participating mill, the Guangxi Pumiao bagasse-based mill withdrew late in the project, after it had completed the BAT/BEP investments for strategic business reasons (the additional cost of air pollution control faced by the mill led the Pumiao's parent company to close the mill). The ICR (paragraph 27) notes that it was decided not to seek replacement with an equivalent mill as this would lead to implementation delays. These changes were made with the second restructuring on June 2016, in the wake of the Guangxi Pumiao mills decision to pull out of the project:

- Component costs were adjusted to reflect the drop in co-financing.
- Some activities were added, such as additional technical assistance to support BAT/BEP investment planning, and expanding support to bioassay monitoring from four to eight laboratories.
- Some targets for intermediate indicators were scaled down in the face of changing circumstances following the consolidation of the industry, with many small pulp and paper mills closing down in the years since approval.
- The closing date was extended by a year in view of the implementation delays.

The third restructuring on June 2018, extended the closing date by three months to September 30, 2018, with the expectation that a full restructuring and longer extension would be prepared and approved subsequently.

The main changes made with the fourth restructuring on September 18.

- The original design envisioned that the government would provide technical assistance to the enterprises. As this implementation modality was not attractive to the enterprises, a sub-project activity was added for providing technical assistance to the enterprises, through funding reallocated between categories.
- The target for the intermediate indicator associated with the number of selected mills developing BAT/BEP plans was decreased from four to two in view of the funding constraints: and



- The project closing date was extended by nine months to June 30, 2019 for completing activities associated with issuance of the National Action Plan.

Split rating. As discussed above, although the activities were implemented only in three mills, this was due to the late withdrawal of a mill from the project, after it had substantially completed the BAT/BEP investments. Given that the project activities were consistent with the original PDOs which were unchanged, (and there was no augmentation of resources), there is no split rating of objectives in this ICR.

3. Relevance of Objectives

Rationale

Country context. The rapid economic development under a resource-intensive growth model before appraisal, had led to significant environmental pollution and ecological degradation. Committed to reversing this trend, the Government made environmental protection a national priority and internationally China ratified many conventions, including the Stockholm Convention on Persistent Organic Pollutants (POPs), for which China had implemented a National Implementation Program (NIP). This program provided a blue print for reducing POPs by 2025. The Stockholm Convention listed twenty-eight chemical substances as POPs and this included unintentionally produced POPs, such as dioxins and furans. The NIP identified the pulp and paper industries as a priority sector for reducing POPs because: (i) The sector was a major source of water pollution in 2006, accounting for 15% of industrial wastewater and 33% of national industrial oxygen demand discharge: (ii) The sector had high energy consumption: and (iii) The sector was expected to have high growth rates in the next decade. Further, the importance of non-wood (commonly, straw, reed, bamboo and bagasse) in the pulp industry was particularly important, given that China relied more heavily than most other countries on non-wood to produce pulp.

Government strategy. The PDOs were well-aligned with the government strategy. The 12th Five Year Plan (FYP) for 2011 -2015, articulated the need for "intensifying environmental protection" and "controlling discharge of pollutants". Before appraisal in 2008, the Government issued wastewater discharge standards for paper and pulp industries. requiring 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. The new standards required all existing mills to meet the required discharge standards from July 1, 2011. The 13th FYP for 2016-2020 highlighted the need for controlling emissions from key industrial pollution sectors and controlling emissions from papermaking

Bank strategy. The PDOs were well-aligned with the Bank strategy. The third pillar of the Bank's Country Partnership Strategy (CPS) for 2013-2016 explicitly highlighted the need for "promoting greener growth" through among other things, "demonstrating pollution control measures". (CPS, page i). The second engagement area of the current Country Partnership Framework (CPF) for 2020-2025 reiterated the need for "promoting greener growth" through "facilitating the transition to a lower carbon energy plan" (CPF, page i).

GEF strategy. At appraisal, the PDOs were fully aligned with the GEF-5 chemicals strategy. The PDOs continue to be aligned with the GEF -7 Programming Decisions strategy for 2018-2022 for Chemicals and



Waste Program on Industrial chemicals. This decision highlighted the need for introducing and using BAT/BEPs for minimizing and ultimately eliminating releases of unintentionally produced POPs.

This project in China was the first GEF co-financed project worldwide aimed at promoting BAT/BEP for non-wood-based paper pulp production. The Bank had however executed similar projects in China, including the program associated with phasing out ozone depleting substances. The PDOs of demonstrating the results of BAT/BEPs in four non-wood mills (although one mill was dropped during implementation) and then disseminating the results to other non-wood mills, were realistic. The Bank replicated the implementation modality of the prior program of using Performance Based Financing to the mills, as the modality was proven to be successful. Although the demonstration activities specifically targeted non-wood pulp mills given its importance for China, the project's long-term action plan objective included reducing pollutants both in wood and non-wood pulp production. The relevance of the PDOs to the government, Bank and GEF strategies is high.

Rating

High

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1

Objective

To demonstrate the result of the BAT/BEPs adoption in four selected non-wood pulp mills

Rationale

Theory of Change. Adopting BAT/BEP in selected non-wood mills that employed the most commonly used non-wood fiber material in China (straw, reed, bamboo and bagasse) using the performance-based financing modality, was aimed at demonstrating that the technology for reducing UPOPs, would be economically viable, improve quality and meet the environmental requirements. This involved technical assistance to the mills for adopting the new technology and monitoring performance through independent verification. Dissemination of the results was likely to increase adoption of new technology by other non-wood-based pulp mills. The causal links between the project activities, their outputs and outcomes were logical, and the intended outcomes were measurable.

- As a result of the government initiatives before appraisal, many large wood pulp mills had adopted BAT/BEPs based on elemental chlorine-free technologies. However, few large existing non-wood mills did so due to the: (i) the high-investment cost and yet-to-be demonstrated benefits; and (ii) limited local capacity in the provinces for monitoring and enforcement. BAT/BEP investments were completed in the three non-wood demonstration mills, which exemplified the pulp-making process for three main types of non-wood fibers (bamboo, reed and straw), as compared to the target of four. (As



indicated in section 2e, the fourth mill, withdrew from the project and was not replaced). The BAT/BEP renovations in the three mills consisted of process improvements tailored to the specific conditions and requirements of each mill. The concentration of dioxins at various sampling points at the three mills was assessed independently through an accredited laboratory, as targeted.

- The demonstration results were summarized in the "BAT/BEP Design Technical Manual for Non-wood Pulp" that was published as a book and disseminated within the industry and used for training mill operators and serving as a guide for designing pulp mills in future.
- With the funds from the withdrawal of the Pumiao mill, BAT/BEP investment plans were developed in three bagasse-based mills in Guangxi province. This was short of the original target of four but exceeded the revised target of two mills.

Outcomes.

- Bioassay monitoring was undertaken in the three mills in 2017, 2018 and 2019, as targeted, to monitor the quality of water and water sewerage and assess the environmental impact of new technologies. The results showed low levels of dioxins generated from the bleaching process.
- The Chemical Oxygen Compound (COD) discharge per unit of non-wood pulp production from the three mills were as follows. The COD discharge at Sichuan Jinfu declined from 10.2 kilograms (Kg) COD at the baseline in March 2012, to 1.94 Kg by June 2019. This exceeded the target of 4.83. kg. The COD discharge at Hunan Linyuan and Henan Baiyun declined from 5.28 and 4.73 kg in June 2016, to 1.42 and 1.67 kg by June 2019. This exceeded the target of 4.65 and 3.33 kg respectively (The baseline and revised targets for Hunan Linyuan and Henan Baiyun were set during the first restructuring in November 2014).
- The Ammoniacal Nitrogen discharge per unit of non-wood production in Sichuan Jinfu declined from 0.72 kg at the baseline in March 2012, to 0.07 kg by June 2019. This exceeded the target of 0.43 kg. The Ammoniacal Nitrogen discharge at Hunan Linyuan and Henan Baiyun and Henan Baiyun declined from 0.45 kg and 0.21 in June 2016, to 0.10 and 0.12 kg by June 2019. This exceeded the target 0.41 kg and 0.15 kg respectively.
- The water consumption per unit of non-wood pulp production in Sichuan Jinfu declined from 72 tons in March 2012 to 25.3 tons by June 2019. This exceeded the target of 53.6 tons. The water consumption in Hunan Linyuan and Henan Baiyun declined from 52.2 tons and 49.2 tons in June 2016 to 42,3 and 45 tons by June 2019. This exceeded the target of 52.2 tons and 49.2 tons respectively.
- The toxic equivalent (TEQ) from the releases of Unintentionally Produced Persistent Organic Pollutants (UPOPs) releases, following the adoption of BAT/BEP technology in the three non-wood fiber mills, reduced from 0.078 TEQ to 0.001 in Sichuan Jinfu by August 2017, exceeding the target of 0.023 TEQ.
- The TEQ from the releases of UPOPs in Hunan Linyuan reduced from 0.113 TEQ to 0.002 TEQ in August 2017, exceeding the target of 0.034 TEQ.
- The TEQ in Henan Baiyun reduced from 0.067 TEG to 0.015 in August 2017, exceeding the target of 0.020.

Rating
Substantial



OBJECTIVE 2

Objective

To support China in developing and adopting a long-term action plan to guide the promotion of a sector-wide BAT/BEP adoption.

Rationale

Theory of Change. Demonstration of the results of the BAT/BEP for non-wood based pulp mills, developing a National Action Plan and guidelines for reducing pollutants in both the non-wood and wood-based pulp production, assistance for setting bioassay laboratories and technical assistance to the mills, were likely to aid in developing and adopting a long-term action plan for promoting a sector wide BAT/BEP in the pulp and paper industry. These outcomes were likely to contribute to the long-term outcome of reducing releases of dioxins to the environment.

Outputs (ICR, pages 19-21 and 43-46).

- The Ministry of Ecology and Environment developed the sector wide BAT/BEP "Guideline for Available Techniques of Pollution Prevention and Control for the Pulp and Paper Industry" in January 2018 and the "Action Plan for Prevention and Control of Water Pollution" issued by the State Council in 2015, as targeted. The Action Plan identified the pulp and paper sector as one of the ten key industrial sectors targeted for technological upgrade.
- The UPOP's monitoring guidelines for the pulp and paper sector were developed as targeted.
- Three national workshops were held for disseminating knowledge on BATBEPs to mills as targeted. One workshop was held for national training on BAT/BEP for the design institutes.
- Five training courses were conducted for the provincial and municipal Environmental Protection Bureaus. This exceeded both the original and revised targets of three and four respectively.
- Eight laboratories were established for bioassay-based environmental screening and monitoring provincial departments as targeted. The ICR (paragraph 59) notes that this is a cost-effective alternative to costly analytical techniques for screening of dioxins and that the project contributed to the development of a standard which could codify, recognize and allow the use of that method.
- Public awareness campaigns were conducted to disseminate knowledge about POPs and the formation of dioxins in the pulp and paper industry by television, Internet, newspapers and on-site promotion with students and residents in communities as targeted.

Outcomes.

- The Chinese Paper Association (CPA) issued the long term "*National Action Plan for Dioxins Reduction in the Pulp and Paper Industry*", on November 23, 2018, as targeted. This plan mandated that both the wood and non-wood-based pulp and paper sector be fully free of elemental chlorine bleaching by 2025. This plan provided the framework for transformation of the industry during the project lifetime.

Rating



Substantial

OVERALL EFFICACY

Rationale

Given that the outcomes were largely realized, overall efficacy is substantial.

Overall Efficacy Rating

Substantial

5. Efficiency

Economic analysis. The cost effectiveness method was used for the economic analysis of this project, in view of the difficulty associated with quantifying the potential environmental and health benefits. The PAD (paragraph 30) states that there were two technical options accepted worldwide for the wood pulp production: (i) Elemental Chlorine Free Bleaching (ECF); and Total Chlorine free (TCF). The ECF option was considered as the least-cost approach for non-wood fiber materials for the following reasons: (i) the ECF process demonstrated complementarities with the existing assets of the project mills, while the TCF would have required much higher investments; (ii) ECF would lead to higher yield and quality; and last but not the least, (iii) there was no available data on the TCF option for non-wood pulp production. This was an important consideration in view of China's heavy reliance on non-wood to produce pulp.

Incremental cost reasoning. The GEF Project Identification Form articulated the incremental reasoning underlying the request for GEF support. This form outlined the baseline/business-as-usual scenario and value added of GEF interventions. Under the business-as usual scenario, China was expected to close small mills and mandate improved water treatment for the larger ones. Under this scenario, BAT/BEP for dioxins reduction in the non-wood sector would be largely ignored, due to the technology and financial barriers and inadequate enforcement. On the other hand, under the GEF alternative, the project was expected to help China to effectively restructure its pulp and paper sector, improve the sector's economic and environmental performance and minimize unintentionally produced POPs in the pulp and paper industry.

Leveraging private sector funding. The GEF funding for this project at US\$14.8 million. This represented less than a fifth (19%) of the actual cost of US\$76.5 million. The remainder of the project cost came through co-financing from the participating mills. This implies that the GEF financing leveraged private sector financing, representing 81% of the actual project cost.



Administrative and Operational issues. There were delays due to abrupt changes in market conditions (discussed in section 9a), which led to the withdrawal of three of the four originally selected mills (although two more mills joined later). These delays contributed to project closing two years behind schedule.

Efficiency Rating

Substantial

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

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

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

6. Outcome

The relevance of the PDOs to the government, the Bank and the GEF strategies is High. Since the outcomes were realized, efficacy of the two objectives - to demonstrate the result of the Best Available Techniques/ Best Environmental Practices (BAT/BEPs) adoption in the selected non-wood pulp mills and supporting China in developing and adopting a long-term action plan to guide the promotion of a sector-wide BAT/BEP adoption - is substantial. Efficiency is substantial, despite the minor administrative and operational shortcomings. Overall outcome is satisfactory.

a. Outcome Rating

Satisfactory

7. Risk to Development Outcome

Technical risk. For the demonstration mills that had completed BAT/BEP investments with project support, there is no risk that they would return to elemental chlorine-based bleaching, as it would not be cost-effective for them to do so (ICR, paragraph 86).

Environmental risk. Given that, while many but not all non-wood pulp and paper mills have adopted BAT/BEP, continued monitoring and enforcement are required to ensure that the sector is fully under Elemental Chlorine Free Bleaching by 2025, as expected by the National Action Plan. Furthermore,



continuous support and funding is required for the laboratories that have introduced the bioassay technique for environmental monitoring of dioxins.

8. Assessment of Bank Performance

a. Quality-at-Entry

The project was prepared based on the experience from related projects in China and elsewhere. The lessons incorporated at design included: (i) an integrated environmental management approach to mainstream POPs reduction with broader environmental concerns; (ii) Using the Performance-Based Financing (PBF) modality; and (iii) using the "demonstrate and disseminate" approach for adopting new technologies (PAD, paragraphs 19 - 21). The project preparation benefitted from analytical work supported by the Canada POPs Trust Fund. The project was prepared by a team which included staff with technical skills and safeguards expertise. The project was implemented by the Ministry of Environmental Protection (MEP). This arrangement was appropriate, given that MEP was the designated national agency for POP activities and for implementing the POPs convention (PAD, paragraph 22). Several risks were identified at appraisal, including substantial risks associated with design, given that the activities involved introducing new technologies under a Performance-based Financing (PBF) scheme. Mitigation measures incorporated at design, included reviewing the mills feasibility studies to ensure that the proposed technologies are in line with the BAT/BEP guidelines of the Stockholm convention and a PBF agreement signed by the mills (PAD, paragraph 29). The arrangements made at appraisal for M&E design and safeguards and fiduciary compliance were appropriate (discussed in section 9 and 10).

The design underestimated risks associated with stakeholder risk relating to the mills' participation. Abrupt changes in market conditions, with a strong decline in yearly production, due in part to the import of cheaper wood pulp reduced the market share of bleached non-wood pulp. This directly affected the mills' capacity to engage in the project, given that they had to make significant investments. This contributed to the withdrawal from the project of three of the four originally selected mills (although two more mills joined later).

Quality-at-Entry Rating
Satisfactory

b. Quality of supervision

Supervision missions were held twice a year, with 14 missions during the lifetime of the project (ICR, page 29). The continuity of leadership was maintained, with two Task Team Leaders (TTLs) for most of the project implementation period and the second TTL having been co TTL since project initiation. The Bank



also provided day-to-day support during implementation through maintaining a field-based co-TTL during implementation. The supervision team worked with the government to select and appraise new mills for replacing the mills that withdrawn from the project. and with the support of management restructured the project to accommodate the new mills. The Bank was candid with its assessment of progress, by downgrading ratings for implementation progress rapidly following the withdrawal of mills and upgrading them when implementation improved. The support provided by the team aided in fiduciary and safeguards compliance (discussed in section 10a).

Quality of Supervision Rating

Satisfactory

Overall Bank Performance Rating

Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

The two key outcome indicators - reduction of unintentional POPs releases in the non-wood fiber mills supported by the project and adoption of a long-term action plan for the paper and pulp sector's unintended POPs - were appropriate for monitoring project performance. The M&E was envisioned at three levels: (i) M&E on dioxins reduction; (ii) M&E on overall environmental performance of the project mills; and (iii) project implementation M&E. The M&E design included the following: (i) Monitoring of dioxin reductions before and after project investments by a qualified independent laboratory; (ii) verification of the overall environmental performance of the mills by an Independent Verification Agency; and (iii) The M&E design envisioned collecting data on dioxin releases of non-project financed mills from the four Environmental Protection Bureaus.

b. M&E Implementation

The targets for the dioxins reduction indicator for the demonstration mills were specified during implementation because the reference baselines were not available at appraisal. Following the replacement of two mills (discussed in section 2e), targets were specified for these mills during implementation. The ICR (paragraph 64) notes that M&E was implemented as planned during implementation through six monthly project progress reports. During implementation, while the independent laboratory was retained to establish the dioxins baseline and verify dioxins releases after BAT/BEP renovations, regular reporting results from the local Environmental Protection Bureaus were used for verifying release of conventional pollution parameters (such as Chemical Oxygen Demand (COD), Ammoniacal Nitrogen and national water effluent standards).



c. M&E Utilization

The ICR (paragraph 65) notes that the results of M&E were used for disbursing payments to the mills participating in the PBF scheme. The ICR notes that the project collected improved data on dioxins releases from the pulp and paper mills in China. This data was published in academic literature and this data was to be used for updating the dioxins inventory for the United Nations Environment Program (UNEP)/ Stockholm toolkit.

M&E Quality Rating

Substantial

10. Other Issues

a. Safeguards

The project was classified as a Category A project for World Bank safeguard policies. Two safeguard policies were triggered at appraisal: Environmental Assessment (OP/BP 4.01); and Involuntary Resettlement (OP/BP 4.12).

Environmental Assessment. The PAD (paragraph 39) notes that positive environmental benefits of the project were to come from minimizing the release of dioxins and furans and reduction of pollutant load in effluents. The possible negative environmental issues, included issues associated with wastewater and waste management, accidental breakdown and environmental risk and safety and health issues during implementation. The ICR (paragraph 40) notes that site-specific environmental assessments were conducted by accredited Environmental Impact Assessment (EIA) institutes for each mill and Environmental Management Plans (EMP) were prepared and publicly-disclosed at appraisal (PAD, paragraph 41). The ICR (paragraph 68) notes that EMPs for the two new project mills that joined after the 2014 restructuring, EMPs were prepared and publicly-disclosed on May 16, 2014. The ICR (paragraph 69) also notes that following the restructuring on May 2016, an Environmental and Social Management Framework was developed as a supplementary environmental assessment document for the project with enhanced attention to social details to guide the design and implementation of the newly introduced activities on technical assistance support to BAT/BEP planning.

The ICR (paragraph 70) notes that there was a wastewater spill incident at the Hunan Lingyuan Paper mill during the renovation of its wastewater treatment facilities on December 4, 2016. Lingyuan took immediate and effective corrective measures to resolve the issue and with the authorization of the local Environmental Bureau, resumed its normal production after two weeks. Nevertheless, the mill conducted a detailed investigation to understand the root cause of the action and proposed actions to guide future operations. Following the mills' self-investigation, a special field mission conducted jointly by the government and the



Bank team In November 2017, confirmed the mills' actions, and there was consistent environmental compliance after the accident.

Involuntary Resettlement. The PAD (paragraph 38) notes that land acquisition and involuntary resettlement was not expected, as the activities were to be implemented in the existing mills' premises. However, this safeguard was triggered, as one of the participating mills (the Guangxi Nanning Sugar Company Pumiao Paper Mill) had acquired land for BAT/BEP before project identification in 2010. A due diligence review was conducted for this land acquisition at appraisal. The review confirmed that there were no adverse effects on local villagers and the affected villagers were satisfied with the compensation arrangements. The ICR (paragraph 73) notes that there were no other involuntary resettlement issues during implementation.

b. Fiduciary Compliance

Financial management. The financial management capacity of the implementing agency - Foreign Economic Cooperation Office (FECO) in the Ministry of Environmental Protection (MEP) - was conducted at appraisal. The assessment concluded that although there was financial management risk due to the inexperience of the selected mills with Bank-financed projects and the use of the PBF scheme, this risk was offset by the extensive experience of the FECO in executing Bank projects. A Financial Management Manual was developed at appraisal and the project staff were to be trained during implementation (PAD, paragraph 35). With the mitigation measures, financial management risk was rated as Moderate at appraisal (PAD, page 19). There were no significant financial management issues during implementation and the audit reports were unqualified (ICR, paragraph 75).

Procurement. A procurement assessment of the FECO in the MEP was conducted at appraisal. The assessment concluded that FECO had adequate experience and capacity to address procurement issues (PAD, paragraph 36). The ICR (paragraph 76) notes that there were no procurement issues and there was no mis procurement during implementation.

c. Unintended impacts (Positive or Negative)

d. Other

11. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Satisfactory	Satisfactory	



Bank Performance	Satisfactory	Satisfactory
Quality of M&E	Substantial	Substantial
Quality of ICR	---	Substantial

12. Lessons

The ICR drew seven lessons and recommendations from the project's experience. The following are three lessons, mentioned in the ICR that have potential implications for other Bank-financed projects, with some adaptation of language.

1. Upstream analytical work may be particularly important, when addressing new sectors.

This project was prepared based on an analytical study conducted with the support of the Canada POPs Trust Fund. This work allowed the Bank team and the implementing agency to gain knowledge of the sector and build networks with industry partners. The lesson is that preliminary analytical work can aid in quick preparation of the project.

2. A combination of pilot demonstration and enabling environment can aid in sector-wide transformation. This project relied on a relatively straightforward design, that addressed the two key barriers that were identified through two complementary components (one focused on technical demonstration and one focused on sector policy and regulatory framework). The lesson is that combining demonstration with policy interventions is more likely to be successful in projects where new technologies are involved.

3. Performance-Based Financing (PBF) sub-grants following commercial practices for procurement can be an efficient way to engage enterprises. Procurement under the PBF sub-grants in this project followed commercial practices that were acceptable to the Bank, ensuring value for money in the process that met the mill's business requirements and was in-line with their baseline investments. The lesson is that the PBF modality, together with independent and credible verification, can be an effective way of transferring grant resources to enterprises that were investing their own significantly larger resources.

13. Assessment Recommended?

No

14. Comments on Quality of ICR



The ICR is well-written and its structure is consistent with OPCS guidelines. Annex four in the ICR provides useful information on the modalities of GEF financing. The ICR candidly discusses issues pertaining to the withdrawal of three of the originally envisioned four mills. The ICR also draws useful lessons from the experience of implementing this project.

There were two minor issues with the ICR. One, there is a discrepancy in the ICR. While the data sheet in page three of the ICR rates M&E quality as substantial, page 31 of the ICR rates overall M&E quality as high, and two, the main body of the text is about 32 pages (more than twice the recommended length of 15 pages).

a. Quality of ICR Rating
Substantial