

**INTEGRATED SAFEGUARDS DATA SHEET  
APPRAISAL STAGE**

**Report No.: ISDSA10026**

**Date ISDS Prepared/Updated:** 18-Jul-2014

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**I. BASIC INFORMATION**

**1. Basic Project Data**

<b>Country:</b>	China	<b>Project ID:</b>	P126832
<b>Project Name:</b>	CH GEF Municipal Solid Waste Management Project (P126832)		
<b>Task Team Leader:</b>	Tijen Arin		
<b>Estimated Appraisal Date:</b>	30-Jun-2014	<b>Estimated Board Date:</b>	14-Nov-2014
<b>Managing Unit:</b>	GENDR	<b>Lending Instrument:</b>	Investment Project Financing
<b>GEF Focal Area:</b>	Persistent Organic Pollutants		
<b>Sector(s):</b>	Solid waste management (100%)		
<b>Theme(s):</b>	Pollution management and environmental health (50%), Environmental policies and institutions (50%)		
<b>Is this project processed under OP 8.50 (Emergency Recovery) or OP 8.00 (Rapid Response to Crises and Emergencies)?</b>			No
<b>Financing (In USD Million)</b>			
Total Project Cost:	32.89	Total Bank Financing:	0.00
Financing Gap:	0.00		
<b>Financing Source</b>			<b>Amount</b>
Borrower			20.89
Global Environment Facility (GEF)			12.00
Total			32.89
<b>Environmental Category:</b>	A - Full Assessment		
<b>Is this a Repeater project?</b>	No		

**2. Global Environmental Objective(s)**

The project would aim to build capacity and demonstrate best available techniques (BAT) and best environmental practices (BEP) in municipal solid waste (MSW) incineration in accordance with the

Stockholm Convention.

### 3. Project Description

The project would support three components: (1) Capacity Building for Improved Operation and Regulation of MSW Incinerators, (2) Capacity Building for Improved MSW Management Planning, and (3) Project Management.

#### Component 1. Capacity Building for Improved Operation and Regulation of MSW Incinerators

This component would support two closely linked sub-components aiming to increase capacity to better operate and regulate MSW incinerators so as to reduce dioxin and other pollutant emissions.

##### Sub-component 1A. Building Capacity for Improved Incinerator Operations and Emissions Control

This sub-component would increase capacity at selected demonstration incinerators to improve operations and reduce dioxin and other pollutant emissions in line with Stockholm Convention BAT/BET.

The project would support operational and environmental performance audits at four candidate demonstration incinerators in Kunming the first year of project implementation. Based on the audits, an operational improvement program would be designed for each incinerator. Incinerators that commit to implementing these programs and fulfill financial eligibility conditions would be supported during the remainder of the project, including through grant funding for necessary upgrades of equipment relevant for dioxin emission reduction. The project will aim to achieve operational improvements at least three demonstration incinerators. If more than one of Kunming's four candidate incinerators fails to meet the above-named conditions, the Project may turn to Ningbo or other cities for eligible demonstration incinerators.

Specifically, the project would support the following activities:

- a) Operational and environmental performance audits that would be carried out during the first 9-12 months of project implementation to fill the information gap on operating conditions at four incinerators in Kunming (Konggang, Wuhua, Xishan, and Dongjiao) and investments in equipment at these incinerators needed to enable monitoring and their online transmission to Kunming Urban Management Bureau (UMB) and Kunming Environmental Protection Bureau (EPB). Experts of MSW operations with substantial international experience would be hired to design and conduct the audits and help design the operational improvement programs.
- b) Dissemination of lessons learned from the audits in Kunming to regulators and incinerator managers in other cities across China. The project would finance a consultancy and incremental costs of dissemination to raise awareness on the linkages between operating conditions and environmental performance for two widely used technologies in China.
- c) Operational improvement programs that would be implemented in the demonstration incinerators that commit to such programs and meet financial eligibility criteria, during the remainder of project life with the help of manuals of operational procedures.
- d) BAT and BEP training for approximately 250 MSW incinerator managers and operators of which 50 would be from Kunming and Ningbo incinerators, and the rest from 40 MSW incinerators across China.
- e) Investments in enhanced equipment to further reduce dioxin emissions for those demonstration incinerators that commit to implementing the operational improvement program and meet the financial eligibility criteria.

##### Sub-component 1B. Capacity Building for Improved Regulation of MSW Incinerators.

This sub-component would support six activities to promote improved regulation of MSW incinerators:

- a) Piloting of integrated permits for selected incinerators, which would specify in detail incinerator operating conditions required to meet emission limits for dioxin and other pollutants. The permits would also include inspection manuals for the regulators.
- b) Building capacity for improved monitoring by regulators through:
  - i. Procurement of IT hardware and software to allow Kunming and Ningbo UMBs and EPBs continuous online access to incinerator operating and emission data;
  - ii. Stack tests for dioxin where standards for such tests are enforced, including maintenance of normal operating conditions at the time of sampling;
  - iii. Enhancing the capacity of the Ningbo Dioxin Laboratory through the purchase of equipment and technical assistance.
- c) Training of regulators from MOHURD and Ningbo and Kunming EPBs and UMBs through study tours to North American and European cities where BAT and BEP for MSW incineration are implemented;
- d) Updating and developing four national-level technical standards for MSW incinerator operations; and
- e) Public awareness raising and disclosure of incinerator operating and emissions data on the internet (Kunming and Ningbo) and community bulletin boards (Kunming).

#### Component 2. Capacity Building for Improved MSW Management Planning

This component would support four activities to promote improved MSW management planning with a view to reduce solid waste going to MSW incinerators:

- a) A study on regional planning of MSW disposal that would identify cost effective disposal options at a regional scale (national level activity);
- b) A national level study on the system of statistical indicators and MSW classification;
- c) Twinning of Kunming and Ningbo on MSW segregation; and
- d) An assessment of the impact of MSW segregation on dioxin emissions in Ningbo.

The component will also support project results monitoring and dissemination.

Component 3. Project Management. This Component would support FECO, Yunnan and Ningbo PMOs to carry out day-to-day project management, including procurement and financial management.

#### **4. Project location and salient physical characteristics relevant to the safeguard analysis (if known)**

The city of Kunming is the capital of Yunnan Province in southwest China. Kunming is located in the middle of Yunnan-Guizhou Plateau. Its overall topography is featured with high northern part and low southern part. Most of the city has an altitude between 1,500m and 2,800m. The city presents low latitude-plateau-monsoon weather feature and has an annual average temperature of 15 oC and an annual precipitation of 1,035mm.

Kunming has a total area of 21,473km<sup>2</sup>, divided into 6 districts, 7 counties and a county level city. It has a population of 7.26 million. The urban area has a population of 5.3 million (2013). The city has a GDP of CNY301 billion and an average per capita GDP of CNY 41,458 in 2012. The city is also a critical transport hub in southwestern China by having the fifth largest airport in China, several national expressways and intensive road networks connecting the remainder of the province.

Kunming has a good ambient air quality compared to most cities in China. Based on Kunming Environmental Quality Reports during 2010-2012, monitored pollutants on a daily basis, including PM10, SO2, and NO2, all met applicable national ambient air quality standard. It also shows a slightly improving trend over the period. In 2012, the monitored annual average PM10, SO2 and NO2 concentrations are 67, 34, and 36 ug/m3 respectively. While, national standard Ambient Air Quality Standard (GB3098-2012, issued in 2012 and to be effective on January 1st, 2016) stipulates standards of 70, 60 and 40 ug/m3 for the three air pollutants in Kunming City.

The four candidate MSW incinerators are located in suburban or rural areas in Kunming. Wuhua incinerator is in the northwestern Kunming, about 6km from its urban area. Around Wuhua incinerator there are other industrial activities, including a feces treatment plant and construction material plants. Dongjiao incinerator is in the eastern Kunming, about 30km from its urban area. By Dongjiao incinerator there is a landfill that was closed in 2008. Xishan incinerator is in the southwestern Kunming, about 50 km from its urban area. By Xishan incinerator there is a waste recycling plant. Konggang incinerator is in the northeastern Kunming, about 50km from its urban area. For all incinerators, local communities are located at least 500m to them, meeting national requirements for safety distances (>300m).

### 5. Environmental and Social Safeguards Specialists

Chaogang Wang (GURDR)

Ning Yang (GENDR)

6. Safeguard Policies	Triggered?	Explanation (Optional)
Environmental Assessment OP/ BP 4.01	Yes	<p>The project is assigned as Category A project due to sensitivity of dioxins emissions and MSW incineration. Dioxins are extremely biologically toxic and persistent in the environment. Other polluting emissions from MSW incineration may include particulate matters (measured in Total Suspended Particulates, TSP); acidic pollutants such as SO2, NOx and HCl; and heavy metals, etc. In addition, combustion by-product fly ash often contains dioxins and heavy metals; hence it is considered a major environmental concern and should be properly managed.</p> <p>A full Environmental Audit and EMP are prepared for each participating incinerator.</p> <p>Two rounds of public consultation were carried out as part of the EIA procedure.</p>
Natural Habitats OP/BP 4.04	No	The Project does not involve any natural habitats. The Project will only operate in existing incinerators and no expansion will take place that would impact on natural habitats.
Forests OP/BP 4.36	No	The Project would not finance any activity that may involve a major change or degradation of the

		important forest area or related major natural habitat as defined in the Policy. The Project will only operate in existing incinerators and no expansion will take place that would impact on forests.
Pest Management OP 4.09	No	The Project would involve neither purchase of any pesticide nor additional pesticide application. No action is required according to the Policy.
Physical Cultural Resources OP/ BP 4.11	No	No cultural heritage or other physical cultural resource has been found in the project sites. The Project will only operate in existing incinerators and no expansion will take place that would impact on physical cultural resources. Chance-find procedure however is included in the EMP.
Indigenous Peoples OP/BP 4.10	No	No indigenous people are associated with the project area or activities, which are all in existing incinerators.
Involuntary Resettlement OP/BP 4.12	No	Land acquisition for purposes of construction of four MSW incineration plants in Kunming City took place prior to this project (2006-2009). The land acquisition was completed without anticipation to the proposed project. Nevertheless, a retroactive review was carried out. The review concluded that compensation has been paid according to relevant government policies and consistent with the principles and requirement of the Bank policy on Involuntary Resettlement OP 4.12. There are no pending issues on land acquisition. Furthermore, no new land acquisition is envisaged under the project as there is no expansion of any of the existing incinerators.
Safety of Dams OP/BP 4.37	No	There is no dam in the project area.
Projects on International Waterways OP/BP 7.50	No	There is no international waterway involved in the project area.
Projects in Disputed Areas OP/BP 7.60	No	There is no disputed Areas involved in the project area.

## II. Key Safeguard Policy Issues and Their Management

### A. Summary of Key Safeguard Issues

<p><b>1. Describe any safeguard issues and impacts associated with the proposed project. Identify and describe any potential large scale, significant and/or irreversible impacts:</b></p>
<p>Environment</p> <p>By design, four existing MSW incinerators in Kunming may receive GEF funding to invest in enhanced equipment in order to implement operational improvement programs (Component 1Ad).</p>

As a precondition to receive the funding, each of the four incinerators will be subject to an intensive operational and environmental performance audit in the first year of project implementation in order to develop the operational improvement programs. In accordance with World Bank OP/BP4.01, the project is categorized as Category A for environmental purposes due to sensitivity of dioxins emissions and MSW incineration.

Since the identified physical investments are mainly about enhancement of air pollution control facilities in these existing incinerators, during project preparation an environmental audit and an environmental management plan (EMP) for each incinerator, and an EA executive summary for the project were developed following domestic regulations and Bank safeguards requirements. The World Bank Group Environmental, Health and Safety Guidelines were incorporated into the environmental audit and EMP where applicable.

Other project activities will support enforcement capacity building of regulators, training of incinerator operators, regional planning of MSW disposal, information disclosure, and national level regulatory capacity building for MSW management. Overall, these activities, by improving incinerators' operation, enhancing governments' enforcement and engaging the public, are in line with Stockholm Convention BAT/BEP guidelines. Bank safeguards policies apply to these technical assistance activities as well. Environmental and social safeguards considerations will be fully blended with the scope of work and terms of references for these technical assistance activities.

**Environmental Impacts.** The project is expected to have direct environmental benefits by reducing dioxins and other air emissions from the demonstration MSW incinerators. As is well known, dioxin is extremely biologically toxic and persistent in the environment. Other polluting emissions from MSW incineration may include particulate matters (measured in Total Suspended Particulates, TSP); acidic pollutants such as SO<sub>2</sub>, NO<sub>x</sub> and HCl; and heavy metals, etc. In addition, combustion by-product fly ash often contains dioxins and heavy metals; hence it is considered a major environmental concern and should be properly managed.

**Environmental Audit.** The environmental audit examined regulatory compliance, environmental and social baselines, operating conditions, management of air emissions, wastewater, solid wastes and other environmental, and health and safety issues of the four candidate incinerators in Kunming.

**Operating Conditions.** The four candidate incinerators in Kunming are relatively new having been put into formal operation in the past few years. Specifically, 1) Wuhua incinerator was built in December 2007 and put into formal operation in July 2008; 2) Dongjiao incinerator was built in March 2009 and put into formal operation in March 2011; 3) Xishan incinerator was built in August 2012 and put into formal operation in June 2013; and 4) Konggang incinerator was built in June 2011 and put into formal operation in August 2013. Konggang incinerator uses the mass burn (moving grate) technology, while the other three use the circulated fluidized bed (CFB) technology for combustion. After the combustion process, air pollution control facilities are all in place, typically including semi-dry scrubber that targets removal of acidic pollutants, activated carbon injection that removes dioxin and heavy metals, and bag house that collects particulates. All four incinerators generate electricity. According to the technical review during project preparation, the four incinerators are well maintained, have qualified operational staff and have control systems in place that should allow for ready adaptation of an operational and environmental performance enhancement program. However, it is also found that the four

incinerators have, to varying degrees, scope for improvements in system control to stabilize process conditions, environmental monitoring, and integrate monitoring of process and environmental parameters for process control and optimization.

**Dioxins Emissions Standards.** A comprehensive review of dioxins emission standards for MSW incinerators around the world shows that EU countries, Japan, Beijing, Hong Kong, and Taiwan all have adopted 0.1 ng TEQ/m<sup>3</sup>. The United State standards are about 0.2 and 0.5 ng TEQ/m<sup>3</sup> (after unit conversion) for new and existing MSW incinerators, respectively. China's current national standard, i.e. Standard for Pollution Control on the MSW Incineration (GB18485-2001), was issued in 2001 and stipulates a dioxin emission standard of 1.0ng TEQ/m<sup>3</sup>. However, in 2008 the Ministry of Environmental Protection (MEP) issued a document stipulating that new MSW incinerators that generate power must meet 0.1 ng TEQ/m<sup>3</sup>. Since Konggang and Xishan incinerators' EIAs were approved after the effectiveness of the MEP document, they are required to meet 0.1 ng TEQ/m<sup>3</sup>. During the project appraisal, MEP issued updated Standard for Pollution Control on the MSW Incineration (GB18485-2014), which stipulates that all existing MSW incinerators will have to meet 0.1 ng TEQ/m<sup>3</sup> starting from January 1st, 2016, while the current standard (GB18485-2001) will remain effective for existing MSW incinerators until December 31, 2015.

**Dioxins Emissions.** Dioxin emissions from the four candidate incinerators have been tested at least once a year by accredited monitoring institutes as required by Chinese regulations. The results of these tests are as follows: 1) for Wuhua, 12 tests were carried out as of January 2014. Results range from 0.057 to 0.89, and 9 results were lower than 0.1 ng TEQ/m<sup>3</sup>; 2) for Dongjiao, 39 tests were carried out as of January 2014. Results ranged from 0.001 ng TEQ/m<sup>3</sup> to 0.187 ng TEQ/m<sup>3</sup>, and 36 results were lower than 0.1 ng TEQ/m<sup>3</sup>; 3) for Xishan, 21 tests were carried out as of June 2013. Results ranged from 0.00131 ng TEQ/m<sup>3</sup> to 0.078 ng TEQ/m<sup>3</sup> and were all below 0.1 ng TEQ/m<sup>3</sup>; and 4) for Konggang, 12 tests were carried out as of end of 2013. Maximum tested level was 0.011ng TEQ/m<sup>3</sup> and all results were below 0.1 ng TEQ/m<sup>3</sup>.

**Emission Levels of Other Air Pollutants.** Other air emissions from the four candidate incinerators were examined by reviewing the results of the environmental acceptance monitoring (which is the precondition of formal operation) and regular inspection monitoring conducted by local environmental protection bureaus and online monitoring records. It should be noted that the EHS Guidelines make reference to EU and US air emission standards for MSW incineration. For some pollutants, either the EU or US standard is more stringent, reflecting different country context, assimilative capacity of the environment, and other factors. The environmental audit found that the EPB inspection monitoring of the four incinerators covered TSP, SO<sub>2</sub>, NO<sub>x</sub>, Pb, Cd, Hg and HCl; and the results all met domestic standards. In addition : 1) Konggang fully met the EHS Guidelines; 2) Xishan met NO<sub>x</sub>, Cd, Hg and HCl of the most stringent standards of the EHS Guidelines, while TSP, SO<sub>2</sub> and Pb did not fully meet the most stringent standards of the EHS Guidelines; 3) Wuhua fully met NO<sub>x</sub>, Pb, Hg and HCl, but did not fully meet the most stringent standards in the EHS Guidelines for TSP, SO<sub>2</sub>; and 4) Dongjiao fully met NO<sub>x</sub>, Pb and Hg, but did not fully meet the most stringent standards in the EHS Guidelines for TSP, SO<sub>2</sub>, Cd and HCl. Further, online monitoring covered TSP, CO, NO<sub>x</sub>, SO<sub>2</sub>, and HCl, and some operating related parameter such as O<sub>2</sub>. Online monitoring results were generally consistent with the EPB inspection findings. However, it is noted online monitoring equipment in the four incinerators sometimes did not work well and reported abnormal data indicating maintenance and validation issues. MEP issued Standard for Pollution Control on the MSW Incineration (GB18485-2014) during the project appraisal, which stipulates air emission limits generally in the same levels of EU and US. The new national standards will be effective for existing MSW incinerators starting from

January 1st, 2016.

**Odor Control.** Odor and other non-point source air pollutants comprised of H<sub>2</sub>S, NH<sub>3</sub> and TSP that are mainly from garbage pit in the incinerators. Local communities are sensitive to odor. It is reported that in the past the public complained odor that were potentially from Wuhua and Xishan incinerators. The four incinerators have implemented odor control measures including maintaining negative pressure at garbage pits, odor removal facilities and closure structure to the garbage pits. For Wuhua and Xishan, odor may also have come from other industrial activities surrounding the two incinerators. In the past two years, environmental monitoring of above-mentioned H<sub>2</sub>S, NH<sub>3</sub> and TSP at the boundary of the incinerators met domestic standards.

**Fly Ash and Solid Wastes Management.** Fly ash produced in the four candidate incinerators ranged from 5,655t/a to 24,972t/a in 2013. CFB incinerators (i.e. Wuhua, Dongjiao and Xishan) produce more fly ash, accounting for about 6-8% of the MSW incinerated in weight; while mass burn incinerator Konggang produces less, accounting for 3%. Fly ash shall either be sent to local hazardous waste treatment facility, or sent to landfill on the condition that it meets the specifications set at the landfill. Kunming's current hazardous waste treatment facility was put into operation in 2012 and its capacity is inadequate to receive the fly ash produced in these incinerators. Thus in the four incinerators, fly ash is treated through solidification with cement, stone and a chelating agent in order to meet national standards for leaching toxicity. Solidified fly ash is sent to Kunming Xishan landfills for final disposal. Bottom slag is a non-hazardous solid waste. It is managed separately from fly ash and recycled for producing construction materials. Other solid wastes including garbage and sludge are incinerated.

**Wastewater management.** Wastewater streams produced in the incineration plants include leachate from garbage pits, domestic wastewater and other process wastewater. Wuhua has its leachate incinerated or sent to designated leachate treatment facility when the volume of the leachate is too much. Other three incinerators have advanced leachate/wastewater treatment facilities and discharge no wastewater to the environment. Overall these wastewater streams are effectively managed. No noncompliance has been identified in the environmental audit process.

**Noise.** Sources of noises in the four incinerators include crushers, draft fan, turbine and other mechanical equipment. Noise control measures taken by the incinerators include sound insulation, damping pad and silencer, etc. Monitoring of noises have been carried out regularly, no noncompliance has been reported.

**Risks.** Risk analysis shows that the main potential environmental risk during operation would be: (a) accidental breakdown of waste management system, and (c) fire or explosion. Risk prevention and mitigation measures and emergency response plans have been incorporated into the incinerators' regular management system and in the EMPs. Overall, the risk levels are considered low.

**EHS Management System.** Each incinerator has an existing EHS system in place, including an environmental and safety office and dedicated staff, occupational safety regulations, operational monitoring, wastewater and air emission sampling and analysis. These incinerators are also closely monitored and supervised by local environmental protection bureaus (EPBs) whose environmental monitoring stations carry out regular inspections. In addition, online monitoring of air emissions, as mentioned above, is in place and data are transmitted to local EPBs.



Findings and Recommendations. The Environmental Audit and technical evaluation carried out during project preparation considered that the incinerators are adequately managed by experienced operators, albeit at uneven levels. Several key issues identified include: 1) all the four incinerators often received humid, low heat-value and abnormal size garbage due to poor at-source segregation, which compromise good combustion at furnace if pretreatment in the plants is inadequate. The three CFB incinerators are more vulnerable to the poor quality waste feedstock, which has resulted in quite considerable plant downtime. The four incinerators' instrumentation and automatic control system may not be adequate to address these challenges. Overall these unsteady operations bring considerable likelihoods of uncertain emissions. 2) Environmental monitoring seems to be inadequate due to technical and capacity constraints. Some monitoring results seem to be unreliable. This is evident that from the fact that some dioxins monitoring results are at the theoretical minimum under perfect operating conditions, while it is obvious that keeping steady operation is a major challenge to the four incineration plants. It is also found that the online monitoring equipment in the four incineration plants doesn't work well all the time.; 3) Incinerator operators' knowledge of process control, comprehensive application of BAT/BEP and environmental compliance need to be further enhanced. In conclusion, the results of Environmental Audit carried out during project preparation prove the necessity of a comprehensive operating and environmental performance audit in the first year of project implementation.

## Social

Social impacts and land acquisition. The social impacts of the proposed Project would be mainly positive. The primary project beneficiaries will be the local environmental protection bureaus in two cities of Kunming and Ningbo and local residents in four districts of Kunming. They will benefit from strengthened capacity for solid waste management and reduced exposure to dioxin emissions from MSW incinerators respectively.

A social assessment was carried out through extensive consultation with various stakeholders, a questionnaire survey with local residents, a desk review, and participator observations.

The assessment aimed at

- (1) Identifying the primary stakeholders, and their interests and needs, and their potential impacts on the project and environment;
- (2) Learning the potential positive and negative impacts, and social risks of the project;
- (3) Learning public perceptions and ideas of information disclosure on the project and air emissions, identifying the primary stakeholders' needs for information disclosure and public participation, and developing strategies suited to local culture and customs;
- (4) Proposing a social management plan that optimizes the project design, improves information disclosure and promotes public participation through extensive consultation, thereby evading risks and promoting the realization of the project objectives.

Topics discussed with stakeholders ranged from waste management in general, such as service coverage and waste management fees, to incineration in particular, including the stakeholders' perceptions of health and other impacts of incineration, as well pollution control technologies that may be supported by the project. The findings of the social assessment reinforced the fact that public reactions against dioxin emissions from MSW incinerators have become more common in China's large cities in recent years, and there is also significant lack of confidence in the information shared with the public on these emissions.

The social assessment found that women declared to know less than men about hazardous emissions from incinerators, but women expressed more concern about incinerators' impact on health and quality of life. Women were also less aware than men of environmental information disclosed by incinerators and less satisfied with the information disclosed. Women were significantly more interested in information on health impacts than men. Finally, women differed from men in their preferred mode of access to information. These differences have been reflected in the information disclosure plan in Kunming.

The main outcome of the social assessment was a public information disclosure and public awareness raising strategy, which have been fully incorporated in project design (see section 5 below) and results indicators. Notably, during the project, local communities' awareness of information disclosure of incinerators pollutant emissions will be monitored, in a gender-segregated way, as part of the Project Results Framework.

Land acquisition for purposes of construction of four incinerators in Kunming City took place prior to this project. It was completed without anticipation to the proposed project. Nevertheless, a retroactive due diligence review of the land acquisition was carried out. The review included a comprehensive review of the land acquisition and resettlement processes of the Xishan and Konggang incinerators and concluded that these processes complied with the Land Administration Law of the People's Republic of China, and the regulations and policies of Yunnan Province and Kunming City on resettlement. Surveys of affected households indicated that all sampled households had enhanced incomes and expenditures after compensation and resettlement, reflecting that the affected households' incomes and living standards were restored and improved effectively. All affected persons interviewed were satisfied with the compensation and process.

In the case of Dongjiao and Wuhua, land acquisition was completed 16 and 8 years ago, respectively. While, due to the time that had elapsed, it was impossible to carry out as detailed a review as in the case of Xishan and Konggang, key information on the impacts of land acquisition in terms of type, area, number of affected people (Wuhua) as well as on compensation payments made (Wuhua) was collected. In addition, in the case of Wuhua, a few affected persons attended the focus group discussions of the project social assessment. These individuals said that since most of the acquired land was wasteland, their production and livelihoods were not affected, and some local residents stated that this plant had improved the local environment and their quality of life to some extent. No complaints were voiced.

Overall, the due diligence review concluded that although the land acquisition was implemented mainly followed the relevant government policies and regulations, it was consistent with the requirements of the Bank Policy on Involuntary Resettlement OP 4.12. The review did not find any pending issues on land acquisition carried out prior to the Project.

No new land acquisition is envisaged under the project as there is no expansion of any of the existing incinerators.

There are no ethnic minority communities in the project area.

**2. Describe any potential indirect and/or long term impacts due to anticipated future activities in the project area:**

The project aims to demonstrate good practices in enhancing enforcement capacity and systematically introducing BAT/BEP to the MSW incinerators. In demonstration city Kunming,

the project activities are expected to result in consistently lower emissions of dioxins and other air emissions than present levels by combining technical, regulatory and public efforts. At demonstration city Ningbo, the project activities will complement with ongoing Bank loan project on MSW segregation. At national level, capacity building activities that aim to strengthen MSW related technical standards, planning and management. In addition, by engaging the public, the project is expected to raise public knowledge and awareness on the proper operation of MSW incineration, hazards of dioxins and the importance of public oversight. Overall, in long term the project have both considerable environmental and social benefits.

**3. Describe any project alternatives (if relevant) considered to help avoid or minimize adverse impacts.**

Several alternatives were considered during project preparation, including the number of demonstration cities and selection of new or existing incinerators.

Given the nature of the GEF project in the context of country implementation of Stockholm Convention, it was decided that the project interventions will place emphasis on one city, namely Kunming, while meeting the needs of national level activities and taking advantage of ongoing MSW management project financed by Bank loan project in Ningbo, in order to maximize the potential demonstration value of the project.

Since the project by nature is to help reduce dioxins emissions rather than support MSW incineration in China, it was decided to carry out interventions on existing MSW incinerators rather than financing building of new incinerators.

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

The four candidate incinerators in Kunming, with technical support from MEP/FECO and local environmental protection bureaus, conducted environmental audit and prepared environmental management plan during project preparation. The environmental audits comprehensively examined regulatory compliance, environmental and social baselines, operating conditions, air emissions control, solid wastes management, wastewater management and environmental risks of the four candidate incinerators in Kunming.

The project by nature can be considered action plans to help the incinerators improve its operations and environmental compliance. After the operating and environmental performance audit in the first year of project implementation, emission targets for each incinerator will be determined and are expected to meet newly issued Chinese national standards for MSW incineration, i.e. Standard for Pollution Control on the MSW Incineration (GB18485-2014). The new national standard is in general in the same level of EU and US standards.

An EMP for each incinerator was prepared by incorporating designed project interventions. The EMP details the institutional arrangements for environmental management and supervision, responsibilities of all concerned parties, international accepted BAT/BEPs and other relevant mitigation measures for both implementation and operational stages, “emergency preparedness plan”, capacity training plan, public engagement plan, environmental monitoring plan, and budget estimates for implementing the EMP. The EMPs will be updated once the results of the first year operational and environmental performance audit of the four incinerators are out. The updated EMPs will be integrated into the Performance Improvement Program of the four incinerators, which will be supported by the project.

MEP/FECO will be responsible for overall environmental management during project implementation. In Kunming, each incinerator 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/local EPBs, and participating incinerators' management, through their existing environmental management office and dedicated staff. Environmental mitigation measures developed in the EMP will be fully incorporated into the environmental, health and safety management systems.

Under Component 2, the project will support a "Study on Regional Planning of MSW Disposal", which will involve case studies to compare strictly local MSW disposal options with regional alternatives from the point of view of economic, financial, and environmental point of view. Concerns under most safeguards policies would be relevant to this study. Therefore, the study terms of reference (TOR) will incorporate all relevant safeguards policies and consultant outputs will be reviewed to ensure that the analysis and recommendations reflect these policies. The TORs for the other studies under Component 2 will also incorporate safeguard policies and requirements as relevant.

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

During project preparation, public consultations were carried out jointly by social and environmental assessment consultants with support from MEP/FECO, local EPBs and candidate incinerator owners. Two rounds of public consultations were conducted in accordance with Bank OP 4.01. A combination of questionnaire surveys, focused group meetings, interviews and public meetings within the project's area of influence was implemented. Public concerns have been incorporated either in the project design or in the EMP.

The public consultations show that communities lack knowledge of MSW incineration and dioxins emissions. They also lack confidence on the shared information with the public on the environmental management of the incinerators. Of the four incinerators, Wuhua incinerator has mostly populated communities in its vicinity, and the opinions obtained from the people consulted show obvious concerns and aversions to the MSW incineration. However, through the public consultations carried out during project preparation, people consulted expressed welcome to the project and willingness to join the designed public engagement programs.

A comprehensive public engagement program was developed and incorporated in the project design, including: 1) information disclosure and public participation program including public disclosure of real-time incinerator emission and operating data, dioxin monitoring data, knowledge dissemination of MSW incineration and health impacts, MSW segregation and its linkage with incineration, interactions between incinerators and nearby communities, etc. and 2) Grievance redresses mechanism that includes a telephone hotline, document filing and specialized complaint institution located at incinerators, community/village, environmental protection bureau, urban management bureau. This mechanism will cover grievances concerning the deficient performance or coverage of Project activities, including any grievances related to legacy issues for land acquired for the construction of four MSW incineration plants in Kunming City.

Information disclosure has been carried out as part of the environmental and social assessments through public bulletins, local newspaper, and the internet. All draft full environmental audit reports, environmental management plans and social assessment reports were made available locally on March 10, 2014, and in the InfoShop on March 25, 2014, and as such, are accessible to

the general public.
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### **B. Disclosure Requirements**

<b>Environmental Assessment/Audit/Management Plan/Other</b>	
Date of receipt by the Bank	10-Mar-2014
Date of submission to InfoShop	25-Mar-2014
For category A projects, date of distributing the Executive Summary of the EA to the Executive Directors	16-Jun-2014
<b>"In country" Disclosure</b>	
China	10-Mar-2014
<i>Comments:</i>	
<b>If the project triggers the Pest Management and/or Physical Cultural Resources policies, the respective issues are to be addressed and disclosed as part of the Environmental Assessment/Audit/or EMP.</b>	
<b>If in-country disclosure of any of the above documents is not expected, please explain why:</b>	

### **C. Compliance Monitoring Indicators at the Corporate Level**

<b>OP/BP/GP 4.01 - Environment Assessment</b>	
Does the project require a stand-alone EA (including EMP) report?	Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ] NA [ <input type="checkbox"/> ]
If yes, then did the Regional Environment Unit or Practice Manager (PM) review and approve the EA report?	Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ] NA [ <input type="checkbox"/> ]
Are the cost and the accountabilities for the EMP incorporated in the credit/loan?	Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ] NA [ <input type="checkbox"/> ]
<b>The World Bank Policy on Disclosure of Information</b>	
Have relevant safeguard policies documents been sent to the World Bank's Infoshop?	Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ] NA [ <input type="checkbox"/> ]
Have relevant documents been disclosed in-country in a public place in a form and language that are understandable and accessible to project-affected groups and local NGOs?	Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ] NA [ <input type="checkbox"/> ]
<b>All Safeguard Policies</b>	
Have satisfactory calendar, budget and clear institutional responsibilities been prepared for the implementation of measures related to safeguard policies?	Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ] NA [ <input type="checkbox"/> ]
Have costs related to safeguard policy measures been included in the project cost?	Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ] NA [ <input type="checkbox"/> ]
Does the Monitoring and Evaluation system of the project include the monitoring of safeguard impacts and measures related to safeguard policies?	Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ] NA [ <input type="checkbox"/> ]
Have satisfactory implementation arrangements been agreed with the borrower and the same been adequately reflected in the project legal documents?	Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ] NA [ <input type="checkbox"/> ]

**III. APPROVALS**

Task Team Leader:	Name: Tijen Arin	
<b><i>Approved By</i></b>		
Regional Safeguards Advisor:	Name: Surhid P. Gautam (RSA)	Date: 05-Aug-2014
Practice Manager/ Manager:	Name: Iain G. Shuker (PMGR)	Date: 18-Aug-2014