



Keco

VALIDATION REPORT

VALIDATION OF Fuqing MSW Incineration Project

REPORT NO. 11-03

REVISION NO. 3



KOREA ENVIRONMENT CORPORATION

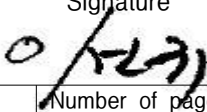


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Date of first issue: 25-05-2012	Project No: KC11-03
APPROVED BY: Lee Seon-woo GHG Certification Center manager	Organizational unit: Korea Environment Corporation (Keco)
Client: C&G Environmental Protection(Fuqing) Co., Ltd.	Client ref: Qiu Kai, Jussi Nykänen

Summary:

- ▶ **A project title:** Fuqing MSW Incineration Project
- ▶ **Host Country:** People's Republic of China
- ▶ **Investor Country:** Finland
- ▶ **A brief description of the validation project:** This project has been developed by C&G Environmental Protection(Fuqing) Co., Ltd. The objective of the project is to reduce Greenhouse Gases by incineration of municipal solid waste(MSW) in Fuqing city instead of landfill while generating electricity during the course of the incineration, which displaces electricity generated from the East China Power Grid.
- ▶ **Scale:** Large
- ▶ **Methodology:** AM0025(ver 12), 'Avoided emissions from organic waste through alternative waste treatment processes'
- ▶ **Emission Reduction Estimate:** Total estimated reduction is 1,127,283tCO₂e(for the crediting period ten (10) years), and the annual average estimated reduction is 112,728tCO₂e over the crediting period.
- ▶ **Scope of validation:** This is a final validation report prepared on the basis of the UNFCCC criteria. Validation has been concurrently prepared by a desk review based on the project design document(PDD) provided by the project participants and cross-check with an on-site visit, interviews with stakeholder and relevant personnel.
- ▶ **The applicability of the methodology and criteria used for validation:** Methodology AM0025 is applicable to the proposed project as it satisfies the conditions mentioned in the methodology.
- ▶ **Any restrictions or uncertainties related to the validation:** None
- ▶ **Main conclusions and corrective action requests:** Based on the desk review and feedback from the project participants, three (3) Corrective Action Requests and twenty-six (26) Clarification Requests were raised by Keco and those requests have been corrected by the project participants.
- ▶ **Summary of the validation status and opinion:**
 - ☐ Corrective Action Requested
 - ☐ Clarification requested
 - ☒ Full approval and submission for registration
 - ☐ Rejected

Work carried out by: Ryu Nam-yong (Team leader) Park Beom-woong (Team member) Kwak Yeong-don (Team member)			Service area: Validation	
Work carried out by: Lee Seon-gyoo Independent technical reviewer		Signature 	Sectoral scope of CDM project activity 1- Energy industries 13- Waste handling and disposal	
Date of this revision: 19-09-2012	Rev. No: 3	Number of pages: 105	<input checked="" type="checkbox"/> No distribution without permission from the Client or responsible organizational unit	



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Abbreviations

AM	Approved Methodology
BM	Build Margin
CAR	Corrective Action Request
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CL	Clarification Request
CM	Combined Margin
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
ECPG	East China Power Grid
EF	Emission Factor
EIA	Environmental Impact Assessment
FAR	Forward Action Request
FSR	Feasibility Study Report
GHG	Greenhouse Gas(es)
GWP	Global Warming Potential
IRR	Internal Rate of Return
Keco	Korea Environment Corporation
LoA	Letter of Approval
MP	Monitoring Plan
NGO	Non Governmental Organization
ODA	Official Development Assistance
OM	Operating Margin
PDD	Project Design Document
PP	Project Participant
VVM	Validation and Verification Manual
UNFCCC	United Nations Framework Convention on Climate Change



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Appendix A: Validation Protocol



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1. INTRODUCTION

Keco has been commissioned as a DOE to validate a CDM project, Fuqing MSW Incineration Project(hereinafter referred to as 'the project'), by C&G Environmental Protection(Fuqing) Co., Ltd.. This report summarizes the findings of the validation of the project to prove that the project meets all the relevant requirements based on the UNFCCC criteria.

1.1. Objective

The purpose of the validation is to ensure a thorough and independent assessment of proposed project activities submitted for registration as a proposed CDM project activity against the applicable CDM. The validation has been performed to confirm general description, baseline selection, additionality, calculation of emission reductions, monitoring plan, crediting period, environmental impacts and stakeholder's comments on a basis of the Kyoto Protocol, CDM rules, modalities, related decisions by the COP/MOP, CDM Executive Board, and host country criteria. This report includes a result of its assessment.

1.2. Scope

The scope of the validation is an independent and objective review on the project design document(PDD) and other relevant documents. The PDD has been reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AM0025(ver 12). Keco has employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs. The validation is not meant to provide any consulting towards the clients. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3. Names and Roles of the Validation Team Members

This is a brief description of validation team members.

Position	Name	Technical Area Competence		Competence Demonstration	Roles			
		1.2	13.1		Desk review	On-site visit/ Interview	Reporting	Technical review
Team leader	Ryu Nam-yong		✓	✓	✓	✓	✓	✓
Team Member	Park Beom-woong	✓	✓	✓	✓	✓	✓	✓
Team Member	Kwak Yeong-don	✓	✓	✓	✓	✓	✓	✓

2. METHODOLOGY

Standard auditing techniques(following CDM Validation and Verification Manual, version01.2) have



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been applied to assess the correctness of the information provided by the project participants. The validation consisted of the following three phases.

- (a) Document review
 - (i) Review of data and information
 - (ii) Cross-checks between information provided in the PDD and information from sources other than that used
- (b) Follow-up actions (i.e. on-site visit, telephone, email interviews)
 - (i) Interview with relevant stakeholders in the host country
 - (ii) Cross-checks of information provided by interviewed personnel
- (c) Resolution of outstanding issues and the issuance of the final validation report and opinion

The validation serves the following purposes.

- (a) It organizes, details and clarifies the requirements the project is expected to meet
- (b) It documents both how a particular requirement has been validated and the result of the validation.

The validation protocol consists of a couple of tables. The different columns in these tables are described at Figure1.

The findings established during the validation can either be seen as a non-fulfillment of validation protocol criteria or where a risk to the fulfillment of project objectives is identified. Corrective Action Requests(CARs) are issued, where:

- (a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reduction;
- (b) The CDM requirements have not been met;
- (c) There is a risk that emission reductions cannot be monitored or calculated.

Clarification requests(CLS) have been raised where information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

Validation Protocol Table 1: Mandatory Requirements			
Requirement	Reference	Conclusion	Cross reference/Comment
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	This is either acceptable based on evidence provided (OK), or a Corrective Action request (CAR) of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Validation report.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.



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Validation Protocol Table 2: Requirement checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
The various requirements in Table 1 are linked to check-list questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the check-list question or item is found.	Explains how conformance with the check-list question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.	The section is used to elaborate and discuss the check-list question and/or the conformance to the question. It is further used to explain the conclusions reached.	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) due to non-compliance with the check-list question (See below). Clarification (CI) is used when the validation team has identified a need for further clarification.

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests				
Draft report clarifications and corrective action requests by Validation team	Ref. to checklist question in table 2	Summary of project participants responses	Review by DOE	Conclusion
If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.	Corrective Action or a Clarification #1 It should address the corrective action or a clarification from project participants	DOE review comment #1 This section should summarise the way of review (based on relevant document, statistical data, sectoral experience) by DOE about responses of project participants. In case of non-closure additional corrective action or clarification and DOE review comment should be added such as #2 or #3.	This section should summarise the validation team's conclusion.

Figure1. Validation protocol tables (See also Appendix A to this report)

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2.1. Documents Review

The Project Design Document(PDD) has been submitted by the project participants(PPs) and additional documents were reviewed. Followings are the documentation reviewed during the validation.

Documents provided by the PPs directly related to the project:

- 〈1〉 PDD [ver 01], Fuqing MSW Incineration Project dated 08/07/2011
- 〈2〉 PDD [ver 02], dated 20/04/2012
- 〈3〉 PDD [ver 03], dated 22/05/2012
- 〈4〉 PDD [ver 03.1], dated 24/05/2012
- 〈4a〉 PDD [ver 04], dated 06/09/2012
- 〈5〉 Pollution control standard of MSW incineration(GB18485-2001) dated 11/05/2010,
http://lhsr.sh.gov.cn/view_0.aspx?cid=50&id=2886
- 〈6〉 A certificate of business registration of C&G Environmental Protection(Fuqing) Co., Ltd. dated 28/11/2011
- 〈7〉 FSR designed by China City Construction Research Institute dated 11/2008
- 〈8〉 Approval letter of FSR by Fujian Provincial Development and Reform Commission dated 25/07/2009
- 〈9〉 EIA by Guizhousheng Environmental Protection Science Research & Design Institute dated 10/2008
- 〈10〉 Approval letter of EIA by Fujian Provincial Environmental Protection Bureau dated 16/06/2009
- 〈11〉 Board meeting minute dated 20/08/2009
- 〈12〉 CDM consultancy agreement between project owner and a consulting firm dated 16/10/2009
- 〈13〉 Engineering, procurement and construction contract between the project owner and New Sky Engineering Co., Ltd. dated 03/07/2010
- 〈14〉 BOT agreement between Fuqing City Management Bureau and C&G Environment Protection (Fuqing) Co., Ltd. dated 22/05/2009
- 〈15〉 Inform letter to Chinese NDRC for consideration of CDM dated 20/11/2010
- 〈16〉 Sampling and physical analysis methods for municipal domestic waste(CJ/T313-2009),
<http://www.docin.com/p-52869724.html>
- 〈17〉 Pictures, comments in questionnaire, minute of stakeholder meeting dated 21/02/2010
- 〈18〉 Construction contracts dated 15/07/2010
- 〈19〉 ERPA between project owner and CERs buyer dated 18/02/2011
- 〈20〉 Written letter of approval from DNA of People's Republic of China dated 06/12/2011
- 〈21〉 The project was approved by China DNA, <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2755.pdf>
- 〈22〉 Technical specification of incinerator/boiler from New Sky China engineering Co. Ltd. dated 15/07/2010



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- 〈23〉 Technical specification of turbine/generator from New Sky China engineering Co. Ltd. dated 25/07/2010
- 〈24〉 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2: Waste generation, Composition and Management data, Table 2A.1, Annex 2A.1,
http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_2_Ch2_Waste_Data.pdf
- 〈25〉 Distributing and utilization of geothermal generation resource,
<http://news.bjx.com.cn/html/20120313/347598-2.shtml>
- 〈26〉 Monitoring plan of the project dated January 2012
- 〈27〉 The Current Situation, Problems and Countermeasures of Water Recourses in Fuqing City, Hydraulic Science and Technology dated 1999
- 〈28〉 Methods and parameters for economical appraisal for construction project[third edition] issued by NDRC dated 03/07/2006
- 〈29〉 Notification on the adjustment of on-grid tariffs for the ECPG issued by China NDRC dated 28/06/2006
- 〈30〉 Regulation on renewable power pricing and cost sharing issued by China NDRC dated 04/01/2006
- 〈31〉 Loan contract between C&G Environment Protection(Fuqing) Co., Ltd. and China Bank(Fuqing branch) dated 15/12/2009
- 〈32〉 Technical Guidance for MSW treatment in China, Jian Cheng[2010]61, released by Ministry of housing and urban-rural development, dated 22/04/2010
- 〈33〉 Technical code for municipal solid waste sanitary landfill, decree CJJ17-2004, released by Ministry of Construction of People's Republic of China dated 19/02/2004
- 〈34〉 Report for chinese MSW treatment and fees charging status released by China NDRC dated 26/02/2007
- 〈35〉 Notice on Strictly Prohibiting the Violative Installation of Thermal Power Generation Units with the Capacity of 135 MW or Below issued by the General Office of the State Council, No.[2002]6 dated 15/04/2002
- 〈36〉 Fujian Provincial Bureau of statistics in 2006, 2007, 2008, 2009
- 〈37〉 China Statistical Year Book 2006, 2007, 2008, 2009, Reference for annual salary and Price index published by National Bureau of statistics of China, <http://www.stats.gov.cn/english/>
- 〈38〉 2010 Baseline Emission Factors for Regional Power Grids in China by China NDRC dated 02/07/2009, <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2552.pdf>
- 〈39〉 Normal range of internal consumption rate for MSW incineration projects,
<http://www.xnyfd.com/jsfw/html/?29736.html>
- 〈40〉 Value added tax, Provisional Regulations of the People's Republic of China, No.[1993]134, issued by National Financial Ministry and National Revenue Ministry, dated 13/12/1993
- 〈41〉 City maintenance & construction tax, Construction and maintenance tax Provisional Regulations of the People's Republic of China, No.[1985]19, issued by National Financial Ministry and National Revenue Ministry, dated 08/02/1985



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- 〈42〉 Educational tax, Decision on amending Provisional Regulations of collecting educational tax, No. [2005]448, issued by National Financial Ministry and National Revenue Ministry, dated 20/08/2005
- 〈43〉 Law of People's Republic of China on income tax order of President No.[2007]63 dated 16/03/2007
- 〈44〉 IRR calculation sheet dated 22/05/2012
- 〈45〉 ER calculation sheet dated 22/05/2012
- 〈46〉 Environment Impact Assessment Classification Management Directory of Construction Project dated 02/09/2008 effective as of 01/10/2008(Environment Protection Ministry of People's Republic of China Order No2.)
- 〈47〉 Solar PV resources in China issued by International New energy web <http://www.in-en.com/newenergy/html/newenergy-1648164866133543.html>
- 〈48〉 Geothermal power generation issued by International New energy web <http://www.in-en.com/newenergy/html/newenergy-1648164866133543.html>, <http://news.bjx.com.cn/html/20120313/347598-2.shtml>
- 〈49〉 Wind resource in Fujian Province, <http://www.chinaste.net/info/detail/16-15923.html>
- 〈50〉 Notice on adjusting the equity ratio of fixed assets investment projects by the State Council' Decree No.27[2009], dated 25/05/2009
- 〈51〉 Table for benchmark loan rate adjustment of financial institutions released by Monetary Policy Department of the People's Bank of China, dated 06/04/2011
- 〈52〉 Pollution control standard for MSW landfill(GB16889-2008) http://www.gov.cn/zxft/ft108/content_957156.htm
- 〈53〉 'Actual O&M cost' of the project from January to March 2012
- 〈54〉 Xiamen Eastern incineration project
- 〈55〉 MSW construction plan issued by People's Government of Fujian Province dated 15/12/2008
- 〈56〉 Fujian Hongmiaoling MSW incineration project
- 〈57〉 Fujian Shishi MSW incineration project
- 〈58〉 Putian waste incineration project
- 〈59〉 Environmental Sanitation Engineering, Vol.18, No.5, October 2010
- 〈60〉 Written letter of approval from DNA of Finland dated 06/06/2012
- 〈61〉 Notice on Value Added Tax on comprehensive utilization of resource and other product, issued by State Administration of Taxation, dated 09/12/2008
- 〈62〉 Regulation on the BOT investment in the utilities sector released by Ministry of Construction dated 05/2004
- 〈63〉 Study on method of estimating power generation during operation for a BOT project of refuse-incineration power generation dated April, 2008



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- 〈64〉 Current situation and estimation of incineration technology in China by Environmental Sanitation Engineering Technology Research Center of National Ministry of Construction dated 20/12/2007
- 〈65〉 Current situation and strategy of MSW treatment in China
- 〈66〉 Analysis of Components and Treatment Methods of Domestic Waste in China, published on Chinese professional journal – Environment Sanitation Engineering
- 〈67〉 Technical Guidance for Municipal Solid Waste Treatment, Jiancheng [2010] No.61 issued by National ministry of housing and urban–rural development, National Development Reform Committee, National Environmental Protection Bureau dated 22/04/2010
- 〈68〉 China Statistical Yearbook 2010
- 〈69〉 Research on China Water Environment Capacity, published in Chinese professional journal China Environmental Science
- 〈70〉 Notice on the electricity tariff of ECPG
- 〈71〉 Waste disposal cost in Shanghai and Ningbo,
http://www.sznews.com/zhuanti/content/2006-04/20/content_99772.htm
- 〈72〉 Waste disposal cost in Guangzhou,
<http://www.21cbh.com/HTML/2010-4-21/yNMDAwMDE3MzcyNQ.html>
- 〈73〉 Construction Standard for Municipal Solid Waste Treatment Project(Jianbiao No.[2001]203) issued by Ministry of Construction and State Development Planning Commission on 23/10/2001
- 〈74〉 Investment Intension Agreement signed between Fuqing City Management Bureau and the project developer dated 20/06/2008
- 〈75〉 Disposal charge of Fuqing city in July, August 2012 issued by Fuqing City Management Bureau

Background documents related to the design and/or methodologies employed in the design or other reference documents:

- (1) Clean Development Mechanism PDD Form, 28/07/2006, version 03
- (2) EB55 Annex4, AM0025, Avoided emissions from organic waste through alternative waste treatment processes, Version 12
- (3) EB65 Annex21, Tool for the demonstration and assessment of additionality version 06.0.0
- (4) EB63 Annex19, Tool to calculate the emission factor for an electricity system, version 02.2.1
- (5) EB61 Annex10 Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site version 05.1.0
- (6) EB62 Annex13, Guidelines on the demonstration and assessment of prior consideration of the CDM, version 04
- (7) EB62 Annex5, Guidelines on the assessment of investment analysis, version 05



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- (8) EB55 Annex1, Clean Development Mechanism Validation and Verification Manual, version 01.2
- (9) EB48, Annex 11, Guidelines for the reporting and validation of plant load factors, version 01

2.2. Follow-up Actions

Keco conducted an on-site visit on 30/08/2011–31/08/2011 and had interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarized in Table 1 below.

Interviewed organization	Interview topics
<ul style="list-style-type: none"> ➤C&G Environmental Protection(Fuqing) Co., Ltd. <ul style="list-style-type: none"> • Mr. Wang Jun hu, Manager of production department • Mr. Yue Zhilong, Finance Center specialist ➤GreenStream network Plc <ul style="list-style-type: none"> • Ms. Ou Meiyu, Senior technician 	<ul style="list-style-type: none"> ✓General aspects of the project ✓Involved personnel and responsibilities ✓Contribution to sustainable development ✓License, operation & maintenance authority and responsibility ✓Monitoring Plan
<ul style="list-style-type: none"> ➤Hangzhou Carbon Trade Environment Engineering Co., Ltd. <ul style="list-style-type: none"> • Ms. Lin Yan, Consultant • Ms. Rao Xiaoguang, Consultant ➤Local Authority <ul style="list-style-type: none"> • Mr. Xue Xing'ai, manager of local environment protection bureau • Mr. Chen Jianquan, local DRC officer 	<ul style="list-style-type: none"> ✓Legal aspects of the project ✓Project boundary ✓Technical details of the project realization ✓Involved personnel and responsibilities ✓Monitoring and measurement equipment ✓Contribution to sustainable development ✓Additionality ✓Baseline methodology ✓Calculation on GHG emission ✓License, operation & maintenance authority and responsibility ✓QA/QC procedure ✓Project management system ✓Duration of the project/Crediting period ✓Environmental impacts ✓Comments by local stakeholder, process ✓Approval by the host country
<ul style="list-style-type: none"> ➤Local Stakeholder <ul style="list-style-type: none"> • Mr. Xue Xing'ai, manager of local environment protection bureau • Mr. Chen Jianquan, local DRC officer • Mr. Lin Yubao, farmer • Mr. Lin Houliang, farmer 	<ul style="list-style-type: none"> ✓Stakeholder comments ✓Social and environmental impact of the project ✓Case of complaint because of the project ✓Profession

Table 1. Interview topics



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2.3. Resolution of Clarification and Corrective Action Requests

The objective of this phase was to resolve the requests for corrective actions, clarifications, forward actions and any other outstanding issues, which need to be clarified for Keco's positive conclusions on the project design. Three (3) Corrective Action Requests(CARs) and twenty-six (26) Clarification Requests(Cls) were identified in the initial validation. In order to guarantee the transparency of the validation process, the raised concerns and given responses are documented in the validation protocol in Appendix A. However, all of the CARs and CLs have been corrected completely through the validation process. Since modifications to the project design documents were necessary to resolve Keco's concerns, the PPs resubmitted the revised project design documentation on 06/09/2012 <4a>. After reviewing the resubmitted project documentation, Keco has issued this final validation report and opinion.

2.4. Internal Quality control

The final validation report was published after a review by an qualified independent technical reviewer as per the Keco's qualification management system.

3. FINDINGS

The validation function by Keco and the results are described as below in accordance with the VVM reporting requirements.

3.1. Approval

The project participants are C&G Environmental Protection (Fuqing) Co., Ltd, Fine Carbon Fund Ky, Nordic Carbon Fund Ky, GreenStream Network Plc and Fine Post-2012 Carbon Fund Ky. The host Party, China, and Annex I Party, Finland, meet the requirements of participation of the CDM. The DNA of China issued the Letter of Approval(LoA) on 06/12/2011 (<20> in the 2.1 Documents review). From the letter, Keco confirms that:

- (a) China is a Party to the Kyoto Protocol;
- (b) Participation is voluntary;
- (c) The proposed CDM project activity contributes to the sustainable development of the host Party;
- (d) it refers to the precise proposed CDM project title in the PDD.

Since it was provided by the PPs, Keco checked the China DNA web site <21> to confirm its authenticity. LoA <60> from the Ministry for Foreign Affairs of Finland was also issued on 06/06/2012. This has been also cross-checked through an interview with a person in charge from the Finnish DNA.

3.2. Participation

Keco confirms that all project participants are listed in a tabular form in section A.3 of the PDD and that information is consistent with the contact details provided in annex 1 of the PDD. The participants, China and Finland, have been approved by each corresponding Party and it has been confirmed by the LoAs.



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3.3. Project design document

The PDD is in compliance with relevant form and guidance as currently provided by UNFCCC (http://cdm.unfccc.int/Reference/PDDs_Forms/PDDs/PDD_form04_v03_2.pdf). The latest version of the PDD template has been used. This section has been handled in the checklist in Appendix A of this report.

3.4. Project description

The project activity involves incineration of municipal solid waste(MSW) in newly constructed incinerators that are implemented under a build-operate-transfer(BOT) scheme (14) and combustion heat is used for power generation with two-stage mechanical grate type incinerators. Combustion temperature for MSW disposal in the incinerator will be maintained at least 850°C. The project installs three units of grate type incinerators with each disposal capacity of 300t/d so the total average daily MSW becomes 900t per day and two sets of condensing turbine generators with the capacity of 12MW and 6MW respectively. Diesel oil will be used as a supplementary fuel during the incineration process(e.g. start-up and/or in case of low temperature[below 850°C] of incinerators). Steam generated by the incineration process will be used for electricity generation. Once the project activity reaches at its full capacity, it is expected that with an annual operation time of 8,000h, approximately 87,703MWh of net electricity will be exported to the East China Power Grid(ECPG) in each year and 300,000 tons of annual amount of MSW will be disposed through incineration. At present, 600t/d(=300t/d×2) incinerators with a 12MW condensing turbine generator are installed and in test operation since January 2012. The rest incinerator with capacity of 300t/d and a 6MW turbine generator will be equipped by 2013. The project employs the anaerobic digestion of leachate from the waste bunker, and solidification of fly ash from the incinerator. All biogas generated from the anaerobic digester is released to the atmosphere. Fly ash is solidified and then is disposed of at the landfill site. The flue gas from boilers is treated by cleaning systems with rapid cooling, semi-dry neutralization, active carbon absorption and bag filters in a semi-dry process.

Prior to the implementation of the project activity, the MSW generated in Fuqing city had been all transported to the Yibadi landfill where there is no landfill gas capturing system and the landfill gases are directly emitted to the atmosphere. The baseline emissions consist of the sum of the baseline emissions of methane produced at the landfill in the absence of the project activity and the baseline emissions from generation of electricity displaced by the project activity, in accordance with AM0025(ver 12).

Through an on-site visit(30/08/2011–31/08/2011) Keco confirms the followings.

- ✓The project is sited at Fuqing city of Fujian Province, People's Republic of China. The coordinates are latitude 25°40'42" and longitude 119°22'03";
- ✓The objective of the project is to reduce methane from the landfill by installing incinerators while generating electric power utilizing heat from the incinerators for power export to the ECPG;
- ✓The power generated from the project activity replaces electricity which would be generated from the ECPG in the absence of the project activity; and
- ✓The project activity involves the installation of three units of two-stage mechanical grate type



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incinerators with each disposal capacity of 300t/d. Two incinerators are installed at the site equipped with a condensing turbine generator with the capacity of 12MW.

After deduction of the internal power consumption rate by the project(22%) and a transmission loss(1%), the rest of the electricity generated is to be exported to the ECPG. The annual net electricity is expected to be 87,703MWh over a 10-year crediting period. The project will contribute to sustainable development by disposing of MSW of Fuqing city which can cause methane emission at the landfill site and creating employment opportunities for local residents. The accuracy and completeness of the project description is secured by the on-site visit including stakeholder interview and cross-check with other sources(see 2.1 Documents review). In conclusion, Keco confirms that the project description, as included to the PDD, is sufficiently accurate and complete in order to comply with the requirements of the CDM.

3.5. Baseline and monitoring methodology

3.5.1 Applicability of the selected methodology to the project activity

The project applies methodology, AM0025, 'Avoided emissions from organic waste through alternative waste treatment processes(ver 12)'. Through the on-site visit, an interview with the PPs and the documents provided, Keco confirms that the information in the PDD complies with the criteria of the methodology AM0025. Table 2 below is to assess the applicability of the methodology.

Condition	Applicability check		
	Criteria discussed in the PDD	Compliance provable	Compliance verified
1 The project activity involves one or a combination of the following waste treatment options for the fresh waste that in a given year would have otherwise been disposed of in a landfill: (e) Incineration of fresh waste for energy generation, electricity and/or heat. The thermal energy generated is either consumed on-site and/or exported to a nearby facility. Electricity generated is either consumed on-site, exported to the grid or exported to a nearby facility. The incinerator is rotating fluidized bed or circulating fluidized bed or hearth or grate type.	Yes	Yes	Yes
2 In case of anaerobic digestion, gasification or RDF processing of waste, the residual waste from these processes is aerobically composted and/or delivered to a landfill.	N/A	N/A	N/A
3 In case of composting, the produced compost is either used as soil conditioner or disposed of in landfills.	N/A	N/A	N/A



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Condition	Applicability check		
	Criteria discussed in the PDD	Compliance provable	Compliance verified
4 In case of RDF/stabilized biomass processing, the produced RDF/stabilized biomass should not be stored in a manner that may result in anaerobic conditions before its use	N/A	N/A	N/A
	§ The project activity does not involve RDF/stabilized biomass processing.		
5 If RDF/SB is disposed of in a landfill, project proponent shall provide degradability analysis on an annual basis to demonstrate that the methane generation, in the life-cycle of the SB is below 1% of related emissions. It has to be demonstrated regularly that the characteristics of the produced RDF/SB should not allow for re-absorption of moisture of more than 3%. Otherwise, monitoring the fate of the produced RDF/SB is necessary to ensure that it is not subject to anaerobic conditions in its lifecycle.	N/A	N/A	N/A
	§ The project activity does not involve RDF/stabilized biomass disposal.		
6 In the case of incineration of the waste, the waste should not be stored longer than 10 days. The waste should not be stored in conditions that would lead to anaerobic decomposition and, hence, generation of CH ₄ .	Yes	Yes	Yes
	§ According to the FSR, the volume of the waste bunker(11,340m ³) can store a maximum of no longer than 5 days. Further, Keco confirms that the crane conveys and mix the MSW to prevent anaerobic decomposition through the on-site visit.		
7 The proportions and characteristics of different types of organic waste processed in the project activity can be determined, in order to apply a multiphase landfill gas generation model to estimate the quantity of landfill gas that would have been generated in the absence of the project activity.	Yes	Yes	Yes
	§ According to the FSR, on the amount, physical composition and character of the MSW in Fuqing city, proportions and characteristics of the waste have been characterized. Also, the proportions and characteristics of different types of organic waste processed in the project activity will be involved in future monitoring.		
8 The project activity may include electricity generation and/or thermal energy generation from the incineration process, respectively, from the waste incinerator. The electricity can be exported to the grid and/or used	Yes	Yes	Yes
	§ The project activity includes electricity generation from waste incineration. The electricity is partly		



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Condition	Applicability check		
	Criteria discussed in the PDD	Compliance provable	Compliance verified
	internally at the project site.	used internally at the project site and mainly exported to the ECPG. This has been confirmed during the on-site visit.	
9	Waste handling in the baseline scenario shows a continuation of current practice of disposing the waste in a landfill despite environmental regulation that mandates the treatment of the waste, if any, using any of the project activity treatment options mentioned above.	Yes	Yes
		§ It was confirmed with a local authority during the on-site visit that landfill was the only way to get rid of MSW before the construction of the incinerator in Fuqing city.	
10	The compliance rate of the environmental regulations during (part of) the crediting period is below 50%; if monitored compliance with the MSW rules exceeds 50%, the project activity shall receive no further credit, since the assumption that the policy is not enforced is no longer tenable.	Yes	Yes
		§ It was confirmed with a local authority during the on-site visit that no regulations exist in the host country with regard to waste treatment or the capture and destruction of LFG. The compliance rate will be monitored as per the monitoring plan.	
11	Local regulations do not constrain the establishment of RDF production plants/thermal treatment plants nor the use of RDF/stabilized biomass as fuel or raw material.	N/A	N/A
		§ The project activity does not involve RDF/thermal treatment plants /stabilized biomass processing.	
12	In case of RDF/stabilized biomass production, project proponent shall provide evidences that no GHG emissions occur, other than biogenic CO ₂ , due to chemical reactions during the thermal treatment process (such as Chimney Gas Analysis report)	N/A	N/A
		§ The project activity does not involve RDF/stabilized biomass processing.	
13	The project activity does not involve thermal treatment process of neither industrial nor hospital waste.	Yes	Yes
		§ Keco checked the FSR and performed an interview with a local authority during the on-site visit to confirm that the project only treats MSW and does not involve treatment of industrial or hospital waste	
14	In case of waste incineration, if auxiliary fossil fuel is	Yes	Yes



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Condition		Applicability check		
		Criteria discussed in the PDD	Compliance provable	Compliance verified
	added into the incinerator, the fraction of energy generated by auxiliary fossil fuel is no more than 50% of the total energy generated in the incinerator.	§ No fossil fuel will be added into the incinerator on a regular basis (co-firing), but auxiliary fossil fuel will only be used in emergency cases(e.g. start-up and/or in case of low temperature[below 850°C] of incinerators)		
15	This methodology is not applicable to project activities that involve capture and flaring of methane from existing waste in the landfill.	Yes	Yes	Yes
		§ By checking the FSR and through an interview with the project owner, Keco can confirm the project activity does not involve capture and flaring of methane from existing waste in the landfill.		

Table 2. Applicability of the methodology.

Keco confirms that the selected baseline and monitoring methodology is applicable to the project activity. Emission reductions that are expected to contribute more than 1% of the overall expected average annual emission reductions, which are not addressed by the applied methodology have not been identified.

3.5.2 Project boundary

The project boundary was assessed based on documented evidence, the on-site visit and interviews. Keco confirms that the identified boundary, the selected sources, and gases as documented in the PDD are justified for the project activity, hence all sources and GHGs required by the methodology have been included within the project boundary. The spatial extent of the project boundary includes the facilities for processing the waste, on-site electricity generation and/or consumption, on-site fuel use, the wastewater treatment plant, the landfill site and all power plants connected to the ECPG, which is in accordance with the methodology AM0025. There are three kinds of GHGs involved in the project activity; CH₄ emitted from the digester for wastewater treatment and from waste incineration, CO₂ from incineration of MSW and diesel oil used as auxiliary fuel and from on-site electricity use, and N₂O from waste incineration.

The selected sources and gases within the project boundaries are justified as follows.

	Sources	GHGs
Baseline emissions	Emissions from decomposition of waste at the landfill site	CH ₄
	Emissions from electricity consumption	CO ₂



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	Sources	GHGs
Project emissions	On-site fossil fuel consumption due to the project activity other than for electricity generation	CO ₂
	Emissions from on-site electricity use	CO ₂
	Direct emissions from the waste treatment processes	N ₂ O, CO ₂ , CH ₄ ,
	Emissions from waste water treatment	CH ₄

Table 3. Summary of emission sources and gases included in the project boundary

3.5.3 Baseline identification

In accordance with the methodology AM0025, the baseline was determined through following four steps:

Step 1: Identification of alternative scenarios

Step 2: Identify the fuel for the baseline choice of energy source taking into account the national and/or sectoral policies as applicable

Step 3: Step 2 and/or Step 3 of the latest approved version of the 'Tool for demonstration and assessment of additionality' shall be used to assess which of these alternatives should be excluded from further consideration (e.g. alternatives facing prohibitive barriers or those clearly economically unattractive).

Step 4: Where more than one credible and plausible alternative remains, project participants shall, as a conservative assumption, use the alternative baseline scenario that results in the lowest baseline emissions as the most likely baseline scenario. The least emission alternative will be identified for each component of the baseline scenario. In assessing these scenarios, any regulatory or contractual requirements should be taken into consideration.

〈STEP 1〉: Since the proposed project activity does not involve heat generation, only alternatives for the disposal/treatment of the fresh waste in the absence of the project activity and power generation will be addressed.

For the disposal/treatment of the fresh waste:

M1: The project activity (i.e. composting, gasification, anaerobic digestion, RDF processing/thermal treatment without incineration of organic waste or incineration of waste) not implemented as a CDM project;

M2: Disposal of the waste at a landfill where landfill gas captured is flared;

M3: Disposal of the waste on a landfill without the capture of landfill gas.

In the PDD:

✓**M1** is correctly included as MSW incineration is in compliance with all applicable legal and regulatory requirements.

✓**M2** is correctly excluded. According to 'Technical code for municipal solid waste sanitary landfill(CJJ17-2004)' 〈33〉, M2 is not mandatorily enforced and according to 'Report for chinese



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MSW treatment and fees charging status' <34> there were less than 3% landfill sites having landfill gas recovery and utilization system(including flare) due to the investment and technical barriers in China. During the on-site visit and interview with a local authority, it is confirmed that there is no such regulation in Fuqing City, either. Therefore, it is validated that M2 is not a realistic alternative.

✓**M3** is correctly included as M3 represents current situation(disposal of MSW at a local landfill site without landfill gas capture system, utilization).

Hence, only M1 and M3 are considered as realistic alternatives in this step.

For power generation:

P1: Power generated from by-product of one of the options of waste treatment as listed in M1 above, not undertaken as a CDM project activity;

P2: Existing or Construction of a new on-site or off-site fossil fuel fired cogeneration plant;

P3: Existing or Construction of a new on-site or off-site renewable based cogeneration plant;

P4: Existing or Construction of a new on-site or off-site fossil fuel fired captive power plant;

P5: Existing or Construction of a new on-site or off-site renewable based captive power plant;

P6: Existing and/or new grid-connected power plants.

In the PDD:

✓**P1** is correctly included as power generated from incineration is in compliance with all applicable legal and regulatory requirements.

✓**P2, P3** are correctly excluded since the project does not include heat generation. P2 and P3 do not generate the same output as the project activity.

✓**P4** is correctly excluded since creation of captive power generation capacity is impossible because construction of thermal power plants with the installed capacity of 24MW is prohibited by 'Notice on Strictly Prohibiting the Violative Installation of Thermal Power Generation Units with the Capacity of 135 MW or Below' <35>.

✓**P5** is correctly excluded as it is found that a couple of reasons such as lack of fund/specialist, technical constraint make solar PV and geothermal power generation not suitable <47>, <48>. According to 'Wind resource in Fujian Province' <49> mentioning the main feature of the wind resource is unequally distributed in Fujian Province in particular, the resource is centralized in islands and peninsular areas of Fujian Province, it can be confirmed that wind resource is not suitable for the project that is located in the inland. Further, the electricity generated by the project is to be supplied to the incineration plant with stable power supply, while hydro resources can not guarantee stable power generation. Therefore, it is validated that P5 is not a realistic alternative.

✓**P6** is correctly included as it is most likely an existing or new grid-connected power plant(s) would supply electricity in the absence of the project.

Hence, only P1 and P6 are considered as realistic alternatives in this step.

According to above analysis, alternatives M1 and M3 for the disposal/treatment of the waste and alternatives P1 and P6 for power generation are left for further discussion.



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〈STEP 2〉: With regard to P1, MSW is used as a fuel for incineration and daily supply of MSW is secured by an agreement 〈14〉 between the project owner and the local authority. Therefore, there is no constraint of MSW supply. For P6, electricity will be provided by the power plants connected to the ECPG. Since the power plants in the ECPG use many types of fuel, it is confirmed that there is no constraint of fuel supply.

〈STEP 3〉: The latest version of 'Tool for the demonstration and assessment of additionality' are used to identify the most plausible baseline scenarios by eliminating non-feasible options. Based on the investment analysis, the project IRR, **4.91%**(post tax), of alternative M1(The project activity not implemented as a CDM project) and P1(Power generated from by-product of one of the options of waste treatment as listed in M1 above, not undertaken as a CDM project activity) is lower than benchmark, **8%**(post tax). Therefore, alternative M1 and P1 are excluded as unfeasible options. Keco has verified relevant evidence and confirmed that the investment analysis is appropriate. After step 3, only one alternative for the disposal/treatment of the waste and one alternative for power generation remain.

〈STEP 4〉: Since there is only one credible and plausible baseline scenario left, this step is not applicable.

Therefore, baseline scenario of the project is a combination of M3 and P6 that is not eliminated.

Scenario	Baseline options		Description
	Waste disposal	Power generation	
1	M3	P6	The disposal of the waste in a landfill site without capturing landfill gas. The electricity is obtained from a grid. No heat is involved.

Table 4. Baseline Scenario

From the analysis above, Keco confirms that the baseline determination is transparent and deemed reasonable.

- ✓All the assumptions and data used by the project participants are listed in the PDD;
- ✓All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD;
- ✓Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable;
- ✓Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD;
- ✓The approved baseline methodology has been correctly applied to identify the most reasonable baseline scenario and the identified baseline scenario reasonably represents what would occur in the absence of the proposed CDM project activity.



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3.5.4 Algorithm and/or formulae used to determine emission reductions

Keco conducted assessment of baseline emissions, project emissions, leakage, and emission reductions. The parameters and equations presented in the PDD, as well as other applicable documents, have been compared with the information and requirements stipulated in the methodology and respective tools. The assumptions and data used to determine the emission reductions are described in the PDD and all the sources have been checked and confirmed. Based on the information reviewed, it can be confirmed that the sources used are correctly quoted and interpreted in the PDD. The values in the PDD are considered reasonable based on the documentation and references reviewed, as well as, the result of the interviews. The baseline methodology has been correctly applied according to the requirements. The estimate of the baseline emissions can be confirmed as the same that have been replicated by Keco using the information provided.

1) Baseline Emissions

As per the methodology AM0025, baseline emissions(BE_y) of the project are calculated using below formula:

$$BE_y = (MB_y - MD_{reg,y}) + BE_{EN,y} \quad (1)$$

where:

BE_y = baseline emissions in year y (tCO_2e)

MB_y = methane produced in the landfill in the absence of the project activity in year y (t_4CO_2e)

$MD_{reg,y}$ = methane that would be destroyed in the absence of the project activity in year y (t_4CO_2e)

$BE_{EN,y}$ = baseline emissions from generation of energy displaced by the project activity in year y (tCO_2e)

➤ Adjustment Factor(AF)

$$MD_{reg,y} = MB_y \times AF \quad (2)$$

where:

AF : adjustment factor for MB_y (%)

The parameter AF shall be estimated as follows:

- In cases where a specific system for collection and destruction of methane is mandated by regulatory or contractual requirements, the ratio between the destruction efficiency of that system and the destruction efficiency of the system used in the project activity shall be used;
- In cases where a specific percentage of the generated amount of methane to be collected and destroyed is specified in the contract or mandated by the regulation, this percentage divided by an assumed efficiency for the collection and destruction system used in the project activity shall be used.

As there are neither contractual requirements for this project nor local and national mandatory regulations for the destruction of certain amount of methane from landfill, AF equals to zero (0). Further, It has been demonstrated in section B.4 of the PDD that the baseline scenario alternative to the project is the disposal of the waste in a landfill site without capturing landfill gas, therefore $MD_{reg,y}$ can be considered as zero.

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➤ Rate of compliance(RATE^{compliance_y})

In cases where there are regulations that mandate the use of one of the project activity treatment options and which is not being enforced, the baseline scenario is identified as a gradual improvement of waste management practices to the acceptable technical options expected over a period of time to comply with the MSW Management Rules. The adjusted baseline emissions (BE_{y,a}) are calculated as follows:

$$BE_{y,a} = BE_y \times (1 - RATE^{Compliance_y}) \quad (3)$$

where:

BE_y = CO₂ equivalent emissions

RATE^{Compliance_y} = state-level compliance rate of the MSW Management Rules in that year y. The compliance rate shall be lower than 50%; if it exceeds 50% the project activity shall receive no further credit

Given that there is no legal or regulation requirements that mandate using of incineration to treat MSW and landfill is prevailing waste treatment in China, Rate of compliance is zero (0). However, as per AM0025 the compliance ratio shall be monitored ex-post based on the official reports for instant annual reports provided by municipal bodies.

➤ Methane produced in the landfill in the absence of the project activity(MB_y)

As per AM0025, MB_y is calculated using 'Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site(ver 05.1.0)' as below.

$$MB_y = BE_{CH_4,SWDS,y} = \phi \cdot (1-f) \cdot GWP_{CH_4} \cdot (1-OX) \cdot \frac{16}{12} \cdot F \cdot DOC_f \cdot MCF \cdot \sum_{x=1}^y \sum_j W_{j,x} \cdot DOC_j \cdot e^{-kj(y-x)} \cdot (1-e^{-kj}) \quad (4)$$

where:

BE_{CH₄,SWDS,y} = methane emissions avoided during the year y from preventing waste disposal at the solid waste disposal site (SWDS) during the period from the start of the project activity to the end of the year y(tCO₂e)

The ex-ante parameters required by the tool are validated as below:

Parameter	Description	Value used	Source
φ	Model correction factor to account for model uncertainties	0.9 ⇒It is validated to be in compliance with the tool.	Tool ¹⁾
f	Fraction of methane captured at the SWDS and flared, combusted or used in another manner	0 ⇒It is validated to be in compliance with the condition of Yibadi landfill.	Tool
GWP _{CH₄}	Global Warming Potential (GWP) of methane, valid for the relevant commitment period	21 ⇒Default value 21 is applied for the first commitment period of the Kyoto Protocol. It is also	UNFCCC, Kyoto Protocol

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Parameter	Description	Value used			Source
		<i>validated to be in compliance with the tool.</i>			
OX	Oxidation factor	<u>0.1</u> <i>⇒It is validated to be in compliance with the condition of Yibadi landfill.</i>			IPCC 2006 ²⁾
F	Fraction of methane in the SWDS gas	<u>0.5</u> <i>⇒Default value 0.5 from IPCC is applied. It is also validated to be in compliance with the tool.</i>			IPCC 2006
DOC _f	Fraction of degradable organic carbon (DOC) that can decompose	<u>0.5</u> <i>⇒Default value 0.5 from IPCC is applied. It is also validated to be in compliance with the tool.</i>			IPCC 2006
MCF	Methane correction factor	<u>0.8</u> <i>⇒It is validated to be in compliance with the condition of Yibadi landfill.</i>			IPCC 2006
W _{i,x}	Amount of organic waste type j prevented from disposal in the SWDS in the year x (tons)	Category	Portion(%)	Amount(ton)	FSR
		Paper & cardboard	12.47	37,410	
		Textile	2.87	8,610	
		Food waste	59.95	179,850	
		Wood	0.81	2,430	
		Garden & park waste	–	–	
		Rubber	0.60	1,800	
		Plastic	5.40	16,200	
		Metal	0.16	480	
		Glass & pottery	1.91	5,730	
		Other	15.83	47,490	
		Total	100.00	300,000	
		<i>⇒It is validated to be in compliance with the FSR.</i>			
DOC _j	Fraction of degradable organic carbon (by weight) in the waste type j	Category		%	IPCC 2006
		Paper & cardboard		40	
		Textile		24	
		Food waste		15	
		Wood		43	
		Garden & park waste		20	

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Parameter	Description	Value used		Source
		Rubber	–	
		Plastic	–	
		Metal	–	
		Glass & pottery	–	
		Other	–	
		⇒ Since the project specific data or country specific data are not available, IPCC default values are used.		
K _j	Decay rate for the waste type j	Category	Rate	IPCC 2006 ✓MAT=20.6°C ✓MAP=1,451mm
		Paper & cardboard	0.07	
		Textile	0.07	
		Food waste	0.40	
		Wood	0.035	
		Garden & park waste	0.17	
		Rubber	–	
		Plastic	–	
		Metal	–	
		Glass & pottery	–	
		Other	–	
		⇒ According to climate information of the project site, IPCC default values are applied.		
y	Year for which methane emissions are calculated	$\frac{10}{1}$ ⇒ The crediting period of the project, ten years, is used.	–	

Table 5. Parameters for calculation of MB_y

Note:

- 1) Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site
- 2) IPCC 2006 Guidelines for National Greenhouse Gas Inventories

Among them, W_{j,x} is calculated as follows.

$$W_{j,x} = W_x \cdot \frac{\sum_{n=1}^z p_{n,j,x}}{z} \quad (5)$$

where:

W_x = total amount of organic waste prevented from disposal in year x(tons)

P_{n,j,x} = weight fraction of the waste type j in the sample n collected during the year x

z = number of samples collected during the year x

Keco checked the estimation calculation of MB_y in the ER calculation sheet <45>, and confirms the

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calculation is correct and in line with the requirement of the 'Tool to determine methane emissions avoided from disposing of waste at a solid waste disposal site(ver 05.1.0)'. Relevant parameters will be monitored as per the tool.

With regard to MCF(Methane correction factor), it was found that the value, 0.8, for the parameter was correctly selected as per 'Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site(ver 05.1.0)' through the on-site visit. The condition of Yibadi landfill corresponds to an unmanaged solid waste disposal site having depths of greater than 5 meters.

➤ Baseline emissions from generation of energy displaced by the project activity($BE_{EN,y}$)

It is confirmed by Keco that the project will produce only electricity which will be supplied to the ECPG, without thermal energy production. Therefore, $BE_{EN,y}$ is calculated as follows:

$$BE_{EN,y} = BE_{elec,y} = EG_{d,y} \times CEF_d \quad (6)$$

where:

$BE_{elec,y}$ = baseline emissions from electricity generated utilizing the combustion heat from incineration in the project activity and exported to the grid(tCO_2e)

$EG_{d,y}$ = amount of electricity generated utilizing the combustion heat from incineration in the project activity and exported to the grid during the year y(MWh)

CEF_d = carbon emissions factor for the displaced electricity source in the project scenario (tCO_2/MWh)

The ex-ante parameters in the formula required by the methodology are validated as below.

Parameter	Description	Value used	Source
$EG_{d,y}$	Amount of electricity generated utilizing the combustion heat from incineration in the project activity and exported to the grid during the year y(MWh)	<u>87,703</u> <i>⇒According to the designed low heat value, amount of MSW, thermal efficiency of waste heat utilization and internal consumption, the net annual electricity is calculated.</i>	FSR
CEF_d	Carbon emissions factor for the displaced electricity source in the project scenario (tCO_2/MWh)	<u>0.7691</u> <i>⇒It is validated to be in compliance with 'Tool to calculate the emission factor for an electricity system'.</i>	<u>⟨38⟩</u>

Table 6. Parameters for calculation of $BE_{EN,y}$

In the PDD, CEF_d is calculated as per 'Tool to calculate the emission factor for an electricity system(ver 02.2.1)'. The operating margin emission factor was determined based on the simple OM method. The ex-ante option was chosen for this calculation. The calculation of the build margin emission factor was based on modified methods agreed by the EB, because plant specific data are not available in China. The emission factor of the thermal power plants was calculated by the



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proportion of the emissions of coal, gas and oil times the emission factor of the best available coal, gas and oil power plant as defined and published by the Chinese DNA. The new thermal capacity installation that exceeded 20% in last years, for which data was available, was finally assessed with this factor.

The operating margin($EF_{grid,OM,y}$) of the ECPG is $0.8592tCO_2e/MWh$, and the build margin($EF_{grid,BM,y}$) of the ECPG is calculated as $0.6789tCO_2e/MWh$. The factors need to be reevaluated once it has been decided which values can be applied. The value for the combined margin emission factor($EF_{grid,CM,y}$) is determined with the weighted average of the $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ using the default values for the factors as described in the methodology.

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM}$$

As per the methodology the combined margin emission factor($EF_{grid,CM,y}$) is $0.7691tCO_2e/MWh$.

2) Project Emissions

Through the on-site visit, it was confirmed no composting($PE_{C,y}$), anaerobic digestion($PE_{a,y}$), gasification($PE_{g,y}$), combustion of RDF/SB($PE_{r,y}$) and/or co-firing($PE_{co-firing,y}$) will take place at the project site. Hence project emissions(PE_y) are calculated using below formula as per the methodology AM0025:

$$PE_y = PE_{elec,y} + PE_{fuel,on-site,y} + PE_{i,y} + PE_{w,y} \quad (7)$$

where:

PE_y = project emissions during the year y(tCO_2e)

$PE_{elec,y}$ = emissions from electricity consumption on-site due to the project activity in year y(tCO_2e)

$PE_{fuel,on-site,y}$ = emissions on-site due to fuel consumption on-site in year y(tCO_2e)

$PE_{i,y}$ = emissions from waste incineration in year y(tCO_2e)

$PE_{w,y}$ = emissions from wastewater treatment in year y(tCO_2e)

➤ Project emissions from electricity consumption($PE_{elec,y}$)

$$PE_{elec,y} = EG_{PJ,FF,y} \times CEF_{elec} \quad (8)$$

where:

$EG_{PJ,FF,y}$ = amount of electricity consumed from the grid as a result of the project activity, measured using an electricity meter(MWh)

CEF_{elec} = carbon emissions factor for electricity generation in the project activity(tCO_2/MWh)

Electricity consumed in the project will be generated by the project activity, hence $EG_{PJ,FF,y}$ is zero leading to $PE_{elec,y}$ zero as well. However, in case of stoppage, maintenance, and emergency of the project, electricity will be imported from the ECPG and in such case $EG_{PJ,FF,y}$ will be monitored ex-post as per the methodology.

➤ Project emissions from fuel consumption on-site($PE_{fuel,on-site,y}$)

The FSR has been verified by Keco to confirm that diesel oil will be provided to increase the combustion temperature of the incinerator during the start-up or if there is a low combustion temperature. The designed annual average consumption of diesel oil is 385ton per year. Emissions

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are calculated from the quantity of fuel used as follows:

$$PE_{\text{fuel, on-site, y}} = F_{\text{cons, y}} \times NCV_{\text{fuel}} \times EF_{\text{fuel}} \quad (9)$$

where:

$F_{\text{cons, y}}$ = fuel consumption on site in year y(l or kg)

NCV_{fuel} = net caloric value of the fuel(MJ/l or MJ/kg)

EF_{fuel} = CO₂ emissions factor of the fuel(tCO₂/MJ)

The ex-ante parameters in the formula required by the methodology are validated as below.

Parameter	Description	Value used	Source
$F_{\text{cons, y}}$	Fuel consumption on site in year y(kg)	$\frac{385,000}{\Rightarrow It is validated to be in compliance with the FSR.}$	FSR
NCV_{fuel}	Net caloric value of the fuel(MJ/kg)	$\frac{42,652 \times 10^{-3}}{\Rightarrow It is validated to be in compliance with the local value from 'China Energy Statistical yearbook'}$	China Energy Statistical yearbook 2007
EF_{fuel}	CO ₂ emissions factor of the fuel (tCO ₂ /MJ)	$\frac{74.1 \times 10^{-6}}{\Rightarrow Default value 74.1 tCO_2/TJ from IPCC is applied.}$	IPCC 2006

Table 7. Parameters for calculation of $PE_{\text{fuel, on-site, y}}$

➤ Project emissions from waste incineration($PE_{i, y}$)

Fossil-based waste CO₂ emissions from the waste incineration process should be accounted as follows:

$$PE_{i, y} = PE_{i, f, y} + PE_{i, s, y} \quad (10)$$

where:

$PE_{i, f, y}$ = fossil-based waste CO₂ emissions from waste incineration in year y(tCO₂e)

$PE_{i, s, y}$ = N₂O and CH₄ emissions from the final stacks from waste incineration year y(tCO₂e)

1) For calculation of $PE_{i, f, y}$, Option-1 is selected as per the methodology.

$$PE_{i, f, y} = \sum_i A_i \times CCW_i \times FCF_i \times EF \times \frac{44}{12} \quad (11)$$

where:

A_i = amount of waste type i fed into the waste incineration plant(t/yr)

CCW_i = fraction of carbon content in waste type i(fraction)

FCF_i = fraction of fossil carbon in total carbon of waste type i(fraction)

EF = combustion efficiency for waste(fraction)

$\frac{44}{12}$ = conversion factor(tCO₂/tC)

Among them, the amount of waste type i fed into the waste incineration plant(A_i) will be continuously monitored and calculated as per the following equation:

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$$A_i = A_{MSW,y} \cdot \frac{\sum_{n=1}^z p_{n,i,y}}{z} \quad (12)$$

where:

$A_{MSW,y}$ = amount of MSW fed into the waste incineration plant(t/yr)

$P_{n,i,y}$ = weight fraction of the waste type i in the sample n collected during the year y

z = number of samples collected during the year y

The ex-ante parameters in the formula required by the methodology are validated as below.

Parameter	Description	Value used		Source
A _i	Amount of waste type i fed into the waste incineration plant(t/yr)	Waste	Amount(ton)	FSR
		Paper & cardboard	37,410	
		Textile	8,610	
		Food waste	179,850	
		Wood	2,430	
		Garden & park waste	–	
		Rubber	1,800	
		Plastic	16,200	
		Metal	480	
		Glass & pottery	5,730	
		Other	47,490	
		⇒It is validated to be in compliance with the FSR.		
		CCW _i	Fraction of carbon content in waste type i(fraction)	
Paper & cardboard	46			
Textile	50			
Food waste	38			
Wood	50			
Garden & park waste	49			
Rubber	67			
Plastic	75			
Metal	–			
Glass & pottery	–			
Other	3			
⇒It is validated to be in compliance with IPCC default values.				
FCF _i	Fraction of fossil carbon in total carbon of waste type i(fraction)			Waste
		Paper & cardboard	1	
		Textile	20	
		Food waste	–	

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Parameter	Description	Value used		Source
		Wood	–	
		Garden & park waste	–	
		Rubber	20	
		Plastic	100	
		Metal	–	
		Glass & pottery	–	
		Other	100	
		<i>⇒It is validated to be in compliance with IPCC default values.</i>		
EF	Combustion efficiency for waste (fraction)	Waste	value	IPCC 2006
		Paper & cardboard	1	
		Textile	1	
		Food waste	1	
		Wood	1	
		Garden & park waste	1	
		Rubber	1	
		Plastic	1	
		Metal	1	
		Glass & pottery	1	
		Other	1	
		<i>⇒It is validated to be in compliance with IPCC default values.</i>		

Table 8. Parameters for calculation of $PE_{i,t,y}$

2) For calculation of $PE_{i,s,y}$, Option-2 is used as per the methodology.

$$PE_{i,s,y} = Q_{\text{biomass},y} \cdot (EF_{N_2O} \cdot GWP_{N_2O} + EF_{CH_4} \cdot GWP_{CH_4}) \cdot 10^{-3} \cdot CF \quad (13)$$

where:

$Q_{\text{biomass},y}$ = amount of waste incinerated in year y(tonnes/yr)

EF_{N_2O} = aggregate N_2O emission factor for waste combustion(kg N_2O /tonne of waste)

EF_{CH_4} = aggregate CH_4 emission factor for waste combustion(kg CH_4 /tonne of waste)

CF = conservativeness factor

The ex-ante parameters in the formula required by the methodology are validated as below.

Parameter	Description	Value used	Source
$Q_{\text{biomass},y}$	Amount of waste combusted in year y(tonnes/yr)	$\frac{300,000}{\Rightarrow It is validated to be in compliance with the FSR.}$	FSR
EF_{N_2O}	Aggregate N_2O emission factor	47×10^{-3}	IPCC 2006

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Parameter	Description	Value used	Source
	for waste combustion(kgN ₂ O/t)	<i>⇒It is validated to be in compliance with IPCC default value.</i>	
GWP _{N₂O}	Global Warming Potential (GWP) of N ₂ O, valid for the relevant commitment period	<u>310</u> <i>⇒Default value 310 is applied for the first commitment period of the Kyoto Protocol.</i>	UNFCCC, Kyoto Protocol
EF _{CH₄}	Aggregate CH ₄ emission factor for waste combustion(kgCH ₄ /t)	<u>0.2×10⁻³</u> <i>⇒It is validated to be in compliance with IPCC default value.</i>	IPCC 2006
GWP _{CH₄}	Global Warming Potential (GWP) of CH ₄ , valid for the relevant commitment period	<u>21</u> <i>⇒Default value 21 is applied for the first commitment period of the Kyoto Protocol.</i>	UNFCCC, Kyoto Protocol
CF	Conservativeness factor	<u>1.37</u> <i>⇒It is validated to be in compliance with AM0025 for conservativeness.</i>	AM0025

Table 9. Parameters for calculation of PE_{i,s,y}

With regard to CF selection as per AM0025, the most conservative value, 1.37, is applied in the PDD.

➤ Project emissions from wastewater treatment(PE_{w,y})

$$PE_{w,y} = PE_{CH_4,w,y} \cdot GWP_{CH_4} = (Q_{COD,y} \cdot P_{COD,y} \cdot B_0 \cdot MCF_P) \cdot GWP_{CH_4} \quad (14)$$

where:

PE_{CH₄,w,y} = methane emissions from the wastewater treatment in year y(tCH₄/y)

Q_{COD,y} = amount of wastewater treated anaerobically or released untreated from the project activity in year y(m³/yr), which shall be measured monthly and aggregately annually

P_{COD,y} = chemical Oxygen Demand(COD) of wastewater(tCOD/m³), which will be measured monthly and averaged annually

B₀ = maximum methane producing capacity(tCH₄/tCOD)

MCF_P = methane conversion factor(fraction), preferably local specific value should be used. In absence of local values, MCF_P default values can be obtained from table 6.3, chapter 6, volume 4 from IPCC 2006 guidelines

'Tool to determine project emissions from flaring gases containing methane' will not be applied to the project to estimate PE_{w,y} as the biogas generated from the waste water treatment process is to be released into the atmosphere.

The ex-ante parameters in the formula required by the methodology are validated as below.

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Parameter	Description	Value used	Source
$Q_{COD,y}$	Amount of wastewater treated anaerobically or released untreated from the project activity in year y(m^3/yr)	<u>44,550</u> \Rightarrow It is validated to be in compliance with the FSR.	FSR
$P_{COD,y}$	Chemical Oxygen Demand(COD) of wastewater($tCOD/m^3$)	<u>0.06</u> \Rightarrow It is validated to be in compliance with the FSR.	FSR
B_0	Maximum methane producing capacity($tCH_4/tCOD$)	<u>0.265</u> \Rightarrow It is validated to be in compliance with AM0025	AM0025
MCF_P	Methane conversion factor(faction)	<u>0.8</u> \Rightarrow It is validated to be in compliance with IPCC default value.	IPCC 2006
GWP_{CH_4}	Global Warming Potential (GWP) of CH_4	<u>21</u> \Rightarrow Default value 21 is applied for the first commitment period of the Kyoto Protocol.	UNFCCC, Kyoto Protocol

Table 10. Parameters for calculation of $PE_{w,y}$

During the crediting period, $Q_{COD,y}$ and $P_{COD,y}$ will be monitored for its calculation.

3) Leakage

Leakage emissions from the residual waste from the anaerobic digester, the gasifier, the processing /combustion of RDF/stabilized biomass or compost($L_{r,y}$) and end use of stabilized biomass($L_{s,y}$) are not accounted for as this is not included in the project. Thus, as per the methodology, leakage is calculated using below formula.

$$L_y = L_{t,y} + L_{i,y} \quad (15)$$

where:

$L_{t,y}$ = leakage emissions from increased transport in year y(tCO_2e)

$L_{i,y}$ = leakage emissions from the residual waste from MSW incinerator in year y(tCO_2e)

➤ Emissions from transportation($L_{t,y}$)

Waste collecting points are located closer to the incineration plant than the existing landfill site, which is verified through the on-site visit. The Yibadi landfill is approximately 100 meter away from the project site. Therefore, emissions from transportation can be ignored.

➤ Emissions from residual waste from MSW incineration($L_{i,y}$)

As the residual waste from the incinerator contains less than 5% of residual carbon, below equation is used as per the methodology.

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$$L_{i,y} = A_{\text{residual}} \cdot FC_{\text{residual}} \cdot \frac{44}{12} \quad (16)$$

where:

A_{residual} = amount of the residual waste from the incinerator(t/yr)

FC_{residual} = fraction of residual carbon contained in the residual waste(%)

$\frac{44}{12}$ = a factor to convert from Carbon to Carbon Dioxide

The ex-ante parameters in the formula required by the methodology are validated as below.

Parameter	Description	Value used	Source
A_{residual}	Amount of the residual waste from the incinerator(t/yr)	<u>44,550</u> <i>⇒ It is validated to be in compliance with the FSR.</i>	FSR
FC_{residual}	Fraction of residual carbon contained in the residual waste (%)	<u>3</u> <i>⇒ It is validated to be in compliance with the FSR.</i>	FSR

Table 11. Parameters for calculation of $L_{i,y}$

$L_{i,y}$ will be based on the actual monitoring of the fraction of residual carbon contained in the residual waste of the project.

4) Emission reductions

Emission reductions due to the project activity during the year y are follows according to the methodology.

$$ER_y = BE_y - PE_y - L_y$$

Where:

ER_y = emissions reductions in year y(tCO₂e)

BE_y = emissions in the baseline scenario in year y(tCO₂e)

PE_y = emissions in the project scenario in year y(tCO₂e)

L_y = leakage in year y(tCO₂e)

As a result, the expected emission reductions are **1,127,283tCO₂e**(112,728tCO₂e/year average) over the defined ten-year crediting period. Since the data provided for the ex-ante estimation of CERs in section B.6.2 and B.6.3 of the PDD are in compliance with AM0025 and the provided ER calculation sheet <45> correctly provides calculation steps with relevant parameters, Keco judges that the calculation of the baseline emissions, project emissions, leakage and the emission reductions are appropriate and reasonable.

3.6. Additionality

The PDD has presented the additionality with the four steps as per Tool for the demonstration and assessment of additionality(ver 06.0.0). Following documents are reviewed to assess the approach used in the PDD:



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✓PDD[ver 04] of Fuqing MSW Incineration Project <4a>

✓IRR calculation sheet <44>

The data, rationales, assumptions, justifications, and documentation provided have been verified using local knowledge as well as sectoral and financial expertise. This information was also confirmed through the following documentation:

✓FSR <7>

✓Picture, comments in questionnaire, minute of stakeholder meeting <17>

Based on these validation steps Keco confirms that the documentation assessed is appropriate for the project.

3.6.1 Prior consideration of the clean development mechanism

It has been demonstrated by the timeline of events of the project that the CDM revenues was seriously considered in the decision to proceed with the project activity prior to start of the project and the continuing real action were taken to secure CDM status for the project in parallel with its implementation:

Date	Events	Documents
20/06/2008	The Investment Intension Agreement	The Investment Intension Agreement <74>
10/2008	EIA completion	EIA Document <9>
11/2008	FSR completion	FSR Document <7>
16/06/2009	EIA approval	Approval letter of EIA by Fujian Provincial Environmental Protection Bureau <10>
25/07/2009	FSR approval	Approval letter of FSR by Fujian Provincial Development and Reform Commission <8>
20/08/2009	The Board approved the project under CDM program	Document on Board of Director's resolution <11>
16/10/2009	CDM consulting agreement	CDM consultancy agreement <12>
21/02/2010	A CDM stakeholder meeting	Picture, comments in questionnaire, minute of stakeholder meeting <17>
03/07/2010	Engineering, procurement and construction contract ⇒ <i>Starting Date of the project</i>	Engineering, procurement and construction contract between the project owner and New Sky Engineering Co., Ltd. <13>
15/07/2010	Construction contract	Construction contract <18>
20/11/2010	Notification to China DNA	Inform letter of CDM project <15>
24/12/2010	Notification to UNFCCC	UNFCCC web site
18/02/2011	Signed ERPA between Fine Carbon Fund Ky, Nordic Carbon Fund Ky, GreenStream Network Plc, Fine Post-2012 Carbon Fund Ky and the project owner	ERPA <19>



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Date	Events	Documents
06/12/2011	Project approval by the host country	LoA from DNA of China <u><20></u>

Table 12. Prior consideration

From the table above, Keco verifies that the start date of the project activity determined as **03/07/2010** is appropriate (date of engineering, procurement and construction contract), which was confirmed by Keco to be the earliest of the dates at which the real action of the project activity began and in compliance with the CDM glossary. This is in accordance with the latest CDM glossary.

As per the latest version of Glossary of CDM terms (ver 06.0), the start date of a CDM project activity is the earliest date at which either the implementation or construction or real action of a CDM project activity begins. In this regard, 'Engineering, procurement and construction contract' signed by the project owner and New Sky Engineering Co, Ltd on 03/07/2010 is regarded as a real action of a project activity. This is also cross-checked against a copy of the real contract <13>.

'Investment Intension Agreement' <74> was signed on 20/06/2008 between Fuqing City Management Bureau and the project owner, which was the draft agreement before a formal BOT contract, where the total amount of MSW disposal treatment and the waste disposal cost were specified. Based on Investment Intension Agreement, the EIA and FSR of the project was completed respectively. Regarding 'BOT agreement' <14>, it is validated by clarification from the PPs and consult with relevant government authorities that a BOT contract is indispensable document as requested by the National Development and Reform Commission (NDRC) of China that is responsible for approval of the FSR. It can also be confirmed that the project procedure is fully in compliance with the current regulation, 'Regulation on the BOT investment in the utilities sector' <62> released by Ministry of Construction of China. The pre-signed BOT agreement is just one step in the project preparation procedure as it cannot be enforced without approval of the NDRC. Hence, the PDD was not considered as committed to the project implementation at the moment of signature of the BOT agreement. Further, the FSR of the project was completed in November 2008. It is validated that the incentive from the CDM was considered as a definitive factor in the decision to proceed with the project. The FSR was approved by Fujian Provincial Development and Reform Commission on 25/07/2009 based on the BOT agreement signed on 22/05/2009 and other relevant documents. In the above mentioned context, the BOT agreement can only be referred as one step in the project preparation phase and cannot be considered as the project start date as per the Glossary of CDM terms. After the BOT agreement is signed, the PPs are considered being granted the legal right to go through other administrative approvals and project financing etc. as per the relevant Chinese regulation.

In conclusion, the date of 03/07/2010 when the project contracted engineering, procurement and construction contract is considered as a real action of the CDM project activity which is the start date of the project activity as per Glossary of CDM terms.

Since the project starting date is after 02/08/2008, it is considered to be a new project activity in



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line with 'Guidelines on the demonstration and assessment of prior consideration of the CDM(ver 04, EB62, Annex13, 15/07/2011)'. Keco confirms that the project activity complies with the requirements of the guidance as:

- ✓the PPs submitted an inform letter on prior consideration of the CDM to the Host Party, People's Republic of China on 20/11/2010 which is within six months of the project activity start date.
- ✓the PPs informed UNFCCC of prior consideration of the CDM dated 24/12/2010 which is also within six months of the project activity start date.

Keco has checked all the physical documents mentioned in above table and verified that all the documents are substantial and reasonable at that situation in the host country. Keco has therefore judges that the incentives of CDM were seriously considered prior to the start of the project activity and real action were taken to secure CDM status for the project in parallel with its implementation.

3.6.2 Identification of alternatives

The baseline scenario of the project is composed of alternative M3(disposal of the waste on a landfill without the capture of landfill gas.) and alternative P6(electricity is obtained from a grid). Through the assessment of the PDD to identify alternatives, Keco confirms that the list of alternatives includes the project activity undertaken without being registered as a proposed CDM project activity, the list contains all plausible scenarios, and the alternatives comply with all applicable legislation. Hence, Keco considers the listed alternatives to be credible and complete.

3.6.3 Investment analysis

Since the project will earn revenues not only from the CERs but also from electricity supply, the simple cost analysis, Option I, is not appropriate. Option II is not applicable because the alternative scenario is to dispose of MSW in a landfill site and purchase electricity from the ECPG, which does not involve investment. Therefore, the PPs opted for Option III(benchmark analysis) to conduct the investment analysis.

The benchmark IRR, 8%(post tax), is derived from 'Methods and parameters for economical appraisal for construction project[third edition] issued by NDRC dated 03/07/2006' <28>. Keco judges that the benchmark is appropriate as the PPs used the government/official approved benchmark as per Tool for the demonstration and assessment of additionality(ver 06.0.0) and the selected benchmark(8%) corresponds to incineration power generation project. Based on the project IRR calculation sheet <44> the IRR of the project without CERs revenue is 4.91%(post tax), which is much lower than the benchmark indicating that the project is not financially attractive compared to the benchmark in the absence of CDM benefits. Hence, Keco confirms that the financial returns of the project would be insufficient to justify the required investment. Meanwhile, the VAT has been rebated in the financial calculation in the FSR and IRR sheet <44>, which is consistent with 'Notice on Value Added Tax on comprehensive utilization of resource and other product' <61> released by State Administration of Taxation, dated 09/12/2008. Keco has also verified that the IRR processing is reasonable and the data input are relied on values from the approved FSR carried out by an authorized third party, China City Construction Research Institute, granted as a top class design institute for incineration waste heat recovery for power generation in China. Therefore, Keco can



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confirm that the input values from the FSR are valid and applicable and the parameters in the PDD and associated annexes are fully consistent with the FSR.

Since the PPs rely on values from the FSR approved by a national authority for the proposed CDM project activity, Keco confirms that the FSR has been the basis of the decision to proceed with the investment in the project. Nine months earlier than the Board decision to develop the project under CDM <11>, FSR was completed <7>, which is definite that the Board decision is based on the FSR. Furthermore, the period between the FSR study and the Board resolution is sufficiently short that it is unlikely the input values would have materially changed.

Keco has reviewed the IRR calculation sheet and confirmed that the operating period of 23 years is selected reasonably as Keco has confirmed the technical specifications of boilers, turbines, generators and incinerators <22>, <23>, where total lifetime of all the equipment are described over 25 years and it is consistent with the requirements of paragraph 3 of 'Guidelines on the Assessment of Investment Analysis(ver 05)', i.e. 'project IRR calculation shall as a preference reflect the period of expected operation of the underlying project activity (technical lifetime)'. Thus, Keco judges that the operating period of 23 years is conservative and appropriate.

In regard to sensitivity analysis, five financial parameters were taken as uncertain factors for sensitive analysis of financial attractiveness:

- a) **Total Investment**
- b) **O&M Costs**
- c) **MSW disposal charge(tipping fee)**
- d) **Electricity exported to the grid**
- e) **Electricity tariff**

As per 'Guidelines on the assessment of investment analysis(ver 05)', the sensitivity analysis is conducted over a range of $\pm 10\%$ for above five parameters by the PPs and Keco confirms that the IRR would remain below the benchmark.

However, for a cross-check, refer to the followings:

- ✓With a decrease in **Total Investment**, a), by 28.5% or **O&M costs**, b), by 43.1%, the project IRR may reach 8%. Considering the increasing pricing level of construction materials, and employee wages in line with the GDP growth rate in China, Keco can confirm that neither the total investment, decreased by 28.5% nor the O&M costs decreased by 43.1% is likely. Keco also cross-checked it with static data from National Bureau of Statistics of China <37>, showing a strong increasing tendency of raw materials, fuels and power prices. See Table 13.

(Preceding year=100)

Year	General Index	Fuel and Power	Ferrous Metals	Nonferrous Metals	Raw Chemical Materials	Timber and Paper Pulp	Building Materials
2006	106.0	111.9	98.3	130.8	102.1	102.6	101.9
2007	104.4	104.3	105.4	111.6	103.6	102.7	103.0



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Year	General Index	Fuel and Power	Ferrous Metals	Nonferrous Metals	Raw Chemical Materials	Timber and Paper Pulp	Building Materials
2008	110.5	120.6	118.4	98.6	105.2	105.2	109.5
2009	92.1	89.2	86.3	81.1	91.3	95.8	101.1
2010	109.6	116.3	106.6	122.2	107.0	103.0	103.8

Table 13. Purchasing price indices for raw materials, fuels and power

- ✓With an increase in **MSW disposal charge(tipping fee)**, c), by 73.2%, the project IRR may reach 8%. However, the tipping fee is fixed in the BOT agreement <14> signed by Fuqing City Management Bureau and C&G Environment Protection(Fuqing) Co., Ltd and will not significantly change unless there is a mutual negotiation and agreement by the both parties. Therefore, it can be confirmed that the increase in the tipping fee by 73.2% is unlikely to occur.
- ✓With an increase in **Electricity exported to the grid**, d), by 27.5%, the project IRR may reach 8%. Since the electricity is generated during the MSW disposal process, the amount of the electricity totally depends on the operation of incinerators. However, it is unlikely the amount of the electricity will increase by 27.5% because an amount of MSW, heating value and the thermal efficiency of waste heat utilization of the equipment are fixed and those figures will not change significantly.
- ✓With an increase in **Electricity tariff**, e) by 27.5%, the project IRR may reach 8%. However, the electricity tariff was provided by the government's latest price policy <29>, when the investment decision of the project was made. From the fact that electricity tariff is strictly regulated by China government and will not significantly change without permission by the central and local governments. Furthermore, the same economic climate where the O&M costs and the electricity tariff are changing simultaneously along with the economy fluctuation, the overall impact will not be great due to mutual-offset of the two indicators. Hence, Keco judges that the actual tariff saved by the project is unlikely to increase by 27.5%.

If the CERs sales revenues are considered, the project IRR of the project will reach the benchmark by 8.17%. According to the investment analysis above, it is convinced that without CDM incentive the investment barrier the project faced is insurmountable. Considering of the CERs sales revenues the IRR of total investment of the project will significantly improve.

In order to assess its correctness, consistence, appropriateness and credibility, input parameters/ indicators for investment analysis has been validated as per the VVM(ver 01.2) by Keco as below:

The FSR was completed November, 2008 and approved by Fujian Provincial Development and Reform Commission dated 25/07/2009. It was drawn up by an authorized third party China City Construction Research Institute granted as a top class design institute for incineration waste heat recovery for power generation in China.

Additionally, Keco compared the input parameters used in the financial analysis with the data reported for other similar CDM projects developed in China.(There are only handful of registered MSW incineration CDM projects hosted in China using MSW for power generation.) Table 14 shows



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the data comparison such as a installed capacity, total static investment, investment costs per MW, net power generation, annual O&M costs, percentage of O&M cost relative to the total investment, and a tariff.

Ref.	Installed capacity (MW)	Total investment (mil.RMB)	Total investment/ installed capacity (mil.RMB/MW)	Net power generation (MWh/y)	O&M cost (mil.RMB/y)	O&M cost/total investment (%)
3480	7.5	256.88	34.25	56,618	28.65	11.15
3525	15	248.87	16.59	59,070	22.62	9.09
3694	18	502.98	27.94	100,800	36.37	7.23
3837	24	502.75	20.95	117,343	28.15	5.60
4824	12	297.50	24.79	54,400	22.24	7.48
5359	36	713.37	19.82	156,000	54.51	7.64
The project	18	440.77	24.49	87,703	31.37	7.12

Table 14. Financial parameters comparison with registered MSW projects

1) Total investment (440,767,700RMB)

The total static investment of 440.77 million RMB is derived from the FSR of the project developed by China City Construction Research Institute in November, 2008 and approved by Fujian Provincial Development and Reform Commission on 25/07/2009. Hence, the total investment is derived from an independent and reliable source. Among the total investment of the project, the construction (equipment purchase+installation) cost is estimated to be **422.72 million RMB** from the FSR accounting for 96% of the total static investment of 440.77 million RMB. In order to assess the estimated construction cost in the FSR, Keco has obtained and reviewed a real engineering, procurement and construction contract submitted by the PPs signed on 03/07/2010 between the project owner and New Sky(China) Engineering Co, Ltd. where the total cost is indicated as **430 million RMB** including costs of equipment(+installation), and construction. The contract contains a contract title, contract cost, consumer, supplier and contract date. Keco also confirms that the contract specifies a consumer(C&G Environment Protection (Fuqing) Co., Ltd.), location/items to be supplied, construction plan, and other conditions that need to be regulated between the project owner and the providers. Thus, Keco judges that the contract is real, credible, and relevant to the project. Since the agreed cost is higher than the estimated construction cost from the FSR, 422.72 million RMB, it can be considered conservative.

Further, referring to Table 14, the investment cost per MW installed capacity of the proposed project is 24.49 million RMB/MW. By comparing the per MW investment cost among similar waste to energy projects registered in China, the cost of the project has been found to be within the range of 16.59–34.25 million RMB/MW. Hence, Keco has confirmed that the total investment is reasonable. The following can be considered for the comparison.



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✓[3694]: has comparable capacity and technology with the project. However, the incinerator equipment is purchased from Belgium manufacturer Keppel Seghers whereas the incinerator for the project activity is from a local Chinese manufacturer.

2) Loan amount (296,000,000RMB)

According to the loan agreement <31>, between C&G Environment Protection(Fuqing) Co., Ltd. and China Bank(Fuqing branch) on 15/12/2009, the actual loan amount is 296,000,000RMB, which is the same as the estimate in the FSR. By reviewing 'Notice on adjusting the equity ratio of fixed assets investment projects by the State Council' Decree No.27[2009] <50>, issued and implemented on 25/05/2009 where the minimum equity ratio for incineration projects is specified as 20%, Keco confirms that the equity ratio of the project($33\%=144,767,700/440,767,700$) is higher than the minimum standard level and the policy was considered at the time of the loan agreement was made. It is therefore confirmed that the amount of loan is appropriate at the time of investment decision.

3) Interest rate (5.94%)

The annually adjusted floating interest rate, 5.94%, is agreed in the bank loan agreement <31>. Referring to 'Table for benchmark loan rate adjustment of financial institutions released by Monetary Policy Department of the People's Bank of China' <51> demonstrating different benchmark interest rates according to a loan period(six months/one year/one to three years/three to five years/over five years), the benchmark interest rate should be 5.94% due to the fact that the bank loan agreement date is 15/12/2009 and the lending duration is fourteen years. The same interest rate is mentioned in the FSR. Thus, it is of Keco opinion that the interest rate 5.94% applied to the project is appropriate at the time of investment decision.

4) Operation and Maintenance Costs(O&M cost) (31,370,000RMB/year)

It is identified that the O&M costs in the FSR is 31,370,000RMB/year. Since the costs are from company experience, Keco checked the documentation, 'Actual O&M cost' of the project from January to March 2012 <53> where actual costs for purchased raw materials, water, wages and welfare, repair and maintenance, and other expenditures are proved for three months to help validate the suitability of the O&M cost applied to the project. The documentation, <53>, is released by C&G Environmental Protection(Fuqing) Co., Ltd. and contains status of the annual O&M costs with invoices and operating hours of two incinerators($300\text{t/d}\times 2$) and a generator(12MW) for three months (January–March 2012). This is also sealed by C&G Environmental Protection(Fuqing) Co., Ltd. with a date. Thus, Keco confirms that it is relevant to the project and credible. According to the documentation, the actual average O&M cost per month is approximately 2,408,514RMB where the annual O&M cost, 28,902,168RMB is expected. Even the fact that the actual annual O&M cost only takes up 92% of the estimated one in the FSR, it is of Keco opinion that the O&M cost is adequate because i)the project still needs to install another 300t/d incinerator and 6MW generator and ii)an increasing tendency of material costs necessary for operation is definite(see Table 13). Further, as shown Table 14 above, the O&M cost of the project(7.12%) against its total investment cost is well within the range of 5.60–11.15%.



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Hence Keco confirms that the annual O&M cost of the project is reasonable.

The O&M cost of the proposed project includes material cost, fuel costs, leachate/slag/other waste treatment cost, repair cost, labour cost and other management expenses. All the values come from an independent third party, China City Construction Research Institute. The Keco confirmed below factors with the FSR and reference documents. See Table 15.

Parameter	Value (RMB/year)	Reference
Material cost	6,577,200	- FSR - Actual cost <53>
Fuel cost	4,318,000	- FSR - Actual cost <53>
Leachate, slag and other waste treatment cost	4,395,600	- FSR, Company experience - Actual cost <53>
Repair cost	8,657,400	- FSR, Company experience - Actual cost <53>
Labour cost	5,098,100	- FSR, Company experience - China statistical year book <37> - Actual cost <53>
Management cost	2,323,700	- FSR, Company experience - Actual cost <53>
TOTAL	31,370,000	

Table 15. Parameters in O&M costs

(a) Material cost (6,577,200RMB/year)

6,577,200RMB/year is determined as raw material costs of the project in the FSR. Keco has checked the documentation, 'Actual O&M cost' <53>, and compared raw material costs with those of the FSR. Keco finds that the average actual cost of raw materials per month is 492,367RMB where an annual cost of them is expected to be 5,908,404RMB which is 90% of the estimation. However, considering only two incinerators with a capacity of 600t/d(=300t/d×2) and a 12MW condensing turbine generator have been installed at present, and an increasing tendency of material costs necessary for operation is definite, the cost is likely to increase. Further, even if the actual material cost(5,908,404RMB) is applied, the IRR becomes 5.09% that is still below the benchmark(8%). Therefore, it can be confirmed that the raw material costs applied in the FSR are reasonable.

(b) Fuel cost (4,318,000RMB/year)

In the FSR the fuel cost includes diesel oil as an auxiliary fossil fuel added into the incinerator and water for the cooling tower. To assess those values, Keco has reviewed 'Actual O&M cost' <53> where actual monthly average cost of diesel oil and water consumed from January to March 2012 is 268,120RMB where an annual cost is accordingly expected to be 3,217,440RMB which is only



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75% of the estimated one in the FSR. However, Keco judges that the fuel cost applied to the project is reasonable due to the fact that i) construction/installation of the project has not been completed and ii) even the fuel cost decreases into 3,217,440RMB per year the IRR changes into 5.20%(from 4.91%) far less than the benchmark 8%.

(c) Leachate, slag and other waste treatment cost (4,395,600RMB/year)

This disposal cost is determined 4,395,600RMB per year in the FSR. Keco has found that the cost is expected to be 3,912,200RMB/year as per 'Actual O&M cost' <53>, 89% of the estimated one through the evidence of actual cost. Given that these leachate, slag and other waste will definitely increase in the future, it can be confirmed that the estimated cost in the FSR is reasonable. Further, IRR becomes 5.04% from 4.91% even the actual cost(3,912,200RMB/y) is applied.

(d) Repair cost (8,657,400RMB/year)

The repair cost of the project is 8,657,400RMB per year in the FSR. Since the cost is from company experience, Keco has cross-checked the value with the actual cost <53>. According to the documentation, the actual repair of the project is expected to be 7,907,742RMB/year, 91% of the estimated one in the FSR. However, since the situation that the project has just started its operation and furthermore not in full operation, it can be judged that the repair cost will increase in the future. Thus, it is Keco opinion that the repair cost in the FSR is reasonable. Further, IRR becomes 5.11% from 4.91% even the actual cost(7,907,742RMB/y) is applied.

(e) Labour cost (5,098,100RMB/year with 86 employees)

Keco confirms that the annual wage applied in the FSR(5,098,100RMB) is reasonable. For its appropriateness Keco examined the statistical annual salary <37> released by China Statistical Year Book where a strong tendency to increase(see Table 16) is identified. Average annual wage per person of Fujian Province is 39,701RMB in 2008, which is lower than the expected one in the FSR, 59,280.2RMB(=5,098,100RMB/86persons) average per person. However, even if the annual statistic wage per person(37,901RMB as in Table 16) is applied(3,414,286RMB/year=39,701RMB×86persons), the IRR becomes 5.35% from 4.91% which is still below the benchmark. Therefore, labour cost of the project activity can be considered reasonable.

Year	Sector	China(RMB)	Fujian Province(RMB)	Proposed project(RMB)
2006	Production and Distribution of Electricity, Gas and Water sector	28,424	29,453	—
2007		33,470	35,946	—
2008		38,515	39,701	59,280
2009		41,869	42,466	—

Table 16. Statistical annual salary

Keco cross-checked the value with the actual cost from January to March 2012 and found that the real cost could be expected to be 4,602,039RMB per year lower than the estimation. Given the fact



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that only some portions of the project have been completed, Keco considers that the labour cost of the project in the FSR is reasonable.

(f) Management cost (2,323,700RMB/year)

The management cost in the approved FSR involves training cost for staff, travel expenses, recruiting costs and etc. The value of the cost is 2,323,700RMB per year in the FSR. To assess its suitability, Keco reviewed the actual cost <53> spent from January to March 2012. According to the documentation, annual management cost can be expected to be 3,354,335RMB which is greater than that of in the FSR. Hence, it is of Keco opinion that the management cost is reasonable.

5) Electricity tariff (0.614RMB/kWh—for the first 15 years, 0.364RMB/kWh—for the rest operational years)

The electricity tariff of the project(0.614RMB/kWh[VAT included] for the first 15 operational years and 0.364RMB/kWh[VAT included] for the rest operational years) is derived from the FSR. Keco has checked the BOT agreement <14> and found that the electricity tariff in the agreement is totally the same as the FSR. According to 'Regulation on renewable power pricing and cost sharing' <30> issued by China NDRC, it is regulated that the electricity tariff for the biomass powered plant over the first 15 years in the operation lifetime is increased by 0.25RMB/kWh on the basis of the 2005 year's tariff for the newly built coal-fired power plant equipped with desulfurization system and the subsidy of 0.25RMB/kWh shall be removed for the rest of the operation lifetime. The expected electricity tariff used in the financial analysis of the project is 0.614RMB/kWh for the first 15 years and 0.364RMB/kWh for the rest of operation lifetime respectively. Besides, Keco reviewed the electricity tariff on the basis of 'Notification on the adjustment of on-grid tariffs for East China Power Grid' <29> where 0.364RMB/kWh(VAT included) is regulated for the electricity tariff in Fujian Province. Hence, Keco confirms that the tariff applied in the PDD is valid and reasonable at the time of the investment decision.

6) MSW disposal charge (61.5RMB/t)

The tipping fee of 61.5RMB/t in the PDD is taken from the FSR, which is the same as the one in the BOT agreement <14> signed between Fuqing City Management Bureau and C&G Environment Protection(Fuqing) Co., Ltd. on 22/05/2009. Keco confirms that the BOT agreement clearly states that waste disposal cost is 61.5RMB/t. Therefore, it is validated that the tipping fee of 61.5RMB/t for all operation lifespan of 23 years of the project is appropriate. It is unlikely to change during the whole operational lifetime of 23 years of the project.

7) Annual net electricity exported to the grid

It is expected that the proposed project will generate approximately 113,900MWh of electricity per year. This value is calculated based on 8,000 annual operating hour sourced from the FSR. Considering the internal consumption rate by the project of 22% and a transmission loss 1%, the net electricity supplied to the grid is expected to be 87,703MWh per year. The plant load factor is calculated to be 72.2%(=113,900MWh/18MW/8,760hour). Annex 11 of CDM-EB 48th meeting report gives a guideline for validation of plant load factor for renewable energy. One option(3(a)) is to use



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plant load factor provided to the government while applying for the project approval. The FSR has this purpose, hence, according to current CDM regulation, the fact that the value is in line with the FSR is considered sufficient for validation of plant load factor. The electricity generation used in the PDD is consistent with the values from the FSR for this project.

Keco further has checked and found that the actual annual operation hour for the already equipped two incinerators is expected to be 6,763h and 6,840h respectively according to 'Actual O&M cost' <53> from January to March 2012 and operation know-how is not well established at the beginning stage of the project activity. Hence, Keco confirms that the ex-ante estimate of 8,000h/y in the FSR is considered reasonable.

The expected net annual output(87,703MWh) is calculated on the basis of the designed amount of MSW with the heat value 6,700KJ/kg, operation hour 8,000h/year and internal consumption 22% as below. 20.4% is used as thermal efficiency of project. All of the input values used in the IRR calculation including data of thermal efficiency of waste heat utilization, are sourced from the FSR compiled by a professional third party, China City Construction Research Institute. According to a specification from designer of FSR, the thermal efficiency of waste heat utilization is defined as the heat efficiency of the whole waste heat utilization system and is the product of thermal efficiency of the incineration boiler, channel, turbine and generator. Thus, the project thermal efficiency of waste heat utilization is calculated as $20.4\% (=85\% \times 99\% \times 25\% \times 97\%)$.

Regarding the thermal efficiency of the project, Keco has reviewed literature 'Study on method of estimating power generation during operation for a BOT project of refuse-incineration power generation' <63> issued in April 2008 where a reasonable range of LHV(4,600–6,700KJ/kg) and thermal efficiency(17.8%–21.5%) of incineration power generation under BOT scheme is specified. The thermal efficiency of the project, 20.4% is well within the range of 17.8%–21.5%. Based on the literature, the FSR applied the thermal efficiency of the project and Keco confirms that the literature was considered at the time of preparation of the FSR(11/2008) and also investment decision(08/2009). In addition, Keco has cross-checked those values with 'Environmental Sanitation Engineering, Vol.18, No.5' <59> issued in October 2010 where average design power generation efficiency of MSW power plants at steam condition with 4.0MPa and 400°C is stipulated as 21%, which is almost the same condition as that of the project activity, 20.4%. Further, even 21.5% is applied to the project, the IRR becomes 5.57%(from 4.91%), still far below the benchmark 8%.

Item	Data	Source
Total amount of MSW	300,000ton/year	FSR
Designed low heat value	6,700KJ/kg	FSR
Thermal efficiency	20.4%	'Study on method of estimating power generation during operation for a BOT project of refuse-incineration power generation' <63>, Environmental Sanitation Engineering, Vol.18, No.5, October 2010 <59>
Internal consumption	22%	FSR



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Item	Data	Source
Transmission loss	1%	FSR
Transmission factor	3,600KJ/kWh	–

✓Total electricity generation: $113,900\text{MWh} = 300,000 \times 10^3 \times 6,700 \times 20.4\% \div 3,600$
 ✓Net electricity generation: $87,703\text{MWh} = 113,900 \times (1 - 22\% - 1\%)$

Table 17. Parameters for calculation of net electricity generation

Therefore, it can be confirmed that the net electricity exported to the grid is reasonable.

8) Internal consumption (22%)

The electricity internal consumption of the project (22% of the total generation) is sourced from the approved FSR, and is calculated by an independent design institute based on scientific analysis. The value was estimated in accordance with the equipment specifications and the design of the system, which is fixed parameter. The normal range of internal consumption rate for MSW incineration projects is 21%–25% (<http://www.xnyfd.com/jsfw/html/?29736.html>) <39>.

9) Tax

Keco confirms that the taxes applied in the project are appropriate by cross-checking relevant documentation as below:

(a) Value added tax (VAT) (17%)

Keco has cross-checked VAT with the document 'Provisional Regulations of the People's Republic of China, No.[1993]134, issued by the National Financial Ministry and National Revenue Ministry' <40> indicating selling or importing merchandise by a taxpayer, except second and third item of present section, the VAT should be 17%. Keco judges VAT 17% reasonable.

(b) City maintenance & construction tax (5% of VAT)

Keco has cross-checked city maintenance & construction tax with the document 'Construction and maintenance tax Provisional Regulations of the People's Republic of China', No.[1985]19, issued by the National Financial Ministry and National Revenue Ministry' <41> indicating if an incorporation is located in a town, the tax rate is 5% of VAT. Keco judges city maintenance & construction tax 5% reasonable.

(c) Education tax (3% of VAT)

Keco has cross-checked educational tax with the document 'Decision on amending Provisional Regulations of collecting educational tax, No. [2005]448, issued by the National Financial Ministry and National Revenue Ministry' <42>. This indicates educational tax rate is 3% of VAT.

(d) Income tax rate (25% of Income)

Keco has cross-checked income tax rate with the document 'Law of People's Republic of China on



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income tax, No.[2007]63, issued by the President of People's Republic of China' <43> indicating the income tax rate is 25%. Keco judges Income tax rate 25% reasonable.

10) Operation lifetime

The expected operational lifetime of the project of 23 years is in line with the FSR. Keco confirms that it is reasonable based on the documentation from the boiler/turbine/generator manufacturer and Keco's sectoral knowledge.

The project activity is under the BOT scheme. Therefore, it is reasonable to assume that the project operational lifetime is limited by the concession period of 25 years, while the technical lifetime of the main equipment is over 25 years. Keco confirms through a review of the BOT agreement <14> that the actual concession period is 25 years, and that the actual period of construction is almost two years. Therefore, the applied project operational lifetime of 23 years is correct and applicable to the project activity.

11) Length of the construction period

In accordance with VVM version 1.2, para 114(a), Keco has reviewed the FSR <7> designed by China City Construction Research Institute and approved by Fujian Provincial Development and Reform Commission where the construction period of two years is determined. For validation of the construction period, Keco has referred 'Construction Standard for Municipal Solid Waste Treatment Project' <73> issued by Ministry of Construction and State Development Planning Commission and found that a reasonable construction period of incineration facility with a daily MSW treatment capacity of 600–1,200t/d is mentioned 24–32 months. Keco has also cross-checked 'Engineering, procurement and construction contract' <13> signed between the project owner and New Sky Engineering Co., Ltd, and identified that a two-year of construction period is specified at chapter 6. Therefore, Keco confirms that the construction period of the project is reasonable.

Regarding the operation limit of 50% for the first operation year, 50% is applied as a plant load factor of the first operation year. After construction, two incinerators are to be operated for the first year with a commission period of three months and the rest one will be equipped in the second operation year, thus, the plant load factor of the first two units is 75%(=9months/ 12months). Since the FSR is designed based on operation of the whole three incinerators, the plant load factor of the first operation year can be calculated as 50%(=75%×2/3). Further, even if 100% of the plant load factor for the first operation year is applied, the IRR becomes 5.35%, still far below the benchmark 8%. Therefore, Keco confirms that the plant load factor of the first operation year of 50% is reasonable.

3.6.4 Barrier analysis

No barrier analysis has been applied.

3.6.5 Common practice analysis

Due to following reason, the PDD considers Fujian Province as an geographical area for the common practice analysis.



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China is the fifth world largest country where the local conditions, such as access to technology, regulatory framework, investment climate, and so on vary significantly among different Provinces. These local conditions have great impact on selection of incineration technology. Therefore, for similar incineration projects to the proposed project, the same Province(Fujian Province) is selected as the applicable geographic area, as access to technology, economic development level, regulatory framework, electricity tariff, MSW disposal cost, and etc. are more comparable under provincial level than the whole country level, China.

1)Access to technology

Chinese incineration plants largely prefer fluidized bed type and grate type. Due to low calorific value of waste(MSW) in China, the use of the generally unavoidable auxiliary fossil fuel must be taken into consideration. Coal can be added into a fluidized bed incinerator, since fluctuations in calorific value can be levelled out due to the high thermal capacity of the sandy bed. The technology 'reverse reciprocating grate' applied to the project activity aims to meet the local MSW characteristics and ensure complete combustion without support of fuel. The reverse reciprocating grate is divided into different combustion zones: drying, degassing and exhaust. The grate in each combustion zone is driven by a separate control system that can adjust the speed of the transport of the wastes to be incinerated through the furnace. This can improve largely the combustion performance of the furnace. The primary and secondary air is also distributed according to the requirement of the different zones. A separate air blower and integrated air pre-heater can meet the proper needs of the incineration air amount and temperature during the different combustion phases. The incineration air can be adjusted by an automatic control system. The operation of exhaust combustion zone is automatically controlled by an infrared device for ensuring complete combustion. A minimum gas phase combustion temperature of 850°C and a minimum residence time of the flue-gases, above this temperature, of two seconds can be strictly respected, which make dioxin smoke effectively removed. The reverse reciprocating grate can be better adapted to the specific nature of the Chinese MSW than the imported furnace of the same type. In China, these two types of incineration technology account for 78% in total according to 'Current situation and estimation of incineration technology in China' [\[64\]](#) released by Environmental Sanitation Engineering Technology Research Center of National Ministry of Construction.

For the sake of adoption of incineration technology, design elements of an incineration plant such as waste composition, amount of waste, calorific value of waste, moisture/carbon content of waste, waste properties and other relevant factors should be considered and daily treatment capacity, purification system, and waste water treatment facility also rely on these elements along with incineration type. The units of the proposed project such as the grate type incinerator with 300t/d capacity and power generation system etc. were determined when the FSR was made after studying those factors. However, the design elements, waste composition, amount of waste, calorific value of waste, moisture/carbon content of waste, waste properties, and others relevant ones differ from Province to Province as each Province in China has different local conditions. In addition, waste properties, heat value of waste, and amount of waste are influenced by geographic condition, economic development level, and consumption level as well as local fuel structure [\[65\]](#) that vary from Province to Province. For example, in some coal-fired heating area of China, such as Gansu



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Province, coal cinder and ash content contained in waste is higher than that of in no coal-fired heating areas, thus the heat value of waste is comparably low <66>, which implies that incineration technology is not suitable in that area. Moreover, if the ash content is too high, treatment for fly ash, residual and smoke generated from incineration process will be more complicated and require higher investment. Further, it is commonly known that enhancement of living level causes increase in the ratio of plastic waste, waste paper, etc. in waste and raises calorific value of waste as well as its amount.

2)Economic development

Due to technology complication, strict requirements for operators and supervision, and comparably high construction investment and O&M costs <67>, the prerequisite for incineration technology is economic development level. In China, the economic development level varies from Province to Province. According to China Statistical Yearbook 2010, financial revenues of Zhejiang, Guangdong, and Jiangsu Provinces are ranked top-three in 2009, and these Provinces have 21, 17, and 14 incineration plants respectively in 2009 <68>, which are also top-three number of incineration plants. Medium-developed areas such as Fujian, Shandong Provinces, have 4-6 incineration plants, mostly other Provinces have 1 or 2 incineration plants, and some under-developed Provinces such as Inner Mongolia, Guizhou, Xizang, Xinjiang and Ningxia have no incineration plants recorded, which implies that incineration technology is not applicable to all over China because of the different economic development level and it is mainly distributed in developed Provinces.

3)Regulatory framework

Each Province has different local regulation on MSW incineration and power generation project investment. The project activity was also examined based on relevant local regulations. Projects developed within the same Province are faced by same regulatory framework and investment climate that make them comparable. In addition, the treatment approach for ash/clinker/wastewater is different and may have different cost impacts on a company. In some Provinces, the government is responsible for the treatment of ash, clinker and the wastewater. In other Provinces, the local governments require on-site treatment of ash, clinker and the wastewater. Jiangsu, Shanghai, and Anhui Province has higher requirements for treatment of ash, clinker and wastewater while Fujian Province has to reach only the third level of national standard. For another example, according to China Water Environment Capacity Shortage Degree(COD index) Research <69>, water capacity of Jiangsu, Shanghai and Anhui is almost exhausted, thus, water pollutant emission must be controlled to the lowest, leachate treatment during incineration process should reach the first level of national standard which requires to install better leachate treatment facilities, causing higher investment; whereas water capacity of Zhejiang, Fujian and Guangdong is comparably sufficient, the leachate treatment just need to reach the third level of national standard, lower than first level. Therefore, it can be confirmed that the environment policy and regulations on the pollutants produced during incineration process are different from Province to Province according to different environmental capacity.

4)Electricity tariff and MSW disposal cost

Electricity tariff, MSW disposal cost are different from location to location in China due to the fact that economic development level, industrial structure, fundamental infrastructure, and development



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strategy and policy framework of each Province differ one another. According to National Bureau of Statistics of China, each Province shows different economic indicators such as salary level and price indices etc. In addition, 'Regulation on renewable power pricing and cost sharing' <30> also shows different electricity tariff from Province to Province. It can be confirmed that different economic climate from location to location may cause different investment cost and O&M cost of a project activity. For example, the electricity tariff in Zhejiang Province is 0.4045RMB/kWh, 0.375RMB/kWh for Jiangsu Province, 0.364RMB/kWh for Fujian Province, and Shanghai has 0.400RMB/kWh <70>. Regarding MSW disposal cost, it also varies from Province to Province due to the different policy, and the economic development level, commonly, the more developed of economy, the higher of a MSW disposal charge, for example, MSW disposal cost in Fuqing city in Fujian province is 61.5RMB/t, Ningbo city in Zhejiang province is 193RMB/t, Shanghai is 240RMB/t, <71> and Guangzhou city in Guangdong Province is 200RMB/t <72> each. As a cross-check of the disposal cost of Fuqing city, Keco has reviewed disposal charge invoices in July and August 2012 <75> issued by Fuqing City Management Bureau where the charge, 61.5RMB/t is mentioned. Further, tariff rates of products, cost of materials and other utilities such as water, cost of labour and services, and types of loan that can be obtained vary considerably from Province to Province, which also have great impact on investment level of incineration plants.

Keco has reviewed the approach presented in the PDD and confirmed that local conditions such as access to technology, economic development level, regulatory framework, electricity tariff, MSW disposal cost, and etc. are taken into account in order to define the geographical area to be used for the common practice analysis. From the analysis above, it can be confirmed that as:

- i) China is a large country where economic development level, geographic condition, industrial structure, fundamental infrastructure, regulatory framework such as policy and regulations are different from Province to Province,
 - ii) due to complicated incineration technology, not all Provinces can access to the technology, thus the incineration technology is not applicable to the whole China, and
 - iii) suitable conditions for MSW incineration technology such as characters of waste, investment climate, and so on are also different from Province to Province,
- incineration technology varies from Province to Province in China depending on those local conditions listed above. As per the 'Tool for Demonstration and Assessment of Additionality'(ver 06.0.0), the most applicable geographical area for the common practice analysis of the proposed project is not the whole country, but the Province where the proposed project is located.

As per Tool for the demonstration and assessment of additionality(ver 06.0.0), the PDD takes a quantitative approach to assess common practices.

According to 'MSW construction plan issued by People's Government of Fujian Province' <55>, there are eight similar projects that started commercial operation before the start date of the project(03/07/2010) in Fujian Province. After leaving out three projects that are out of the design output range(9-27MW:±50% of the project activity, 18MW), only five project, 1)Fujian Hongmiaoling MSW incineration Project, 2)Fujian Shishi MSW incineration project, 3)Xiamen Eastern incineration



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project, 4)Hui'an incineration project, and 5)Putian waste incineration project are to remain for further consideration. Among them, project 3) and project 4) are under CDM process, which makes N_{all} 3.

✓Fujian Hongmiaoling MSW Incineration Project(waste disposal: 1,000t/d, installed capacity: 16MW)

This project is developed by Chongqing Iron & Steel (Group) Co., Ltd. that is a large steel joint enterprise with hundred year's history and is the biggest state-owned company in Chongqing city [56]. This project also adopts a different technology from the proposed project. All these circumstances can let this project have better financing circumstances and market than the proposed project.

✓Fujian Shishi MSW Incineration Project(waste disposal: 1,400t/d, installed capacity: 24MW)

This project is developed by a private company and has a cogeneration plant whose energy is used for both electricity and heat generation. As the proposed project does not involve a cogeneration plant, this is different from the proposed project activity.

✓Putian waste incineration Project(waste disposal: 1,050t/d, installed capacity: 24MW)

This project is developed by a private and also a state-owned company by different stages, which means that this project has a partly better financial advantage than the proposed project. Further, per kW investment, 11,250(RMB/kW), of this project is much lower than that of the proposed project, 24,487(RMB/kW), which can be considered as a different technology as per the Tool for the demonstration and assessment of additionality.

As addressed above, three other similar projects certainly have far better access to financing, or different technology usage from the proposed project. Hence, N_{diff} is to be 3.

As per Tool for the demonstration and assessment of additionality:

1) F is calculated to be zero($=1-N_{all}/N_{diff}=1-3/3$) and

2) $N_{all}-N_{diff}$ is also calculated to be zero($=3-3$).

Therefore, it can be concluded that the proposed project is not a common practice in the defined region.

Moreover, taking into account the financial difficulty faced by the project owner in the construction of the project and the project's poor rate of return, the project owner decided to proceed with the implementation of the project as a CDM project. Thus, the proceed of CERs is a key element for the project. In conclusion, it is practically impossible to invest in the similar projects without CDM.

3.7. Monitoring plan

Keco has applied a two-step process to assess compliance with the requirement of the VVM as below:

(a) Compliance of the monitoring plan with the approved methodology

The monitoring plan presented in the PDD complies with the requirements of the applicable methodology AM0025(ver 12). Keco has verified that all parameters in the monitoring plan against the requirements of the methodology, and no relevant deviations have been found.

The parameters need to be monitored as per the methodology AM0025 has been validated as follows:

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No.	Parameter	Unit	Description
1	$EG_{PJ,FF,y}$	MWh	Amount of electricity consumed from the grid as a result of the project activity
2	$F_{cons,y}$	tonnes/yr	Fuel(diesel oil) consumption on-site during year y of the crediting period
3	$A_{MSW,y}$, $Q_{biomass,y}$, W_x	tonnes/yr	Amount of MSW fed into the waste incineration plant
4	$P_{n,i,y}$	–	Weight fraction of the waste type i in the sample n collected during the year y
5	z	–	Number of samples collected during the year y
6	CCW_i	fraction	Fraction of carbon content in waste type i
7	FCF_i	fraction	Faction of fossil carbon in total carbon of waste type i
8	EF	fraction	Combustion efficiency for waste
9	MB_y	tCH ₄	Methane produced in the landfill in the absence of the project activity in year y
10	$EG_{d,y}$	MWh	Amount of electricity generated from incineration in the project activity displacing electricity in the baseline during the year y
11	CEF_d	tCO ₂ /MWh	Emission factor of displaced electricity by the project activity
12	$RATE^{Compliance}_y$	number	Rate of compliance
13	$A_{residual}$	tonnes/yr	The amount of the residual waste from the incinerator
14	$FC_{residual}$	%	Fraction of residual carbon in the residual waste of MSW incinerator
15	$Q_{COD,y}$	m ³ /yr	Amount of waste water treated anaerobically or released untreated from the project activity in year
16	$P_{COD,y}$	tCOD/m ³	Chemical Oxygen Demand(COD) of wastewater
17	–	MJ	Energy generated by auxiliary fossil fuel added in the incinerator

Table 18. Parameter to be monitored in the methodology AM0025

Some parameters are to be monitored and calculated as per the following tools mentioned in AM0025(ver 12).

- Tool to calculate the emission factor for an electricity system(ver 02.2.1)
- Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site(ver 05.1.0)

The monitoring plan provided in the PDD complies with the requirements of AM0025 and the above tools.

Of many monitoring parameters to determine baseline emissions, methane emissions from the landfill site in the absence of the project activity in year y(MB_y) and amount of electricity generated utilizing the combustion heat from incineration in the project activity($EG_{d,y}$), are of very importance and need to be determined accurately.



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- ✓ MB_y is calculated as per 'Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site'. In this calculation, W_x , also referred to as $A_{MSW,y}$ in AM0025 is one of the monitoring parameters which govern the accuracy of MB_y . Keco confirmed through the on-site visit that $A_{MSW,y}$ was measured using electronic weigh bridges.
- ✓ $EG_{d,y}$ is used to calculate $BE_{EN,y}$. This monitoring parameter is continuously monitored by a main electricity meter (bidirectional meter) and recorded by a grid company belonging to the ECPG. For the purpose of a cross-check, another electricity meter is installed and recorded by the project owner. The meters will be calibrated by a qualified organization. Further, the electricity sales invoices of every month could be archived. The electricity metering equipment will be properly configured and the metering equipment will be checked by both the project owner and the grid company according to the Chinese national standard 'Technical Management Code for Electricity Metering' (DL/T448-2000) before the project operation.

Monitoring parameters to determine project emissions are $EG_{PJ,FF,y}$, $F_{cons,y}$, $A_{MSW,y}$, FCF_i , $Q_{COD,y}$ and $P_{COD,y}$.

- ✓ $EG_{PJ,FF,y}$ (amount of electricity consumed from the grid as a result of the project activity, measured using an electricity meter) is continuously monitored by a main electricity meter (bidirectional meter) and recorded by a grid company belonging to the ECPG to determine project emissions from grid electricity use ($PE_{elec,y}$). For the purpose of a cross-check, another electricity meter is installed and recorded by the project owner. The meters will be calibrated by a qualified organization.
- ✓ $F_{cons,y}$ (fuel consumption on site in year y) is monitored to determine project emissions from fuel use on-site ($PE_{fuel,on-site,y}$) and measured by a oil flow meter. Keco finds the meter are equipped properly to monitor the amount of diesel oil through the on-site visit.
- ✓ $A_{MSW,y}$ (also referred to as $Q_{biomass,y}$, W_x) and FCF_i (fraction of fossil carbon in total carbon of waste) are measured for the calculation of project emissions from waste incineration ($PE_{i,y}$). As describe above, $A_{MSW,y}$ is measured by the calibrated weighbridge and sampling and analysing of each waste fraction will be done at least four times per year for FCF_i by a qualified lab according to ASTM D6866-08: "Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis" and "Standard Practice for Collection of Integrated Samples for the Speciation of Biomass (Biogenic) and Fossil-Derived Carbon Dioxide Emitted from Stationary Emissions Sources".
- ✓ $Q_{COD,y}$ (amount of waste water treated anaerobically or released untreated from the project activity in year) and $P_{COD,y}$ (chemical oxygen demand (COD) of wastewater) are measured to calculate project emissions from wastewater treatment ($PE_{w,y}$). Monitoring instruments for both parameters are to be subject to regular maintenance and testing to ensure accuracy,

Other parameters used for calculation of baseline emissions and project emissions are default values or constants. Additionally, the PDD describes that monitoring of laws and regulations as well as compliance will be conducted. Keco confirmed that the values described in the PDD were appropriate at the time of preparing the report.

(b) Implementation of the Plan

Monitoring structure for the project activity is comprehensively detailed in the PDD including



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description of the responsibility, procedure reference, equipment details, calibration frequency and maintenance. Archiving of the records is indicated. By reviewing the provided power plant monitoring plan <26> and on-site interview with the PPs, Keco confirms that the monitoring arrangements described in the monitoring plan are feasible within the project design, and the means of implementation of the monitoring plan is sufficient to ensure the emission reductions achieved by the proposed CDM project activity can be reported ex-post and verified. In conclusion, Keco has the opinion that the PPs have the ability to implement the monitoring plan.

3.8. Sustainable development

The DNA of the Host country, People's Republic of China issued the Letter of Approval(LoA) on 06/12/2011 <20>, has confirmed the contribution of the project to the sustainable development.

3.9. Local stakeholder consultation

The project owner invited local stakeholders on 21/02/2010 for comments on the project activity via distributing and collection responses to a questionnaire. Keco confirmed through an interview with two local residents that the questionnaires were distributed transparently, as the questionnaires were available for everyone who wanted to give comments on the project. Total fifty questionnaires were distributed and all of them were collected with 100% return rate. According to the fifty collected questionnaires, the interested stakeholder have a very good understanding of the project, and they generally agreed that the project had positive influence on the local socio-economy, environmental impact, the role of the project, and their work and life. Only 6% of respondents considers that air and water pollution can possibly happen by the project. In order to clear the negative opinion, the PPs will employ the methods mentioned in the EIA to mitigate the impact. The returned questionnaires with answers of interested stakeholders had been maintained by the project owner and were presented to Keco for assessment during the on-site visit. <17> During the visit, Keco conducted an interview with local stakeholders and confirmed that the stakeholders had been invited. The interview with stakeholders and review of returned questionnaires show that the summary of the comments received has been completely provided in the PDD and due account of the comments has been described in the PDD. Keco has therefore its opinion that the local stakeholder consultation is appropriate.

3.10. Environmental Impacts

Keco has ensured that Environmental Impact Assessment(EIA) Report have been carried out by Guizhousheng Environmental Protection Science Research & Design Institute <9> and approved by Fujian Provincial Environmental Protection Bureau <10>. The environmental impact results from the project have been identified and analyzed in the PDD. By checking the EIA report, Keco is able to ensure that the environment impacts occurs mainly in the construction period due to dust, noise, waste water, and solid waste. All above impacts would be within an acceptable limit by carrying out corresponding mitigation measures as per the statement of the EIA. Keco therefore concludes that the project will not have significant impacts on the environment by means of measures of pollution avoidance and control.



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4. COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

According to the modalities for the Validation of CDM projects, DOE shall make publicly available the project design document and receive, within 30 days, comments from Parties, stakeholders and UNFCCC accredited non-governmental organizations and make them publicly available. Keco published the project documents on the UNFCCC CDM web site <http://cdm.unfccc.int> on 15/07/2011 and invited comments by 13/08/2011 from Parties, stakeholders and non-governmental organizations. There were mainly 6 comments from Patrick Schroeder on behalf of Wuhu Ecology Center on 13/08/2011, which are summarized as below. Keco assesses that the responses from the PPs considering relevant circumstances and documentation including the methodology AM0025(ver 12) to the comments are reasonable.

1) Waste classification and organic waste handling(animal feed, composting and anaerobic digestion) are not considered as alternative scenarios.

→ First of all, waste classification and organic waste handling are not listed as baseline scenario alternatives according to AM0025(ver 12). Secondly, although waste classification was proposed in some cities, there are a lot of difficulties to put into effect¹⁾. As for the methods of organic handling, such as animal feed, composting and anaerobic digestion, there exist many problems. The precondition for animal feed is waste classification and separation, however, waste classification is not well implemented at present, which may result in harmful effects on animals. According to 'Analysis on the treatment methods of MSW'²⁾, stone, metal, glass and plastic can not be composed by microorganism so they should be picked up for separate treatment.

2) The project has started before CDM approval, which indicates insufficient additionality. This is proved by announcement of EIA(16/07/2007), BOT privilege agreement of Fuqing MSW incineration power plant(06/2009) and report of completion of the power plant(04/2011).

→ There are actually no rules or regulations from the UNFCCC specifying that projects under CDM can not be started before CDM approval. Therefore, announcement of EIA and/or BOT agreement can not have any effect on CDM process.

3) 3-1 There is a possibility of emission of highly toxic substances such as dioxine because of burning plastic wastes and low calorific value as wastes are not separated in China and amount of moisture in wastes are very high.

3-2 Other pollutants such as dioxin, furans, PCBs, (all of which are regulated under the Stockholm Convention), brominated and brominated-chlorinated aromatic hydrocarbons in the process of incinerating are not included in the PDD. Those materials will have great impact on human health in China.

3-3 Solidification of fly ash and landfilling it are not enough treatment as this pollutes both surface and ground water.

1) <http://www.crd.net.cn/web/NewsInfo.asp?NewsId=4550>

2) <http://wenku.baidu.com/view/80f696000740be1e650e9aff.html>

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→ The proposed project uses grate type incinerators. The combustion techniques totally comply with 'Solid Waste Incineration Pollution Control Standard'(GB18485-2001). The Environment Impact Assessment(EIA) Report of the proposed project was compiled by a third party, Guizhou Environmental Protection Science Research & Design Institute which has the highest grade A in China under the EIA law and approved by Fujian Environmental Protection Bureau. Before the formal operation of the proposed project, the Acceptance of Environmental Protection will be conducted by Fuqing Environmental Protection Bureau to ensure that all the necessary pollution prevention and control requirements are included in the project. According to the EIA report, the main pollutants contained in the exhaust gas from incinerator are dust, acid gas(e.g. HCl, HF, SO_x, NO_x), heavy metal(e.g. Hg, Pb, Cr) and toxic pollutant (e.g. dioxin, furans). The proposed project will adopt flue gas cleaning system which include lime system, spray dry reaction tower system, bag-type dust elimination, active carbon system and slag transportation system.

✓ Prevention and control of the gas

A bag filter does well in the removal of organic pollutants and heavy metal and its dust removal efficiency is greater than 99%, which can meet the requirements of the prevention and control of the project gas.

✓ Prevention and control of the acid gas

The project adopts a half dry cleaning technology that combines a half dry reaction tower and a bag filter. Burning gas of incinerator goes into the reaction tower after heat recovery by waste heat boilers. Reaction with the lime slurry, the burning gas removes the acid gas(such as HCl, SO₂ and HF) to meet the requirements of the prevention and control of acid gas.

✓ Prevention and control of the dioxin

At first, incineration technologies can avoid the generation of dioxin by fully stirring and mixing the MSW to ensure uniform and complete combustion. It can also control the retention time of the furnace gas more than two seconds under the condition of over 850°C to secure the full decomposition of the dioxin. Likewise, the regeneration of the dioxin can be reduced. In addition, activated carbon is injected into a flue gas pipeline following the reaction tower to absorb the dioxin. Then, the gas will be processed in the bag filter to ensure the sufficient adsorption. As measures taken above, the dioxin emitting concentration of the project waste gas are expected to be lower than 0.1ngTEQ/m³ within the national standard.

✓ Prevention and control of the heavy metal

Generally, heavy metals exist in flue gas in the form of solid and gas. The project adopts the process of a half dry reaction tower, activated carbon adsorption and a bag filter to deal with the heavy metal. Thus, the discharge of the heavy metal in the flue gas would meet the requirements of the control standards of the life waste incineration pollutant(GB18485-2001).

✓ Prevention and control of the NO_x

The generation of NO_x should be inhibited by burning control including a SNCR denitrification system that can prevent and control the NO_x.



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As for solidification of fly ash and landfilling, all the measures illustrated in the report must be totally implemented, otherwise the project can not be operated. There are two main solid wastes generated during the course of the proposed project, slag and fly ash. Based on the rules of 'Solid Waste Incineration Pollution Control Standard'(GB18485-2001), the slag generated during the incineration process is treated as common solid waste, while the fly ash is identified as dangerous solid waste. Thus, the slag can be sent to a landfill. The fly ash will be pre-treated by mixing cement and chelating agents, the efficiency is up to 97%. The fly ash will be sent to Fujian Hazardous Waste Landfill site after passing the leaching toxicity test conducted by legal authorities, which shall comply with the requirements specified in the 'Solid Waste Incineration Pollution Control Standard'(GB18485-2001), 'Solid Waste Landfill Pollution Control Standard' (GB168889-2008), 'Pollution Control Standards for the Storage of Hazardous Waste' (GB18597-2001), and 'Pollution Control Standard for Hazardous Waste Landfill'(GB18598-2001). Keco also confirmed a document where Fuqing Environment Health Bureau agreed on fly ash treatment after solidification and transportation to Yibadi landfill. The document was agreed and signed by Fuqing Environment Health Bureau and C&G Environmental Protection(Fuqing) Co., Ltd. on 01/12/2011.

- 4) **If the incinerator burns recyclable materials, the locals who make a living by recovering recyclable materials from municipal waste will lose even this livelihood. Moreover, workers in the incineration plant are exposure to the high-pollution and high-risk circumstances for a long time.**

→ Through an interview with locals, it is confirmed that there are only few locals who make a living by recovering recyclable materials from municipal waste and these days it is hard to find those who do that job in the local areas. In addition, most recyclers collect wastes from public places such as city commercial district, restaurants, entertainments places, or living areas and the wastes they choose are materials that can be acquired by waste acquisition station by low price, such as plastic beverage bottles, packing paper box, clothing, metal and so on. Thus, given that the waste recycling is before the waste being sent to waste transfer station or the compression stations, rather than the waste processing sites, the waste incineration project will not impact the locals who make a living by recovering recyclable materials. As for the opinion about the workers in incineration plant are exposure to the high-pollution and high-risk circumstances, it is not realistic. As analyzed in question 3 above, the main air pollutions are dust, acid gas(e.g. HCl, HF, SO_x, NO_x), heavy metal(e.g. Hg, Pb, Cr) and toxic pollutant(e.g. dioxin, furans). All of these pollutants will be well eliminated and reduced to reach the requirements of national standards by the corresponding protection measures illustrated by the EIA report. Further, the FSR was compiled by China Urban Construction Design & Research Institute and approved by Fujian Provincial DRC, the proposed project meets the security demands in China. Keco also confirmed a document released from Fuqing Environment Health Bureau in 2012 stating that for the sake of health and safety waste collection is prohibited in the landfill site.

- 5) **Consumption of diesel oil, 385t/y, will be greater than the expectation of the PDD due to low**



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calorific value of MSW. With the incentive of national subsidy on electricity, the waste incineration power plant will likely mix huge amounts of fossil fuel with the wastes to maximize the profit. Also, there is no third party monitoring to guarantee the proportion of fossil fuel would fulfill the national requirement, auxiliary fuel limit of 20%. Recyclable resources such as paper and plastic are used as fuel. This not only results in waste of non-renewable resources, but will also increase GHG emission and energy consumption through the production of the materials which are supposed to be recycled. This part of emissions is not considered in the PDD.

→ The proposed project adopts the advanced grate type incinerators that do not need to add any fossil fuels for co-combustion. The consumption of diesel oil, 385t/y, is derived from the FSR and the amount was confirmed in the FSR that the diesel oil will be used to ignite the incinerators. Consumption of diesel oil will be monitored as per the methodology AM0025(ver 12) during the crediting period. Relevant receipt(s) will be kept for a cross-check. Further, fossil fuel consumption will be considered as project emissions, which means the more fuel consumption, the less CERs the PPs obtain. The methodology also states that if auxiliary fossil fuel is added into the incinerator, the fraction of energy generated by auxiliary fossil fuel is no more than 50% of the total energy generated in the incinerator. Thus, the question for incinerators need to constantly feed in fossil fuel to sustain operation combustion temperature does not quite correspond to the situation of the project. The auxiliary fuel limit of 20% is aimed at another kind of incinerator type, i.e. a circulating fluidized bed incinerator that needs to add coals for combustion while the proposed project adopts advanced grate type incinerators that do not need to mix fossil fuels for combustion. The diesel oil is just used to ignite the incinerators. As analyzed in the question 1, at present in China, the waste classification is not put into effect, the recyclable resources such as paper and plastic used as a fuel is not a realistic option. At the same time, those leakages are not considered in the methodology AM0025. Moreover, as mentioned above, the GHG emissions from the project have already been included in the PDD.

6) The PDD: i)does not include a methodology they use for stakeholder consultation, ii)fifty of respondents is much too small to be representative and iii)the result shows support rate is 100% without any objections where the reliability is really worthy to be questioned.

→ According to the requirements specified in the EIA issued by Ministry of Environment Protection, the project owner conducted three times of public notice to collect public comments(p230 of the EIA). The first public notice was conducted on 16/07/2007 for twenty (20) days through the web site and there were no comments received. The second one was conducted on 28/08/2007 in terms of a symposium. Local government representatives and local residents were invited to take part in. During this second public investigation, 114 questionnaires were handed out and 110 were received back. Main problems the representatives concerned were whether the investment was enough and how the



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environment would be influenced. All of these questions were successfully resolved. The third public notice was conducted on 06/09/2007 for eighteen (18) days and no comments were received. The stakeholder meeting held on 21/02/2010 presented in the PDD(ver 01) was a CDM coordinative meeting after the three times of EIA public notices. Considering a couple of times of opportunities were given to the public, the number of fifty (50) questionnaires handed out to local stakeholders were considered enough. As the proposed project can resolve the environmental pollutants, such as odor, generated by the Yibadi landfill site, the local representatives all support the proposed project.

5. VALIDATION OPINION

Keco has performed a validation of the proposed CDM project activity, Fuqing MSW Incineration Project. The validation was performed on the basis of UNFCCC criteria and host country criteria.

Keco carried out the validation via i) desk review of project design documentation, the baseline and monitoring plan; ii) follow-up interviews with project stakeholders and technical experts; and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion. No public funding is involved and the validation did not reveal any information indicating that the project can be seen as a diversion of ODA funding.

The proposed project applies the baseline and monitoring methodology AM0025(ver 12), 'Avoided emissions from organic waste through alternative waste treatment processes' and 'Tool for the demonstration and assessment of additionality'(version 06.0.0) to determine that the project activity would not have occurred anyway due to the barrier identified.

Emission reductions from the project are hence additional to any that would have occurred in the absence of the project activity. Given that the project is expected to be implemented and maintained as designed, the project is likely to achieve the estimated total amount of emission reductions of 1,127,283tCO₂e over 10 years crediting period and annual average emission reductions of 112,728tCO₂e by disposing of MSW at the incinerating plant instead of a landfill over the crediting period. The project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change.

In our opinion, this proposed CDM project activity, as described in the revised and resubmitted PDD dated 06/09/2012(ver 04) meets all relevant UNFCCC requirements for CDM and relevant host country criteria. Keco will therefore recommend the registration of the proposed project, "Fuqing MSW Incineration Project", as CDM project activity.

The validation is based on the information made available to the DOE and the engagement conditions detailed in this report. The only purpose of this report is its use during the registration process as part of the CDM project cycle. Hence, Keco cannot be held liable by any party for



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decisions made or not made based on the validation opinion, which will go beyond that purpose.

19-09-2012

Signature: 

Keco GHG Certification Center Manager
Lee Seon-woo

6. VALIDATION TEAM

□ Team Members

Ryu Nam-yong, Keco, Republic of Korea- Validation Team leader

Park Beom-woong Keco, Republic of Korea – Team member

Kwak Yeong-don, Keco, Republic of Korea – Team member

□ Qualification of validator

a. Ryu Nam-yong, Team Leader

CERTIFICATE

No. 110019

Name : **Ryu Nam-yong** (Date of Birth : 4 Apr. 1973)

Qualification



Team leader ☒ Validator ☒ Verifier ☒

Qualified for the following technical areas

Sectoral Scope	Technical Area	Valid from
1 Energy industries	Waste heat/gas recovery	15 Feb. 2011
6 Construction	Construction	15 Feb. 2011
13 Waste handling and disposal	Waste handling and disposal	15 Feb. 2011
	Animal waste management	15 Feb. 2011
15 Agriculture	Animal waste management	15 Feb. 2011

As a auditor, based on the competence requirements of Korea Environment Corporation.

Date : 12 Mar. 2012

 Park Seung-hwan
Chairman of Korea Environmental Coporation 

b. Park Beom-woong, Team member

CERTIFICATE

No. 110073

Name : **Park Beom-woong** (Date of Birth : 3 Nov. 1980)

Qualification



Team leader ☒ Validator ☒ Verifier ☒

Qualified for the following technical areas

Sectoral Scope	Technical Area	Valid from
1 Energy industries	Energy generation from renewable energy sources	29 Jun. 2011
	Waste heat/gas recovery	15 Feb. 2011
13 Waste handling and disposal	Waste handling and disposal	15 Feb. 2011
	Animal waste management	15 Feb. 2011
15 Agriculture	Animal waste management	15 Feb. 2011

As a auditor, based on the competence requirements of Korea Environment Corporation.

Date : 12 Mar. 2012

 Park Seung-hwan
Chairman of Korea Environmental Coporation 

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c. Kwak Yeong-don, Team member

Korea Environment Corporation

 **CERTIFICATE**

No. 110050

Name : **Kwak Yeong-don** (Date of Birth : 5 Jan. 1963)

Qualification

Team leader ☐ Validator ☒ Verifier ☒

Qualified for the following technical areas

Sectoral Scope	Technical Area	Valid from
1 Energy industries	Energy generation from renewable energy sources	9 Mar. 2011
	Waste heat/gas recovery	9 Mar. 2011
13 Waste handling and disposal	Waste handling and disposal	9 Mar. 2011

As a auditor, based on the competence requirements of Korea Environment Corporation.

Date : 12 Mar. 2012

 **Park Seung-hwan**  
Chairman of Korea Environmental Corporation

Appendix A

Validation Protocol

Table 1. Mandatory Requirements for Clean Development Mechanism(CDM) Project Activities

REQUIREMENT	REFERENCE	CONCLUSION	CROSS REFERENCE/COMMENT
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art. 12.2	OK	The project will assist Finland(Annex I) in achieving compliance.
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures § 40a	OK	In accordance with a Letter of Approval (LoA), the DNA of the Host country confirms the sustainable development.
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art. 12.2.	OK	The proposed project results in fewer GHG emissions than the baseline case
4. The project shall have written approval of voluntary participation from the designated national authorities of each party involved	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures § 40a	OK	Written approval letter (LoA) from DNA of China and Finland have been received.
5. The emission reductions should be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	Section B of the PDD
6. Reduction in GHG emissions must be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5.c, CDM Modalities and Procedures § 43	OK	Section B.5 of the PDD
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Marrakech Accords (Decision 17/CP.7)	OK	No public funding has been involved.
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures § 29	OK	DNA of the Host party : China National Development and Reform Commission DNA of Annex I Party : Finland Ministry of Foreign Affairs, International Environmental Policy
9. The host Party and the participating Annex I Party shall be a Party	CDM Modalities	OK	Host party: China

REQUIREMENT	REFERENCE	CONCLUSION	CROSS REFERENCE/COMMENT
to the Kyoto Protocol	and Procedures § 30, 31b		China is a party to the Kyoto Protocol. Ratification date is 30/08/2002. Annex1 Party: Finland Finland is a party to the Kyoto Protocol. Ratification date is 31/05/2002.
10. The participating Annex I Party' s assigned amount shall have been calculated and recorded	CDM Modalities and Procedures § 31b	OK	The assigned amounts for Finland have been calculated and recorded.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures § 31b	OK	Finland has in place national systems for estimation of GHG emissions and regularly submits inventories to UNFCCC.
12. The project design document shall conform with the latest CDM Project Design Document format	Marrakech accords, CDM Modalities, Appendix B, EB Decisions	OK	CDM-PDD(version03) has been used.
13. Comments by local stakeholders are invited, and a summary of these provided	CDM Modalities and Procedures § 22b	OK	Section E of the PDD
14. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	Marrakech Accords, CDM Modalities § 37c	OK	Section D of the PDD
15. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available.	CDM Modalities and Procedures § 40	OK	The period for comments at UNFCCC web site was 15/07/2011–13/08/2011. There was mainly 6 comments received from Patrick Schroeder on behalf of Wuhu Ecology Center on 13/08/2011. Details are provided in this validation report.

REQUIREMENT	REFERENCE	CONCLUSION	CROSS REFERENCE/COMMENT
16. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures § 37e	OK	The latest version of approved methodology, AM0025, is applied.
17. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures § 45c,d	OK	Section B.4 of the PDD

Table 2. Requirement Check list

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
1. Approval					
All Parties involved have approved the project activity.	/1/ 44				
1.1. Has the DNA of each Party indicated as being involved in the proposed CDM project activity in Section A.3 of the PDD provided a written letter of approval?	/1/ 45	DR/I	YES, Written Letters of Approval(LoA) from DNA of China and Finland have been obtained. <u>CAR1</u> A written letter of approval(LoA) from DNA of Finland is not provided.	CAR1	OK
1.2. Does the written letter of approval from each DNA involved;	/1/ 45				
1.2.1. Does it confirm that the party is a Party of the Kyoto Protocol?	/1/ 45(a)	DR	YES, Host party: China China is a party to the Kyoto Protocol. Ratification date is 30/08/2002. Annex1 Party: Finland Finland is a party to the Kyoto Protocol. Ratification date is 31/05/2002. <u>CAR1</u> Same as 1.1 above	CAR1	OK
1.2.2. Does it confirm that participation is voluntary?	/1/ 45(b)	DR	YES, A LoA from DNA of the Host country confirms that the participation is voluntary. <u>CAR1</u> Same as 1.1 above	CAR1	OK
1.2.3. In the case of the host Party, does the proposed CDM project activity contribute to the sustainable development of the country?	/1/ 45(c)	DR	YES, A LoA from DNA of the Host country confirms the sustainable development of the country.	CAR1	OK




REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			<u>CAR1</u> Same as 1.1 above		
1.2.4. Does it refer to the precise proposed CDM project activity title in the PDD being submitted for registration?	/1/ 45(d)	DR	YES, The LoAs from DNA of China and Finland indicate the exact CDM project activity title with the PDD. <u>CAR1</u> Same as 1.1 above	CAR1	OK
1.3. Is the letter of approval unconditional with respect to 1.2.1 to 1.2.4 above?	/1/ 46	DR/I	YES, The LoAs from China and Finland have covered those information. <u>CAR1</u> Same as 1.1 above	CAR1	OK
1.4. Has the letter of approval been issued by the respective Party's designated national authority(DNA)?	/1/ 47	DR/I	YES, The DNA of China and Finland issued a LoA on 06/12/2011 and 06/06/2012 respectively. <u>CAR1</u> Same as 1.1 above	CAR1	OK
1.5. Is the letter of approval authentic?	/1/ 48	DR/I	YES, Authenticity has been confirmed by checking Chinese DNA and email correspondence with the DNA. <u>CAR1</u> Same as 1.1 above	CAR1	OK
1.6. Do letters of approval contain additional specification of the project activity, such as the PDD version number?	/1/ 50	DR	NO, The letters do not contain such information. <u>CAR1</u> Same as 1.1 above	CAR1	OK
1.7 Does a letter of approval refer to a specific version of the validation report and the DOE therefore is unable to submit this	/1/ 50	DR	NO, The LoAs from DNA of China and Finland do	CAR1	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
precise version of the validation report?			not specify version of the validation report. <u>CAR1</u> Same as 1.1 above		
2. Participation					
All project participants have been listed in a consistent manner in the project documentation, and their participation in the project activity has been approved by a Party to the Kyoto Protocol.	/1/ 51				
2.1. Are the project participants listed in tabular form in Section A.3 of the PDD?	/1/ 52	DR	YES, There are project participants(PPs) listed in section A.3 of the PDD.	OK	OK
2.2. Is the information consistent with the contact details provided in annex 1 of the PDD?	/1/ 52	DR	YES, The information is consistent with the contact details in annex 1 of the PDD.	OK	OK
2.3. Has the participation of each project participant been approved by at least one Party involved either in a letter of approval or in a separate letter specifically to approve participation?	/1/ 52	DR/I	YES, LoAs have been issued by DNA of China and Finland. <u>CAR1</u> Same as 1.1 above	CAR1	OK
2.4. Are any entities other than those approved as project participants included in these Sections of the PDD?	/1/ 52	DR/I	NO, There were no entities other than those approved as project participants included in the PDD.	OK	OK
2.5. Has the approval of participation been issued from the relevant DNA?	/1/ 53	DR/I	YES, LoAs have been issued by DNA of China and Finland. <u>CAR1</u> Same as 1.1 above	CAR1	OK
3. PDD					

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.										
The PDD used as a basis for validation shall be prepared in accordance with the latest template and guidance from the CDM Executive Board available on the UNFCCC CDM website.	/1/55														
3.1. Is the PDD used as a basis for validation prepared in accordance with the latest template and guidance?	/1/55	DR	YES, The PPs used the latest template of PDD(ver03, in effect as of 28/07/2006).	OK	OK										
3.2. Is the PDD in accordance with the applicable CDM requirements for completing PDD?	/1/5657	DR	YES,	OK	OK										
3.2.1. Are the following indicated in Section A.1 of the PDD; · The title of the project activity, · The current version number of the document, and · The date when the document was completed?	/2/	DR	YES, There are the title of the project activity, current version number of the document, and the date when the document was completed in section A.1 of the PDD as below: ✓Title: Fuqing MSW Incineration Project ✓Current version number and the date <table border="1"><tr><td>Ver 01</td><td>08/07/2011 (for GSP)</td></tr><tr><td>Ver 02</td><td>20/04/2012</td></tr><tr><td>Ver 03</td><td>22/05/2012</td></tr><tr><td>Ver 03.1</td><td>24/05/2012</td></tr><tr><td>Ver 04</td><td>06/09/2012</td></tr></table> ✓Completion date the PDD: 06/09/2012	Ver 01	08/07/2011 (for GSP)	Ver 02	20/04/2012	Ver 03	22/05/2012	Ver 03.1	24/05/2012	Ver 04	06/09/2012	OK	OK
Ver 01	08/07/2011 (for GSP)														
Ver 02	20/04/2012														
Ver 03	22/05/2012														
Ver 03.1	24/05/2012														
Ver 04	06/09/2012														
3.2.2. Has not potential public funding for the project from Parties in Annex I be a diversion of official development assistance?	/2/	DR/I	NO, Keco confirms that there is no public funding involved in the project.	OK	OK										
3.2.3. Has the Section B.8 of the PDD provided followings? · Date of completion of the application of the methodology to the project activity · Contact information of the persons(s)/entity(ies) responsible for the application of the baseline and monitoring methodology to the project activity	/2/	DR	YES, The PDD describes the date of completion of the methodology, 24/03/2011, and a contact person responsible for the application of the baseline and monitoring methodology to the project activity.	OK	OK										

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
4. Project description					
The PDD shall contain a clear description of the project activity that provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation.	/1/ 58				
4.1. Is the description of the proposed CDM project activity sufficiently covering all relevant elements and accurate?	/1/ 59	DR/I	YES, The proposed CDM project activity sufficiently covers relevant elements accurate. <u>CL1</u> Information of Fuqing Yibadi landfill such as a treatment capacity per day, operating start date, operation entity, distance from collection point(s)/area(s), current situation whether the landfill is in operation, how much MSW is disposed of, location, and etc. are not detailed.	CL1	OK
4.2. Does the description provide a clear understanding of the nature of the proposed CDM project activity?	/1/ 59	DR/I	YES, The description provides a clear understanding of the nature of the proposed CDM project activity.	OK	OK
4.3. If the proposed CDM project activity involves the alteration of an existing installation or process, are the differences resulting from the project activity compared to the pre-project situation clearly stated in the project description?	/1/ 63	DR	N/A The proposed CDM project is a new facility.	OK	OK
4.4. Are followings included in the description in Section A.2 of the PDD? · The purpose of the project activity; · Explain how the proposed project activity reduces greenhouse gas emissions; · The view of the project participants on the contribution of the project activity to sustainable development	/2/	DR	YES, The PDD describes contributions of the proposed project to local area, host country and global environment. ✓The purpose of the project activity: -The project activity will lead to the mitigation of greenhouse gas emissions.	CL2	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			<p>✓How the proposed project activity reduces greenhouse gas emissions: -The project activity will reduce GHGs by incinerating MSW instead of disposing of it at the landfill which can result in methane emissions.</p> <p>✓The view of the project participants on the contribution of the project activity to sustainable development: -The project will generate annual electricity 87,703MWh utilizing MSW and employment chances for local residents.</p> <p><u>✍ CL2</u> There are stakeholder's comments received on this matter. 'Issue 4' mentions that if the incinerator burns recyclable materials, the locals who make a living by recovering recyclable materials from municipal wastes will lose even this livelihood. Please provide how many employees can be hired due to this project</p>		
4.5. Are the project's spatial(geographical) boundaries clearly defined so that no submitted project could potentially be confused with another in Section A.4.1 of the PDD?	/2/	DR/I	<p>YES, The geographical coordinates are provided and the location is clear so that no submitted project could potentially be confused with another.</p>	OK	OK
4.6. Have a description of how environmentally safe and sound technology and knowhow is being applied by the project activity inter alia technology transfer to the Host Party(ies) for application in the project activity been included in Section A.4.3 of the PDD?	/2/	DR/I	<p>YES, The PDD describes that no technologies have been transferred to the host country. All the equipment employed is domestically manufactured.</p> <p><u>✍ CL3</u></p>	CL3 CL4 CL5 CL6	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			<p>Details on any biogas generated during the course of the MSW treatment is not provided.</p> <p> CL4</p> <p>Some of the technical specifications of main equipment such as a boiler, wastewater treatment facility are not provided.</p> <p> CL5</p> <p>Technical lifetime are not mentioned when describing main equipment.</p> <p> CL6</p> <p>Calculation steps for total generation of electricity per year and annual net electricity delivered to the ECPG are not detailed. In doing so, parameters such as line loss rate, amount of self consumption and calorific value of MSW should be mentioned in the PDD.</p>		
4.7. Has the chosen crediting period been indicated and the estimation of the total emission reductions as well as annual estimates for the chosen crediting period been provided in the PDD Section A.4.4?	/2/	DR	<p>YES,</p> <p>The PDD describes chosen crediting period, fixed ten-year, and the estimation of the total emission reductions, 1,127,283tCO₂e, and annual estimates, 112,728CO₂e during the defined crediting period.</p>	OK	OK
5. Baseline and monitoring methodology					
<p>The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.</p> <p>A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.</p>	/1/ 65				
(a) General requirement					



REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
5.1. Do the baseline and monitoring methodologies selected by the project participants comply with the methodologies previously approved by the CDM Executive Board?	/1/ 65 68	DR	YES, The approved methodology, AM0025[ver12], 'Avoided emissions from organic waste through alternative waste treatment processes' is used.	OK	OK
5.2. Are the number and the version of the approved methodology that is used indicated and correctly quoted in Section B.1 of the PDD?	/2/	DR	YES, The PDD clearly mentions the approved methodology with the number and the version.	OK	OK
5.3. Is the used version of the baseline and monitoring methodology valid?	/1/ 68	DR	YES	OK	OK
5.4. Is the selected methodology applicable to the project activity?	/1/ 66(a)	DR/I	YES, The PDD explains mainly nine applicability conditions related to incineration of waste as below: ✓The project activity involves the incineration of fresh waste for electricity generation. Electricity generated is partly consumed on-site and mainly exported to the East China Power Grid(ECPG). The incinerator is of grate type, which has been verified against the manufacturer specification. ✓According to the FSR, the volume of the waste bunker(11,340m³) can store a maximum of no longer than 5 days. Further, Keco confirms that the crane conveys and mix the MSW to prevent anaerobic decomposition through the on-site visit. ✓According to the FSR, on the amount, physical composition and character of the MSW in Fuqing city, proportions and characteristics of the waste have been	OK	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			<p>characterized. Also, the proportions and characteristics of different types of organic waste processed in the project activity will be involved in future monitoring.</p> <p>✓The project activity includes electricity generation from waste incineration. The electricity is partly used internally at the project site and mainly exported to the ECPG. This has been confirmed during the on-site visit. No heat recovered for thermal generation is involved in the project.</p> <p>✓It was confirmed with a local authority during the on-site visit that landfill was the only way to get rid of MSW before the construction of the incinerator in Fuqing city.</p> <p>✓It was confirmed with a local authority during the on-site visit that no regulations exist in the host country with regard to waste treatment or the capture and destruction of LFG. The compliance rate will be monitored as per the monitoring plan.</p> <p>✓Keco checked the FSR and performed an interview with a local authority during the on-site visit to confirm that the project only treats MSW and does not involve treatment of industrial or hospital waste</p> <p>✓No fossil fuel will be added into the incinerator on a regular basis (co-firing), but auxiliary fossil fuel will only be used in emergency cases(e.g. start-up and/or in case</p>		

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			<p>of low temperature[below 850°C] of incinerators)</p> <p>✓By checking the FSR and through an interview with the project owner, Keco can confirm the project activity does not involve capture and flaring of methane from existing waste in the landfill.</p> <p><u>CL7</u></p> <p>The reason that the energy from 385 ton of diesel is less than 50% of the total is not explained quantitatively.</p>		
(b) Applicability of the selected methodology to the project activity					
5.5. Is the methodology correctly quoted and applied by comparing it with the actual text of the applicable version of the methodology?	/1/ 70	DR	YES, The methodology is correctly quoted and applied by comparing it with the actual text of methodology AM0025(ver 12).	OK	OK
5.6 Have the project participants shown that the project activity meet each of the applicability conditions of the approved methodology or any tool or other methodology component referred to therein?	/1/ 66(b) 71 76	DR	YES, Refer to 5.4 above.	OK	OK
5.7. Is the project activity expected to result in emissions other than those allowed by the methodology?	/1/ 71	DR/I	NO, The project activity is not expected to result in emissions other than those allowed by the methodology.	OK	OK
5.8. Is it possible to make a determination regarding the applicability of the selected methodology to the proposed CDM project activity?	/1/ 72-75	DR/I	YES, Refer to 5.4 above.	OK	OK
(c) Project boundary					
5.9. Does the delineation in the PDD of the project boundary meet	/2/	DR/I	YES,	OK	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
the requirements of the selected baseline?	/1/ 78–80		The PDD has correctly described the project boundary including the physical delineation of the proposed CDM project activity within the project boundary and met the requirements of the selected baseline.		
5.10. Have all sources and GHGs required by the methodology been included within the project boundary?	/2/ /1/ 78	DR/I	YES, The emission sources included or excluded from the project boundary for determination of both baseline and project emissions are explained and listed in Table B.3–1. All of gases and sources that need to be included are demonstrated.	OK	OK
5.11. If the methodology allows project participants to choose whether a source or gas is to be included within the project boundary, is the justification provided reasonable?	/2/ /1/ 79 80	DR/I	N/A	OK	OK
(d) Baseline identification					
5.12. Has the PDD identified the baseline for the proposed CDM project activity?	/1/ 81	DR	YES, The PDD identifies the baseline for the proposed CDM project.	OK	OK
5.13. Has any procedure contained in the methodology to identify the most reasonable baseline scenario been correctly applied?	/1/ 82	DR	YES, The PDD correctly applies the procedure contained in the methodology to identify the most reasonable baseline scenario.	OK	OK
5.14. Has each step in the procedure been described in the PDD against the requirements of the methodology?	/1/ 82	DR/I	YES, The PDD follows the steps in the methodology as below: }Step1 <Identification of alternative scenario> –Realistic and credible alternatives have been	GL8 GL9	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			<p>discussed for the disposal of fresh waste in the absence of the project activity(M1–M3) and the power generation(P1–P6). Elimination of the non–feasible options was justified.</p> <p>›Step2 ‹Identify the fuel for the baseline choice of energy source taking into account the national and/or sectoral policies as applicable›</p> <p>–Fuel used for baseline scenario and project activity is identified and it is confirmed that there is no constraint of fuel supply.</p> <p>›Step3 ‹Use Step 2 and/or step 3 of the latest approved version of the 'Tool for the demonstration and assessment of additionality' shall be used to assess which of these alternatives should be excluded from further consideration›</p> <p>–Some of the alternatives are excluded due to a economic barrier.</p> <p>›Step4 ‹Where more than one credible and plausible alternative remains, project participants shall, as a conservative assumption, use the alternative baseline scenario that results in the lowest baseline emissions as the most likely baseline scenario. The least emission alternative will be identified for each component of the baseline scenario. In assessing these scenarios, any regulatory or contractual requirements should be taken into consideration›</p> <p>–Since there is only one alternative scenario this step is not considered</p>		

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			<p> CL8 Evidence of the expectation of increase in the amount of MSW such as statistical data of MSW generation is not provided.</p> <p> CL9 A contract for MSW supply between the local authority and the project owner is not provided.</p>		
5.15. If the selected methodology requires use of tools to establish the baseline scenario, has it been correctly applied?	/1/ 82	DR	YES, The latest version of 'Tool for the demonstration and assessment of additionality' is applied.	OK	OK
5.16. Does the methodology require several alternative scenarios for reasonable baseline scenario? · If yes, are all those scenarios reasonable in the context of the proposed CDM project activity? · Has no reasonable alternative scenario been excluded?	/1/ 83	DR	YES, The methodology require several alternative scenarios for reasonable baseline scenario. In the PDD, alternative scenarios are reasonable in the context of the proposed CDM project activity and no reasonable alternative scenario has been excluded.	OK	OK
5.17. Have the key assumptions and rational been explained and justified? · Are all the assumptions and data used by the project participants listed in the PDD, including their references and sources? · Is all documentation used relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD? · Are the assumption, calculation and rationales used reasonable?	/1/ 84 87(a) 87(b) 87(c) /2/	DR	YES, The key assumptions and rational have been explained and justified and the assumption, calculation and rationales used are reasonable.	OK	OK
5.18. Have all relevant policies and circumstances been identified and correctly considered in Section B.5 of the PDD?	/1/ 85 87(d) /2/	DR/I	YES, All relevant policies and circumstances have been identified and correctly considered.	OK	OK
5.19. Does the PDD provide a verifiable description of the identified baseline scenario, including description of the technology that	/1/ 86	DR/I	YES, The PDD describes the disposal of MSW in the	OK	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
would be employed and/or the activities that would take place in the absence of the proposed CDM project activity?	87(e)		landfill would be employed in the absence of the proposed CDM project activity.		
(e) Algorithms and/or formulae used to determine emission reductions					
5.20. Has the PDD explained how the procedures, in the approved project category to calculate project emissions, baseline emissions, leakage emissions and emission reductions are applied to the proposed project activity?	/1/ 89 /2/	DR/I	<p>YES, The PDD explains how the procedures, in the approved project category to calculate project emissions, baseline emissions, leakage emissions and emission reductions are applied to the project activity.</p> <p><u>✎ CAR2</u> The PDD is not consistent with 'Tool to calculate the emission factor for an electricity system(ver 02.2.0)' from the step 5 although the use of the latest tool is mentioned section B.1. of the PDD.</p> <p><u>✎ CL10</u> Sources of the power grid, ECPG, to which the project is connected to determine CO₂ emission factor not provided.</p>	CAR2 CL10	OK
5.21. Does the PDD clearly state which equations will be used in calculating emission reductions?	/2/	DR	<p>YES, The PDD explains how the procedures, in the approved project category to calculate project emissions, baseline emissions, leakage emissions and emission reductions are applied to the project activity.</p> <p><u>✎ CAR3</u> The PDD assumes the leakage emissions from increased transport, L_{t,y}, to be '0', but there is no quantitative details of distance from collecting</p>	CAR3	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			points of waste to the project site and the landfill provided.		
5.22. Have the equations and parameters in the PDD been correctly applied as per the methodology used?	/1/ 90	DR/I	YES, The equations and parameters in the PDD have been correctly applied and Keco compared them to those in the selected approved methodology and relevant tools.	OK	OK
5.23. If the methodology provides for selection between different options for equations or parameters, has adequate justification been provided and have correct equations and parameters been used in accordance with the methodology selected?	/1/ 90	DR	YES, The equations and parameters in the PDD have been correctly applied and Keco compared them to those in the selected approved methodology. ✓PE _{i,f,y} (fossil-based waste emissions): Option 1 ✓PE _{i,s,y} (waste incineration emissions): Option 2	OK	OK
5.24. (For Section B.6.2 of the PDD) If data and parameters have already been determined and will remain fixed throughout the crediting period without being monitored throughout the crediting period of the proposed CDM project activity. · Are all data sources and assumptions appropriate? · Are calculations are correct, applicable to the proposed CDM project activity? · Will calculations result in a conservative estimate of the emission reductions ?	/1/ 91 /2/	DR/I	There are some parameters that will remain fixed throughout the crediting period without being monitored throughout the crediting period of the proposed CDM project activity. Keco has assessed that all data sources and assumptions are appropriate and calculations are correct, applicable to the proposed CDM project activity and result in a conservative estimate of the emission reductions.	OK	OK
5.25. (For Section B.6.3 of the PDD) Has the PDD provided a transparent ex-ante calculation of project emissions, baseline emissions (or, where applicable, direct calculation of emission reductions) and leakage emissions expected during the crediting period, applying all relevant equations?	/1/ 92 /2/	DR/I	YES, The PDD has provided a transparent ex-ante calculation of project emissions, baseline emissions and leakage emissions. <u>CL11</u> A source of 'China energy statistical year book 2007' for determination of 'NCV _{fuel} ' is not provided. <u>CL12</u>	CL11 CL12	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			The value '0.8' selected for MCF_p to calculate $PE_{CH_4,w,y}$ is not sufficiently explained, while the IPCC document referred to in the methodology provides several options based on the type of treatment.		
5.26. Has it documented how each equation is applied, in a manner that enables the reader to reproduce the calculation?	/1/ 92 /2/	DR	YES, The PDD clearly explains the equations in a manner that enables the reader to reproduce the calculation.	OK	OK
5.27. If the project activity involves more than one component activity, have emission reduction calculations for each of the component been provided separately in a transparent manner?	/2/		N/A	OK	OK
5.28. (For Section B.6.4 of the PDD) Has the PDD summarized the results of the ex-ante estimation of emission reductions for all years of the crediting period, using the tabular form provided?	/2/	DR	YES, The PDD has summarized the results of the ex-ante estimation of emission reductions for all years of the crediting period, in section B.6.4.	OK	OK
5.29. Have all data used to determine the baseline emissions (variables, parameters, data sources etc.) been illustrated in a transparent manner?	/1/ 93 /2/	DR	YES, All data used to determine the baseline emissions have been illustrated in a transparent manner.	OK	OK
6. Additionality of a project activity					
The PDD shall describe how a proposed CDM project activity is additional.	/1/ 94				
6.1. Does project participants describe how a proposed CDM project activity is additional in the PDD?	/1/ 94	DR/I	YES, The PPs have describe how the proposed CDM project activity is additional in the PDD with the 'Tool for the demonstration and assessment of additionality(ver 06.0.0)'. 	OK	OK
6.2. Are all data, rationales, assumptions, justifications and documentation provided by project participants to support the	/1/ 95	DR/I	YES, All data, rationales, assumptions, justifications	GL13 GL14	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
demonstration of additionality reliable and credible?			<p>and documentation provided by the PPs to support the demonstration of additionality reliable and credible.</p> <p><u>✎ CL13</u> Relevant documentation for prior consideration is not provided.</p> <ul style="list-style-type: none"> • Environmental Impact Assessment(EIA) and its approval letter • Feasibility Study Report(FSR) and its approval letter • Official minutes of the Board of the project owner to determine CDM consideration • A CDM consulting agreement • Evidence on the stakeholder meeting including a notice letter, questionnaires answered by stakeholder, pictures taken and etc. • A purchase contract for main equipment • A notification of Chinese NDRC for the project • ERPA signed by CERs buyers and the project owner • A construction contract • Evidence of a bank loan showing the amount and interest rate • BOT agreement • Evidence of the benchmark(footnote 12) <p><u>✎ CL14</u> Following information is not provided in Table B.5-2.</p> <ul style="list-style-type: none"> • O&M costs such as costs for materials, fuels, repair, labour, management and etc. 	CL15 CL16	

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			<ul style="list-style-type: none"> • Operation life time of equipment • Incinerator capacity(per day) • Operating hour per year <p>✍ CL15 Details on the tariff subsidy, 0.25 CNY/kWh, applied to the investment analysis as a revenue for fifteen years are not provided.</p> <p>✍ CL16 Evidence of agreement of disposal charge (tipping fee) between the local government and the project owner is not provided.</p>		
6.3. Does the proposed project activity comply with the latest tools and documents provided by the CDM Executive Board to demonstrate the additionality of proposed CDM project activities, as well as specific complementary or alternative requirements included in approved CDM methodology?	/1/ 96 137	DR	YES, The latest version of 'Tool for the demonstration and assessment of additionality' has been applied and the proposed project activity complies with it.	OK	OK
(a) Prior consideration of the clean development mechanism					
6.4. If this starting date is earlier than the date of publication of the CDM-PDD for global stakeholder consultation, has Section B.5 in the PDD contain a description of how the benefits of the CDM were seriously considered prior to the starting date?	/2/	DR/I	YES, The starting date of the project is 03/07/2010, which is earlier than the date of PDD publication for global stakeholder consultation, 15/07/2011. With benchmark analysis, the PDD has demonstrated that without CDM incentive the investment barrier the project faces is insurmountable.	OK	OK
6.5. Did project participants reported in Section C.1 of the PDD about the start date of the project activity in accordance with the "Glossary of CDM terms"?	/1/ 99 /2/	DR/I	YES, The PDD determines the date of signing of engineering, procurement and construction contract	OK	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.										
			as its starting date(03/07/2010), in accordance with the definition in the glossary of terms.												
6.6. For a new project activity (a project activity with a start date on or after 02 August 2008), if PDD has not been published for global stakeholder consultation or a new methodology proposed to the CDM Executive Board before the project activity start date, did project participants had informed the host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status?	/1/ 100 101	DR	YES, The proposed project is a new project activity since the starting date is after 02/08/2008. In regard with intention to seek CDM status the PPs: ✓Submitted an inform letter on prior consideration of the CDM to the Host Party, People's Republic of China, dated 20/11/2010, which is within six months of the project activity start date(03/07/2010), and ✓Informed UNFCCC of prior consideration of the CDM and the received date is 24/12/2010, which is within six months of the project activity start date(03/07/2010).	OK	OK										
6.7. For an existing project activity(a project activity with a start date before 02 August 2008), for which the start date is prior to the date of publication of the PDD for global stakeholder consultation, are there sufficient and available evidence to support the serious consideration of the CDM in the decision to implement the project activity?	/1/ 100 102(a)	DR	N/A	OK	OK										
6.7.1. Does the evidence from project participants indicate that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation?	/1/ 102(b)	DR	YES, The PPs mentioned activities to seek CDM status in the PDD as below: <table><tr><th>DATE</th><th>EVENTS</th></tr><tr><td>20/06/2008</td><td>Investment Intension Agreement</td></tr><tr><td>10/2008</td><td>Completion of EIA</td></tr><tr><td>11/2008</td><td>FSR completion</td></tr><tr><td>16/06/2009</td><td>EIA approval</td></tr></table>	DATE	EVENTS	20/06/2008	Investment Intension Agreement	10/2008	Completion of EIA	11/2008	FSR completion	16/06/2009	EIA approval	CL13	OK
DATE	EVENTS														
20/06/2008	Investment Intension Agreement														
10/2008	Completion of EIA														
11/2008	FSR completion														
16/06/2009	EIA approval														

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS		Draft Concl.	Final Concl.
			25/07/2009	FSR approval		
			20/08/2009	The Board approved the project under CDM program		
			16/10/2009	CDM consulting agreement		
			21/02/2010	A CDM stakeholder meeting		
			03/07/2010	Engineering, procurement and construction contract ⇒ <i>Starting Date of the project</i>		
			20/11/2010	Notification to China DNA		
			24/12/2010	The project notification confirmed by UNFCCC		
			18/02/2011	Signed ERPA between the CERs buyers and the project owner		
			06/12/2011	LoA from China		
			📎 CL13 Relevant documentation for prior consideration is not provided. Refer to 6.2 above.			
(b) Identification of alternatives						
6.8. Does approved methodology that is selected by the proposed CDM project activity prescribe the baseline scenario so that no further analysis is required?	/1/105	DR/I	NO, The approved methodology does not prescribe the baseline scenario.		OK	OK
6.9. If no above question, does the PDD identify credible alternatives to the project activity in order to determine the most realistic baseline scenario?	/1/105	DR	YES, The PDD identifies credible alternatives to the project activity.		OK	OK
6.9.1. Does the list of alternatives include as one of the options that the project activity is undertaken without being registered as a proposed CDM project activity?	/1/106(a)	DR/I	YES, The list of alternatives in the PDD includes one of the options that the project activity is undertaken without being registered as a		OK	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			proposed CDM project activity. M1 (the project activity, incineration of waste, not implemented as a CDM project), P1 (the project undertaken without CDM program) are selected for consideration of an alternative.		
6.9.2. Does the list contain all plausible alternatives?	/1/ 106(b)	DR/I	YES, The PDD explains all the plausible alternatives.	OK	OK
6.9.3. Do the alternatives comply with all applicable and enforced legislation?	/1/ 106(c)	DR/I	YES, The alternatives comply with all applicable and enforced legislation.	OK	OK
(c) Investment analysis	/1/ 108				
6.10. Does the PDD provide evidence that the proposed CDM project activity would not be below? · The most economically or financially attractive alternative; or · Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs)	/1/ 108	DR/I	YES, The PDD describes that without the sale of certified emission reductions(CERs) the proposed project is not feasible with the investment analysis where the project IRR is determined as 4.91%, which is much lower than the applied benchmark, 8%. <u>CL17</u> Project IRR/ER calculation sheets are not provided.	CL17	OK
6.11. Do project participants demonstrate this through one of the following approaches? · The proposed CDM project activity would produce no financial or economic benefits other than CDM-related income. Document the costs associated with the proposed CDM project activity and the alternatives identified and demonstrate that there is at least one alternative which is less costly than the proposed CDM project activity;	/1/ 109	DR/I	YES, Through the benchmark analysis the PPs demonstrate that the financial returns of the proposed CDM project activity would be insufficient to justify the required investment. The PPs selected the benchmark analysis as below: · Option I (Simple cost analysis)	OK	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
<ul style="list-style-type: none"> · The proposed CDM project activity is less economically or financially attractive than at least one other credible and realistic alternative; · The financial returns of the proposed CDM project activity would be insufficient to justify the required investment. 			<p>Since the proposed project will earn revenues from not only the CDM but also the electricity output, the simple cost analysis method is not applicable;</p> <ul style="list-style-type: none"> · Option II (Investment comparison analysis) It is not used, as the identified alternative (purchase of the power from the grid) does not involve investments; · Option III (Benchmark analysis) It is the key consideration for the project entity to compare the benchmark IRR with estimation of the project investment IRR, therefore, option III is applicable for investment analysis of the proposed project. 		
6.12. Is the plant load factor defined ex-ante in the PDD according to the latest "Guidelines for the reporting and validation of plant load factors"?	/1/ 110	DR	N/A	OK	OK
To verify the accuracy of financial calculations carried out for any investment analysis,	/1/ 111				
6.13. Are all parameters and assumptions used in calculating the relevant financial indicator valid and these parameters accurate and suitable?	/1/ 111(a) 111(b) 111(c)	DR/I	<p>YES, All parameters and assumptions used in calculating the relevant financial indicator are valid and these parameters are accurate and suitable. <u>CL13</u> Relevant documentation for prior consideration is not provided. <u>CL14</u> Following information is not provided in Table B.5-2.</p>	CL13 CL14 CL15 CL16 CL17	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			<p><u>CL15</u> Details on the tariff subsidy, 0.25 CNY/kWh, applied to the investment analysis as a revenue for fifteen years are not provided.</p> <p><u>CL16</u> Evidence of agreement of disposal charge (tipping fee) between the local government and the project owner is not provided.</p> <p><u>CL17</u> Project IRR/ER calculation sheets are not provided.</p>		
6.14. Is the computation carried out and documented by the project participants correct?	/1/ 111(d)	DR	<p>YES, The PPs correctly compute financial parameters.</p> <p><u>CL17</u> Project IRR/ER calculation sheets are not provided.</p>	CL17	OK
6.15. Is the period of assessment limited to the proposed crediting period of the CDM project activity?	/3/ 3	DR	<p>NO, The crediting period of the project is ten (10) years. However, the period of assessment is twenty-three (23) years according to the IRR calculation sheet and the FSR.</p> <p><u>CL17</u> Project IRR/ER calculation sheets are not provided.</p>	CL17	OK
6.16. Does the IRR calculation include the cost of major maintenance and/or rehabilitation if these are expected to be incurred during the period of assessment?	/3/ 3	DR/I	<p>YES, In the O&M cost, repair costs have been included.</p> <p><u>CL17</u> Project IRR/ER calculation sheets are not provided.</p>	CL17	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
6.17. Does the fair value of project activity assets at the end of the assessment period include as a cash inflow in the final year?	/3/ 4	DR	YES, The fair value is included at the end of the assessment period under the name of 'recovered circulation fund' in the IRR sheet. <u>CL17</u> Project IRR/ER calculation sheets are not provided.	CL17	OK
6.18. Is the fair value calculated in accordance with local accounting regulations where available, or international best practice?	/3/ 4	DR	YES, The fair value is calculated in accordance with local accounting regulations. <u>CL17</u> Project IRR/ER calculation sheets are not provided.	CL17	OK
6.19. Are depreciation, and other non-cash items related to the project activity, which have been deducted in estimating gross profits on which tax is calculated, added back to net profits for the purpose of calculating the financial indicator?	/3/ 5	DR	YES, Throughout the calculation process of the project IRR, non-cash items such as depreciation and amortization have not been considered as an actual expense so there is no double counting. <u>CL17</u> Project IRR/ER calculation sheets are not provided.	CL17	OK
6.20. Are all of the input values used in investment analysis valid and applicable at the time of the investment decision taken by the project participants?	/3/ 6	DR/I	YES, All of the input values used in investment analysis valid and applicable at the time of the investment decision taken by the project participants. <u>CL13</u> Relevant documentation for prior consideration is not provided. <u>CL14</u>	CL13 CL14 CL15 CL16 CL17	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			<p>Following information is not provided in Table B.5-2.</p> <p><u>✎ CL15</u> Details on the tariff subsidy, 0.25 CNY/kWh, applied to the investment analysis as a revenue for fifteen years are not provided.</p> <p><u>✎ CL16</u> Evidence of agreement of disposal charge (tipping fee) between the local government and the project owner is not provided.</p> <p><u>✎ CL17</u> Project IRR/ER calculation sheets are not provided.</p>		
6.21. Are the listed input values consistently applied in all calculations?	/3/ 6	DR	<p>YES, Input values are consistently applied in all calculations.</p> <p><u>✎ CL15</u> Details on the tariff subsidy, 0.25 CNY/kWh, applied to the investment analysis as a revenue for fifteen years are not provided.</p> <p><u>✎ CL16</u> Evidence of agreement of disposal charge (tipping fee) between the local government and the project owner is not provided.</p> <p><u>✎ CL17</u> Project IRR/ER calculation sheets are not provided.</p>	CL15 CL16 CL17	OK
6.22. In the case of project activity for which implementation ceases after the commencement and where implementation is recommenced due to consideration of the CDM, does the	/3/ 7	DR	N/A	OK	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
investment analysis reflect the economic decision making context at point of the decision to recommence the project?					
6.23. Did project participants supply spreadsheet versions of all investment analysis?	/3/ 8	DR	YES, The PPs have provided a IRR calculation sheet. <u>CL17</u> Project IRR/ER calculation sheets are not provided.	CL17	OK
6.24. Are the all formulas used in the analysis readable and all relevant cells viewable and unprotected?	/3/ 8	DR	YES, All the formulas used in the analysis readable and all relevant cells viewable and unprotected. <u>CL17</u> Project IRR/ER calculation sheets are not provided.	CL17	OK
6.25. Is not the cost of financing expenditures included in the calculation of project IRR?	/3/ 9	DR	No, The cost of financing expenditures such as loan repayments and interest has not been included in the calculation of the project IRR. Therefore, there is no double counting in the calculation. <u>CL17</u> Project IRR/ER calculation sheets are not provided.	CL17	OK
6.26. In the calculation of equity IRR, are the portion of investment cost which is financed by equity just considered as the net cash outflow and the portion of investment costs which is financed by debt not considered a cash outflow?	/3/ 10	DR	N/A The benchmark ration is for a project IRR.	OK	OK
6.27. In cases where a project IRR is calculated, is a pre-tax benchmark applied?	/3/ 11	DR	NO, A benchmark, 8%(after income-tax), derived from a document, 'Methods and parameters for economical appraisal for construction project', is applied. However, actual interest payable is	CL18	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			taken into account in the calculation of income tax as per 'Guidelines on the assessment of investment analysis'. <u>CL18</u> The document of a benchmark ratio was released in 2003 while the FSR was completed in Nov. 2008. Thus, the latest document of a benchmark ratio should be checked, found and provided.		
6.28. Were the sensitivity analysis by the project participants to determine under what conditions variations in the result would occur, and the likelihood of these conditions assessed?	/1/ 111(e)	DR/I	YES, There are five parameters that are to be considered.	OK	OK
6.29. For the sensitivity analysis, are only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues, subjected to variation?	/3/ 20	DR	YES, Variables including the construction investment, O&M costs, MSW disposal charge, electricity delivered to the grid and electricity tariff are subjected to variation.	OK	OK
6.30. Are the results of this variation for the sensitivity analysis presented in the PDD and reproducible in the associated spreadsheets?	/3/ 20	DR	YES, The results of the variation for the sensitivity analysis are presented in the PDD and reproducible. <u>CL17</u> Project IRR/ER calculation sheets are not provided.	CL17	OK
6.31. For the sensitivity analysis is the range of variations reasonable in the project context?	/3/ 21	DR	YES, As per 'Guidance on the assessment of investment analysis', the sensitivity was conducted over a range of $\pm 10\%$.	OK	OK
To confirm the suitability of any benchmark applied in the investment analysis,	/1/ 112				

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
6.32. Is the type of benchmark applied suitable for the type of financial indicator presented?	/1/ 112(a) /3/ 12	DR	YES, The PPs used an appropriate benchmark for power industry supplied by NDRC China for the project IRR. <u>CL18</u> The latest document of a benchmark ratio should be checked, found and provided considering the document, 'Interim rules on economic assessment of electrical engineering retrofit Projects', was released in 2003 while the FSR was completed in Nov. 2008.	CL18	OK
6.33. Do risk premiums applied in determining the benchmark reflect the risk profile associated with the project type or activity?	/1/ 112(b)	DR	NO, In China, the officially approved benchmark is commonly used for assessment of a project investment. No risk premium is applied in determining the benchmark.	OK	OK
6.34. Is it reasonable to assume that no investment would be made at a rate of return lower than the benchmark?	/1/ 112(c)	DR/I	YES, The project IRR, 4.91%, is lower than the benchmark, 8%, so the investment in the project is unlikely.	OK	OK
6.35. In the cases of projects which could be developed by an entity other than the project participants, did project participants use the benchmark based on publicly available data sources which can be clearly validated?	/3/ 13	DR	N/A	OK	OK
6.36. Is internal company benchmarks/expected returns applied?	/3/ 14	DR	NO	OK	OK
6.37. If the benchmark based on parameters that are standard in the market, is the cost of equity determined either by: (a) selecting the values provided in Appendix A of /3/; or by (b) calculating the cost of equity using best financial practices,	/3/ 15	DR	N/A The project uses a project IRR for an investment analysis.	OK	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
based on data sources?					
6.38 If a company's internal benchmark used for the expected return on equity, is the cost of debt based on the weighted average cost of debt financing of the legal entity owning the CDM project activity?	/3/ 16	DR	N/A The project uses a project IRR for an investment analysis.	OK	OK
6.39 If a company's internal benchmark is used for the expected return on equity, are the percentage of debt financing and equity financing reflect the long-term debt/equity finance structure of the legal entity owning the assets of the project activity?	/3/ 17	DR	N/A The project uses a project IRR for an investment analysis.	OK	OK
6.40 If the benchmark is based on parameters that are standard in the market, is the typical debt/equity finance structure observed in the sector of the country used?	/3/ 18	DR	N/A The project uses a project IRR for an investment analysis.	OK	OK
6.41. Did project participants rely on values from Feasibility Study Reports(FSR) that are approved by national authorities for proposed CDM project activities?	/1/ 113	DR/I	YES, The PPs rely on values from the FSR approved by Fujian Provincial DRC. <u>CL13</u> Relevant documentation for prior consideration is not provided.	CL13	OK
6.41.1. Is the period of time between the finalization of the FSR and the investment decision sufficiently short that it is unlikely the input values would have materially changed?	/1/ 113(a)	DR/I	YES, Nine months after the FSR completion(Nov. 2008), the board of C&G Environmental Protection(Fuqing) Co. Ltd. decided to develop the project under CDM program(20/08/2009). Therefore, it is confirmed that the period between FSR study and the board resolution is short that it is unlikely the input values would have materially changed.	OK	OK
6.41.2. Are the values used in the PDD and associated annexes are fully consistent with the FSR?	/1/ 113(b)	DR/I	YES, The values used in the PDD and associated	CL13	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			annexes are fully consistent with the FSR. <u>CL13</u> Relevant documentation for prior consideration is not provided.		
6.41.3. Are the input values from the FSR valid and applicable at the time of the investment decision?	/1/ 113(c)		ES, All of the input values used in investment analysis valid and applicable at the time of the investment decision taken by the PPs. <u>CL13</u> Relevant documentation for prior consideration is not provided.	CL13	OK
(d) Barrier analysis	115				
6.42. Has the PDD demonstrated that the proposed CDM project activity faces barriers that; · Prevent the implementation of this type of proposed CDM project activity · Do not prevent the implementation of at least one of the alternatives	/1/ 115	DR	N/A Since this Step 3. 'Barrier analysis' is optional when Step 2. 'Investment analysis' is satisfactory, the PPs skipped the analysis as per 'Tool for the demonstration and assessment of additionality'.	OK	OK
6.43. Are not the barriers presented issues that have a clear direct impact on the financial returns of the project activity?	/1/ 116	DR	N/A	OK	OK
6.44. Is existence of barriers substantiated by independent sources?	/1/ 117(a)	DR/I	N/A	OK	OK
6.45. Do the barriers prevent the implementation of the project activity but not the implementation of at least one of the possible alternatives?	/1/ 117(b)	DR/I	N/A	OK	OK
(e) Common practice analysis	/1/ 119				
6.46. Is the geographical scope(i.e. the defined region) of the common practice analysis appropriate for the assessment of common practice related to the project activity's technology or	/1/ 120(a)	DR/I	YES, Since the conditions such as location, infrastructure, economical situation, and	OK	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
industry type?			development vary from province to province in the ECPG, Keco judges the presented region, Fujian Province, is considered appropriate for the common practice analysis.		
6.47. Were official sources and local and industry expertise used to determine to what extent similar and operational projects (i.e. using similar technology or practice), other than CDM project activities, have been undertaken in the defined region?	/1/ 120(b)		<p>YES,</p> <p>According to 'MSW construction plan issued by People's Government of Fujian Province', there are eight similar projects that started commercial operation before the start date of the project(03/07/2010) in Fujian Province. After leaving out two projects that are in progress under CDM and three projects that are out of the design output range(9–27MW:±50% of the project activity, 18MW), only three project, 1)Fujian Hongmiaoling MSW Incineration Project, 2)Fujian Shishi MSW Incineration Project, and 3)Putian waste incineration project are to remain for further consideration</p> <p><u>CL19</u></p> <p>Details whether the three incineration projects have power generation system are not provided.</p>	CL19	OK
6.48. If similar and operational projects, other than CDM project activities, are already "widely observed and commonly carried out" in the defined region, are there the essential distinctions between the proposed CDM project activity and the other similar activities?	/1/ 120(c)		<p>YES,</p> <p>It is assessed that there are essential distinctions between the proposed CDM project activity and the similar projects in perspective of company ownership(stated-owned or not), financial resource, and unit investment cost. The similar projects have a better financial indicator than the proposed project.</p> <p>Moreover, taking into account the financial</p>	OK	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			difficulty faced by the project owner in the construction of the project and the project's poor rate of return, the project owner decided to proceed with the implementation of the project only if it is registered as a CDM project. Thus, the proceed of CERs is a key element for the project.		
7. Monitoring plan					
The PDD shall include a monitoring plan. This monitoring plan shall be based on the approved monitoring methodology applied to the proposed CDM project activity.	/1/ 122				
7.1. (For section B.7 of the PDD) Has the PDD noted that data monitored and required for verification and issuance are to be kept for a minimum of two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later?	/2/	DR	YES, The PDD has noted that all the data monitored under the monitoring plan will be kept in electronic and hard copy format for two years after the end of crediting period.	OK	OK
7.2. (For section B.7 of the PDD) If data and parameters will be monitored on implementation and hence become available only after validation of the project activity, are the estimates provided in the PDD for these data and parameters reasonable?	/2/	DR/I	YES, There are main parameters to be monitored on implementation and hence become available only after validation of the project activity as below. ✓For baseline emissions: • W_x (total amount of organic waste) This parameter is also referred to as $A_{MSW,y}$, $Q_{biomass,y}$ in the methodology AM0025 and a key factor for determination of MB_y (methane emissions from the landfill site in the absence of the project activity in year y). W_x is to be measured by a weighbridge automatically which will be calibrated by skilled technicians.	OK	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			<ul style="list-style-type: none"> • $EG_{d,y}$(amount of electricity generated utilizing combustion heat from incineration in the project activity) This parameter is a key factor for $BE_{EN,y}$ (baseline emissions from generation of energy displaced by the project activity in year y). It will be measured by main electricity meters that are also subject to calibration by skilled technicians. Payment invoices made to the grid operator and payment receipts will be cross-checked for verification of the electricity. ✓For project emissions: <ul style="list-style-type: none"> • $EG_{PJ,EF,y}$(amount of electricity consumed by the grid as a result of the project activity) This parameter will be monitored to determine project emissions from grid electricity use ($PE_{elec,y}$) and measured using the electricity meters. • $F_{cons,y}$(diesel oil consumption) This parameter will be monitored to determine project emissions from fuel use on-site ($PE_{fuel,on-site,y}$) and this will be cross-checked with paid fuel invoices. • $A_{MSW,y}$(also referred to as $Q_{biomass}$, amount of MSW fed into the incinerators) This parameter will be monitored to determine project emissions from waste incineration ($PE_{i,y}$) and as mentioned above, this will be measured by a weighbridge. • $Q_{COD,y}$(amount of waste waster treated 		

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			anaerobically or released untreated from the project activity in year), $P_{COD,y}$ (Chemical Oxygen Demand(COD) of wastewater($tCOD/m^3$). These parameters will be monitored to determine project emissions from wastewater treatment($PE_{w,y}$). ✓Other than these parameters used for calculation for baseline and project emissions are default values or constants.		
For compliance of the monitoring plan with the approved methodology					
7.3. Is the list of parameters required by the selected approved methodology identified in Section B.7.1 of the PDD, using tabular form provided by guideline for completing the PDD?	/1/ 123(a) /2/	DR	YES, There is a list of parameters required by the approved methodology in the PDD.	OK	OK
7.4. Does the monitoring plan contain all necessary parameters?	/1/ 123(a)	DR	YES, The monitoring plan contains all necessary parameters.	OK	OK
7.5. Are the parameters clearly described?	/1/ 123(a) /2/	DR/I	YES, The PPs clearly explains the parameters in the PDD.	OK	OK
7.6. Does the means of monitoring described in the plan comply with the requirements of the methodology?	/1/ 123(a)	DR	YES, The means of monitoring described in the plan comply with the requirements of the methodology.	OK	OK
For implementation of the plan					
7.7. Are the monitoring arrangements described in the monitoring plan feasible within the project design?	/1/ 123(b)	DR	YES, By reviewing the provided operation plan and on-site interview with the PPs, Keco confirms that the monitoring arrangements described in the monitoring plan are feasible within the	CL20 CL21 CL22 CL23	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			<p>project design.</p> <p><u>CL20</u> A diagram showing location of meters measuring in and outflow of the electricity from the on-site transformer station(sub-station) and etc., is not provided.</p> <p><u>CL21</u> A summary of details of metering equipment such as a type(model), an operation entity, a calibration entity/frequency, accuracy, recording frequency and etc, in a tabular form is not provided.</p> <p><u>CL22</u> The grid company to check meters for $EG_{d,y}$ and $EG_{PJ,EF,y}$ is not clarified.</p> <p><u>CL23</u> There is no $P_{COD,y}$ for waste water COD along with eight parameters to be monitored in sector B.7.2.</p>		
7.8. Is the means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures, sufficient to ensure that the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified?	/1/ 123(b)	DR/I	<p>YES,</p> <p>The parameters to be monitored are largely the total amount of MSW for the feed of incinerators and the electricity generated to the grid. Generally, the amount of electricity transferred to the grid is to be cross-checked with two meters, one at the project site and the other at the grid part. Monitoring equipment is planned to be properly installed in the project.</p>	OK	OK
7.9. Have the operational and management structure that the project	/2/	DR/I	YES,	OK	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
operator will implement in order to monitor emission reductions and any leakage effects generated by the project activity been described in the PDD?			The PDD demonstrates an operational and management structure.		
7.10. Have the responsibilities for and institutional arrangements for data collection and archiving been clearly indicated in the PDD?	/2/	DR	YES, The PDD demonstrates the responsibilities for and institutional arrangements for data collection and archiving.	OK	OK
7.11. Has the monitoring plan reflected good monitoring practice appropriate to the type of project activity?	/2/	DR	YES, CL24 A monitoring manual and operation plan for the project facility are not provided.	CL24	OK
8. Sustainable development					
CDM project activities shall assist Parties not included in Annex I to the Convention in achieving sustainable development.	/1/ 125				
8.1 Does the letter of approval by the DNA of the host Party confirm the contribution of the proposed CDM project activity to the sustainable development of the host Party?	/1/ 126	DR	YES, The DNA of the Host country, People's Republic of China has issued the Letter of Approval(LoA) and confirmed the contribution of the project to the sustainable development. CAR1 Same as 1.1 above	CAR1	OK
9. Local stakeholder consultation					
Local stakeholders shall be invited by the PPs to comment on the proposed CDM project activity prior to the publication of the PDD on the UNFCCC website.	128				
9.1. Were stakeholders invited by the project participants to comment on the proposed CDM project activity prior to the	/1/ 128	DR/I	YES, Keco finds the stakeholder meeting was held	CL13	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
publication of the PDD on the UNFCCC web site?			on 21/02/2010 and questionnaires were distributed to fifty local stakeholders through the on-site visit. <u>CL13</u> Evidence on the stakeholder meeting including the notice letter, questionnaires answered by stakeholder, pictures taken and etc. are not provided.		
9.2. Have comments by local stakeholder that can reasonably be considered relevant for the proposed CDM project activity, been invited?	/1/ 129(a)	DR	YES, The comments by the stakeholders have been invited and Keco has cross-checked it with real questionnaires and an interview. <u>CL13</u> Same as 9.1 above.	CL13	OK
9.3. Has the PDD described the process by which comments by local stakeholder have been invited and compiled?	/2/	DR	YES, The description how comments by local stakeholders have been invited and compiled is presented in the PDD.	OK	OK
9.4. Was an invitation for comments by local stakeholders made in an open and transparent manner, in a way that facilitates comments to be received from local stakeholders and allows for a reasonable time for comments to be submitted.(in Section E.1 of the PDD)?	/2/	DR/I	YES, Keco confirms that an invitation for comments by local stakeholders was made in an open and transparent manner through an interview with a couple of stakeholders during the on-site visit.	OK	OK
9.5. Do project participants describe a project activity in a manner which allows the local stakeholders to understand the project activity, taking into account confidentiality provisions of the CDM modalities and procedures.(in Section E.1 of the PDD)?	/2/	DR/I	YES, By interviewing stakeholders Keco can confirm that the PPs described a project activity in a manner which allowed the stakeholders to understand the project activity.	OK	OK
9.6. Is the summary of the comments received complete in Section E.2 of the PDD?	/1/ 129(b)	DR/I	YES, The summary of the comments is described in	OK	OK

REQUIREMENT CHECK LIST	Ref. §	MoV	COMMENTS	Draft Concl.	Final Concl.
			the PDD in a tabular form.		
9.7. Have the project participants taken due account of any comments received and described this process in Section E.3 of the PDD?	/1/ 129(c)	DR/I	YES, The PPs are to take countermeasures to the comments, which has been described in the PDD.	OK	OK
10. Environmental impacts					
Project participants shall submit documentation to the DOE on the analysis of the environmental impacts of the project activity in accordance with paragraph 37(c) of the CDM modalities and procedures	/1/ 131				
10.1. Have project participants submitted documentation on the analysis of the environmental impacts of the project activity?	/1/ 131	DR/I	YES, CL13 EIA is not submitted.	GL13	OK
10.2. If an environmental impact assessment required by the host Party, have the project participants undertaken an analysis of environmental impacts?	/1/ 131 132	DR/I	YES, The PPs performed EIA and obtained an approval by Fujian Provincial Protection Bureau. CL25 It is not clear whether the project activity is controlled under the EIA law and/or which category the project activity is classified into under the EIA law. CL26 In response to the comment received by stakeholder, treatment of dioxin and how to solidify the fly ash should be described.	GL25 GL26	OK

/1/ Validation and Verification Manual (ver. 01.2)

/2/ Guidelines for completing the project design document(CDM-PDD) and the form for proposed new methodologies(CDM-NM) (ver. 07)

/3/ Guidelines on the assessment of investment analysis (ver. 05)

Table 3. Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by Validation team	Ref. to checklist question in table 2	Summary of the project participants responses	Review comment for each PDD by DOE	Conclusion
CAR1 A written letter of approval(LoA) from DNA of Finland is not provided.	1.1/1.2.1/1.2.4 /1.3/1.4/1.5/ 1.6/1.7/2.3/2.5 /8.1	A LoA from the host country is provided.	LoAs from the host country and the investment country are provided. So CAR1 is closed.	OK
CAR2 The PDD is not consistent with 'Tool to calculate the emission factor for an electricity system(ver 02.2.0)' from the step 5 although the use of the latest tool is mentioned section B.1. of the PDD.	5.20	'Tool to calculate the emission factor for an electricity system(ver 02.2.1)' is applied to the project instead of version 02.2.0.	The PPs follows the tool to calculate the emission factor. So CAR2 is closed.	OK
CAR3 The PDD assumes the leakage emissions from increased transport, $L_{t,y}$, to be '0', but there is no quantitative details of distance from collecting points of waste to the project site and the landfill provided.	5.21	There is 100 meter distance between the landfill and the project site.	Keco confirms that waste collecting points are located closer to the incineration plant than the existing landfill site, which is validated to be compliance with the actual situation through the on-site visit. So CAR3 is closed.	OK
CL1 Information of Fuqing Yibadi landfill such as a treatment capacity per day, operating start date, operation entity, distance from collection point(s)/area(s), current situation whether the landfill is in operation, how much MSW is disposed of, location, and etc. are not detailed.	4.1	The information of landfill site is added in the PDD(ver 02)	Brief information of the landfill is detailed in the PDD. So CL1 is closed.	OK
CL2	4.4	There are 86 staff to be hired	The number is confirmed through the FSR.	OK

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There are stakeholder's comments received on this matter. 'Issue 4' mentions that if the incinerator burns recyclable materials, the locals who make a living by recovering recyclable materials from municipal wastes will lose even this livelihood. Please provide how many employees can be hired due to this project		as per the FSR(p123).	So CL2 is closed.	
CL3 Details on any biogas generated during the course of the MSW treatment is not provided.	4.6	Details of any biogas generated during the course of MSW treatment is added in the PDD.	Explanation of biogas generated from the project is provided in the PDD. So CL3 is closed.	OK
CL4 Some of the technical specifications of main equipment such as a boiler, wastewater treatment facility are not provided.	4.6	Specification of boilers and waste water treatment are added in the PDD.	The parameters of waste incinerators, turbines, generators, boilers and waste water treatment are provided in Table 4.3-1/2/3/4/5 in the PDD. So CL4 is closed.	OK
CL5 Technical lifetime are not mentioned when describing main equipment.	4.6	Technical lifetime for main equipment are added in the PDD.	Technical lifetime of waste incinerators, turbines, generators, boilers and waste water treatment are provided in Table 4.3-1/2/3/4/5 in the PDD. So CL5 is closed.	OK
CL6 Calculation steps for total generation of electricity per year and annual net electricity delivered to the ECPG are not detailed. In doing so, parameters such	4.6	Detailed calculation steps of total generation and net electricity delivered to the ECPG are added in the PDD.	Calculation steps for total generation of electricity per year(113,900MWh/y)and annual net electricity(87,703MWh/y) delivered to the ECPG are provided considering the calorific value of MSW, the designed LVH, internal consumption rate, and transmission loss in the PDD.	OK

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as line loss rate, amount of self consumption and calorific value of MSW should be mentioned in the PDD.			So CL6 is closed.	
CL7 The reason that the energy from 385 ton of diesel is less than 50% of the total is not explained quantitatively.	5.4	Calculation steps for energy generated from diesel oil and the total energy generated from the incineration are added in the PDD.	Quantitative description of energy generated from diesel oil consumption and how this value is less than 50% of the total energy from the incineration is provided in the PDD. So, CL7 is closed.	OK
CL8 Evidence of the expectation of increase in the amount of MSW such as statistical data of MSW generation is not provided.	5.14	The FSR where the expectation of MSW increasing is stated is provided.	Keco confirms that the provided FSR states the amount of daily MSW is expected to increase considering population of Fuqing city by 2020. So, CL8 is closed.	OK
CL9 A contract for MSW supply between the local authority and the project owner is not provided.	5.14	BOT agreement has been provided.	Keco confirms the provided BOT agreement signed between the project owner and the local authority where the tariff, tipping fee, concession period, etc. are agreed. So, CL9 is closed.	OK
CL10 Sources of the power grid, ECPG, to which the project is connected to determine CO ₂ emission factor not provided.	5.20	Relevant documentation is provided.	Evidence of the ECPG to determine CO ₂ emission factor and of the amount of low-cost/must-run resources to calculate the 'Operating Margin' has been provided. So, CL10 is closed.	OK
CL11 A source of 'China energy statistical year book 2007' for determination of 'NCV _{fuel} ' is not provided.	5.25	Relevant documentation is provided.	'China energy statistical yearbook 2009' is provided and Keco confirms that NCV _{fuel} corresponds to 42,652×10 ⁻⁶ TJ/ton. So, CL11 is closed.	OK

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CL12 The value '0.8' selected for MCF_p to calculate $PE_{CH_4,w,y}$ is not sufficiently explained, while the IPCC document referred to in the methodology provides several options based on the type of treatment.	5.25	The justification of the choice for value 0.8 for the parameter MCF_p has been explained in the PDD.	Since the project uses an anaerobic reactor to treat leachate generated, 0.8 for the parameter MCF_p in accordance with 2006 IPCC Guideline is correct. So, CL20 is closed.	OK
CL13 Relevant documentation for prior consideration is not provided. <ul style="list-style-type: none"> Environmental Impact Assessment(EIA) and its approval letter Feasibility Study Report(FSR) and its approval letter Official minutes of the Board of the project owner to determine CDM consideration A CDM consulting agreement Evidence on the stakeholder meeting including a notice letter, questionnaires answered by stakeholder, pictures taken and etc. A purchase contract for main equipment A notification of Chinese NDRC for the project ERPA signed by CERs buyers and the 	6.2/6.7.1/6.13 /6.20/6.41/ 6.41.2/6.41.3/ 9.2/10.1	Relevant documentation is provided.	Relevant documentation to assess prior consideration is provided. So, CL13 is closed.	OK

Draft report clarifications and corrective action requests by Validation team	Ref. to checklist question in table 2	Summary of the project participants responses	Review comment for each PDD by DOE	Conclusion
project owner • A construction contract • Evidence of a bank loan showing the amount and interest rate • BOT agreement • Evidence of the benchmark(footnote 12)				
CL14 Following information is not provided in Table B.5-2. • O&M costs such as costs for materials, fuels, repair, labour, management and etc. • Operation life time of equipment • Incinerator capacity(per day) • Operating hour per year	6.2/6.13/6.20	Details are provided in Table B.5-2. and Table section A.4.3 of the PDD.	Keco cross-checked the values provided with the FSR and equipment purchase agreement and confirms they are consistent. So, CL14 is closed.	OK
CL15 Details on the tariff subsidy, 0.25 CNY/kWh, applied to the investment analysis as a revenue for fifteen years are not provided.	6.2/6.13/6.20 /6.21	The document "The Tentative Management Measures for Renewable Power Pricing and Cost Sharing" is provided for validation indicating that the waste incineration power generation project in China, belonged to biomass power projects, could enjoy the subsidy electricity tariff 0.25 CNY/kWh for 15 years since operation.	Keco confirms that the provided documentation regulates that the electricity tariff for the biomass powered plant over the first 15 years in the operation lifetime is increased by 0.25RMB/kWh on the basis of the 2005 year's tariff for the newly built coal-fired power plant equipped with desulfurization system and the subsidy of 0.25RMB/kWh shall be removed for the rest of the operation lifetime. So, CL15 is closed.	OK
CL16	6.2/6.13/6.20	BOT agreement has been	Keco confirms the provided BOT agreement signed	OK

Draft report clarifications and corrective action requests by Validation team	Ref. to checklist question in table 2	Summary of the project participants responses	Review comment for each PDD by DOE	Conclusion
Evidence of agreement of disposal charge (tipping fee) between the local government and the project owner is not provided.	/6.21	provided.	between the project owner and the local authority where the tariff, tipping fee, concession period, etc. are agreed. So, CL16 is closed.	
CL17 Project IRR/ER calculation sheets are not provided.	6.10/6.13/6.14 /6.15/6.16/ 6.17/6.18/6.19 /6.20/6.21/ 6.23/6.24/6.25 /6.30	Project IRR/ER calculation sheets are provided.	Keco reviewed the provided project IRR calculation sheet and the ER calculation sheet and confirms that the values in the sheets are consistent with the PDD and the FSR. Calculation steps and the results are considered appropriate. So, CL17 is closed.	OK
CL18 The document of a benchmark ratio was released in 2003 while the FSR was completed in Nov. 2008. Thus, the latest document of a benchmark ratio should be checked, found and provided.	6.27/6.32	For the benchmark, "Economical Assessment and Parameters for Construction Project(version 3)" issued by National Development & Reform Committee and the Ministry of Construction in 2006 is used. According to this document, the financial benchmark IRR for MSW-based power generation in China is 8% (after tax).	The PDD is revised to apply the latest document released by national authority for the benchmark IRR. So, CL18 is closed.	OK
CL19 Details whether the three incineration projects have power generation system are not provided.	6.47	Common practice analysis is revised as per "Tool for the demonstration and assessment of additionality(ver 06.0.0)". Among three similar projects, there is only one that has both electricity and heat generation.	Keco confirms that the PDD correctly applies the tool for common practice analysis and found that there is one project with power generation system. However, the corresponding project is a cogeneration plant. So, CL19 is closed.	OK

Draft report clarifications and corrective action requests by Validation team	Ref. to checklist question in table 2	Summary of the project participants responses	Review comment for each PDD by DOE	Conclusion
CL20 A diagram showing location of meters measuring in and outflow of the electricity from the on-site transformer station(sub-station) and etc, is not provided.	7.7	A diagram showing the monitoring parameters of the project are added in the PDD.	Figure B.7.2.2 and Table B.7.2-1 are provided to detail the location of meters to measure in and outflow of the electricity from the on-site transformer station(sub-station) and etc. So, CL20 is closed.	OK
CL21 A summary of details of metering equipment such as a type(model), an operation entity, a calibration entity/frequency, accuracy, recording frequency and etc, in a tabular form is not provided.	7.7	The operation entity, calibration entity and the company to check the meters are added in the PDD.	Monitoring methods and equipment for the required parameters are detailed in section B.7.2 of the PDD. So, CL21 is closed.	OK
CL22 The grid company to check meters for $EG_{d,y}$ and $EG_{PJ,EF,y}$ is not clarified.	7.7	Fuzhou Electric Power Company will be responsible for checking the meters of the project.	The PDD clearly describes the a company to check meters for $EG_{d,y}$ and $EG_{PJ,EF,y}$. So, CL22 is closed.	OK
CL23 There is no $P_{COD,y}$ for waste water COD along with eight parameters to be monitored in sector B.7.2.	7.7	$P_{COD,y}$ and $Q_{COD,y}$ have been included as monitoring parameters in the PDD.	The PDD correctly revised to add $P_{COD,y}$ and $Q_{COD,y}$ to calculate $PE_{w,y}$. So, CL23 is closed.	OK
CL24 A monitoring manual and operation plan for the project facility are not provided.	7.11	Relevant documentation is provided.	A monitoring manual and operation plan for the project facility are provided. So, CL24 is closed.	OK
CL25 It is not clear whether the project activity is controlled under the EIA law	10.2	"EIA Classification Management Directory of Construction Project" issued by Central People's	Keco confirms that MSW incineration power generation is classified into Category E(Electricity) and sub-item 3(Biogas power generation). as per "EIA Classification	OK

Draft report clarifications and corrective action requests by Validation team	Ref. to checklist question in table 2	Summary of the project participants responses	Review comment for each PDD by DOE	Conclusion
and/or which category the project activity is classified into under the EIA law.		Government of the People's Republic of China is added in D.1 of PDD version 02. Based on the Directory, the waste incineration project is classified into Category E(Electricity) Item 2 (Biomass power generation).	Management Directory of Construction Project". So, CL25 is closed.	
CL26 In response to the comment received by stakeholder, treatment of dioxin and how to solidify the fly ash should be described.	10.2	A control method of dioxin and other air pollutants as well as fly ash are detailed described based on the EIA report in the PDD.	Details on air pollution treatment are provided in the PDD which is based on the provided EIA report. So, CL26 is closed.	OK