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# VALIDATION REPORT

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## SHENYANG LAOHUCHONG LFG POWER GENERATION PROJECT IN CHINA

REPORT No. 2008-9050

REVISION No. 01



# VALIDATION REPORT

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CERTIFICATION AS

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Approved by: Michael Lehmann	Organisational unit: DNV Climate Change Services
Client: Asja Ambiente Italia Spa	Client ref.: Alberto Manzone

**Project Name:** Shenyang Laohuchong LFG Power Generation Project  
**Country:** China  
**Methodology:** ACM0001  
**Version:** 06  
**GHG reducing Measure/Technology:** capture and burn biogas and generate electricity.  
**ER estimate:** 136,570 tonnes CO<sub>2</sub> in average per year for 10 years.

## Size

☒ Large Scale

☐ Small Scale

## Validation Phases:

☒ Desk Review

☒ Follow up interviews

☒ Resolution of outstanding issues

## Validation Status

☒ Corrective Actions Requested

☒ Clarifications Requested

☒ Full Approval and submission for registration

☐ Rejected

In summary, it is DNV's opinion that the "Shenyang Laohuchong LFG Power Generation Project" in China, as describe in the PDD version 3 of June 16, 2008 meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0001 version 06.

DNV thus requests the registration of the project as a CDM project activity.

Report No.: 2008-9050	Date of this revision: 2008/06/30	Rev. No. 01
Report title: Shenyang Laohuchong LFG Power Generation Project in China		
Work carried out by: Rita Valoroso, Elfride Covarrubias, Tang Zhi Ang, Luis Filipe Tavares.		
Work verified by: Anjana Sharma (applicant draft report), Hendrik Brinks (draft report); Barbara Lara (applicant final report), Mari Grooss Viddal (final report)		

Key words:

Climate Change, Kyoto Protocol,  
Validation, Clean Development Mechanism

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### Abbreviations

AC	Percentage of electrical energy used for the biogas plant auto-consumption
AF	Adjustment Factor
BE	Baseline Scenario
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CH <sub>4</sub>	Methane
CNEPW	China North East Electric Power Grid
CL	Clarification Request
CO <sub>2</sub>	Carbon Dioxide
DNA	Designated National Authority
DNV	Det Norske Veritas
DOC	Fraction of degradable organic carbon dissimulated
EB	Executive Board
EF	Emission Factor
EF <sub>BM</sub>	Build Margin Emission Factor
EF <sub>OM</sub>	Operating Margin Emission Factor
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ER	Emission Reduction
F	Fraction by volume of CH <sub>4</sub> in landfill gas
FSR	Feasibility Study Report
GEF	Global Environmental Facility
GHG	Greenhouse gas(es)
HDPE	High-density polyethylene
H <sub>2</sub> S	Hydrogen sulphide
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate Return
k	Methane generation rate constant
LFG	Landfill gas
Lo	Methane generation potential
MCF	Methane Correction Factor
MP	Monitoring Plan
MW	Mega Watt
NCV	Net Calorific Value
NDRC	National Development and Reform Commission of the People's Republic of China
O <sub>2</sub>	Oxygen
O&M	Operation & Maintenance
OM	Operating Margin
OXID	Oxidation Factor
PDD	Project Design Document
PLC	Programmable Logic Control
PP	Project Participant
UNFCCC	United Nations Framework Convention on Climate Change



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Appendix A: Validation Protocol

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### 1 EXECUTIVE SUMMARY – VALIDATION OPINION

*Det Norske Veritas Certification AS (DNV) has performed a validation of the “Shenyang Laohuchong LFG Power Generation Project” in China. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host Party criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.*

*The review of the project design documentation and the subsequent follow-up interviews have provided DNV sufficient evidence to determine the fulfilment of stated criteria.*

*The host Party is China and the Annex I Party is Italy. Both Parties fulfil the participation criteria and have approved the project and authorized the project participants. The DNA from China confirmed that the project assists in achieving sustainable development.*

*The project correctly applies ACM0001 “Consolidated baseline and monitoring methodology for landfill gas project activities” version 06. By capturing, burning and generating electricity using the landfill gas instead of passively venting, the project results in reductions of CH<sub>4</sub>/CO<sub>2</sub> that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.*

*The total emission reductions from the proposed project are estimated to be on the average 136 570 tCO<sub>2</sub>e per year over the selected 10 years fixed crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change, however, taking into account the inherent uncertainty of the First Order Decay Model.*

*Adequate monitoring and training procedures have been established and will be implemented when the plant will be in operation and the personnel will be trained before the plant enters into operation and before the crediting period starts.*

*In summary, it is DNV’s opinion that the “Shenyang Laohuchong LFG Power Generation Project” in China, as described in the PDD of June 16, 2008 meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0001 version 6.*

*DNV thus requests the registration of the project as a CDM project activity.*



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### 2 INTRODUCTION

Asja Ambiente Italia Spa has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the “Shenyang Laohuchong LFG Power Generation Project” in China (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, and the subsequent decisions by the CDM Executive Board.

#### 2.1 Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

#### 2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is 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 ACM0001. The validation team has, based on the recommendations in the Validation and Verification Manual /2/employed a risk-based approach, 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 project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.



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### 3 METHODOLOGY

The validation consisted of the following three phases:

- I a desk review of the project design documents
- II follow-up interviews with project stakeholders
- III the resolution of outstanding issues and the issuance of the final validation report and opinion.

The following sections outline each step in more detail.

#### 3.1 Desk Review of the Project Design Documentation

The following table lists the documentation that was reviewed during the validation:

- /1/ CDM PDD Asja Ambiente Italia Spa, Shenyang Laohuchong LFG Power Generation Project, version 01 – July 2, 2007, version 02 – January 21, 2008, version 03 – June 16, 2008.
- /2/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*.  
<http://www.ieta.org/ieta/www/pages/index.php?IdSitePage=200>
- /3/ CDM Executive Board; ACM0001/version 06 Consolidated baseline and monitoring methodology for landfill gas project activities.
- /4/ CDM Executive Board; ACM0002/version 06 Consolidated methodology for grid-connected electricity generation from renewable sources.
- /5/ CDM Executive Board; Tool for the demonstration and assessment of additionality/Version 04.
- /6/ CDM Executive Board; Annex 3 EB22 Clarifications of the consideration of national and/or sectoral policies and circumstances in baseline scenarios/version 02
- /7/ CDM Executive Board; Annex 13 EB28 Methodological "Tool to determine project emissions from flaring gases containing methane".
- /8/ National Development and Reform Commission of the People's Republic of China – Letter of Approval for Shenyang Laohuchong LFG Power Generation Project as a Clean Development Mechanism Project – March, 2008.
- /9/ Shenyang Laohuchong Municipal Solid Waste Management Co. Ltd. and Asja Ambiente Italia Spa - Addendum to the Agreement of December 8, 2005 "contract to develop the Shenyang Laohuchong LFG Power Generation Project" – November 27, 2006.
- /10/ Asja Ambiente Italia Spa, Spreadsheet CERs calculations – version of November 2007, January 2008 and latest version of June 2008.
- /11/ Asja Ambiente Italia Spa, Spreadsheet IRR calculations – version of November 2007, January 2008 and latest version of June 2008.
- /12/ Asja Ambiente Italia Spa, Spreadsheet Operational Costs – December 2006



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- /13/ Asja Ambiente Italia Spa, Spreadsheet Variable Costs – December 2006.
- /14/ Feasibility Study Report of Shenyang Laohuchong LFG Power Generation Project prepared by the Shenyang Aluminium and Magnesium Engineering and Research Institute - May, 2007.
- /15/ Liaoning Provincial DRC, Approval letter of the Feasibility Study Report of Shenyang Laohuchong LFG power generation project – June 15, 2007
- /16/ Environmental Study Report for Shenyang Laohuchong LFG Power Generation Project prepared by the Shenyang Environment Science Institute – January 26, 2007.
- /17/ Shenyang Environmental Protection Bureau, Approval letter of the Environmental Impact Assessment – February 14, 2007.
- /18/ Stakeholder questionnaires – July 18, 2006.
- /19/ Advisement of the public consultation meeting for Shenyang Laohuchong LFG Power Generation Project – June 29, 2006.
- /20/ CDM Executive Board; answer to DNV's request for deviation of Chinese project activities from AM0005, received on 1<sup>st</sup> December 2005.  
<http://cdm.unfccc.int/Projects/Deviations/index.html>
- /21/ Technical Code for Sanitary Landfill of Municipal Domestic Refuse CJJ17-88
- /22/ Urban Solid Waste Landfill Technology Standard CJJ17–2004
- /23/ China Government - National Action Plan for Collection and utilization of landfill gas – December, 2001.
- /24/ Technical code for sanitary landfill of municipal domestic refuse – (CJJ17-2001) – December 01, 2001.
- /25/ Standard for pollution control on the landfill site for domestic waste - GB16889-1997.
- /26/ General Office of the State Council Guo Ban Fa Ming Dian – Notice of the General Office of the State Council concerning “Strict prohibition of the construction of Thermal Power Units with capacity of 135MW” – 2002, Document n. 6.
- /27/ Chinese new energy website: [http://www.newenergy.org.cn/html/2006-2/2006217\\_7650.html](http://www.newenergy.org.cn/html/2006-2/2006217_7650.html) - “Prescribe on construction and supervise of the small scale thermal power generation units” – August, 1997.
- /28/ Jinan Diesel Engine Co. Ltd – Technical sheet for 500KW landfill gas generator
- /29/ Asja Renewables (Shenyang) Co. Ltd – Torch and electronic control system acceptance report – October 18, 2007.
- /30/ Liaoning Provincial Price Bureau - Approval for the electricity price – April 14, 2008.
- /31/ State DRC - Tentative management measures for price and sharing of expenses for electricity generation from renewable energy – January 01, 2006.
- /32/ CDM in China Office of National Coordination Committee on Climate Change - Measures for Operation and Management of Clean Development Mechanism Projects in China – October, 2005 (art. 24 local tax).





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- /33/ Operation Department of Power Generation and Transmission, State Power Corporation - Interim Rules on Economic Assessment of Electric Engineering Retrofit Projects - Published in 2003.
- /34/ Anshan overcomes technical difficulties change LFG into auto fuel – May 31, 2002.  
Website: [http://www.china.com.cn/tech/txt/2002-05/31/content\\_5153404.htm](http://www.china.com.cn/tech/txt/2002-05/31/content_5153404.htm)
- /35/ Nanjing landfill will be changed into “plant”.  
Website: [http://www.86ne.com/Biomass/200201/Biomass\\_34576.html](http://www.86ne.com/Biomass/200201/Biomass_34576.html)
- /36/ Global Environment Fund (GEF) “Accelerate urban waste LFG collection and utilization” Project Progress – March 07, 2003.
- /37/ Asja Ambiente Italia Spa – Excel sheet BWH 2007 generation in 5 plants (from January 01, 2007 to December 31, 2007).
- /38/ Website:  
<http://energia.mecon.gov.ar/Electricidad/boletines/quinquenales/1991-1995/TABLA%20DE%20CONVERSIONES%20ENERGETICAS.html>
- /39/ Asja Ambiente Italia Spa – Declaration issued by Technical Office Responsible – June 09, 2008.
- /40/ Shenyang Municipal Engineerign Design Institute – Feasibility Study of Laohuchong landfill – November 9, 2001.
- /41/ Shenyang Laohuchong Municipal Solid Waste Management Co. Ltd – The data sheet of LaoHuChong Landfill waste area (from 2003 to 2007) – June 15, 2008.
- /42/ People’s Republic of China State Standard – Integrated Emission Standard of Air Pollutants – GB16297-1996.
- /43/ Standard of noise at boundary of industrial enterprises – GB12348-90
- /44/ Liaoning Provincial DRC – Approval for additional capacity – July 10, 2007.
- /45/ Shenyang Laohuchong Municipal Solid Waste Management Co. – Conference resolution board meeting – November 24, 2005.
- /46/ DNA of Italy Ministry for the Environment Land and Sea – Letter of Approval for “Shenyang Laohuchong LFG Power Generation Project” – June 25, 2008.
- /47/ China Electric Yearbook – years 2004 – 2005 – 2006

Main changes between the PDD version 01 of July 2, 2007, published for the 30 days stakeholder commenting period and the latest version 03 of June 16, 2008, are:

- updated data for CNEPG with last available data (2003-2005);
- the financial analysis has been revised (first version dated November 2007)
- updates referring to the resolution of the Corrective Action and Clarification requests raised by the validation (refer to Table 3 of the Validation Protocol in Appendix A).



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### 3.2 Follow-up Interviews with Project Stakeholders

	Date	Name	Organization
/48/	2007- 12-10	Mr. Guan Zhen Department Director in Development Communication Dep.	Shenyang Laohuchong Municipal Solid Waste Management Co. Ltd
/49/	2007-12-10	Ms. Cui Jianshuang Chinese Commercial Manager	Asja Renewables China Co. Ltd
/50/	2007-12-10	Ms. Ma Lijia Commercial Assistant	Asja Renewables China Co. Ltd
/51/	2007-12-10	Mr. Li Wei Senior Project Manager	Asja Renewables China Co. Ltd
/52/	2007-12-10	Mr. Yuan Qunyi Consulting Engineer	Asja Renewables China Co. Ltd

### 3.3 Resolution of Outstanding Issues

The objective of this phase of the validation was to resolve any outstanding issues which needed be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in a transparent manner the criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in the figure below. The completed validation protocol for the "Shenyang Laohuchong LFG Power Generation Project" is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of CDM criteria or where a risk to the fulfilment of project objectives is identified. Corrective action requests (CAR) are issued, where:

- mistakes have been made with a direct influence on project results;
- CDM and/or methodology specific requirements have not been met; or
- there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.



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A request for clarification (CL) may be used where additional information is needed to fully clarify an issue.

<b>Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities</b>		
<b>Requirement</b>	<b>Reference</b>	<b>Conclusion</b>
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	This is either acceptable based on evidence provided ( <b>OK</b> ), a <b>Corrective Action Request (CAR)</b> of risk or non-compliance with stated requirements or a request for <b>Clarification (CL)</b> where further clarifications are needed.

<b>Validation Protocol Table 2: Requirement checklist</b>				
<b>Checklist Question</b>	<b>Reference</b>	<b>Means of verification (MoV)</b>	<b>Comment</b>	<b>Draft and/or Final Conclusion</b>
<i>The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the large-scale PDD template, version 03 - in effect as of: 28 July 2006. Each section is then further sub-divided.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.</i>	<i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.</i>	<i>This is either acceptable based on evidence provided (<b>OK</b>), or a <b>corrective action request (CAR)</b> due to non-compliance with the checklist question (See below). A request for clarification (CL) is used when the validation team has identified a need for further clarification.</i>

<b>Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests</b>			
<b>Draft report clarifications and corrective action requests</b>	<b>Ref. to checklist question in table 2</b>	<b>Summary of project owner response</b>	<b>Validation conclusion</b>
<i>If the conclusions from the draft Validation are either a CAR or a CL, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 2 where the CAR or CL is explained.</i>	<i>The responses given by the project participants during the communications with the validation team should be summarised in this section.</i>	<i>This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".</i>

**Figure 1: Validation protocol tables**



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### 3.4 Internal Quality Control

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another technical review before requesting registration of the project activity. The technical reviews were performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

### 3.5 Validation Team

Role/Qualification	Last Name	First Name	Country
Project Manager/GHG Auditor	Valoroso	Rita	DNV Italy
CDM Validator	Covarrubias	Elfride	DNV Italy
GHG Auditor	Tang	Zhi Ang	DNV China
Sector Expert	Tavares	Luis Filipe	DNV Brazil
Technical Reviewer (Applicant for draft report)	Sharma	Anjana	DNV India.
Technical Reviewer (draft report)	Brinks	Hendrik	DNV Norway
Technical Reviewer (Applicant for final report)	Lara	Barbara	DNV Mexico
Technical Reviewer (final report)	Viddal	Mari Grooss	DNV Norway

The qualification of each individual validation team member is detailed in Appendix B to this report.



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### 4 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The final validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation.

#### 4.1 Participation Requirements

The project's host Party is China and the participating Annex I Party is Italy. China and Italy fulfil the participation requirements and have ratified the Kyoto Protocol. The project participants are Shenyang Laohuchong Municipal Solid Waste Management Co. Ltd as the project owner, and Asja Ambiente Italia Spa from Italy. A letter of approval including authorization of Shenyang Laohuchong Municipal Solid Waste Management Co. Ltd as the project participant by the DNA of China has been granted, confirming also that the proposed project activity assists China in achieving sustainable development /8/. The letter of approval by the Italian DNA has been granted including the authorization of Asja Ambiente Italia Spa as a project participant and confirming the Italian voluntary participation in the Clean Development Mechanism /46/.

The validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards China.

#### 4.2 Project Design

The objective of the proposed project is to extract biogas from a landfill and to generating electricity with flaring of the landfill gas as backup. The project will be carried out at the Shenyang Laohuchong Municipal solid waste landfill located 28 km from Shenyang city; It has been confirmed that no towns are close to the landfill area, only a village which is situated at a distance of 4 km from the landfill. The project includes landfill gas collection system, pre-treatment system for the biogas, power generation and flare combustion system where the equipments will be from local manufacturer and the know-how technology (design, construction, operation and maintenance process) is from Asja Ambiente Italia Spa, which has many years experience in Italy for landfill gas recovery and reutilization systems. According to the approved FSR /14/ /15/, the installed electricity generation capacity will be 2 MW and in the FSR it is stated that according to the biogas increase in the future, the total generator installation will be finally 3 MW, this has also been stated by the Liaoning Provincial DRC on July 10, 2007 /44/. Referring to this, four phases are forecasted: the first phase foresee the installation of 48 wells, 4 substations of regulation, the suction station, the biogas treatment station, the flare and 3 engines of 500kW each; the second phase will be developed during the year 2009-2010 and that period will the 4<sup>th</sup> engine of 500kW be installed; the third phase will be developed during the year 2011-2012 and 77 wells, 7 substation of regulation, a flare combustion section will be installed and the suction and the treatment station will be update; besides in the same period the 5<sup>th</sup> engine of 500 kW will be installed; the last phase will be implemented during the year 2014-2015 and foresee the installation of the 6<sup>th</sup> engine with the same capacity of the others yet installed. These phases have been also considered in the



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financial analysis /11/. The biogas conveying pipe network is laid along the treatment area ground as variation with landform and the pipe material is high-density polyethylene (HDPE) /14/. The technology of the proposed project activity reflects current good practices.

The generated electricity is exported to the China Northeast Power Grid. The coverage area of the landfill is 602, 470 m<sup>2</sup> and it began its operation in 2003 and will be closed in 2025 /FSR/; as per the data sheet issued by the project owner /41/ the landfill receives domestic and non-hazardous industrial waste with an average of the composition accounting 30% of paper and textiles, 28% garden and park waste, 25% food waste, 8% wood and 9% other waste, for an annual average amount of 355, 900 tons. During the operational period, the landfill is managed adopting specific procedure for daily waste cover, final cover and leachate collection /40/.

The proposed project activity is likely to contribute to create environmental, social and economic benefits, such as:

- generation of zero emission electricity;
- elimination of gas emissions coming from the landfill (abatement of the CH<sub>4</sub> emissions from the landfill);
- reduce the risks of the fire and explosion at the landfill that are related to inappropriate landfill gas network collection.

The project activity is considered as a renewable project, with recovery and destruction of the biogas containing methane, producing electricity and/or burn in flare, and it is expected to reduce GHG emissions by an estimated annual average of 136,570 tCO<sub>2</sub>e during the 10 years fixed crediting period. Based on the agreement signed between Shenyang Laohuchong Municipal Solid Waste Management Co. Ltd. and Asja Ambiente Italia Spa /9/, a fixed crediting period of 10 years has been selected and will start on January 01, 2009 or the date of registration, whichever is the latest. The starting date of the project activity has been defined as the construction date of July 01, 2007 which is after the approval of the FSR that was on June 15, 2007/15/. As per the approved FSR /14/ /15/ the operational lifetime of the project has been defined as 15 years on the basis of the prediction that the landfill gas yield for a period of 15 years.

### 4.3 Baseline Determination

The project applies and complies with the approved methodology ACM0001 “Consolidated baseline methodology for landfill gas project activities” /3/ in addition to the approved methodology ACM0002 “Consolidated baseline methodology for grid- connected electricity generation from renewable sources” /4/ for the determination of the emission coefficient for grid electricity. The methodology chosen is applicable referring to landfill gas activities, where; a) the captured gas is flared, or b) the captured gas is used to produce energy, or c) the captured gas is used to supply consumers through natural gas distribution network. The methodology is applicable to the proposed project activity where the captured gas is flared and used to produce electricity.

The project boundaries include the geographical site of the project activity and the system boundary is defined as all the plants connected to the China North East Power Grid to which the project activity plant will be connected by transmission line.





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The gases included in the project boundary are as follows:

	GHGs involved	Description
<i>Baseline emissions</i>	CH <sub>4</sub>	LFG venting: included as a main component of the LFG
	CO <sub>2</sub>	Emissions from electricity generation in grid connected fossil fuel fired power plants of the grid that will be displaced by the project.
<i>Project emissions</i>	CH <sub>4</sub>	Methane emissions from incomplete combustion of flare: Methane included as a main component of the LFG
	CO <sub>2</sub>	Emissions from consumption of electricity.
<i>Leakage</i>	No leakage effect needs to be accounted under this methodology.	

The alternative scenarios that have been considered, as required by ACM0001 version 6, are (further details are also included in section 4.4 of this report):

LFG1: the proposed project activity undertaken without being registered as a CDM project activity. As demonstrated in section 4.4, in absence of a CDM being developed, the only revenues from the electricity production are insufficient to cover the project investment costs and the operational costs. It is therefore not considered a realistic baseline scenario.

LFG2: atmospheric release of the landfill gas. As demonstrate in section 4.4 of this report, there are some legal requirements on the recovery and utilization of landfill gas in China. DNV was able to verify that they are not systematically enforced and the non-enforcement is wide spread around the country /23/ /24/ /25/. There are no contractual obligations for the landfill to capture or flare LFG.

In addition, six alternatives have been considered for the power generation and seven alternatives for the heat generation. It is stated that other renewable sources are not applicable and without financial support there is no economic incentive for LFG collection and energy generation systems (electricity and heat) (P1). Electricity revenues do not cover all the investment and operational costs required for power generation from landfill gas. The same apply for the heat generation scenarios, especially since the landfill is located in a distance from any potential heat consumers.

The baseline scenario for the project activity, as the most likely scenario in the absence of the proposed project activity, is therefore the total atmospheric release of the landfill gas (LFG2), the electricity is obtained from an existing/new grid connected power plant (P6) and the heat for potential consumers is continued to be sourced from existing fossil fuel based boilers (H4). No credits are claimed from heat generation for this project.

As alternative baseline scenario fuel, the project developer has considered coal which is abundantly available in the host country and it has been also demonstrate that this is the main energy source used in the China Northeast Power Grid, accounting to 98,89% /47/. In addition, the grid baseline fuel includes the fuel from power plants connected to the grid as per ACM0002 version 6.



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The baseline scenario has been selected using conservative assumptions wherever possible taking into account the national and sectoral policies //23/ /24/ /25/ as it has been demonstrate in section 4.4.

In conclusion, it is DNV's opinion that the baseline scenario is correctly selected as the atmospheric release of the landfill gas (LFG2) to comply with the regulation /23/ /24/ /25/, the power generation is produced by the existing grid connected power plants (P6) and the heat generation to potential consumers is continued to be produced by the existing fossil fuel boilers (H4).

### 4.4 Additionality

According to the approved methodology ACM0001 /3/, the project additionality was assessed applying the methodological tool "Tool for demonstration and assessment of addionality" Version 4 /5/.

It has been demonstrated by the chronological events that the CDM revenues were considered for the project activity prior to starting date of the project:

- a) Shenyang Laohuchong Municipal Solid Waste Management Co., Ltd, the project owner, conceptualized the project on November 24, 2005 during a conference resolution Board Meeting /45/ established that a high- qualified design institute will be appointed for the feasibility study compilation. The FSR prepared by the Shenyang Aluminium and Magnesium Engineering and Research Institute on May, 2007 /14/ for a power plant of 2 MW, has been approved by the Liaoning Provincial DRC on June 15, 2007 /15/ stating that the construction period is from 2007 to 2009. It is verified that in the FSR it is clearly mentioned the application of the CDM for the Shenyang Laohuchong LFG power generation project.
- b) The project owner and Asja Ambiente Italia Spa signed on December 8, 2005 an agreement /9/ for the purpose of undertaking a CDM project based on the utilization for power generation of the landfill gas.
- c) The project developer, on July 01, 2007 started the construction of the biogas plant.

The starting date of the project has been established by the project developer on July 01, 2007 with the start of construction. It is DNV's opinion that this is the correct date to represent the earliest for the date of which the implementation, construction or real action of the project activity began. Through the FSR and agreement with Asja Ambiente Italia Spa, it has been demonstrated that the CDM benefits were seriously taken into account prior to the decision to go ahead with the project.

The following steps, according to the methodological tool for demonstration and assessment of addionality have been applied:

*Step 1: identification of alternatives to the project activity consistent with the current laws and regulations.*

The following alternatives have been identified and the additionality test has been applied for each alternative of the baseline considered: LFG scenarios, alternative power generation scenarios and alternative heat generation scenarios.

- 1) Landfill gas scenarios.





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Two alternative scenarios have been considered:

- LFG 1 the project activity (capture landfill gas and its flaring and used for electricity generation) undertaken without being registered as a CDM project activity;
- LFG 2 atmospheric release of the landfill gas or partial capture of landfill gas and destruction to comply with regulations or contractual requirements, or to address safety and odour concerns.

Both scenarios are in compliance with the applicable local laws and regulations, but as demonstrated with the investment analysis (please refer to step 2) the only realistic baseline scenario is the LFG2. There is no contractual requirement /9/. There are some legal requirements on the recovery and utilization of landfill gas in China. However, DNV was able to verify that these are not systematically enforced and the non-enforcement is wide spread around the country /23/ /24/ /25/.

The Shenyang landfill, before the proposed project activity, was emitting the biogas to the atmosphere and in order to prevent firing or explosion, according to the local regulation /24/, a passive system, not efficient, made of vertical wells was installed. No flaring system was in place. This was confirmed during site visit.

### 2) Power generation scenarios.

According to the approved methodology ACM0001 /1/ six alternative power scenarios have been considered. It has been demonstrate that the alternative P2 (existing or construction of a new on-site or off-site fossil fuel cogeneration plant) and P4 (existing or construction of a new on-site or off-site fossil fuel fired captive power plant) are not in compliance with China's relevant laws and regulations. China's regulations prohibit the construction of coal fired power plant less 135 MW in the areas covered by the large grid such as the Northeast China Power Grid /26/. The other alternative scenarios (P3, P5) are in compliance with the local relevant laws and regulation but other renewable sources are not applicable to the project site, therefore they cannot be considered as a likely baseline scenario. In Step 2 below, it is confirmed that P1 is not a realistic scenario since revenue from electricity sale does not cover the investment and operating costs of power generation. Only the scenario P6 (existing and/or new grid-connected power plants) results in a realistic baseline scenario.

### 3) Heat generation scenarios.

According to the approved methodology ACM0001 /1/ seven alternative heat scenarios have been considered. It has been demonstrated that the alternative H2 (existing or construction of a new on-site or off-site fossil fuel cogeneration plant) is not in compliance with the China's relevant laws and regulation. According to China's regulation, the construction of thermal units under 100 MW is strictly limited /27/. The other alternative scenarios (H1, H3, H5, H6, H7) are in compliance with the local relevant laws and regulations, but as it has been demonstrated that i) other renewable sources are not available in the area, ii) there are no potential consumers of heat in the surroundings, and iii) more advanced heat generation technologies require high investments and competency, they cannot be considered as likely baseline scenarios. Only the current practice of existing on-site or off-site fossil fuel based boilers (H4), results in a realistic baseline scenario. No credits are claimed from heat generation for this project.



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### *Step 2: Investment analysis.*

Since the project scenario without CDM (LFG1) generates revenues from the electricity component (P1), the benchmark analysis (project IRR) has been applied for conducting the investment analysis.

The proposed project activity is a relative new type of investment and it is not a common practice in China, therefore, more operational, technological and market risks than for a conventional power plant can be expected. The selected benchmark IRR of 8% for the power industries can therefore be considered as conservative and applicable for the construction of biogas power plants /33/.

Based on the data from the approved Feasibility Study Report /14/ /15/, the project IRR without CER revenues account to 4,36% /11/ which shows that the project is not financially attractive compared to the benchmark in the absence of CDM benefits. The IRR analysis covers 15 years as per the project activity lifetime /11/.

In line with the paragraph 54 of EB38 report, DNV confirms that:

- the input parameters used in the financial analysis are taken from the Feasibility Study Report developed by the Shenyang Aluminium and Magnesium Engineering and Research Institute on May, 2007 /14/ and approved by the Liaoning Provincial DRC on June 15, 2007 /15/. The input parameters used in the financial analysis can thus be considered information provided by an independent and recognized source.
- The FSR refers to the total capacity of 2 MW. For the additional 1 MW to reach the 3MW, the investment costs for the biogas collection, the biogas suction, treatment, analysis, torch combustion and electricity generation including the transformation and distribution section have been considered identical to the data used in the approved FSR, also the increase of the revenues is calculated in function of the increase of the power plant capacity. This is deemed reasonable.
- DNV has compared the input parameters used for the financial analysis included in the PDD /1/ with the parameters stated in the approved Feasibility Study Report /14/, /15/ and was able to confirm that the values applied are consistent with the values stated in the FSR.
- The FSR was approved on June 15, 2007 /15/ and thus only one month prior to the decision to proceed with the project activity which was on July 01, 2007. Given this relative short period of time between approval of the FSR and the decision to proceed with the project activity, it is unlikely in the context of the project that the input values would have materially changed and that it is thus reasonable to assume that the FSR has been the basis of the decision to proceed with the investment in the project.
- The input parameters used in the financial analysis were compared with the data reported for other similar proposed project activity in China with similar power production capacity and with similar average tons of waste per year entering in the landfill, by comparing the investment costs per MW, the electricity tariff, and the percentage of operational and maintenance costs relative to total investment costs. DNV was able to confirm that the input parameters used in the financial analysis are reasonable and adequately represent the economic situation of the project.



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The sensitivity analysis shows the variation of the three main financial parameters: the total investment, the electricity revenue and the operation costs.

Total investment costs: the cost of the equipment depends on international prices and the trend in the market shows that the prices of the raw material increase so it is not likely that the total investment to reach the 8% of benchmark should decrease by 24.45%.

Electricity revenue: the electricity tariff (0,597 rmb/kwh) is made of two parts which are i) the “local benchmarking price” that depends on the Province /30/ and ii) a “subsidy price” which is granted to renewable energy power generation units /31/. This last is a fixed tariff and does not change while the first part can vary between 0,24 and 0,38 rmb/kwh. On 14 April 2008, the project participant received the approval of the electricity price of 0,597 rmb/kwh from the Liaoning Provincial Price Bureau /30/, applying the variable part of 0,347 rmb/kwh. This is 5.5% below the maximum price of 0,38 rmb/kwh. An increase of 12.65% of the electricity tariff to reach the 8% of benchmark is therefore deemed unlikely.

Operational costs: it has been showed that the operational and maintenance costs should decrease of about 19.45% to reach the 8% benchmark. It is unlikely that the operational and maintenance costs are reduced to reach the benchmark since this could lead to a reduction in the performance of the plant and the O&M costs have been calculated taking into account the variables in a conservative manner. Trends in the market show that the price of manpower and equipment are expected to increase..

In conclusion, DNV has checked the IRR calculation and the sources referred above, and is of the opinion that the investment analysis and the sensitivity assessment have been correctly done and show that the project activity is unlikely to be the most financially attractive option.

### *Step 3: barrier analysis.*

The project participant has not applied the barrier analysis.

### *Step 4: common practice*

Only three similar projects in China that were not carry out as CDM projects have been identified and compared with the proposed project activity. The Anshan, Nanjing and Ma'anshan projects have been developed under the Accelerate Urban Waste LFG Collection and Utilization supported by the international Global Environment Fund /34/ /35/ /36/ and are therefore not comparable with this project. The documented evidence for the assumptions made have been provided by the project developer and were verified by DNV confirming the reference sources.

Based on the above mentioned arguments, it is DNV's opinion that the emission reductions achieved by the project are additional to any that would have happened in absence of the project.

## 4.5 Monitoring

The project applies and it is in compliance with the approved monitoring methodology ACM0001/3/. In addition the methodological “Tool to determine project emissions from flaring gases containing methane” /7/ and the approved methodology ACM0002



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“Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources” /4/ have been applied. It has been confirmed that there are no sustainable development indicators that need to be monitored according to the Chinese regulation.

To collect necessary data for the monitoring plan, two operators will be employed and a Project Manager will verify the correct application of the operative procedures.

### 4.5.1 Parameters determined ex-ante

To estimate the annual methane generation, the US EPA LANDGem (version 3.026) model has been used, which uses the first decomposition rate equation considering the methane generation rate, the potential methane generation capacity, the mass of waste accepted, the lifetime of the landfill.

To calculate the baseline emissions, conservative values and conservative assumptions /47/ have been adopted which are elaborated in the Section B.4 and B.5 of Validation Protocol. The assumptions made by the project developer are confirmed by DNV by checking the referenced sources and the calculations.

An AF of 0 has been considered because even if there are some legal requirements on the recovery and utilization of landfill gas in China, DNV was able to verify that they are not systematically enforced and the non-enforcement is wide spread around the country /22/ /23/ /24/. No contractual requirements or obligates exist to install a specific system for collection and destruction of methane /9/. This was confirmed during the validation.

To calculate the emission factor from the North East China Power Grid, the approved methodology ACM0002 version 6 /4/ has been applied, and according to this the Simple OM is used for calculating the  $EF_{OM}$  of the CNPG because the detailed data applying the dispatch analysis method is not available. The operating margin emission factor of Northeast China Power Grid is 1.240358 tCO<sub>2</sub> / MWh for the years 2003-2005. These were the most recent data available at PDD publication. The  $EF_{BM}$  was calculated according to the option 1 of the ACM0002 methodology and it is fixed in the crediting period. No ex-post monitoring of the  $EF_{OM}$  and  $EF_{BM}$  is required. Since plant specific fuel consumption and electricity generation data is not publicly available in China, the project proponent adopted the deviation as approved by the CDM EB (13 February 2006) for AM0005 /46/ as follows:

- Use of capacity additions for estimating the build margin emission factor for grid electricity;
- Use of weights estimated using installed capacity in place of annual electricity generation;
- Use the efficiency level of the best technology commercially available in the Provincial / regional or national grid of China, as a conservative proxy, for each fuel type in estimating the fuel consumption to estimate the build margin (BM), for coal fired plant, efficiency of 35,82 % is selected, for oil and gas fired power plant, efficiency of 47,67 % is selected.

The build margin emission factor of the North East China Power Grid is 0.8632 tCO<sub>2</sub>/MWh. The baseline emission factor is the weighted average value of the  $EF_{OM}$  and  $EF_{BM}$  with a default value of weight of 50%. The combined grid emission factor,  $EF_y$  of the grid taking into account is equal to 1.05176 tCO<sub>2</sub> / MWh.



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### 4.5.2 Parameters monitored ex-post

Parameters to be monitored *ex-post* include the ones required by the approved monitoring methodology ACM0001 /3/ and in addition the “Tool to determine project emissions from flaring gases containing methane”. For each data and parameters monitored, the measurement methods and procedures to be applied are specified.

The main data and parameters that will be monitored are:

- total amount of LFG captured measured continuously by flow meter normalized according to landfill gas temperature and pressure;
- amount of LFG flared measured continuously by flow meter, normalized according to landfill gas temperature and pressure;
- amount of LFG combusted in the power plant measured continuously by flow meter, normalized according to landfill gas temperature and pressure;
- methane fraction in the LFG measured continuously with a gas analyser on wet basis;
- net amount of electricity generated using LFG measured continuously with an electricity meter;
- total amount of electricity required to meet the project requirement measured continuously with an electricity meter;
- power plant and flare working hours measured by an hour meter;
- the default values are applied for the flare efficiency and the temperature of the exhaust gas stream in the flare is continuously monitored by a thermocouple.
- any other parameters required to monitor proper operation of the flare according to the manufacturer's specification;
- project emissions from flaring of the residual gas stream measured and calculated as per the “tool to determine project emissions from flaring”;
- volumetric fraction of methane in the residual gas on dry basis measured in continuous by a gas analyser;
- volumetric flow rate for the residual gas in dry basis at normal conditions measured in continuous by a flow meter;
- annual monitoring of legal requirements.

### 4.5.3 Management system and quality assurance

A Monitoring Plan for the project (Annex 4 of the PDD) has been developed and it includes:

- procedure for data collecting, frequency and quality control including the procedure to handle the erroneous measurement ;
- a description of the monitoring equipments and installations;
- a description of the monitoring organization;
- procedure for calibration of metering equipment;
- procedure for data management system;
- procedure for audit review;

## 4.6 Estimate of GHG Emissions

The GHG emission reductions have been estimate ex-ante according to the methodology ACM0001 /3/ using the US EPA LanGEM First Order Decay model and conservative options





## VALIDATION REPORT

and assumptions as described in the previous paragraph and in the Validation Protocol (Appendix A). The project activity, during the operation, will calculate emission reductions on an ex-post basis by measuring the actual methane captured and flared/ utilized as stated in the monitoring plan. The electricity consumption by the project activity has been calculated ex-ante as percentage of the electricity generated and during the operation the electricity consumption will be measured as stated in the monitoring plan. The emission reductions have been calculated as the net quantity of the electricity exported to the grid. No leakage effects have been accounted for according to the approved methodology ACM0001 /3/. The default value of 90% for the flare efficiency has been used for the ex-ante calculation. This is in line with the “Tool to determine project emissions from flaring gases containing methane”. The default value will also be applied ex-post. With a combined grid emission factor,  $EF_y$  of 1.05176 tCO<sub>2</sub> / MWh, the annual average over the crediting period of estimated emission reductions are 136,570 tCO<sub>2e</sub> and the total estimated reductions for the 10-year crediting period are 1,365,700 tCO<sub>2e</sub>.

DNV has checked the ER calculations /10/ and the related sources /28/ /29/ /40/ /41/ /38/ /39/ and can confirm that the GHG calculations are complete and transparent and their accuracy has been verified. However, the First Order Decay model has an inherent uncertainty of up to 50% in forecasting landfill gas generation potential, and hence the amount of CERs, which will be monitored ex-post, might vary from the projected amount.

### 4.7 Environmental Impacts

The Environmental Impact Assessment of January 26, 2007 was approved by the Shenyang Environmental Protection Bureau on February 14, 2007. The project will not have any significant environmental impact and in addition during the construction and operation period a series of practical measures will be implemented, such as to collect the separated condensate of LFG i for treatment, the methane will be treated with filtering and desiccation system to lower the content of H<sub>2</sub>S and dust to ensure that the emission of exhaust gas will meet the national standard, some noise mitigation are used to meet the national noise standard such as enclosure no-sound materials, muffle, and vibration mitigation measures.

### 4.8 Comments by Local Stakeholders

A local stakeholder consultation process has been held in Shenyang on July 18, 2006 between the PPs, Laohuchong landfill operators, local authorities of the Government of the City of Shenyang and experts from Shenyang Normal University, Shenyang Environmental Protection Bureau, Shenyang Environmental Science Institute, Shenyang University, and the project was advertised in the Shenyang Newspaper of June 29, 2006/19/. The general opinion in the questionnaires /18/ of the 44 representative stakeholders participating in the meeting, were positive and the contents were checked by DNV during the site visit.

### 4.9 Comments by Parties, Stakeholders and NGOs

The PDD of July 2, 2007 was made publicly available on DNV's climate change website (<http://cdm.unfccc.int/Projects/Validation/index.html>) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from August 21, 2007 to September 19, 2007. No comments were received during this period.

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## VALIDATION REPORT

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# APPENDIX A

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## CDM VALIDATION PROTOCOL



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

Requirement	Reference	Conclusion
<b>About Parties</b>		
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
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	<del>CAR1</del> OK
4. 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	<del>CAR1</del> OK
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	OK
9. 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

Requirement	Reference	Conclusion
<b>About additionality</b>		
10. Reduction in GHG emissions shall be additional to any that would occur in the 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. 12.5c, CDM Modalities and Procedures §43	<del>CL3—CL4</del> <del>CL5—CL6</del> OK
<b>About forecast emission reductions and environmental impacts</b>		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	OK
<b>For large-scale projects only</b>		
12. 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.	CDM Modalities and Procedures §37c	OK
<b>About stakeholder involvement</b>		
13. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	OK
14. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
<b>Other</b>		
15. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
16. A baseline shall be established on a project-specific basis, in a transparent manner	CDM Modalities and Procedures §45c,d	OK

Requirement	Reference	Conclusion
and taking into account relevant national and/or sectoral policies and circumstances.		
17. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
18. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK
19. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK

**Table 2: Requirements Checklist**

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<b>A. General Description of Project Activity</b> <i>The project design is assessed.</i>					
<b>A.1. Project Boundaries</b> <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project's spatial boundaries (geographical) clearly defined?	/1/	DR	Yes. The project site is located in Tashan Farm, Chenxiang Town, Su Jiatun District at approximately 28 km from Shenyang city – Liaoning Province.  The geographical coordinates for the project site are: 41°33' N and 123° 34'E.		OK
A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/1/	DR	Yes. For the landfill section the project boundary includes the biogas extraction and pre treatment system, the flare, and the power generation unit.  For the electricity generation the project activity boundary is defined as the China North East Power Grid and includes all the plants connected to it.		OK
<b>A.2. Participation Requirements</b> <i>Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party, Letter of Approval, Authorization and Project Participant.</i>					
A.2.1. Which Parties and project participants are	/1/	DR	<i>Participating Parties are:</i>		OK

\* MoV = Means of Verification, DR= Document Review, I= Interview  
CDM Validation 2008-9050, rev. 01

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
participating in the project?			Host Party: People's Republic of China Annex I Party: Italy <i>Project Participants are:</i> Shenyang Laohuchong Municipal Solid Waste Management Co. Ltd. (project owner) from the host Party, China. Asja Ambiente Italia Spa – from Annex I Party, Italy.		
A.2.2. Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party?	/1/	DR	<b><i>Approval from China and Italian DNA are not yet available and neither the authorization to Asja Ambiente Italia and Shenyang Laohuchong Municipal Solid Waste Management Co. Ltd as project participants.</i></b>	<del>CAR1</del>	OK
A.2.3. Do all participating Parties fulfil the participation requirements as follows: - Ratification of the Kyoto Protocol - Voluntary participation - Designated a National Authority	/1/	DR	Yes, both participating Parties fulfil the criteria to participate in a CDM project activity. <i>Ratification of the Kyoto Protocol</i> China has ratified Kyoto Protocol on 30 August 2002. Italy has ratified Kyoto Protocol on 31 May 2002. <i>Voluntary participation</i> <b><i>A formal letter of confirmation regarding the voluntary participation by DNA of both participating Parties is not yet available. Please refer to A.2.2.</i></b>	<del>CAR1</del>	OK

\* MoV = Means of Verification, DR= Document Review, I= Interview  
CDM Validation 2008-9050, rev. 01

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<b><i>Designated a National Authority</i></b> Both Parties involved have Designated National Authority for CDM: China has designated the “National Development and Reform Commission of the People’s Republic of China” (NRDC); Italy has designated the “Ministry for the Environment and Territory, Department for Global Environment, International and Regional Conventions”.		
A.2.4. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/1/	DR	It is stated that no funds from public national or international sources will be used in any aspect of the proposed project.		OK
<b>A.3. Technology to be employed</b> <i>Validation of project technology focuses on the project engineering, choice of technology and competence/maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					
A.3.1. Does the project design engineering reflect current good practices?	/1/	DR I	Yes. It reflects current good practices.		OK
A.3.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/	DR I	Yes. The equipments in the project can be considered Chinese best available technology. The project includes LFG collecting system, pre-treatment system,		OK

\* MoV = Means of Verification, DR= Document Review, I= Interview  
CDM Validation 2008-9050, rev. 01

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>power generation system and flare combustion system..</p> <p><i>It should included in the PDD further information about the gas extraction system used in the project activity (i.e. types and number of wells, material used for pipeline, ecc), as well the type of the flare (enclosed or open flare) and flare efficiency of the power plant.</i></p> <p>During the site visit it has been stated that the proposed project will be developed in different phases of construction and operation.</p> <p><i>The project developer needs to clearly describe the plan for the implementation of the proposed project. The number of phases of the project and amount of work to be completed in each phase needs to be described clearly in the PDD.</i></p>	<p><del>CL1</del></p> <p>CL18</p>	
A.3.3. Does the project make provisions for meeting training and maintenance needs?	/1/	DR I	Yes. During the site visit it has been confirmed that training was provided to six people of the Chinese staff (from October 2006 to December 2006), by technical experts of Asja Ambiente Italia about the operation and processes of the landfill gas extraction, flare and power plant. During the		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			site visit, the training records have been checked.		
<b>A.4. Contribution to Sustainable Development</b> <i>The project's contribution to sustainable development is assessed.</i>					
A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?	/1/	DR	<u><b>Confirmation regarding the project's contribution to the sustainable development of the host Party is not yet available.. Please refer to A.2.2.</b></u>	CAR1	OK
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	Yes. The project is likely to contribute to create other environmental, social and economic benefits, like: <ul style="list-style-type: none"> <li>- generation of zero emission electricity;</li> <li>- elimination of gas emissions coming from the landfill (abatement of the CH<sub>4</sub> emissions from the landfill);</li> <li>- reduce the risks of fire and explosion at the landfill that are related to inappropriate landfill gas network collection.</li> </ul>		OK
<b>B. Project Baseline</b> <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
<b>B.1. Baseline Methodology</b> <i>It is assessed whether the project applies an</i>					



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>appropriate baseline methodology.</i>					
B.1.1. Does the project apply an approved methodology and the correct version thereof?	/1/ /3/ /4/	DR	Yes. The project applies the methodology ACM0001/version 6 of the “Consolidated baseline methodology for landfill gas project activities”. In addition the ACM0002/version 6 “Consolidate baseline methodology for grid-connected electricity generation from renewable sources” is also employed to determine the emission factor for the grid electricity.		OK
B.1.2. Are the applicability criteria in the baseline methodology all fulfilled?	/1/	DR	Yes. The methodology chosen is applicable to the proposed project activity where the captured gas is flared and used to produce energy (electricity).  <i>A description of the current situation at the Shenyang Laohuchong Municipal Solid waste landfill is requested. The project developer also needs to explain the maximum allowable height of the landfill, maximum allowable waste that be dumped in the landfill as per the local environmental laws/regulations.</i>	CL2	OK
<b>B.2. Baseline Scenario Determination</b>  <i>The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the</i>					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>baseline scenario has been followed in a complete and transparent manner.</i>					
B.2.1. What is the baseline scenario?	/1/	DR	The baseline scenario considered as a conservative option for baseline is to continue current activity, that means the total amount of methane produced in the landfill released into the atmosphere and electricity generated by the project activity provided by China North East Power Grid.		OK
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/ /22/ /23/ /24/ /25/ /26/ /27/	DR	<p><b><i>The baseline determination procedure in the methodology has not been followed; step 2 has not been applied. For the export energy should be also considered the heat generation in the absence of the project activity.</i></b></p> <p>The alternatives baseline scenarios that were identified are the following:.</p> <ul style="list-style-type: none"> <li>- <u>Continuation of current practice: Direct release of LFG into the atmosphere and electricity supply from the North East China grid-</u> It is stated that this alternative is the common practice in China. There is no legal requirement in China to collect, treat and destroy/utilise the LFG generated.</li> <li>- <u>Collect methane produced by the landfill and burnt through flare but not used for power generation, so the electricity is</u></li> </ul>	CAR2	OK

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			<p><u>provided by the China North East Power Grid.</u> It is stated that the investments costs to capture and destroy the methane in the flares is high In the absence of any legal requirement for the collection and destruction of LFG in China, this alternative is unattractive to any investor in the absence of any external income. Hence, this alternative cannot be considered a feasible option.</p> <p>- <u>Construction of a fossil fuel fired power plant with equivalent annual power generation.</u> This alternative is not in compliance with China’s relevant laws and regulations. DNV was able to verify that according to Chinese regulations, the construction of coal fired power plants under 135 MW in areas covered by the large grids such as provincial grids is strictly prohibited. It has also been verified that any captive thermal power plant with installed capacity less than 100 MW is also strictly prohibited. Hence, this alternative is not a realistic and credible option.</p> <p>- <u>Carry out the project activity without CDM.</u> In absence of CDM revenues or other financial support, the only electricity revenues are insufficient to recover project investments and operational costs. The</p>		

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			<p>detailed discussion regarding the barriers faced by this alternative are discussed in section B.3.1. Hence, this alternative cannot be considered a feasible option.</p> <p>Based on the above mentioned discussion, the only alternative that is in compliance with the local laws and regulations and also does not face any barrier is “<i>Continuation of current practice i.e. release of LFG directly into the atmosphere and electricity supply from the North East China power grid</i>”. Hence, the same has been selected as the baseline scenario.</p>		
B.2.3. Has the baseline scenario been determined according to the methodology?	/1/ /5/	DR	<b>No. Please refer to B.2.2..</b>	<del>CAR2</del>	OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	Yes, the baseline scenario has been determined using the conservative assumptions wherever possible.		OK
B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/ /23/ /24/ /25/	DR	Yes. The baseline scenario takes into account the national and sectoral policies. Except the simple control facilities avoiding explosion of methane aggregation, Chinese government does not mandate to flare or collect LFG emitted from landfills and most of them are releasing LFG directly to the atmosphere without any previous treatment or utilization.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR	Yes.		OK
B.2.7. Have the major risks to the baseline been identified?	/1/	DR	Currently there are no law or regulation in China that mandates the collection and destruction of LFG generated. Hence, no risk to the baseline is expected during the first crediting period. The legal requirements will be monitored annually and AF will be updated at the renewal of the crediting period.		OK
<b>B.3. Additionality Determination</b> <i>The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.</i>					
B.3.1. Is the project additionality assessed according to the methodology?	/1/ /5/ /11/	DR	<p>According to the approved methodology AMC0001, the project additionality was assessed applying the “Tool for the demonstration and assessment of additionality”, version 03.</p> <p><u>Step 1 - Identification of alternatives to the project activity.</u> Four different realistic and credible alternative scenarios were identified, and three of them are in compliance with the Chinese Laws and Regulations.</p> <p><b><i>The conclusion of step 1 of the additionality</i></b></p>	CL3	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p><i>test is unclear. Updated PDD with a clear indication of which alternatives will be further considered in Step 2 is requested.</i></p> <p><u>Step 2 - Investment analysis.</u> To determine as the project activity is economically and financially attractive than the other alternatives, the Benchmark analysis was applied. The IRR for the project activity without CDM revenues is -0.58% which is lower than of the financial benchmark of return of Chinese power industries, which is 8% This benchmark is widely use for landfill gas collection and power generation projects in China. The financial benchmark has been checked by the FSR as well. The IRR with CDM revenues is 19.09%. A sensitivity analysis was conducted taking into account three main elements (namely total investment, electricity revenue and operation cost). It has been observed that even after a variation up to 10% in the above mentioned parameters does not make the project financially attractive.</p> <p><i>Justification is needed for why 10% variation is chosen as reasonable variation and why it is not likely for each of the three main parameters to vary a degree to reach the benchmark.</i></p>	<del>CL4</del>	

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			<p><i>The project developer has considered a benchmark of 8% which has been sourced from the Interim rules on economic assessment of electrical engineering retrofit project. The project developer is requested to justify how his benchmark is applicable to a landfill gas collection and utilization (for power generation) project.</i></p> <p><u>Step 3 - Barriers analysis.</u></p> <p>Step 3 was not applied.</p> <p><u>Step 4 - Common practice analysis.</u> The passive venting method is the common practice in current landfill situation in China. Moreover, according to a publication made by Lu Guoqiang State Environmental Protection Administration China (March, 2006) China has 700 registered landfill sites but only 10 of them have installed gas recovery and utilization system.</p> <p><i>In the common practice analysis, the project developer needs to clarify the following points related to the 10 landfill sites:</i></p> <ul style="list-style-type: none"> <li>- <i>what type of gas utilization is being carried out;</i></li> <li>- <i>how they (i.e. gas collection and utilization system) are different from the proposed project activity;</i></li> </ul>	<p>CL5</p> <p>CL6</p>	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<ul style="list-style-type: none"> <li>- <i>what is the date of the installation of the gas collection and utilization system;</i></li> <li>- <i>do they also faced similar barriers as the proposed project activity.</i></li> </ul> <p><i>For each argument is requested to provide quantitative information and documented evidence.</i></p> <p>In China landfill gas recovery and utilization cannot be considered a common practice and this practice have been grant financed trough CDM or trough GEF.</p>		
B.3.2. Are all assumptions stated in a transparent and conservative manner?	/1/ /11/	DR	Yes.		OK
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	/1/ /11/	DR	Yes.		OK
B.3.4. If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity?	/1/	DR I	<p>The project starting date was defined as July 1, 2007 as construction date. The project activity has the construction permission which was issued on July 16, 2007 and requires the project starts construction within three months after the issuance date.</p> <p><i>The project developer needs to provide an evidence for the fact that the benefits of CDM revenues were seriously considered in the decision to go ahead with the project.</i></p>	CL7	OK



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<i>A clarification is requested for why the construction started (July 1, 2007) before to obtain the permission construction which is dated on July 16, 2007.</i>	CL8	
<b>B.4. Calculation of GHG Emission Reductions – Project emissions</b> <i>It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.4.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /7/ /10/	DR	Yes. The project emissions have been calculated according the approved methodology ACM0001. Project emissions are related to the electricity imported from the power grid and to the quantity of methane destroyed by flaring. The electricity consumed by the project activity has been determined ex-ante as a percentage of the electricity generated using the landfill gas. The electricity produced using the landfill gas is calculated through the theoric capacity installed (MW) which consider the annual methane extracted, the methane heating value, the generator efficiency rate, the energy conversion factor and the working hours of blowers. To calculate the annual methane extracted from the landfill and used for energy production has been considered		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>the biogas capture efficiency, the annual methane generation and the working hours of blowers.</p> <p>To estimate the annual methane generation has been used the LANDGem (version 3.02<sup>6</sup>) model which uses the first decomposition rate equation considering the methane generation rate, the potential methane generation capacity, the mass of waste accepted, the lifetime of the landfill.</p> <p>The project emissions from flaring has been calculated applying the methodological tool “<i>Tool to determine project emissions from flaring gases containing Methane</i>”. They have been determined through the mass flow rate of methane in the residual gas, the flare efficiency and the GWP of methane.</p> <p>The project emissions estimated ex-ante will be determined ex-post by metering project data once the project activity will be in operation.</p>		
B.4.2. Have conservative assumptions been used when calculating the project emissions?	/1/ /10/	DR	<p>Yes. It has been adopted conservative valued for the project emissions calculation, that are the following:</p> <ul style="list-style-type: none"> <li>- the percentage of electrical energy used for the biogas plant auto-consumption (AC): 4,8% on the basis of the project</li> </ul>		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>participant experience;</p> <ul style="list-style-type: none"><li>- for methane heating value (<math>HV_{CH_4}</math>): 8,250 kCal/Nm<sup>3</sup> CH<sub>4</sub> (source: Italian Technical standard UNI 10389);</li><li>- for the generator efficiency rate (GER): 30% on the basis of the project participant experience and manufacture's specification;</li><li>- for the energy conversion factor (ECF): 860 kCal/kWh;</li><li>- for the working hours of blowers (BHW): 8000 h/y;</li><li>- for the biogas capture efficiency (CE). 40% on the basis of the project participant experience;</li><li>- for the flare efficiency: 90% as default value.</li><li>- Global Warming Potential of Methane (GWP): 21 tCO<sub>2e</sub>/tCH<sub>4</sub> as a default value.</li></ul> <p><i>Documented evidence is requested about the assumption made for the AC%, for the GER, for the ECF, for the BWH, for the CE, for the mass flow rate of methane and for the flare efficiency. As well as need to explain in the PDD what to refer the technical standard UNI10389, if the flare</i></p>	<del>CL9</del>	

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			<i>efficiency refer to enclose flare or no, and to include in the table Annex 3.1. the adopted data for the BWH and for the mass flow rate of methane.</i>		
B.4.3. Are uncertainties in the project emission estimates properly addressed?	/1/	DR	Yes.		OK
<b>B.5. Calculation of GHG Emission Reductions – Baseline emissions</b> <i>It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /3/ /4/ /10/ /20/	DR	<p>Yes. The baseline emissions have been calculated according the approved methodology ACM0001. To estimate the annual methane generation has been used the LANDGem (version 3.02<sup>6</sup>) model which uses the first decomposition rate equation considering the methane generation rate, the potential methane generation capacity, the mass of waste accepted, the lifetime of the landfill.</p> <p>To calculate the emission factor from China North East Power Grid has been applied the approved methodology ACM0002 and according to it the Simple OM is used for</p>		OK

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			<p>calculating <math>EF_{OM}</math> of CNEPG because the detailed data applying the dispatch analysis method is not available. The <math>EF_{BM}</math> was calculated to the option 1 of the ACM0002 methodology and it is fixed in the crediting period. No ex-post monitoring of the <math>EF_{OM}</math> and <math>EF_{BM}</math> is required. Since plant specific fuel consumption and electricity generation data is not publicly available in China, the project proponent adopted the deviation method as approved by the CDM EB (February 13, 2006) for AM0005 and AMS.I.D as follows, which are deemed to be applicable for this project:</p> <ul style="list-style-type: none"> <li>- use of capacity additions for estimating the build margin emission factor for grid electricity;</li> <li>- use of weights estimated using installed capacity in place of annual electricity generation;</li> <li>- use the efficiency level of the best technology commercially available in the Provincial/Regional of national grid of China, as a conservative proxy, for each fuel type in estimating the fuel consumption to estimated the build margin (BM), for coal fired plant, efficiency of 35,82% is selected, for oil and gas fired power plant, efficiency</li> </ul>		

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			of 47,67% is selected.		
B.5.2. Have conservative assumptions been used when calculating the baseline emissions?	/1/ /9/ /10/	DR	<p>Yes. It has been adopted conservative values for the baseline emissions calculation, that are the following:</p> <ul style="list-style-type: none"> <li>- methane generation rate (k): 0,0668. The methane generation rate constant is influenced by the moisture content, the availability of nutrients, pH, temperature and the rainfall. The Shenyang's average rainfall is 735 mm.</li> </ul> <p><b><i>Documented evidence is requested about the type of daily cover used at the site, the permeability and time of placement of final cover, the type of base linear, the lechate collection system and the depth of waste in the site, the operation lifetime of the landfill. The Annex 3 of the PDD need to updated.</i></b></p> <ul style="list-style-type: none"> <li>- potential methane generation capacity (L<sub>0</sub>): 116 m<sup>3</sup> CH<sub>4</sub>/tonne waste. The calculation formula was given from the IPCC Good Practice where the methane correction factor (MCF) has been used a IPCC default value of 1.0 for managed landfill as considered the Shenyang landfill; for the degradable organic carbon has been used the DOC% by weight waste IPCC default value for</li> </ul>	CL10	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>major waste stream and then it has been calculated on the basis of the % of the waste composition of Shenyang landfill considering a 30% of paper and textile, 28% of garden and park waste, 25% of food waste, 8% of wood and 9% of other wastes. The DOC% applied is 22,91%. For the fraction of DOC dissimulated (DOCf) has been assumed a medium biodegradable fraction value in China of 0.55; the fraction (F) by volume of CH<sub>4</sub> in landfill gas has been used a IPCC default value of 50%.</p> <p><i>Documented evidence is requested about the type of waste considered and dumped in the landfill, the DOCf. The Annex 3 of the PDD need to update for the DOC% determination.</i></p> <p><i>Documented evidence for the quantity of waste entering in the landfill every year is requested.</i></p> <p>An AF of 0 has been considered because no regulatory or contractual requirements obligate to install a specific system for collection and destruction of methane. This was confirmed during the validation.</p>	<p>CL11</p> <p>CL12</p>	

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			The combined margin emission factor is calculated to 1.05176 tCO <sub>2</sub> /MWh, where the $EF_{OM}$ is calculated to 1.2403 tCO <sub>2</sub> /MWh and the $EF_{BM}$ is calculated to 0.8632 tCO <sub>2</sub> /MWh.		
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	Yes.		OK
<b>B.6. Calculation of GHG Emission Reductions – Leakage</b> <i>It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.6.1. Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /3/	DR	Leakage has not been considered in accordance with the baseline methodology.		OK
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?			NA		NA
B.6.3. Are uncertainties in the leakage emission estimates properly addressed?			NA		NA
<b>B.7. Emission Reductions</b> <i>The emission reductions shall be real, measurable and give long-term benefits related to the mitigation</i>					



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<i>of climate change.</i>					
B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.	/1/	DR	Emission reductions will be measured in line with ACM0001 version 6 requirements. Benefits are for long-term.		OK
<b>B.8. Monitoring Methodology</b> <i>It is assessed whether the project applies an appropriate monitoring methodology.</i>					
B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1/ /3/ /7/	DR	The project applies and it is in compliance with the approved “consolidated monitoring methodology for landfill gas project activity” refer to the methodology ACM0001 version 06. In addition the monitoring methodology procedure, refer to the “Tool to determine project emissions from flaring gases containing methane” and the methodology ACM0002 version 6 for the electricity generation component. These are also employed.		OK
B.8.2. Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1/	DR	The section B.7.1 of the PDD defines that data and parameters will be kept during the crediting period. All data should be kept until two years after the end of the crediting period.		OK
<b>B.9. Monitoring of Project Emissions</b> <i>It is established whether the monitoring plan provides for reliable and complete project emission</i>					

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<i>data over time.</i>					
B.9.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR	Yes, in line with the methodology the monitoring plan provides for the collection and archiving all necessary data.		OK
B.9.2. Are the choices of project GHG indicators reasonable and conservative?	/1/	DR	Methane from incomplete combustion of the flare is monitored in line with the “Tool to determine project emissions from flaring gases containing methane”		OK
B.9.3. Is the measurement method clearly stated for each GHG value to be monitored and deemed appropriate?	/1/	DR	Yes.		OK
B.9.4. Is the measurement equipment described and deemed appropriate?	/1/	DR	Yes. The section B.7.1. of the PDD describes the appropriate measurement method and the procedure to be applied. To monitor; i) the total amount of landfill gas captured and flared/ combusted, will be installed flow meters, continuously normalized according to landfill gas temperature and pressure; ii) for the net amount of electricity generated using landfill gas and the net amount of electricity required by the project activity will be measured continuously by electricity meters; iii) the working hours of the blower will be		OK

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			measured by hour meters; iv) the volumetric fraction of O <sub>2</sub> in the exhaust gas of the flare, the concentration of methane in the exhaust gas of the flare in dry basis at normal condition will be measured continuously by a gas analyzer.		
B.9.5. Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR	Yes. The measurement equipments will follow regular maintenance and testing regime to ensure accuracy. In case of no signal of the measurement equipments, to determine the values during the time span, the average of the seven days will be used.		OK
B.9.6. Is the measurement <i>interval</i> identified and deemed appropriate?	/1/	DR	Yes. The measurement equipments measured continuously and data will be aggregated hourly, monthly and yearly in line with ACM0001 version 6.		OK
B.9.7. Is the <i>registration, monitoring, measurement and reporting</i> procedure defined?	/1/	DR	<b><i>Need to be defined procedure for data handling, reporting, quality control and control assurance.</i></b>	CL13	OK
B.9.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR	Yes. The measurement equipments will follow regular maintenance and testing regime to ensure accuracy. <b><i>Need to be defined the calibration intervals.</i></b>	CL13	OK
B.9.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance	/1/	DR	Yes. The monitored and recorded data will be copied to magnetic media every six months and stored. A plant maintenance manual will		OK

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documentation)			be provided with specific details for day-to-day records handling.		
<b>B.10. Monitoring of Baseline Emissions</b> <i>It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.</i>					
B.10.1.Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/ /3/	DR	According to the approved methodology ACM0001 data and parameters to calculate actual captured and utilized methane will be monitored ex-post and the monitoring methodology is based on direct measurement.		OK
B.10.2.Are the choices of baseline GHG indicators reasonable and conservative?	/1/	DR	CH <sub>4</sub> emitted in the baseline and CO <sub>2</sub> from the grid emission factor.		OK
B.10.3.Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate?	/1/	DR	Yes.		OK
B.10.4.Is the measurement <i>equipment</i> described and deemed appropriate?	/1/	DR	Yes. Please refer to B.9.4. The methane fraction in the landfill gas, the volumetric fraction of component in the residual gas, will be measured continuously by a gas analyzer on the same basis (dry and wet).		OK
B.10.5.Is the measurement <i>accuracy</i> addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR	Yes. Please refer to B.9.5.		OK

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B.10.6. Is the measurement <i>interval</i> for baseline data identified and deemed appropriate?	/1/	DR	Yes. Please refer to B.9.6.		OK
B.10.7. Is the registration, <i>monitoring</i> , <i>measurement</i> and <i>reporting</i> procedure defined?	/1/	DR	<b><i>Please refer to B.9.7.</i></b>	<del>CL13</del>	OK
B.10.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR	<b><i>Yes. Please refer to B.9.8.</i></b>	<del>CL13</del>	OK
B.10.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR	Yes. Please refer to B.9.9.		OK
<b>B.11. Monitoring of Leakage</b> <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
B.11.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	No leakage effect needs be accounted under this methodology ACM0001.		OK
B.11.2. Are the choices of project leakage indicators reasonable and conservative?			NA		NA
B.11.3. Is the measurement method clearly stated for each leakage value to be monitored and deemed			NA		NA

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appropriate?					
<b>B.12. Monitoring of Sustainable Development Indicators/ Environmental Impacts</b> <i>It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
B.12.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/ /17/	DR I	<p>The EIA of the project was approved by the Shenyang Environmental Protection Bureau on February 14, 2007.</p> <p>It has been confirmed that there are no sustainable development indicators that need to be monitored according to the Chinese regulation.</p>		OK
B.12.2. Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR I	The monitoring methodology does not require collection and archiving of relevant data concerning environmental, social and economic impacts. There is no such requirement in China that requires monitoring of sustainable development indicators.		OK
B.12.3. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/	DR	Yes.		OK
<b>B.13. Project Management Planning</b> <i>It is checked that project implementation is properly</i>					

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<i>prepared for and that critical arrangements are addressed.</i>					
B.13.1. Is the authority and responsibility of overall project management clearly described?	/1/	DR	Yes. The authority and responsibility for the overall management of the project activity has been defined.		OK
B.13.2. Are procedures identified for training of monitoring personnel?	/1/	DR	Yes. It will be available a guidebook about landfill gas extraction and utilization in English and in Chinese		OK
B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	<i>No. Emergency preparedness for cases where emergencies can cause unintended emission need to be identified in the PDD with related procedure.</i>	CL14	OK
B.13.4. Are procedures identified for review of reported results/data?	/1/	DR	<i>No. Procedure for review of reported results and data need to be identified and explained in the PDD.</i>	CL14	OK
B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	<i>No. Procedure for corrective actions in order to provide for more accurate future monitoring and reporting need to be identified and explained in the PDD.</i>	CL14	OK
<b>C. Duration of the Project/ Crediting Period</b> <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1.1. Are the project's starting date and operational lifetime clearly defined and evidenced?	/1/	DR I	The project starting date was defined as 01 July 2007 as construction date. The project activity has the construction permission and requires the project starts construction within		OK

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			three months after the issuance date. <b><i>Please refer to B.3.4.</i></b> The expected operational lifetime of the project is 15 years. <b><i>A justification is requested for why the project developer has considered the operational lifetime of the project as 15 years when the contract for the power generation is for ten years and where the landfill will stop receiving waste in year 2025.</i></b>	CL8  CL15	
C.1.2. Is the start of the crediting period clearly defined and reasonable?	/1/	DR	A fixed crediting period has chosen and it will start on July 1, 2008. <b><i>The starting date of the crediting period needs to be changed to at least two months after request for registration.</i></b>	CL16	OK
<b>D. Environmental Impacts</b> <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
D.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR	Yes. The analysis of the environmental impacts has been described.		OK
D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/ /17/	DR I	The EIA was approved by the Shenyang Environmental Protection Bureau on February 14, 2007		OK



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.1.3. Will the project create any adverse environmental effects?	/1/	DR	The project activity will not create any significant negative environmental effects.		OK
D.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	The project activity will not have any transboundary effects.		OK
D.1.5. Have identified environmental impacts been addressed in the project design?	/1/ /16/	DR I	Yes. The impacts identified in the EIA have been addressed in the PDD. The EIA has also been verified during the site visit.		OK
D.1.6. Does the project comply with environmental legislation in the host country?	/22/	I	The project activity is in compliance with the relevant Chinese laws and regulations (refer to Technical Code for Municipal Solid Waste Sanitary Landfills CJJ17-2004)  <i>A description of the extraction and destruction efforts needed in order to be in line with safety regulation of the landfills is requested. Documented evidence needed that this landfill was in compliance with the safety regulations.</i>	CL17	OK
<b>E. Stakeholder Comments</b>  <i>The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.</i>					
E.1.1. Have relevant stakeholders been consulted?	/1/ /18/	DR	Yes. A stakeholder meeting was held in Shenyang on July 18, 2006.		OK
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	Yes. The notice for stakeholder meeting was		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	/19/		advertised on Shenyang Newspaper on June 29, 2006. The advertisement in local media of the public consultation meeting has also been verified during the site visit.		
E.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR	Yes. The stakeholder consultation process is in accordance with Chinese EIA regulations.		OK
E.1.4. Is a summary of the stakeholder comments received provided?	/1/ /18/	DR	Yes. A brief summary of the stakeholder comments is provided and it respects the content of the original feedback forms collected and verified during the site visit.		OK
E.1.5. Has due account been taken of any stakeholder comments received?	/1/ /18/	DR/ I	All comments received were positive and it has also been verified during the site visit.		OK

**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 owner response	Validation team conclusion
<p><b>CAR.1</b></p> <p>Approval from China and Italian DNA are not yet available and neither the authorization to Asja Ambiente Italia Spa and Shenyang Laohuchong Municipal Solid Waste Management Co. Ltd as a project participant.</p> <p>A formal letter of confirmation regarding the voluntary participation by DNA of both participating Parties is not yet available.</p> <p>Confirmation regarding the project's contribution to the sustainable development of the host country is not yet available.</p>	<p>A.2.2.</p> <p>A.2.3.</p> <p>A.4.1.</p>	<p>The LoA from DNA of China has been received.</p>	<p>The DNA of China issued the LoA on March, 2008 authorizing the Shenyang Laohuchong LFG Power Generation Project and confirming that the project activity assists China in achieving sustainable development and confirming the China's participant to voluntarily participate in and carry out the project activity.</p> <p>The DNA of Italy issued the LoA on June 25, 2008 authorizing Asja Ambiente Italia Spa as project participant and confirming the Italian voluntary participation in the CDM.</p> <p>CAR 1 is closed.</p>
<p><b>CAR.2</b></p> <p>The baseline determination procedure in the methodology has not been followed; step 2 has not been applied. For the export energy should be also considered the heat generation in the absence of the project activity.</p>	<p>B.2.2.</p> <p>B.2.3.</p>	<p>The PDD has been modified accordingly.</p>	<p>The PDD has been updated and the baseline determination methodology has been applied correctly considering the baseline scenario for waste treatment, power generation and heat generation as well as the step 2 has been applied to identify the fuel for the baseline choice of energy taking into account the national and sectoral policies where applicable.</p> <p>CAR 2 is closed</p>
<p><b>CL.1</b></p> <p>It should included in the PDD further information about the gas extraction system used in the project</p>	<p>A.3.2.</p>	<p>Information from the feasibility study of the project activity and the manufacturer's specifications has been added to the PDD.</p>	<p>The approved Feasibility Study Report /14/ /15/ has been checked as well as the technical sheet of the engines /28/ and</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
activity (i.e. types and number of wells, material used for pipeline, etc), as well as the type of the flare (enclosed or open flare) and flare efficiency of the flare.		Besides, you will find the technical sheet of the flare and the engines as well as the gas extraction system. The information has been added in the PDD and the documented evidences have been provided.	control system acceptance of the flare /29/. The PDD in section A.4.3. has been updated with the information about the gas extraction system used in the proposed project activity and in Annex 3, Table Annex 3.1. with the information about the type of flare used and the flare efficiency. CL 1 is closed.
<b>CL.2</b> A description of the current situation at the Shenyang Laohuchong Municipal Solid Waste landfill is requested. The project developer also needs to explain the maximum allowable height of the landfill, maximum allowable waste that be dumped in the landfill as per the local environmental laws/regulations.	B.1.2.	The landfill is operated according to the guidelines foreseen in the project owner's landfill feasibility study. The feasibility study gives the description of the landfill base on the applicable. Annex 3 of the PDD was updated with this information and documented evidences have been provided.	It is confirmed that the situation before the installation of the biogas plant of the proposed project activity, was emitting all the biogas to the atmosphere. According to the local regulations /21/ in order to prevent firing or explosions, a system made of vertical wells was installed without any flaring; these vertical wells were not efficient and have been replaced with the high-quality biogas extraction and collection system of the proposed project activity. CL 2 is closed.
<b>CL.3</b> The conclusion of Step 1 of the additionality test is unclear. Updated PDD with a clear indication of which alternatives will be further considered in Step 2 is requested.	B.3.1.	The PDD has been modified accordingly and the documents used as evidence in the additionality assessment have been provided.	Please refer to CAR2. CL 3 is closed.
<b>CL.4</b> Justification is needed for why 10% variation is chosen as reasonable variation and why it is not	B.3.1.	The sensitivity analysis has been changed and all the justifications have been added to the investment analysis in the PDD.	The sensitivity analysis has been updated and PP has given the justification in order to the variation of the financial indicators

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
likely for each of the three main parameters to vary a degree to reach the benchmark.			needed to reach the 8% benchmark. The IRR calculation has been checked as well as the sensitivity analysis, the documents to support the assumptions made /30/ /31/ /32/ and the update PDD. CL 4 is closed.
<b>CL.5</b> The project developer has considered a benchmark of 8% which has been sourced from the Interim rules on economic assessment of electrical engineering retrofit project. The project developer is requested to justify how his benchmark is applicable to a landfill gas collection and utilization (for power generation) project.	B.3.1.	The benchmark reference has been provided. The justification on how this benchmark is applicable to a landfill gas collection and power generation project has been added in the PDD.	The proposed project activity is a relative new type of investment and since this is not a common practice in China, there are more operation, technological and market risks than for conventional power plants. The benchmark IRR of the power industries can be considered as conservative. Documented evidence has been checked /33/ and the PDD has been update in Section B.5. CL 5 is closed.
<b>CL.6</b> In the common practice analysis, the project developer needs to clarify the following points related to the 10 landfill sites: <ul style="list-style-type: none"> <li>- what type of gas utilization is being carried out;</li> <li>- how they (i.e. gas collection and utilization system) are different from the proposed project activity;</li> <li>- what is the date of the installation of the gas collection and utilization system;</li> <li>- do they also faced similar barriers as the</li> </ul>	B.3.1.	The common practice analysis has been changed in order to comply with the PDD's format. Information on Anshan, Nanjing and Ma'anshan projects comparable to the project activity have been provided.	The PDD has been updated and as common practice has been taking into account the three non-CDM projects that are comparable with the proposed project activity. All these three projects were supported by GEF and developed under the "Accelerate Urban Waste LFG collection and utilization "Project Progress. Documented evidence /24/ /35/ /36/ has been checked. CL 6 is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>proposed project activity.</p> <p>For each argument is requested to provide quantitative information and documented evidence.</p>			
<p><b>CL.7</b></p> <p>The project developer needs to provide an evidence for the fact that the benefits of CDM revenues were seriously considered in the decision to go ahead with the project.</p>	B.3.4.	<p>The PDD has been update and the evidence has been provided.</p>	<p>It has been demonstrated by the chronological events that the CDM revenues were considered for the project activity prior to starting date of the project:</p> <ul style="list-style-type: none"> <li>- Shenyang Laohuchong Municipal Solid Waste Management Co., Ltd, the project owner, conceptualized the project on November 24, 2005 during a conference resolution Board Meeting /45/ established that a high-qualified design institute will be appointed for the feasibility study compilation. The FSR prepared by the Shenyang Aluminium and Magnesium Engineering and Research Institute on May, 2007 /14/ for a power plant of 2 MW, has been approved by the Liaoning Provincial DRC on June 15, 2007 /15/ stating that the construction period is from 2007 to 2009. I It is verified that CDM is clearly mentioned in the FSR.</li> <li>- The project owner and the CERs buyer signed on December 8, 2005 and agreement /9/ for the purpose of undertaking a CDM project based on</li> </ul>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			<p>the exploitation for power generation of the landfill gas.</p> <ul style="list-style-type: none"> <li>- The project developer on July 01, 2007 started the construction of the biogas plant.</li> </ul> <p>The updated PDD and the documented evidence have been checked.</p> <p>CL 7 is closed.</p>
<p><b>CL.8</b></p> <p>A clarification is requested for why the construction started (July 1, 2007) before to obtain the permission construction.</p>	<p>B.3.4. C.1.1.</p>	<p>The starting construction date is July 1, 2007 and it is after the approval of the FSR which was on June 15, 2007.</p>	<p>The approval of the FSR has been checked and it is confirmed that no construction permits are required for this type of project. The project starting date of 1 July is deemed appropriate as the earliest of implementation, construction and real action.</p> <p>CL 8 is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p><b>CL.9</b></p> <p>Documented evidence is requested about the assumption made for the auto consumption (AC%), for the generator efficiency rate (GER), for the energy conversion factor (ECF), for the BWH, for the collection efficiency (CE), for the mass flow rate of methane and for the flare efficiency. As well as need to explain in the PDD what to refer the technical standard UNI10389, if the flare efficiency refer to enclose flare or no, and to include in the table Annex 3.1. the adopted data for the BWH and for the mass flow rate of methane.</p>	B.4.2.	<p>The following documented evidences have been provided:</p> <ul style="list-style-type: none"> <li>- feasibility study report that evidence the CE (40%) assumption on page 32;</li> <li>- the flare efficiency is specified in the manufacturer's technical sheet;</li> <li>- the GER (30%) is declared in the manufacturer's manual and the UNI standard has been provided too;</li> <li>- the BWH are based on Asja's experience and documented evidence has been provided to shown the values of the EWH for the last ear in 5 plants in Italy. The BWH are strictly related to the BWH since without blowers running there is no biogas and thus non engine can work. An excel sheet called "Load curves" has been provided and it was done using data published by ENEL, where the production of our plants is reported in a continuous manner (this data is used for billing);</li> <li>- the ECF is a standard value, please refer to the website: <a href="http://energia.mecon.gov.ar/Electricidad/boletines/quinquenales/1991-1995/TABLA%20DE%20CONVERSIONES%20ENERGETICAS.html">http://energia.mecon.gov.ar/Electricidad/boletines/quinquenales/1991-1995/TABLA%20DE%20CONVERSIONES%20ENERGETICAS.html</a>;</li> <li>- the AC% was also assumed base on Asja's experience. Documented</li> </ul>	<p>The following is provided:</p> <ul style="list-style-type: none"> <li>- the FSR mentioned the biogas collection rate as per 40%;</li> <li>- for the flare efficiency the PP adopted a conservative value as 90% which is lower than the burning efficiency established by the manufacture (98%) /29/;</li> <li>- the manufacture's manual /28/ established the efficiency of engine set can reach 30-33%; the PP adopted 30%;</li> <li>- the BWH has been established in 8,000 h/y as Asja's experience; the excel sheet of the production of five plants in operation in Italy /37/ has demonstrate that the annual average production is around 8,730 h/y;</li> <li>- the energy conversion factor is fixed value /38/;</li> <li>- the AC% has been established in 4,8% as Asja's experience; the excel sheet /37/ and the declaration by the Technical Office Responsible of Asja Ambiente Italia Spa /39/ demonstrate that the value used is appropriate;</li> </ul> <p>The PDD in Annex 3.1 has been update and it has been checked as well as the documented evidence to support the</p>



Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>evidence has been provided as a declaration of the auto consumptions of the last year for 5 Asja plants and a declaration from the Asja's technicians;</p> <ul style="list-style-type: none"> <li>- the mass flow rate was calculated with the LandGem, this is not a default value but a fixed value and it related to the biogas generated.</li> </ul> <p>Annex 3.1 of the PDD has been updated.</p>	<p>assumptions made by the PP.</p> <p>CL 9 is closed.</p>
<p><b>CL.10</b></p> <p>Documented evidence is requested about the type of daily cover used at the site, the permeability and time of placement of final cover, the type of base linear, the lechate collection system and the depth of waste in the site, the operation lifetime of the landfill. The Annex 3 of the PDD need to updated.</p>	B.5.2.	<p>The feasibility study of the landfill has been provided. Annex 3 of the PDD has been updated with this information. The operational lifetime of the landfill is stated in the approved feasibility study report of the proposed project activity.</p>	<p>In the FSR it is stated that the landfill will be in operation from 2003 to 2025, and the technical feasibility study of the landfill /40/ mentioned the management procedure related to thickness cover (thickness of each layer, daily clay cover and final cover), leachate collection.</p> <p>The PDD in Annex 3 has been update and it has been checked as well as the documented evidence.</p> <p>CL 10 is closed.</p>
<p><b>CL.11</b></p> <p>Documented evidence is requested about the type of waste considered and dumped in the landfill, the DOCf. The Annex 3 of the PDD need to update for the DOC% determination.</p>	B.5.2.	<p>The type of waste is declared by the project owner in a specific document that it has been provided. DOCf was taken from IPCC guidelines (<a href="http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_3_Ch3_SWDS.pdf">http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_3_Ch3_SWDS.pdf</a> - table 3.5).</p> <p>The Annex 3 of the PDD has been updated.</p>	<p>The data sheet issued by the project owner /41/ confirms the type of waste dumped in the landfill. For the year 2007, the data are not yet elaborated and made publicly available, the PP considers a valid estimation based on the data included in the FSR.</p> <p>The PDD in Annex 3 has been updated and it has been checked as well as the</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			documented evidence. CL 11 is closed.
<b>CL.12</b> Documented evidence for the quantity of waste entering in the landfill every year is requested.	B.5.2.	A data sheet by the project owner has been provided.	The data sheet issued by the project owner /41/ confirms the quantity of waste dumped in the landfill. In order to the year 2007 the data are not yet elaborated and made publicly available, the PP considers a valid estimation based on the amount included in the FSR. CL 12 is closed.
<b>CL.13</b> Need to be defined procedure for data handling, reporting, quality control and control assurance. Need to be defined the calibration intervals.	B.9.7. B.9.8. B.10.7. B.10.8.	The PDD has been updated according to the Monitoring Plan.	The PDD has been updated including in the Annex 4 “Monitoring Information”, the procedure regarding data collected, frequency and quality control, monitoring equipment and installation, monitoring organization, calibration, data management system and audit review. The updated PDD has been checked. CL 13 is closed.
<b>CL. 14</b> Emergency preparedness for cases where emergencies can cause unintended emission need to be identified in the PDD with related procedure. Procedure for review of reported results and data need to be identified and explained in the PDD. Procedure for corrective actions in order to provide for more accurate future monitoring and	B.13.3.          B.13.4.	The PDD has been updated with the procedure requests.	The updated PDD has been checked. The monitoring plan has been prepared and it contains procedure for data collected, frequency, quality control, for erroneous measures, for the equipment maintenance and calibration, for data management system, for audit review and emergency preparedness. CL 14 is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
reporting need to be identified and explained in the PDD	B.13.5.		
<b>CL.15</b> A justification is requested for why the project developer has considered the operational lifetime of the project as 15 years when the contract for the power generation is for ten years and where the landfill will stop receiving waste in year 2025.	C.1.1.	The approval of the FSR constitutes the approval for construction and operation. The FSR has been approved just for 15 years so we assumed a 15 years operational lifetime of the project activity.	As per the approval FSR /14/ /15/ the operational lifetime of the project has been stated as 15 years and it has been established on the basis of the prediction that the landfill gas yield for a period of 15 years. CL 15 is closed.
<b>CL.16</b> The starting date of the crediting period needs to be changed to at least two months after request for registration.	C.1.2.	The PDD has been updated as well as the IRR calculation and the CERs calculation.	The PDD and ER calculation /10/ have been updated and checked. CL 16 is closed.
<b>CL.17</b> A description of the extraction and destruction efforts needed in order to be in line with safety regulation of the landfills is requested. Documented evidence needed that this landfill was in compliance with the safety regulations.	D.1.6.	The Chinese government has issued a standard that requests ventilation and flaring system installation for the sake of safety; in addition, if the conditions permitted, utilization system should also be installed. Urban Solid Waste Landfill Technology Standard has been provided.	The following regulations (Technical code for sanitary landfill of municipal domestic refuse CJJ17-2001 – December 01, 2001; Urban Solid Waste Landfill Technology Standard CJJ17—2004) in China dealing with the management of landfill gas. There are some legal requirements on the recovery and utilization of landfill gas in China. However, DNV has been able to verify that the regulations are not systematically enforced and the non-enforcement is wide spread around the country. CL 17 is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<b>CL.18</b> The project developer needs to clearly describe the plan for the implementation of the proposed project. The number of phases of the project and amount of work to be completed in each phase needs to be described clearly in the PDD.	A.3.2.	The PDD has been update mentioned the four phases foresee for the construction of the biogas plant.	The PDD has been updated and checked. CL 18 is closed.

## **APPENDIX B**

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### **CERTIFICATES OF COMPETENCE**



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## CERTIFICATE OF COMPETENCE

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***Rita Valoroso***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1

<b><i>GHG Auditor:</i></b>	Yes		
<b><i>CDM Validator:</i></b>	--	<b><i>JI Validator:</i></b>	--
<b><i>CDM Verifier:</i></b>	--	<b><i>JI Verifier:</i></b>	--
<b><i>Industry Sector Expert for Sectoral Scope(s):</i></b>	--		

Høvik, 30 November 2007

*Michael Lehmann*

Michael Lehmann

*Technical Director, International Climate Change Service*



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## CERTIFICATE OF COMPETENCE

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***Zhi Ang (Walter) Tang***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

<b><i>GHG Auditor:</i></b>	Yes		
<b><i>CDM Validator:</i></b>	Yes	<b><i>JI Validator:</i></b>	--
<b><i>CDM Verifier:</i></b>	--	<b><i>JI Verifier:</i></b>	--
<b><i>Industry Sector Expert for Sectoral Scope(s):</i></b>	--		

Høvik, 2 May 2008

*Michael Lehmann*

Michael Lehmann

*Technical Director, International Climate Change Services*



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## CERTIFICATE OF COMPETENCE

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***Elfride V. Covarrubias***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

<b><i>GHG Auditor:</i></b>	Yes		
<b><i>CDM Validator:</i></b>	Yes	<b><i>JI Validator:</i></b>	--
<b><i>CDM Verifier:</i></b>	--	<b><i>JI Verifier:</i></b>	--
<b><i>Industry Sector Expert for Sectoral Scope(s):</i></b>	--		

Høvik, 4 January 2008

*Michael Lehmann*

Michael Lehmann

*Technical Director, International Climate Change Services*





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## CERTIFICATE OF COMPETENCE

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***Luis Filipe Tavares***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1)

<b><i>GHG Auditor:</i></b>	Yes		
<b><i>CDM Validator:</i></b>	Yes	<b><i>JI Validator:</i></b>	--
<b><i>CDM Verifier:</i></b>	Yes	<b><i>JI Verifier:</i></b>	--
<b><i>Industry Sector Expert for Sectoral Scope(s):</i></b>	Sectoral scope 9 & 13		

Høvik, 6 November 2006

**Einar Telnes**  
*Director, International Climate Change Services*

**Michael Lehmann**  
*Technical Director*



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## CERTIFICATE OF COMPETENCE

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***Anjana Sharma***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	--
<b>CDM Verifier:</b>	--	<b>JI Verifier:</b>	--

**Industry Sector Expert for Sectoral Scope(s):**

**Technical Reviewer for (group of) methodologies:**

ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes
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Høvik, 1 June 2008

*Michael Lehmann*

Michael Lehmann

*Technical Director, Climate Change Services*



## CERTIFICATE OF COMPETENCE

### *Hendrik Brinks*

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1)

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	--
<b>CDM Verifier:</b>	--	<b>JI Verifier:</b>	--
<b>Industry Sector Expert for Sectoral Scope(s):</b>	Sectoral scope 1, 2, 3 & 12		
<b>Technical Reviewer for (group of) methodologies:</b>			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS- III.I	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes	ACM0006, AM0007, AM0015, AM0036, AM0042	Yes
ACM0004, ACM0012	Yes		

Høvik, 30 October 2007

*Michael Lehmann*

Michael Lehmann

*Technical Director, International Climate Change Services*



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## CERTIFICATE OF COMPETENCE

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***Mari Grooss Viddal***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	--
<b>CDM Verifier:</b>	--	<b>JI Verifier:</b>	--
<b>Industry Sector Expert for Sectoral Scope(s):</b>	--		
<b>Technical Reviewer for (group of) methodologies:</b>			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes		
ACM002, AMS-IA-D, AM0019, AM0026, AM0029, AM0045	Yes		

Høvik, 26 September 2007

*Michael Lehmann*

Michael Lehmann

*Technical Director, International Climate Change Services*



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## CERTIFICATE OF COMPETENCE

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***Barbara Lara***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

<b><i>GHG Auditor:</i></b>	Yes		
<b><i>CDM Validator:</i></b>		<b><i>JI Validator:</i></b>	--
<b><i>CDM Verifier:</i></b>	--	<b><i>JI Verifier:</i></b>	--
<b><i>Industry Sector Expert for Sectoral Scope(s):</i></b>	--		

Høvik, 2 May 2008

*Michael Lehmann*

Michael Lehmann

*Technical Director, Climate Change Services*