VALIDATION REPORT (rev.5.4)

"Jinju Landfill Gas Recovery and Power Generation CDM Project"

in Republic of Korea

REPORT No. : 2011-018

KSA KOREAN STANDARDS ASSOCIATION

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ABBREVIATIONS

BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CL	Clarification Request
CM	Combined Margin
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
KECO	Korea Environment Corporation
KEPCO	Korea Electric Power Co. Ltd.
KMA	Korea Meteorological Administration
KPX	Korea Power Exchange
KSA	Korean Standards Association
FAR	Forward Action Request
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
MP	Monitoring Plan
MoV	Means of Validation
NGO	Non-Governmental Organization
ODA	Official Development Assistance
OM	Operational Margin
PDD	Project Design Document
UNFCCC	United Nations Framework Convention for Climate Change

0. VALIDATION OPINION

Korean Standards Association (KSA) has carried out validation of the "Jinju Landfill Gas Recovery and Power Generation CDM Project" in the Republic of Korea. The validation has performed on the basis of UNFCCC criteria for the Clean Development Mechanism and the host country criteria.

The proposed project activity is to generate electricity from methane captured from existing landfill site. Electricity generated by the project will be supplied to the grid.

According to the standard audit technique defined in the 'Validation and Verification Manual (EB55)', the validation has been performed by desk review based on the project design document and other additional documents, follow-up actions including on-site assessment and interviews with project stakeholders, and resolution of outstanding issues and the preparation of the validation report.

Total emission reductions from the project are estimated to be on the 37,376 tCO_2-eq per year over the selected 10 year crediting period without renewal. The emission reduction forecast has been checked and is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

Validation team also confirmed that monitoring and maintenance plans are clearly defined and adequate.

In KSA's opinion, the project activity meets all relevant UNFCCC requirements for CDM, is eligible as a category I and III small-scale CDM project activity, and correctly applies the approved simplified baseline and monitoring methodologies AMS-III.G.(ver.07) AMS-I.D.(ver.17). Hence, KSA requests the registration of the project "Jinju Landfill Gas Recovery and Power Generation CDM Project" as a CDM project activity.

July 17th, 2012

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1. INTRODUCTION

Nurieconet Co., LTD.(hereafter, Nurieconet), one of the project participants, has contracted Korean Standards Association (hereafter, KSA) to carry out a validation of the proposed project "Jinju Landfill Gas Recovery and Power Generation CDM Project" (hereafter, project) in Korea. This report summaries the findings over the validation process that has been performed on the validation requirements of the Clean Development Mechanism (CDM).

1.1 Objective

The purpose of validation is to ensure a thorough, independent assessment of proposed project activities submitted for registration as a proposed CDM project activity against the applicable CDM requirements. In particular, the project's baseline, the 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 stated requirements and identified criteria. The validation is seen as necessary to provide assurance to stakeholders of the quality of the project activity and its intended generation of certified emission reduction (CERs).

1.2 Scope

The scope of the validation is defined as an independent and objective review of the project design document (PDD) and the relevant documents. The information in these documents is reviewed against the criteria stated in Article 12 of Kyoto Protocol (decision 17/CP.7), the CDM modalities and procedures as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities and the relevant decisions of the COP/MOP and the CDM Executive Board including the approved baseline and monitoring methodologies AMS-III.G. (ver.07) /1-2/ and AMS-I.D. (ver.17) /1-3/. The KSA validation team follows a risk-based approach in the validation focusing on the identification of significant risks for project implementation and generation of certified emission reductions (CERs). Validation is no meant to provide any consulting toward the project participants. However, the corrective action requests (CARs) and clarifications (CLs) may have provided input for improvement of the project design.

1.3 Validation Team

The validation has been performed by the following personnel;

Role/Qualification	*Name*	*Document Review*	*Site Visit*	*Follow-up Actions*	*Reporting*	*Technical Review*
Team Leader CDM Validator	Mr. SeungKeun Choi	✔	✔	✔	✔	
Team Memeber CDM Validator	Mr. Kyoo-Il Sohn	✔	✔	✔	✔	
Team Memeber Technical Expert	Mr. Chung-Kook Lee	✔	✔	✔		
Technical Reviewer CDM Validator	Mr. Seong-Yong Park					✔
Technical Reviewer CDM Validator	Mr. Ju-Dong Yeo					✔
Technical Reviewer Technical Expert	Mr. Woo-Jin Park					✔

For the qualification of individual team members, see appendix B

2. METHODOLOGY

To assess the correctness of the information provided by the project participants, the validation consists of the following three phases;

Ⅰ. Review of Documents, including;

- Review of data and information to verify the correctness, credibility and interpretation of presented information;
- Cross check between information provided in the PDD and information from sources other than that used, if available, and if necessary independent background investigations.

Ⅱ. Follow-up actions, including;

- Interview with relevant stakeholders in the host country, personnel with knowledge of the project design and implementation;
- Cross-check of information provided by interviewed personnel to ensure that no relevant information has been omitted the validation

Ⅲ. The resolution of outstanding issues and the issuance of the final validation report and opinion.

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

Validation Protocol Table 2: Requirement checklist				
Checklist Question	Reference	Means of Verification (MoV)	Comment	Draft and/or Final Conclusion
The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organised in five different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the checklist question or item is found.	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.	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.	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) due to noncompliance with the checklist question (See below). Clarification Request (CL) is used when the validation team has identified a need for further clarification.

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

Figure 1 Validation Protocol Tables

2.1 Review of Documents

The validation has been performed by KSA primarily based on the review of the PDD and the other supporting documents. The PDD ver.0, dated on Dec. 1st, 2011 /1-1/, was initially reviewd and KSA requested the PPs to present the supporting information and documents related to the project design. Such additional information and documents were also reviewed by KSA. Through the validation process, the PDD and relevant documents were evaluated to confirm the actions taken by the PPs to the CARs and CLs issued by KSA.

2.2 Follow-up Actions

Follow-up interviews with the stakeholders and site visits were conducted on Jan 31st, 2012. The schedule for on-site assessment and interviewed personnel are as follows;

Site Name	Location (Address)
Jinju Landfill	San 287, Yusu-Ri, Naedong-Myeon, Jinju-Si, Gyeongsangnam-Do, Republic of Korea (GPS Coordinate: N 35.119074°, E 128.014091°)

Interviewee	Roles and Responsibility	Interview Topics
Mr. Dong-wook Kim Ms. Jung-ju Park Mr. Chang Hun Lee Mr. Sung Hak Kim	Nurieconet, Project participant Carbontree, Consultant Seijin ENG, Constructor HAEIN, Engineer (Generator)	- Document related to the project's physical features - Construction contract - Feasibility Study Report - Records related to the stakeholder consultation - Specifications of monitoring equipments - Baseline scenario

2.3 Resolution of clarification and corrective action requests

As the outcomes of the validation process, validation team can raise Corrective Action Requests (CARs) and Clarification requests (CLs) in order to confirm that the proposed project activity meets the CDM requirements and can achieve credible emission reductions. CARs and CLs require the project participant to modify the project design, to rectify the PDD or to provide adequate additional explanations or evidence. Criteria for CARs and CLs are as follows and are based on the "Clean Development Mechanism Validation and Verification Manual" (EB 55 Annex 1) /2-1/.

• Corrective Action Request (CAR) shall be raised if one of the followings occurs;

a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;

b) The CDM requirements have not been met;

c) There is a risk that emission reduction cannot be monitored or calculated.

• Clarification (CL) Request shall be raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

The validation by KSA identified 16 CARs and 10 CLs. The resolution of CARs and CLs raised by KSA is to be reflected in the revised PDD and submitted to KSA for validation conclusion.

2.4 Internal Quality Control

After validation team prepared draft validation report, the person in charge of internal quality control process of KSA designated Mr. Seong-Yong Park, Mr. Ju-Dong Yeo and Mr. Woo-Jin Park, who have been qualified by KSA's internal procedure, as technical reviewer to review validation report and relevant documents prior to the submission of the report to the project participants and UNFCCC CDM secretariat. As a result of the review, validation report has been revised.

3. VALIDATION FINDINGS

In this section, means of validation and validation findings for each criteria are stated, in line with VVM (EB55). Additional validation approaches are described in the validation protocol, appendix A of this report.

3.1 DNA Approval

From the PPs, validation team has received Letter of Approval /1-4/, issued by host party's (Republic of Korea) DNA, dated on 25/06/2012. Precise project title is identified in the Letter of Approval, and it clearly states followings:

(i) Host party has ratified Kyoto Protocol
(ii) The project is voluntary
(iii) The project contributes to sustainable development in the host party

To verify received LoA, validation team made phone call to the administrative personnel of DNA, and he has confirmed that the LoA is effective.

3.2 Project Participation

The PDD identified that Jinju city and Nurieconet Co., Ltd have been involved for the project activity as the participants. Both are organizations in the host party, which is non-Annex I country. Both PPs are consistently stated not only in section A.3 but also the other parts of the PDD.

In addition, validation team has confirmed that Jinju City and Nurieconet Co., Ltd are also exactly listed in the Letter of Approval issued by host party's DNA

As a result, validation team has confirmed that the project participants have been consistently listed in the project documentation.

3.3 Project Design Document

PDD provided by the PPs used latest version of template, the CDM-SSC-PDD version 03, and complied with "Guidelines for Completing the Simplified Design Document (CDM-SSC-PDD) and the Form for Proposed New Small Scale Methodologies (CDM-SSC-NM) (ver.05)" /2-2/.

3.4 Project Description

The information presented in the PDD on the technical design are consistent with the actual planning and implementation of the project activity as confirmed by;

• Review of following document provided by the PPs:
- PDD /1-1/
- Excel Spreadsheets for calculation of the operating/build margin emission coefficient /1-5/
- Excel Spreadsheets for emission reduction estimation /1-11/
- Engineering Work Report[1)] for Jinju Landfill project /1-6/
- Design Drawings for the project /1-26/

• On-site assessment has been performed and interviewed people who related to the project activities.

• Cross-check with information in the similar projects registered as CDM project activity in Korea.

In the view of the above, KSA confirms that the project description as included in the PDD is sufficiently accurate and complete in order to comply with the requirements of the CDM

3.4.1 General Information

Project Scenario

The project is to supply electricity to the KEPCO (Korea Electric Power Corporation) grid generated by recovered methane from existing landfill site. Without the project, methane would have been directly emitted into the atmosphere, and the amount of electricity produced by the project would have been produced by a thermal power plant which uses fossil fuel.

Physical Information

The project site is located in San 287, Yusu-Ri, Naedong-Myeon, Jinju-Si, Gyeongsangnam-Do, Republic of Korea. The planned capacity of generator is 925kW. Including methane avoidance by the project activity, expecting annual average emission reductions are 37,376tCO_2-eq for selected 10-year crediting period without renewal.

Previous Situation before Proposed Activity

The project site 'Jinju landfill' has started to import solid waste from Jinju city since 1990s. According to national law "Waste Control Act" /2-12/, landfill site shall have flaring facility or shall capture landfill gas to utilize it as fuel. Moreover, article 30 of the "Waste Control Act" /2-12/

1) Engineering Work Report includes not only design information, but also financial feasibility analysis.

request the landfill to be carried out regular inspection by public organization designated by enforcement decree. However, validation team confirms that the requirement in the Act has become dead letter.

Although Jinju landfill has 'simple burning system' to collect landfill gas and flare it, the gas has not been captured, but directly emitted into the atmosphere without operation of the facilities. Nevertheless, Korea Rural Corporation (KRC) recently carried out inspection for Jinju landfill in accordance with article 30 of the "Waste Control Act" /2-12/, and reported that there were no non-conformities.

To ensure again, validation team cross-checked with following documents:

- Approval of Landfill Site Installation, 24/12/2991, Ministry of Environment /1-28/
- Status of Landfill Sites, Ministry of Environment, 2011 /1-29/
- Status of waste disposal and treatment (1996-2010), Ministry of Environment /1-10/
- Letter of Approval, issued by DNA of host party /1-4/
- Regular Inspection Report for Jinju Landfill, by KRC /1-31/

Reviewing the documents above, validation team found followings:

- Jinju Landfill site has been approved by Ministry of Environment in 1991;
- 182 landfills among 217 in Korea emits landfill gas into atmosphere without recovery;
- DNA confirmed that the proposed project is voluntary; and
- Designated inspection body (KRC) confirmed current situation.

In conclusion, validation team confirmed that the previous situation is direct emission of landfill gas into the atmosphere.

3.4.2 Eligibility as a small-scale project

Capacity Threshold for SSC CDM project

Paragraph 3(b) of the "General Guidelines to SSC CDM Methodologies (ver.17)" describes that:

> *In a project activity with more than one component that will benefit from simplified CDM modalities and procedures, each component shall meet the threshold criterion of each applicable type.*

The proposed project is combination of type III project (landfill gas recovery), and type I project (electricity generation from biogas). Expected average annual emission reduction of landfill gas recovery project (excluding electricity generation), is 33,624tCO_2-e, less than 60ktCO_2-e. For electricity generation, capacity of generator is 925kW, less than 15MW. Thus, the proposed project is eligible for small scale project activity.

De-bundling Issue

As per the paragraph 2 of "Guidelines on Assessment of Debundling for SSC Project Activities (ver.03)" defines that:

> *A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity, if there is a registered SSC CDM project activity or an application to register another SSC CDM project activity (a) with the same PPs, (b) in the same project category and technology/measure, (c) registered within the previous 2 years, and (d) whose project boundary is within 1 km of the project boundary of the proposed small- scale activity at the closest point.*

After interviews with the PPs and CDM webpage check, validation team confirmed that the PPs do not have any registered CDM project and has not proceed another CDM project. In this reason, requirement (a) among the four requirements above is not applied, so validation team confirmed that the project is not a de-bundled component of a large scale CDM project activity.

Conclusion

In conclusion, validation team confirmed that the project is eligible as a small-scale project.

3.4.3 Choice of the Crediting Period

The PPs has chosen fixed 10-year of crediting period, since the date of registration. Refer to the Engineering Work Report /1-6/, the expected operational lifetime is 15 years, which is longer than selected crediting period. It is also consistently described in the PDD - section A.4.3 and C.

3.5 Baseline and Monitoring Methodology

3.5.1 Applicability of selected methodology to the Project Activity

The proposed project activity is to recover methane from the existing landfill, produce electricity by burning recovered methane, and then supply to the grid. Estimated average annual emission reduction is 37,376tCO_2-e.

Applied methodology AMS-III.G. (ver.07) is applicable for the project that capture and combust methane from landfill, and result in emission reduction of less than or equal to 60ktCO_2-e. Estimated average emission reductions by methane recovery is 33,624tCO_2-e. So, the proposed project meets the applicability conditions.

For AMS-I.D. (ver.17), the project activity meets the following applicability conditions:

- Renewable energy generation unit

- Supply electricity to the grid
- Install a new power plant at a site where there was no renewable energy power plant before

Section B.2 of the PDD demonstrates how the proposed project activity meets the applicability conditions. validation team has confirmed that the project meets applicability conditions in the applied methodologies by:

- *Review of following document*
  - PDD /1-1/
  - Applied methodologies AMS-III.G. (ver.07) and AMS-I.D.(ver.17)
  - Engineering Work Report for Jinju Landfill project /1-6/
  - Design Drawings for the project /1-26/

- *On-site assessment including interviews people who related to the project activities.*

3.5.2 Project Boundary

As per applied methodologies, project boundary is identified as belows:

- For AMS-III.G, (ver.07), the project boundary is the physical, geographical site of the landfill where the gas is captured and destroyed/used.
- For AMS-I.D. (ver.17), the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.

Figure B-1 in section B.3 of the PDD shows how the PPs have identified project boundary for the proposed project activity.

To confirm that identified project boundary is appropriate, validation team reviewed following documents:

- PDD /1-1/
- Applied methodologies AMS-III.G. (ver.07) and AMS-I.D.(ver.17)
- Engineering Work Report for Jinju Landfill project /1-6/
- Design Drawings for the project /1-26/

After review of documents, validation team carried out on-site assessment. When the team visited the project site, most of the facilities have been installed, so was able to confirm the project would be implemented as designed. In conclusion, project boundary identified in the PDD is appropriate.

3.5.3 Baseline Identification

Baseline Scenario for Methane Recovery

As per the applied methodology AMS-III.G.(ver.07), the baseline scenario is the situation where, in the absence of the project activity, biomass and other organic matter are left to decay within the project boundary and methane is emitted to the atmosphere.

However, "General Guidelines to the SSC CDM Methodologies (ver.17)" requires to demonstrate eligibility of the baseline scenario by the steps provided. Section B.4 of the PDD describes how the PPs identified baseline scenario in accordance with the requirement.

step 1. Identifying alternatives

The PPs identified four (4) alternatives including the project activity without CDM revenue, the eliminated the last one because it is not realistic.

To verify if all plausible alternatives have been identified, validation team applied following approaches:

- Cross-check to the registered CDM projects in the host country, which applied same methodologies:
  - Mokpo Landfill Gas Recovery Project for Electricity Generation (reference no: 2834) /2-13/
  - Gwangju metropolitan city sanitary landfill LFG power plant CDM project (reference no: 4294) /2-14/

- Research to identify how other landfill sites deal with landfill gas generated
  - Status of waste disposal and treatment (1996-2010), Ministry of Environment /1-10/

As a result of the analysis, validation team concluded that all plausible alternatives have been identified.

step 2. Compliance with local regulation

The PPs analyzed that all three alternatives remaining are complied with local regulation. "Waste Control Act" in Korea stated that all landfills shall capture landfill gas, then flare or use for fuel. However, as validated in section 3.4.1 above, the law is statement-level without specific requirements in the enforcement rule and decree. In this situation, alternatives promote the intention of the law, so validation team accepted that all three alternatives are complied with local regulation.

step 3. Barrier Test

According to the paragraph 19 of the "General Guidelines to SSC CDM Methodologies (ver.17)", barrier test is applied as specified in "attachment A to Appendix B of the simplified M&P for SSC CDM (ver.08)" /2-15/.

Alternative 2 has been eliminated at this stage, because it is not financially feasible. Refer to the assessment of investment analysis in 'section 3.6.2 Additionality' below, validation team confirmed that the project activity without CDM registration is not profitable.

Alternative 3 has also been eliminated at this stage, because it only cause O&M cost for the PPs without any income. Validation team confirmed it in that no reasonable decision makers would decide to proceed this unprofitable alternative, even no regulations forced it.

As the outcome of the step 3, it is unveiled that alternative 1 is the only alternative that remains.

Step 4.

The only remaining alternative 1 is not the project activity without CDM revenue, but corresponds to the baseline scenario defined in the applied methodology AMS-III.G.(ver.07). In conclusion, validation team confirmed that alternative 1 is most plausible and eligible baseline scenario, and is in accordance with applied methodollogy AMS-III.G. (ver.07).

Baseline Scenario for Electricity Generation

As per the methodology AMS-I.D.(ver.17), the baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid.

Section B.4 of the PDD identified baseline scenario for the electricity generation activity, in accordance with baselline defined in the methodology AMS-I.D.(ver.17)

Validation team confirms the identified baseline scenario after following assessment :

- Review of following documents:
  - PDD /1-1/
  - Applied Methodology AMS-I.D. (ver.17) /1-3/
  - Engineering Work Report /1-6/
  - Design Drawings for the project /1-26/

- On-site assessment including interviews with the PPs

Conclusion

As defined in the applied baseline methodologies AMS-III.G.(ver.07) and AMS-I.D.(ver.17), the PPs identified baseline scenario in accordance with applied methodologies and correctly reflected it in the PDD. KSA confirms that all related CDM requirements, including relevant and/or sectoral policies and circumstances, have been correctly identified taken into account in the definition of the baseline scenario. A verifiable description of the baseline scenario has been included in the PDD, KSA confirms that:

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

3.5.4 Algorithms and/or Formulae used to determine emission reductions

The validation team conducted assessment of baseline emissions, project emissions, leakage emission, and emission reductions. The parameters and equations presented in the PDD, as well as other applicable documents, have been compared with the information and requirements specified in the applied methodologies and respective tools as listed below:

(a) AMS-III.G. (ver.07) /1-2/
(b) Emissions from solid waste disposal sites (ver.06.0.1) /1-7/
(c) AMS-I.D. (ver.17) /1-3/
(d) Tool to calculate baseline, project and/or leakage emissions from electricity consumption (ver.01) /1-25/
(e) Tool to calculate emission factor for an electricity system (ver.02.2.1) /1-8/
(f) Excel spreadsheets for emission reduction estimation /1-11/
(g) Status of waste disposal and treatment (1996-2010), Ministry of Environment /1-10/
(h) Status of Landfill Sites, Ministry of Environment, 2011 /1-29/
(i) Webpage of Korea Meteorological Administration /1-9/

In summary of the assessment belows, validation team confirms that:

- All assumptions and data used to determine the emission reductions are described in the PDD;
- All documented sources used are correctly quoted and interpreted in the PDD;
- All values in the PDD are considered reasonable based on the documentation and references reviewed;
- The baseline methodology has been correctly applied according to the requirements; and
- The estimate of the baseline emissions can be confirmed as the same that have been replicated by the validation team using the information provided.

Baseline Emission

Baseline emission for the proposed project activity consists of baseline from (a) methane recovery activity and (b) electricity generation by methane combustion. Each emission has been appropriately calculated in accordance with applied methodologies and methodological tools

(a) *Baseline Emissions for methane recovery*

As per AMS-III.G. (ver.07), following equation is applied in the calculation:

$$BE_y = BE_{CH4,SWDS,y} - MD_{reg,y} \times GWP_{CH4}$$

where,

$BE_{CH4,SWDS,y}$: *Methane emission potential of a solid waste disposal site (in* tCO_2e*)*

$MD_{reg,y}$: *Methane emissions that would be captured and destroyed to comply with regulation. 0 is applied because the project site has not been required to capture and flare methane by regulation.*

GWP : 21 of Global Warming Potential for Methane is applied.

The parameter $BE_{CH4,SWDS,y}$ is calculated in accordance with methodological tool, "Emissions from solid waste disposal sites (ver.06.0.1)". Validation team has assessed each parameter applied to calculate methane generation in baseline scenario as below:

Parameter	Definition	Value Applied	Source	Assessment
ϕ	Model correction factor	0.75	Methodological tool "Emissions from solid waste disposal sites (ver.06.0.1)"	OK. Default value of Application A, provided by the tool is appropriately applied.

f	Fraction of methane captured at the SWDS and flared, combusted or used in another manner	0	AMS-III.G.(ver.07)	OK. Default value provided in the methodology is appropriately applied.
GWP_{CH4}	Global Warming Potential of methane	21	IPCC default value	OK. The value of 21 is appropriately applied.
OX	Oxidation factor	0.1	Methodological tool	OK. Default value in the tool is appropriately applied.
F	Fraction of methane in the SWDS gas	0.5	Methodological tool	OK. Default value in the tool is appropriately applied.
DOC_f	Fraction of degradable organic carbon (DOC) that decomposes under the specific conditions occurring in the SWDS	0.5	Methodological tool	OK. Default value in the tool is appropriately applied.
MCF	Methane correction factor	1.0	Methodological tool	OK. Default value in case of anaerobic managed SWDS is appropriately applied
DOCj	Fraction of degradable organic carbon in the waste type j	wood 43% paper 40% food 15% textiles 24% garden 20% others 0%	Methodological tool	OK. Default value in the tool is appropriately applied.
k_j	Decay rate for the waste type j	pulp 0.04 wood 0.02 other 0.05 food 0.06	Methodological tool, and Korea Meteorological Administration. PET is not available, so assumed that MAP/PET is less than 1 as a conservative approach.	According to Korea Meteorological Administration (KMA), Mean average temperature in Jinju area is 13.1℃/1-9/, MAT is 1,512.8mm /1-9/. For PET (Potential evapotranspiration), validation team also could not found the value. Considering evaporation is 1,126.1mm in Jinju area by KMA and evapotranspiration is sum of evaporation and transpiration, PET might be very close to the value of MAP. So, the PP's conservative assumption is reasonable.
$W_{j,x}$	Amount of solid waste type j disposed or prevented from disposal in the SWDS in the year x(t)	Refer to the calculation spreadsheet	According to "Status of waste disposal and treatment (1996-2010)"/1-10/	OK. The references were published by government. Total amount of annual waste import is consistently applied from the analysis

			and "Analysis for waste import 1995-2011, Jinju City" /1-24/	report /1-24/. However, for the amount of each waste type in the total waste, the PPs applied values from national status report /1-10/. Validation team also failed to find out the values from other sources, so accepted it because it is most available data. Values provided in the document have been accurately applied.

As a result of above assessment for applied parameter, validation team has concluded that baseline emission calculation provided in the worksheet is appropriate.

(b) *Baseline Emissions for electricity production*

Baseline scenario for electricity production activity is that the amount of electricity supplied to the grid would have been produced by power plants of the grid. 0.7493MW of output capacity is applied based on "Engineering Work Report" /1-6/, which is published by Nurieconet Co., Ltd. and reviewed by KECO (Korea Environment Corporation). In addition, in the host country, electricity sales business shall be previously approved in accordance with "Electricity Business Act" /2-10/. The "Engineering Work Report" has been also submitted for business approval, and the governor of Gyeongsangnam-do has approved it. So the report can be regarded as external document, which has high quality of evidence. Validation team has reviewed the document of approval /1-19/, so regarded the values in the report as reliable.

However, estimated amount of methane that would be generated at the landfill was calculated in accordance with old version of methodological tool in the Engineering Work Report. Validation team requested the PPs to reflect latest version, so the values for methane generation has been changed from the report. Except this, all the values, information, and assumptions are consistent with the report.

Validation team has reviewed "Engineering Work Report" and excel worksheet, then confirmed that the following values applied to calculate baseline emission for electricity production activity are appropriately estimated.

(c) *Emission factor for electricity consumption*

Since the project activity is the installation of a new grid-connected renewable power plant, the baseline scenario is correctly identified as an electricity delivered to the grid by the project activity by the combined margin (CM) calculation described in the "Tool to calculate the emission factor for an electricity system (ver.02.2.1)", namely "the net electricity amount by the project activity" * "CM factor". For this purpose it has been validated by KSA validation team that the project participant applied all the 6 steps as per the approved baseline methodology.
Since the Korean electricity system is not constituted of layered dispatch system, the national grid is considered for the determination of a baseline grid electricity emission coefficient (EF_{CO2}).

At first, the PPs have selected year of 2008, 2009, and 2010 to calculate operating margin (OM). According to the "Tool to calculate emission factor for an electricity system (ver.02.2.1)", to calculate simple OM, 3-year generation-weighted average based on the most recent data at the time of submission of the PDD to the DOE shall be used. The initial version of PDD has been submitted to KSA in Dec 2011, while "The status report of generation facility for 2010", which is essential information to calculate OM, has been published on July 2011. In this reason, validation team has concluded that the selection of 2008~2010 for OM is appropriate.

Step 1: Identify the relevant electric power system

The electricity by the proposed project activity is connected physically to KEPCO grid which is the only one in Korea. And the power plant in islands except Jeju Island are not connected to the national grid, so they are not considered. Thus, the relevant electric power system is KEPCO grid.

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)

"Option Ⅰ. Only grid power plants are included in the calculation" was chosen.

Step 3: Select an Operation Margin (OM) Method

As low-cost/must-run resources constitute less than 50% of total grid generation in average of the five most recent years, "Simple OM" method option has been chosen.

During the most recent 5 years (2006 ~ 2010), low-cost/must run resources constitute 37.78% of total grid generation which is less than 50%.

Step 4: Calculate the operation margin emission factor according to the selected method.

According to the selected method, simple OM is calculated as the generation-weighted average emission per electricity unit of all generating power plant within KEPCO grid, not including low-operating cost and must run power plants for the most recent three years (2008 ~ 2010).

Subsequently choosing Option A, the simple OM emission factor is determined as per formular

of tool as OM = 0.6933

Step 5: Calculate the build margin (BM) emission factor

In the calculation of build margin, capacity additions of the most recent plants contributing to 20% of the total generation are used. Since 20% falls on part capacity plants contributing to 20.078% of the total generation have been considered during build margin calculations.

The approximate operation margin is calculated as average of data available for three years 2008, 2009 and 2010, which is the most recent statistics available at the time of CDM-PDD submission to the DOE for validation. The build margin is calculated using data of 2010.

BM is calculated as the generation-weighted average emission factor of all generating power plant within KEPCO grid during the most recent year y for which power generation data is available. BM emission factor is determined as per formular of tool as BM = 0.6357.

Step 6: Calculate the combined margin (CM) emission factor.

According to "Tool to calculate the emission factor for an electricity system (ver.02.2.1)", the weighting factor is set to be respectively W_{OM} = 50% and W_{BM} = 50% for the first crediting period.

The combined margin (CM) of the project activity is calculated as 0.6645t$CO_{2\text{-eq}}$/MWh. The baseline emission factor determined ex-ante will be used for calculation of emission reductions.

OM	BM	CM
0.6933	0.6357	0.6645

All steps and formula mentioned in the methodology are properly applied in the PDD. There is no transfer of energy generating equipment from another activity or the transfer of exiting equipment to another activity. The emission reduction by the project will be direct function of the net electricity fed to the KEPCO grid.

The power sector data used for the calculation has been cross checked as follows;

- Each power plant of the electric generation amount : "Statistics of Electric Power in Korea" /1-12/ and "The status report of generation facility" by KPX /1-13/.

"Statistics of Electric Power in Korea" for 2008, 2009 and 2010 have been verified with KEPCO website (http://www.kepco.co.kr), i.e. those were issued by KEPCO (Korea Electric Power Corporation) on May 2009, May 2010 and May 2011 respectively. The "Status Report on the Generation Facility in Korea for 2010" was published on June 2011, which is most recent data for the PPs at the time of PDD preparation.

Thus, "Statistics of Electric Power in Korea" for 2008, 2009 and 2010 were the most recent

available data sources at the time of PDD submission to DOE for validation as per "Tool to calculate the emission factor for an electricity system (ver.02.2.1)" /1-8/

- Each Fuel of CGVs and NCVs : "The Energy Act" /1-14/ and IPCC guideline on greenhouse gas inventories /2-3/

As above, KSA confirmed that all data used for the calculation are not excessive and appropriate.

All the equations involved along with the KEPCO grid power sector data used for calculation were found by the validation team to be in line with the "Tool to calculate the emission factor for an electricity system (ver.02.2.1)". The ex-ante determined grid emission factor will be fixed for the selected crediting period.

The grid emission factor (CM) has been validated as 0.6645t$CO_{2\text{-}e}$/MWh, the same value has properly been used in the emission reduction calculation as per the requirement of AMS-I.D. (ver.17).

Project Emission

The PDD describes that electricity imported from the grid is considered as the source for project emission. For ex-ante estimation, following equation is applied:

$$PE_{y,electricity} = (EL_{IMP,PJT,y} - EL_{IMP,BASE,y}) \times EF$$

where,

$EL_{IMP,PJT,y}$: *Quantity of electricity imported by project activity*

$EL_{IMP,BASE,y}$: *Quantity of electricity imported in baseline scenario. 0 is applied.*

EF : *0.6645tCO_2/MWh of combined margin is applied.*

The value of $EL_{IMP,PJT,y}$ is calculated based on estimated amount of recovered methane and operational conditions assumed in the 'Engineering Work Report'. Assessment for the conditions is also described in section 3.6.2 below.

Validation team has also reviewed similar projects /2-13,-14/ in Korea that has already been registered, then found there were no other project emission sources. After on-site assessment, validation team concluded that all sources have been identified.

Leakage Emission

The PPs identified that there is no leakage emission for the proposed project activity, because there is no equipment transferred from another activity.

Emission Reductions

Equations for emission reduction calculation have been appropriately applied in accordance with latest version of applied methodologies AMS-III.G. and AMS-I.D.

(a) *ex-ante estimation*

To estimate emission reductions, the PPs have applied following equation in accordance with approved methodologies:

(i) *for methane recovery,*

$$ER_{y,estimated} = BE_y - PE_y - Leakage$$
$$= BE_{CH4,SWDS,y} - MD_{reg,y} \times GWP$$
$$= BE_{CH4,SWDS,y} \times GWP$$

∵ No leakage source is identified, $MD_{reg,y}$ is 0 as described above.

Project emission from electricity import is considered in the electricity generation part.

As a result of calculation, average 33,624tCO_2/year of emission reductions by methane recovery has been appropriately estimated.

(ii) *for electricity generation,*

$$ER_{y,electricity} = BE_{y,electricity} - PE_{y,electricity} - Leakage$$

where,

PEy,electricity is emissions by electricity import from the grid. All consumption in the boundary is reflected in this parameter.

Leakage is 0.

As a result of calculation, average 3,752tCO_2/year of emission reductions by electricity generation has been appropriately estimated in the excel spreadsheet.

(b) *ex-post determination*

To determine ex-post emission reductions, following equation is appropriately applied in accordance with applied methodologies:

$$ER_y = (MD_y - MD_{reg,y}) + (EL_{EXP,PJT,y} - EL_{IMP,PJT,y}) \times EF - Leakage$$

where,

MD_y : Methane captured and destroyed/gainfully used by the project activity in the year y (tCO_2e)

$MD_{reg,y}$: 0

$EL_{EXP,PJT,y}$: Quantity of electricity export to the grid by the project activity.

$EL_{IMP,PJT,y}$: Quantity of electricity import to the grid by the project activity.

EF : Emission factor for the grid, 0.6645tCO_2/MWh

Leakage : 0

In this equation, MD_y is calculated by the equation below:

$$MD_y = LFG_{electricity,y} \times w_{CH4,y} \times D_{CH4,y} \times GWP_{CH4}$$

where,

$LFG_{electricity,y}$: Landfill gas destroyed in the year y (m^3LFG)

$w_{CH4,y}$: Methane content in landfill gas in the year y

$D_{CH4,y}$: Density of methane at normal condition, 0.716$kgCH_4/m^3CH_4$ (fixed value by "Project emissions from flaring (ver.02.0.0)")

GWP_{CH4} : Global Warming Potential of Methane, 21

3.6 Additionality of a Project Activity

3.6.1 Prior Consideration of the Clean Development Mechanism

a) Starting Date of CDM project activity

According to "Glossary of CDM terms (ver.05)" /2-4/, the starting date of CDM project activity is the earliest date at which either the implementation of consideration or real action of a project activity begins. The PPs has defined project start date as the contraction date (10/06/2011) on which the PPs confirmed proceeding the project activity and profit distribution ratio on section C.1.1 of the PDD. Moreover, as described in section E of the PDD, the PPs announced implementation of the project via mass media, which means that contraction on 10/06/2011 is regarded for the PPs as kick-off of the project activity. Validation team checked the contract /1-15/, then confirmed that the starting date of CDM project activity is appropriate.

b) Prior Consideration of the CDM

"Guidelines on the Demonstration and Assessment of Prior Consideration of the CDM (ver.04)" /2-5/ requires the PPs to inform a host party DNA and UNFCCC secretariat in writing of the commencement of the project activity. The PPs has informed DNA of Korea and UNFCCC secretariat of their consideration of CDM project activity on November 14th of 2011, within six

months of project starting date (10/06/2011). Validation team checked UNFCCC CDM website and contacted DNA of Korea to verify it.

In summary, KSA has confirmed that the project activity meets CDM requirements of "Guidelines on the Demonstration and Assessment of Prior Consideration of the CDM (ver.04)" /2-5/.

3.6.2 Additionality

To demonstrate additionality, the PPs selected to demonstrate investment barrier. So, validation team performed assessment by following "Guidelines on the Assessment of Investment Analysis (ver.05)" /2-6/.

Applied Benchmark

To compare with the project IRR, the PPs applied 7.0% of benchmark, according to "Research for improvement of new and renewable energy feed-in tariff policy" /1-16/, published by 'Ministry of Commerce, Industry and Energy' of Korea. The report was to determine the amount of feed-in tariff, and assumed interest rate as 7.0% for analysis. Validation team confirmed the benchmark is suitable because (i) the value can be regarded as standard in the market as required by paragraph 18 of "Guidelines on the Assessment of Investment Analysis (ver.05)" /2-6/, and (ii) it is conservative approach compare to the 10.8% of default value given in the guideline.

Underlying Assumptions

The PPs have made following assumptions:

(i) Annual amount of waste imported to the landfill after project implementation is assumed that it is same as the amount of 2010.

(ii) Composition of the waste is not analyzed, but referred to the "Status of waste disposal and treatment, 1996-2010" /1-10/ issued by Ministry of Environment of Korea .

(iii) Amount of methane generated at the landfill is estimated in accordance with methodological tool "Emissions from Solid Waste Disposal Site (ver.6.0.1)" /1-7/, although Engineering Work Report /1-6/ estimated the amount based on old version of the tool.

Validation team reviewed following documents and then confirmed that these assumptions are reasonable and appropriate:

- Engineering Work Report /1-6/
- Emissions from solid waste disposal sites (ver.06.0.1) /1-7/
- Status of waste disposal and treatment (1996-2010) /1-10/
- Excel spreadsheets for emission reduction estimation /1-11/

Parameters used

- Construction cost: 2,745,194,000 won is consistent with Engineering Work Report. /1-6/. Validation team has found one registered project whose capacity is almost same with the proposed project "Gwangju metropolitan city sanitary landfill LFG power plant CDM project". As a result, construction cost were also similar, so validation team confirmed that the value is not appropriate.

Project	Registered Project	Proposed Project
Capacity	1MW	925kW
Construction Cost	2,624 million won	2,745 million won

- O&M cost: average 320,977,000 won/yr is consistently applied according to Engineering Work Report. Validation team cross-checked O&M cost for two registered CDM projects in the host country, and found that this value is lowest while registered projects have similar capacity of generator. So, this value is not over estimated.
- Tax rate: Appropriate rates are applied in accordance with 'Corporate Tax Act' /1-18/.
- Fair value: 15 year operation lifetime is not shorter than the lifetime defined in the 'Corporate Tax Act' /1-18/. So, fair value is not considered.
- Methane content in the recovered LFG is 50%, default value in IPCC 2006
- Amount of electricity production : Annual average of 5,513MWh for 15 year operation period is calculated in the spreadsheet based on following operating conditions defined in the Engineering Work Report /1-6/
  - Landfill gas is recovered and directly supplied to engine.
  - Generator can be operated full-time (8,760 hours); and
  - 4% of electricity production is deducted for on-site consumption.

  Prior to the finalize this validation report, construction has been finished, and then validation team confirmed that actual amount of electricity generation is close to this estimated value.
- Unit price of electricity (SMP) : 101.41 won/kWh is average price for last 5 year (2006-2010). Validation team could review monthly average unit price of electricity through "Electricity Exchange Statistics System (http://epsis.kpx.or.kr)", and confirmed the value.
- Operational Lifetime: 15 years is consistently applied with Engineering Work Report. /1-6/
- CERs price: 11 Euro/CER while 1,500KRW/Euro, in the Engineering Work Report /1-6/

Sensitivity Analysis

Paragraph 20 of "Guidelines on the Assessment of Investment Analysis (ver.05)" requires that variables that constitute more than 20% of either total project costs or revenue should be subjected to reasonable variation. So, the PPs selected (i) construction cost, (ii) O&M cost, and (iii) electricity sales revenue as variables to be analyzed.

Paragraph 21 of the guideline requires to cover at least +10% and -10% of range, and this requirement is reflected in the sensitivity analysis. But, the PPs did not analyze with direction to decrease project revenue and increase project cost because it is not able to impact of the analysis result.

Table B-4 in the PDD shows the summary of sensitivity analysis. None is higher than 7.0% of benchmark. Validation team confirmed that all calculation and the result in the worksheet is appropriate.

Conclusion

As a result of assessment, validation team confirmed that all assumptions, values, and calculations are correct. The outcome of investment analysis shows that IRR without CDM project is below the benchmark, while IRR with CDM revenue is over the benchmark. So, the project is additional.

3.7 Monitoring Plan

As described in the following criteria, by review of documents and on-site assessment, KSA has confirmed that (i) monitoring diagram (figure B-5) described in the PDD is complete, (ii) proposed monitoring plan complies with applied monitoring methodologies AMS-III.G. (ver.07) and AMS-I-D. (ver.17), and (iii) the PPs are able to implement the monitoring plan.

3.7.1 Compliance of Monitoring Plan with Methodologies

Identification of Monitoring Parameters

To identify parameters required to monitor, validation team analyzed following documents:

- Applied monitoring methodology AMS-III.G.(ver.07) /1-2/
- Methodological Tool "Emissions from Solid Waste Disposal Sites (ver.06.0.1) /1-7/
- Applied monitoring methodology AMS-I.D.(ver.17) /1-3/
- General Guidelines to SSC CDM Methodologies (ver.17) /2-7/
- Developed monitoring plan, described in the PDD

As the outcomes of the review, validation team identified monitoring parameters for the proposed project activity.

Compliance with Applied Methodologies

Validation team also carried out assessment of compliance of monitoring parameters defined in

section B.7.1 of the PDD with applied monitoring methodology and relevant requirements. Assessment result is as described below:

No	Parameter identified	Description	Parameter in the PDD	Assessment
1	$PE_{power,y}$	Parameters related to emissions from electricity and/or fuel consumption	$EL_{IMP,PJT,y}$	OK. Emissions from electricity consumption by the project is considered as the source of project emission. Emission factor for electricity system is fixed ex ante, so the amount of electricity import from the grid will be measured. This parameter includes electricity import for both landfill gas recovery and electricity generation facilities.
2	$LFG_{i,y}$	Landfill gas destroyed via method i in year j	$LFG_{electricity,y}$	OK. PDD defined this parameter as the amount of landfill gas combusted in the power plant in that total landfill gas recovered is directly supplied to produce electricity, without flaring. The PDD described that a gas flowmeter with temperature/pressure correction function would be installed. Manufacturer's specification for the flowmeter has been provided by the PPs.
3	$w_{CH4,y}$	Methane content in landfill gas	$w_{CH4,y}$	OK. According to monitoring plan, a gas analyzer will be installed to measure this parameter. Validation team reviewed manufacturer's specification, and confirmed that this parameter will be appropriately measured.
4	T	Temperature of landfill gas	T	OK. This parameter will not be independently measured, but gas flowmeter will provide temperature-corrected gas flows.
5	P	Pressure of the landfill gas	P	OK. This parameter will not be independently measured, but gas flowmeter will provide pressure-corrected gas flows.
6	EG_y	Quantity of net electricity supplied to the grid in year y	$EL_{EXP,PJT,y}$	OK. Watt-hour meter will be installed according to national laws, "Measures Act" and "Act on Operation of Electricity Market".

3.7.2 Implementation of Monitoring Plan

Monitoring Arrangements

To assess feasibility of implementation of monitoring plan, validation team has carried out following steps:

- Review of following documents:
  - Engineering Work Report /1-6/
  - Design Drawings /1-26/

- Manufacturer's specifications for gas flowmeter and analyzer /1-27/
- Monitoring Plan described in the PDD
- Monitoring methodologies AMS-III.G.(ver.07) and AMS-I.D.(ver.17)
- Measures Act /2-16/
- Act on the Operation of Electricity Market /2-17/

• On-site assessment including interviews with the PPs and construction company

As a result of the assessment, validation team has found followings:

- Monitoring plan in the PDD ensures completeness of monitoring points
- Gas flowmeter provides corrected volume, by measuring temperature and pressure
- Gas flow and methane content will be continuously measured
- Electricity export and import will be appropriately installed complying with national laws
- All monitoring data will be recorded in the computer system at the site

In conclusion, validation team confirmed that the monitoring arrangement described in the PDD is feasible to be implemented

Management System

Section B.7.2 of the PDD describes monitoring system for the project activity including:

- Monitoring Organization
- Data record and storage
- Equipment calibration and maintenance
- Emergency procedure
- Training procedure

All the criteria listed above have been reflected in the 'CDM Operating Manual' /1-17/, developed by the PPs, so validation team concluded that the management and quality assurance system for the project activity is appropriate to be implemented.

3.8 Sustainable Development

Letter of Approval issued by host party's DNA states that the project contributes to sustainable development in Korea. Validation team has received the LoA by the PPs, and confirmed it by contacting administrator of DNA.

3.9 Local Stakeholder Consultation

To receive local stakeholder's opinion for the project, the PPs announced the project activity in local newsletter and webpage[2] of Jinju City. Moreover, the PPs invited representatives of local residents to introduce the project activity and to take their comments.

Validation team has performed assessment by following steps:

a) Confirmed following newspapers reporting the project activity, described in section E.1 of PDD.
   - Joongang Daily, 13/06/2011 /1-22/
   - Environment Daily, 14/06/2011 /1-20/
   - Domin Daily, regional newspaper in Gyeongsangnam-do, 14/06/2011 /1-21/

b) Checked website of Jinju City and confirmed that the project activity has been noticed on June 13th 2011

c) Reviewed "Records of residents' meeting" /1-23/. 10 representatives of local residents in the meeting have signed, with expectation of positive effects.

As a result, validation team has concluded that the PPs have appropriately proceed local stakeholder consultation process.

3.10 Environmental Impacts

As per "Environment Impact Analysis Act" /2-8/, the project activity does not need to conduct EIA. Except electricity production activity, the landfill site has already existed prior to the project, ex-EIA has been regularly conducted in accordance with Wast Control Act /2-12/. Valdiation team reviewed the latest ex-EIA report /2-9/, and confirmed that there was no issues related to environmental impact.

4. COMMENTS BY PARTIES, STAKEHOLDERS AND NGOs

Initial version of PDD was made available on the UNFCCC CDM website and was open for comments from global stakeholders such as Parties, stakeholders, and NGOs from 31 Dec 2011 to 29 Jan 2012. No comments were received.

2) http://www.jinju.go.kr/01civic/08_01.jsp?amode=view&idx=10058&cpage=108&gcode=1875

5. REFERENCES

Category 1 Documents:

Documents directly related to the project.

/1-1/ Project Design Document, initial ver.0, (01/12/2011), final ver.04 (02/07/2012)

/1-2/ AMS-III.G. (ver.07)

/1-3/ AMS-I.D. (ver.17)

/1-4/ Letter of Approval, issued on 25/06/2012, by DNA of Korea

/1-5/ Excel Spreadsheets for calculation of the operating/build margin emission coefficient

/1-6/ Engineering Work Report for Jinju Landfill project, April 2011, Nurieconet Co., Ltd.

/1-7/ Emissions from solid waste disposal sites (ver.06.0.1)

/1-8/ Tool to calculate emission factor for an electricity system (ver.02.2.1)

/1-9/ Korea Meteorological Administration

http://www.kma.go.kr/weather/climate/average_30years.jsp?yy_st=2011&stn=192&norm=Y&obs=0&mm=7&dd=12&x=11&y=16

/1-10/ Status of waste disposal and treatment (1996-2010), published by Ministry of Environment

/1-11/ Excel spreadsheets for emission reduction estimation and Investment analysis

/1-12/ Statistics of Electric Power in Korea

/1-13/ The status report of generation facility in 2010 by KPX

/1-14/ Energy Act

/1-15/ Construction Contract, signed on 10/06/2011

/1-16/ Research for improvement of new and renewable energy feed-in tariff policy, by Ministry of Commerce, Industry and Energy of Korea ,31/03/2006

/1-17/ CDM Operating Manual, rev.0, Feb 2012

/1-18/ Corporate Tax Act

/1-19/ Letter of approval for electricity business, 05/12/2011, issued by Gyeongsangnam-do

/1-20/ http://www.hkbs.co.kr/hkbs/news.php?mid=1&r=view&uid=207290

/1-21/ http://www.idomin.com/news/articleView.html?idxno=350742

/1-22/ http://article.joinsmsn.com/news/article/article.asp?total_id=5630746

/1-23/ Records of residents' meeting

/1-24/ Analysis for waste import 1995-2011, Jinju City

/1-25/ Tool to calculate baseline, project and/or leakage emissions from electricity consumption (ver.01)

/1-26/ Design Drawings for the project, April 2011, Sejin ENG Co., Ltd.

/1-27/ Specifications of Gas Analyzer and Gas Flowmeter

/1-28/ Approval of Landfill Site Installation, 24/12/2991, Ministry of Environment

/1-29/ Status of Landfill Sites, Ministry of Environment, 2011

/1-30/ Promotion of Installation of Waste Disposal Facilities and Assistance, etc. to Adjacent Areas Act, 21/03.2008

/1-31/ Regular Inspection Report for Jinju Landfill, by KRC, 04/05/2009

Category 2 Documents:

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

/2-1/ Validation and Verification Manual (EB55)

/2-2/ Guidelines for Completing the Simplified Design Document (CDM-SSC-PDD) and the Form for Proposed New Small Scale Methodologies (CDM-SSC-NM) (ver.05)

/2-3/ 2006 IPCC guideline on greenhouse gas inventories

/2-4/ Glossary of CDM terms (ver.05)

/2-5/ Guidelines on the Demonstration and Assessment of Prior Consideration of the CDM (ver.04)

/2-6/ Guidelines on the Assessment of Investment Analysis (ver.05)

/2-7/ General guideline to SSC CDM methodologies (ver.17)

/2-8/ Environment Impact Analysis Act, 01/01/2009

/2-9/ ex-EIA report for Jinju Landfill in 2008

/2-10/ Electricity Business Act, 01/01/2012

/2-11/ Enforcement Decree of the Environmental Impact Assessment Act, 09/03/2011

/2-12/ Waste Control Act, 24/07/2010

/2-13/ Registered PDD for Mokpo Landfill Gas Recovery Project for Electricity Generation (reference no: 2834)

/2-14/ Registered PDD for Gwangju metropolitan city sanitary landfill LFG power plant CDM project (reference no: 4294)

/2-15/ attachment A to Appendix B of the simplified M&P for SSC CDM (ver.08)

/2-16/ Measures Act, 18/03/2009

/2-17/ Act on the Operation of Electricity Market, Nov 2011

APPENDIX A

VALIDATION PROTOCOL FOR SMALL-SCALE CDM ACTIVITIES

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

Requirement	Reference	Conclusion	Cross Reference / Comment
1. The project shall assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention	Kyoto Protocol Art. 12.2 Decision 17/CP.7 CDM Modalities and Procedures §40a	OK	Table 2, Section A.2.3 and C.1
2. The project shall assist Parties included in Annex I in achieving compliance with part of their quantified emission reduction commitment under Art. 3 of Kyoto Protocol.	Kyoto Protocol Art. 12.2,	OK	Table 2, Section A.3.1 to A.3.3
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved, including confirmation by the host Parties that the project activities assists its in achieving sustainable development.	Kyoto Protocol Art.12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK	Table 2, Section A.2.1 to A.2.6
4. The emission reductions should be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art.12.5b	OK	Table 2, Section B.4
5. Reduction in GHG emissions must be additional to any that would occur in absence of the project activity., i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	Kyoto Protocol Art.12.5c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	OK	Table 2, Section B.5

Requirement	Reference	Conclusion	Cross Reference / Comment
6. The project activity should lead to the transfer of environmental safe and sound technology and knowhow.	Decision 17/CP.7	N/A	Table 2, Section E
7. 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(f)	N/A	Table 2, Section A.6.5
8. Parties participating in the CDM shall designate a national authority for the CDM.	Decision 17/CP.7, CDM Modalities and Procedures § 29	OK	Table 2, Section A.2.3
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities and Procedures § 30, 31b	OK	Table 2, Section A.2.3
10. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b,c,d	N/A	Table 2, Section A.3
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	N/A	Table 2, Section A.3

Requirement	Reference	Conclusion	Cross Reference / Comment
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in §6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK	Table 2, Section B.1.2, B.1.8
13. The project design document shall conform with the Small Scale CDM Project Design Document format	Simplified Modalities and Procedures for Small Scale CDM Project Activities, Appendix A	OK	Table 2, Section A.4
14. The proposed project activity shall confirm one of the project categories defined for small scale CDM project activities and use the simplified baseline and monitoring methodology for that project category.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK	Table 2, Section A.6.2, B.1
15. Comments by local stakeholders are invited, and a summary of these has been provided	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	OK	Table 2, Section D
16. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK	Table 2, Section E

Requirement	Reference	Conclusion	Cross Reference / Comment
17. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d	OK	Table 2, Section D Global Stakeholder Consultation is mentioned in section 4 of the main context.
18. The proposed activity conforms to all other requirements for CDM project activity in the CDM modalities and procedures that are not replaced by these simplified modalities and procedures.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22 f	OK	
19. The emission reduction attributable to the proposed project activity shall be adjusted for leakage.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §30	OK	Table 2, Section B.6
20. The proposed project boundary shall encompass all anthropogenic emissions by sources of greenhouse gases under the control of the project participants that are significant and reasonably attributable to the CDM	Simplified Modalities and Procedures for Small Scale CDM Project Activities §31	OK	Table 2, Section B.2

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
A. General Description of Project Activity					
A.1. Title of Small-Scale Project Activity					
A.1.1. Does the project title enable to identify the unique CDM project activity ?	/EB 41/ Annex12	DR	OK. The title of proposed project activity includes location, technology/measure appled.	OK	OK
A.1.2. Are there any identification concerning the revision number and the date of the revision ?	/EB 41/ Annex12	DR	OK. Section A.1. identifies revision number and date of the PDD.	OK	OK
A.2. Approval					
A.2.1. Have all parties involved approved the project activity ?	/VVM/ 44	DR, I	OK. LoA of Korea has been issued.	~~PENDING~~	OK
A.2.2. Has the DNA of each Party indicated as being involved in the proposed CDM project activity in section A.3 of the PDD provided a written letter of approval ?	/VVM/ 45	DR	OK. The proposed project activity is an uni-lateral CDM which means only DNA of Korea has been identified.	OK	OK
A.2.3. Does each letter confirms that ; a) The party is a party to the Kyoto Protocol. b) Participation is voluntary. c) In the case of the host Party, the proposed CDM project activity contributes to the sustainable development of the country. d) It refers to the precise proposed CDM project activity title in the PDD being submitted for registration.	/VVM/ 45 /M&P 40(a)	DR	OK. LoA issued by DNA states them.	~~PENDING~~	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
A.2.4 Is the letter(s) of approval unconditional with respect to (a) to (d) above A.1.3 ?	/VVM/ 46	DR	OK. LoA of Korea has been issued.	~~PENDING~~	OK
A.2.5 Has the letter(s) of approval been issued by the respective Party's DNA ?	/VVM/ 47	DR	OK. LoA of Korea has been issued.	~~PENDING~~	OK
A.2.6 Has the letter(s) of approval been issued by the respective Party's DNA ? If in doubt, verify with the DNA that letter(s) of approval are valid for the proposed projects activity, project participants and authentic.	/VVM/ 48, 49	DR	OK. LoA of Korea has been issued.	~~PENDING~~	OK
A.3 Participation					
A.3.1 Is the information the project participants listed in section A.3 and Annex 1 of the PDD internally consistent to each other and exactly the same as in the LoA from each Party involved.	/VVM/ 52	DR	The PDD identifies Jinju city and Nurieconet Co., Ltd. have been involved in the project activity. The PPs shall provide relevant document. /CL01/	~~CL01~~	OK
A.3.2. The participation of each project participants has been approved by at least one Party involved, either in a letter of approval or in a separate letter specifically to approve participation ?	/VVM/ 51, 52	DR	OK. LoA from host party's DNA has been issued. No other parties are involved.	~~PENDING~~	OK
A.3.3 Are there no entities other than those approved as project participants as project participants included in these sections of the PDD.	/VVM/ 51, 53	DR	OK. LoA from host party's DNA has been issued. No other parties are involved.	~~PENDING~~	OK
A.4. Project Design Document					

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
A.4.1. Was the PDD prepared in accordance with the latest template from the EB ?	./VVM/ 55	DR	OK. Latest version of PDD form has been used	OK	OK
A.4.2. Is the PDD in accordance with the applicable CDM requirements for completing PDD's and is the PDD duly completed ?	/VVM/ 55	DR	OK. PDD has information requested by "Guidelines for completing the simplified project design document (CDM-SSC-PDD) and the form for proposed new small scale methodologies (CDM-SSC-NM) (ver 05)"	OK	OK
A.5. Project Description					
A.5.1 Does the information in section A.2 and A.4 of the PDD provides the reader with a clear understanding of the precise nature of the project activity ?	/VVM/ 58, 59	DR, I	Information in the PDD (ver.01) is not consistently described ex1) version of applied methodology, name of the grid the project activity is connected to. ex2) result of sensitivity analysis in the PDD is not consistent with worksheet. /CAR16/ PDD (ver.02) has some mistype and non-official expressions. ex) operating manure, Kyungsannamdo, Act for measurement, National grid /CL09/ OK. Section A.2 and A.4 of the PDD (ver.04) provide clear information about project activity.	~~CAR16~~ ~~CL09~~	OK
A.5.2 Does the information in section A.2 and A.4 of the PDD provides the reader with a clear understanding of the technical aspects of its implementation ?	/VVM/ 58	DR, I DR, I	OK. The PP has cleary described project activity into the section A.2 and A.4	OK	OK
A.5.3 Is the proposed project activities in existing or utilizing existing equipments ? If so, does the description in the PDD reflect	/VVM/ 60	DR, I	No, proposed project activity is greenfield project that all facilities will be newly installed.	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
the project activity for the followings types of CDM project activities unless other means are specified in the methodology. (a) Large scale projects (b) Non-bundled small scale projects (c) Bundled small scale projects					
A.5.4 In case a site inspection has been concluded, does the description in PDD reflect the proposed CDM project activity ?	/VVM/ 60	DR, I	Yes, validation team has conducted on-site assessment on Feb 10th, 2011. The team has confirmed description in the PDD has appropriately reflected proposed project activity.	OK	OK
A.5.5 Were designs, feasibility study reports (FSR) or comparisons to equivalent projects available for review ? Is the project description consistent with them ?	/VVM/ 62	DR, I	OK. The PPs provided "Research for feed in tariff" by government and Engineerign Work Report for the proposed project activity.	OK	OK
A.5.6 In case no physical site inspection was undertaken, how the project description was assessed for appropriateness and what is the outcome ?	/VVM/ 62	DR	N/A	OK	OK
A.5.7 Does the project activity involve the alternation of an existing installation or process ? If so, does the project description clearly sate the difference resulting from the activity compared to the pre-project situation ?	/VVM/ 63	DR, i	There had been simple burning system to decrease landfill gas ventilation, but it had not been used due to the risk of fire. The proposed project activity is to install all new facilities, so validation team concluded description in the PDD is definite.	OK	OK
A.6. Technical Description of the Small-scale Project Activity.					
A.6.1 Location of the Small-scale Project Activity.					

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
A.6.1.1 Does the information on the location of the project activity allow for a clear identification of the site ?	EB 41 Annex12	DR, I	GPS information in the PDD is needed to be decimal format. /CL05/	~~CL05~~	OK
A.6.2 Type and category and technology/measure of of the Small-scale Project Activity.					
A.6.2.1 Is the category correctly identified and indicated ?	EB 41 Annex12	DR, I	OK. The category of the proposed project activity has been identified as both (i) and (iii). Category (i) is for electricity generation from landfill gas, and (iii) is for landfill gas (methane) recovery.	OK	OK
A.6.2.2 Does the project qualify as a small-scale CDM project activity as described in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM ?	PDD A.4	DR	OK. The proposed project activity meets requirements of small scale CDM project.	OK	OK
A.6.2.3 Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	PDD A.4	DR	OK. Project boundary is defined in B.3 of the PDD	OK	OK
A.6.3 Estimated amount of emission reduction over the chosen crediting period.					
A.6.3.1.Does the project design clearly and consistently indicate the chosen crediting period, the total estimation of emission reductions for the chosen crediting period ?	PDD A.4	DR	OK. The PPs has chosen 10-year of crediting period without renewal, and estimation of emission reductions for each year is consistently described throughout the PDD.	OK	OK
A.6.4 Public Funding of the small-scale project activity.					
A.6.4.1 Does the information on public funding provided conform to the actual situation or planning as presented by the project	PDD A.4.4	DR, I	OK. There is no ODA in Korea. But, the PP needs to provide the sources of budget. /CL03/	~~CL03~~	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
participants ?					
A.6.5 Debundling					
A.6.5.1 Is the small-scale project activity a debundled component of a large scale project activity ?	/VVM/ 136 (c)	DR, I	The PDD (ver.01) stated that proposed project activity is not a de-bundled component of a large scale project activity, but there is no demonstration HOW. /CAR04/.	~~CAR04~~	OK
B. Baseline and monitoring methodology					
B.1 Applicability of selected methodology to the project activity.					
B.1.1 Is the methodology correctly quoted and applied by comparing it with the actual text of the applicable version of the methodology available on the UNFCCC CDM web site ?	/VVM/ 70	DR	For initial version of the PDD, the applied methodology AMS-III.G and reference methodology ACM0001 is not latest version. For example, calculating adjustment factor(AF) has been changed in the latest version of ACM0001, but PDD has applied a formula from old version. /CAR05/	~~CAR05~~	OK
B.1.2 Does the project activity meet the applicability criteria conditions of the approved methodology or any other tool or other methodology component referred to therein ?	/VVM/ 71	DR	PDD shall clearly demonstrate how the proposed project activity meets each applicability condition defined in the applied methodologies. /CAR03/	~~CAR03~~	OK
B.1.3 Is comparable information available from other sources and cross check with the PDD in order to assess the applicability ?	/VVM/ 71	DR, I	N/A	OK	OK
B.1.4 Is the project activity expected to result in emission other than those allowed by the methodology ?	/VVM/ 71	DR, I	OK. The proposed project activity does not result in unexpected project emissions.	OK	OK
B.1.5 Is the project activity a small scale project activity ? (If yes, assess the specific small-scale activity)		DR	YES. The proposed project activity is a small-scale CDM project activity.	OK	OK
B.1.6 Does the project activity qualify within the	/VVM/	DR, I	OK. The proposed project activity is composed of methane	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
thresholds of the three possible types of small scale project activities ?	136 a)		recovery component whose expected emission reduction is less than 60ktCO_2e/yr and electricity generation component whose capacity is less than 15MW.		
B.1.7 Does the project activity conforms to one of the approved small-scale categories and applies the relevant tool or methodology ?	/VVM/ 136 (b)	DR	OK. The proposed project activity conforms to the approved methodologies AMS-III.G. (ver.07) and AMS-I.D. (ver.17)	OK	OK
B.1.8 Is the project activity not a debundled component of a large-scale project, in accordance with the rules defined in appendix C of the simplified modalities and procedures for small scale CDM project activities ?	/VVM/ 135 (c)	DR, I	PDD does not have evidences to demonstrate the proposed project activity is not a de-bundled component of a large scale CDM project activity. /CAR04/	~~CAR04~~	OK
B.1.9 Is an assessment of the environmental impacts of the proposed CDM project activity required by the Host Party ?	/VVM/ 135 (d)	DR	No. "Enforcement Decree of the Environmental Impact Assessment Act" /2-11/ of Republic of Korea requires EIA for electricity generation plant with capacity of over 10MW.	OK	OK
B.2 Project Boundary					
B.2.1 Is the delineation of the project boundary in the PDD correct and does it meet the requirements of the selected baseline methodology ?	/VVM/ 79	DR, I	B.3 in the PDD defined project boundary, and it is in accordance with AMS-III.G. But, as per AMS-I.D., project boundary shall be extended to the grid to which the project plant is connected to. /CAR13/	~~CAR13~~	OK
B.2.2 Have all sources and GHG's required by the methodology been included within the project boundary ?	/VVM/ 79	DR, I	OK.	OK	OK
B.2.3 Does the methodology allow PP's to choose whether a source or gas is to be included within the project boundary ?	/VVM/ 79	DR, I	NO. Applied methodologies - AMS-III.G. and AMS-I.D. do not allow the PPs to choose sources or gases to be included.	OK	OK
B.3 Baseline Identification					
B.3.1 Does the PDD identify the baseline for the proposed CDM project activity ?	/VVM/ 81	DR, I	Yes, Section B.4 in the PDD describes baseline scenario for the proposed project activity. But, the PPs need to clarify how	~~CAR06~~	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
			identified baseline scenario is conformed with baselines identified in the applied methodologies. /CAR06/		
B.3.2 Has any procedure contained in the methodology to identify the most reasonable baseline scenario been correctly applied?	/VVM/ 82 & 87(d)	DR, I	OK. PDD has followed procedure to identify baseline scenario required by 'General Guidelines to the SSC CDM Methodologies"	OK	OK
B.3.3 Does the selected methodology require use of tools to establish the baseline scenario?	/VVM/ 82	DR, I	No.	OK	OK
B.3.4 Does the methodology require several alternative scenarios to be considered in the identification of the most reasonable baseline scenario?	/VVM/ 83	DR, I	For AMS-III.G., "General guidelines to SSC CDM Methodologies" is applied to identify baseline scenario. No. Each of the applied methodology AMS-I,D, - fixed baseline scenario. Baseline is that electricity supplied to the grid by the project activity would have been generated by grid-connected power plants and by addition of new generation sources. To clarify, validation team asked the PPs to demonstrate whether capacity increase of landfill gas recovery is planned or possible within proposed crediting period. /CL07/	~~CL07~~	OK
B.3.5 If yes, are all scenarios that are considered by the project participants and are supplementary to those required by the methodology reasonable in the context of the proposed project activity ?	/VVM/ 83	DR, I	There is no evidence that shows project site is allowed that to emit landfill gas to atmosphere, for validation team to be able to directly access the information. /CL02/	~~CL02~~	OK
B.3.6 Does PDD provide all the assumptions and data including reference and sources ?	/VVM/ 84 & 87(a)	DR, I	OK. - As per AMS-III.G., baseline is to emit all LFG to the atmosphere, and is calculated by "Emissions from solid waste disposal site(ver.06.0.1)." Assumption made by the PPs are follows: a) Amount of annual waste after project implementation is assumed that it would be same with 2010.	~~CAR12~~	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
			b) Composition of waste is based on "Status of waste disposal and treatment, 1996-2010" issued by Ministry of Environment of Korea /1-10/. - As per AMS-I.D., baseline emission is appropriately calculated by "Tool to calculate emission factor for an electricity system (ver.02.2.1)" except Singori nuclear power plant is missed. /CAR12/		
B.3.7 Are all the documentation used for establishing the baseline scenario correctly quoted and interpreted in the PDD ?	/VVM/ 84 & 87(b)		OK. It is demonstrated in B.4 in the PDD	OK	OK
B.3.8 Are the information provided in the PDD cross-checked with other credible sources, such as local expert opinion, if available ?	/VVM/ 84	DR, I	For LFG recovery activity, alternatives were identified in section B.4. Validation team cross-checked registered CDM projects in Korea, then found that identified alternatives are same. Outcome of the steps to identify baseline scenario is complied with scenario provided in the methodology. For electricity generation, it's type I project, so baseline is already provided in the methodology.	OK	OK
B.3.9 Are all the assumptions and data used by the project participants justified appropriately and supported by evidence ?. Are those deemed reasonable?	/VVM/ 87(c)	DR, I	OK. Validation team reviewed relevant evidences.	OK	OK
B.3.10 Have all applicable CDM requirements been taken into account in the identification of the baseline scenario for the proposed CDM project activity?	VVM 85	DR, I	OK. Baseline scenario is provided in the each applied methodology. For LFG recovery, baseline has been identified through the steps defined in the 'General Guidelines to SSC CDM methodologies'.	OK	OK
B.3.11 Have all relevant policies and circumstances been identified and correctly considered in the	VVM 85 &		OK. For LFG project, following laws of the host party have been appropriately taken into account: - Environment Impact Analysis Act	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
PDD, in accordance with the guidance by the CDM EB?	87(d)		- Enforcement Decree of EIA Act - Waste Control Act For electricity generation, baseline scenario is provided in the each applied methodology.		
B.3.12. Does the PDD provide a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed CDM project activity?	/VVM/ 86		OK. Description and procedure to identify baseline for LFG recovery project is verifiable. Baseline scenario provided in the each applied methodology is correctly reflected for electricity generation.	OK	OK
B.4 Algorithms and/or formulae used to determine emission reductions					
B.4.1 Have the equations and parameters in th PDD been correctly applied as required by the selected approved methodology ?	/VVM/ 90	DR	OK. All parameters and equations in the PDD have been appropriately applied as selected methodology AMS-III.G. (ver.07) and AMS-I.D. (ver.17).	OK	OK
B.4.2 In case the methodology provides the selection of different options for equations or parameters, has an adequate justification been provided and were the correct equations and parameter used in accordance with the methodology ?	/VVM/ 90	DR	OK.	OK	OK
B.4.3 Is the choice of data and parameters used in the equations appropriate ?	/VVM/ 91	DR	PDD (ver.01) does not provide the source data related to the amount of waste applied in the calculation spreadsheet. /CL04/	~~CL04~~	OK
B.4.4 In case of ex-ante data and parameters, are all data sources and assumptions appropriate ?	/VVM/ 91	DR, I	OK. As per AMS-III.G., annual amount of waste is assumed that it is same with 2010. Moreover, composition of waste has not been measured, but is referred to "Status of waste	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
And Are calculations correct, applicable to the proposed project activity ?			disposal and treatment, 1996-2010" issued by Ministry of Environment of Korea /1-10/.		
B.4.5 In case of ex-post data and parameters, are the estimates provided in the PDD for these data and parameters reasonable ?	/VVM/ 91	DR, I	OK. Validation team has reviewed references of the assumptions and references.	OK	OK
B.5 Additionality of a project activity					
B.5.0.1 Describe how the reliability and credibility of all data, rationales, assumptions, justifications and documentation provided by the project participant to support the demonstration of additionality is assessed and validated using local knowledge, sectoral and financial expertise and considering other sources of information for cross checks.	/VVM/ 95	DR, I	OK. Refer to B.5.3 below.	OK	OK
B.5.0.2 Are any tools and documents provided by the EB to demonstrate the addtionality of the proposed CDM project activities relevant and have they been correctly considered and applied ?	/VVM/ 96	DR	OK. Refer to B.5.3 below.	OK	OK
B.5.0.3 Are any specific complementary or alternative requirements included in the approved CDM methodology and have they been correctly considered and applied ?	/VVM/ 96	DR	OK. Refer to B.5.3 below.	OK	OK
B.5.1 Prior Consideration of the clean development mechanism.					

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
B.5.1.1 Is the start date of the project activity, reported in the PDD, in accordance with the latest version of the "Glossary of CDM terms" ?	/VVM/ 99	DR	Validation team found that timeline of the project activity, described in the PDD (ver.01), is not lined with evidences. /CAR07/ OK. The PPs identified the date of contraction between the PPs as the project start date, and the date 10/06/2011 is identified and consistently described as the project start date on table 5.5 and section C.1.1 of the PDD (ver.04).	~~CAR07~~	OK
B.5.1.2 Is the project activity, in accordance with the guidance from the EB, a new project activity (project activities with start date at or after 02 Aug 2008) or an existing project activity (project activities with starting date before 02 Aug 2008) ?	/VVM/ 100	DR	The project start date is June 10th, 2011. So, the proposed project activity is new project activity, whose start date is after 02 Aug, 2008. Validation team confirmed that the PPs have notified prior consideration to UNFCCC CDM secretariat and it is listed on Nov. 14th 2011, on CDM website. Also, notification to host party's DNA has been confirmed.	~~PENDING~~	OK
B.5.1.5 If there is an existing project activity (project activities with start date before 02 Aug 2008) for which the start date is prior to the date of publication of the PDD for global stakeholder consultation, please verify through documents review that PP's prior consideration ;	/VVM/ 102	DR	N/A	OK	OK
(a) Evidence that must indicate that awareness of the CDM prior to the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the project. Evidence to support this would include, inter alia, minutes and/or notes related to the consideration of the decision by the Board of Directors, or equivalent, other project	/VVM/ 102 (a)	DR	N/A	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
participant, to undertake the project as a proposed CDM project activity.					
(b) Reliable evidence from project participants that must indicate that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation. Evidence to support this should include, inter alia, contracts with consultants for CDM/PDD/methodology services, Emission Reduction Purchase Agreements or other documentation related to the sale of the potential CERs (including correspondence with multilateral financial institutions or carbon funds), evidence of agreements or negotiations with a DOE for validation services, submission of a new methodology to the CDM Executive Board, publication in newspaper, interviews with DNA, earlier correspondence on the project with the DNA or the UNFCCC secretariat.	/VVM/ 102 (b)	DR	N/A	OK	OK
B.5.2 Identification of Alternatives					
B.5.2.1 Does the PDD identify credible alternatives to the project activity in order to determine the most realistic baseline scenario, unless the applied approved methodology prescribes the baseline scenario and no further analysis is required?	/VVM/ 105	DR	In step 2 B.4 of the PDD (ver.01), PPs stated that alternative 1 is only remaining and plausible. But there is no explanation which regulations/laws are applied to the other alternatives. If alternative 1 (proposed CDM project activity) is the only remaining alternative at this stage, this project is not additional. /CAR02/ OK. Baseline scenario that has already been determined in the applied methodologies AMS-III.G. (ver.07) and AMS-I.D. (ver.17) has been appropriately reflected in the PDD (ver.04).	~~CAR02~~	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
B.5.2 Does the list of alternatives given in the PDD ensures that:	/VVM/ 106	DR	Refer to the belows	OK	OK
(a) The list of alternatives includes as one of the options that the project activity is undertaken without being registered as a proposed CDM project activity?	/VVM/ 106 (a)	DR	OK. Fixed baseline scenario in the methodologies is applied.	OK	OK
(b) The list contains all plausible alternatives which can be considered to be viable means of supplying the outputs or services that are to be supplied by the proposed CDM project activity?	/VVM/ 106 (b)	DR	Validation team cannot agree that the PP has identified all possible and credible alternatives. For example, to recover landfill gas utilizing existing simple burning system is not considered as alternatives. Moreover, alternatives related to electricity generation are not taken into account. /CAR06/ As a result of corrective action, the PP defined baseline as the scenario defined in the methodologies.	~~CAR06~~	OK
(c) The alternatives comply with all applicable and enforced legislation?	/VVM/ 106 (c)	DR	Identified baseline scenario is not mandatory.	OK	OK
B.5.3 Investment Analysis					
B.5.3.1 Has the investment analysis been used to demonstrate the additionality of the proposed CDM project?	/VVM/ 108	DR	Yes.	OK	OK
B.5.3.2 Which approach is chosen for investment analysis of the proposed CDM project activity and is it appropriate? (a) The proposed CDM project activity would produce no financial or economic benefits	/VVM/ 109	DR	The PPs has chosen type (c) approach to demonstrate investment barrier of the proposed project activity.	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
other than CDM-related income, and there is at least one alternative which is less costly than the proposed CDM project activity (simple cost analysis); (b) The proposed CDM project activity is less economically or financially attractive than at least one other credible and realistic alternative (comparison analysis); (c) The financial returns of the proposed CDM project activity would be insufficient to justify the required investment (benchmark analysis).					
B.5.3.3 Please describe how the accuracy of financial calculations carried out for any investment analysis is validated . (a) Conduct a thorough assessment of all parameters and assumptions used in calculating the relevant financial indicator, and determine the accuracy and suitability of these parameters using the available evidence and expertise in relevant accounting practices. (b) Cross-check the parameters against third-party or publicly available sources, such as invoices or price indices. (c) Review feasibility reports, public announcements and annual financial reports related to the proposed CDM project activity	/VVM/ 111	DR	OK. Refer to B.5.3.4 and B.5.3.5 below	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
and the project participants. (d) Assess the correctness of computations carried out and documented by the project participants. (e) Assess the sensitivity analysis by the project participants to determine under what conditions variations in the result would occur, and the likelihood of these conditions.					
B.5.3.4 Is benchmark applied in the investment analysis suitable ?	/VVM/ 112	DR	See belows	OK	OK
(a) Is the type of benchmark applied suitable for the type of financial indicator presented ?	/VVM/ 112 (a)	DR	OK. Paragraph 13 of "guidelines on the assessment of investment analysis (ver.05)" requires that in cases of projects which could be developed by an entity other than the PP the benchmark should be based on parameters that are standard in the market. The PPs applied benchmark based on research for improvement of new and renewable energy feed-in tariff policy by Ministry of Commerce, Industry and Energy of Korea /1-16/. The report has analyzed average investment cost and income, with interest rate of 7.0% the PPs has applied to the investment analysis of the proposed project activity.	OK	OK
(b) Does any risk premium applied in determining the benchmark reflect the risks associated with the project type or activity ?	/VVM/ 112 (b) EB 51 Annex58 para 15	DR	n/a	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
(c) Is it reasonable to assume that no investment would be made at a rate of return lower than the benchmark by, for example, assessing previous investment decisions by the project participants involved and determining whether the same benchmark has been applied or if there are verifiable circumstances that have led to a change in the benchmark ?	/VVM/ 112 (c)	DR	The PPs has made three major assumptions not only for investment analysis, but also for baseline emission estimation. 1) Annual amount of waste after project implementation is assumed that it is same with 2010, the latest data at the time of project development. Validation team has concluded that this assumption is conservative enough because the number is about 15% less than average amount of waste for last five years, resulting in less methane emissions, less emission reductions, and less income of the PPs. 2) Composition of waste is referred to the national statistical report "Status of waste disposal and treatment, 1996-2010" issued by Ministry of Environment of Korea. Validation team reviewed this document and then concluded that this assumption is reasonable. 3) Amount of methane generated at the landfill site is calculated based on the latest version of methodology and methodological tool. But, in the engineering work report, it is calculated by old version.	OK	OK
B.5.3.5 In case where the PP's rely on values from Feasibility Study Reports (FSR) that are approved by national authorities for proposed project activities, describe the means to validate the following requirements:	/VVM/ 113	DR	OK. FSR (Engineering Work Report) is required to be submitted to the government for approval for electricity business.	OK	OK
(a) Has the FSR been the basis of the decision to proceed with the investment in the project, i.e. that the period of time between the finalization of	/VVM/ 113 (a)	DR	OK. The FSR (Engineering Work Report) is issued on April of 2011, and decision to proceed with the investment was made on June of 2011. So, this timeline is enough for validation team to confirm that the input values would not been	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
the FSR and the investment decision is sufficiently short for the DOE to confirm that it is unlikely in the context of the underlying project activity that the input values would have materially changed;			materially changed.		
(b) Are the values used in the PDD and associated annexes fully consistent with the FSR, and where inconsistencies occur the DOE should validate the appropriateness of the values;	/VVM/ 113 (b)	DR	Investment analysis shall be carried out based on the identified project boundary. But, PPs reflected LFG utilization fee and operation manage and oversee fee that flows *inside* of the project boundary. These internal cashflows shall not be considered. /CAR01/ The PPs reflected 7.582% of 'operation manage and oversee fee' as a cost of investment analysis. But, validation team found that the portion shall be applied only to CER revenue, not to all income of Nurieconet Co., LTD. This non-conformity resulted in increasing total investment cost. /CAR09/ In the investment analysis, annual O&M cost has been changed in PDD(ver.03), different from documented evidences /CL10/ Resolved in the PDD (ver.04) a) construction cost, O&M cost, cooperation tax and electricity production are consistent with FSR. b) electricity price (SMP) is average price for past four years, based on information from Korea Power Exchange. c) 7.0% of discount rate is consistent with "research for improvement of new and renewable energy feed-in tariff policy by Ministry of Commerce, Industry and Energy of Korea " d) CERs price is from average market price for last 3 months	~~CAR01~~ ~~CAR09~~ ~~CL10~~	OK
(c) On the basis of its specific local and sectoral	/VVM/	DR	n/a. Input values are validated not by sectoral experts, but by	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
expertise, is confirmation provided, by crosschecking or other appropriate manner, that the input values from the FSR are valid and applicable at the time of the investment decision.	113 (c)		FSR and relevant documents as mentioned above.		
B.5.3.6 If a fair value for the project assets in the end of the assessment period is included, assess whether it is calculated in accordance with the local accounting regulation where available or international best practice ?	EB 51 Annex58 para 4	DR	N/A. Fair value of the project assets is not included	OK	OK
B.5.3.7 Does the financial indicator calculation include adding back of the depreciation and other non-cash related items to taxable profits ?	EB 51 Annex58 para 5	DR	OK. Depreciation and other non-cash items are not included in the analysis.	OK	OK
B.5.3.8 Are input values used in all investment analysis valid and applicable at the time of the investment decision taken by the project participant.	EB 51 Annex58 para 6	DR	All input values were valid at the time of decision, but CER price is based on average market price for last 3 months at the time of validation. /CAR15/	~~CAR15~~	OK
B.5.3.9 In case of the project activities for which implementation ceases after commencement and where implementation is recommenced due to consideration of the CDM, does the investment analysis reflect the economic decision making context at point of the decision to recommence the project ?	EB 51 Annex58 para 7	DR	N/A. The proposed project activity has been decided to commence with CDM consideration.	OK	OK
B.5.3.10 Does the project participant supply spreadsheet versions of all investment	EB 51 Annex	DR	Yes.	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
analysis ?	58 para 8				
B.5.3.11 If project IRR is chosen, are the costs of financing expenditures (loan repayment and interests) excluded from the calculation of the project IRR ?	EB 51 Annex 58 para 9	DR	Yes. All financial cost has been excluded from the analysis.	OK	OK
B.5.3.12 If equity IRR is chosen, is the part of the investment costs which is financed by equity considered as net cash outflow ? Is the part of the investment costs which is financed by debt excluded in net cash outflow ?	EB 51 Annex 58 para 10	DR	N/A. The analysis has chosen project IRR.	OK	OK
B.5.3.13 If project IRR is chosen and a post-tax benchmark is applied, is the actual interest payable taken into account in the calculation of income tax, with an reasonable interest rate ?	EB 51 Annex 58 para 11	DR	In the investment analysis worksheet, 7.32% of benchmark, applied to demonstrate investment barrier, is not the interest rate for loan of Jinju city bank, but assumption provided by bidding rule. The PPs shall apply appropriate benchmark as allowed by "Guidelines on the Assessment of Investment Analysis(version 05, EB62 annex 5)" /CAR08/ In the Investment Analysis. corporate tax rate is not accurate. The applied tax rate is from old version of Corporate Tax Act. The Act has been revised. /CAR14/	~~CAR08~~ ~~CAR14~~	OK
B.5.3.14 In case a benchmark is used, is the applied benchmark appropriate to the type or IRR calculated ?	EB 51 Annex 58 para 12	DR	OK. The benchmark is from government research, calculated by WACC using best practice in the domestic market. This meets paragraph 15 (b) of "Guidelines on the assessment of investment analysis (ver.05)".	OK	OK
B.5.3.15 In case the project activity could also be	EB 51	DR	OK. Refer to the B.5.3.14 above.	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
developed by an entity other than the project participant, is the benchmark based on publicly available data sources which can be clearly validated ?	Annex58 para 13				
B.5.3.16 In cases that internal company benchmarks/ expected returns are applied, is it verified that there is only one possible project developer and, either the internal company benchmarks/expected returns have been used for similar project with similar risks developed by the same company or, if the company is brand new, have been used for similar projects in the same sector in the country/region ?	EB 51 Annex58 para 14	DR	N/A	OK	OK
B.5.3.17 Are the results of variation of variable that constitute more than 20% of either total project costs or total project revenues clearly presented in PDD and reproducible with spreadsheet ? Are the ranges of variation deemed appropriate in the context of the specific project circumstances ?	EB 51 Annex 58 para 17 & 18	DR	OK. Initial construction cost and O&M cost are variables that constitute more than 20% of total cost, and the PPs has conducted sensitivity analysis with them. Sensitivity analysis has been appropriately conducted with 5% and 10% toward more conservative directions, as required by paragraph 21 of "Guidelines on the assessment of investment analysis (ver.05)"	OK	OK
B.5.4 Barrier Analysis					
B.5.4.1 Has the barrier analysis been used to demonstrate the additionality of the proposed	/VVM/ 115	DR	N/A. To demonstrate additionality of the proposed SSC CDM project activity, the PPS applied investment analysis.	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
CDM project?					
B.5.4.2 What barriers are identified and described in PDD to demonstrate additionality?	/VVM/ 115	DR	N/A. To demonstrate additionality of the proposed SSC CDM project activity, the PPS applied investment analysis.	OK	OK
B.5.4.3 Does any issue considered in the barrier analysis have a clear direct impact on the financial returns of the project activity and thus shall be assessed by investment analysis?	/VVM/ 116	DR	N/A. To demonstrate additionality of the proposed SSC CDM project activity, the PPS applied investment analysis.	OK	OK
(a) Risk related barriers, for example risk of technical failure, that could have negative effects on financial performance, or	/VVM/ 116 (a)	DR	N/A. To demonstrate additionality of the proposed SSC CDM project activity, the PPS applied investment analysis.	OK	OK
(b) Barriers related to the unavailability of sources of finance for the project activity.)	/VVM/ 116 (b)	DR	N/A. To demonstrate additionality of the proposed SSC CDM project activity, the PPS applied investment analysis.	OK	OK
B.5.4.4 To asses the barrier analysis apply the following two-step process:	/VVM/ 117	DR	N/A. To demonstrate additionality of the proposed SSC CDM project activity, the PPS applied investment analysis.	OK	OK
(a). Please assess whether the barriers are real: Please assess the available evidence and/or undertake interviews with relevant individuals (including members of industry associations, governmen officials or local experts if necessary) to determine whether the barriers listed in the PDD exist. (Review that existence of barriers is substantiated by independent sources of data such as relevant national legislation, surveys of local conditions and	/VVM/ 117 (a)	DR	N/A. To demonstrate additionality of the proposed SSC CDM project activity, the PPS applied investment analysis.	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
national or international statistics. If existence of a barrier is substantiated only by the opinions of the project participants, this shall not be considered to be adequately substantiated. To demonstrate that a barrier is real it has to be supported by sufficient evidence on the basis of sectoral or local expertise)					
(b) Do the barriers prevent the implementation of the project activity but not the implementation of at least one of the possible alternatives? *(Please note, that not all barriers present an insurmountable hurdle to a project activity being implemented. By applying local and sectoral expertise to judge whether a barrier or set of barriers would prevent the implementation of the proposed CDM project activity and would not equally prevent implementation of at least one of the possible alternatives, in particular the identified baseline scenario*	/VVM/ 117 (b)	DR	N/A. To demonstrate additionality of the proposed SSC CDM project activity, the PPS applied investment analysis.	OK	OK
B.5.4.5 Is it sufficiently demonstrated that CDM alleviates the identified barriers that prevent the proposed project activity from occurring ?	/VVM/ 115	DR	N/A. To demonstrate additionality of the proposed SSC CDM project activity, the PPS applied investment analysis.	OK	OK
B.5.4.5 Overall, is the barrier analysis in compliance	/VVM/	DR	N/A. To demonstrate additionality of the proposed SSC CDM	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
with the latest version of *"Guidelines for objective demonstration and assessment of barriers (EB50, Annex 13)"*?	115		project activity, the PPS applied investment analysis.		
B.5.5 Common Practice Analysis					
B.5.5.1 Is common practice required by the methodology applied by the proposed project activity to demonstrate additionality?	/VVM/ 119	DR	N/A. To demonstrate additionality of the proposed SSC CDM project activity, the PPS applied investment analysis.	OK	OK
B.5.5.2 Is the proposed project activity first-of-its-kind? If so, please specify how this statement is substantiated	/VVM/ 119	DR	N/A. To demonstrate additionality of the proposed SSC CDM project activity, the PPS applied investment analysis.	OK	OK
B.5.5.3 In case the project activity is not first of its kind, is the geographical scope (e.g. the defined region) of the common practice analysis appropriate for the assessment of common practise related to the project activity's technology or industry type? Please consider that for certain technologies the relevant region for assessment will be local and for others it may be transnational / global. If a region other than the entire host country is chosen, please assess the explanation why this region is more appropriate.	/VVM/ 120 (a)	DR	N/A. To demonstrate additionality of the proposed SSC CDM project activity, the PPS applied investment analysis.	OK	OK
B.5.5.4 Was an assessment concerning the existence	/VVM/	DR	N/A. To demonstrate additionality of the proposed SSC CDM	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
of other similar projects undertaken? Does this include official sources and was local and industry expertise used to determine to what extent similar and operational projects (e.g., using similar technology or practice), other than CDM project activities, exist in the defined region?	120 (b)		project activity, the PPS applied investment analysis.		
B.5.5.5 If similar and operational projects, other than CDM project activities, are already "widely observed and commonly carried out" in the defined region, what are essential distinctions between the proposed CDM project activity and the other similar activities?	/VVM/ 120 (c)	DR	N/A. To demonstrate additionality of the proposed SSC CDM project activity, the PPS applied investment analysis.	OK	OK
B.5.5.6 Final Conclusion: Based on the assessment of questions B.5.5.1. to B.5.5.5 is the proposed project activity additional ?	/VVM/ 119	DR	N/A. To demonstrate additionality of the proposed SSC CDM project activity, the PPS applied investment analysis.	OK	OK
B.5.6 Additionality of Renewable Energy Projects					
B.5.6.1 Is the project size ≤5MW of installed capacity of renewable energy ?	EB 54 Report Annex15	DR	N/A	OK	OK
B.5.6.2 Is the geographic location of the project in LDCs/ SIDs or a special underdeveloped zone of the host country identified by the Government before 28 May 2010 ?	EB 54 Report Annex15 (a)	DR	N/A	OK	OK
B.5.6.3 Is the project an off grid (<12 hrs grid	EB 54	DR	N/A	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
availability per 24 hrs day is also considered off grid for this assessment) project supplying to households/ communities ?	Report Annex15 (b)				
B.5.6.4 Are the following two conditions satisfied ? ▫ Project is for distributed renewable energy generation with each of the independent subsystems/ measures in the project ≤750kW. ▫ End users of the subsystems or measures are households/ communities/SMEs.	EB 54 Report Annex15 (c)	DR	N/A	OK	OK
B.5.6.5 Specific renewable energy technologies recommended by the host country DNA and approved by the Board (Conditions apply ; The installed capacity of technology/measure contributes ≤ to national electricity generation)	EB 54 Report Annex15 (d)	DR	N/A	OK	OK
B.6 Monitoring Plan					
B.6.1 Does the PDD include a monitoring plan ?	/VVM/ 122	DR	OK. It is demonstrated in section B.7.2 of the PDD	OK	OK
B.6.2 Does the monitoring plan comply with the approved methodology ?	/VVM/ 123	DR, I	OK	OK	OK
(a) Does the list of parameters identify required by the selected approved methodology. ?	/VVM/ 123 (a) (i)	DR, I	OK. As per AMS-III.G. monitoring parameters required are: I) PEy : emissions from electricity/fuel consumption ii) LFGi,y : Landfill gas destroyed by the project activity iii) Wch4 : methane content in the LFG iv) T : temperature of LFG	OK	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
			v) P: pressure of LFG As per AMS-I.D. monitoring parameters required are: I) EGy : net electricity generated by the project activity		
Does the monitoring plan contain all necessary parameters ?	/VVM/ 123 (a) (ii)	DR, I	OK. All required parameters are planned to be monitored in B.7.1 of PDD. By the way, parameter T and P would not be independently monitored because the PPs would install a gas flowmeter that measure normal cubic meters of LFG with temperature/pressure correction.	OK	OK
Does the means of monitoring described in the plan comply with the requirements of the methodology ?	/VVM/ 123 (a) (ii)	DR, I	Monitoring plan does not include measurement/archive frequency /CAR11/.	~~CAR11~~	OK
(b) Are the monitoring arrangements described in the monitoring plan feasible within the project design ?	/VVM/ 123 (b) (i)	DR, I	Electricity meter for auxiliary power is under KEPCO's control. In this reason, the PPs shall clearly demonstrate how watt-hour meter for auxiliary power consumption can be managed and calibrated by themselves. /CAR10/ OK. It is suitable to the proposed project activity.	~~CAR10~~	OK
- Are the means of implementation of the monitoring plan, including the data arrangement and qualify assurance and quality control procedures, sufficient to ensure that the emission reductions achieved by requesting from the proposed CDM project can be reported ex post and verified ?	/VVM/ 123 (b) (ii)	DR, I	OK. A gas flowmeter, a gas analyzer, watt-hour meters both for export and for import electricity will be installed, and all measurement data will be electronically recorded. In addition, Nurieconet - one of the PPs - has already experience in operating same kind of project activity.	OK	OK
C. Sustainable development					
C.1 Does the letter approval by the DNA of the host	/VVM/	DR	OK. LoA issued by host party's DNA states that the project	~~PENDING~~	OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
Party confirms the contribution of the proposed CDM project activity to the sustainable development of the host Party ?	126		contributes to sustainable development in Korea		
D. Local Stakeholder Consultation					
D.1 Were relevant stakeholders invited by the PP's to comment on the proposed CDM project activity prior to the publication of the PDD on the UNFCCC website?	/VVM/ 128 & 129 (a)	DR, I	OK. It is demonstrated on E.1 of the PDD. The PPs has announced the commencement of the project in local newsletter and webpage of both Jinju City and Korean Environment Corperation. In addition, the PPs has invited the represents of local residents to introducee of the project.	OK	OK
D.2 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?	/VVM/ 128	DR	OK. Invitation of local residents was required by "Promotion of Installation of Waste Disposal Facilities and Assistance, etc. to Adjacent Areas Act".	OK	OK
D.3 Have appropriate media been used to invite comments by local stakeholders?	/VVM/ 128	DR, I	OK. Refer to the D.1 above.	OK	OK
D.4 Is the summary of the received comments complete?	/VVM/ 128(b)	DR	OK. No comments were received.	OK	OK
D.5 Have the PP's taken due account of any comments received and have they described this process in the PDD?	/VVM/ 128 (c)	DR	No. There were no comments received.	OK	OK
E. Environmental Impacts					
E.1 Have the PP's submitted an analysis of environmental impacts of the project activity? If those impacts are considered significant by the project participants or the host Party is an	/VVM/ 132	DR, I	N/A. Environmental Impact Analysis for the project is not needed. "Environment Impact Analysis Act" in Korea requires EIA in case the capacity is over 10MW. Capacity of electricity production of the project is 925kW. But, the existing landfill site is needed to conduct ex-EIA by Waste Control Act /2-12/.		OK

Checklist Question	Ref.	MoV	Comments	Draft Concl.	Final Concl.
Environmental Impact Assessment (EIA) generated?			Validation team does not have ex-EIA report, so cannot confirm that there was no issue in the report. /CL06/ Figures in section E.1 and E.2 are written in Korean. The PPs are needed to provide major information in English into the PDD. /CL08/	~~CL06~~ ~~CL08~~	
E.2 Were transboundary environmental impacts identified in the analysis?		DR, I	N/A. Refer to the E.1 above	OK	OK
E.3 Will the project create any adverse environmental effects?		DR, I	N/A. Refer to the E.1 above	OK	OK
E.4 Have the identified environmental impacts been addressed in the project design sufficiently?		DR, I	N/A. Refer to the E.1 above	OK	OK
E.5 Does the project comply with environmental legislation in the host country?		DR, I	N/A. Refer to the E.1 above	OK	OK

Table 3 Resolution of Corrective Action and Clarification Requests (dated on 09 April. 2011)

No. of CAR/CL	Description of the CAR/CL	Ref.	Comments/Response from project proponent	Conclusions
CAR 01	Investment analysis shall be carried out based on the identified project boundary. But, PPs reflected LFG utilization fee and operation manage and oversee fee that flows *inside* of the project boundary. These internal cashflows shall not be considered.	B.5.3.5 (b)	1. Considered inside of the project boundary for income and cost, some of cost items was not included in cashflow. cost items are added and re-analyze investment analysis. - Deliberation fee - Interest Cost - Depreciation Cost - CER price is changed 9 Euro to 5 Euro 2. For investment analysis, Government bond yield rate is changed to Jinju City interest rate (7.32%). 3. Korea Environmental Organization is excluded in the project as a project participant. 4. 101.41 won (five-year average price) during 2006 to 2010 is considered to be a unit price of electricity sales (SMP) for investment analysis. Please refer to investment analysis excel file.	Resolved. All data and values in the analysis have been appropriately applied in accordance with the latest version of "Guidelines on the assessment of investment analysis (EB62)"
CAR 02	In step 2 B.4, PPs stated that alternative 1 is only remaining and plausible. But there is no explanation which regulations/laws are applied to the other alternatives. If alternative 1 (proposed CDM project activity) is the only remaining alternative at this stage, this project is not additional.	B.5.2.1	Modify and make up for the defect in PDD B.4.	Resolved. Alternatives identified in the PDD (ver.04) are now reasonable and plausible with clear description.
CAR 03	PDD(version 02) does not have clear demonstration how the proposed project activity meets applicability conditions of each methodology	B.1.2	PDD was supplemented with applicability of methodology for the proposed project. Please refer to PDD B.2.	Resolved. All the applicability conditions are considered and appropriately demonstrated in the PDD (ver.04)

No. of CAR/CL	Description of the CAR/CL	Ref.	Comments/Response from project proponent	Conclusions
CAR 04	The PPs shall clearly demonstrate that the proposed project activity is not a de-bundled component of a large scale project activity. PDD does not have evidences.	A.6.5.1 B.1.8	Modified in PDD A.4.5.	Resolved. Clearly described in the revised PDD (ver.04)
CAR 05	The applied methodology AMS-III.G and reference methodology ACM0001 is not latest version. For example, calculating adjustment factor(AF) has been changed in the latest version of ACM0001, but PDD has applied a formula from old version	B.1.1	According to the annual public report of Ministry of Environment in Korea, the status quo of Jinju landfill is venting LFG without flaring by existing simple burning systems and under the regulation, Jinju landfill should be checked regularly by Korea Rural Corporation. Korea Rural Corporation noticed and sent a letter of certificate to Jinju city mayor in 2009 after periodic test. Supporting evidences of the above matter are attached and modified in PDD B.4. 1. Excel file of the status quo of landfills in Korea 2009. 2. Letter of Certificate of landfill operation 2009.	Resolved. AF value has been changed in the latest version of applied methodology, and the PPs correctly reflected it in the revised PDD.
CAR 06	Validation team cannot agree that the PP has identified all possible and credible alternatives. For example, to recover landfill gas utilizing existing simple burning system is not considered as alternatives. Moreover, alternatives related to electricity generation are not taken into account.	B.3.1 B.5.2	According to "baseline under the methodology AMS-III.G_Version 07 and AMS-I.D_Version 17, B.4. description of baseline is modified.	Resolved. Alternatives identified in the PDD (ver.04) are now reasonable and plausible with clear description.
CAR 07	During on-site assessment, validation team found that timeline of the project activity, described in the PDD, is not lined with evidences.	B.5.1.1	Modified in Table B-5, PDD B.5.	Resolved. Information in the table has been correctly revised.

No. of CAR/CL	Description of the CAR/CL	Ref.	Comments/Response from project proponent	Conclusions
CAR 08	In the investment analysis worksheet, 7.32% of benchmark, applied to demonstrate investment barrier, is not the interest rate for loan of Jinju city bank, but assumption provided by bidding rule. The PPs shall apply appropriate benchmark as allowed by "Guidelines on the Assessment of Investment Analysis(version 05, EB62 annex 5)"	B.5.3.13	7% benchmark is applied to assess more conservative analysis. Discount rate 7% is for LFG generation as a indicator to assess investment in renewable energy project in Korea (this public report was published in 2006 by Ministry of Knowledge economy). Please refer to report, page 37 to 56.	Resolved. Changed benchmark is appropriate, with objective evidence.
CAR 09	The PPs reflected 7.582% of 'operation manage and oversee fee' as a cost of investment analysis. But, validation team found that the portion shall be applied only to CER revenue, not to all income of Nurieconet Co., LTD. This non-conformity resulted in increasing total investment cost.	B.5.3.5 (b)	Investment analysis excel data has been revised. Please refer to Investment analysis excel file.	Resolved. Correctly revised.
CAR 10	Electricity meter for auxiliary power is under KEPCO's control. In this reason, the PPs shall clearly demonstrate how watt-hour meter for auxiliary power consumption can be managed and calibrated by themselves.	B.6.2 (b)	The amount of auxiliary power consumption will be checked and paper bill will be sent to PP monthly. Under the regulations, electricity meter will be calibrated by PP every seven year. please check PDD B.7.1.	Resolved. Description in the revised PDD (ver.04) is in accordance with national laws.
CAR 11	Monitoring plan does not have information related to features of monitoring equipment, recording frequency, and level of monitoring accuracy.	B.6.2	Please check PDD B.7.2 (monitoring plan) and attached "Jinju Landfill Gas Recovery and Power Generation CDM Operating Manual" file (keep uploading operating manuel).	Resolved. Revised PDD (ver.04) provides information.
CAR 12	In electricity emission factor calculation, BM does not include Sinkori nuclear plant which was operating in	B.3.6	Completion time of Sinkori nuclear plant was in March, 2011 but under the regulations, Sinkori is	Resolved. BM has been correctly

No. of CAR/CL	Description of the CAR/CL	Ref.	Comments/Response from project proponent	Conclusions
	2010		considered calculating BM because its operating time was August, 2010. The data, related to EF and emission reductions was modified in EF excel sheet and investment analysis file. please check both files and PDD.	changed.
CAR 13	Figure B-1 in section B.3 of the PDD is not in accordance with above definition of the project boundary	B.2.1	Figure B-1 is modified. Please check in section B.3 of the PDD.	Resolved. The PPs correctly identified the project boundary.
CAR 14	In the Investment Analysis. corporate tax rate is not accurate.	B.5.3.13	Investment analysis is modified. Please check investment analysis excel file and PDD.	Resolved. Revised calculation correctly applied corporation tax rate in accordance with the latest revision of "Corporation Tax Act"
CAR 15	In the Investment Analysis worksheet, applied CERs price is not at the time of investment decision.	B.5.3.8	Feasibility study data for CER price assumption is applied. please check attached file for CAR15.	Resolved. Value in the FSR (called Engineering Work Report for this project) is applied.
CAR 16	Information in the PDD is not consistently described ex1) version of applied methodology, name of the grid the project activity is connected to ex2) result of sensitivity analysis in the PDD is not consistent with worksheet.	A.5.1	Errors are corrected. Information in the PDD is now consistent.	Resolved. Information, data, and valued in the revised PDD are not consistent.
CL 01	The PDD identifies Jinju city and Nurieconet Co., Ltd. have been involved in the project activity. The PPs shall provide relevant document.	A.3.1	Please check the attached file, CL01_"A contract between Jinju City and Nurieconet".	Resolved. In the provided contract, the PPs identified in the PDD are consistently listed.
CL 02	Please provide source of the evidence that shows project	B.3.5	Refer to CAR05 and modified in PDD B.4.	Resolved.

No. of CAR/CL	Description of the CAR/CL	Ref.	Comments/Response from project proponent	Conclusions
	site is allowed that to emit landfill gas to atmosphere, for validation team to be able to directly access the information.			Appropriate evidences have been provided.
CL 03	Please provide document that shows sources of budget for the proposed project activity	A.6.4.1	Please check the attached file, CL03	Resolved. Appropriate evidences have been provided.
CL 04	Please provide source of 'amount of waste' that is used to calculate baseline emission	B.4.3	Please check the attached file, CL04	Resolved. Appropriate evidences have been provided.
CL 05	GPS location in section A.4.1 of PDD is needed to be demonstrated as decimal format	A.6.1.1	Pleas check PDD A.4.1.4; changed to decimal format	Resolved. Appropriate evidences have been provided.
CL 06	Section D.2 of PDD described that ex-EIA has been conducted. Please clarify assessment criteria of ex-EIA and demonstrate how ex-EIA is related to environmental impact of the project activity.	E.1	Proposed project will improve the condition of landfill by collecting LFG and hazardous gases from landfill. it is going to improve air, water, soil condition. Even PP and residents do not need to worry about safety from explosion and sanitary from smell. ex-EIA in 2008 and 2011 mentioned about LFG utilization to improve environment around landfill. Added this in PDD D.2.	Resolved. Appropriate evidences have been provided.
CL 07	Please demonstrate whether capacity increase of landfill gas recovery is planned or possible within proposed crediting period.	B.3.4	There is no plan to increase capacity of landfill gas recovery and not plan to add generators during crediting period.	Resolved. Appropriate evidences have been provided.
CL 08	Figures in section E.1 and E.2 are written in Korean. The PPs are needed to provide major information in English into the PDD	E.1	Modified in PDD SECTION E.	Resolved. Appropriate evidences have been provided.
CL 09	PDD (version 02) has some mistype and non-official expressions. ex) operating manure, Kyungsannamdo, Act for	A.5.1	Modified in PDD.	Resolved. Appropriate evidences have been provided.

No. of CAR/CL	Description of the CAR/CL	Ref.	Comments/Response from project proponent	Conclusions
	measurement, National grid			
CL 10	In the investment analysis, please clarify annual O&M cost has been changed in version 3, different from documented evidences	B.5.3.5 (b)	Evidence data for final feasibility study is applied. please check investment analysis.	Resolved. Appropriate evidences have been provided.

APPENDIX B

CERTIFICATES OF COMPETENCE

KSA

CDM Validator/Verifier Certificate

Seung-Keun Choi

Certificate No. : CDM-015

Technical Area : -

Korean Standards Association hereby certifies that the above person is qualified by KSA's Qualification requirements as a technical expert for CDM validation and verification activities.

VALID FROM	VALID UNTIL
2011.01.21	2014.01.20

PRESIDENT OF KSA

Kaphong Choi

KOREAN STANDARDS ASSOCIATION

13F, Ace High-end Tower 3, 371-50, Gasan-dong, Gwumcheon-gu, Seoul, Korea

KSA

GHG Validator/Verifier Certificate

Kyoo-Il Sohn

Certificate No. : CDM-001

Technical Area : 13.1

Korean Standards Association hereby certifies that the above person is qualified by KSA's Qualification requirements to conduct validation and verification for CDM and GHG project.

VALID FROM	VALID UNTIL
2011.1.21	2014.1.20

PRESIDENT OF KSA

KOREAN STANDARDS ASSOCIATION

13F, Ace High-end Tower 3, 371-50, Gasan-dong, Gwumcheon-gu, Seoul, Korea

KSA

Technical Expert Certificate

Chung-kook Lee

Certificate No. : CDM-013

Technical Area : 1.2, 2.1, 2.2, 3.1

Korean Standards Association hereby certifies that the above person is qualified by KSA's Qualification requirements as a technical expert for CDM validation and verification activities.

VALID FROM	VALID UNTIL
2010.09.20	2013.09.19

PRESIDENT OF KSA

Kaphong Choi

KOREAN STANDARDS ASSOCIATION

13F, Ace High-end Tower 3, 371-50, Gasan-dong, Gwumcheon-gu, Seoul, Korea

KSA

CDM Validator/Verifier Certificate

Seong-Yong Park

Certificate No. : CDM-014

Technical Area : -

Korean Standards Association hereby certifies that the above person is qualified by KSA's Qualification requirements as a technical expert for CDM validation and verification activities.

VALID FROM	VALID UNTIL
2011.01.21	2014.01.20

PRESIDENT OF KSA

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KSA

GHG Validator/Verifier Certificate

Ju-Dong Yeo

Certificate No. : CDM-002

Technical Area : 13.1

Korean Standards Association hereby certifies that the above person is qualified by KSA's Qualification requirements to conduct validation and verification for CDM and GHG project.

VALID FROM	VALID UNTIL
2011.1.21	2014.1.20

PRESIDENT OF KSA

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KSA

Technical Expert Certificate

Woo-Jin Park

Certificate No. : CDM-019

Technical Area : 1.2, 2.1, 2.2, 3.1

Korean Standards Association hereby certifies that the above person is qualified by KSA's Qualification requirements as a technical expert for CDM validation and verification activities.

VALID FROM	VALID UNTIL
2010.09.20	2013.09.19

PRESIDENT OF KSA

Kaphong Chon

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