VALIDATION REPORT

PT NAVIGAT ORGANIC ENERGY INDONESIA INTEGRATED SOLID WASTE MANAGEMENT (GALFAD) PROJECT IN BALI, INDONESIA

REPORT NO. 2007-0240

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DET NORSKE VERITAS

VALIDATION REPORT

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Approved by: Einar Telnes Director	Organisational unit: DNV Certification, International Climate Change Services
Client: Mitsubishi UFJ Securities Co., Ltd.	Client ref.: Kyoko Tochikawa

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Summary:

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the "PT Navigat Organic Energy Indonesia Integrated Solid Waste Management (GALFAD)" project in Indonesia on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board.

The validation consists of the following three phases: i) a desk review of the project design documents, ii) follow-up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

In summary, it is DNV's opinion that the project, as described in the project design document version 3.1 of 2 February 2007, meets all relevant UNFCCC requirements for the CDM and correctly applies the consolidated baseline and monitoring methodology AM0025 version 5 and ACM001 version 04. Hence, DNV requests the registration of the "PT Navigat Organic Energy Indonesia Integrated Solid Waste Management (GALFAD) Project in Bali, Indonesia" as a CDM project.

Report No.: 2007-0240	Subject Group: Environment
Report title: PT Navigat Organic Energy Indonesia Integrated Solid Waste Management (GALFAD) Project in Bali, Indonesia	
Work carried out by: Thivakaran Narayanan; Anu Chaudaray, Ramesh Ramachandran. Filipe Tavares	
Work verified by: Miguel Rescalvo	

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Abbreviations

AMDAL	Analysis Mengenai Dampak Linkungan (EIA)
BAPEDAL	Indonesia Environmental Impact Management Agency
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH_4	Methane
CL	Clarification request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N_2O	Nitrous oxide
NOEI	PT Navigat Organic Energy Indonesia
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
PLN	Indonesian State Electricity Company
SARBAGITA	Sanitation Management Body for the city and areas of Denpasar, Badung, Gianyar and Tabanan (abbreviated as SARBAGITA).
UNFCCC	United Nations Framework Convention on Climate Change

1 INTRODUCTION

Mitsubishi UFJ Securities Co., Ltd. has commissioned Det Norske Veritas Certification Ltd. (DNV) to validate the "PT Navigat Organic Energy Indonesia Integrated Solid Waste Management (GALFAD)" project in Bali, Indonesia (hereafter called "the project"). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consists of the following personnel:

Mr Thivakaran Narayanan	DNV Certification Malaysia	Team Leader, GHG auditor
Mr. Filipe Ravares	DNV Certification Brazil	Sector Expert
Mr. Ramesh Ramachandran	DNV Certification India	GHG Auditor
Ms Anu Chaudhary	DNV Certification India	GHG Auditor
Mr. Miguel Rescalvo	DNV Certification Norway	Technical reviewer (acting)
Mr. Einar Telnes	DNV Certification Norway	Technical reviewer

1.1 Validation Objective

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

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodologies AM0025 version 05 and ACM0001 version 04. The validation team has, based on the recommendations in the Validation and Verification Manual /3/ employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

1.3 Description of Proposed CDM Project

PT Navigat Organic Energy Indonesia (NOEI) intends to carry out a project that involves the construction and operation of "GALFAD® (Gasification, LandFill gas and Anaerobic Digestion) plant at the TPA Suwung landfill site in Bali. The plant will treat and recover energy from municipal solid waste from the neighbouring areas. The landfill started operation in 1984 and currently receives approximately 800 tonnes of waste per day.

Energy will be produced from municipal solid waste through three systems: firstly, by the recovery of landfill gas extracted from the landfill; secondly, by recovery of biogas extracted from the anaerobic digester, fed with high moisture content organic waste; and thirdly, by pyrolysis-gasification of dry organic waste. The recovered energy will be used to supply electricity to the local grid.

The project will contribute to greenhouse gas (GHG) reductions in two ways:

i) through destruction of methane that would have been emitted from the landfill site in the absence of the project;

ii) through the displacement of fossil fuel-based grid electricity generation with the project's carbon-neutral electricity.

The project is estimated to reduce on average 123,423 tCO_2/year during the seven years of the first renewable crediting period. The project is estimated to last for 21 years.

2 METHODOLOGY

The validation consists of the following three phases:

I a desk review of the project design, the baseline and monitoring plan

II follow-up interviews with project stakeholders

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

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual /3/. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

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

The validation protocol consists of three tables. The different columns in these tables are described in Figure 1.

The completed validation protocol for the "PT Navigat Organic Energy Indonesia Integrated Solid Waste Management (GALFAD)" is enclosed in Appendix A to this report.

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

i) mistakes have been made with a direct influence on project results;

ii) validation protocol requirements have not been met; or

iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

The term *clarification* (CL) may be used where additional information is needed to fully clarify an issue.

Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities			
Requirement	***Reference***	***Conclusion***	***Cross reference***
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**), a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements or a request for **Clarification (CL)** where further clarifications are needed.*	*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 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	*Gives reference to documents where the answer to the 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 non-compliance with the checklist question (See below).A request for **Clarification (CL)** is used when the validation team has identified a need for further clarification.*

Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification			
Draft report corrective action requests and requests for clarifications	***Ref. to Table 2***	***Summary of project participants' response***	***Final 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 project participants during the communications with the validation team should be summarised 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 PDD version 3.1 of 2 February 2007 /1/ and its previous versions submitted by Mitsubishi UFJ Securities Co. Ltd. and additional background documents related to the project design and baseline were reviewed. A list of the main documents reviewed is given in the references at the end of this report.

2.2 Follow-up Interviews

In the period of 3-4 August 2006, DNV performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of PT NOEI, the Indonesian DNA and SARBAGITA were interviewed. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

Interviewed organisation	Interview topics
NOEI Navigat- HQ	➢ Project technology and starting date ➢ Legal compliance, environmental impacts, local stakeholder consultation ➢ Project participants ➢ Additionality and ODA ➢ Monitoring and project management ➢ Financial analysis and emissions reduction calculations ➢ Landfill operations related issues
SARBAGITA	➢ Legal compliance, environmental impacts, local stakeholder consultation ➢ Monitoring and project management
Indonesian DNA	➢ Project Technology in the Indonesian context ➢ Suitability of baseline given in PDD ➢ Legal compliance, environmental impacts, local stakeholder consultation ➢ DNA approval mechanism for CDM projects

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified for DNV's positive conclusion on the project design. The corrective action requests and requests for clarification raised by DNV, presented to the project participants in DNV's draft validation report of 21 September 2006 (rev. 0), were resolved during communications between Mitsubishi UFJ Securities and DNV. To guarantee the transparency of the validation process, the concerns raised and responses given are documented in the validation protocol in Appendix A.

2.4 Internal Quality Control

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

3 VALIDATION FINDINGS

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

The validation findings relate to the project design as documented and described in the project design documentation, version 3.1 of 2 February 2007.

3.1 Participation Requirements

PT Navigar Organic Energy Indonesia (NOEI) is the project participant from the host Party Indonesia. Mitsubishi UFJ Securities Co., Ltd. is the project participant from Japan. The Parties involved in this project are the Republic of Indonesia as the host Party and Japan as the Annex I Party. The Parties involved meet the requirements to participate in the CDM project.

The DNA of Indonesia provided approval on 8 December 2006 and confirmed the project's contribution to the sustainable development of Indonesia. Japan provided approval on 25 January 2007.

The project contributes to the sustainable development of Indonesia by promoting the utilization of an indigenous resource for producing electricity and by improving the municipal solid waste management. By treating the waste, the project will lead to an improved environment around the landfill site, with reduced health hazards, odours and increased sanitation, among other benefits.

3.2 Project Design

The project proposes the implementation of a GALFAD system (gasification, landfill gas recovery and anaerobic digestion). The technologies incorporated in the GALFAD system include:

i) Waste separation: The arriving waste is segregated into 'wet waste' and 'dry waste'.

ii) Pyrolysis gasification as a combination of pyrolysis and gasification processes. Pyrolysis converts dry waste into low molecular weight hydrocarbon gases or 'pyrogas'. The residue of the pyrolysis process is fed into the gasification unit, in which this residue is broken down further.

iii) A landfill gas recovery system. The collection system will be installed in a new area of the landfill and thus only biogas from the newly disposed waste will be collected.

iv) Anaerobic digestion. The waste is fed into a digester in which the anaerobic bacteria decomposes (at an accelerated pace) the waste into methane, carbon dioxide as well as minor quantities of other gases.

v) Electricity generation.

The project is planned to be implemented in four phases:

Phase I: Installation of the landfill gas (LFG) collection and flaring system.

Phase II: Installation of a 2.0MW power generator to produce energy using the recovered LFG.

Phase III: Installation of a pyrolysis gasification plant to process the dry portion of the organic waste. This phase will add 2.8MW to the total electricity generation capacity.

Phase IV: Installation of a second line of the pyrolysis gasification plant as well as an anaerobic digester. Phase IV will double the waste processing capacity of the entire facility, and add another 4.8MW to the generating capacity. The electricity generation capacity is expected to reach 9.6MW after the completion of this phase, in May 2012.

The lifetime of the project is expected to be at least 21 years. The construction start date will be 1st November 2006 and the start of the 1st crediting period is 1st May 2007.

The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Indonesia.

3.3 Project Baseline

The project applies the approved methodologies:

i) AM0025 version 05 “Avoided emissions from organic waste through alternative waste treatment processes”;
ii) ACM0001 version 04 “Consolidated methodology for landfill gas project activities”;
iii) AMS I.D version 09 “Grid connected renewable electricity generation”.

The project is within the eligibility requirements of AM0025 as the project involves a number of treatments for fresh waste that would otherwise have been disposed of in a landfill, the residual waste from the anaerobic digestion is aerobically composted, the residual waste from the pyrolysis gasification is returned to the landfill and there is not regulations that mandates the treatment of waste.

The LFG produced from the waste that is not treated in other components of the project activity is collected and flared and is utilized for the production of electricity. The project complies with the applicability criteria of the methodology ACM0001.

Once fully implemented, the project is expected to have an installed capacity of 9.6MW of electricity generation. This is within the small-scale project limit of 15MW. The project will thus be eligible to apply the small scale methodology (AMS I.D) to account for its emissions associated with the displacement of fossil fuel based electricity.

The baseline scenario has been demonstrated to be the continuation of the untreated disposal of the waste in the existing landfill site and the release of the biogas to the atmosphere. It has been demonstrated that there is not regulations in Indonesia requiring the LFG to be flared or the waste to be treated. The contract granting NOEI the right of exploiting the landfill does not require flaring or treating the waste either.

3.4 Additionality

The additionality of the project has been demonstrated applying the “Tool for demonstration and assessment of additionality”.

Step 0: Preliminary screening based on the starting date of the project

The project does not claim for CERs before the date of registration.

The project developer determined the project would be feasible only with CDM assistance during 2004, leading to talks and a formal contract between PT Navigat Organic Energy Indonesia and Mitsubishi UFJ Securities on 22 November 2004 (Mitsubishi Securities at the time). Relevant parts of this document have been made available to DNV during the validation. This also concluded in a new CDM methodology being proposed based on this project.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

Three scenarios were considered. Firstly, the continuation of the current practice of untreated disposal; secondly, the project activity without CDM and thirdly, installation of a landfill gas recovery system. While all three options will meet requirements of current laws and regulations, investment in the second and third option were deemed to be economically unjustified in lieu of prevailing practice and location of the project. This was confirmed during interviews with the Indonesian DNA and the Sanitation Management Authority (SARBAGITA).

Step 2 was chosen to demonstrate additionality since the project faces financial barriers to its implementation.

Step 2: Investment Analysis

A benchmark analysis is deemed the most appropriate analysis method. A benchmark IRR of 12.7% has been applied, this is the Indonesia's inter bank interest rate as published by the Ministry of Finance in April 2006. This benchmark index is considered appropriate as private project developer /investors face risks that require additional premium to be add to the return on investment.

The project's IRR has been demonstrated to be 2.53%, which shows the project is financially unattractive without the CDM incentive. Conservative values for the different variables have been selected e.g. a electricity tariff of EUR0.045/kWh, a load factor for electricity generation of 80% or the turnkey investment is forecasted from the contracts with providers. The calculations have been assessed and are considered correct.

A sensitivity analysis has been carried out, using scenarios that decrease the investments, lower the operating cost, increase the electricity tariff and increase the load factor. In the best scenario the IRR reaches 6.64%, which is still well below the benchmark rate.

Step 4: Common practice analysis:

It was confirmed during follow-up interviews with the developer, Indonesian DNA representative as well as SARBAGITA, the project will be the first of its kind in Indonesia. There are at present no regulations, nor is any foreseen in the near future, which will require waste management and treatment using the techniques proposed by this project activity or any landfill gas collection and destruction. Even simpler and less expensive technologies of landfill gas recovery and utilization have yet to be carried out on a large scale in the country.

Step 5: Impact of CDM registration:

The potential revenue from CERs, as a result of CDM, will increase the IRR of the project, making it more financially viable than the same project scenario without CDM discussed in step 2 above.

Taking into account the barriers faced by the project it has been demonstrated that the project is not a likely baseline scenario and thus, it is additional.

3.5 Monitoring Plan

The project correctly applies the following monitoring methodologies:

i) AM0025 / Version 05 for "Avoided emissions from organic waste through alternative waste treatment processes";
ii) ACM0001 /Version 04 for "Consolidated methodology for landfill gas project activities";
iii) AMS I.D / Version 09, for "Grid connected renewable electricity generation".

The applicability of the monitoring methodologies is found appropriate and their respective eligibility criteria are met, as given in 3.3 above.

The specified project GHG indicators (emissions from anaerobic digestion and emissions from gasification) are measurable. Landfill gas related parameters (captured, flared, combusted in power plant) will be measured by flowmeters and data aggregated monthly and yearly.

The calibration periodicities and the QA/QC proposed practices are in line with the methodologies. Project management planning related procedures are not in place as this is still a very early stage in the project. This includes calibration procedures, implementation of authority and responsibilities, day-to-day record handling, dealing with data adjustments etc. The correct implementation of such practices will have to be assessed during the verification phase.
Annual regulatory requirements, including noise and water quality parameters will be monitored by BAPEDAL as part of EIA (AMDAL) requirements. The Indonesian DNA does not require monitoring of sustainable development indicators.

3.6 Calculation of GHG Emissions

Baseline emissions are from methane produced in the landfill in the absence of waste treatment in the gasification and anaerobic digestion process, the landfill flaring and those related to the displacement of electricity generated using the biogas collected and exported to the grid by the project activity.

The methane produced in the landfill in the absence of the project activity has been calculated using the "Tool to determine methane emissions avoided from dumping waste at a solid waste disposal". Default values providing in the methodology or IPCC 2006 values are applied for the different variables. It has been demonstrated that there is not regulations in Indonesia requiring the LFG to be destroyed. NOEI is not required to flare LFG or to treat it as per the concession contract for the exploitation of the landfill site. Thus, MD_{reg} is justified to be zero.

For the landfill gas flaring component, the emissions reduction is proposed to be directly monitored as per the methodology ACM0001.

Baseline emissions due to the electricity component are calculated as the amount of electricity exported to the grid times an emission factor calculated as provided in the methodology AMS I.D. version 9. The methodology AMS I.D. calls for the calculation of the emission coefficient as

a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology ACM0002. The project is planned to export electricity to the Java-Bali grid. The operating margin emission factor (0.854 tCO_2/MWh) has been calculated and fixed ex-ante based on data provided by PLN (Indonesia state electricity company) for the years 2002, 2003 and 2004. The build margin is proposed to be calculated ex-post for the year in which actual project generation and associated emissions reductions occur. For the ex-ante estimation of emissions reduction the build margin is considered to be 0.854 tCO_2/MWh, which is conservative taking into account the generation mix of the Java-Bali Grid and the latest generation additions. The combined factor (0.854 tCO_2/MWh) was calculated as the weighted average (50/50) of the simple operating margin.and the build margin.

Project emissions are those from the anaerobic digestion process, the gasification process, the eventual use of fossil fuels and the eventual use of electricity (before electricity is produced on site). The emissions from the anaerobic digestion process are the methane emissions due to the physical leakage of the digester and the N_2O and CH_4 emissions from stacks of the digester. The emissions due to the gasification process are those form the fossil-based waste from the process and the emissions from the final stacks from the gasification. For the estimation of project emissions it is assumed that there is not any leakage from the digester (this is justified as per the provided technical documents). No fossil fuel waste is expected to be fed into the process, no fossil fuel is used, the N_2O presence is stack gas is zero (based on technical specifications) and a combustion efficiency of 99% for the methane is assumed. Thus, the ex-ante estimation of project emissions is 564.66 tCO_{2e}/year. Emissions due to electricity consumption taken from the grid will be monitored ex-post in addition to this.

Leakage is caused from the methane and nitrous oxide emissions from the residual waste for the anaerobic digestion and is ex-ante estimated on the average of 1296.07 tCO_{2e}/year. The project activity is located in the same landfill site where the waste is currently disposed and where it would have been disposed if the current practices continue, thus no leakage from transportation is expected to occur.

The estimated emissions reductions are foreseen to be on the average 123,423 tCO_2e per year during the first seven year crediting period. The estimation of emissions reduction and the calculations have been verified and are found to be conservative and correct.

3.7 Environmental Impacts

An environmental impact analysis or AMDAL was performed as required by the regulation 27/1999. The environmental impacts of the project have been addressed sufficiently. Impacts of the project on odour, waste pollution, groundwater, work opportunity for local community as well as fire-risks have been considered. Some of the standard requirements include leachate treatment and wastewater treatment plant facilities, environmental monitoring and socialisation (i.e. informing local community of activities undertaken at the site). An additional requirement, which was seen to be in progress, is to push back waste from the edges of the landfill site so as to clearly allow a boundary between the landfill and the mangroves.

The environmental authority, as part of the EIA requirement, will monitor in fixed intervals key parameters related to the impacts given above. If required, they will also follow-up any public complaints related to the project.

3.8 Comments by Local Stakeholders

A public consultation exercise as well as a door to door survey was performed, involving respondents from the local community. This included village/government officials and cultural leaders. A summary of the comments received have been provided and due account has been taken in the PDD. Issues raised by the community will be addressed as part of the mitigation plans as detailed in the Environmental Management Plan (*Rencana Pengelolaan Lingkungan*) which resulted from the AMDAL (EIA).

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD of 3rd November 2006 was made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 10-11-2006 to 09-12-2006.

No comments were received.

VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the "PT Navigat Organic Energy Indonesia Integrated Solid Waste Management (GALFAD)" project in Indonesia. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

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

The host country is Indonesia and the Annex I Party is Japan. Both countries fulfil the participation criteria of CDM. By promoting the recovery of energy from municipal solid waste, the project will likely contribute to sustainable development in Indonesia. Indonesia provided approval of voluntary participation on 8 December 2006 and confirmed the project contribution to the sustainable development of the country. Japan provided approval on 25 January 2007.

The project applies AM0025 version 05 (Avoided emissions from organic waste through alternative waste treatment processes) and ACM 0001 version 04 (Consolidated baseline methodology for landfill gas project activities). It is eligible to use both methodologies as the project involves a combination of anaerobic digestion with biogas collection and flaring, and pyrolysis gasification. The residual is then aerobically composted and returned to the landfill. The project also applies AMS-I.D version 09 (Grid connected renewable electricity generation) as there will be electricity generation from biogas captured from the anaerobic digester and synthetic gas generated from the pyrolysis gasification process. Emission reductions will be claimed here for displacing energy generation from other sources.

The additionality of the project is demonstrated through the existence of investment and prevailing practice barriers. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The estimated emissions reductions are projected to be on the average 123,423 tCO_2e per year during the first seven year crediting period. Given that the project is implemented as designed and applies the approved baseline and monitoring methodologies, the project is likely to achieve the estimated amount of emission reductions.

In summary, it is DNV's opinion that the "PT Navigat Organic Energy Indonesia Integrated Solid Waste Management (GALFAD)" project in Indonesia, as described in the project design document, version 3.1, of 2 February 2007, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodologies AM0025 version 05, ACM0001 version 04 and AMS-I.D. version 09. DNV thus requests the registration of the project as a CDM project.

REFERENCES

Documents provided by the project proponent that relate directly to the project:

/1/ PT Navigat Organic Energy Indonesia Integrated Solid Waste Management (GALFAD) Project PDD, Version 3.1, 2 February 2007

/2/ LoA from Indonesia dated 8 December 2006

LoA from Japan dated 25 January 2007

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

/3/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. http://www.vvmanual.info

/4/ AM0025 Version 05

/5/ AMS Type I.D Version 09

/6/ ACM0001 Version 04

/7/ Contract Agreement between PT Navigat Organic Energy Indonesia and SARBAGITA, witnessed by the Governor of Bali, dated 2 April 2004 ('Kontrak Kerjasama').

/8/ Emissions calculations

NOEI Projection 26Jan 2007.xls

/9/ Precipitation and temperature data sourced from Balai Besar Meteorologi dan Geofisika Wilaya III Denpasar

iklimbali.xls

/10/ Financial analysis

IRR2.xls

Persons interviewed during the validation, or persons who contributed with other information that are not included in the documents listed above:

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APPENDIX A

CDM VALIDATION PROTOCOL

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

Requirement	Reference	Conclusion	Cross Reference / Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art.12.2	OK Japan provided approval on 25 January 2007	Table 2, Section E.4.1
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	OK This was confirmed in the LoA from Indonesia of 8 December 2006	Table 2, Section A.3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art.12.2.	OK The LoA from Indonesia was granted on 8 December 2006	Table 2, Section E.4.1
4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	The LoA from Japan was granted on 25 January 2007.. The LoA from Indonesia was granted on 8 December 2006	Table 2, Sections A.3.1 and A.3.2
5. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	It is confirmed that the estimated emissions reductions will be real, measurable and give long term benefits related to the mitigation of climate change.	Ok.
6. Reduction in GHG emissions shall 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, CDM Modalities and Procedures §43	Emissions reduction as a result of the project will be additional to those that would occur without the project.	Ok.

Requirement	Reference	Conclusion	Cross Reference / Comment
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	The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Indonesia.	OK.
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures §29	The Indonesian DNA is the National Commission on CDM (KOMNAS MPB). The Japanese DNA is The Liaison Committee for the Utilization of the Kyoto Mechanisms.	Ok
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities §30/31a	Japan is a Party to the Kyoto Protocol and ratified it on 4th June 2002. Indonesia is a Party to the Kyoto Protocol and ratified it on 03 December 2004.	Ok
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	Japan's assigned amount is 94% of the emission in 1990.	Ok
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	Japan has in place a national system for estimating GHG emissions and submits its inventory to the UNFCCC.	Ok
12. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received	CDM Modalities and Procedures §37b	Stakeholder consultation has been carried out as required by law of Host Party country, issues summarised and addressed accordingly.	Table 2, Section G
13. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are	CDM Modalities and Procedures §37c	Environmental impacts have been analysed and appropriate mitigation measures identified, as per Host Party	Table 2, Section F

Requirement	Reference	Conclusion	Cross Reference / Comment
considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.		requirements.	
14. Baseline and monitoring methodology shall be previously approved by the CDM Executive Board	CDM Modalities and Procedures §37e	Monitoring methodologies applied in this project (AM0025 Version 03, ACM0001 Version 03 and AMS I.D Version 08) are the latest versions approved at the time of PDD.	Table 2, Section B.1.1 and D.1.1
15. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP	CDM Modalities and Procedures §37f	Project management planning procedures have not been formally developed but quality assurance and quality control procedures planned are as per requirement of the respective monitoring methodologies.	Table 2, Section D
16. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available	CDM Modalities and Procedures §40	The project was open for stakeholder comments from 12 July to 10 August 2006.	
17. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances	CDM Modalities and Procedures §45c,d	OK	Table 2, Section B.2
18. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure	CDM Modalities and Procedures §47	Baseline methodology limits itself to emissions reductions within defined project boundary.	Table 2, Section B.2
19. The project design document shall be in conformance with the UNFCCC CDM-PDD format	CDM Modalities and Procedures Appendix B, EB	PDD of 2 February 2007 uses UNFCCC CDM-PDD format Version 03.1..	Ok

Requirement	Reference	Conclusion	Cross Reference / Comment
	Decision		

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A. General Description of Project Activity *The project design is assessed.*					
A.1. Project Boundaries *Project Boundaries are the limits and borders defining the GHG emission reduction project.*					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR	Yes, this is confirmed from site visit. They match drawings produced. The project is located at TPA Suwung Landfill, approximately 10km outside of Denpasar, the capital of Bali, The landfill site occupies approximately 24ha. The landfill itself is located on reclaimed tidal land and is part of protected forest area called "Tahura". 10ha of this area has been assigned for use as a disposal site for municipal solid waste.		Ok
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/	DR	Yes, this is clearly defined in the PDD. The system boundary comprises of a waste separation area using rotary screens and manual sorting, a pyrolysis gasification process, a landfill gas recovery wells, piping and gas delivery unit, an anaerobic digester and engines to generate electricity.		Ok

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A.2. Technology to be employed *Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.*					
A.2.1. Does the project design engineering reflect current good practices?	/1/	DR I	It is best practice, first time in Indonesia that the GALFAD technology is being implemented. This was also confirmed by the Indonesian DNA.		OK
A.2.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/	DR I	Yes, current practice is basically open dumping of waste in landfill sites, allowing methane to be released to atmosphere. The project technology represents significant improvement over this practice.		OK
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1/	DR	There is the possibility that certain components of the project (such as the pyrolisis process and anaerobic digester) could see improvements being introduced into the market.		OK
A.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	/1/	DR	Experienced local boilermen from industry or ship-related working experience are to be recruited. Basic training is to be provided with regards to equipment operation and maintenance.		OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/	DR I	Equipment supplier is contracted to provide training on operation and maintenance, Details of implementation plan are not in place as yet but it will be possible to verify these during verification of this project in the		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			future. All relevant training manuals and records shall be made available.		
A.3. Contribution to Sustainable Development *The project's contribution to sustainable development is assessed.*					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	/1/	DR I	This was confirmed during interview with Indonesian DNA as well as SARBAGITA, the local authority in charge of waste management in Denpasar. Formal evidence in the form of a LoA needs to be provided.		**CAR 1**
A.3.2. Is the project in line with host-country specific CDM requirements?	/1/	DR I	It was determined that the project is in line with Indonesia's specific CDM requirements but formal confirmation is pending.	CAR 1	
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR I	The project was found to meet Indonesia's sustainable development policies, addressing a need for improved waste management practices to meet increasing amounts of municipal solid waste generated from cities and municipalities in Indonesia.		
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	Anticipated benefits include a more systematic and sanitary management of municipal waste. This has been confirmed by DNA as well as local authority on Bali, SARBAGITA.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
B. Project Baseline *The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.*					
B.1. Baseline Methodology *It is assessed whether the project applies an appropriate baseline methodology.*					
B.1.1. Is the baseline methodology previously approved by the CDM Executive Board?	/1/	DR	Yes, project employs following methodologies, ACM 0001 (Version 03, 19 May 2006), AM0025 (Version 03, 3 March 2006) and AMS I.D (Version 08, 3 March 2006)		OK
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/1/	DR I	Yes, this is justified and confirmed by the site visit. Baseline methodology applicability and appropriateness is justified in the PDD. AM0025 is deemed applicable as : i) project will involve a combination of anaerobic digestion with biogas collection and flaring as well as pyrolysis gasification; ii) residual waste from anaerobic digestion process will be aerobically composted; iii) residual waste from the pyrolysis gasification process will be returned to landfill; iv) proportion and characteristics of different types of organic waste processed in project activity can be determined for use in the multiphase landfill gas generation model;		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			v) project will include electricity generation from biogas captured from anaerobic digester and synthetic gas generated from the pyrolysis gasification process. ACM 0001 is deemed applicable for the landfill gas recovery component of the project, as the: i) captured gas will be flared (excess); ii)captured gas will be used to produce energy (e.g. electrical/thermal) and emission reductions are claimed for displacing or avoiding energy generation from other sources. The project will eventually have a 9.6MW electricity generation capacity, falling within the 15MW threshold to be eligible for the small scale methodology AMS I.D.		
B.2. Baseline Determination *The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.*					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	/1/	DR I	Applicability of methodologies and determination of chosen baseline is transparently discussed in PDD.		
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/	DR	Yes. This is deemed conservative and appropriate.		OK
B.2.3. Has the baseline been established on a project-specific basis?	/1/	DR	Yes, baseline was specifically established for this NOEI Galfad project.		Ok
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral	/1/	DR	This was confirmed to be appropriate during interviews with the DNA, SARBAGITA and		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
policies, macro-economic trends and political aspirations?			project proponent.		
B.2.5. Is the baseline determination compatible with the available data?	/1/	DR	Baseline scenario determination is done utilising the Tool for Demonstration and Assessment of Additionality, It is compatible with available data.		OK
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/	DR	As above Yes, it was confirmed with authorities that dumping of municipal waste and allowing methane to escape to the air was common practice. This is the most likely baseline scenario.		OK
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario?	/1/	DR	Yes, the project's additionality has been demonstrated through the tool for demonstration and assessment of additionality: Step 0: A formal contract between PT Navigat Organic Energy Indonesia and Mitsubishi UFJ Securities on 22 November 2004 (Mitsubishi Securities at the time) has been signed. Relevant parts of this document have been made available to DNV. Step 1: Identification of alternatives to the project activity: Three scenarios were considered and all three options meet requirements of current laws and regulations, investment in the second and third option were deemed to be economically unjustified in lieu of prevailing practice and location of the project. This		Ok

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			was confirmed during interviews with the Indonesian DNA and the Sanitation Management Authority (SARBAGITA). Step 2 (Investment analysis) was chosen to demonstrate additionality since the project faces financial barriers to its implementation. A benchmark analysis is deemed the most appropriate analysis method. While the project developer /investors face unique risks that are uncommon in relation to current practice (e.g. this is a private commercial project as opposed to a government funded project; this project proposes a technology that is probably the first of its kind in Indonesia), a conservative figure is applied in the benchmark analysis, based on the Bank of Indonesia published inter-bank interest rate of 12.7%. This figure is deemed more conservative as the risks faced by this particular project would likely result in a higher benchmark IRR. A project IRR of 2.53% is attained from the calculations, showing that the project is financially unattractive without incentive from CDM. Sensitivity analysis is also done, using scenarios with lower EPC cost, lower operating cost, increased electricity tariff and load factors, arriving at the same conclusion, that the project remains financially unattractive.		

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			Step 4: Common practice analysis: It was confirmed during follow-up interviews that the project will be the first of its kind in Indonesia. There are at present no regulations, nor is any foreseen in the near future, which will require landfill gas collection and destruction. Step 5: Impact of CDM registration: The potential revenue from CERs, as a result of CDM, will increase the IRR of the project, making it more financially viable and hence overcome the barriers. Thus it is acceptable that this project activity is additional to what would occur under current practice without the incentive from CDM.		
B.2.8. Have the major risks to the baseline been identified?	/1/	DR	Yes, this has been done by reviewing local conditions. There are no requirements nor are there any anticipated in near future requiring capture of landfill gas.		Ok
B.2.9. Is all literature and sources clearly referenced?	/1/	DR	Yes, following site audit, clarification were made to ensure consistency in data given in PDD, including Tables 13 and 16 in Section E.		Ok
C. Duration of the Project/ Crediting Period *It is assessed whether the temporary boundaries of the project are clearly defined.*					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	/1/	DR	The construction start date as well as the start of the 1st crediting period is required to be finalized. This information is now given	~~CL1~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			in Table 3. Operational lifetime of 21 years given is reasonable as this is the normal lifetime given for similar equipments as stated by the equipment supplier.		
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/1/	DR	Yes, a renewable crediting period of 7 years is defined. The project's operational lifetime is expected to last for 21 years.		Ok
D. Monitoring Plan *The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed ((Blue text contains requirements to be assessed for optional review of monitoring methodology prior to submission and approval by CDM EB).*					
D.1. Monitoring Methodology *It is assessed whether the project applies an appropriate baseline methodology.*					
D.1.1. Is the monitoring methodology previously approved by the CDM Executive Board?	/1/	DR	Yes, The project correctly applies the following monitoring methodologies: ▪ AM0025 / Version 05 for "Avoided emissions from organic waste through alternative waste treatment processes" ▪ ACM0001 /Version 04 for "Consolidated methodology for landfill gas project activities"; ▪ AMS I.D / Version 09, for "Grid connected renewable electricity		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			generation".		
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1/	DRI	Yes, monitoring methodologies are applicable to this project and appropriateness is justified in the PDD. AM0025 is deemed applicable as : i) project will involve a combination of anerobic digestion with biogas collection and flaring as well as pyrolysis gasification; ii) residual waste from anaerobic digestion process will be aerobically composted; iii) residual waste from the pyrolysis gasification process will be returned to landfill; iv) proportion and characteristics of different types of organic waste processed in project activity can be determined for use in the multiphase landfill gas generation model; v) project will include electricity generation from biogas captured from anaerobic digester and synthetic gas generated from the pyrolysis gasification process. ACM 0001 is deemed applicable for the landfill gas recovery component of the project, as the: i) captured gas will be flared (excess); ii)captured gas will be used to produce energy (e.g. electrical/thermal) and emission reductions are claimed for displacing or avoiding energy generation from other sources.		Ok

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			The project will eventually have a 9.6MW electricity generation capacity, falling within the 15MW threshold to be eligible for the small scale methodology AMS I.D.		
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	/1/	DR	Yes, the proposed monitoring methodology reflects current good monitoring and reporting practices.		Ok
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	/1/	DR	Yes, two options are discussed – Option 1 Monitoring of the emissions in the project scenario and baseline scenario whereby monitoring emissions from on-site fuel usage, emissions from stack gas, baseline emissions from waste decay and baseline emissions from electricity displacement are discussed; Option 2 relates to direct monitoring of emissions reductions from the project activity whereby monitoring methane emissions from residual waste is discussed.		Ok
D.2. Monitoring of Project Emissions *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR	Parameters to be measured, calculated or estimated are given in the PDD. These include the following: Total quantity of waste diverted from landfill (A_x) Composition of waste treated ($P_{j,x}$); Methane Fraction in Landfill gas (F); Electricity generated using biogas/syngas exported to the grid (EG_d);		Ok

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			Electricity supplied to the grid (EG_y); Total amount of landfill gas captured ($LFG_{total,y}$).		
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR (I)	Project GHG indicators are according to the respective monitoring methodologies applied in the project.		Ok
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/	DR	The specified project GHG indicators (emissions from anaerobic digestion and emissions from gasification) are measurable. Landfill gas related parameters (captured, flared, combusted in power plant) will be measured by flowmeter and data aggregated monthly and yearly.		
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/1/	DR	Yes, real measurements of project emissions can be calculated by data measured with the flowmeter as well as other indicators such as temperature and pressure of landfill gas.		Ok
D.2.5. Will the indicators enable comparison of project data and performance over time?	/1/	DR	Yes, this can be done over time.		Ok
D.3. Monitoring of Leakage *It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.*					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	Section D.2.3.1 discusses variables related to leakage that will be monitored. This covers all relevant sources of leakage for the project.		Ok
D.3.2. Are the choices of leakage indicators reasonable?	/1/	DR	Yes, choices of leakage indicators are reasonable.		Ok
D.3.3. Will it be possible to monitor / measure the	/1/	DR	Leakage from transportation of compost is deemed negligible as compost transport is	~~CL 2~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
specified leakage indicators?			already a part of current operations. The PDD states that the anaerobic digester is designed to prevent leakages and as such no leakage is expected. During site interview, it was difficult to confirm this from the evidence presented. Further information is required to validate this statement. This has been responded to in Table 3.		
D.3.4. Will the indicators give opportunity for real measurements of leakage effects?	/1/	DR (I)	Pending, D.3.3	~~CL 2~~	**OK**
D.4. Monitoring of Baseline Emissions *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/	DR (I)	It was determined during site visit that the planned data collection and archiving is as per as per requirements of the respective methodologies - ACM 0001 (Version 03, 19 May 2006), AM0025 (Version 03, 3 March 2006) and AMS I.D (Version 08, 3 March 2006).		Ok
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR (I)	Yes the indicators are reasonable. These include emissions from waste decomposition and emissions from fossil-based grid electricity generation.		Ok
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/	DR (I)	Yes, measuring the specified baseline and project emission sources can be done.		Ok
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?			As given in PDD, B.4, the indicators will enable real measurements of baseline emissions.		Ok

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts *It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.*					
D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR (I)	Site audit confirmed that the environmental indicators will be monitored periodically by the environmental authorities. The authorities will look at social and economic indicators as and when required (e.g. if public complaints are made).		OK
D.5.2. Is the choice of indicators for sustainability development (social, environmental, economic) reasonable?	/1/	DR	The sustainable development indicators are reasonable and cover the requirements of the DNA and regulatory requirements.		Ok
D.5.3. Will it be possible to monitor the specified sustainable development indicators?	/1/	DR	Yes, monitoring specified criteria will be possible based on criteria set by environmental authorities.		Ok
D.5.4. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/	DR	This was confirmed to be so at the interview with the Indonesian DNA.		Ok
D.6. Project Management Planning *It is checked that project implementation is properly prepared for and that critical arrangements are addressed.*					
D.6.1. Is the authority and responsibility of project management clearly described?	/1/	DR	It was determined during site visit that with regards to project management planning, details for a formal structure involving key responsibilities has yet to be developed. However in the PDD Section D.3, indicates quality control and quality	~~CL 3~~	**OK**

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			assurance procedures will be implemented as required by the respective monitoring methodologies (e.g. maintenance and calibration of equipment will be according to recognised international standards, maintenance and calibration of meters will be the same.) This has been responded to in Table 3.		
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/	DR	A formal description of authority and responsibility is not in place as yet.		Ok
D.6.3. Are procedures identified for training of monitoring personnel?	/1/	DR	Formal procedures for training of monitoring personnel is not in place as yet. This is expected to be provided by the equipment supplier as part of the contract. Records of training and manuals will be available during verification.		OK
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	Safety features are a part of the design drawings for the project facilities but formal procedures are not in place as yet. This information will be available during verification.		OK
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR	Formal procedures for calibration of monitoring equipment are not in place as yet. However, this will be in place before project implementation and needs to be confirmed during verification.		Ok
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR	This information is expected to be provided by the equipment supplier at the time of installation. Formal procedures for maintenance of monitoring equipment and installations are not in place as yet.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR	Formal procedures for monitoring, measurements and reporting are not in place as yet but are expected to be available during verification.		OK
D.6.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR	Formal procedures for day-to-day records handling are not in place as yet but will in place once operations commence.		OK
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR	Formal procedures for dealing with possible monitoring data adjustments and uncertainties are not in place as yet but will be demonstrable during verification.		OK
D.6.10. Are procedures identified for review of reported results/data?	/1/	DR	Procedures for reviewing reported results/data are not formalised as yet.. This will be in place upon project commencement		OK
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/	DR	Procedures for internal audits of GHG project compliance with operational requirements are not formalised as but will be demonstrable during verification.		OK
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1/	DR	At present, there are no formal procedures identified for project performance reviews before data is submitted for verification. This will be demonstrable during verification how management conducts such reviews.		OK
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	Formal procedures for corrective actions to provide for more accurate future monitoring and reporting are at present not in place. This is also expected to be verifiable in the future upon project commencement.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
E. Calculation of GHG Emissions by Source *It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.*					
E.1. Project GHG Emissions *The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.*					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	/1/	DR I	Yes, the PDD addresses these aspects in Section E.1, including emissions from anaerobic digestion (physical leakage, stack gas emissions/biogas excess flare) and emissions from gasification (auxiliary fossil fuel, stack gas emissions).		Ok
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	Yes, calculations are transparently documented. A critical factor used in the estimation of the project emissions is use of the state electricity company's (PLN) data from 2002-2004 to calculate the Java-Bali electrical grid emission factor. This was deemed conservative and appropriate.		OK
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	/1/	DR	Conservative assumptions have been used, within methodology requirements as per E.1.4 below.		Ok
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/1/	DR	Uncertainties in GHG emissions estimates are adequately addressed in Section E.1 of PDD. Two main areas are emissions from anaerobic digestion and emissions from gasification.		Ok

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			For the former, physical leakage from anaerobic digester is expected not to occur due to the design of the digester itself. N_2O and CH_4 emissions in the biogas is expected to be minor but will be monitored. For the latter (emissions from gasification), any auxiliary fossil fuel use will be monitored. Any N_2O and CH_4 emissions from stack gas emissions are expected to be minor but will be monitored anyway.		
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A been evaluated?	/1/	DR	Yes, the relevant greenhouse gases (CO_2, CH_4, N_2O) and sources are addressed in Section B.4 of the PDD.		Ok
E.2. Leakage *It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed and estimated ex-ante.*					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/	DR	It was determined during site visit that potential leakage (e.g. emissions from increased transportation activities, emissions from residual waste from anaerobic digestion and gasification process) are properly identified. Emissions from increased transportation is not expected to increase due to project activity as compost transport is already ongoing as part of current operations. N_2O & CH_4 emissions from residual waste		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			are estimated and included in emissions reductions calculations in PDD.		
E.2.2. Have these leakage effects been properly accounted for in calculations?	/1/	DR	Leakage effects are included in the calculation of project emissions and in estimating emissions reductions in Section E of the PDD.		OK
E.2.3. Does the methodology for calculating leakage comply with existing good practice?	/1/	DR	Leakage calculation complies with methodology AM0025 accordingly.		OK
E.2.4. Are the calculations documented in a complete and transparent manner?	/1/	DR	As above		OK
E.2.5. Have conservative assumptions been used when calculating leakage?	/1/	DR	As per E.2.1, this has been done conservatively.		OK
E.2.6. Are uncertainties in the leakage estimates properly addressed?	/1/	DR	Uncertainties in leakage estimates are properly addressed in E.2. The AM0025 default emission factor of 0.043 kg N_2O per tonne of compost is used. Dry matter content of compost is taken as 65%, the maximum allowable as per the same methodology. The fraction of residual compost material that behaves anaerobically is conservatively assumed to be 5% by compared to a 2% figure used in Project 0169 Composting of Organic Waste in Dhaka.		OK
E.3. Baseline Emissions *The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.*					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	/1/	DR (I)	It is determined from interview with project proponents and design drawings as well as site visit that this has been done		Ok

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			accordingly.		
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1/	DR	Boundaries are clearly defined and cover all relevant sources for baseline emissions.		Ok
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	Yes, this is done so in Section E of the PDD.		Ok
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1/	DR	The estimation of the baseline emissions have been projected in the PDD by using of the state electricity company's (PLN) data from 2002-2004 to calculate the Java-Bali electrical grid emission factor. This figure is acceptable to the Indonesia DNA.		Ok
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	/1/	DR	Yes, uncertainties are adequately addressed with explanations of factors used given.		Ok
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?	/1/	DR	Appropriate methodologies and conservative assumptions have been used in determining baseline and project emissions.		Ok
E.4. Emission Reductions *Validation of ex-ante estimated emission reductions*.					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	/1/	DR	The project emissions and associated leakage emissions are estimated to be 13,025 tCO_2e for the first crediting period. Total estimated emissions reductions over the first crediting period is 863,962 tCO_2e.		Ok

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
F. Environmental Impacts *Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.*					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/		The interview with Indonesian DNA and SARBAGITA showed that environmental impacts of the project have been adequately identified and addressed. As required by law, an AMDAL (EIA) was carried out, resulting in an environmental management plan to mitigate negative impacts identified.		OK
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/	DR	As required by Host Party regulations, an EIA was conducted and accepted by the authority.		Ok
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	From the interview with project proponent and SARBAGITA, no adverse impacts are foreseen from the project activities. Mitigation actions from the environmental management plan are being put in place and will be periodically monitored by the authorities. These include cleanup of mangroves and greening (buffering) mangroves.		Ok
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	Yes, these have been considered in the EIA, particularly as the project site is within a conservation area.		Ok
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	Yes, as per F.1.1. Site audit determined that mitigation actions requested by authority (the clearly demarcate between boundary of landfill site and conservation site) are underway.		Ok

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
F.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	Yes, project meets host country environmental legislation requirements. This was confirmed during interview with the DNA and SARBAGITA. The AMDAL (EIA) requires monitoring for environmental parameters. There will be 6 monthly monitoring of water quality, air quality, noise as well as from time to time, monitoring of community perception and work opportunity. Standard requirements of the authority include leachate treatment system, clear segregation between boundary of landfill and the mangroves. The local building authority approval has been sought. Operation of the landfill requires a license from Wali Kota of Denpasar, which is in place.		Ok
G. Stakeholder Comments *The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.*					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR	Yes, it was confirmed with SARBAGITA and DNA that all relevant stakeholders were consulted regarding this project.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	It is confirmed that public consultation and door-to-door surveys were used in gathering comments from stakeholders.		OK
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the	/1/	DR	Yes, the consultation process was carried out according to local requirements. This		Ok

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
stakeholder consultation process been carried out in accordance with such regulations/laws?			was confirmed during interview with DNA and SARBAGITA.		
G.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR	Yes, summary of stakeholder comments is in section G of PDD. During site audit, minutes of stakeholder meeting as well as attendance lists were made available.		Ok
G.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	Yes, all comments have been answered and SARBAGITA, as the local authority, is in touch with project proponent regularly in ensuring stakeholders needs are adequately addressed. These needs currently are for the project to be operational so that environmental mitigation measures arising from the EIA will be implemented as well the offer of work opportunities, both of which will be beneficial to the local community.		Ok

x

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
CAR 1: Letter of Approval is pending from the Indonesian and Japanese DNAs.	A.3.1		Pending
CL 1: The construction start date as well as the start of the 1st crediting period is required to be finalized in PDD. Further information is required to validate this statement	E.3.4	The construction start date will be 1st November 2006. First crediting period will commence 1st May 2007.	OK the clarification request has now been closed. This is satisfactory.
CL 2: The PDD states that the anaerobic digester is designed to prevent leakages and as such no leakage is expected. During site interview, it was difficult to confirm this from the evidence available.	D.3.4	Project participants will be able to periodically measure leakage. NOEI will carry this out and maintain such results of said sampling as required.	OK The clarification request has now been closed. This is adequate given that for a newly built anaerobic digester, such leakage is of low likellihood .
CL 3: For project management planning, details for a formal structure involving key responsibilities has yet to be developed.	D.6.1	Project participants now have available a chart, which indicates the site operators reporting to the site manager/on-site CDM manager, The line of authority links to NOEI HQ. This will be the basic chain of communications as well as key responsibilities.	OK The clarification request has now been closed. This is satisfactory. Periodic verifications in future will be able to confirm the adequacy of project management planning.

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CERTIFICATE OF COMPETENCE

Einar Telnes

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

GHG Auditor:	Yes		
CDM Validator:	Yes	***JI Validator:***	Yes
CDM Verifier:	Yes	***JI Verifier:***	Yes
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 1,2,3,6 & 10		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	*AM0021*	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	Yes	*AM0023*	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	*AM0024*	Yes
ACM0004	Yes	*AM0027*	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	*AM0028, AM0034*	Yes
ACM0007	Yes	*AM0030*	Yes
ACM0008	Yes	*AM0031*	Yes
ACM0009, AM0008, AMS-III.B	Yes	*AM0032*	Yes
AM0006, AM0016, AMS-III.D	Yes	*AM0035*	Yes
AM0009, AM0037	Yes	*AM0038*	Yes
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	Yes	*AM0041*	Yes
AM0014	Yes	*AM0034*	Yes
AM0017	Yes	*AMS-II.A-F*	Yes
AM0018	Yes	*AMS-III.A*	Yes
AM0020	Yes	*AMS-III.E, AMS-III.F*	Yes

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director

CERTIFICATE OF COMPETENCE

Michael Lehmann

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

GHG Auditor: Shuyong Sun	Yes		
CDM Validator: Xin Wang	Yes	***JI Validator:***	Yes
CDM Verifier: Wilson Tang	Yes	***JI Verifier:***	Yes
Industry Sector Expert for Sectoral Scope(1): Michael Lehmann	Sectoral scope 1,2,3 & 9		
Technical Reviewer for (group of) methodologies: Wilson Tang			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	*AM0021*	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	Yes	*AM0023*	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	*AM0024*	Yes
ACM0004	Yes	*AM0027*	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	*AM0028, AM0034*	Yes
ACM0007	Yes	*AM0030*	Yes
ACM0008	Yes	*AM0031*	Yes
ACM0009, AM0008, AMS-III.B	Yes	*AM0032*	Yes
AM0006, AM0016, AMS-III.D	Yes	*AM0035*	Yes
AM0009, AM0037	Yes	*AM0038*	Yes
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	Yes	*AM0041*	Yes
AM0014	Yes	*AM0034*	Yes
AM0017	Yes	*AMS-II.A-F*	Yes
AM0018	Yes	*AMS-III.A*	Yes
AM0020	Yes	*AMS-III.E, AMS-III.F*	Yes

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director

CERTIFICATE OF COMPETENCE

Miguel Rescalvo

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

GHG Auditor:	Yes		
CDM Validator:	Yes	***JI Validator:***	--
CDM Verifier:	--	***JI Verifier:***	--
Industry Sector Expert for Sectoral Scope(s):			
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	--	*AM0021*	--
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	--	*AM0023*	--
ACM003, ACM0005, AM0033, AM0040	--	*AM0024*	--
ACM0004	--	*AM0027*	--
ACM0006, AM0007, AM0015, AM0036, AM0042	--	*AM0028, AM0034*	--
ACM0007	--	*AM0030*	--
ACM0008	--	*AM0031*	--
ACM0009, AM0008, AMS-III.B	--	*AM0032*	--
AM0006, AM0016, AMS-III.D	--	*AM0035*	--
AM0009, AM0037	--	*AM0038*	--
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	--	*AM0041*	--
AM0014	--	*AM0034*	--
AM0017	--	*AMS-II.A-F*	--
AM0018	--	*AMS-III.A*	--
AM0020	--	*AMS-III.E, AMS-III.F*	--

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director

CERTIFICATE OF COMPETENCE

Ramesh Ramachandran

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

GHG Auditor:	Yes		
CDM Validator:	Yes	***JI Validator:***	--
CDM Verifier:	Yes	***JI Verifier:***	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 13 (wastewater)		

Høvik, 6 November 2006

Einar Telnes Michael Lehmann
Director, International Climate Change Servicer *Technical Director*

Thivakaran Narayanan

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

GHG Auditor:	Yes		
CDM Validator:	Yes	***JI Validator:***	--
CDM Verifier:	--	***JI Verifier:***	--
Industry Sector Expert for Sectoral Scope(s):	--		

Høvik, 6 November 2006

Einar Telnes Michael Lehmann
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CERTIFICATE OF COMPETENCE

Filipe Tavares

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

GHG Auditor:	Yes		
CDM Validator:	Yes	***JI Validator:***	--
CDM Verifier:	Yes	***JI Verifier:***	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 9 & 13		

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Servicer

Michael Lehmann
Technical Director

Anu Chaudhary

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

GHG Auditor:	Yes		
CDM Validator:	Yes	***JI Validator:***	--
CDM Verifier:	--	***JI Verifier:***	--
Industry Sector Expert for Sectoral Scope(s):	--		

Høvik, 6 November 2006

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