



RINA

# VALIDATION REPORT

**Final**


“Ayer Hitam landfill gas recovery project”  
in  
Malaysia

Report N°2011-MU-05-MD

Revision N°1.2




# VALIDATION REPORT

<b>Project Title:</b> Ayer Hitam landfill gas recovery project		<b>Country:</b> Malaysia	<b>Estimated CERs (tCO<sub>2</sub>e):</b> 54,556 annual average	
<b>Client:</b> Abyl Carbon		<b>Client contact:</b> Ms. Anne Sophie Zirah		
<b>Report No.:</b> 2011-MU-05-MD		<b>Revision:</b> 1.2	<b>Date of this report:</b> 11/02/2012	
<b>Approved by (Final Report – DCI Director approval):</b>  Roberto Cavanna			<b>Date of approval:</b> 15/02/2012	
<b>Methodology</b>				
<b>Number:</b> ACM0001	<b>Version:</b> 11 of 28/05/2009	<b>Title:</b> Consolidated baseline and monitoring methodology for landfill gas project activities	<b>Scale</b> Large	<b>SS(s):</b> 13

RINA Services S.p.A. (RINA), commissioned by Abyl Carbon, has performed the validation of the project activity "Ayer Hitam landfill gas recovery project" in Malaysia, with regard to the relevant requirements for CDM activities.

In conclusion, it is RINA's opinion that the project activity "Ayer Hitam landfill gas recovery project", in "Malaysia", as described in the PDD version 08 of 31/01/2012, meets all relevant requirements for CDM activities and all relevant host Party criteria and correctly applies the baseline and monitoring methodology "ACM0001", "Consolidated baseline and monitoring methodology for landfill gas project activities", version 11 of 28/05/2010. Hence RINA requests the registration of the project as a CDM project activity.

<b>Work carried out by:</b> Cyril Augustus Arokiasamy Rekha Menon, Nisha Raghavan	<input checked="" type="checkbox"/> No distribution without permission from the Client or organizational unit responsible <input type="checkbox"/> Strictly confidential <input type="checkbox"/> Unrestricted distribution
<b>Work verified by (Final Report – CRT person responsible approval)</b>  Paolo Teramo	<b>Keywords:</b> Climate Change, Kyoto Protocol, Clean Development Mechanism, Validation

# VALIDATION REPORT

## Abbreviations

AHSL	Ayer Hitam Sanitary Landfill
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM M&P	Modalities and Procedures CDM
CER(s)	Certified Emission Reduction(s)
CH <sub>4</sub>	Methane
CL	Clarification Request
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
CRT	Coordination and Technical Control Staff
DANIDA	Danish International Development Assistance
DCI	Certification Division of RINA Services Spa
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
Ecair	Ecair Holdings BV
EIA	Environmental Impact assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
JLSB	Jana Landfill Sdn Bhd
LoA	Letter of Approval
MEWC	Ministry of Energy, Water and Communications
MoV	Means of Verification
MP	Monitoring Plan
MR	Monitoring Report
NGO	Non-governmental Organization
ODA	Official Development Assistance
PDD	Project Design Document
PE	Project Emission
PP(s)	Project Participant(s)
PTM	Pusat Tenaga Malaysia (Malaysia Energy Center)
Ref.	Document Reference
RINA	RINA Services Spa
RM	Malaysian Ringgits
SEDA	Sustainable Energy Development Authority, Malaysia
SS(s)	Sectoral Scope(s)
TNB	Tenaga Nasional Berhad – State Electric Utility Company
TNB ES	TNB Energy Services Sdn Bhd – 100% subsidiary of TNB

## **VALIDATION REPORT**

UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual
WLSB	Worldwide Landfills Sdn Bhd

# VALIDATION REPORT

<b>Table of Contents</b>		<b>Page</b>
1	INTRODUCTION .....	6
1.1	Objective	6
1.2	Scope	6
2	METHODOLOGY .....	6
2.1	Document Review	6
2.2	Follow-up actions	10
2.3	Resolution of outstanding issues	11
2.4	Internal quality control	15
2.5	Validation team and the technical reviewer(s)	13
3	VALIDATION FINDINGS .....	13
3.1	Approval and Participation	13
3.2	Project design document	15
3.3	Project Design	15
3.4	Application of selected baseline and monitoring methodology	17
3.5	Project boundary and baseline identification.	17
3.6	Additionality	20
3.7	Monitoring Plan	32
3.8	Estimation of GHG emissions	36
3.9	Environmental Impacts	39
3.10	Local stakeholders consultation	39
4	COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS.....	39
5	VALIDATION OPINION .....	40

Appendix A: Validation Protocol

# VALIDATION REPORT

## 1 INTRODUCTION

Abyl Carbon has commissioned RINA to carry out the validation of the “Ayer Hitam landfill gas recovery project” in Malaysia.

This report summarizes the findings of the validation of the project, performed on the basis of UNFCCC criteria for CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting.

### 1.1 Objective

The objective of the Validation is to have an independent evaluation of a project activity by a designated operational entity against the requirements of the CDM as set out in decision 3/CMP.1, its annex and relevant decisions of the COP/MOP, on the basis of the project design document. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC requirements 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 to review the PDD against the UNFCCC criteria for CDM.

UNFCCC criteria for CDM refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, and the subsequent decisions by the CDM Executive Board.

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

## 2 METHODOLOGY

Validation was conducted using RINA procedures in line with the requirements specified in the CDM M&P, the latest version of the CDM Validation and Verification Manual, and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques.

The validation consisted of the following three phases:

- Document review;
- Follow-up actions;
- The resolution of outstanding issues and the issuance of the final validation report.

The following sections outline each step in more detail.

### 2.1 Document Review

The PDD, version 8 of 31/01/2012 /01/ in particular the applicability of the methodology, the baseline determination, the additionality of the project activity, the starting date of the project, the monitoring plan, the emission reduction calculations provided in the form of a spreadsheet, version 8 of 31/01/2012 /19/, were assessed as part of the validation.

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

/01/	<p>Abyl Carbon: CDM-PDD for project activity “Ayer Hitam landfill gas recovery Project” in Malaysia, version 08 of 31/01/2012</p> <p>Abyl Carbon: CDM-PDD for project activity “Ayer Hitam landfill gas recovery Project” in Malaysia, version 07 of 21/11/2011.</p> <p>Abyl Carbon: CDM-PDD for project activity “Ayer Hitam landfill gas recovery Project” in</p>
------	---

## VALIDATION REPORT

	Malaysia, version 06 of 21/10/2011. Abyl Carbon: CDM-PDD for project activity "Ayer Hitam landfill gas recovery Project" in Malaysia, version 05 of 16/05/2011.
/02/	DNA of Malaysia: Environment Management and Climate Change Division under the Ministry of Natural Resources and Environment; Letter of approval dated 06/07/2011
/03/	DNA of France: General Directorate for Energy and Climate change of the Ministry of Ecology, Sustainable Development, Transports and Housing, acting as the French Designated National Authority (DNA): Letter of approval dated 30/11/2011
/04/	CDM Executive Board: Validation and Verification Manual, version 01.2, EB55 report Annex 01 of 30/07/2010
/05/	CDM Executive Board: Baseline and monitoring methodology "ACM0001", "Consolidated baseline and monitoring methodology for landfill gas project activities", version 11, EB47 report Annex 6 of 28/05/2009
/06/	CDM Executive Board: Tool for the demonstration and assessment of additionality - version 6.0.0, EB65 report Annex 21, dated 25/11/2011
/07/	CDM Executive Board: Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site - version 5.1, EB61 report Annex 10, of 03/06/2011
/08/	CDM Executive Board: Tool to determine project emissions from flaring gases containing methane - version 1, EB28 report Annex 13.
/09/	CDM Executive Board: Tool to calculate baseline, project and/or leakage emissions from electricity consumption - version 1, EB39 report Annex 7, of 16/05/2008
/10/	CDM Executive Board: Tool to calculate the emission factor for an electricity system - version 2.2.1, EB63 report Annex 19 of 29/09/2011
/11/	CDM Executive Board: Project design document form (CDM-PDD) Version 03 - in effect as of 28/07/2006, EB25 report Annex 15.
/12/	CDM Executive Board: Guidelines for completing the project design document (Version 07), EB41 report Annex 12 of 02/08/2008.
/13/	CDM Executive Board: Guidelines on the demonstration and assessment of prior consideration of the CDM version 4 EB62 report Annex 13, dated 15/07/2011.
/14/	Government of Malaysia: Public cleansing management Act 2007
/15/	Government of Malaysia: The Environment Quality Act 1974 Government of Malaysia: Environment Quality (Environment Impact Assessment) Order 1987.
/16/	Government of Malaysia: Electricity supply Act 1990
/17/	WLSB and State Government: Privatization cum concession agreement between the State Government of Selangor Darul Ehsan and Worldwide Sita Environmental Management dated 12/04/1995.
/18/	Abyl Carbon: Investment analysis spread sheet "Ayer Hitam - Investment analysis 21.11.2011 - decision making.xls" version 7, dated 21/11/2011 Abyl Carbon: Investment analysis spread sheet "Ayer Hitam - Investment analysis 21.11.2011 - actual costs" version 7, dated 21/11/2011 Abyl Carbon: Investment analysis spread sheet "Ayer Hitam - Investment analysis 21.10.2011 - actual costs 3 MW.xls" version 7, dated 21/11/2011 Abyl Carbon: Investment analysis spread sheet "Ayer Hitam - Investment analysis 21.10.2011 - inputs at the time of decision making.xls", version 6, dated 21/10/2011 Abyl Carbon: Investment analysis spread sheet, "Ayer Hitam - Investment analysis 21.10.2011 - actual costs.xls" version 6, dated 21/10/2011 Abyl Carbon: Investment analysis spread sheet "Ayer Hitam - Investment analysis 21.10.2011 - actual costs 3 MW.xls" version 6, dated 21/10/2011 Abyl Carbon: Investment analysis spread sheet "Ayer Hitam - Investment analysis 16.05.2011.xls" version 5, dated 16/05/2011
/19/	Abyl Carbon: Emission reduction calculation sheet "Ayer Hitam - ER 31.01.2012.xls" version 8, dated 31/01/2012 Abyl Carbon: Emission reduction calculation sheet "Ayer Hitam - ER 21.11.2011.xls" version 7, dated 21/11/2011 Abyl Carbon: Emission reduction calculation sheet "Ayer Hitam - ER 21.10.2011.xls" version

## VALIDATION REPORT

	6, dated 21/10/2011 Ably Carbon: Emission reduction calculation sheet "Ayer Hitam - ER 16.05.2011.xls" version 5, dated 16/05/2011
/20/	Ably Carbon: Invitation to Stakeholder for meeting dated 11/05/2011
/21/	Ably Carbon: Summary of stakeholder comments and list of stakeholders, dated 10/05/2011
/22/	WLSB: No ODA statement dated 21/04/2011, reference no.WLSB/cdm/NZ/ems/H034a-11.
/23/	WLSB: Incoming waste records from the year 1995 till 2006 issued vide letter dated 25/04/2011, reference: WLSB/AHSL/cdm/tonnage/ZAR/ems/H036a-11.
/24/	Geo System Survey Services : Landfill layout drawing surveyed on 03/12/2010 and plotted on 05/01/2011.
/25/	WLSB: Ayer Hitam Emergency preparedness plan of June 1999.
/26/	IPCC: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5 , Waste, available at weblink <a href="http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol5.html">http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol5.html</a> , in English , retrieved on 07/06/2011
/27/	CDM Executive Board: Glossary of CDM, version 5, dated 19/08/2009
/28/	CDM Executive Board: Annual compilation and accounting report for Annex B parties under the Kyoto Protocol, FCCC/KP/CMP/2008/9/Rev.1, Table 3 available at weblink <a href="http://unfccc.int/resource/docs/2008/cmp4/eng/09r01.pdf">http://unfccc.int/resource/docs/2008/cmp4/eng/09r01.pdf</a> in English retrieved from UNFCCC website on 07/06/2011 sourced for emission target for France
/29/	CDM Executive Board: Guidelines on the assessment of investment analysis, version 05, EB62 report Annex 5, dated 15/07/2011.
/30/	KeTTHA: Handbook on the Malaysian feed-in tariff for the promotion of renewable energy of March 2011 available at weblink <a href="http://www.mbipv.net.my/dload/FiT%20Handbook%20English.pdf">http://www.mbipv.net.my/dload/FiT%20Handbook%20English.pdf</a> in English, retrieved on 16/06/2011.
/31/	Inland Revenue Board of Malaysia: Official website available at <a href="http://www.hasil.gov.my">http://www.hasil.gov.my</a> , in English, retrieved on 16/06/2011.
/32/	Suruhanjaya Tenaga : Grid system operation and performance report: peninsular Malaysia (April 2011)" as available in the Suruhanjaya Tenaga Website at weblink <a href="http://www.st.gov.my/index.php?option=com_content&amp;view=article&amp;id=5833%3Apeninsular-malaysia-april-2011&amp;catid=793%3Acurrent-highlights&amp;Itemid=1200&amp;lang=en">http://www.st.gov.my/index.php?option=com_content&amp;view=article&amp;id=5833%3Apeninsular-malaysia-april-2011&amp;catid=793%3Acurrent-highlights&amp;Itemid=1200&amp;lang=en</a> in English, retrieved on 16/06/2011.
/33/	UNEP: Policy Brief on Zero Waste: A Proposal for a POPs-Free Alternative to Managing Municipal Discards in Indonesia, Malaysia and the Philippines of March 2006.
/34/	PTM (Malaysia Energy Center) : Study on Grid Connected Electricity Baselines in Malaysia Year: 2008, version 2 of March 2010
/35/	MEWC/PTM/DANIDA: Study on CDM potential in the waste sector in Malaysia of 2004
/36/	Ably Carbon: EF Grid – Spreadsheet to determination of Emission factor of the grid, version 1 of 16/05/2011.
/37/	Website: <a href="http://www.worldclimate.com">www.worldclimate.com</a> , referred for the annual temperature of the project location, English Language, retrieved on 16/06/2011.
/38/	Malaysia Energy Center: Study on grid connected energy baselines for Malaysia of 2008
/39/	WLSB: Information on landfill management by WLSB as available in their website at weblink <a href="http://www.whbenvironment.com/">http://www.whbenvironment.com/</a> in English, retrieved on 26/12/2011
/40/	TUV Rheinland: Validation report of the "Ayer Hitam Landfill gas recovery project" No: 9105040109, rev. 01 of 13/03/2006.
/41/	Malaysian Energy Centre (PTM): Malaysian CDM information Handbook, 2009, source referred for sustainable development indicators for Malaysia.
/42/	GE Jenbacher: Instructional documentation for Generator set JGC 320 GS-L.L, Jana Landfill, J B285 of 2004, giving the technical specification of the gas engines installed. GE Energy: Correspondence from GE Energy , Germany dated 25/01/2010 on the life time and availability of Jenbacher Gas Engines
/43/	Organics Group: Technical specification of gas booster skid of 1300m3/hr at 300 mBar, for Jana Landfill Sdn. Bhd, Project Number PS3514.
/44/	Saidy Ridzah Associates: Chartered accountant certificate confirming project costs dated 02/11/2011.



## VALIDATION REPORT

/45/	WLSB: Financial statements for the year 2008, 2009 and 2010.
/46/	TNB ES: Letter confirming project chronology, reference TNBES/JLSB/Sept-11, dated 21/09/2011.
/47/	TNB ES: Power generation details for the years 2004, 2005, 2006, 2007, 2010 and 2011 , reference: TNB(B)/PP&P/PSTK/ 8/11/4, dated 08/07/2011 – available in Malaysian language and partially in English, sufficient for the purpose of the document.
/48/	TNB ES: Letter confirming restart date of the project activity and no power generation during 2004-2007, reference: TNB(B)/PP&P/RE&GT/ 8/11/4, dated 25/10/2011.
/49/	TNB ES: Power consumption records at the landfill for the period June 2007 to November 2010, reference: TNBES/JLSB/Sept-11 dated 18/11/2011
/50/	CDM Executive Board: List of Annex- I parties, available at weblink: <a href="http://unfccc.int/parties_and_observers/parties/annex_i/items/2774.php">http://unfccc.int/parties_and_observers/parties/annex_i/items/2774.php</a> in English, retrieved on 06/12/2011.
/51/	GE Jenbacher: Maintenance Schedule for engine model J 312-320 GS, Version: C21/121/221/81/281/82 of 05/2006.
/52/	Price WaterHouse Coopers: Directors report and financial statements for JLSB for the year ending 31/12/2009 giving financial reports for the years 2008 and 2009.
/53/	JD Energy Systems Sdn Bhd: Invoice No.837 for a value of RM 252,930 of 16/03/2009 for repair of one LFG gas engine.
/54/	Suruhanjaya Tenaga; Malaysian Energy commission statistical information available at weblink <a href="http://www.st.gov.my/index.php?option=com_phocadownload&amp;view=category&amp;id=10%3Astatistics-electricity&amp;download=111%3Aelectricity-supply-industry-in-malaysia-performance-and-statistical-information-2009&amp;Itemid=4241&amp;lang=en">http://www.st.gov.my/index.php?option=com_phocadownload&amp;view=category&amp;id=10%3Astatistics-electricity&amp;download=111%3Aelectricity-supply-industry-in-malaysia-performance-and-statistical-information-2009&amp;Itemid=4241&amp;lang=en</a> in English, retrieved on 06/12/2011.
/55/	International POPs Elimination Network: Policy Brief on Zero Waste: A Proposal for a POPs-Free Alternative to Managing Municipal Discards in Indonesia, Malaysia and the Philippines, of March 2006 for demonstrating the common practice of handling solid wastes in Malaysia, available at weblink <a href="http://www.ipen.org/ipepweb1/library/ipep_pdf_reports/2ins%20zero%20waste%20in%20malaysia,%20indonesia,%20philippines.pdf">http://www.ipen.org/ipepweb1/library/ipep_pdf_reports/2ins%20zero%20waste%20in%20malaysia,%20indonesia,%20philippines.pdf</a> in English, retrieved on 06/12/2011
/56/	Previous webhosted CDM PDDs available at weblink <a href="http://www.tuvdotcom.com/quality_marks/9105040109/public_documents?locale=en">http://www.tuvdotcom.com/quality_marks/9105040109/public_documents?locale=en</a> in English, retrieved on 06/12/2011. Ecair Malaysia BV: 3 <sup>rd</sup> webhost - CDM-PDD for project activity “Ayer Hitam landfill gas recovery Project” in Malaysia, version 4.2 of 02/05/2008. Ecair Malaysia BV: 2 <sup>nd</sup> webhost - CDM-PDD for project activity “Ayer Hitam landfill gas recovery Project” in Malaysia, version 3.2 of 15/06/2007. Ecair Malaysia BV: 1 <sup>st</sup> webhost - CDM-PDD for project activity “Ayer Hitam landfill gas recovery Project” in Malaysia, version 01 of 03/10/2006.
/57/	DNA of Malaysia: Environment Management and Climate Change Division under the Ministry of Natural Resources and Environment; previous Letter of approval dated 13/02/2009
/58/	Tri-party agreement between the State Government of Selangor, JLSB and WLSB dated 04/09/2002
/59/	TNB: TNB Corporate report 2003 giving its organizational structure.
/60/	Tri-party subscription agreement between TNB, JLSB and WLSB dated 17/08/2005
/61/	WLSB: Cover page of board meeting dated 10/10/2005
/62/	WLSB: Board minutes meeting dated 06/01/2006
/63/	WLSB: Board minutes meeting dated 02/04/2007
/64/	Share sale agreement between TNB ES and WLSB 18/07/2008
/65/	Surhanjaya Tenaga (Energy commission of Malaysia): Authorization of the Energy Commission to proceed with the transfer of shares of JLSB dated 29/01/2009 and its English translation.
/66/	Economic Planning unit-Prime Minister's department: Authorization of the Economic Planning to proceed with the transfer of shares of JLSB dated 15/04/2009 and its English Translation

## VALIDATION REPORT

/67/	Supplement Agreement between TNB and JLSB for increase in grid export power tariff dated 21/08/2007
/68/	Supplement Agreement between TNB and JLSB for further increase in grid export power tariff dated 29/05/2009
/69/	TUV Rheinland: Email from Mr. Norbert Heidelmann, Business Manager Carbon Services, TÜV Rheinland Energie und Umwelt GmbH dated 03/02/2011
/70/	Agreement between Ably Carbon and WLSB dated 26/04/2011
/71/	UNDP: Malaysia Developing a solid waste management model for Penang of Feb 2008, used as a reference to emission reduction calculations.
/72/	GreenTech Malaysia: CDM Website of Malaysia available at weblink: <a href="http://cdm.greentechmalaysia.my/">http://cdm.greentechmalaysia.my/</a> in English, retrieved on 06/12/2011
/73/	WLSB: Board minutes meeting dated 03/03/2009.
/74/	Website: <a href="http://www.worldclimate.com">www.worldclimate.com</a> , referred for the annual temperature of for landfill site in English, retrieved on 06/12/2011
/75/	WLSB /Ably Carbon: Ayer Hitam, LFG recovery rate calculation received on 207/07/2011
/76/	SKM Enviros: Selangor MBT plant, design statement, draft 1 of 10/05/2010, giving waste composition in the region.
/77/	Universiti Tenaga Nasional (National Energy University):C.H. Yip, Universiti Tenaga Nasional, Malaysia: An Overview on the Feasibility of Harvesting Landfill Gas from MSW to Recover Energy of 2008, available at weblink : <a href="http://www.uniten.edu.my/newhome/uploaded/coe/iccbt/iccbt%202008/conference%20f%20extract/UNITEN%20ICCBT%2008%20An%20Overview%20on%20the%20Feasibility%20of%20Harvesting%20Landfill%20Gas%20from.pdf">http://www.uniten.edu.my/newhome/uploaded/coe/iccbt/iccbt%202008/conference%20f%20extract/UNITEN%20ICCBT%2008%20An%20Overview%20on%20the%20Feasibility%20of%20Harvesting%20Landfill%20Gas%20from.pdf</a> in English, retrieved on 06/12/2011.
/78/	Ably Carbon: Request for validation signed by the General Manager of Ably Carbon dated 02/05/2011
/79/	JD Energy Systems Sdn Bhd: Quotation ref. QS003-09(WL) dated 04/02/2009.
/80/	Invoices for 1 <sup>st</sup> Engine overhaul: JD Energy Systems Sdn Bhd: Invoice number895 dated 17/05/2010, 852-A dated 27/05/2010, 852 dated 07/07/2009, 864 dated 20/10/2009, 863 dated 20/10/2009, 862 dated 20/10/2009, 847 dated 04/05/2009, 837 dated 16/03/2009. Duracooling Tech Sdn Bhd: Invoice number 20100001 dated 07/01/2010, 20100066 dated 03/0/2010, 20100065 dated 03/02/2010, 20100742 dated 18/08/2010. Kejuruteraan Elektro Mega: Invoice number 1529 dated 31/08/2010, 1526 dated 19/02/2010 ECS Energy Cooling Systems: Invoice number 91080 dated 09/04/2009, 91078 dated 05/03/2009
/81/	Energy Cooling systems: Quotation ref: 08-2043B, for 1 <sup>st</sup> GDU overhaul dated 24/11/2008
/82/	UNIFX Enterprise SDN BHD: Quotation for repairing existing wells dated 08/04/2008

## VALIDATION REPORT

/83/	Invoices for capex related to Gas wells and pipelines in 2010: Sealand Teknikal (M) Sdn Bhd: Invoice number STW066/2010 dated 20/10/2010. Unify Enterprises Sdn Bhd: Invoice number 13298 dated 14/10/2010 EnviroEquip Sales & Rental (M) Sdn Bhd: Invoice number SI090099 dated 07/07/2009 Smart Biogas: Invoice number SBE/WWL/010709-051 dated 01/07/2009
/84/	WLSB: Board minutes dated 17/12/2010 for Board meeting dated 16/12/2010
/85/	WLSB: Letter of appointment to JD Energy systems dated 28/02/2011
/86/	Invoices for repair work post commissioning the project: JD Energy Systems Sdn Bhd: Invoice number 968 dated 07/04/2011, 960 dated 15/03/2011, 964 dated 07/03/2011, 946 dated 17/01/2011, 945 dated 13/01/2011, 899 dated 04/06/2010 Wengcon machinery Sdn Bhd: Invoice number IN096418 dated 29/11/2010 One stop maintenance service: Invoice number 1423 dated 07/04/2011.
/87/	Invoices for service and maintenance of pretreatment unit: Duracooling Tech Sdn Bhd: Invoice number 20110354 dated 18/04/2011, 20110353 dated 14/04/2011, 20110259 dated 25/03/2011, 20110092 dated 23/02/2011, 20101058 dated 01/12/2010, 20100908 dated 01/10/2010
/88/	Invoices for preventive maintenance post commissioning the project: JD Energy Systems Sdn Bhd: Invoice number 962 dated 18/03/2011, 943 dated 13/01/2011, 944 dated 13/01/2011, 929 dated 24/11/2010, 923 dated 21/10/2010, 910 dated 12/07/2010.
/89/	Invoices for lube oil post commissioning the project: JD Energy Systems Sdn Bhd: Invoice number 967 dated 06/04/2011, 966 dated 06/04/2011, 965 dated 06/04/2011, 942 dated 07/01/2011, 941 dated 07/01/2011, 928 dated 22/11/2010, 922 dated 21/10/2010, 893 dated 04/06/2010, 927 dated 22/11/2010.
/90/	TNB: Cost of electricity in Malaysia at decision making cross verified using weblink: <a href="http://www.tnb.com.my/residential/pricing-and-tariff.html">http://www.tnb.com.my/residential/pricing-and-tariff.html</a> , in English, retrieved on 06/12/2011
/91/	TNB: Electricity invoice for the period December 2010 to March 2011
/92/	Invoices for manpower and competency services post commissioning the project: TNB Invoice number 50153868 dated 10/03/2010, 50153856 dated 10/03/2010, 50153151 dated 01/03/2010 Terachi Electrical services Sdn. Bhd: Invoice number 3479/10 dated 30/06/2010 LFG Engineering services Sdn Bhd: Invoice number LFG/INV/04/2010 dated 05/02/2010, LFG/INV/05/2010 dated 05/02/2010, LFG/INV/03/2010 dated 12/01/2010.
/93/	Alloy Insurance Brokers Sdn Bhd: Insurance note ref no. AIBSB/WOR02/005/11 dated 11/02/2011
/94/	Invoices for Maintenance of pipelines and network post commissioning of the project: Unify Enterprises Sdn Bhd: Invoice number 13000 dated 28/05/2010, 13350 dated 03/01/2011 EnviroEquip Sales & Rental (M) Sdn Bhd: Invoice number SI00113 dated 09/07/2010
/95/	The Malaysian Accounting Standards Board,; <a href="http://www.masb.org.my/index.php?option=com_content&amp;view=article&amp;id=1035%3Aamasb14-depreciation-accounting-pg1&amp;catid=7%3Aamasb-for-private&amp;Itemid=15">http://www.masb.org.my/index.php?option=com_content&amp;view=article&amp;id=1035%3Aamasb14-depreciation-accounting-pg1&amp;catid=7%3Aamasb-for-private&amp;Itemid=15</a> ), to evidence that residual value of an asset is insignificant as per Malaysian Accounting standards. English Language, retrieved on 27/12/2011
/96/	Government of Malaysia: Malaysian Tax regulations available at <a href="http://www.hasil.gov.my">http://www.hasil.gov.my</a> , in English language, retrieved on 27/12/2010.

# VALIDATION REPORT

/97/	Malaysia Energy Commission: Feed in Tariff of Malaysia, dated 20/05/2010
/98/	SEDA: SEDA portal giving history of passing renewable energy Act available at weblink <a href="http://seda.gov.my/go-home.php?omaneg=0001010000000101010100010000100000000000000000000000&amp;s=255">http://seda.gov.my/go-home.php?omaneg=0001010000000101010100010000100000000000000000000000&amp;s=255</a> , in English, retrieved on 27/12/2011
/99/	CDM Executive Board: Clarification on restart of a project activity with CDM revenues dated 20/12/2011
/100/	UNFCCC – CDM website: PDD upload dates for the project available at interface <a href="http://cdm.unfccc.int/Projects/Validation/index.html.in">http://cdm.unfccc.int/Projects/Validation/index.html.in</a> English, retrieved on 27/12/2011
/101/	Organics Asia Co Ltd: Letter reference number TNS/4638, from Organics Asia Co Thailand dated 21/01/2010 on the life time of flares.
/102/	Ranhill Bessektu Sdn Bhd: Preliminary Environment Impact Assessment Study for the Ayer Hitam Landfill of June 1992.
/103/	UNFCCC Website: Weblink <a href="http://cdm.unfccc.int">http://cdm.unfccc.int</a> available in English, retrieved on 27/12/2011

## 2.2 Follow-up actions

On 24/06/2011 RINA visited the Ayer Hitam sanitary landfill located at Puchong, in the State of Selangor, Malaysia to resolve questions and issues identified during the document review and to perform interviews with relevant stakeholders in the host country.

The key personnel interviewed and the main topics of the interviews are summarized in the table below.

	Date	Name and Role	Organization	Topic
/a/	24/06/2011 26/06/2011	/ Anne Sophie Zirah CDM Consultant	Abyl Carbon, Project proponent	Project Description, CDM consideration, Baseline identification, Project Boundary. Additionality, Baseline Calculation, prior CDM consideration and monitoring.
/b/	24/06/2011 26/06/2011	/ Sim Kean Hong CDM Consultant		
/c/	24/06/2011	Edishan Mohd Sukar, Environment Manager.	Worldwide Landfills Sdn.Bhd (WLSB) Landfill operator and Project proponent.	Start and closure of the landfill, categorization of waste, monitoring of wastes disposed at landfill and waste handling procedures. Inception of the power plant and its present status. Prior CDM consideration, additionality and monitoring.
/d/	24/06/2011	Noor Azam Mastor, Manager , Business Development		
/e/	24/06/2011	Noni Norrishah Local Resident	Representative from community – Pangsapun Sri Indah	Conduct of stakeholder meeting, Mode of invitation for stakeholders meeting, advantages and disadvantages of the proposed project of installing LFG recovery and power
/f/	24/06/2011	Tarekukly Contractor	Binaform	

## VALIDATION REPORT

/g/	24/06/2011	Tan Shin Huat Operator	Binaform	generation from captured LFG, locals perception about the project. Start of the power plant in 2004 and closure of the landfill in 2006.
/h/	24/06/2011	Abd Halian Technician	WLSB	Monitoring the Power plant and flaring unit their operation and maintenance.
/i/	23/06/2011	Ahmad Bin Alang Kuala Selangor State Executive Council member.	Kuala Selangor State Executive Council.	Locals' perception about the project and legislations on landfill management in Malaysia.

### 2.3 Resolution of outstanding issues

The objective of this phase of the validation is to resolve any outstanding issues which need to be clarified for RINA's positive conclusion on the project design.

To guarantee transparency a validation protocol has been customized for the project. The protocol shows in a transparent manner the requirements, means of validation and the results from validating the identified criteria. The validation protocol consists of four tables; the different columns in these tables are described in the figure below (see Figure 1). The completed validation protocol is enclosed in Appendix A to this report.

A corrective action request (CAR) is raised if one of the following occurs:

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

A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the CDM requirements for registration. CARs, CLs and FARs identified are included in the validation protocol in Appendix A of this report.

# VALIDATION REPORT

Figure 1 Validation protocol tables

Validation Protocol, Table 1 - Mandatory requirement		
Requirement	Reference	Conclusion
The requirements the project must meet.	Makes reference to the documents where the answer to the requirement is found.	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) if a requirement is not met. A request for clarification (CL) is used when the validation team has identified a need for further clarification.

Validation Protocol, Table 2 - Requirement checklist					
Checklist Question	Ref.	MoV	Comments	Draft Conclusion	Final Conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organized in seven different sections.	Makes reference to documents where the answer to the checklist question or item is found.	Explain how conformance with the checklist question is investigated. Examples are document review (DR), interview or any other follow-up actions (I), cross checking (CC) with available information relating to projects, (N/A) means not applicable.	The discussion on how the conclusion is arrived at and the conclusion on the compliance with checklist question so far.	OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements. For CAR, CL and FAR see the definitions above.	OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements.

Validation Protocol, Table 3 - Resolution of Corrective Action Requests and Clarification			
Corrective action requests and/or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
The CAR and/or CLs raised in table 2 are repeated here.	Reference to the checklist question number in Table 2 where the CAR or CL is explained.	The responses given by the project participants to address the CARs and/or CLs.	The validation team's assessment and final conclusion of the CARs and/or CLs.

Validation Protocol, Table 4 - Forward Action Requests		
Forward action request	Reference to Table 2	Response by project participants Validation Conclusion
The FAR raised in table 2 is repeated here.	Reference to the checklist question number in Table 2 where the FAR is explained.	Response by the project participants on how forward action request will be addressed prior to first verification.



## VALIDATION REPORT

### 2.4 Internal quality control

All the revisions of the validation report before being submitted to the client were subjected to an independent internal technical review to confirm that all validation activities had been completed according to the pertinent RINA instructions.

The technical review was performed by a technical reviewer(s) qualified in accordance with RINA's qualification scheme for CDM validation and verification.

### 2.5 Validation team and the technical reviewer(s)

The validation team and the technical reviewers consist of the following personnel:

Role/Qualification	Last Name	First Name	Country
Team Leader CDM / Technical Expert	Arokiasamy.	Cyril Augustus	India
Technical Expert/ CDM Validator	Menon	Rekha	India
Financial Expert	Raghavan	Nisha	United Kingdom
Technical Reviewer	Valoroso	Rita	Italy
Technical Reviewer	Badhwar	Naresh	India

## 3 VALIDATION FINDINGS

The findings of the validation related to the project, as described in the PDD version 08 of 31/01/2012 and the previous version 07 of 21/11/2011, version 06 of 21/10/2011, version 05 of 16/05/2011 /01/, are stated in the following sections.

The validation requirements, the means of validation and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A

### 3.1 Approval and Participation

The project's host Party is Malaysia and the Annex I Party is France. The parties Malaysia and France fulfil the requirements to participate in the CDM. Both the parties have ratified the Kyoto protocol and established a Designated National Authority (DNA) as the participating requirements for CDM under the Kyoto Protocol. Malaysia ratified the Kyoto Protocol on 04/09/2002 and established as DNA the Environment Management and Climate Division under Ministry of Natural Resources and Environment as per the LoA /02/. France ratified the Kyoto Protocol on 31/05/2002 and established the General Directorate for Energy and Climate Change of the Ministry of Ecology, Sustainable Development, Transports and Housing acting as the French DNA, as per the LoA /03/.

The project participants are Worldwide Landfills Sdn. Bhd from Malaysia and Ably Carbon from France, both participants are private entities. The project participants as in the LoA are correctly listed in table A.3 of the PDD and the information is consistent with the contact details provided in Annex 1 of the PDD /01/.

The DNA of Malaysia issued a Letter of Approval on 06/07/2011, authorizing Worldwide Landfills Sdn. Bhd as project participant and confirming that the project assists in achieving sustainable development/02/. The Letter of Approval from France was issued on 30/11/2011, authorizing Ably Carbon as project participant/03/. Both the letters were received directly by the PP and refer to the precise project activity in the PDD/01/.

Both the letter of approvals have been issued by the respective DNAs of the Host Party and the Annex I party for the specific CDM project, and original letter of approvals were verified, hence RINA did not doubt their authenticity.

By checking the above documents /02/ /03/, RINA considers both the LoAs in accordance with paragraphs 45-48 of the VVM /04/.

## VALIDATION REPORT

The proposed project does not involve any public funding from an Annex I Party, which is confirmed by the PP /22/ and the chartered accountant certificate dated 02/11/2011 /44/, validation of balance sheets of WLSB for the year 2008, 2009 and 2010 /45/. Thus, did not reveal any information that indicated that the project could be seen as a diversion of official development assistance (ODA) funding towards the host country.

Project participants	Worldwide Landfills Sdn. Bhd	Ably Carbon
Parties involved	Malaysia	France
<b>APPROVAL</b>		
LoA received	Yes /02/	Yes /03/
Date of LoA	06/07/2011	30/11/2011
LoA received from	Environment Management and Climate Change Division under the Ministry of Natural Resources and Environment – submitted by the PP to the validation team	The General Directorate for Energy and Climate Change of the Ministry of Ecology, Sustainable Development, Transports and Housing acting as the French Designated National Authority – submitted by the PP to the validation team
Validation of authenticity	Original Letter of approval was verified hence RINA did not doubt their authenticity	Original Letter of approval was verified, hence RINA did not doubt their authenticity
Validity of LoA	Yes	Yes
<b>PARTICIPATION</b>		
Party is party to Kyoto Protocol	Yes	Yes
Voluntary participation	Yes	Yes
Project contribution to SD	Yes	N/A

### 3.2 Project design document

The PDD for the project activity “Ayer Hitam landfill gas recovery project”, in “Malaysia”, version 08 of 31/01/2012, version 07 of 21/11/2011, version 06 of 21/10/2011 and version 05 of 16/05/2011 /01/ submitted by the Ably Carbon has been the basis for the validation process. RINA confirms that the above PDD is based on the currently valid PDD template and is completed in accordance with the applicable guidance document “Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies (CDM-NM) /12/

The main changes between the PDD version 05 of 16/05/2011 published for the 30 days global stakeholder commenting period and the final version 08 of 31/01/2012 /01/ submitted for registration are the following:

1. Minor updatation in emission reductions calculations. The waste composition used in the ER calculations in the webhosted PDD was inconsistent with the reference used and has been corrected by PP to be in accordance with table 2.3 of the IPCC guidelines. Also the crediting period of the project activity has been modified to a feasible one consistent with the progress of the validation of the project activity, hence the emission reductions by the project activity has decreased marginally.
2. PP has



## VALIDATION REPORT

submitted investment analysis for a 3 MW power plant due to the uncertainty in LFG recovery from the landfill, a maximum of 80% efficiency of LFG recovery considered and to demonstrate that the revenue generation from increased electricity generation does not affect the additionality of the proposed project.

3. The start date of the project activity has been updated to 16/03/2009, based on the first financial commitment of the PP, which is when WLSB further invested to purchase a majority share and to repair the engines in order to restart the implementation of the project.

After reviewing the revised version 08 /01/, RINA issued the final validation report and opinion.

### 3.3 Project Design

The project activity is to operate and maintain a landfill gas collection and utilization system on the landfill of Ayer Hitam, Malaysia and use of the captured landfill gas for power generation, which will be supplied to the local grid and would be flared in case of non-availability of engines. Electricity required for the project activity is imported from the grid. As verified during site visit, the landfill is located at Puchong in the State of Selangor, in Malaysia, 18km South of Kuala Lumpur. The project's geographic coordinates are 03°00'05"N and 101°39'37"E verified to be correct with Google earth.

During site visit it was noted that PP has overhauled the complete existing non-active landfill gas collection system and a 2MW power plant commissioned during the year 2004 on the Ayer Hitam Landfill, Malaysia. The energy plant consists of a pre-treatment system, biogas generators and an open flare for exigencies. The landfill started its operation from 1995 and was closed in 2006. The operation area of the landfill covers 28 hectares. It was operated in 7 phases and includes 19 cells /24/ and an anaerobically managed sanitary landfill with leachate collection and treatment systems. The landfill has received a total domestic waste volume of more than 6,207,685 ton over the period and was closed on 31/12/2006 as per the tonnage received report /23/ by WLSB dated 25/04/2011. Due to PP's insufficient experience /77/ on operating the LFG recovery and utilization plant commissioned in the year 2004 /47/, the gas wells got choked and the engine broke down due to entry of leachate and the plant was shut down in the year 2007 /46/. As observed during site visit PP has revamped a few existing gas wells, added new gas wells to meet the LFG requirement of the project power plant. However new gas wells and old gas wells are in the same operating area of the landfill as evident from the survey drawing plotted on 05/01/2011 /24/. PP refurbished one 1048 kW engine /42/ and started generating power from 23/06/2010. One more engine of identical capacity was overhauled and put on operation on 29/08/2011 /48/. Further, it was also noticed that the power plant is also equipped with an open flare of 1300 m<sup>3</sup>/hr capacity existing from 2004 /43/ used only for the purpose of safety as explained by the PP during site visit.

In the scenario existing prior to commissioning of the project activity on 09/04/2004 /46/, LFG was allowed to exhaust through passive venting wells. There was no LFG collection and flaring system installed in the landfill. RINA confirmed the same during stakeholder interaction had on 24/06/2011 and the previous validation report No: 9105040109, rev. 01 of 13/03/2006 by TUV Rheinland /40/. It was also checked from the WLSB's website /39/ and the National Energy University of Malaysia /77/ that this is the first engineered sanitary landfill to have landfill gas based power plant in Malaysia /77/. Being the first such project in Malaysia and lack of prior experience of PP on the Malaysian landfill gas collection system and LFG based power plant, the gas engines broke down during 2007 /46/ /77/ and thus, the LFG collection system, flaring and power plant stopped operating and were inactive from 2007 till 2010; this was confirmed by the power generation records from the landfill gas provided by TNB ES in its letter dated 08/07/2011 /47/ and letter dated 25/10/2011 /48/. Further to crosscheck the flares were not operating RINA also checked the power consumption details at the landfill /49/ during the period 2007 to 2010. Noted that the power consumption for the period from 2007-2010 was 594 kW/month /49/, which was used for lighting purposes at the landfill, RINA accepted this since the power consumption for Flare is 60kW /43/, the gas engine is 34.75 KW /42/ and the chillers is 2 numbers x 17+2 kW /43/. Thus it can be confirmed that the flare and the engine was not in operation during this period. This is further demonstrated by Price Water House Cooper's 31/12/2009 financial report /52/, JLSB registered no revenue in 2008 and 2009. Hence it is accepted that LFG collection, flaring / utilization system was inactive during the period 30/05/2007 to 23/06/2010. Thus, it is clear that the CDM project activity is a restart of the existing, inactive LFG collection, flaring/ utilization

## VALIDATION REPORT

system by refurbishing existing 2 gas engines of 1048kW capacity each , refurbishing 32 existing gas wells and piping network, introducing 83 new gas wells and piping network and use of existing one number of 1300 m<sup>3</sup>/hr capacity for safety. RINA accepted that the existing flare is used only for the purpose of safety based on the site visit observations and interview with PP. Further the prevailing regulations /14/ /15/ does not demand flaring of LFG and PP does not have any benefit in recovering and flaring LFG. In the absence of the project activity the gases would have continued to be released to the atmosphere. Further discussion on baseline and chronology of the project activity is discussed in section 3.6 of this report.

The project has restarted its operation from 23/06/2010 and it is expected to be continued with two refurbished engines of 1048 kW capacity each amounting to a total installed capacity of about 2 MW. The 2 numbers of GE Jenbacher 1048kW gas engines from Austria /42/ and the open flare of one number of 1300 m<sup>3</sup>/hr capacity from Organics Asia Co. Ltd, from United Kingdom of Great Britain /43/ installed, demonstrates that implementation of project has resulted in transfer of technology /77/ from Annex-I countries /50/ to host country.

The operational lifetime of the project activity is 15 years and this has been confirmed by verifying the maintenance schedule provided by GE Jenbacher /51/ of the gas engine installed, which mentions the maintenance required till 60,000 hours of operation and mentions "After the overhaul 60,000 operating hours, the maintenance work to be carried out is repeated at the same interval periods", assuming conservatively that only one overhaul can be made to the engine, a life time of 15 years is accepted.

The existing flare is used only for emergencies and hence not considered for assessment of operational lifetime of the project activity. In the event of PP choosing flaring as option of disposing the LFG captured, an enclosed flare would be installed, which has technical lifetime of 20 years /101/.

The landfill is being operated by Worldwide landfills from 12/04/1995 as per the privatization cum concession agreement /17/ between the State Government of Selangor Darul Ehsan and Worldwide Sita Environmental Management, a group company of Worldwide Holdings Behard dated 12/04/1995. The agreement is valid for a period of 25 years /17/. As per the Tri-party Agreement between the State Government of Selangor, JLSB and WLSB dated 04/09/2002 /58/, JLSB, a joint venture between TNB-ES and WLSB, will exploit the landfill gas from the Ayer Hitam landfill for electricity. The generated electricity will be sold to TNB, this agreement is valid for 15 years from 2002 /58/. RINA accepted that the validity of these agreements /17/ /58/ do not have any favorable impact on the additionality of the project activity as the power plant now belongs to the PP since WLSB has bought 50% of shares and owns 80% (20% by TNB ES) /64/, /65/ stake on the LFG recovery system, the power plant and the flare. Also, the generated electricity will be sold to grid owned by TNB /58/ and the electricity required for the power plant and landfill operations is being imported from the grid (TNB).

The starting date of the project activity is 16/03/2009 and it corresponds to the first financial commitment on implementation of the project which is the date of first invoice 16/03/2009 /53/ received for repairing one engine being the earliest, significant, expenditure made for the restart of the project activity and has been considered as the start date of the project activity.

The estimated emission reductions by the proposed project activity are 54,556 tCO<sub>2</sub>e annually and 545,560 tCO<sub>2</sub>e over the 10 years of the fixed crediting period starting from 01/01/2012 or the date of registration whichever is the later.

RINA was able to verify all the documented evidence listed above during the validation process and can confirm that data and considerations are complete and accurate; moreover RINA confirms that the description of the proposed CDM project activity, as contained in the PDD sufficiently covers all relevant elements, is accurate and complete and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity.

### 3.4 Application of selected baseline and monitoring methodology

The project correctly applies the approved baseline and monitoring methodology ACM0001 "Consolidated baseline and monitoring methodology for landfill gas project activities", version 11 of 28/05/2009 /05/.

## VALIDATION REPORT

The proposed project activity meets the criteria defined in the baseline methodology as it ensures that:

- in the baseline scenario, that is the existing practice prior to restart of the project activity, LFG generated from the Ayer Hitam Landfill is totally released to the atmosphere; LFG recovery stopped on 30/05/2007 /46/ when the engines broke down; since then, the LFG was totally released in the atmosphere, though the approved methodology ACM0001 /05/ does not include situations such as restart, it does not state that this situation is not applicable, hence accepted.
- the project activity includes LFG capture and the captured LFG is used for power generation; a 1300 m<sup>3</sup>/hr flare is available and would be used during emergencies and non availability of gas engines, the PP may install an enclosed flare and use it as an option of disposal in future.
- the captured gas is not used to supply consumers through natural gas distribution network, in the project scenario and only used for generation of electricity or flared.

The project also fulfills the applicability conditions of other methodological tools, which are mentioned below:

- "Tool for the demonstration and assessment of additionality - version 6.0.0, EB65, /06/ dated 25/11/2011: required as per the methodology ACM0001, version 11 /05/;
- "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site" version 05.1 /07/ dated 03/06/2011. As observed during site visit and as per the preliminary Environment Impact Assessment Study /102/ done for the landfill during June 1992, the MSW dumped in the disposal site can be clearly identified and the waste dumped is purely MSW.
- "Tool to determine project emissions from flaring gases containing methane" version 01 /08/. The residual gas flared is not likely to contain other combustible gases than methane, carbon monoxide and hydrogen. The residual gas stream is obtained from decomposition of organic material through landfill.
- "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" version 01 /09/ dated 16/05/2008. The electricity to be used by the project activity will otherwise be supplied from the grid/ from the onsite generator or from other available resources.
- "Tool to calculate the emission factor for an electricity system" version 02.2.1 /10/ dated 29/09/2011. The project activity will substitute the electricity from the grid.

RINA confirms that the proposed project activity meets the applicability conditions of ACM001, version 11 and also the tools referred above. Further emission sources which are not addressed by the applied methodology and which are expected to contribute more than 1% of the overall expected average annual emissions reduction have not been identified. However, there is no likelihood of any emission sources which could contribute to more than 1% of the expected average annual emissions since the project activity does not include major construction activities at site and was mostly assembly of the bought out items/equipments, as reported by PP during the site visit.

RINA hereby confirms that the selected baseline and monitoring methodology has been previously approved by the CDM Executive Board, and is applicable to the Project, which complies with all the applicability conditions therein.

### 3.5 Project boundary and baseline identification

#### 3.5.1 Project boundary

As per the approved baseline and monitoring methodology ACM0001, "Consolidated baseline and monitoring methodologies for landfill gas project activities", version 11 of 28/05/2010 /05/, the project boundary is the site of the project activity where the gas is captured and destroyed/used. The project activity is to operate and maintain a landfill gas collection and utilization system on the landfill of Ayer Hitam, Malaysia and use of the captured landfill gas for power generation, which will be supplied to the local grid and would be flared incase of non availability of engines. Electricity required for the project

## VALIDATION REPORT

activity is imported from the grid. The PP in future may supply electricity for onsite use also. The project activity includes an open flare for exigencies and in future the PP may install an enclosed flare for disposal of the recovered LFG.. RINA accepted such hypothetical situations as it is a LFG recovery project and that these scenarios do not impact additionality of the project activity as the electricity required for onsite use is imported from the grid in the baseline and flaring as option of disposal does not have any financial gain other than CDM funds. The project boundary as mentioned in the latest PDD, version 08 /01/, includes the landfill, landfill gas production, landfill gas collection, the flaring unit (hypothetical, may be included in future), electricity production, possible consumption of electricity produced onsite, onsite use of electricity from the grid, electricity supply to the grid, the peninsular Malaysian grid and the connected power plants, which is in line with the project boundary as defined in the methodology ACM0001, version 11. RINA confirms that the project boundary covers all the system components as per the proposed project design.

Emissions sources included in the project boundary are shown in the table below:

	GHGs involved	Description
Baseline emissions	CH <sub>4</sub>	Emissions from decomposition of waste at landfill site
	CO <sub>2</sub>	Emissions from electricity that may have been consumed or generated onsite/offsite in the baseline scenario.
Project emissions	CO <sub>2</sub>	Emissions from on-site electricity use from the grid, or from on site generator or from other available sources.
	CH <sub>4</sub>	Methane emissions from flare, methane not burned due to flare efficiency correction.
Leakage	NA	No leakage is expected by the approved methodology applied.

By checking the information and the project site, RINA can confirm that the project boundary and emission sources described in the PDD are accurate and complete, and also that the selected sources and gases are justified for the proposed project activity.

### 3.5.2 Baseline identification

According to the approved methodology ACM0001 “Consolidated baseline and monitoring methodologies for landfill gas project activities”, version 11 /05/ the baseline scenario of the project has been identified using “Tool for the demonstration and assessment of additionality” /06/. In selecting the most plausible baseline scenario, the following steps were undertaken,

Step 1: Identification of alternative scenarios:

Sub-step 1 a): Define alternatives to the project activity

Three alternative scenarios have been identified with regards to disposal and treatment of the waste:

LFG1: LFG capture and its flaring undertaken without being registered as a CDM project activity.

LFG 2: Atmospheric release of LFG or partial capture of landfill gas and destruction to comply with regulations or contractual requirements, or to address safety and odour concerns,

LFG 3: Use of the waste for incineration.

The project also intends to produce electricity and sell the same to the grid. Hence, the credible and realistic baseline power generation alternatives are identified as follows:

## VALIDATION REPORT

P1: Power generated from landfill gas undertaken without being registered as CDM project activity.

P2: Existing or construction of new onsite or offsite fossil fuel fired cogeneration plant.

P3: Existing or construction of new onsite or offsite renewable based cogeneration plant.

P4: Existing or construction of new onsite or offsite fossil fuel fired captive power plant.

P5: Existing or construction of new onsite or offsite renewable based captive power plant.

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

RINA accepted the above as the identification of alternatives to be complete and exhaustive as:

1. The project does not intend to use heat energy. Hence, baseline heat generation alternatives have not been discussed. The validation team also confirms that there is no industrial activity around the dump site and hence there will not be any steam requirement either onsite or off site the project activity.
2. the LFG recovery system and power plant at site commissioned in 2004 /47/ was redundant from 2007 /46/ as the engines broke-down and the gas wells were choked. Hence the plant as such cannot be considered as an alternative; the plant requires to be revamped, which is the project activity.
3. the Ayer Hitam landill is already a compacted and closed landfill as verified during site visit. Further as per the UNDP report /71/ of 2008. Though composting, Refuse Derived Fuel, incineration could be options for disposal of MSW in Malaysia, about 95-97% of the wastes generated in peninsular Malaysia end up in landfill. The report further mentions that the Refuse Derived Fuel and composting are not practically viable options for Malaysia, now and in the near future.

Outcome of step 1a: As the project activity does not aim at producing heat, existing or construction of new onsite or offsite fossil fuel or renewable based cogeneration plant is not part of the baseline scenario. Hence P2 and P3 are not considered to be credible and realistic alternatives. There is no captive power plant on site or off-site, confirmed during the site visit. There is no need for a new captive power plant as grid electricity is already available and there is no supply constraint. RINA verified this from the report on Electricity Supply Industry in Malaysia, Performance and Statistical Information 2009, Suruhanjaya Tenaga (Energy Commission) Electricity supply in Malaysia 2006, Performance and Statistical Information, Suruhanjaya Tenaga (Energy Commission) /54/. As per this report the whole of Malaysia is supplied by power plants with higher installed capacity than the demand. The maximum demand of peninsular Malaysia was 14245MW during the year 2009 and the total installed capacity in the grid is 21817MW. Also, the state of Selangor is supplied by four important power plants: Kappar (2,420 MWcapacity), Connaught Bridge (828 MW), Genting Sandyen (762 MW) and Putra Jaya (625 MW). All of these plants are grid-connected power plants. In this scenario constructing a new fossil fuel fired or renewable based captive power plant would be more costly than to continue using electricity from the grid. In addition, alternatives P4 and P5 do not take advantage of the waste disposed in the landfill. Hence P4 and P5 are not considered realistic and credible alternatives. LFG 3 is eliminated, as incinerators are not an effective option in tropical climate due to high moisture and organic content and low calorific value of waste. Incineration of solid waste in Malaysia is only 5%. RINA confirmed the same from Asian Cities in the 21st Century: Contemporary Approaches to Municipal Management Vol. 4 Partnerships for Better Municipal Management, ADB, which was cross referred to secondary evidence in "Policy brief on zero waste management" UN assisted International PoPs elimination Project (IPEP) in Indonesia, Malaysia and Philippines, dated March 2006 /55/, as per this report, "Incineration has very limited use for municipal solid waste and has not had much success in the cities of Asian developing countries where it has been installed, because most of these cities have encountered many problems with imported incinerators, either due to design problems or high operating and maintenance costs." The validation team confirmed that incineration is not common practice in Malaysia. Hence it is not a feasible alternative. The alternatives taken into consideration, after sub-step 1a) are LFG1, LFG2, P1, and P6

Outcome of Sub- step 1b: Consistency with mandatory laws and regulations:



## VALIDATION REPORT

Based on the following regulations which are applicable to Malaysia all the LFG alternatives, LFG1 and LFG 2 and power generation alternatives, P1 and P6 comply with the mandatory laws and regulations /14/ to /16/:

The Solid Waste and Public Cleansing Management Act 2007 (Act 672): regulatory framework for managing solid waste from generation to treatment and disposal.

- The Environmental Quality Act 1974 (Act 127): Order 1987 main legislation regulating the environmental management in Malaysia./15/
- Electricity Supply Act 1990 (Act 447): regulatory framework for electricity supply industry. /16/

RINA verified the above regulations and confirm that no legislation currently requires collecting, recovering, utilizing and/or destroying landfill gas. Alternatives LFG1 and LFG2 therefore comply with mandatory laws and regulations. No law regulating electricity generation interferes with the construction of power plants, either producing electricity for internal use or providing power to the grid or to the local users, hence alternative P1, and P6 are in compliance with the mandatory laws and regulations. The validation team confirms that in Malaysia there are no policies or requirement governing the collection and utilization of landfill gas. The alternatives taken into consideration, after sub-step 1b) are combinations of baseline options of either LFG1 and P1 or LFG2 and P6

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

Electricity imported from the grid has been identified as the baseline. RINA verified this from the report on Electricity Supply Industry in Malaysia, Performance and Statistical Information 2009, Suruhanjaya Tenaga (Energy Commission) Electricity supply in Malaysia 2006, Performance and Statistical Information, Suruhanjaya Tenaga (Energy Commission) /54/. As per this report the whole of Malaysia is supplied by power plants with higher installed capacity than the demand. The maximum demand of peninsular Malaysia was 14245MW during the year 2009 and the total installed capacity in the grid is 21817MW. In Malaysia, grid electricity is available in abundance and there is no supply constraint in 2009 that is during the restart of the project activity. The baseline scenario for the energy component is that electricity is obtained from the grid through predominantly gas based power plants as mentioned earlier. Hence electricity supply from the grid has been identified as the baseline fuel and alternatives LFG1, LFG2, P1 and P6 are feasible baseline scenarios for the project activity.

**Outcome:** Following the steps 1 and 2, project participant has identified electricity imported from the grid as the baseline option and the alternatives LFG1, LFG2, P1 and P6 as feasible baseline scenarios of the project activity. The PP further demonstrated that LFG 1 and P1 are not economically attractive as discussed below in section of “Additionality” and narrowed down on LFG2 and P6 as credible alternative to the project activity.

RINA was able to verify all the documented evidence listed above during the validation process and can confirm that:

- all the assumptions and data used by the PP are listed including their references and sources;
- all documentation used and listed above, are relevant to determine 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 evidences as quoted and can be deemed reasonable;
- relevant national/sectoral policies are considered and listed in the PDD;
- the approved baseline methodology ACM0001 version 11 “Consolidated baseline and monitoring methodologies for landfill gas project activities” has been correctly applied to

## VALIDATION REPORT

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.

### 3.6 Additionality

According to the approved baseline and monitoring methodology ACM0001, "Consolidated baseline and monitoring methodologies for landfill gas project activities", version 11 of 28/05/2009 /05/, the additionality of the project has been established applying the "Tool for demonstration and assessment of additionality", version 6.0.0 /06/

The above opinion of RINA to the additionality of the proposed project is further explicitly explained in the following steps.

#### 3.6.1 Prior consideration of the clean development mechanism

In line with paragraph 67 of EB41 /56/ meeting report, the starting date of the project activity is 16/03/2009 and it corresponds to the first financial commitment on implementation of the project which is the date of first invoice 16/03/2009 /53/ for repairing one engine being the earliest, significant, expenditure made for the restart of the project activity has been considered as the start date of the project activity, which is in line with the CDM Glossary Terms /27/. This is further confirmed with the letter ref 2011-001-S /99/ from CDM Executive Board dated 20/12/2011, which mentions that term implementation in the Glossary of CDM refers /27/ to either construction or operation of the project activity. If a project started, stopped and then restarted due to consideration of CDM benefits of the CDM, this can be considered as a restart. Here the project was started in 2004 stopped in 2007 and restarted in 2010 /46/ /47/ due to consideration of CDM benefits /100/ hence considered as restart of project as per the glossary of CDM terms /27/

As discussed in section 3.3 of this report, the proposed project activity is a restart /99/ of the CDM project activity commissioned during 09/04/2004 /46/. The landfill gas collection system and power plant completely stopped operating from 30/05/2007 /46/ as the engines broke down due to lack of prior experience of PP /77/ on a Malaysian landfill gas collection system and LFG based power projects.

Since the start date of the proposed project is after 02/08/2008 and the identified start date is prior to 24/05/2011 when the PDD was published for global stakeholder consultation, the PP needs to demonstrate that the CDM was seriously considered in the decision to implement the project activity, and the benefits of CDM were a decisive factor in the decision to proceed with the project and that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation. During the course of validation RINA noted that the project started its initial validation in the year 2007 and the PDD was first uploaded for global stakeholder comments on 06/01/2007. Thus, it is clear that the PP was aware of CDM and the CDM was seriously considered in the implementation of the project activity. The PDD has been webhosted for GSC, three times prior to the web host of the project activity by RINA for restart of the project activity, The second and third upload were due to revision of methodology, the period of webhost was cross checked with date of revision of methodology and hence accepted. Deliberation of project chronology is discussed in detail below in this section. PP had also obtained LoA for the project activity from the host country DNA on 13/02/2009 /57/. Hence both the UNFCCC and DNA were already informed about the project activity prior to the start date of the project activity and does not require a separate notification using standardized form F-CDM-Prior Consideration /13/. It was further noted that though the LFG collection, flaring and utilization system stopped operating, the PP continued the validation activities in getting the CDM status for the project activity till 03/05/2008 /56/. Hence, this clearly demonstrates the project developer's awareness of the CDM and importance of CDM revenues for the development of the project.

The timeline of implementation of the project illustrated below has been reviewed and considered to be valid and realistic.

## VALIDATION REPORT

Date	Activity	Evidence
04/09/2002	Signature of an agreement between the State Government of Selangor, Worldwide Landfills Sdn. Bhd. (WLSB) and Jana Landfill Sdn. Bhd (JLSB), a 100% owned subsidiary of Tenaga Nasional Berhad Energy Services Sdn. Bhd (TNB-ES). According to this agreement, JLSB is granted the right to exploit the landfill gas to generate electricity	Agreement /58/ mentions that WLSB owns the landfill and TNB ES through JLSB has right to exploit gas for power generation. Hence accepted that the project in the beginning, in 2002 was owned 100% by TNB ES.
09/04/2004	Start of operation of the power plant. The power plant is owned and operated by a 100% owned subsidiary of TNB-ES	TNB Corporate report 2003 /59/ says JLSB a 100% owned subsidiary of TNB ES and in turn TNB ES is a 100% subsidiary of TNB. Account statement of electricity delivered to TNB /47/ gives the period of start of power generation and export. Hence start date of operation accepted.
17/08/2005	WLSB acquires 30% of JLSB by investing 1,620,030 RM. JLSB is then owned 70% by TNB-ES and 30% by WLSB	Agreement /60/ confirms activity, hence accepted. Further Immediately after investing 30% shares in the project on 17/08/2005 /60/, WLSB have taken steps to secure CDM status which is demonstrated by the Board minutes dated 06/01/2006 /61/ /62/ and the project validation started on 06/01/2007 when the PDD version 1 was first webhosted /56/.
10/10/2005	Board decision to start up a CDM project,	Board meeting /61/ clearly confirms that CDM was considered for the continued operation of the plant suffering losses due to insufficient revenues. This is further confirmed in the board meeting minutes of 06/01/2006 /62/ that the board agreed to develop a CDM project for continued operation of the plant Hence PP's prior consideration of CDM for the continuous operation of the plant since 10/10/2005 was accepted, which is when the PP became a shareholder of the project activity /60/.
06/01/2006	Board decision to appoint Ecair Holdings BV as the CDM consultant	Board meeting /61/ /62/, wherein the Board approved appointment of Ecair Holdings BV as the CDM consultant for the project activity, Board decided to Ecair will bear all costs related to registering of the project activity. Hence Ecair had contracted the DOE
04/08/2006	MoU between WLSB and Ecair Holding BV for feasibility study.	Board meeting minutes /63/ confirms the activity, hence accepted. Further here the board's approval was sought for formation of a Joint Venture involving Ecair Holding BV and WLSB. Including Ecair as a PP and the CDM benefits would be shared. All expenses related to validation of the project activity will be borne by Ecair.



## VALIDATION REPORT

04/10/2006	Engine no.1 break down. Stop operations of one engine	TNB confirmation, /46/ the state electric utility confirms stop of one engine, which was holding 70% shares at that point of time and the electricity off taker, hence accepted.
06/01/ 2007	PDD 1st upload for validation	UNFCCC website /100/, hence accepted.
19/03/2007	Submission of the project to the Host Party DNA.	Board meeting minutes /63/ mentions about status of CDM project and submission of the project to the host party DNA
24/04/2007	PDD 2nd upload for validation	UNFCCC website, uploaded once again due to revision of methodology, cross checked with date of revision of methodology and hence accepted.
30/05/2007	Engine no.2 break down. Total stop of operation of the power plant after both engines broke down	TNB confirmation /46/. The state utility and the electricity off taker, hence accepted.
21/08/2007	Addendum to the PPA: increase of the electricity purchasing price to 19.0 sen/kWh	Supplement agreement /67/ demonstrates that the project is financially not favorable.
03/05/2008	PDD 3rd upload for validation	UNFCCC website uploaded once again due to revision of methodology cross checked with date of revision of methodology and hence accepted.
18/07/2008	Share sale agreement: TNB-ES agrees to sell 50% of its shares in JLSB to WLSB	Agreement /64/ details that to own 80% of shares, 50% shares worth of RM.2,700,000 is to be sold by TNB ES and bought by WLSB, hence accepted.
29/01/2009	Authorization of the Energy Commission to proceed with the transfer of shares of JLSB	Letter from Energy Commission /65/ confirms activity, hence accepted.
13/02/2009	Host country's letter of Approval	LoA /57/
16/03/2009	First invoice for repairing one engine. Start date of the project activity: financial commitment to recommence the implementation of the project	Invoice /53/, the earliest invoice, first significant investment made for the restart of the project activity, as per Glossary of CDM terms on start date of project activity /27/. This was also confirmed by the letter from CDM Executive Board dated 20/12/2011 /99/ clarifying on restart of the project activity with CDM revenues, hence accepted
15/04/2009	Authorization of the Economic Planning to proceed with the transfer of shares of JLSB. WLSB acquires the project equipments by acquiring the majority shares in a Joint Venture with TNB-ES	Letter from Economic Planning /66/ approving share transfer from the Government of Malaysia, hence accepted
29/05/2009	Addendum to the PPA: increase of the purchasing price to 21.0 sen/kWh	Second supplement agreement /68/, demonstrates that the project is financially not favorable
23/06/2010	Re-start of operation of the power plant (one engine)	Account statement of electricity delivered to TNB /47/. The state utility and the electricity off taker.
26/04/2011	Contract between Ably Carbon (CDM	Contract /70/. Ably Carbon is CDM

## VALIDATION REPORT

	consultant) and WLSB	consultant as well as the PP.
02/05/2011	Contract between RINA and Ably Carbon	Signed acceptance of contract /78/
24/05/2011	PDD 4th upload for validation	UNFCCC website, webhosting of the restarted /99/ project activity.

RINA has assessed and verified the evidence related to timeline for serious CDM consideration and the real and continuing action to attain CDM status of the project activity in line with Annex 13 of EB 62 /13/. Immediately after investing 30% shares in the project on 17/08/2005 /60/, WLSB have taken steps to secure CDM status which is demonstrated by the Board minutes dated 06/01/2006 /61/, appointment of Ecair as the CDM consultant /62/ MoU between WLSB and Ecair Holding BV for feasibility study on 04/08/2006 /63/ formation of joint venture with Ecair Holdings BV and including Ecair Holdings BV as a PP 19/03/2007 /63/ and the validation start of the project activity on 06/01/2007, details available in UNFCCC website. Since Ecair, a PP is responsible for CDM registration of the project activity, Ecair appointed TUV Rheinland as the DOE /63/. Also PP has simultaneously made continuous requests to TNB to increase power tariff /67/ /68/. Though the power plant and LFG collection system were not in operation from 2007 to 2010 /46/, PP had made continuous efforts to secure CDM status, demonstrated by the third webhost of the project activity by TUV Rheinland on 03/05/2008 and PP had obtained host country approval for the project activity on 13/02/2009 /57/. As intimated by the PP, the project validation was not moving forward due certain issues with Ecair, and hence Ecair moved out of the project activity, hence the contract with DOE is also terminated. Termination of contract was confirmed by verifying the UNFCCC website and based on email dated 03/02/2011 /69/ from Mr. Norbert Heidelmann, Business Manger Carbon Services, TUV Rheinland. PP changed the consultant for the project activity and appointed Ably Carbon on 26/04/2011 /70/. Thereafter RINA was appointed as the DOE and project activity was webhosted on 24/05/2011, confirming serious prior consideration of CDM for the project.

In conclusion, in accordance with the requirements of the Guidance on the demonstration and assessment of prior consideration of the CDM/13/ and VVM/04/, RINA can confirm that the CDM was considered seriously in the decision to implement the project activity.

### 3.6.2 Identification of alternatives

As discussed in section 3.5.2 of this report the identified alternative scenarios for the project activity are consistent with all applicable and enforced legislation. The alternative scenarios that have been considered, as required by the approved methodology AMC0001 version 11 are:

(a) LFG1: the proposed project activity undertaken without being registered as a CDM project activity. As demonstrated in the following section, in absence of a CDM being developed, the only revenues from the electricity production are insufficient to cover the project investment costs and the operational costs. It is therefore not considered a realistic baseline scenario. (b) LFG 2: atmospheric release of Landfill gas or partial capture of landfill gas and destruction that means the continuation of the current situation. As demonstrated it complies with regulations and contractual requirements for addressing safety and odor concerns. In addition six alternatives have been considered for the power generation and (c) scenario P1 Power generated from landfill gas undertaken without being registered as CDM project activity is not a likely baseline scenario since the electricity revenues do not cover all the investment and operation costs required fro power generation from landfill gas; (d) scenario P6 existing and/or new grid connected power plants that means the continuation of the current situation.

As discussed in the following section of this report the baseline scenario for the project activity, as the most likely scenario in the absence of the proposed project activity, is therefore the total atmospheric release of the landfill gas (LFG2) and the electricity is obtained from an existing/new grid connected power plant (P6).

The project proponent has justified the selection of the baseline scenario in line with the applied methodology and RINA can confirm the same is deemed reasonable.

## VALIDATION REPORT

### 3.6.3 Investment analysis

#### 3.6.3.1 Choice of approach

The PP has selected investment analysis to demonstrate additionality using “Tool for the demonstration and assessment of additionality”, Version 6.0.0 /06/. The project developer has chosen to apply the benchmark analysis method and has identified Net Present Value as the most suitable financial indicator. Additionality Tool (Ver. 6.0.0) /06/ recommends a financial/ economic indicator such as IRR or NPV, for demonstrating the additionality using benchmark analysis. RINA considers NPV to be a suitable indicator on account of the following:

1. The project generates revenue from the sale of electricity, hence simple cost analysis is not suitable for the project activity /29/.
2. The alternative to the project activity is supply of electricity from the grid and release of greenhouse gases into the atmosphere. Hence Investment comparison analysis is not appropriate in accordance with Guidelines on the assessment of investment analysis, version 05 of EB62, Annexure 5 /29/.
3. NPV is the difference between the present value of cash inflows and the present value of cash outflows. NPV is often used in capital budgeting to analyze the profitability of an investment or project. All other things being equal, using internal rate of return (IRR) and net present value (NPV) measurements to evaluate projects often results in the same findings. However, there are a number of projects for which using IRR is not as effective as using NPV to discount cash flows. However NPV is more effective when there are complex cash flows.
4. Further the PP selected NPV as the appropriate financial indicator as the revenues from the project activity without CDM are too low to reach a positive IRR.

#### 3.6.3.2 Discount rate

The PP has selected NPV as the appropriate financial indicator and has used 10.9% as the discount rate in the calculation of NPV. RINA considers this rate to be acceptable as:

- the PP expects to fund the project wholly from equity and
- this is the rate that has been suggested by Guidelines on the assessment of Investment Analysis Version 5 /29/ as the default values for the approximate expected return on equity for different project types and host countries. 10.9% is the rate that has been suggested by the guidelines as the expected return on equity for Waste handling and disposal projects in Malaysia.

#### 3.6.3.3 Input parameters

At the time of submission of the PDD, as communicated by the PP, had implemented other projects (It operates the sanitary landfills of Ayer Hitam, Jeram, Tanjung DuaBelas, Kunag Badak, the inert landfills of Dengkil, Kuang, the dumpsites of Kampong Sungai Kertas and Kampong Sungai Kembong, as well as the transfer station of Shah Alam) in the same sector in Malaysia. The investment analysis prepared at the time of decision making was based experience of the PP's project team /39/ in the implementation of these projects, as well as quotes from the suppliers and other third party evidences available at the time of decision making; this meets the requirement as per the guidance number 6 of guidelines on investment analysis /29/. In order to validate parameters that had been based on internal evidence, the PP has provided two sets of investment analysis /18/. The first one was prepared at the decision making date and has been the basis for the validation. Additionally the PP has also provided an analysis based on actual costs to date. We have therefore used the second financial analysis for cross verification. All the costs in the second financial analysis are based on invoices and contracts from third parties. The PP has also submitted a certificate from Wan Mohd Kamal Abdul Majid, of Saidy Ridzah associates- Chartered Accountants /44/ which confirms the total capex costs.

## VALIDATION REPORT

RINA accepted this approach as it was found that the actual costs were higher than the estimates and hence the estimates are conservative and therefore acceptable. The following table shows the validation assessment for both sets of data.

Parameters	Value at decision making date	Value based on actuals	Source	Validation Assessment and cross checking
<b>Capital Expenditure</b>				
	MYR	MYR		
<b>2009</b>				
Recoverable asset value	5,400,000	5,400,000	Share sale agreement /64/ dated 18/07/2008 between TNB Energy Services SDN BHD and Worldwide Landfills SDN BHD.	<p>The share sale agreement was entered into in July 2008 in order to acquire 50% of the assets of Jana Landfill. On this date the assets of Jana Landfill was valued at 5,400,000 MYR /64/. Since the shareholders agreement was available on the date the decision to recommence the project was taken, and is a valid document between two unconnected third parties, cross verified against the Energy approval letter dated January 2009 /65/. This is also consistent with guidance number 7 of the guidance on investment analysis /29/ which mentions that capital costs incurred prior to the revised project activity start date can be reflected as the recoverable value of assets which are limited to potential reuse/resale of tangible assets and hence it has been accepted.</p> <p>The investment analysis had been prepared at the decision making date based on the original quotation received from JD Energy systems /79/. The letter confirms that the payment to be made for the first overhaul. Further certified by chartered accountant dated 02/11/2011 /44/</p> <p>The PP has carried out the cash flow for 100% of the costs and revenues. RINA accepted this approach as the project IRR will be the same whether the cash flow is prepared at 100% or 80%.</p>
1 <sup>st</sup> engine			Quote received	Verified against the quote received

## VALIDATION REPORT

overhaul	843,100	1,081,270	from JD Energy Systems SDN BHD /79/ dated 04/02/2009	from JD Energy systems /79/. Accepted as it is a third party document available on the decision making date, and documented in Board minutes dated 03/03/2009 /73/. Cross verified against actual invoices from JD Energy systems, Dura cooling Tech SDN BHD, Kejuruteraan Elektro Mega and Energy Cooling System /80/ further certified by chartered accountant dated 02/11/2011 /44/
1st GDU overhaul	265,518	-	Quotation /81/ received from Energy Cooling systems dated 24/11/2008.	Verified against the quotation /81/. As the quotation was available at the decision making date hence accepted. The quotation is available in Euros, the corresponding value in MYR has been sourced from the Board minutes dated 03/03/2009, quoting the value in Euro and equivalent in MYR presented to the board /73/
Repair existing wells	35,535	-	Quotation from UNIFX Enterprise SDN BHD dated 08/04/2008 /82/	Cross verified against the quotation and actual invoices /80/ and /44/.
2010				
Gas wells and pipelines	500,000	782,418	The original estimate at the decision making date was based on the PP's expertise. This is now supported by invoices from suppliers /83/.	Actual costs are verified against invoices received /83/ from suppliers. The original costs were based on the PP's expertise in implementation of other similar projects and is now supported by invoices from suppliers , also certified by Chartered accountant /44/
2011				
Gas wells and pipelines	500,000	1,757,891	The original estimate at the decision making date was based on the PP's expertise. This is now supported by Board resolution	Actual costs verified against Board resolution dated 16/12/2010 /84/ to award the contract of post closure works to SGB Engineering Sdn Bhd. Actual costs have been certified by Chartered accountant by certificate dated 02/11/2011 /44/. Hence accepted.
2 <sup>nd</sup> engine and GDU overhaul	1,108,600	1,150,000	The original estimate at the decision making date was same as that of the 1 <sup>st</sup> engine and GDU overhaul as above.	Actual costs verified against letter of appointment to JD Energy systems dated 28/02/2011. Further supported by Chartered accountant's certificate dated 02/11/2011 /44/. Hence accepted.

## VALIDATION REPORT

Monthly Operating expenditure				
Repair work	25,000	25,517	The original estimate at the decision making date was based on the PP's expertise. This is now supported by invoices from suppliers /86/.	Actual costs verified against invoices for the period June 2010 to April 2011 /86/
Pre-treatment unit	500	808	The original estimate at the decision making date was based on the PP's expertise. This is now supported by invoices from suppliers /87/.	Actual costs verified against invoices for the period October 2010 to April 2011 /87/.
Preventive maintenance	11,500	10,823	The original estimate at the decision making date was based on the PP's expertise. This is now supported by invoices from suppliers /88/.	Actual costs verified against invoices for the period June 2010 to April 2011 /88/
Oil / lubricant	13,000	12,667	The original estimate at the decision making date was based on the PP's expertise. This is now supported by invoices from suppliers /89/.	Actual costs verified against invoices for the period June 2010 to April 2011 /89/.
Total	50,000	49,814	Calculated	Calculation verified and found correct.
Annual cost per engine	600,000	597,763	Calculated	Calculation verified and found correct.
Annual cost for 2 MW	1,200,000	1,195,526	Calculated	Calculation verified and found correct, further it is noted that the NPV of the project is negative even on assuming this value void.
Electricity consumption	133,392	130,124	The original estimate at the decision making date was based on the PP's experience prior	RINA has verified this against, power consumption as per specifications of gas engine and chillers /42/, which is very high when compared to the assumption made by the PP based on actual



## VALIDATION REPORT

			to stop of the plant in 2007. This is now supported by invoices	electricity consumption at site, conservative, hence accepted. Further cost of electricity is assumed as per the actual invoices /91/, there has been no increase in power tariff from June 2006, until June 2011 as cross verified from TNB website /90/. Hence the cost and quantity of electricity assumed by PP is accepted.
Manpower / competency service	180,000	201,752	The original estimate at the decision making date was based on the PP's expertise.	Cross verified with invoices from contractors /92/ against the original estimates and found correct hence accepted
Insurance	48,000	47,747	The original estimate at the decision making date was based on the PP's expertise.	Actual costs verified against insurance notes /93/ from insurers and found correct hence accepted.
Maintenance pipes & network	50,000	41,537	The original estimate at the decision making date was based on the PP's expertise.	Actual costs verified against invoices from suppliers /94/ and found correct hence accepted.
Total Operational expense	1,611,392	1,616,685	Calculated	Calculation verified and found correct. RINA compared the overall operational expenses with other similar projects in Malaysia available at UNFCCC website bearing project IDs: 323, 927 and 2467 and found that to be around 170,000 Euro per MWh, using the conversion rate 4.85 MYR/Euro as per the board minutes dated 03/03/2009 /73/, this works out to 1,649,000, hence the assumption by PP is considered conservative and accepted.
Lifetime / Depreciation	15 years	15 years	Maintenance schedule provided by GE Jenbacher /51/ and Malaysian Accounting standards /95/	The operational lifetime of the project activity is 15 years and this has been confirmed by verifying the maintenance schedule provided by GE Jenbacher /51/ of the gas engine installed, which mentions the maintenance required till 60,000 hours of operation and mentions "After the overhaul 60,000 operating hours, the maintenance work to be carried out is repeated at the same interval periods", assuming

## VALIDATION REPORT

				<p>conservatively that only one overhaul can be made to the engine, a life time of 15 years is accepted.</p> <p>Malaysian Accounting standards /95/ requires the depreciable amount of a depreciable asset should be allocated on a systematic basis to each accounting period during the useful life of the asset. The PP has apportioned the value of the asset across the life time of the project and hence accepted.</p>
Tax rate	25%	25%	Statutory rate in Malaysia /96/ and audited accounts of PP/45/	Agrees to the tax rate /96/ included in the audited accounts /45/ of the PP hence accepted.
Scrap value	<p>Final scrap value MYR 100,000</p> <p>Scrap value of machine scrapped in 2019 is MYR 200,000</p>	<p>Final scrap value MYR 100,000</p> <p>Scrap value of machine scrapped in 2019 is MYR 200,000</p>	Malaysian Accounting Standards Board /95/	<p>Scrap value of RM 100,000 had been taken into account in the initial investment analysis. In the absence of national guidelines to calculate the scrap value, this value was based on 10% of the overhaul cost /79/ /81/. Even though the Malaysian Accounting Standards Board /95/ recommends ignoring the residual value of an asset, to be conservative, a scrap value of 200,000 MYR has been accounted as cash inflow when the first engine is removed. Similarly, a scrap value of 100,000 MYR has been accounted for the second engine at the last operational year. Hence accepted.</p>
Cash outflow on account of investment expenses				The cashflow for the initial investment has been spread over three years. This is in line with the actual expenditure for the project.
Unit price of electricity	0.210 MYR/kwh	0.210 MYR/kwh	Power purchase agreement dated 29/05/2009 /68/,	<p>Verified against publicly available documents /97/ at the date of decision making and found correct. It was noted that as per Handbook on the Malaysian feed-in tariff for the promotion of renewable energy of March 2011 /30/, the feed-in tariff for LFG based power projects of more than 4MW and less than 10MW is 0.38 RM/kWh and the rate is effective for a period of 16 years. However this is not enacted at the time of</p>



## VALIDATION REPORT

				decision making /98/ and purchase of shares in 2009 /65/ /66/. Hence accepted.
--	--	--	--	--

### 3.6.3.4 Calculation and conclusion

The PP has provided two sets of financial analysis to prove additionality. The first one that was based on inputs available at the time of decision making and a second financial analysis was based on actual costs. The initial financial analysis had been prepared using the PP's expertise in the field. The PP has provided support for most of the capex (circa 90% of capex) but has been unable to provide support for the operating expenses which had been prepared by the PP using their existing expertise in the field. To date the PP has implemented several projects in the area and the data from these projects had been used to prepare the assumptions for the investment analysis. In order to substantiate the expenditure, the PP has provided actual invoices for the expenditure incurred. As the actual expenditure was higher than the project estimates, this has been accepted.

We have reviewed the audited accounts of the PP for the years: 2008, 2009 and 2010 /45/ and can confirm the following:

1. The tax rates shown in the accounts /45/ agree to the tax rates used by the PP.
2. There is a term loan within the accounts but the PP has confirmed that the same was not for the project activity. The 2008 accounts show that there has been no goodwill on the acquisition of Jana landfill and therefore indicates that the price paid on acquisition is for the fixed assets of the company.

The assessment involves checking the data input taken from quotation/documents, adoption of correct accounting principle and arithmetical accuracy. RINA has checked the quotation/ documents and ensured that right input has been taken in the project cost and projections. The accounting principles adopted with respect to depreciation and tax are found to be correct. The arithmetical accuracy is also found to be correct.

### 3.6.3.5 Sensitivity analysis

The Guidance on assessment of investment analysis /29/ requires that the investment analysis should contain a sensitivity analyses that supports the robustness of the conclusion arrived at by varying the critical assumptions to a reasonable variation ( $\pm 10\%$ ). Accordingly the PP has carried out the following sensitivity analysis using (a) electricity price, (b) investment costs, and (c) operating costs. All of the above parameters constitute more than 20% of the project cost or project revenue.

The PP has carried out sensitivity analysis to understand the impact of a higher capacity (3MW) on the project IRR, reasonable variations of the parameters and their likelihood of reaching benchmark has been demonstrated for 3 MW capacity as below:

Parameter	Changes/variation Decision making date		3MW capacity	Break even point
Electricity price	+10%	-5,294,625 MYR	-6,407,203 MYR	An increase of 58% in the tariff is required. The tariff used is as per the power purchase agreement dated 29/05/2009 /68/. A sharp increase of 58% from the first year of operation is not possible.
	-10%	-7,578,507 MYR	-9,390,756 MYR	
Investment Cost	+10%	-7,322,356 MYR	-8,875,704 MYR	The Investment costs will need to be reduced by 81%. This is not possible as costs have already been incurred.
	-10%	-5,503,948 MYR	-6,874,159 MYR	

## VALIDATION REPORT

Operating Costs	+10%	-7,001,774 MYR	-8,781,733 MYR	Operating costs will have to be reduced by 98% which is not possible as actual operating costs have been incurred and a reduction of 98% is not possible.
	-10%	-5,831,527 MYR	-6,985,983 MYR	

The sensitivity analysis carried out by the PP demonstrates that the NPV of the project is negative and continues to be negative under all circumstances in the absence of the CDM revenue and hence RINA concludes that the project is additional.

### 3.6.4 Common practice analysis

The project participant has selected host country as the geographical area to demonstrate common practice analysis since the regional data is not available. RINA accepts the same as it is conservative and the default boundary as given in the additionality tool /06/. The measure applied is methane destruction as per paragraph 6 of the additionality tool /06/ and the output of the project is to capture LFG and utilize for electricity generation. While applying paragraph 47 of the additionality tool /06/ it is noted that there are no plants that deliver the same output or capacity, within the applicable output range as per Step 1, as that of the proposed project activity that have started commercial operation before the start date of the project as demonstrated herein. As per the UNDP study on waste management model for Penang dated Feb 2008 /71/ "Overall institutional and organizational arrangements for solid waste management at the federal, state, and local authority levels have generally been weak and lack the resources for effective planning and management of waste. Such shortcomings are also evident in the day-to-day management of solid waste by states and local authorities: data on solid waste are often lacking and there is little forward planning. In rural areas, there is hardly any waste collection and households tend to undertake their own waste disposal by burial in proximity to their dwellings or in communal bins serviced periodically by contractor. Consequently, unofficial dumping and development of many small dumpsites is widespread". According to the report from DANIDA Study of 2004 /35/ there were approximately 245 landfills in Malaysia, of which 145 are considered as "active landfills" (excluding closed landfills and landfills with no data record). The report indicates that only 4 landfills have implemented a LFG recovery system: Ayer Hitam, Selangor (the project landfill site); Larkin, Johor; Krubon, Melaka and another landfill in Johor.

- The landfill gas project in Larkin is subsidized by the Commonwealth Department
- The project of Krubon, project reference number 0323, is registered under the CDM
- Two landfills in Johor are also developing a CDM project: the landfill of Kampung Kelichap in Batu Pahat is currently under validation and the landfill of Seelong in Johor Bahru, project reference number 0927, is also registered under CDM

As available in the UNFCCC website /103/, four other landfills have implemented or plan to implement a LFG recovery system; all of them are CDM projects: Bukit Tagar project reference number 2467 and Taman Beringin, project reference number 1925 landfills in Kuala Lumpur, and Kuantan landfill Project reference number 1652. Penang landfill LFG gas recovery project is under validation. However except for Ayer Hitam none of the eight projects have yet started commercial production of electricity using recovered LFG /103/. Hence as per paragraph 47 of the additionality tool /06/ the factor F becomes null. This clearly demonstrates that LFG recovery is not a common practice in Malaysia. Excluding the Larkin landfill gas project, which is subsidized by the Commonwealth Department /35/ all other activities similar to the proposed project activity have been implemented or are planned to be implemented in the framework of the CDM /103/.

Thus the validation team confirms that in Malaysia LFG collection, flaring and utilization is not a common practice. In summary, it is sufficiently demonstrated with the NPV analysis and common practice analysis, that the project is not a likely baseline scenario and that the emission reductions occurring from this will hence be additional.

# VALIDATION REPORT

## 3.6.5 Conclusion

RINA can confirm that all data, rationales, assumptions, justifications and documentation provided by the project participants to support demonstration of additionality are credible and reliable.

By assessing the evidences presented and cross-checking the information contained in, RINA considers the reasoning for the proposed project additionality demonstration is credible and reasonable i.e. the proposed project has the ability to reduce anthropogenic emissions of greenhouse gases by sources below those that would have occurred in the absence of the registered CDM project activity.

## 3.7 Monitoring Plan

The approved baseline and monitoring methodology ACM0001, "Consolidated baseline and monitoring methodologies for landfill gas project activities", version 11 of 28/05/2009 /05/ has been applied.

The monitoring plan is in accordance with the monitoring methodology; the monitoring plan will give opportunity for real measurement of achieved emission reductions.

RINA has checked all the parameters presented in the monitoring plan against the requirements of the methodology; no deviations relevant to the project activity have been found in the plan.

RINA confirms that the monitoring arrangements described in the monitoring plan are feasible within the project design, and the means of implementation of the monitoring plan are sufficient to ensure the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified.

### 3.7.1 Parameters determined ex-ante

Following are the list of ex-ante parameters, determined at the restart of the project activity and in accordance with the methodology and tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site, tool to calculate baseline, project and/or leakage emissions from electricity consumption.

1. Global Warming Potential of methane ( $GWP_{CH_4}$ ) : for the first commitment period is  $21tCO_2e/tCH_4$  (default values as per IPCC guidelines 2006) This value is adopted from the methodology ACM0001 /05/
2. Density of methane ( $D_{CH_4}$ ):  $0.0007168tCH_4/m^3CH_4$ . This value is adopted from the methodology ACM0001 /05/.
3. Adjustment Factor (AF): 0%. as there is no enforced regulatory or contractual requirements for LFG collection/utilization in Malaysia. During site visit it was observed that there is no collection / destruction of LFG at the landfill site. Hence the adjustment factor assumed as zero is accepted.
4. Carbon emission factor of electricity  $CEF_{elec,BL,y} = CO_2$  emissions intensity of the baseline source of electricity displaced, in  $tCO_2e/MWh$ . Value applied is  $0.672 tCO_2/MWh$  calculated using the Tool to calculate the emission factor for an electric system", version 02.2.1 /10/ as the weighted average of OM and BM). The weight of OM and BM are selected for the first crediting period as 0.5 as requested for renewable power plant by the methodological tool. The combined emission factor is determined ex-ante based on the most recent official sources available in the host country the "Study on Grid Connected Electricity Baselines in Malaysia Year: 2008" published by PTM (Malaysia Energy Center) /34/. Details are included in section 3.8 of this report. The appropriateness and validity of the report is confirmed by cross verifying with the website of the Malaysian Green Technology Corporation./72/.
5. Average technical transmission and distribution losses (TDLy): 20% (Default values according to the Tool to calculate baseline, project and/or leakage emissions from electricity consumption).
6. Fraction of methane captured at the SWDS and flared, combusted or used in any other manner, (f): 0 (Defined by the methodology ACM0001, Version 11).

## VALIDATION REPORT

7. Model correction factor ( $\phi$ ): 0.9 (as per the "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site")/07/
8. Fraction of methane in the SWDS gas (volume fraction), (F): 0.5 (as per the "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site")/07/
9. Oxidation factor (OX) – 0.1 (as per the "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site") /07/. Since the site is managed solid waste disposal site covered with soil as observed during site visit, the value of 0.1 has been applied, conservative.
10. Fraction of degradable organic carbon than can decompose  $DOC_f$  – 0.5 (Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site / IPCC 2006 Guidelines for National Greenhouse Gas Inventories).
11. Methane Correction Factor (MCF) – 1 (Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site / IPCC 2006 Guidelines for National Greenhouse Gas Inventories /26/). The landfill meets the criteria, controlled placement of waste, cover material, mechanical compacting, and leveling, hence considered as an anaerobic managed landfill. RINA confirmed the same during the site visit.
12. Fraction of degradable organic carbon in the waste type j, ( $DOC_j$ ), on wet basis - default values as per IPCC guidelines 2006, the wastes entering the landfill site are weighed wet and this was confirmed during site visit, the value assumed is also conservative.
13. Decay rate for the waste type j ( $k_j$ ) – default values as per IPCC guidelines 2006, Volume 5, Table 3.3: Tropical (MAT >20°C), wet (MAP >1000mm). It is noted that the Mean average temperature for the region of Kuala Lumpur, Malaysia is 27°C and average rainfall is 2,394 mm. RINA confirmed the same from the website Worldclimate /74/, which gives the long-term averages from weather stations near to the project activity.
14. Recovery rate (Rr): 60%. Recovery rate was estimated based on the PPs internal expertise and as per their standard calculation internally developed /75/ for the proposed project. As per the 2006 IPCC guidelines, Chapter 3 of Volume 5, methane recovery from landfills vary between 10 and 85% /26/. As verified during site visit the landfill site was a standard anaerobic landfill. Also the PP has used an optimistic recovery rate of 80%, corresponding to installation of 3MW gas engines in the investment analysis to prove that the project does not cross the benchmark selected. Hence the value assumed by the PP is accepted to be conservative. Also lower the methane generation, it brings down the feasibility of the project. Hence the value chosen by PP is considered sufficient and accepted.

All these values taken for the calculations are as per the methodology or IPCC guidelines or default values as per the corresponding tools. The same are also transparently discussed in the PDD. Being conservative, the RINA validation team accepted these values.

### 3.7.2 Parameters monitored ex-post

The project has been started however the monitoring systems as required by the methodology will be installed on successful registration of the project activity. However, the PP has proposed to monitor the following parameters according to the approved monitoring methodology, ACM0001, version 11, dated 28/05/2009 /05:

1. Amount of LFG captured in  $Nm^3$  ( $LFG_{total,y}$ ) : measured by flow meter, continuous monitoring, and reporting once a month. Temperature and pressure is not separately monitored, as the flow meters used automatically monitor and expresses LFG volumes in  $Nm^3$
2. Amount of LFG combusted in power plant in  $Nm^3$  ( $LFG_{electricity,y}$ ): measured by flow meter, continuous monitoring, and reporting once a month. Temperature and pressure is not separately monitored, as the flow meters used automatically monitor and expresses LFG volumes in  $Nm^3$ . However if provision to obtain temperature and pressure readings are available in the meter this would be reported once per month as given below.
3. Amount of LFG flared in  $Nm^3$  ( $LFG_{flare,y}$ ): measured by flow meter, continuous monitoring, and reporting once a month. Temperature and pressure is not separately monitored, as the flow

## VALIDATION REPORT

meters used automatically monitor and expresses LFG volumes in  $\text{Nm}^3$ . In case  $\text{LFG}_{\text{flare}}$  is not monitored, emission reductions will not be claimed for the excess LFG that will be flared, whether in an open or enclosed flare.

4. Average fraction of methane in the LFG % ( $\text{WCH}_4$ ) as  $\text{m}^3\text{CH}_4/\text{m}^3\text{LFG}$ : measured by continuous gas analyzer, continuous monitoring, and reporting once a month.
5. Temperature (T) of LFG in  $^{\circ}\text{C}$ : measured by temperature sensor, continuous monitoring, and reporting once a month.
6. Pressure (P) of LFG in Pa: measured by pressure sensor, continuous monitoring, recording every minute and reporting once a month.
7. Net amount of electricity generated in MWh ( $\text{EL}_{\text{LFG}}$ ): Measured by electricity meter(s) The electricity generated, sent to the grid and/or used onsite will be monitored separately for each user and energy balance will be maintained. This does not have any significant impact on the project as in the baseline the onsite energy consumption is from the grid. Recording and reporting frequency to be determined according to the requirements of the electricity off-taker(s).
8. Quantity of electricity consumed by the project in MWh ( $\text{E}_{\text{CPJ,y}}$ ): Measure by electricity meter (separate electricity meter will be used to monitor the electricity consumed at site and in case there are several sources of electricity in use (grid, backup generator, renewable sources), the electricity imported from each source will be monitored separately. Continuous monitoring, recording and reporting at least once a quarter, aggregated manually via onsite meter are ensured.
9. Operation of the energy plant in hours: by hour counter, continuous monitoring, recording and reporting frequency to be determined according to the requirements of the electricity off-taker.

The following are the parameters related to monitoring of methane destruction efficiency of the flare, which will also be monitored throughout the crediting period in line with the "Tool to determine project emissions from flaring gases containing methane" /08/. The parameters and the means of measurement of the parameters are as under.

1. Volumetric fraction of component methane in the residual gas in the hour h ( $\text{fv}_{\text{i,h}}$ ): measured by continuous gas analyzer. Monitoring frequency is continuous. Values to be averaged hourly or at a shorter time interval. Measurement is done on dry basis even when the residual gas temperature exceeds  $60^{\circ}\text{C}$ . As a simplified approach, project participants will only measure the methane content of the residual gas and consider the remaining part as  $\text{N}_2$ .
2. Volumetric flow rate of the residual gas in dry basis,  $\text{m}^3/\text{h}$  ( $\text{FV}_{\text{RG,h}}$ ): measured by flow meter. Monitoring frequency is continuous. Values to be averaged hourly or at a shorter time interval. Measurement is done on dry basis even when the residual gas temperature exceeds  $60^{\circ}\text{C}$ .
3. Volumetric fraction of  $\text{O}_2$  in the exhaust gas of the flare in the hour h ( $\text{tO}_{2,\text{h}}$ ): measured by continuous gas analyzer. Monitoring frequency is continuous. Values to be averaged hourly or at a shorter time interval.
4. Concentration of methane in the exhaust gas of the flare in dry basis at normal conditions in the hour h,  $\text{mg}/\text{m}^3$  ( $\text{fv}_{\text{CH}_4,\text{FG,h}}$ ): measured by continuous gas analyzer. Monitoring frequency is continuous. Values to be averaged hourly or at a shorter time interval.
5. Temperature in the exhaust gas of the flare (T) in  $^{\circ}\text{C}$ : measured by thermocouple. Monitoring frequency is continuous.
6. Other flare operation parameters: This include all data and parameters that are required to monitor whether the flare operates within the range of operating conditions according to the manufacturer's specification including a flame detector in case of open flares, for the PP to use default values in the Tool /08/.

Relevant regulations for LFG project activities will be monitored at the renewal of each credit period. Changes to regulation will be converted to the amount of methane that would have been



## VALIDATION REPORT

destroyed/combusted during the year in the absence of the project activity ( $MD_{BL,y}$ ). The same is also discussed in the PDD in section B.6.2.

Parameters as required by the Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site /07/ are not required to be monitored as the project is on a closed landfill and as such no wastes are expected to be avoided from being disposed at solid waste disposal sites on account of the project activity.

The monitoring plan contains all necessary parameters as discussed above. The means of monitoring described in the PDD complies with the requirements of the methodology ACM0001, Version 11 /05/.

### 3.7.3 Management system and quality assurance

From the PDD and the discussions with the PP during site visit, it was confirmed that project implementation, operation and maintenance, collection, storage and monitoring of data are the responsibility of the General Manager, WLSB. However the CDM consultancy services will be provided by Ably Carbon. During the site visit, it was found that other than electricity imported and exported no other parameter is monitored. PP informed during site visit that all such monitoring instruments as required by the methodology /05/ will be installed once the project is registered. However RINA confirms that the monitoring arrangements described in the monitoring plan are appropriate and feasible within the project design and since the proposed monitoring is reliable and in line with the requirements of the tool, the validation team accepted the same.

Calibration of all the measuring instruments is planned to be done periodically or as per the manufacturer specification or national/international standards, as available. As indicated in the PDD, the PP will identify the procedures to deal with malfunction of equipments, data discrepancies and the storage of data. The data necessary for estimating or measuring the GHG emissions within the project boundary are measured by the instruments, where the data would be collected in data acquisition and transmitted to modem. Collection and storage of data is through automatic transmission. It is stated that in case the automatic transmission fails the PP will rely on the manual transmission. The data will be stored up to two years after the end of crediting period or the last issuance of CERs whichever occurs later.

RINA is of the opinion that the monitoring plan will give opportunity for real measurement of achieved emissions reductions and can be reported ex-post and verified.

### 3.8 Estimation of GHG emissions

The validation team checked the Emission Reduction calculation sheets /19/ and confirms that that equations used have been correctly applied and as per the selected methodology ACM0001, Version 11 of 28/05/2009. The same was also cross checked with the PDD, version 08 and found to be in order.

The emission reduction  $ER_y$  by the proposed project activity during the crediting period is the difference between baseline emissions  $BE_y$ , project emissions  $PE_y$  and emissions due to leakage  $L_y$  as follows.

Baseline Emissions:

The baseline emissions are calculated using the equation no.1 as mentioned in the methodology:

$$BE_y = (MD_{project,y} - MD_{BL,y}) * GWP_{CH_4} + EL_{LFG,y} * CEF_{elec,BL,y} + ET_{LFG,y} * CEF_{ther,BL,y}$$

As discussed in section 3.5.2, the project doesn't aim to utilize thermal energy from the LFG, hence  $ET_{LFG,y}$  is considered to be zero.

1. The amount of methane that would have been destroyed / combusted during the year in the absence of the project due to regulatory and/or contractual requirement ( $MD_{BL,y}$ ) is zero, since there is no mandated regulatory or contractual requirement undertaken for LFG collection and destruction in

## VALIDATION REPORT

Malaysia /14/ to /16/, /33/, /35/ and /71/. Also as discussed in section 3.6.4, as per UNFCCC website /103/, 4 LFG recovery projects are already registered and another 2 are under validation, hence it is confirmed that there is no legal requirement or specific policy of Government with respect to the landfill gas collection and utilization as on date. Hence AF (Adjustment Factor) is zero and there by  $MD_{BL,y}$  is zero.

$$MD_{BL,y} = MD_{project,y} * AF$$

2. The ex-ante estimate of the amount of methane that would have been destroyed/combusted during the year, in tonnes of methane ( $MD_{project,y}$ ) is calculated as per the following equation as mentioned in the “Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site” /07/.

$$MD_{project,y} = BE_{CH_4,SWDS,y} / GWP_{CH_4}$$

The methane generated from the landfill in the absence of the project activity at year y ( $t_{CO_2e}$ ), ( $BE_{CH_4,SWDS,y}$ ) is calculated as per the “Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site.”  $BE_{CH_4,SWDS,y}$  is calculated with a multi-phase model. The calculation is based on a first order decay (FOD) model. The model differentiates between the different types of waste j with respectively different decay rates  $k_j$  and different fractions of degradable organic carbon ( $DOC_j$ ). The model calculates the methane generation based on the actual waste streams  $W_{j,x}$  disposed in each year x, starting with the first year after the start of the project activity until the end of the year y, for which baseline emissions are calculated (years x with  $x = 1$  to  $x = y$ ). The Adjustment Factor (AF) is zero as there is no regulatory or contractual requirement for the landfill gas collection. Hence, the baseline emissions are not adjusted for fraction of methane captured at Solid Waste Disposal Site. The waste volumes are as per the data available with the landfill operator /23/. RINA accepted the same as it is more appropriate for the project activity since it is available from the time of inception of the landfill, hence accurate to the project activity. During the site visit and interaction with the stakeholders, it was noted that the only study available on the physical composition of waste generated in the region is as per the design statement made by SKM Enviros for Selangor MBT plant /76/, which is for Jeram Sanitary landfill which is also a landfill similar to Ayer Hitam near Kuala Lumpur nevertheless the waste categorization is less accurate: there are only 3 categories: organic, paper and inorganic. The organic category includes food, wood, textile and garden waste, without any distinction. This results in a less accurate evaluation of  $BE_{CH_4}$  since all these 4 categories have different  $DOC_j$  and decay rate  $k_j$ . RINA accepted this as the plant has already been commissioned and in operation, the LFG generation estimations using IPCC default values prove to be accurate. Also it was noted by the validation team that incase the organic component is further divided into other subcategories as given in the IPCC estimates, this also yields almost the same result. Further RINA also cross checked the emission reductions using the values as given in the DANIDA report /35/ and found that the values assumed by the PP are conservative; therefore, the validation team accepted the same. Also the efficiency (60%) of degassing system, which will be installed in the project activity is taken into account for estimating the ex-ante estimation of  $MD_{project,y}$ .

3.Ex-ante estimation of the net quantity of electricity produced using LFG ( $EL_{LFG,y}$ ) in MWh calculated by multiplying 85% of the availability of biogas engine /42/ and the minimum of (units installed i.e. 1048kW x 2 Nos or the electrical capacity calculated with regard to the quantity of LFG generated). The validation team confirms that the data sources and assumptions are appropriate and the calculations will result in conservative estimate of the emission reductions.

4. The grid emission factor is determined ex-ante by the weighted average of operating margin and build margin calculated as per the “Tool to calculate the emission factor for an electricity system”, version 02 /10/. Based on information provided by Pusat Tenaga Malaysia (PTM) /34/, the official Malaysian Energy Centre, which is the official EF to be used in Malaysia. The relevant electricity system is Peninsular Malaysia. The weight of OM and BM are selected for the first crediting period as 0.5 as requested for renewable power plant by the methodological tool.

Calculation of  $EF_{OM}$ : The simple OM emission factor is selected since there is no low-cost/must run resource in the grid generation and thereby fulfilling the requirement, i.e. less than 50% of total grid

## VALIDATION REPORT

generation in the average of the five most recent years. Total CO<sub>2</sub> emissions in tCO<sub>2</sub> in the region divided by the net electricity generated and exported to the grid of that region from the year 2006 to 2008.

Years	Generation (GWh)	CO <sub>2</sub> Emission (tonnes)	Baselines (tCO <sub>2</sub> /MWh)
2008	90,215	56,322,476	0.624
2007	89,421	53,938,845	0.604
2006	84,906	49,333,299	0.581
Average Operating Margin for 3 years			0.603

The values used in calculation of OM have been sourced from Study on Grid Connected Electricity Baselines in Malaysia Year: 2008, prepared and published by PTM (Malaysia Energy Center) /34/ since the report is an official source, the validation team accepted the same. The validation team also confirms that the data used in the calculation is the most recent data available at the time of validation /72/. The EF<sub>OM</sub> is calculated ex-ante and will be fixed in the first crediting period of the project activity.

Calculation of the EF<sub>BM</sub> : as part of the tool requires the project proponent to identify set of power units to be included in the build margin. The set of five power units that have been built most recently comprise 37.2% of the total system generation in Peninsular Malaysia in 2008. The group of power units to be included in the build margin is identified as the set of five power units that have been built most recently. RINA checked the same with the values from PTM Study on grid connected electricity baselines- 2008 /34/ and found to be in line. In terms of vintage of data, project participants went ahead to choose the option 1. This option does not entitle the project proponent to monitor the emission factor during the crediting period i.e. it is determined once at the validation stage. The calculated build margin for year 2008 is 0.741 tCO<sub>2</sub>/MWh. The average of OM (0.603 tCO<sub>2</sub>/MWh) and BM (0.741 tCO<sub>2</sub>/MWh) were calculated as EF<sub>grid</sub> giving EF<sub>grid,CM,y</sub> = 0.672 tCO<sub>2</sub>/MWh.

The validation team accepted the same as it has been calculated as per the tool to calculate emission factor of an electricity system /10/, as referred by the approved methodology ACM0001 /05/.

The amount of the baseline emissions from methane that would have been allowed to get vented to the atmosphere is calculated to be 491,617 tCO<sub>2</sub>e over the ten year crediting period and the baseline emissions from the electricity that would have been generated by existing and new grid connected power plants in the absence of the project activity is calculated to be 63,058 tCO<sub>2</sub>e over the ten year crediting period.

### Project Emissions

1. Project emissions generated due to incomplete combustion of methane by flaring has been calculated based on the "Tool to determine project emissions from flaring gases containing methane", /08/. Since the flare used is an open flare, default value of 50% is chosen as flare efficiency. However the temperature of the exhaust gas of the flare needs to be monitored in order to determine the flare efficiency. The project proponent may change this to a closed flare any time during the crediting period and apply appropriate default efficiency values, being 90% for a high efficiency enclosed flare. As explained in section 3.7.3 of this report, other than electricity imported and exported no other parameter is monitored. PP informed during site visit that all such monitoring instruments as required by the methodology /05/ will be installed once the project is registered. Further the existing flare for use only during emergencies.

2. Project emissions from the consumption of electricity in the project activity is calculated using the following equation as mentioned in the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", /09/. If the project uses electricity from the grid, using option A.1 of the tool /10/, project emissions are calculated based on the power consumed by the project activity and the emission factor of the grid and taking into account transmission and distribution losses, using the following formula:



## VALIDATION REPORT

$$PE_{EC,y} = EC_{PJ,y} * EF_{grid,y} * (1+TDL)$$

$EC_{PJ,y}$  comprises of electricity consumed by flares and biogas engines. The electricity consumed is calculated based on the base power of flares /43/ and engines /42/ (as per manufacture specification) for full operation throughout the year. The validation confirms the same as conservative, hence accepted.

$$EC_{PJ,y} = EC_{PJ,flare,y} + EC_{PJ,elec,y}$$

As discussed above, the grid emission factor is 0.672 tCO<sub>2</sub>/MWh, which is based on PTM Study on grid connected electricity baselines- 2008 /34/. TDLy is 20%, which is the default value as per "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" scenario A. Scenario A is applied if electricity is imported from the grid and a value of zero is applied for scenario B. Since the values applied are as per the tool defined by the methodology ACM0001, the validation team accepted the same. However the same needs to be monitored ex-post.

$$PE_y = EC_{PJ,y} * EF_{grid,y} * (1+20\%)$$

The project also uses a backup power generator, for which the fuel may be renewable, non-renewable. fossil fuel generator, using option B2 of the tool, project emissions will be calculated based on the power consumed by the project activity and the conservative default value of 1.3 tCO<sub>2</sub>/MWh, using the following formula:

$$PE_y = EC_{PJ,y} * 1.3$$

### Leakage

No leakage effects need to be accounted under the methodology.

### Emission Reductions

$$ER_y = BE_y - PE_y$$

Based on the calculation sheets /19/ and the PDD /01/, the emissions reductions from the project activity have been determined to be 54,556 tCO<sub>2</sub>e per year over the 10 year fixed crediting period starting from 2012 to 2021 and the expected start date of crediting period is 01/01/2012 /19/. The validation team noted that all assumptions and data used by the PP in the PDD, version 08 cross checked with the references and the sources provided by the PP in the PDD and found them to be appropriate and conservative. The emission reductions estimated can be replicated for data and parameter values provided in the PDD, version 08 of 31/01/2012 and supporting files /19/ submitted for registration.

The validation team concludes that the project emissions, baseline emissions, leakage and emission reductions stated in the PDD are appropriate and as per the methodology and the GHG calculations are complete and transparent, and their accuracy has been verified.

## 3.9 Environmental Impacts

Malaysia DNA does not require an environmental impact assessment for this project activity according to the Environmental Quality Act 1974 /15/ and Environment Quality (Environment Impact Assessment) Order 1987 /15/. This is also confirmed with other similar registered projects 2467 and 1925 from the same region in Malaysia.

An analysis of environmental impacts has been conducted and documented in the PDD. RINA reviewed the analysis mentioned in the PDD. The PP has identified and analyzed the potential environmental impacts including the impact on the landscape, fauna and flora, air and climate, safety. The only identified impact is noise and considered insignificant due to the distance between the landfill site and dwellings. Workers onsite are not affected as the landfill is already closed and the time of exposure near flaring unit and power plant becomes insignificant. The conclusion of the analysis has

## VALIDATION REPORT

been described in the PDD, and no significant environmental impacts are expected from the project activity.

### 3.10 Local stakeholders consultation

Prior to the publication of the PDD on the UNFCCC website, from 24/05/2011 to 22/06/2011, the project owner WLSB has arranged a local stakeholder's consultation meeting to discuss their concerns on the proposed CDM project - "Ayer Hitam landfill gas recovery project", on 11/05/2011 at the Air Hitam landfill site office. The Stakeholders were invited by mean of formal letter by mails and faxes about two weeks prior to the meeting. These have been verified by the validation team during the onsite visit and the invitation letters /20/. Local councillors from Majlis Perbandaraan Subang Jaya , Representatives from unit Perancang Ekonomi Negri Selangor, representatives from mosques, residence associations, landfill operator, and workers were Identified as stakeholders, 16 attendants in total participated.

The validation team verified the summary of the meeting /21/, 2 questions / comments were received during the stakeholder consultation meeting and they have been addressed accordingly. However there is no negative comment on the project. During the site visit, the validation team also interviewed a few of the stakeholders as given in section 2.2 above. The validation team also verified the photographic evidences for the conduct of the stake holder consultation, and list of participants who attended the stake holder meeting /21/ and found them satisfactory and confirms that relevant stakeholders were involved in the consultation process.

Further the persons available to the validation team for interview confirmed that there were no adverse comments about the project and this project will lead to employment generation and better environmental conditions.

RINA considers the local stakeholder consultation carried out adequately and can confirm that the process is credible.

## VALIDATION REPORT

### 4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD version 05 of 16/05/2011 /01/ was made publicly available on the CDM UNFCCC website and Parties, stakeholders and NGOs through the CDM website (<http://cdm.unfccc.int/Projects/Validation/DB/Q4PSV7AIEXYOHBAX8WL1J0OSDCKIEX/view.html>) invited to provide comments during a 30 days period from 24/05/2011 to 22/06/2011. Two comments were received and are given in the text box below.

Comment 1:

By: zhong zhou li, zhongzhouli8@gmail.com

Subject: DOE to verify the DPR/FR with what is submitted to the banks.

Comment: It is evident from the PDD that the values are consistent and it is definitely forged and cooked up values to show a non CDM project as a CDM project. What is this? DoE to check the Detailed Project Report and Feasibility Report which is submitted to the other agencies and Banks by Project owner and ensure that the values match with the DPR/FR submitted to DoE also. After careful study of PDD it is found that DPR/FR is in different versions made and submitted with different purposes to different agencies which is totally unacceptable, illegal and unethical. PP/Consultant may show some undertaking letter from bank manager to DoE stating that both DPR's are same. These kinds of letters should not be accepted and entertained by DoE. While collecting the DPR/FR from banks and other agencies, all DPR/FR pages should be counter signed by Banks and other agencies so that the real DPR/FR given to other parties by the PP/Consultant is same as the one submitted to DOE. In this particular project there is clear cut evidence that DPR/FR values are changed/ fabricated mischievously and intentionally. This must be probed fully. DOE must take a written undertaking from the PP/Consultant about the list of parties to whom this DPR/FR is submitted and for what purposes. Then DOE should cross check with all the parties and confirm that the same DPR/FR is submitted to all the parties correctly without any changes. DOE must not accept any reports and undertakings from PP/Consultant. DOE must make independent evaluation and use totally different parties without informing the PP or Consultant to cross check the facts. DOE to write to the party who prepared the DPR/FR which is submitted to the banks and other agencies and the same is verified against the one submitted to the DOE by PP/Consultant. This project is a fabricated and fake CDM project and must be rejected by the DOE right away. DOE should not support this kind of projects otherwise CDM EB should suspend this DOE for at least one year.

Reply by PP: The comment received is baseless and does not refer to the particular project of Ayer Hitam. Indeed, the exact same comment was received for the project of Jeram which was uploaded for public comment the same day. Furthermore, the comment does not make reference to any precise point of the PDD, it asserts strong accusations without any evidence.

Action by RINA: The reply from the PP is considered appropriate as the PDD did not refer to any detailed project report or feasibility study. The project has been funded completely through PP's own funds, also evidences for actual investment done is available. Further, validation has been done as per the requirements of VVM /04/ and RINA has not made any such findings. Hence closed.

Comment 2:

By: CDM Consultant, ecoideal@gmail.com

Subject: Additionality of the project activity.

Comment: Pg 5 of PDD declares no LFG collection system is in place for the landfill.

## VALIDATION REPORT

This contradicts the fact that the site has already a developed landfill gas to power system since 2005.  
See below:

[http://www.whbenvironment.com/index.php?option=com\\_content&task=view&id=16&Itemid=36](http://www.whbenvironment.com/index.php?option=com_content&task=view&id=16&Itemid=36)

I cannot see how additionality can be explained.

A similar CDM application earlier for this project has been submitted in 2008.

Action by RINA: Yes, the webhosted PDD was not transparent on this issue, this was raised as a finding (CAR3/CAR4/CAR5/CL6) to the PP and now the PDD has been corrected. Further validation is available in the report above.

.

## VALIDATION REPORT

### 5 VALIDATION OPINION

RINA Services Spa (RINA) has performed validation of the project activity “Ayer Hitam landfill gas recovery project” in Malaysia, with regard to the relevant requirements for CDM activities.

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

The host Party is Malaysia and the Annex I Party is France. Both Parties fulfill the participation criteria and have approved the project and authorized the project participant Worldwide Landfills Sdn Bhd and Ably Carbon. The DNA from Malaysia confirmed that the project assists in achieving sustainable development.

The project correctly applies the approved baseline and monitoring methodology “ACM0001”, “Consolidated baseline and monitoring methodology for landfill gas project activities”, version 11 of 28/05/2009.

By collection, flaring and power generation from LFG gas the project results in reduction of CH<sub>4</sub> emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the “Ayer Hitam landfill gas recovery project” are estimated to be on an average 54,556 tCO<sub>2</sub>e per year over the selected 10 years fixed crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

The monitoring plan provides for the monitoring of the project’s emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is RINA’s opinion that the project participants are able to implement the monitoring plan.

In conclusion, it is RINA’s opinion that the project activity “Ayer Hitam landfill gas recovery project” in Malaysia, as described in the PDD, version 08 of 31/01/2012, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology “ACM0001”, “Consolidated baseline and monitoring methodology for landfill gas project activities”, version 11 of 28/05/2009.

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

# **APPENDIX A**

## **VALIDATION PROTOCOL**



**TABLE 1 MANDATORY REQUIREMENTS**

Requirement	Reference	Conclusion
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reductions commitment under Art. 3.	Kyoto Protocol Art.12.2	<del>CAR</del> 1 OK
2. The project shall assist non Annex I Parties contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2	<del>CAR</del> 1 OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved	Kyoto Protocol Art.12.5a CDM Modalities and Procedures §40a	<del>CAR</del> 1OK
4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art.12.2 CDM Modalities and Procedure §40	<del>CAR</del> 1OK
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance (ODA) 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	<del>CL</del> 3OK
6. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities and Procedures §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedure §31b	OK
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedure §31b	OK
10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	CDM Modalities and Procedure §43	<del>CAR 5 to 8 and CL 6 to 10</del> OK
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art.12.5b	<del>CL11 to 13</del> OK
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall	CDM Modalities and Procedures §37c	<del>CL15</del> OK

Requirement	Reference	Conclusion
be carried out. (If not LSC, delete the section)		
13. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	CL16OK
14. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30/45 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	CL16OK
15. Baseline and monitoring methodology shall be previously approved by the CDM Methodology Panel.	CDM Modalities and Procedures §37e	OK
16. 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 §47	CL6OK
17. 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	CL12 <del>and</del> CL13.OK

TABLE 2 REQUIREMENTS CHECKLIST

Checklist Question		Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
<b>A Description of Project Activity</b>						
<b>A.1 Title of the project activity</b>						
A.1.1.	Title of the project activity, revision number and date of PDD (section A.1).	/01/	DR/I	As per the webhosted PDD for the project activity, version 5, dated 16/05/2011, The title of the project activity is "Ayer Hitam landfill gas recovery project. As per the discussion had with the PP, LoA is yet to be obtained for the project. <i>PP is requested to submit LoA from the DNA of Malaysia once available for verification.</i>	<b>CAR1</b>	<b>OK</b>
A.1.2	Does the project comply with the applicable requirements for completing the PDDs?	/01/, /11/, /12/	DR	Yes, the PDD complies with the (CDM-PDD) template Version 03 - in effect as of: 28 July 2006. However, in a few sections the PDD doesn't follow the guidelines for completing the project design document (Version 07) of 02/08/2008. Section A.4.3 doesn't address the technical specifications of the flare and biogas engine and the emission sources and greenhouse gases involved in project activity, such findings are raised as CAR /CL in appropriate sections.	<b>CAR2</b>	<b>OK</b>
<b>A.2 Description of the proposed project activity</b>						

<sup>1</sup> MoV: DR document review, I interview, CC cross checking

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
<p>A.2.1 Does the PDD contain an accurate description of the project activity and provide the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation? How was the design of the project assessed?</p>	<p>/01/, /18/, /27/, /17/</p>	<p>DR/I</p>	<p>The purpose of the project activity as per the webhosted PDD is to build, operate and maintain a landfill gas collection and utilization system on the Ayer Hitam Landfill, Malaysia.</p> <p>However during site visit it was noted that gas collection system and the landfill gas based 2MW power plant is already in operation from the year 2004. The project activity is located 18 km South of Kuala Lumpur; the project's geographic coordinates are 03°11'20"N and 101°21'50"E</p> <p>The landfill is currently operated by Worldwide Landfills Sdn. Bhd. <i>PDD is not transparent on who owns the landfill, from when the current operator is operating the landfill and its appointment</i></p> <p>During the site visit and interaction with WLSB, it was found that the project was implemented in 2004 and was in operation till 2007. However this is not stated in PDD. The PDD states that purpose of project activity is to build, operation and maintain a landfill gas collection and utilization system where as this is not correct as system is already existing at site. The pre-project scenario stated in PDD is not clear. It needs to be clearly described in the</p>	<p><del>GL1, CAR3,</del></p> <p><b>GL1</b></p> <p><b>CAR3</b></p>	<p><b>OK</b></p>

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>PDD whether the project is alteration of existing equipment. The PDD does not provide any details on the situation existing at project site from 2004 to 2007 with respect to quantity of landfill captured, details of equipments used for power generation, reasons why power generation was stopped in 2007 etc. Also the PP is requested submit the commissioning certificate of power plant, PPA, operational log book of the power plant, records of shut down and evidences of repairs done to the existing biogas engines.</p> <p>The PDD is not transparent on the number of phases and the area covered by the landfill. The PP is requested to support the same with evidences.</p> <p>Capacity of the power plant mentioned is not consistent throughout the PDD; the PP is requested to explain the same.</p>	<b>CAR3</b>	
A.2.2 Does the project activity involve alteration of existing installations? If yes, have the differences between pre-project and post-project activity been clearly described in the PDD?	/01/,	DR/I	As observed during the site visit, the project activity involves alteration of the existing installations. In the proposed project activity an existing landfill gas collection system and a 2MW power plant commissioned during the year 2004 on the Ayer Hitam Landfill, Malaysia are being refurbished. It was noted that captured landfill gas is being used to generate power and the generated power is being supplied to the regional grid. The energy plant consists of a pre-treatment system, biogas generators and an open flare for	<b>GL1</b>	<b>OK</b>

Checklist Question		Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
				<p>exigencies. The above information is not transparently available in the webhosted PDD and was explained by WLSB, the landfill operator.</p> <p><i>PP is requested to make it transparent in the PDD the pre-project and post-project scenarios of the project activity.</i></p>		
<b>A.3 Project participants</b>						
A.3.1	Have the Parties and project participants participating in the project been listed in tabular form in Section A.3 and are they consistent with the information detailed in Annex 1 of the PDD?	/01/, /12/	DR	<p>The parties involved are Malaysia (host country) and France as Annex I country and the project participants are Worldwide Landfills Sdn. Bhd and Ably Carbon (both private entities) and are listed in tabular form as per the guidelines for CDM-PDD. The details provided are consistent with that of information in Annex 1 of the PDD.</p> <p>However the same also needs to be checked with the LOA on submission.</p>	<b>CAR-1</b>	<b>OK</b>
A.3.2	Do all participating Parties fulfil the participation requirements as follows: (a) Party has ratified the Kyoto Protocol (b) Party has a Designated National Authority (c) The assigned amount has been determined	/01/, /28/	DR/CC	<p>The two participating parties are Malaysia (host country) and France as Annex I country.</p> <p>Malaysia ratified the Kyoto Protocol on 04/09/2002 and the DNA is under the Ministry of Natural Resources and Environment. There is no assigned amount for Malaysia. (non annex-I country)</p> <p>France, ratified the Kyoto Protocol on 31/05/2002 and the DNA is under the Ministry of Ecology, Energy, Sustainable development and the Sea, in charge of green technologies and climate change negotiations. The</p>		<b>OK</b>



Checklist Question		Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
				assigned amount is 2,819,626,640 tCO <sub>2</sub> eq.		
A.3.3	Have the letters of approval have been issued?	/01/	DR	The LoAs from both Parties are not yet available.	<b>CAR1</b>	<b>OK</b>
A.3.4	Do the letters of approval meet the following requirements? (a) LoA confirms that the Party has ratified the Kyoto Protocol; (b) LoA confirms that participation is voluntary (c) The LoA confirms that the project contributes to the sustainable development of the Host Country? (d) The LoA refers to the precise project activity title in the PDD (e) The LoA was received directly by the DNA of the PP In case of doubt regarding the authenticity of the LoAs, describe how it was verified that the letter of approval is authentic.	/01/	DR/I	PP to refer comment above in section A.3.3	<b>CAR1</b>	<b>OK</b>
A.3.5	Have all private/public project participants been authorized by a Party to the Kyoto Protocol?	/01/	DR	PP is yet to provide LoAs for the project activity; this will be confirmed once the LoAs are issued, PP to submit the LoA's from the host party DNA of Malaysia and that of France.	<b>CAR1</b>	<b>OK</b>
<b>A.4 Technical description of the project</b>						
A.4.1	Is the project location clearly defined?	/01/	DR/CC	As confirmed during site visit, the project is proposed at the landfill of Ayer Hitam, located at Puchong, in the State of Selangor, Malaysia. The geographical coordinates as given in the PDD are Longitude: E: 101°39'37" and Latitude N: 03°00'05". This is confirmed by the validation team through the Google earth and found to be correct.		<b>OK</b>

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
A.4.2 Does the project design engineering reflect current good practices? Would the technology result in a significantly better performance than any commonly used technologies in the host Country? Is any transfer of technology from any Annex I Party involved?	/01/, /35/, /39/	DR	<p>As per the discussion had with the PP during site visit Prior to the year 2004, there is no methane recovery this is confirmed during stakeholder interaction had on 24.06.2011 Also, this is the first engineered sanitary landfill in Malaysia to have landfill gas based power plant as available in WLSB's website available publicly and as per the DANIDA study of 2004. As explained by the PP during the site visit, the power plant was commissioned during 2004 and stopped in 2007 as the engines broke-down. The Flare available was not operated as this does not give any benefit to the PP. Hence from 2007 there was no methane recovery this is considered as the baseline scenario.</p> <p>However PP is requested to provide credible third party evidences to support that both the power plant and the flares were not operated from 2007 till the restart of the project activity in 2010.</p> <p>The project scenario proposed, is revamp of existing LFG collection system and installation of new gas wells, the LFG collection system is composed of a network of vertical well and horizontal trenches. The low pressure created in the system will allow the gas extraction, which is fed into 2 gas engines of 1048 kW each. The system is proposed to be equipped with a monitoring unit to measure the required parameters.</p> <p>The key technical specifications of the</p>	<p><del>CAR2/CL1/</del> <b>CL2</b></p> <p><b>CL1</b></p> <p><b>CAR2</b></p>	<b>OK</b>

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>installed flare system and the gas engines are not transparent in the PDD. Operational lifetime of the project activity in section A.4.3 of the PDD is stated as 20 years and the same in section C.1.2 is stated as 15 years, PP is requested to explain the same.</p> <p>The PP is requested to provide the evidences to support the operational lifetime of engines and flares.</p> <p>It is also noted that the nominal power of gas engines is taken as 34.75 kW, which is based on the JGC 320 GS technical specifications issued in the year 2010 for 1063 kW biogas engines. However the biogas engines specific to the project was commissioned in the year 2004 and the capacity is 1048 kW. PP is requested to justify the appropriateness of value selected.</p> <p>The PP is requested to make transparent in the PDD on the commonly used technology and how the technology proposed in this project activity is better.</p> <p>The engines installed are from Jenbacher, Germany and Flares from Organics group, United Kingdom. However <i>PP is requested to make it transparent in the PDD on technology transfer due to the project activity.</i></p>	<b>CL2</b>	

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
A.4.3 If public funding from Parties included in Annex I is used for the project activity, have these Parties provided 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?	/01/, /22/	DR	As per section A.4.5 of the PDD and the declaration made by the PP vide letter dated 21/04/2011, there is no public funding involved in the project activity.  PP is requested to submit the audited balance sheets for both entities, Worldwide Landfills Sdn. Bhd. for the past 3 years.	CL3	OK
<b>B. Application of a baseline and monitoring methodology</b>					
<b>B.1 Methodology applied</b>					
B.1.1 Does the project activity apply an approved methodology and the correct version thereof?	/01/, /05/, /06/, /07/, /08/, /09/, /10/	DR/CC	The methodology applied is "ACM0001", "Consolidated baseline and monitoring methodology for landfill gas project activities", version 11 of 28/05/2009  The version of methodology applied is the latest available with UNFCCC and applicable as on date.  As per section B.1 of the PDD, PP has used the following methodological tools:  1. Tool for the demonstration and assessment of additionality (version 5.2, EB39) 2. Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (version 5, EB55) 3. Tool to determine project emissions from flaring gases	CAR4	OK

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion	
			<p>containing methane (version 1, EB28)</p> <p>4. Tool to calculate baseline, project and/or leakage emissions from electricity consumption (version 1, EB39)</p> <p>5. Tool to calculate the emission factor for an electricity system (version 2.1, EB60).</p> <p>However, <i>PP is requested to update the “Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site” and the “Tool to calculate the emission factor for an electricity system” as per EB 61 report.</i></p>			
B.2 Applicability criteria of the methodology/tools						
B.2.1	How was it validated that the project activity complies with the applicability criteria?	/05/, /23/, /24/, /40/	DR/CC /I	<p><u>Applicable criteria as per the methodology ACM001:</u></p> <p><u>Requirement:</u></p> <p>This methodology is applicable to landfill gas capture project activities, where the baseline scenario is the partial or total atmospheric release of the gas</p> <p><u>Applicability:</u></p> <p>In the baseline, from the year 2007, methane is vented to atmosphere and this is confirmed during stakeholder interaction had on 24.06.2011 However, <i>PP is requested to make it transparent in the PDD on how the project meets the applicability condition of the methodology when LFG recovery was already happening prior to webhost of the project activity in 2006. In this PP is</i></p>	CL4	OK

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>requested to make it transparent in the PDD the complete details of various activities beginning from 2002 and explain how the methodology is applicable with credible evidences.</p> <p>PP is requested to submit credible third party documents to demonstrate that the power plant and the flare was not in operation from the year 2007 till the start of the project activity and make the above transparent in section B.2 of the PDD.</p> <p>It is noted that date of issue of and the previous validation report No: 9105040109, rev. 01 by TUV Rheinland is 13/03/2006 and in the report it is stated that site visit was made in 2007. PP is requested to clarify the reason behind this inconsistency.</p> <p><u>Requirement:</u> The project activities should include situations such as: (a) The captured gas is flared; and/or (b) The captured gas is used to produce energy (e.g. electricity/thermal energy). (c) The captured gas is used to supply consumers through natural gas distribution network.</p> <p><u>Applicability:</u> In this proposed CDM project activity, methane is captured and recovered methane will be used for power generation or flared if gas engines are not available for power generation Hence scenarios a) and b) apply to the</p>		



Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>project.</p> <p><i>PDD is not transparent on if the captured gas will be used to supply consumers through natural gas distribution network (scenario C) as per the applicability condition.</i></p> <p><i>PDD is not transparent on the project's compliance to applicability criteria as per the tools referred by the methodology</i></p> <p>However, as per applicability criteria as given in the Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site, the Tool is not applicable to hazardous wastes.</p> <p>Applicability: As communicated by the PP, hazardous wastes are not dumped in the landfill as it is a sanitary landfill, however <i>PP is requested to justify with credible third party evidences that no hazardous waste is permitted to be deposited in the project landfill.</i></p>		
B.2.2 Is the selected baseline one of the baseline(s) described in the methodology and this hence confirms the applicability of the methodology?	/01/, /05/	DR	The baseline is not defined in the methodology. However, atmospheric release of the landfill gas and use of electricity from grid supplied connected power generation sources is considered as baseline,. However PP to refer comments in section B.2.1 above.	<b>CAR4</b>	<b>OK</b>

Checklist Question		Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
<b>B.3 Project boundary</b>						
B.3.1	Is the project boundary are clearly defined and in accordance with the applied methodology?	/01/, /05/	DR	<p>As per the methodology the project boundary is the site of the project activity where the gas is captured and destroyed/; used. This includes the power grid from which the electricity is sourced or power generated using the captured LFG is connected to.</p> <p>This is consistent with the project boundary selected by the PP and documented in section B.3 of the PDD and the figure therein. <i>However, grid is not stated in the project boundary description.</i></p> <p>Also, during the site visit it was noted that there was no onsite electricity consumption or back-up power generation system at site. PP is requested to clarify the same in the PDD and the figure - project boundary given in section B.3 of the PDD.</p>	CL5	OK
B.3.2	What are the project's system boundaries (components and facilities used to mitigate GHGs)?	/01/	DR/I	<p>The components and facilities used in the project activity to mitigate GHGs will include the landfill, LFG collection systems, biogas engines for the electricity production, fossil fuel based backup generator, flares and related monitoring systems and the connected grid.</p> <p>However Please refer section B.3.1 above.</p>	CL5	OK
B.3.3	Which sources are identified for the project? Does the	/01/, /05/	DR/I	The source identified in the baseline is	CL5	OK

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
identified project boundary cover all possible sources linked to the project activity?			<p>the methane emissions from decomposition of waste at the landfill site, emissions from electricity consumption or generation at site while in the project activity are CO<sub>2</sub> emission from the on-site electricity use from grid / onsite generator and the methane emissions from flare of un-burnt methane due to flare efficiency.</p> <p>The validation team on discussion with the PP and the landfill operators confirmed that there could not be any other possible source of emissions and what is identified by the PP is complete and as per the methodology.</p> <p>However Please refer section B.3.1 above</p>		
B.3.4 Does the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology? Do these sources contribute by more than 1% to the estimated emission reductions of the project?	/01/	DR/I	<p>The project does not involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology. It is also confirmed that the construction phase of the project activity will involve mostly assembly of the bought out machinery at site and hence it is not expected to contribute to more than 1% of the estimated emission reduction.</p>		OK
<b>B.4 Baseline scenario identification</b>					
B.4.1 Which baseline scenarios have been identified? Is the list of the baseline scenarios complete?	/01/, /05/	DR	<p>According to the approved methodology ACM0001, the following baseline scenarios have been identified.</p> <p>For disposal and treatment are :</p> <ul style="list-style-type: none"> <li>LFG1: Project without CDM benefits.</li> </ul>		OK

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<ul style="list-style-type: none"> <li>LFG2: No or partial recovery of LFG.</li> <li>LFG3: Use of waste for incineration</li> </ul> <p>For power generation are:</p> <ul style="list-style-type: none"> <li>P1: Power generation from LFG without CDM benefits.</li> <li>P2: Fossil fuel based cogeneration plant.</li> <li>P3: Renewable fuel based cogeneration plant.</li> <li>P4: Fossil fuel based captive power plant</li> <li>P5: Renewable energy based captive power plant</li> <li>P6: Grid connected power plants.</li> </ul> <p>Since the project activity does not involve any thermal energy generation, the heat component is not considered.</p> <p><i>PP to refer comments in section A.2.1 above on the scenario at the landfill from 2004 till date, wherein LFG was recovered and electricity was generated using recovered LFG. In this scenario PP is requested to justify how no or partial recovery of LFG is an applicable baseline to the project activity.</i></p>	<b>CAR3/CL6</b>	
B.4.2 How have the other baseline scenarios been eliminated in order to determine the baseline?	/01/, /05/, /06/, /13/, /14/, /15/, /16/, /32/	DR/I/C	<p>PP to refer comments in section B.4.1 above.</p> <p>The validation team accessed the Environmental quality Act 1974 and Electricity supply Act 1990 to</p>	<b>CL6</b>	<b>OK</b>

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>understand the statutory requirements for the project activity. All the scenarios discussed above i.e., LFG1, LFG2, LFG3, P1, P2, P3, P4, P5 and P6 are in compliance with the mandatory laws.</p> <p>Elimination of LFG3: In Malaysia 5% of the wastes are handled by Incineration as per the "table in page number 9 of the Un assisted International POPs elimination project in Indonesia, Malaysia and the Philippines "Policy brief on Zero waste" (2006). This report discusses in detail the technical, operational and financial barriers existing and the possible generation of POPs due to incinerators Hence elimination of LFG3 is accepted.</p> <p>Elimination of P2 and P3: The proposed project activity does not aim at installation of a cogeneration plant or producing heat energy at all, hence P2 and P3 are eliminated. It is also noted and confirmed during site visit that there are no process industries in near vicinity to the landfill site. Hence the elimination is justified.</p> <p>Elimination of P4 and P5: It is confirmed during site visit that there is no existing fossil fuel based / renewable based captive power plant as on date at the site of the project activity. The PP also confirmed that</p>		

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>they have no plans to construct any new fossil fuel based / renewable based captive power plant at the proposed site except for a backup generator for the electricity requirements of the facility, incase grid power is not available.</p> <p>As per the electricity supply industry in Malaysia, performance and statistical information 2009, by Suruhanjaya Tenaga (Energy Commission) of Malaysia, grid electricity is available and there is no supply constraint. The power plants in this region are predominantly based on Natural Gas. This was also cross verified with the “Grid system operation and performance report: peninsular Malaysia (April 2011)” as available in the Suruhanjaya Tenaga Website. The installed capacity as on 30<sup>th</sup> April 2011 was 21,817MW and the Maximum demand for the month of April 2011 was 15,146 MW at 16.30 hr on 04/04/2011.</p> <p>Also alternatives P4 and P5 do not take advantage of the waste disposed in the landfill and the PP has explained that it is out of the scope of their expertise. Hence the scenario P4 and P5 elimination is accepted as they are not realistic and credible.</p> <p>Elimination of P1: Power generation from the LFG without CDM benefit is unviable as per the investment analysis done, which is discussed in detail in section B.5.</p>		



Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion	
			<p>Elimination of LFG 1:</p> <p>This alternative involves additional costs and no associated revenues, hence not considered as a plausible baseline.</p> <p>Hence LFG2 – Atmospheric release of LFG and P6 – Electricity supply from grid connected power plants remain as baseline, which is continuation of the pre-project scenario.</p> <p>However PP is requested to demonstrate with credible third party evidences on how electricity supplied by the grid has the lowest emissions as mentioned in Step 2 in section B.4 of the PDD. Also, Fuel for baseline choice of energy is not stated in Step 2 of section B.4 as required by the methodology.</p>			
B.4.3	What is the baseline scenario? Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/01/, /05/, /06/, /13/, /14/, /15/	DR/I	<p>The baseline selected i.e., the current scenario, atmospheric release of the LFG, that is the generated LFG is not captured and vented to the atmosphere</p> <p>Please refer section B.4.2 above.</p>	CL6	OK
B.4.4	Has the baseline scenario been determined using conservative assumptions? Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic	/01/, /13/, /14/, /15/	DR	The alternatives identified are not based on any assumptions and are in compliance with the rules of the country. The validation team accessed	CL6	OK

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
trends and political aspirations?			<p>the Environmental quality Act 1974 and Electricity supply Act 1990 to understand the statutory requirements with respect to landfill management and noted that there is no legal requirement or specific policy of Government with respect to the landfill gas collection and utilization as on date.</p> <p>Please refer section B.4.2 above.</p>		
<b>B.5 Additionality determination</b>					
B.5.1	What tool does the project use to assess additionality? Is this in line with the methodology?	/01/, /05/, /06/	DR	Tool for the demonstration and assessment of additionality, version 5.2 is used to demonstrate additionality; this is in line with the requirement of the methodology.	
B.5.2	What is the project additionality mainly based on?	/01/, /06/	DR	PP has attempted to demonstrate additionality through investment analysis and common practice analysis. This is acceptable as per the Tool for the demonstration and assessment of additionality, version 5.2.	OK
<b>B.5.3</b>					
B.5.3.1	What is the starting date of the proposed project activity?	/01/, /13/, /40/	DR	The start date of the project activity is 15/04/2009, which corresponds to date on which WLSB acquired majority shares in joint venture with TNB Energy Services Sdn. Bhd. <i>PP is requested to submit authorization letter and approval letter translated in English. Further PP is requested to clarify how this can be considered as start date in accordance</i>	OK

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p><i>with the Glossary of CDM terms, since it is noted that PP had 30% shares in the project activity from the year 2004 and has been notified as one of the PP in the previous webhosted PDD.</i></p> <p>As per the draft validation report No: 9105040109, rev. 01 of 13/03/2006 by TUV Rheinland and the PDD, version 4.2 of 02/05/2009 the start date of the project activity is taken as 01/01/2009, which is inconsistent with the start date mentioned in the PDD, version 05 of 16/05/2011 webhosted on 24/06/2011. PP is requested to clarify the inconsistencies in start date selected.</p> <p>PP is requested to submit all three webhosted PDDs and their respective validation reports, termination contract with the DOE(s) and also provide the justification on the requirement of webhosting the PDD three times.</p> <p>The PP is further requested to clarify if the project is a new project activity or an existing project activity and how does it comply with the "Guidelines on the demonstration and assessment of prior consideration of the CDM version 3 EB49 report Annex 22, dated 11/09/2009.</p>		
B.5.3.2 What is the evidence for serious consideration of CDM prior to the time of decision to proceed with the project activity?	/01/, /13/,	DR	The PDD is not transparent on the serious consideration of CDM prior to the time of decision to proceed with the	<b>CAR-6</b>	<b>OK</b>

Checklist Question		Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
				project activity. Provide the same with supporting evidences. In addition PDD is not transparent on the real actions taken in parallel to the implementation of the project activity to secure CDM status. Provide the same with supporting evidences. Detailed Chronology of events is not provided		
B.5.3.3	What initiatives were taken by the project participants from the starting date of the project activity to the start of validation in parallel with the physical implementation of the project activity?	/01/, /13/	DR	Please refer section B.5.3.1 and B.5.3.2	<del>CAR 5/</del> <b>CAR6</b>	<b>OK</b>
B.5.3.4	Does the timeline of the project confirm that continuous actions in parallel with the implementation were taken to secure CDM status?	/01/, /13/	DR	Please refer section B.5.3.1 and B.5.3.2	<del>CAR 5/</del> <b>CAR6</b>	<b>OK</b>
<b>B.5.4</b>	<b>Investment analysis</b>					
B.5.4.1	What is the analysis method used to determine whether the proposed project activity is not (a) the most economically or financially attractive; or (b) economically or financially feasible, without the revenue from the sale of certified emission reductions?	/01/, /06/, /29/	DR	<p>The project proponent has used investment analysis method and followed the stepwise demonstration of additionality as determined in the "Tool for demonstration and assessment of additionality" version 5.2.</p> <p>The project proponent has applied benchmark analysis method ,</p> <p>.</p> <p>However, the PDD is not transparent on how the benchmark analysis is appropriate for the project activity.</p>	<b>CAR7</b>	<b>OK</b>
B.5.4.2	What the financial indicator is used?	/01/, /06/, /29/	DR	PP has used NPV as the financial indicator to demonstrate additionality of the project, as the revenues from the	<b>CL7</b>	<b>OK</b>

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>project activity are too low to reach a positive IRR, this is acceptable as per sub-step 2b (4) of the EB 39 report, Annex 10.</p> <p>The project proponent has used the default return on equity as the benchmark discount rate as given in the Guidelines on the assessment of investment analysis, version 5. The value chosen is 10.9% which is the default return on equity applicable for a sector 13 project. PP is requested to clarify why the return on equity is the appropriate benchmark discount rate..</p> <p>Also PP is requested to correct the name of the guideline as per the latest revision dated 15/07/2011.</p>		
B.5.4.3 Does the income tax calculation take depreciation into account? Is the depreciation year in accordance with normal accounting practice in the Host Country?	/01/, /18/	DR	<p>.</p> <p>Depreciation has been done gradually for the lifetime of the project activity, which is 15 years. However as per A.4.3 of the PDD, the operational lifetime of the project activity is mentioned as 20 years.</p> <p>Also PP is requested to clarify on how the lifetime of the project is expected to be in operation until 2024, when the power plant was commissioned in the year 2004. PP is requested to correct the PDD as appropriate and demonstrate the same with credible evidence.</p>	CL8	OK

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			The attachments available in the investment analysis spreadsheet version 1, dated 16/05/2011 could not be opened.		
B.5.4.4	Is the time period of the investment analysis and operating time of the project realistic? Has salvage value been taken into account? Is the working capital returned in the last year of the operation?	/01/, /18/,/19/, /20/, /21/	<p>DR</p> <p>The period of Investment Analysis &amp; operating time is 15 years.</p> <p>Please refer section B.5.4.3</p> <p>Since the technical lifetime of gas engines is 15 years, the salvage value of the engines deployed on the project at the end of 15 years is taken as Nil. However <i>PP is requested to make it transparent in the PDD on why scrap value of the plant is not accounted in the Financial analysis.</i></p> <p>As discussed during the site visit, the power plant was restarted during the year 2010 with one engine of 1048 kWe and the other engine of 1048 kWe was under overhaul during site visit and expected to be in operation from September 2011. Out of these 2 engines, one engine will be removed on the eight year, 2018. PP is requested to justify the residual value taken for the removed engine in the investment analysis and the cost of overhaul assumed the year 2017. Residual life is not justified as per Tools to calculate remaining lifetime of an equipment</p> <p>In the Financial Summary the Cash</p>	<b>CL8/CAR5</b>	<b>OK</b>



Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>Flows from operations for first 2 years of operation of the project is negative and for all the other years it is positive. However it is noted that the cash flows are consistent during every year of operation and depends upon LFG collection. The accumulated cash flow from operations maintains balance during the operational life time of the project activity. Hence, the working capital is returned over the life of the project.</p> <p>Cash outflows on account of CAPEX in the first year and salvage value of engines have been considered to be a part of Cash Flows from operations</p> <p>Please refer section B.5.3.1 and B.5.3.2 above on start date for the project activity.</p>		
<p>B.5.4.5 Cross-check of main parameters used in the financial analysis: electricity generation, electricity tariff, investment costs, operating and maintenance costs, taxes, other costs.</p>	<p>/01/, /18/, /30/, /31/</p>	<p>DR/CC</p>	<p>Following are the parameters used in financial analysis.</p> <p>1. Investment costs: Estimated as RM.7,555,000 for equipments required for the capture of LFG, power plant and flares for contingency. The investment analysis is based on investments done during the year 2009 and 2010 and proposed during the year 2011. <i>PP is requested to support the suitability and accuracy of each of the sub-items assumed individually with credible evidences valid at the time of decision</i></p>	<p><b>CAR8</b></p>	<p><b>OK</b></p>

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p><i>making.</i></p> <p>2. Operation and maintenance costs: Estimated as RM.600,000 per year. PP is requested to support the suitability and accuracy of each of the sub-items individually with credible evidences valid at the time of decision making. The PDD, investment analysis sheets are not transparent on the cost of power assumed in calculating operation costs.</p> <p>3. Electricity sale price: the price of electricity is assumed as 0.21 MYR/KWh; However, as per Handbook on the Malaysian feed-in tariff for the promotion of renewable energy of March 2011, the feed-in tariff for LFG based power projects of more than 4MW and less than 10MW is 0.38 RM/kWh and the rate is effective for a period of 16 years.</p> <p>4. Refurbishment of gas engines: Spent once in the middle of the technical lifetime of the project activity, that is on the 6<sup>th</sup> or 7<sup>th</sup> year of operation. <i>PP is requested to support the refurbishment costs assumed with credible evidences valid at the time of decision making.</i></p> <p>5. Electricity generation: PP to refer comments on Investment costs in this section above. PP proposes to install 2</p>		

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>engines initially and remove one engine in 2018. As per section A.2 of the PDD and the discussions had with the PP during site visit, there is a level of uncertainty in the estimation of the quantity of LFG that could be recovered and hence the PP may install more than 2 MW power plant depending on actual LFG captured on implementation of the project. <i>PP is requested to make it transparent in the PDD on the most probable capacity of the power plant and demonstrate that the project is additional in extreme cases of LFG recovery.</i></p> <p><i>It is noted that the project is a restart of the existing power plant. PP is requested to make it transparent on the applicability of clause number 7 of the guidance on demonstration and assessment of investment analysis in IRR spreadsheets and in the PDD. It appears that cost of setting up of entire gas collection system and power plant etc is considered. This is not justified as project is mainly refurbishing existing gas engines etc.</i></p> <p><i>6. PP has submitted a break-up of capital expenditure and operational expenditure based upon actual, PP is requested to demonstrate how the same was available to the PP at the time of decision making.</i></p> <p><i>7. PP is requested to provide sources for</i></p>		

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>each of the input parameters used in NPV calculations and also explain how these parameters were applicable at the time of decision making as per para 6 of EB 62 Annex 5. Further in line with para 111(c) of VVM 1.2, PP is requested to provide actual values of all the parameters since the project is already implemented.</p> <p>8. Taxes: The income tax rate applied is 25%, this is acceptable as verified at the website of Inland revenue board of Malaysia, under the Ministry of Finance, Malaysia. The tax rate applicable in Malaysia for assessment year 2009 for a company which has more than 2.5 million MYR paid up capital onwards is 25%. Hence accepted.</p>		
<p>B.5.4.6 Sensitivity analysis: have the key parameters contributing to more than 20% of the revenue/costs during operating or implementation been identified?</p>	<p>/01/, /18/, /30/, /31/</p>	<p>DR/CC</p>	<p>Electricity sale price, Investment Costs, Operating costs and electricity generation are the parameters considered for sensitivity analysis as per section B.4 of the PDD.</p> <p>PP is requested to justify selection of only operating costs for sensitivity analysis and not the operating and maintenance costs in total. Sensitivity on electricity generation is not given in excel spreadsheet</p> <p>PP to refer comment in section B.5.4.5 above.</p>	<p><b>CL9</b></p>	<p><b>OK</b></p>

Checklist Question		Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
B.5.4.7	Sensitivity analysis: is the range of variations is reasonable in the project activity? The main parameters can be changed for the different project category.	/01/, /18/, /30/, /31/	DR/CC	Parameters chosen for sensitivity analysis has been varied for $\pm 10\%$ to understand the sensitivity of the each of the component. Since the project is already commissioned, PP is requested to submit the actual costs incurred against the assumptions made in the investment analysis, to justify the sensitivity range taken for analysis. PP to refer comments in section B 5.4.5 and B.5.4.6 above.	CL9	OK
B.5.4.8	Have the key parameters been varied to reach the benchmark and the likelihood of this happening been justified to be small?	/01/, /18/, /30/, /31/	DR/CC	PP has determined the breakeven point for the parameters electricity sale price, Investment costs, and operating costs, where the NPV of project becomes positive. <i>However it is noted that the breakeven point for electricity generation is not transparent in the PDD.</i>  Clarification is sought as per the comments made in sections B.5.4.5 and B.5.4.6, <i>Benchmark selected needs to be justified and accordingly sensitivity analysis needs to be justified</i> Robustness of the sensitivity analysis could be concluded only after validating the input values assumed in the financial analysis.	CL9	OK
<b>B.5.5 Barrier analysis</b>						
B.5.5.1	Are the barriers identified complimentary to a potential investment analysis?	/01/	DR	The PP has demonstrated the additionality of the project through the investment analysis, thus the barrier analysis has not been applied. .		OK

Checklist Question		Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
B.5.5.2	How were the investment barriers assessed to be real? How does CDM alleviate the investment barriers?	/01/	DR	Please refer to section B.5.5.1.		OK
B.5.5.3	Is the project activity prevented by the investment barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/01/	DR	Please refer to section B.5.5.1.		OK
B.5.5.4	How were the technological barriers assessed to be real? How does CDM alleviate the technological barriers?	/01/	DR	Please refer to section B.5.5.1.		OK
B.5.5.5	Is the project activity prevented by the technological barriers and is at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/01/	DR	Please refer to section B.5.5.1.		OK
B.5.5.6	How were the barriers due to prevailing practise assessed to be real? How does CDM alleviate the barriers due to prevailing practice?	/01/	DR	Please refer to section B.5.5.1.		OK
B.5.5.7	Is the project activity prevented by the barriers due to prevailing practice and is at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/01/	DR	Please refer to section B.5.5.1.		OK
B.5.5.8	How were the other barriers assessed to be real? How does CDM alleviate the other barriers?	/01/	DR	Please refer to section B.5.5.1.		OK
B.5.5.9	Is the project activity prevented by the other barriers and is at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/01/	DR	Please refer to section B.5.5.1.		OK
<b>B.5.6 Common practice analysis</b>						
B.5.6.1	What are the geographical scope and scope of technology of the common practice analysis?	/01/, /06/	DR	Country level is taken as the region for common practice analysis. This is justified as per the tool for demonstration and assessment of additionality.		OK
B.5.6.2	How many similar non-CDM-projects exist in the region within the scope?	/01/, /33/, /34/, /35/	DR	Please refer section B.4.4 above, applicable legislation does not require landfills to collect and destroy the gas	<del>CL10</del>	OK

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>generated.</p> <p>As per UNDP study on waste management of February 2008 overall institutional and organizational arrangements for solid waste management have been weak and unofficial dumping and development of many small dumpsites is widespread.</p> <p>According to Ministry of Housing and Local Government Malaysia had 112 waste receiving sites in 2008 and only 18 of them are sanitary landfills, LFG capture and recovery is not a requirement as said above. <i>The document provided in support of this does not have a cover page, no logo of the organisation that has published in the report, now this document could be located in the website of Ministry of Housing and Local Government Malaysia. PP is requested to give the document with cover page carrying logo, or provide the web link of the document if available publicly on internet.</i></p> <p>Validation team referred DANIDA study of 2004, as per page 24 of the report only 4 landfills have implemented a LFG recovery system; 3 under CDM scheme and one subsidized by the commonwealth department; <i>however the same has been mentioned as 3 projects in the PDD. PP is requested to correct the same</i></p> <p>As per the UNFCCC website, there are 5 registered landfill gas projects with the</p>		



Checklist Question		Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
				latest one being in 2009 and 3 other landfill projects under validation. Thus it is concluded that there are no similar non-CDM projects in the region.		
B.5.6.3	How were possible essential distinctions between the project activity and similar activities assessed?	/01/	DR	Similar activities listed in the PDD in section B.5 are also being developed under the CDM mechanism, except for one project in Larkin, which is under Commonwealth department.  However PP to refer comments in section B.5.6.2 above.	<b>CL10</b>	<b>OK</b>
B.5.6.4	What is the data source(s) used for the common practice analysis?	/01/	DR	The sources used are UNDP study on waste management of February 2008. KPKT Study on safe closure and rehabilitation of landfill sites in Malaysia, 2008. Study on CDM potential in the waste sector in Malaysia by DANIDA of 2004 UNFCCC website on landfill projects in Malaysia. However, PP to refer comments in section B.5.6.2 above.	<b>-CL10</b>	<b>OK</b>
<b>B.5.7 Conclusion on the additionality assessment</b>						
B.5.7.1	What is the conclusion with regard to the additionality of the project activity?	/01/	DR	Additionality of the project activity will be concluded on submission and acceptance of documents as required above.	<b>CAR5/CAR6/ CAR8/ CL6/CL7/CL 8/CL9/CL10</b>	<b>OK</b>
<b>B.6 Calculation of GHG emission reductions</b>						
<b>B.6.1 Baseline emissions</b>						
B.6.1.1	Are the calculations documented according to the	/01/, /05/	DR	Baseline emissions are calculated using		<b>OK</b>

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
approved methodology and in a complete and transparent manner?	/07/ /32/, /33/, /37/		<p>the formula as per the Methodology ACM0001 and the tools referred therein. The formula used is</p> $ER_y = BE_y - PE_y$ <p>Where</p> <p><math>ER_y</math> = Emission reduction in year <math>y</math></p> <p><math>BE_y</math> = Baseline Emissions in year <math>y</math></p> <p><math>PE_y</math> = Project Emissions in year <math>y</math></p> <p><math>BE_y</math> is obtained using equation 1 of ACM0001 :</p> $BE_y = (MD_{project,y} - MD_{BL,y}) * GWP_{CH_4} + EL_{LFG,y} * CEF_{elec,BL,y} + ET_{LFG,y} * CEF_{ther,BL,y}$ <p>Where:</p> <p><math>BE_y</math> = Baseline emissions in year <math>y</math> (tCO<sub>2</sub>e)</p> <p><math>MD_{project,y}</math> = Amount of methane that would have been destroyed / combusted during the year, in tonnes of methane (tCH<sub>4</sub>) in project scenario; This is estimated by using equation 13 of the methodology ACM0001, discussed below.</p> <p><math>MD_{BL,y}</math> = Amount of methane that would have been destroyed / combusted during the year in the absence of the project due to regulatory and / or contractual requirement, in tons of methane (tCH<sub>4</sub>): This is estimated as per equation 2 of the methodology ACM0001, There is no legal requirement as on date in Malaysia to recover the LFG, hence the Adjustment factor is taken as 0, However PP to</p>	GL11/CAR4	

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>refer comments in section B.2.1 above on the baseline, the situation prior to the start of the project activity.</p> <p><math>GWP_{CH_4}</math> = Global Warming Potential value for methane for the first commitment period is <math>21tCO_2e/tCH_4</math> : This value is adopted from the methodology ACM0001</p> <p><math>EL_{LFG,y}</math> = Net quantity of electricity produced using LFG, which in the absence of the project activity would have been produced by power plants connected to the grid or by an onsite / off-site fossil fuel based captive power generation, during year <math>y</math>, in megawatt hours (MWh). Note that <math>EL_{LFG}</math> measures the electricity generated using LFG, which is fully sent to the grid and not used onsite. This is estimated as a maximum of 2 x 1048 kW gas engines in operation.</p> <p>The electricity consumed on-site (<math>EC_{PJ}</math>) is separately imported from the grid and measured with a separate meter.</p> <p><math>CEF_{elec,BL,y}</math> = <math>CO_2</math> emissions intensity of the baseline source of electricity displaced, in <math>tCO_2e/MWh</math>. This is assumed to be 0.672 <math>tCO_2/MWh</math> sourced from the Pusat Tenaga Malaysia (PTM), the official Malaysian Energy Centre. PP has <i>documented the sources used to arrive at the grid emission factor and have provided the</i></p>	<b>GAR4</b>	

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>step-wise working as per the tool to calculate emission factor for an electricity system, however PP is requested to update the EF spreadsheet and the PDD in accordance with the aforesaid tool, version 2.2.</p> <p><math>ET_{LFG,y}</math> = Quantity of thermal energy produced utilizing the landfill gas, which in the absence of the project activity would have been produced from onsite/offsite fossil fuel fired boiler/air heater, during the year <math>y</math> in TJ</p> <p><math>CEF_{ther,BL,y}</math> = CO<sub>2</sub> emissions intensity of the fuel used by boiler/air heater to generate thermal energy which is displaced by LFG based thermal energy generation, in tCO<sub>2</sub>e/TJ.</p> <p>Both the above parameters are not applicable to the project as the PP doesn't intent to use thermal energy from the project, this is documented in section B.6.1 of the PDD and hence assumed zero, thus accepted.</p> <p>Estimation of MD<sub>project,y</sub>:</p> $MD_{project,y} = BE_{CH4,SWDS,y} / GWP_{CH4}$ <p>Where:</p> <p><math>BE_{CH4,SWDS,y}</math> = Methane generation from the landfill in the absence of the project activity at year <math>y</math> (tCO<sub>2</sub>e), is calculated as per the "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site".</p>	<b>CAR4</b>	

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>However PP to refer to the comment in section B.1.1 above on the revision of tool.</p> <p>The amount of methane produced in the year <math>y</math> <math>BE_{CH_4, SWDS, y}</math> is :</p> $\phi (1-f) * GWP_{CH_4} * (1-OX) * 16/12 * F * DOC_f * MCF * \sum \sum W_{j,x} * DOC_j * e^{-kj(y-x) * (1-e^{-kj})}$ <p><math>\phi</math> – Value applied is 0.9, this is acceptable as this a default value from the tool applied</p> <p><math>f</math> – Value applied is 0, this is acceptable as per the methodology applied ACM0001.</p> <p><math>OX</math> – Oxidation factor, value applied 0.1 as per the tool, the default values given are 0 and 0.1, The value 0.1 is applied for landfills where soil or compost is used as covering material, the validation team verified this. it was covered with soil conservative, hence acceptable.</p> <p><math>F</math> – Value applied 0.5, acceptable as this is default value from the tool applied</p> <p><math>DOC_f</math>: Value applied is 0.5, default value from the tool applied , hence acceptable.</p> <p><math>MCF</math>: Value applied 1 – as the landfill meets the criteria: controlled placement of waste, cover material, mechanical compacting and levelling.</p> <p><math>W_{j,x}</math> : Amount of organic waste type <math>j</math></p>		

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>prevented from disposal in SWDS in the year x (tons). <i>RINA checked the same with the records of the landfill operator and found to be 6,207,684.59 ton for the period from 1995 to 2006. However the same value is not reflected in ER calculations. PP is requested to correct the same. Further it is also noted that the values of W<sub>j</sub> (waste composition) at the landfill site is not consistent in the PDD and ER sheets. Moreover, it is also noted that the waste composition specific to the project is available with the landfill operator. PP is requested to justify appropriateness and conservatives of the default values of IPCC on waste composition selected in ER calculations.</i></p> <p>DOC<sub>j</sub> - Default IPCC values, adapted from Tables 2.4 and 2.5 of the IPCC 2006 Guidelines as detailed in the tool to determine methane emissions corresponding to the wet wastes have been applied, since the disposed waste is measured on wet basis, conservative, hence applicable.</p> <p>k<sub>j</sub>: Values for tropical (climate with mean average precipitation of more than 1000mm is taken, this is acceptable as per the weather records checked with worldclimate website,</p> <p>Recovery rate: (R<sub>r</sub>) ; is 60% as per Table in section B.6.2 and B.6.3 of the PDD, this is an assumption by the PP, However, the <i>PP is requested to</i></p>		

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p><i>provide support the same with evidences.</i></p> <p>FE: The flaring efficiency is assumed as 90% in case of continuous and consistent operation, 50% in case of fluctuations and 0% if the flare exhaust is lesser than 500°C. However, <i>during site visit it was noted that the flares installed at the site are open flares and the value for flare efficiency chosen by the PP is of enclosed flares. PP is requested to explain the same</i></p>		
B.6.1.2 Have conservative assumptions been used when calculating the baseline emissions and are the uncertainty estimates properly addressed?	/01/, /22/, /26/	DR	Please refer section B.6.1.1.	CL11	OK
<b>B.6.2 Project emissions</b>					
B.6.2.1 Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/01/, /09/, /10/, /22/	DR	<p>Applying equation 16 of the approved methodology ACM0001, for the project, the Project emissions is</p> $PE_y = PE_{EC,y}$ <p>Where <math>PE_{EC,y}</math> is Emission from consumption of electricity in the project case.</p> <p>PP has used equation 1 of the tool to calculate project emissions from electricity consumption</p> <p>Where project emission due to consumption of electricity by flares and gas engines have been taken in to account. The formula used is :</p> $PE_{EC,y} = (EC_{PJ,flare,y} + EC_{PJ,elec,y}) * EF_{grid} * (1 + TDL)$	CL11	OK



Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>Where:</p> <p><math>EC_{PJ,flare,y}</math> is the electricity consumed by flare in year <math>y</math> in MWh. The value calculated based on the base power consumption of blowers <math>\times 24 \times 365/1000</math>. However it is noted that the power consumption from the chillers are not taken into consideration. <i>PP is requested to include the same in ER calculations and deduct it from baseline emissions. Also PP is requested to submit the technical specification of the flares indicating the power consumption of the flares.</i></p> <p><math>EC_{PJelec,y}</math> is quantity of electricity consumed by the power plant in year <math>y</math>, in MWh, the value assumed is 34.75 kW <math>\times 2</math> nos and 85% from the year August 2011. The PP is requested to make the same transparent in the ER spread sheets and the PDD. Also <i>PP to submit evidences for 85% availability of engines and the technical specification of the engines indicating their power consumption.</i></p> <p>As per section B.6.1 of the PDD, <math>EF_{grid}</math> (0.672 tCO<sub>2</sub>/MWh) is used as emission factor for project emissions due to consumption of electricity from grid, In case of this being supplied by onsite fossil fuel fired power plant a default factor of 1.3 tCO<sub>2</sub>/MWh will be applied and zero tCO<sub>2</sub>/MWh in case of a</p>		

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>renewable resource, that is if the project uses electricity from the grid, using option A.1 of the tool /10/, project emissions are calculated based on the power consumed by the project activity and the emission factor of the grid and taking into account transmission and distribution losses, using the following formula:</p> $PE_{EC,y} = EC_{PJ,y} * EF_{grid,y} * (1+TDL)$ <p>Where:  <math>PE_{EC,y}</math> : project emissions from electricity consumption by the project activity during the year <math>y</math> (tCO<sub>2</sub>/yr);</p> <p><math>EC_{PJ,y}</math> :quantity of electricity consumed by the project activity during the year <math>y</math> (MWh);</p> <p><math>EF_{grid,y}</math> :emission factor of the grid (tCO<sub>2</sub>/MWh), calculated as using Tool /10/ to calculate the emission factor for an electricity system (same as CEF<sub>elec,y</sub> or EF<sub>EL,j,y</sub>)</p> <p>TDL<sub>y</sub> : average technical transmission and distribution losses in the grid in year <math>y</math> for the grid voltage at project site. As the source of electricity in the project situation is the grid (Scenario A), default value of 20%, as specified in the "Tool to calculate project emissions from electricity consumption".</p> <p>If the project uses a fossil fuel</p>		

Checklist Question		Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
				<p>generator, using option B.2 of the tool /10/, project emissions will be calculated based on the power consumed by the project activity and the conservative default value of 1.3 tCO<sub>2</sub>/MWh as per the tool /09/ using the formula: <math>PE_y = EC_{PJ,y} * 1.3</math></p> <p>Two sources of electricity consumption are identified on site: flaring equipment and power plant when electricity production will start:</p> $EC_{PJ,y} = EC_{PJ,flare,y} + EC_{PJ,elec,y}$ <p><math>EC_{PJ,flare,y}</math>: quantity of electricity consumed by the flaring equipment in year <math>y</math></p> <p><math>EC_{PJ,elec,y}</math>: quantity of electricity consumed by the energy plant in year <math>y</math></p>		
B.6.2.2	Have conservative assumptions been used when calculating the project emissions and are the uncertainty estimates properly addressed?	/01/, /09/, /10/	DR/I	Please refer section B.6.2.1.	<b>CL44</b>	<b>OK</b>
<b>B.6.3 Leakage</b>						
B.6.3.1	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/01/, /05/	DR	According to the approved methodology ACM0001, leakage is accounted to zero.		<b>OK</b>
B.6.3.2	Have conservative assumptions been used when calculating the leakage and are the uncertainty estimates properly addressed?	/01/, /05/	DR	Please refer to section B.6.3.1		<b>OK</b>
<b>B.6.4 Emission reductions</b>						
B.6.4.1	Has the methodology been correctly applied to calculate the emission reductions and can this be replicated by the data provided in the PDD and supporting files to be submitted for registration?	/01/, /05/	DR	Please refer section B.6.1.1 and B.6.2.1	<b>CL44</b>	<b>OK</b>
<b>B.6.5 Data and parameters that are available at validation and that are not monitored</b>						

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
B.6.5.1 How were the parameters available at validation verified?	/01/	DR	<p>Following are the parameters available during validation:</p> <p>There is no legal requirement as on date in Malaysia to recover the LFG Hence the Adjustment factor is taken as 0. However the PP has committed that the same will be monitored for the subsequent crediting periods.</p> <p>GWP of Methane as 21 tCO<sub>2</sub>e/tCH<sub>4</sub> - from IPCC and hence accepted.</p> <p>Density of methane as 0.0007168 tCH<sub>4</sub>/m<sup>3</sup>CH<sub>4</sub> from methodology and hence accepted.</p> <p>Carbon emission factor of electricity in Peninsular Malaysia as 0.672 tCO<sub>2</sub>e/MWh from the Pusat Tenaga Malaysia (PTM) which is the official Malaysian Energy Centre. However PP to refer comment in section B.6.1.1 on calculation of emission factor for electricity from grid.</p> <p>Transmission and distribution losses 20% in case of use of electricity imported from the grid or 0 in case of use of a fossil fuel backup generator, the default values from the Tool to calculate baseline, project and / or leakage emission from electricity consumption, hence accepted.</p> <p>Methane emitted calculated</p>	CL11/CAR4	OK

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>theoretically using the tool to determine methane emission avoided from disposal of waste at a solid waste dump yard, however PP to refer to section B.1.1 on revision of the tool.</p> <p>Fraction of methane captured at the SWDS, 0.0 to be assumed as per the methodology ACM0001, hence accepted.</p> <p>Model correction factor as 0.9 as per the tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site, hence accepted.</p> <p>Oxidation factor 0.1 for solid waste covered with oxidizing material, as per the tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site, as confirmed during the site visit, it is a managed SWDS covered with oxidizing material, conservative, hence accepted.</p> <p>Fraction of methane in LFG, 0.5 , from IPCC values, hence accepted</p> <p>Fraction of degradable organic carbon that can decompose, 0.5 as per IPCC values, hence accepted.</p> <p>Methane correction factor, as 1 as per the IPCC values for landfill where there is controlled placement of waste, cover material, mechanical compacting and levelling of the waste, the same was confirmed during the site visit observation.</p> <p>Type wise degradable organic carbon</p>	<b>CAR4</b>	

Checklist Question		Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
				<p>as per default IPCC values, hence accepted.</p> <p>Decay rate- IPCC values for tropical climate is accounted, hence accepted.</p> <p>Solid waste composition- taken as per IPCC. However it is noted that the waste composition specific to the project is available with the landfill operator. PP is requested to justify appropriateness and conservativeness of the default values used in ER calculations and support the same with evidences.</p>		
<b>B.7 Monitoring plan</b>						
<b>B.7.1 Data and parameters monitored</b>						
B.7.1.1	Does the monitoring plan described in the PDD comply with the requirements of the methodology?	/01/, /05/, /07/, /08/	DR	<p>The parameters required to be monitored in the context of the project: as per the methodology ACM0001 are</p> <ol style="list-style-type: none"> <li>1. Total amount of LFG captured.</li> <li>2. Amount of LFG flared</li> <li>3. Amount of LFG combusted in power plant</li> <li>4. Project emissions from flaring of the residual gas stream in year</li> <li>5. Methane fraction in the landfill gas<sup>y</sup></li> <li>6. Temperature of the landfill gas</li> <li>7. Pressure of the landfill gas</li> <li>8. Net amount of electricity generated using LFG</li> <li>9. Carbon emission factor of electricity</li> <li>10. Operation hours of the energy plant</li> </ol>	<b>CL42</b>	<b>OK</b>

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>11. Project emissions from electricity consumption by the project activity during the year <math>y</math></p> <p>MG<sub>PR,y</sub>:Amount of methane generated during year <math>y</math> of the project activity is not required to be monitored as this is a closed landfill and the estimation done ex-ante which is as per actual quantity of waste disposed in the landfill.</p> <p>As per Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site the following parameters also need to be monitored:</p> <ol style="list-style-type: none"> <li>1. Global warming Potential of methane , valid for the relevant commitment period</li> <li>2. Total amount of organic waste prevented from disposal in year.</li> <li>3. Weight fraction of the waste type in the sample collected during the year, however this is not applicable to the project activity as no MSW is prevented from disposal.</li> <li>4. Number of samples collected during the year, however this is not applicable to the project activity as not MSW is prevented from disposal.</li> </ol> <p>Specific as per tool to determine project emissions from flaring gases containing</p>		



Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>methane, the following are to be monitored:</p> <ol style="list-style-type: none"> <li>1. Volumetric fraction of component i in the residual gas in the hour h where <math>i = \text{CH}_4, \text{CO}, \text{CO}_2, \text{O}_2, \text{H}_2, \text{N}_2</math></li> <li>2. Volumetric flow rate of the residual gas in dry basis at normal conditions in the hour h</li> <li>3. Volumetric fraction of <math>\text{O}_2</math> in the exhaust gas of the flare in the hour h</li> <li>4. Concentration of methane in the exhaust gas of the flare in dry basis at normal conditions in the hour h</li> <li>5. Temperature in the exhaust gas of the flare</li> <li>6. Other flare operation parameters that are required to monitor whether the flare operates within the range of operating conditions</li> </ol> <p>The PP has identified the above parameters to be monitored, however except for the inbuilt monitoring systems in the gas engines and the electrical energy meters all the other monitoring systems are required to be installed.</p> <p>The PP has proposed to monitor the following parameters:</p> <p>LFG combusted in power generators:</p>		

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>measured using continuous flowmeters, recorded once per month and expressed in m<sup>3</sup>. Hence accepted.</p> <p>Total LFG captured, at normal temp and pressure measured using continuous flowmeters, aggregated monthly and expressed in m<sup>3</sup>. however <i>it is not clear that the average value taken in a time interval taken is not greater than an hour in ER calculations as required by the methodology</i> Further the PP has confirmed that , in case no monitoring is done for LFG<sub>flare</sub> , the only monitoring would be done is for LFG<sub>electricity,y</sub>, which would be equal to LFG<sub>total,y</sub> .</p> <p>Amount of LFG flared, continuously measured using a flow meter in m<sup>3</sup>, and aggregated yearly and monthly, however it is not clear that the average value taken in a time interval taken is not greater than an hour in ER calculations as required by the methodology. Further the PP has also confirmed that incase LFG<sub>flare</sub> is not monitored, no CERs will be claimed for the excess LFG that is flared. RINA accepted the same since it is conservative.</p> <p>Average fraction of methane in LFG continuously measured with a gas analyser and expressed in % (m<sup>3</sup>CH<sub>4</sub>/m<sup>3</sup>LFG), however it is not clear</p>		

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>that the average value taken in a time interval taken is not greater than an hour in ER calculations as required by the methodology.</p> <p>Temperature of the LFG, measured continuously with a temperature sensor and expressed in °C, since LFG is expressed in Nm<sup>3</sup>, this need not be recorded, hence accepted.</p> <p>Pressure of LFG measured with a pressure sensor continuously and expressed in Pa. since LFG is expressed in Nm<sup>3</sup>, this need not be recorded, Hence accepted.</p> <p>Electricity consumption onsite with authorized electricity meters, continuously monitored and aggregated manually and reported monthly, the meters are under the control of the electricity supply agency. In case the source of electricity is other than grid, the same is separately monitored.</p> <p>Project emissions from electricity generation and flaring, calculated as per the tool to calculate baseline, project and or leakage emissions from electricity consumption and expressed as tCO<sub>2</sub>e and monitored periodically. Hence accepted.</p>		

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>Electricity generated using LFG measured continuously using authorized electricity meters and expressed in reporting and recording frequency would be done as per the requirements of electricity off-taker.</p> <p>Operation of the energy plant in hours is measured with an hour counter, monitored annually and expressed in hours. Further PP is requested to clarify how the reporting and recording frequency of this parameter is determined according to the requirements of electricity off-taker.</p> <p>GWP<sub>CH4</sub> is to be monitored annually, which is as per the methodology. Hence accepted.</p> <p>Organic waste prevented from decomposition, measured in tons is taken as per the data available from the landfill operator, however it is noted that the parameter is not applicable to the project activity since there is no disposal of MSW is prevented from disposal due to the project activity.</p> <p>Weight fraction of waste type, and number of such sample measurements in a year, sample measurement by PP in accordance with the approved methodology ACM0001 version 11, this is not required. Also however it is noted</p>		

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>that the parameter is not applicable to the project activity since there is no disposal of MSW is prevented from disposal due to the project activity. Further the composition of waste is not used in ex-post ER calculations.</p> <p>Number of samples collected during the year, not applicable since there is no disposal of MSW is prevented from disposal due to the project activity.</p> <p>Project emissions from flaring of the residual gas stream would be calculated as per the “tool to determine project emission from flaring gases containing methane”. The PP has confirmed that only the methane content of the residual gas would be monitored and consider the remaining part as N<sub>2</sub>.</p> <p>Volumetric fraction of component i in the residual gas in the hour h, measured by continuous gas analyser, the values averaged hourly or at a shorter time interval.</p> <p>Volumetric flow rate of the residual gas in dry basis at normal conditions measured by flow meter continuously, averaged atleast hourly or at a shorter time interval and expressed in m<sup>3</sup>/h. Hence accepted.</p>		

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>Volumetric fraction of O<sub>2</sub> in the exhaust gas of the flare in the hour h, measured continuously by continuous gas analyser. Values would be averaged hourly or a shorter time interval. The same is accepted as this is as per the methodology.</p> <p>Concentration of methane in the flare exhaust gas measured using continuous gas analyzer, averaged hourly and expressed in mg/m<sup>3</sup>. Hence accepted.</p> <p>Temperature in the exhaust gas of the flare is continuously measured and monitored using a Thermocouple and expressed in °C. Hence accepted.</p> <p>Other flare operation parameters will be monitored as necessary to ensure continuous operation of flare within defined range.</p>		
B.7.1.2 Does the monitoring plan contain all necessary parameters and are they clearly described?	/01/, /05/	DR	Please refer comments in section B.7.1.1, the gaps identified needs to be incorporated in the PDD	<b>CL42</b>	<b>OK</b>
B.7.1.3 Is the measurement equipment described? Is the accuracy of the measurement equipment addressed and deemed appropriate? Are the requirements for maintenance and calibration of measurement equipment described and deemed appropriate?	/01/	DR	Please refer section B.7.1.1. Further during the site visit it is noted that except for the inbuilt monitoring systems in the gas engines and the electrical energy meters all the other monitoring systems are required to be		<b>OK</b>

Checklist Question		Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
				installed. However the PDD complies with the requirements of the monitoring methodology, hence accepted.		
B.7.1.4	Is the monitoring frequency adequate for all monitoring parameters? Is it in line with the monitoring methodology?	/01/, /05/	DR	The monitoring frequency of each parameter is discussed in section B.7.1.1. Further it is noted that monitoring is in line with the requirements of the methodology and the tools applied.		OK
B.7.1.5	Is the recording frequency adequate for all monitoring parameters? Is it in line with the monitoring methodology?	/01/, /05/	DR	Please refer to comments in section B.7.1.1, the recording frequency of all monitoring parameters are in line with the methodology and tools applied for the project, the gaps in monitoring plan has been identified and raised as CL in section B.7.1 The monitoring records are maintained for 2 years after the end of crediting period. Hence accepted. As discussed above except for the inbuilt monitoring systems in the gas engines and the electrical energy meters all the other monitoring systems are required to be installed and availability of the entire above mentioned measuring device is to be checked during verification.		OK
<b>B.7.2 Monitoring of sustainable development indicators/environmental impacts</b>						
B.7.2.1	Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/01/	DR	There is no indication that the sustainable development indicators are to be monitored. <i>However the same shall be confirmed on receipt of the LoA.</i>	<del>CAR1</del>	OK
B.7.2.2	Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/01/	DR	Please refer comments in section B.7.2.1	<del>CAR1</del>	OK

Checklist Question		Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
B.7.2.3	Are the sustainable development indicators in line with stated national priorities in the host country?	/01/, /41/	DR	Yes, the sustainable development indicators mentioned in section A.2 of the PDD are as per those listed sustainable development indicators of the DNA.		OK
B.7.3 Management, quality assurance and quality control						
B.7.3.1	How has it been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/01/, /05/	DR	Calibration of all the measuring instruments is planned to be done periodically or as per the manufacturer specification or national/international standards, as available. PP has reported in PDD that it will identify procedures to deal with malfunction of equipments, data discrepancies and storage of data. The data necessary for estimation or measuring the GHG emissions within the project boundary are measured by the instruments, where the data would be collected in data acquisition and transmitted to modem. Collection and storage of data is through automatic transmission. It is stated that in case the automatic transmission fails the PP will rely on the manual transmission. The data will be stored up to two years after the end of crediting period. RINA is of the opinion that the monitoring plan will give opportunity for real measurement of achieved emissions reductions and can be reported ex-post and verified. This is accepted as it complies with the monitoring plan proposed by the approved methodology.  PP is requested to clarify the roles and	CL13	OK



Checklist Question		Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
				responsibility of Aby carbon as one of the PP in this project activity and also provide the contract agreement between worldwide landfills and Aby carbon.		
B.7.3.2	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	/01/, /05/	DR	<ol style="list-style-type: none"> <li>1. Data is proposed to be automatically transferred.</li> <li>2. Manual transmission will be done incase of failures</li> <li>3. All data will be stored physically on the disk of the server machine</li> <li>4. Periodical backup is proposed.</li> <li>5. Records will be retained for two years after the end of the crediting period.</li> </ol> Hence accepted		OK
B.7.3.3	Are the data management and quality assurance and quality control procedures sufficient to ensure that the emission reductions achieved by/resulting from the project can be reported ex post and verified?	/01/, /05/	DR	Please refer to section B.7.3.1		OK
B.7.3.4	Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/01/, /05/	DR	Please refer to section B.7.3.2		OK
<b>C. Duration of the project activity and crediting period.</b>						
<b>C.1 Start date of project activity</b>						
C.1.1	What is the expected starting date of the project activity and how has been determined? When was the first construction activity?	/01/, /27/	DR	The starting date of the project activity is 15/04/2009. Please refer section B.5.3.1.	<del>CAR5</del>	OK
C.1.2	What is the expected operational lifetime of the project activity? Is it reasonable?	/01/, /20/, /21/	DR	The expected operational life time as per section C.1.2 of the PDD is mentioned as 15 years. PP is requested to submit appropriate	<del>CAR9, CL8</del>	OK

Checklist Question		Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
				documents to demonstrate the same.  Also it is noted that as per the tool to determine remaining life time of the equipment, for gas fired generators is 50,000 hours and on continuous operation this translates to about 6 years. The PP is requested to clarify how this is in line with the crediting period selected.  PP to refer comments in section B.5.4.3 of this report that the lifetime given in section A.4.3 is different from lifetime given in section C.1.2	<b>CL8</b>	
<b>C.2 Start date of crediting period</b>						
C.2.1	What is the expected starting date of the proposed project activity? Does the crediting period start eight week after the request for registration?	/01/, /27/	DR	As per section C.2.2.1 of the PDD, the starting date of the first crediting period is planned to be 01/01/2012 or the date of registration whichever is the earlier. PP is required to justify on how this statement is consistent with the glossary of CDM terms for start date of crediting period.	<b>CAR10</b>	<b>OK</b>
C.2.2	What is the length of the crediting period? Is it clearly defined and reasonable?	/01/	DR	The PP has opted for 10 years fixed crediting period. However the same is not available in year and months format	<b>CL14</b>	<b>OK</b>
<b>D. Environmental Impact</b>						
D.1.1	Has an analysis of the environment impacts of the project activity been undertaken? Is it clearly and sufficiently described in the PDD?	/01/, /14/	DR	PP has done an analysis of environmental impacts and clearly and sufficiently described the same in section D.1 of the PDD. It describes about the impact on landscape, fauna and flora, air and climate and on safety, hence considered acceptable.	<b>CL15</b>	<b>OK</b>

Checklist Question		Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
				Also, Malaysia DNA does not require an environmental impact assessment for this project activity according to the Environmental Quality Act 1974. The same was also confirmed through the letter dated 22/09/2010, from the department of environment, Malaysia confirming LFG recovery project does not require EIA to be done as per the Environment Quality (Environment Impact Assessment) Order 1987.  However <i>PP</i> is requested to submit copies of leachate analysis report from authorized agencies also detailing the acceptable limits.		
D.1.3	Is the analysis of the environmental impacts required by the legislation of the host Country? If yes, has the EIA has been approved by local Government? Does the approval contain any conditions that need monitoring?	/01/, /14/	DR	Please refer to section D.1.1	<b>CL15</b>	<b>OK</b>
D.1.4	Is it the project in line with the current environmental legislation in the host Country?	/01/, /14/	DR	Please refer to section D.1.1	<b>CL15</b>	<b>OK</b>
<b>E. Local stakeholder consultation</b>						
E.1.1	Are the local stakeholders be invited by the PP prior to the publication of the PDD to the UNFCCC website?	/01/	DR	Stakeholders listed in section 2.2 were interviewed during site visit and it was confirmed that the Stakeholder meeting was held on 11/05/2011, the same was also confirmed by the summary of stakeholder's consultation report. However the summary document provided is same as what is given in PDD, PP is requested to provide the minutes of meeting. Also PP is requested to make the date of invitation letter transparently in the PDD.	<b>CL16</b>	<b>OK</b>

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			<p>Local councillors from Majlis Perbandaraan Subang Jaya , Representatives from unit perancang Ekonomi Negri Selangor representatives from mosques, residence associations landfill operator, and workers were Identified as stakeholders and were invited by means of letters and fax 2 weeks prior to the stakeholder meeting.</p> <p>In addition, general public was informed through posters put up on the landfill entrance two weeks prior to the stakeholder meeting.</p> <p><i>PP is also requested to provide the evidences of fax communication of invitation to stakeholder meeting and the number of invitation letters sent and the list of participants who attended the stakeholders meeting.</i></p> <p><i>As given in the PDD, it is noted that the first stakeholder meeting was conducted on 26/08/2006; a total of 15 persons attended the meeting. PP is requested to submit evidences.</i></p>		
nsoE.1.2 Area the stakeholders invited be considered as regards commenting the proposed project activity?	/01/.	DR	A total of 16 persons attended the local stakeholder consultation meeting. 2 questions / comments were received during the stakeholder consultation meeting and they have been addressed accordingly. The summary of questions raised and the PP's reply to each of		<b>OK</b>

Checklist Question	Reference	MoV <sup>1</sup>	Comments	Draft Conclusion	Final Conclusion
			them respectively is documented in section E.2 of the PDD. However there is no negative comment on the project. RINA confirmed the same by one to one interaction with the stakeholder.		
E.1.3 Is the summary of the comments received from the stakeholders, provided in the PDD complete?	/01/	DR	The stakeholders confirmed during interview that the stakeholders summary mentioned in the PDD is inline with what had happened in the actual proceedings of the meeting. Further they also expressed there positive opinion on the project, hence accepted.		OK
E.1.4 Has due account been taken by the project participants of any stakeholder comments received?	/01/,	D R	All questions raised during the meeting have been addressed and the summary of the same is available in E 3 of the PDD		OK
E.1.5 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?	/01/	DR	PP to refer to the comments in section B.4 above. No legislation in Malaysia demands stakeholder consultation for a LFG project		OK

**TABLE 3 RESOLUTION OF CORRECTIVE ACTION REQUESTS AND CLARIFICATION REQUESTS**

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>CAR 1</p> <p>PP is requested to submit LoA from the DNA of Malaysia and LoA from France once available for verification.</p>	<p>A.1.1, A.3.1, A.3.3, A.3.5, B.7.2.1, B.7.2.2</p>	<p>The LoA from Malaysia is available.</p> <p>The LoA from France is pending.</p>	<p>Copy of the LoA dated 06/11/2011, from the Ministry of Natural Resources and Environment has been provided by the PP.</p> <p>The LoA was directly received by the PP and approves the voluntary participation of the PP.</p> <p>The LoA is valid for a period of one year and continues to be valid once submitted to UNFCCC for registration.</p> <p>LoA from France dated 30/11/2011 was received by the PP.</p> <p>CAR1 is closed.</p>
<p>CAR 2</p> <p>1. Section A.4.3 doesn't address the technical specifications of the flare and biogas engine and the emission sources and greenhouse gases involved in project activity as required by the Guideline for completing the project design document version 07 of 02/08/2008.</p>	<p>A.1.2, A.4.2</p>	<p>1. Section A.4.3 has been modified to include further details on technical specifications of the flare and of the engines.</p>	<p>PDD has been modified to include capacity of flares, manufacturer and the power consumption of the flares as per the technical details of the flare installed at site, hence accepted.</p> <p>The maintenance manual of the gas engines, submitted by the PP do not have the details of power consumption of gas engines, hence PP has used the power consumption of similar engines from GE as per specification for JGC 320 GS-L.L</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>2. Operational lifetime of the project activity in section A.4.3 of the PDD is stated as 20 years and the same in section C.1.2 is stated as 15 years, PP is requested to explain the same..</p> <p>3. The PP is requested to provide the evidences to support the operational lifetime and technical specifications of engines and flares.</p> <p>4. It is also noted that the nominal power of gas engines is taken as 34.75 kW, which is based on the JGC 320 GS technical specifications issued in</p>		<p>2. Operational lifetime of the project activity is 15 years. Reference to 20 years in section A.4.3 is a typo mistake.</p> <p>3. The operational lifetime of the engines depends on the quality of maintenance. As per the manufacturer, the maintenance schedule of the engines is based on 60,000 operating hours. After that, an overhaul is required and the maintenance work can be repeated. 60,000 operating hours correspond to 7 to 8 years depending on the availability. We assumed an average lifetime of 15 years, including an overhaul after 7.5 years. The maintenance schedule is submitted to the audit team.</p> <p>4. The power consumption of the gas engines is not available in the technical specifications of the engines – 125 page-detailed manufacturer's manual dated 2004-01 provided to the audit team. Nevertheless since the engine type – JGS 320 – is the same as in the technical sheet provided and even though the capacity is slightly different (1048 kW vs. 1063 kW, i.e. 1.4% difference) the</p>	<p>model is assumed and justified the same in point 4 of this CAR, also power consumption is measured ex-post, hence accepted.</p> <p>PDD has been corrected for this change, consistent throughout the PDD, hence accepted.</p> <p>Maintenance schedule, J 312-320 GS; Version C21/121/221/81/281/82, mentions the maintenance required till 60,000 hours of operation and mentions "After the overhaul 60,000 operating hours, the maintenance work to be carried out is repeated at the same interval periods", assuming conservatively that only one overhaul can be made to the engine, a life time of 15 years is logical, hence accepted.</p> <p>Accepted.</p> <p>CAR 2 is closed.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
the year 2010 for 1063 kW biogas engines. However the biogas engines specific to the project was commissioned in the year 2004 and the capacity is 1048 kW. PP is requested to justify the appropriateness of value selected		nominal power of 34.75 kW per engine should be applicable. If we applied the 1.4% difference factor, the theoretical nominal power of the engine would be 34.26 kW and the resulting difference in annual ER is 5 tCO <sub>2</sub> which is considered as negligible (0.009% of the annual ER).	
<p>CAR 3</p> <p>1. During the site visit and interaction with WLSB, it was found that the project was implemented in 2004 and was in operation till 2007. This is not stated in PDD. The PDD states that purpose of project activity is to built, operation and maintain a landfill gas collection and utilization system where as this is not correct as system is already existing at site. The pre-project scenario stated in PDD is not clear. It needs to be clearly described in the PDD whether the project is alteration of existing equipment. The PDD does not provide any details on the situation existing at project site from 2004 to 2007 with respect to quantity of landfill captured, details of equipments used for power generation, reasons why power generation was stopped in 2007 etc.Also the PP is requested submit the commissioning certificate of power plant, PPA, operational log book of the power plant, records of shut down and evidences of repairs done to the existing biogas engines.</p>	A.2.1, B.4.1	<p>1. In answer to the raised CAR:</p> <p>1.1 the chronology in section B.5 has been further detailed</p> <p>2<sup>nd</sup> response: Section A.2 has been further detailed.</p> <p>1.2 sections A.2, A.4.3 and B.2 have been modified</p> <p>1.3 no information is available on the quantity of LFG captured between 2004 and 2007 since no equipment for measuring it was installed on site (<i>inter alia</i> flowmeter and gas analyzer)</p> <p>1.4 the plant stopped due to the 2 engines break downs.</p> <p>1.5 the commissioning certificate and the operational log book of power plant are not available. Nevertheless the commissioning date can be substantiated by the confirmation from TNB-ES that the plant started commercial operations on 9 April 2004 (letter dated 21 Sept 2011). This letter also confirms the date of</p>	<p>1.1 Chronology is now detailed from the year 2002, however section A.2 of the PDD should give a brief description of the pre project scenario, PP is requested to correct the PDD as appropriate.</p> <p>2<sup>nd</sup> response: The correction made in section A.2 of the PDD, meets the requirement, hence accepted.</p> <p>1.2 The modifications done to the PDD is consistent with the site visit findings hence accepted.</p> <p>1.3 OK, this is further substantiated with the letter from the TNB-ES dated 25/10/2011, ref no.TNB/PP&amp;P/RE&amp;GT 8/11/4.</p> <p>1.4 Given in section B.5 of the PDD, hence accepted.</p> <p>1.5 OK, accepted.</p>



Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>2. Capacity of the power plant mentioned is not consistent throughout the PDD; the PP is requested to explain the same.</p>		<p>stopping the power plant (30 May 2007). Finally, the operations of the power plant can be substantiated by the confirmation of statement account of TNB-ES, dated 8 July 2011.</p> <p>1.6 the PPAs and invoices proving the engines repairs are provided. It shall be noted that the PPA of 2001 is not available however the 2 supplementary agreements of 27/08/2007 and 29/05/2009 give sufficient information about the 2001 agreement, in particular the date of signature (16/10/2001) and the parties (JLSB and TNB). The initial purchase price of 0.165 RM/kWh can be verified in TNB confirmation of electricity invoiced (statement account, provided above</p> <p>1.7. records of shut down can be proved by records of operations and the letter from TNB-ES mentioned above in 1.6.</p> <p>2. The power plant capacity is 2 MW, it includes 2 biogas engines of 1048 kW capacity each. The PDD has been corrected accordingly.</p>	<p>1.6 OK</p> <p>1.7 OK, accepted as per the letter from the TNB-ES dated 25/10/2011, ref no.TNB/PP&amp;P/RE&amp;GT 8/11/4.</p> <p>2. OK, said correction has been done, hence accepted.</p> <p>CAR 3 is closed.</p>
<p>CAR 4</p> <p>1. PP is requested to update the "Tool to determine methane emissions avoided from</p>	<p>B.1.1, B.2.1, B.6.1.1, B.6.5.1, B.2.2</p>	<p>1. As a response to the raised CAR, version of the tools has been updated as per EB61.</p>	<p>1. Latest version of Tool to determine methane emissions avoided from disposal of waste at</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>disposal of waste at a solid waste disposal site" and the "Tool to calculate the emission factor for an electricity system" as per EB 61 report.</p> <p>2. PP is requested to make it transparent in the PDD on how the project meets the applicability condition of the methodology when LFG recovery was already happening prior to webhost of the project activity in 2006. In this PP is requested to make it transparent in the PDD the complete</p>		<p>The update of the Tool for SWDS does not impact the ER calculations since the landfill contains no domestic sludge, as confirmed by a letter provided by the landfill operator.</p> <p>The update of the Tool to calculate the EF does not impact the EF result and thus does not impact the ER calculations.</p> <p>2. Though LFG recovery happened from April 2004 to May 2007, no LFG was recovered after the stop of the power plant on 30 May 2007 until the restart of the plant on 23 June 2010. It should be noted that the auxiliary flare is part of the power plant, so when the power plant stopped, the flare was not functioning and no LFG was flared.</p> <p>Therefore the situation on the landfill of Ayer Hitam prior to the restart of the project, which is also the baseline scenario, is the release of the LFG in the</p>	<p>a solid waste disposal site (version 5.1, EB61) is now referred in section B.1 of the PDD and consistent throughout the PDD. The modification made in the revised tool does not impact the emission reduction calculations since the landfill does not receive any domestic sludge. Verified letter dated – submitted by the PP confirming the same, hence accepted.</p> <p>Verified Study on Grid Connected Electricity Baselines in Malaysia of the year 2008, the latest data published by the Malaysian DNA. The modifications made in the PDD in annex 3 are consistent with the requirements of the Latest version of Tool to calculate the emission factor for an electricity system (version 2.2, EB61). Hence accepted.</p> <p>The argument by the PP is accepted, however PP is requested to submit evidences to substantiate that the flares were not operated between 2007 and 2010, the time during which the LFG was not recovered.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>details of various activities beginning from 2002 and explain how the methodology is applicable with credible evidences.</p>		<p>atmosphere. Hence the applicability condition of the methodology is met. A detailed chronology has been included in section B.5 of the PDD.</p> <p>It is worth noting that though the meth ACM0001 does not include such situations as restart, it does not state that this situation is not applicable.</p> <p>2<sup>nd</sup> response: Evidence that the flare was not operating between June 2007 and June 2010 is provided: electricity bills for this period showing that the electricity consumption was minor as compared to the period of plant (engine + auxiliary flare) operation.</p> <p>3. TNB-ES confirmed in a letter dated 21 Sept 2011 that the plant shut down on 30 May 2007. TNB-ES also confirmed in the statement of account dated 8 July 2011 that no electricity was generated by the plant until June 2010. Finally, TNB-ES also confirmed in a letter dated 24 October 2011 that the power plant recorded no operation from 30 May 2007 to 23 June 2010.</p> <p>Besides, as proven by Price Water House Cooper's 31-12-2009 financial report, JLSB registered no revenue in 2008 and 2009. It further confirms that operations were stopped during this period.</p>	<p>2<sup>nd</sup> response: Letter dated 18/11/2011, from TNB Energy services Sdn. Bhd, ref. number: YNBES/JLSB/Nov-11, shows a steep decrease in power consumption in July 2007 and a sharp increase in May 2010, and thereafter this has been consistent. Also PP has submitted a declaration letter dated 29/11/2011, which states that there was no active collection of LFG during June 2007 to June 2010. Hence accepted, that LFG was completely vented to atmosphere.</p> <p>Accepted, however PP is requested to submit evidences to substantiate that the flares were not operated between 2007 and 2010, as requested above.</p>
<p>3. PP is requested to submit credible third party</p>			

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
documents to demonstrate that the power plant and the flare was not in operation from the year 2007 till the start of the project activity and make the above transparent in section B.2 of the PDD.		It should be noted that the auxiliary flare is part of the power plant, so when the power plant stopped, the flare was not functioning. 2 <sup>nd</sup> response: Evidence provided: same as above.  4. The applicability of each of the tools referred by the methodology is already developed in details in section B.6.1 of the PDD.	2 <sup>nd</sup> response: Accepted as above.  Applicability of each of the tool is discussed in section B.6.1 of the PDD, hence accepted.  CAR 4 is closed.
4. PDD is not transparent on the project's compliance to applicability criteria as per the tools referred by the methodology			
CAR 5 1. The start date of the project activity is 15/04/2009, which corresponds to WLSB acquired majority shares in joint venture with TNB Energy Services Sdn. Bhd. PP is requested to submit authorization letter and approval letter translated in English. Further PP is requested to clarify how this can be considered as start date in accordance with the Glossary of CDM terms, since it is noted that PP had 30% shares in the project activity from the year 2004 and has been notified as one	B.5.3.1, B.5.3.2, B.5.3.3, B.5.3.4, B.5.4.4, B.5.7.1, C.1.1	1. English translation of the letters is provided to the audit team The chosen start date corresponds to the recommencing of the project which is when WLSB further invested to purchase the majority shares in JLSB and repair the engines in order to restart the implementation of the project. According to the glossary, the start date is when PP has committed to expenditures	OK, accepted on the basis that operation of the power plant was under TNB-ES initially and WLSB became the major share holder in 2009 by acquiring shares, hence accepted.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>of the PP in the previous webhosted PDD.</p> <p>2. As per the draft validation report No: 9105040109, rev. 01 of 13/03/2006 by TUV Rheinland and the PDD, version 4.2 of 02/05/2009 the start date of the project activity is taken as 01/01/2009, which is inconsistent with the start date mentioned in the PDD, version 05 of 16/05/2011 web hosted on 24/06/2011.</p>		<p>related to the implementation or the construction of the project activity. The start date was considered as 15/04/2009 because the financial commitment at that date represented 53% of the CAPEX required to restart the project.</p> <p>Though a financial expenditure was made on 17 August 2005 when WLSB invested in 30% of shares in JLSB, the plant was stopped 2 years later. In order to restart the project, WLSB needed to purchase a majority share in JLSB and further invest to repair the plant. This investment was 6 times higher than the 2005 investment. Since the plant had shown operational problems, the new investment would not have been done without considering CDM. Hence the case is indeed a restart as defined in the glossary: the implementation of a project is recommenced due to the consideration of CDM.</p> <p>2. Three PDD have been published for global comments on the UNFCCC website prior to the considered PDD. In the first published PDD (version 1 of 03/10/2006) the starting date is indicated as 01/07/2007.</p> <p>In the second published PDD (version 3.2 of 15/06/2007) the starting date is indicated as 01/10/2007</p> <p>In the third published PDD (version 4.2 of 02/05/2008) the starting date is indicated as 01/01/2009</p> <p>In those 3 PDD, the starting date of the project activity corresponds to the starting date of the crediting period.</p>	<p>Three webhosted PDDs were submitted by the PP and has been webhosted only due to revision in methodology. It is noted that the start date of project activity and the starting date of crediting period is assumed the same; hence the starting date of the project activity has varied between PDDs. However the start date mentioned in the webhosted PDD version 5 is as per the glossary of CDM terms. Hence accepted.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>3. The PP is requested to submit all three webhosted PDDs and their respective validation reports, termination contract with the DOEs and also provide the justification on the requirement of webhosting the PDD three times.</p>		<p>In the draft validation report of 13/03/2006 by TUV Rheinland, the starting date is indicated as 01/07/2007 and also corresponds to the starting date of the crediting period.</p> <p>In all these past cases, the starting date of the project activity does not follow the UNFCCC definition as per the CDM Glossary.</p> <p>3. As a response to the CAR, the three webhosted PDD are provided to the audit team. The re-submissions of the PDD are due to the revision of the methodology ACM0001: version 4 (1<sup>st</sup> upload) then version 5 (2<sup>nd</sup> upload) and version 8 (3<sup>rd</sup> upload). Prior to October 2009 (EB50 Annex 49) it was necessary to published the PDD for global stakeholders consultation each time a methodology was revised.</p> <p>PP only obtained the draft validation report of the 1<sup>st</sup> PDD and the clarification requests and corresponding answers of the 3<sup>rd</sup> PDD (dated 15/02/2010). The previous DOE has been approached several times but the DVR of the 2<sup>nd</sup> and 3<sup>rd</sup> PDD have not been obtained.</p> <p>2<sup>nd</sup> response: The validation reports from the previous DOE are not available. PP further tried to contact the previous DOE but did not obtain any reply. The termination of the contract can be cross-checked with the UNFCCC website in the Project Cycle Search, section "validation", looking at the projects classified as "validation contract</p>	<p>Validation reports and the termination of contract with the previous DOE engaged are critical documents required to make further progress in validation of the project activity.</p> <p>2<sup>nd</sup> response:Email correspondence PP had with Mr. Norbert Heidelbergmann, &lt;Norbert.Heidelbergmann@de.tuv.com&gt; 2011Business Manager Carbon Services on Thu, 3 Feb TÜV Rheinland Energie und Umwelt GmbH, confirmed that the contract with them is terminated, however he could not get the required documents in time, UNFCCC website also gives the project under the category validation contract has been terminated, hence accepted</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>4. The PP is further requested to clarify if the project is a new project activity or an existing project activity and how does it comply with the "Guidelines on the demonstration and assessment of prior consideration of the CDM version 3 EB49 report Annex 22, dated 11/09/2009.</p>		<p>has been terminated" (<a href="http://cdm.unfccc.int/Projects/Validation/index.html">http://cdm.unfccc.int/Projects/Validation/index.html</a>)</p> <p>4. The project start date is after 2 August 2008 and after the first publication for global stakeholders. Both the UNFCCC and the Host Party DNA were informed of the CDM project in 2007. The UNFCCC was informed through the publication of the previous PDD which already included the owner of the project activity as PP. WLSB was represented through Worldwide-Ecoventure Sdn Bhd which was a joint venture between Ecair, the previous CDM consultant, and WLSB.</p>	<p>The definition new project or an existing project is now redefined in the revised prior consideration guideline as project with start date prior and after 02/08/2008. CDM was considered prior to start date of the project activity and though the LFG based power plant was not in operation from 2007, the process of getting the project registered under CDM continued to happen as evident from the webhost of PDD version 4.2 of 02/05/2008. Hence accepted.</p> <p>CAR 5 is closed</p>
<p>CAR 6</p> <p>The PDD is not transparent on the serious consideration of CDM prior to the time of decision to proceed with the project activity. Provide the same with supporting evidences. In addition PDD is not transparent on the real actions taken in</p>	<p>B.5.3.2, B.5.3.3, B.5.3.4, B.5.7.1</p>	<p>CDM consideration: see §4 of CAR5 above.</p> <p>The chronology in section B.5. has been further detailed. The supporting evidences for each event are provided to the audit team.</p>	<p>Signed agreement dated 04/09/2002 is submitted. This mentions that JLSB will put up a power plant generating electricity using gas generated from landfill. JLSB will sell the electricity generated to TNB-ES.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
parallel to the implementation of the project activity to secure CDM status. Provide the same with supporting evidences. Detailed Chronology of events is not provided		<p>On 4 September 2002, a tripartite agreement was signed between the State Government of Selangor, Worldwide Landfills Sdn. Bhd. (WLSB) and Jana Landfill Sdn. Bhd (JLSB), a 100% owned subsidiary of TNB Energy Services Sdn. Bhd (TNB-ES). According to this agreement (provided), JLSB is granted the right to exploit the landfill gas to generate electricity.</p> <p>In 2004-2005, the power plant was controlled by TNB-ES through its 100% subsidiary JLSB which operated the plant.</p> <p>From Aug 2005 to May 2007, the power plant was operated by JLSB which was owned 30% WLSB and 70% TNB-ES.</p> <p>2<sup>nd</sup> response: As confirmed in the subscription agreement of 17 August 2005 (provided).</p> <p>Since 10 October 2005, CDM was already considered. This is mentioned in the board meeting minutes of 6 January 2006 (provided): "the Board at its previous meeting had agreed to develop a CDM project at AHSL". The previous meeting mentioned took place on 10 October 2005 (cover page of the minutes provided).</p> <p>The first upload of the PDD for global stakeholders consultation in January 2007 further demonstrates the early consideration of CDM.</p>	<p>Section 3 of the agreement, confirms the statement made by the PP, hence accepted.</p> <p>As per TNB corporate report 2003, TNB ES is a 100% subsidiary of TNB and JLSB is a 100%v subsidiary of TNB ES. Hence accepted.</p> <p>PP is requested to mention and submit the supporting evidence for the statement.</p> <p>2<sup>nd</sup> response: Subscription agreement dated 17/08/2005, confirms the statement, hence accepted.</p> <p>Evidences submitted have been cross checked and found to be demonstrating the statements made by the PP, hence accepted.</p> <p>The project was restarted on 15/04/2009 and first PDD upload for Global stakeholder comments was during 06/01/2007, hence it is accepted that</p>



Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
		<p>On 30 May 2007, the plant stopped due to engines breakdown. No investment was done to repair the engines until 2009. Thus from 30 May 2007 to 23 June 2010, the plant was not in operations, as evidenced by TNB statement of account.</p> <p>In 2008, TNB-ES decided to divest its participation in JLSB rather than further investing in the overhaul of the project. The purchase tariff was increased and WLSB decided to acquire the project by purchasing TNB-ES's 50% shares in JLSB.</p> <p>Evidence provided: -share sale agreement 18 July 2008</p> <p>The share transfer was negotiated during one year (2008/2009), meanwhile CDM validation was continuing, the plant was not operating and the purchase tariff was again negotiated.</p> <p>2<sup>nd</sup> response: Evidences provided: -amendment of PPA 29 May 2009 -TNB confirmation that the plant was not operating -CDM continuing: 3<sup>rd</sup> upload of PDD 3 May 2008 and LoA 13 Feb 2009 -authorization letter from the Energy Commission for the transfer of shares</p> <p>Eventually in April 2009, WLSB acquired the majority shares in the project and</p>	<p>there has been prior CDM consideration for the project activity.</p> <p>OK, accepted.</p> <p>Share sale agreement dated 18/07/2008, confirms the statement, hence accepted</p> <p>PP is requested to submit the evidences for the statements made.</p> <p>2<sup>nd</sup> response: The evidences submitted are in line with statement made by the PP, hence accepted.</p> <p>PP is requested to mention the supporting documents against each of the statement</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
		<p>further invested to repair the engines. This is considered as the re-start date of the project.</p> <p>2<sup>nd</sup> response: Evidence provided: -authorization letter from the Economic Planning for the transfer of shares -engine repair invoice</p> <p>After CAR10 was raised, the start date has been reconsidered as 16/03/2009 which is when PP received a first invoice for repairing one engine. Evidence provided: -invoice RM 252,930 of 16/03/2009 from JD Energy Systems Sdn Bhd</p>	<p>made.</p> <p>2<sup>nd</sup> response: PP has submitted evidences for each of the activity listed in the chronology, hence accepted.</p> <p>CAR 6 is closed.</p>
<p>CAR7</p> <p>PDD is not transparent on how the benchmark analysis is appropriate for the project activity.</p>	B.5.4.1	<p>According to the Tool for the demonstration and assessment of additionality, if the project activity generates financial or economic benefits other than CDM related income, the investment comparison analysis or the benchmark analysis can be applied.</p> <p>Since there is no investment in the baseline scenario, we chose to apply the benchmark analysis.</p> <p>Section B.4 sub-step 3a) of the PDD has been further detailed.</p>	<p>PDD has been revised for the said change, consistent with the additionality tool, hence accepted.</p> <p>CAR 7 is closed.</p>
<p>CAR 8</p> <p>1. The investment analysis is based on investments done during the year 2009 and 2010 and proposed during the year 2011. PP is requested to support the suitability and accuracy of each of the sub-items assumed individually with</p>	B.5.4.5, B.5.7.1	<p>1. The investment analysis provided in the initial PDD was based on actual values and each value is supported by a piece of evidence, mainly invoices, provided to the audit team.</p> <p>A second investment analysis based on</p>	<p>1. The investment analysis available at the time of decision making is supported with external evidences for about 90% of the CAPEX and assumptions for OPEX are not supported with external documents. Considering the PP's</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>credible evidences valid at the time of decision making.</p> <p>2. Operation and maintenance costs: Estimated as RM.600,000 per year. PP is requested to support the suitability and accuracy of each of the sub-items individually with credible evidences valid at the time of decision making. The PDD, investment analysis sheets are not transparent on the cost of power assumed in calculating operation costs.</p>		<p>information available at the time of decision making is provided as an answer to the raised CAR.</p> <p>2. Each sub-item of the opex is evidenced by invoices, provided as embedded documents in the excel file "Supporting evidences for OPEX and CAPEX.xls". Cost of power: average electricity consumption is 14,000 kWh per month (based on invoices from Dec-10 to May-11) for one engine. The cost of electricity is 0.397 RM/kWh, as indicated in all invoices provided. The cost of power from 2011 and onwards is calculated based on these 2 values and the number of engines in operations. The cost of power of 2010 is based on actual costs. A second investment analysis based on information available at the time of decision making is provided as an answer to the raised CAR. 2<sup>nd</sup> response: The average monthly consumption is 13,657 kWh. This exact value has been considered in a new version of the investment analysis. The value used for the year 2010 has been reviewed based on 4 months consumption at 13,657 kWh at the cost of 0.397 RM/kWh, i.e. 32,531 RM.  The internal estimates at the time of decision making are provided. Values used for budgeting the opex at that time are based on experience and internal expertise</p>	<p>expertise in the field and that the records of actual expenses incurred are available and higher than the assumption made by the PP, this is accepted.</p> <p>2. Cost of power consumed is based on actual; this is conservative against the specifications of the gas engines. However in the financial analysis spreadsheet it is not transparent on how the value 75,000 RM for the year 2010 is arrived at against cost of electricity. PP is also requested to explain on how 14,000KWh/Month is arrived, the average of monthly consumptions as per the evidence submitted is lesser than the value assumed.</p> <p>PP is requested to submit the internal estimates made for the project activity at the time of decision making.</p> <p>2<sup>nd</sup> response: Verified and found to be OK. Conservative value when compared to the electricity requirement as per the technical specifications. Hence accepted.</p> <p>Supporting evidences for about 88% of the estimation is available; the cost of gas wells has been estimated based on PP's expertise. Similarly there is no supporting evidence for the operation costs. However</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>3. The price of electricity is assumed as 0.21 MYR/kWh; However, as per Handbook on the Malaysian feed-in tariff for the promotion of renewable energy of March 2011, the feed-in tariff for LFG based power projects of more than 4MW and less than 10MW is 0.38 RM/kWh and the rate is effective for a period of 16 years.</p> <p>4. PP is requested to support the refurbishment costs assumed with credible evidences valid at the time of decision making.</p>		<p>3. The price of electricity of 0.21 MYR/kWh is the actual price of purchase as per the PPA signed on 29 May 2009 with Tenaga Nasional Berhad (provided to the audit team). The Malaysian Government aims at promoting renewable energy and plans to increase the feed-in tariff in the future. Nevertheless the law on renewable energy has not been enacted yet and was not available at the time of decision making in 2009.</p> <p>4. Refurbishment cost of RM 1,150,000 in 2018 has been assumed as the same cost for the overhaul of the 2<sup>nd</sup> engine. This cost is based on actual invoices by supplier (submitted to the audit team). To be transparent, PP had used the actual cost, which is indeed after the start date. The cost available prior to the start date was 1,108,618 RM (843,100 RM for the engine and 265,518 for the GDU), as evidenced by the quotes provided. Modification: a second investment analysis based on information available at the time of decision making is provided as an answer to the raised CAR.</p> <p>2<sup>nd</sup> response: Expenses made in 2011 are supported with external documents: invoices and</p>	<p>these assumptions have been accepted based on PP's expertise in the field and that the actual costs incurred are now available for cross check. Hence accepted.</p> <p>3. OK. This price rise is not approved till date, PP had entered in to an agreement with TNB-ES during 18/06/2008 itself to buy 50% of shares in JLSB and has been exporting power to the grid at the rate of 0.21 MYR/kWh as per the said PPA. This could be considered as an e- policy, hence kept out of the additionality discussion.</p> <p>4. The expenses made in 2011 have not been supported with external documents, PP is requested to provide evidences as appropriate.</p> <p>2<sup>nd</sup> response: The chartered accountant's certificate dated 02/11/2011 certifies each</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
5. PP is requested to make it transparent in the PDD on the most probable capacity of the power plant and demonstrate that the project is additional in extreme cases of LFG recovery.		<p>confirmation by a chartered accountant.</p> <p>5. At the time of validation, the capacity of the power plant is expected to be 2 MW (2 engines of 1048 kW). An investment analysis is also prepared for 3 MW, assuming a recovery rate of 80% (20% more than the base scenario) and the cost of overhaul of an additional engine (which is conservative since the cost of overhaul is inferior to the cost of a new engine). The result of the investment analysis for 3 MW shows the same conclusion: the alternative without CDM is not profitable. The error message in excel is due to an IRR value which is too low to be calculated. The IRR has been removed of the spreadsheets, only the NPV will be used. The 3 MW hypothesis has been further discussed in the PDD section B.4.</p> <p>6. Clause number 7 of the Guidance on demonstration and assessment of investment analysis is taken into account as follows The point of the decision to recommence the project is 15 April 2009 At this point in time, the "potential resale of tangible assets" is known through the arms length transaction whereby WLSB buys 50% of JLSB for RM 2.7 Million. The market fair value of the company, as</p>	<p>of the value as given the investment analysis spread sheet based on actual amount incurred during implementation of the project and operation. Hence accepted.</p> <p>5. OK, additionality of the project may be I now be discussed on the basis of a 3MW power plant. The IRR value in the spread sheet for 3MW is not available, an error message is seen, PP is requested to correct. Also the discussion on 3MW power plant is not transparent in the PDD.</p> <p>OK accepted.</p> <p>The discussion in the PDD is found to be sufficient hence accepted.</p> <p>6. OK, consistent with the guidelines and supported with actual purchase cost of 50% of the shares, hence accepted.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>6. It is noted that the project is a restart of the existing power plant; PP is requested to make it transparent on the applicability of clause number 7 of the guidance on demonstration and assessment of investment analysis in IRR spreadsheets and in the PDD. It appears that cost of setting up of entire gas collection system and power plant etc is considered. This is not justified as project is mainly refurbishing existing gas engines etc.</p> <p>7. PP has submitted a break-up of capital expenditure and operational expenditure based upon actual, PP is requested to demonstrate how the same was available to the PP at the time of decision making.</p> <p>8. PP is requested to provide sources for each of the input parameters used in NPV calculations and also explain how these parameters were applicable at the time of decision making as per para 6 of EB 62 Annex 5. Further in line with para</p>		<p>evidenced by this transaction, is thus RM 5.4 Million; this is also considered as the recoverable value of the assets since JLSB only contained tangible assets at that time.</p> <p>In order to restart the project, additional capital expenditure is required to be done in the project (RM 4.685 Million), for engines repair and civil works, as evidenced by the invoices to the project. Only the cost of gas collection system extension and the cost of engines repair are considered, not the entire gas collection system and power plant.</p> <p>7.8. The investment analysis provided in the initial PDD was based on actual values and each value is supported by a piece of evidence, mainly invoices, provided to the audit team.</p> <p>A second investment analysis based on information available at the time of decision making is provided as an answer to the raised CAR, based on the available quotes.</p>	<p>7.8. OK, Accepted as detailed against other points of this CAR.</p> <p>CAR 8 is closed.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
111(b) of VVM 1.2, PP is requested to provide actual values of all the parameters since the project is already implemented.			
<p>CAR 9</p> <p>1. The expected operational life time as per section C.1.2 of the PDD is mentioned as 15 years. PP is requested to submit appropriate documents to demonstrate the same. Also it is noted that as per the tool to determine remaining life time of the equipment, for gas fired generators is 50,000 hours and on continuous operation this translates to about 6 years. The PP is requested to clarify how this is in line with the crediting period selected.</p>	C.1.2	<p>See answer to CAR 2. The 15 years period begins when the project has been re-started in June 2010, after a complete overhaul of the engines, thus the technical lifetime of the project overcomes the fixed crediting period of 10 years. Note that the mentioned tool is not applicable to ACM0001 version 11. As confirmed by TNB statement account, the plant has been operating for 33 months from 2004 to 2007. The operational lifetime was actually less than 3 years. Since the technical lifetime is 15 years, the remaining lifetime of the engines would be theoretically more than 12 years, which is greater than the crediting period.</p>	<p>OK, accepted.</p> <p>CAR 9 is closed.</p>
<p>CAR10</p> <p>PP is required to justify on how the statement the statement made in section C.2.2.1 of the PDD is consistent with the glossary of CDM terms for start date of crediting period.</p>	C.2.1	<p>According to the glossary, the start date is when PP has committed to expenditures related to the implementation or the construction of the project activity. The start date was considered as 15/04/2009 because the financial commitment at that date represented 53% of the CAPEX required to restart the project. It shall be noted that a first invoice was received on 16/03/2009 for repairing the 1<sup>st</sup> engine. Nevertheless the amount invoiced at that time represented only 2.5% of the CAPEX and was not considered as the start date as compared</p>	<p>OK, accepted on the basis that operation of the power plant was under TNB-ES initially and WLSB became the major share holder in 2009 by acquiring shares, hence accepted.</p> <p>CAR10 closed.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
		<p>to the amount committed on 15/04/2009. After considering the raised CAR10, PP modified the start date as 16/03/2009.</p> <p>Though a financial expenditure was made on 17 August 2005 when WLSB invested in 30% of shares in JLSB, the plant was stopped 2 years later. In order to restart the project after 3 years of stop, WLSB needed to purchase a majority share in JLSB and to further invest to repair the plant. This investment was 6 times higher than the 2005 investment. Since the plant had shown operational problems, the new investment would not have been done without considering CDM. Hence the case is indeed a restart as defined in the glossary: the implementation of a project is recommenced due to the consideration of CDM.</p>	
<p>CL 1</p> <p>1. PDD is not transparent on who owns the landfill, from when the current operator is operating the landfill and its appointment.</p>	A.2.1, A.2.2,A,4,2	<p>1. The landfill is owned by WLSB. Before its closure, the landfill was operated by WLSB. PDD section A.4.1.1 has been corrected.</p> <p>The full concession agreement between the State Government of Selangor and WLSB dated 12 April 1995 is provided. The term of the concession is 5 years after the closing of the landfill i.e. 31 December 2011.</p> <p>Then, according to the Tripartite agreement (CAR6) dated 4 September 2002, WLSB has the right on the landfill gas and grants this right to JLSB for a period of 15 years which can be renewed for 5 years.</p>	<p>1. PDD section A.4.1.1 has been corrected for this CL; PP has submitted the concession agreement dated 12/04/1995, wherein the state government has privatized and have made a concession agreement with the PP. which mentions that WLSB has the right on the landfill gas. Hence accepted.</p>



Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>2. PP is requested to provide credible third party evidences to support that both the power plant and the flares were not operated from 2007 till the restart of the project activity in 2010.</p>		<p>2. TNB-ES confirmed in a letter dated 21 Sept 2011 that the plant shut down on 30 May 2007. TNB-ES also confirmed in the statement of account dated 8 July 2011 that no electricity was generated by the plant until June 2010.</p> <p>Besides, as proven by Price Water House Cooper's 31-12-2009 financial report, JLSB registered no revenue in 2008 and 2009. It further confirms that operations were stopped during this period.</p> <p>2<sup>nd</sup> response: Evidence that the flare was not operating between June 2007 and June 2010: see CAR4.</p>	<p>2. The argument by the PP is accepted, however PP is requested to submit evidences to substantiate that the flares were not operated between 2007 and 2010, the time during which the LFG was not recovered.</p> <p>2<sup>nd</sup> response: Discussed and accepted in CAR 4</p>
<p>3. The PDD is not transparent on the number of phases and the area covered by the landfill. The PP is requested to support the same with evidences.</p>		<p>3. The landfill covers 42 hectares. The operation area covers 28 hectares. The landfill was operated in 7 phases and includes 19 cells. The layout of the landfill is provided. The information has been added in the PDD.</p>	<p>3. PDD is now clear on the area, number of phases and the number of cells. This is consistent with the landfill layout diagram dated 05/01/2011. Hence accepted.</p>
<p>4. Capacity of the power plant mentioned is not consistent throughout the PDD; the PP is requested to correct the same.</p>		<p>4. The power plant capacity is 2 MW, it includes 2 biogas engines of 1048 kW capacity each. The PDD has been corrected.</p>	<p>4. OK, the information on capacity of the power plant is consistent throughout the PDD and as per the technical specification of the installed power plant, hence accepted.</p>
<p>5. PP is requested to make it transparent in the PDD the pre-project and post-project scenarios of the project activity.</p>		<p>5. In accordance with the PDD Guidelines Annex 12 EB 41, the pre-project scenario (scenario existing prior to the implementation of the project activity) post-project scenario (project scenario) are described in PDD section A.2 §3. This paragraph has been slightly modified to</p>	<p>5. The information requested was on the start of the project activity in 2004, shut down in 2007 and restart in 2010, this is not transparent in the project description in section A.2 of the PDD, which needs to give a brief description of the scenarios prior to the project activity. PP is</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
		answer the raised CL.  2 <sup>nd</sup> response: PDD section A.2 §3 was further revised.	requested to modify the PDD as appropriate. 2 <sup>nd</sup> response: OK, accepted. CL1 is closed.
CL 2 1. The PP is requested to make transparent in the PDD on the commonly used technology and how the technology proposed in this project activity is better.  2. PP is requested to make it transparent in the PDD on technology transfer due to the project activity.	A.4.2	1. The proposed project activity is the first of its kind in the Host Country. The technology used is not commonly used, this is the only landfill in Malaysia equipped with biogas engines.  2. The engines are manufactured by GE Jenbacher, which is recognized as the best practice in terms of biogas power plant. Jenbacher is an Austrian provider, thus the project activity includes a technology transfer.	As per the discussion had during the site visit and the DANIDA study report, it is transparent that the project landfill is the first in Malaysia to install biogas recovery and reuse system. Further the technology used in the project activity is of Annex 1 country origin, referred from the technical specification of gas engines and flares. Hence it is accepted that the technology used in the project activity is better than those commonly available in the host country  PDD is made transparent on technology transfer confirmed with the technical specifications of gas engines and flares. Hence accepted.  CL2 is closed.
CL 3 PP is requested to submit the audited balance sheets of Worldwide Landfills Sdn. Bhd. for the past 3 years	A.4.3	The financial statement of WLSB for years 2008, 2009 and 2010 are provided to the audit team.	Received.  Also a letter from Chartered accountant dated 02/11/2011, certifying the costs and that there is no diversion of ODA has been provided.  CL3 is closed.
CL 4 1. PDD is not transparent on if the captured gas	B.2.1	1. The captured gas will not be used to	This has been made transparent in

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>will be used to supply consumers through natural gas distribution network (scenario C) as per the applicability condition.</p> <p>2. PP is requested to justify with credible third party evidences that no hazardous waste is permitted to be deposited in the project landfill.</p> <p>3. It is noted that date of issue of and the previous validation report No: 9105040109, rev. 01 by TUV Rheinland is 13/03/2006 and in the report it is stated that site visit was made in 2007. PP is requested to clarify the reason behind this inconsistency.</p>		<p>supply consumers through natural gas distribution network.</p> <p>2. This has been confirmed by the landfill operator during the site visit.</p> <p>2<sup>nd</sup> response: The landfill has obtained all the required permits to operate, including an EIA.</p> <p>3. Generally speaking, a DOE's report is not in the control of PP. In the particular case of this project, DOE and CDM consultants have changed. For these reasons, current PP cannot clarify why TUV Rheinland did a typo mistake in a draft validation report 4 years ago. Common sense should help current DOE solve this outstanding issue.</p> <p>2<sup>nd</sup> response: The termination of the contract can be cross-checked with the UNFCCC website in the Project Cycle Search, section "validation", looking at the projects classified as "validation contract has been terminated" (<a href="http://cdm.unfccc.int/Projects/Validation/index.html">http://cdm.unfccc.int/Projects/Validation/index.html</a>)</p>	<p>section B.2 of the PDD.</p> <p>Yes, it was verbally confirmed by the PP during the site visit, PP is requested to submit credible evidences for the same.</p> <p>2<sup>nd</sup> response: EIA for the landfill prepared during June 1992, mentions that the landfill is meant for municipal solid waste which includes residential, commercial and industrial non-toxic solid wastes. Also the PP has submitted a declaration that no hazardous wastes are deposited in the landfill. Hence accepted.</p> <p>PP is requested to submit the termination of contract with the previous DOE.</p> <p>2<sup>nd</sup> response: OK accepted</p> <p>CL 4 is closed.</p>
CL 5	B.3.1, B.3.2, B.3.3		

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>1. Inclusion of Grid within the project boundary is not stated in the project boundary description.</p> <p>2. During the site visit it was noted that there was no onsite electricity consumption or back-up power generation system at site. PP is requested to clarify the same in the PDD and the figure-project boundary given in section B.3 of the PDD.</p>		<p>1. The grid is included in the figure of project boundary. To address the raised CL, it has also been added in the project boundary description.</p> <p>2. The electricity consumed by the project activity is currently supplied by the grid. Nevertheless a back up generator may be needed in the future, therefore it shall be mentioned in the PDD. In case in the future, PP decide to consume electricity supplied from their own LFG engines, it shall also be mentioned in the PDD. In the project boundary figure (section B.3), the corresponding arrows are in dotted lines to reflect the hypothetical situations and a legend has been added under the dotted lines (<i>hypothetic</i>).</p>	<p>Section B.3 has been modified as mentioned, hence accepted.</p> <p>Correction made in the project boundary specifies the current scenario and the probable inclusion of back power generation systems and internal consumption of generated electricity. Hence accepted</p> <p>CL5 is closed.</p>
<p>CL 6</p> <p><u>1. PP to refer comments in section A.2.1 above on the scenario at the landfill from 2004 till date, wherein LFG was recovered and electricity was generated using recovered LFG. In this scenario PP is requested to justify how no or partial recovery of LFG is an applicable baseline to the project activity.</u></p>	<p>B.4.2, B.4.3, B.4.4, B.5.7.1</p>	<p>1. DOE to refer to answer in CAR4. LFG was not “recovered from 2004 till date” since the plant stopped on 30 May 2007: no LFG was recovered from this date and until the restart of the project activity. During the 3 years preceding the project activity scenario, LFG was not recovered. The identification of this scenario as the baseline scenario is demonstrated using the additionality Tool throughout the PDD, in accordance with the methodology. It shall be noted that from 1995 – date of opening the landfill – until 2010, LFG was partially recovered and used during only 3 years, indeed during 80% of the time, LFG was released into the atmosphere.</p> <p>2<sup>nd</sup> response:</p>	<p>OK, justification accepted on the basis of considering the situation prior to the restart of the project activity and the baseline is the situation prior to 2010, however PP is requested to demonstrate with credible evidence that no flaring was done during this time.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>2. PP is requested to demonstrate with credible third party evidences on how electricity supplied by the grid has the lowest emissions as mentioned in Step 2 in section B.4 of the PDD.</p> <p>3. Fuel for baseline choice of energy is not stated in Step 2 of section B.4 as required by the methodology.</p>		<p>Evidence that the flare was not operating between June 2007 and June 2010: see CAR4.</p> <p>2. The baseline scenario for the energy component is that electricity is obtained from the grid. The following sentence has been deemed irrelevant and has been deleted from the PDD; "This alternative results in lowest baseline emissions"</p> <p>3. The following sentence is already mentioned in the outcome of step 2 in section B.4 of the PDD: "electricity supply from the grid has been identified as the baseline fuel".</p> <p>2<sup>nd</sup> response: The dominant fuel of the electricity grid is natural gas. Evidence from the Energy Commission (Suruhanjaya Tenaga) statistics (<a href="http://www.st.gov.my">www.st.gov.my</a>). Exact link to information available at the time of validation: <a href="http://www.st.gov.my/images/stories/industry/energy_info/1.1-1-III_Energy_Stat_-_1Summary.pdf">http://www.st.gov.my/images/stories/industry/energy_info/1.1-1-III_Energy_Stat_-_1Summary.pdf</a></p>	<p>2<sup>nd</sup> response: Letter dated 18/11/2011, from TNB Energy services Sdn. Bhd, ref. number: YNBES/JLSB/Nov-11, shows a steep decrease in power consumption in July 2007 and a sharp increase in May 2010, and thereafter this has been consistent. Also PP has submitted a declaration letter dated 29/11/2011, which states that there was no active collection of LFG during June 2007 to June 2010. Hence accepted, that LFG was completely vented to atmosphere.</p> <p>2. PP has deleted the line which mentions that "This alternative (grid power consumption) results in lowest baseline emissions" Removal of this line do not impact the determination of baseline, hence accepted.</p> <p>3. PP is requested to make it transparent on the dominant fuel for the electricity grid to which the project is connected.</p> <p>2<sup>nd</sup> response: Verified the website, OK, accepted.</p> <p>CL6 is closed.</p>
CL 7	B.5.4.2, B.5.7.1		

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>The project proponent has used the default return on equity as the benchmark discount rate as given in the Guidelines on the assessment of investment analysis, version 4. The value chosen is 10.9% which is the default return on equity applicable for a sector 13 project, PP is requested to clarify why the return on equity is the appropriate benchmark discount rate. Also PP is requested to correct the name of the guideline as per the latest revision dated 15/07/2011.</p>		<p>According to the guideline, "depending on the country and sector, project participants can select the relevant benchmark value for their proposed CDM project activity"; this value can be applied as a default value.</p> <p>The name of the guideline has been corrected.</p>	<p>Since the project proponent has chosen the default value as given in the guideline, the same is accepted.</p> <p>The name and version of the guideline is corrected and hence accepted.</p> <p>CL7 is closed.</p>
<p>CL 8</p> <p>1. Lifetime of the project activity given in section A.4.3 is different from lifetime given in section C.1.2</p> <p>2. Depreciation has been done gradually for the lifetime of the project activity, which is 15 years. However as per A.4.3 of the PDD, the operational lifetime of the project activity is mentioned as 20 years. Also PP is requested to clarify on how the lifetime of the project is expected to be in operation until 2024, when the power plant was commissioned in the year 2004. PP is requested to correct the PDD as appropriate and demonstrate the same with credible evidence.</p> <p>3. The attachments available in the investment analysis spreadsheet version 1, dated 16/05/2011 could not be opened.</p> <p>4. PP is requested to make it transparent in the</p>	<p>B.5.4.3, B.5.7.1</p> <p>B.5.4.4,</p>	<p>1. As mentioned in CAR2, this was a typo mistake. The lifetime is considered as 15 years, not 20 years.</p> <p>2. As mentioned above and in CAR2, the operational lifetime of the project activity is assumed as 15 years. Reference to 20 years was a typo mistake Evidence for the depreciation of 15 years is provided. See answer to CAR2 and CAR8. The project is expected to operate until June 2025, i.e. 15 years after the re-start in June 2010. Though the power plant was initially commissioned in 2004, the engines were completely overhauled in 2010 and 2011.</p> <p>3. An updated investment analysis is submitted to the audit team.</p> <p>4. A scrap value of RM 200,000 is accounted for one engine, in year 2019,</p>	<p>PDD has been corrected and lifetime of the project activity is now consistent throughout the PDD. Hence accepted</p> <p>PP to refer conclusion against CAR2 and CAR 7 on the lifetime and crediting period of the project activity. It is accepted that the crediting period chosen is appropriate to the project activity. Hence accepted.</p> <p>References given along with updated investment analysis sheet is accessible. Hence accepted.</p> <p>PP is requested to justify the same with</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>PDD on why scrap value of the plant is not accounted in the Financial analysis.</p> <p>5. PP is requested to justify the residual value taken for the removed engine in the investment analysis and the cost of overhaul assumed in the year 2019. Residual life is not justified as per Tools to calculate remaining lifetime of an equipment</p>		<p>when the engine is removed (see §5. below). No scrap value had been accounted for in the year 2025 because PP assumed that after 2 overhauls, the remaining engine would be out of use. In addition, the book value is zero since the engine is fully amortized. To address the raised CL, a scrap value of RM 100,000 has been assumed in 2025 in the modified IA. This value is half the scrap value considered for the engine removed in 2019 and also corresponds to 10% of the overhaul cost.</p> <p>5. A scrap value of RM 100,000 had been taken into account in the initial investment analysis. In the absence of national guidelines to calculate the scrap value, this value was arbitrary based on 10% of the overhaul cost. The scrap value of the engine removed in year 2019 has been changed in the updated investment analysis. It is calculated considering the residual value of the engine minus the overhaul cost. Rationale: the overhaul is necessary to re-use the engine. The scrap value should consider the potential costs and revenues of the asset. To be conservative, we consider the gross value of one engine to be 2,700,000 RM, i.e. 50% of the recoverable asset value. Then the residual value after 7.5 years is 1,350,000 RM. The overhaul cost considered is 1,150,000 RM, as per the repair cost of the 2<sup>nd</sup> engine in 2011 (based on</p>	<p>prescribed accounting practices for Malaysia.</p> <p>OK, however PP is requested to justify the same with the prescribed accounting practices for Malaysia.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
		<p>invoices). Hence, the scrap value is assumed as 200,000 RM.</p> <p>2<sup>nd</sup> response: According to the Malaysian Accounting Standards Board (MASB), the residual value of an asset is insignificant and can be ignored in the calculation of the depreciable amount. Financial Reporting standard 116 of 2010 provided and information also available at the following link (available at the time of validation): <a href="http://www.masb.org.my/index.php?option=com_content&amp;view=article&amp;id=1035%3Amasb14-depreciation-accounting-pg1&amp;catid=7%3Amasb-for-private&amp;Itemid=15">http://www.masb.org.my/index.php?option=com_content&amp;view=article&amp;id=1035%3Amasb14-depreciation-accounting-pg1&amp;catid=7%3Amasb-for-private&amp;Itemid=15</a>),</p>	<p>2<sup>nd</sup> response: Referred the web link, consistent with the justification given, hence accepted.</p> <p>CL8 is closed.</p>
<p>CL 9</p> <p>1. Benchmark selected needs to be justified and accordingly sensitivity analysis needs to be justified.</p> <p>2. PP is requested to submit the actual costs incurred against the assumptions made in the investment analysis to justify the sensitivity range taken for analysis.</p>	<p>B.5.4.6, B.5.4.7, B.5.4.8, B.5.7.1</p>	<p>1. Selected benchmark rate follows the latest Guidelines on the assessment of investment analysis, please refer to CL7. According to §21 of these guidelines, “variations in the sensitivity analysis should at least cover a range of <math>\pm 10\%</math>”. Therefore the submitted IA complies with the guidelines.</p> <p>2. Invoices justifying the actual costs are provided to the audit team. According to the Guidelines mentioned above, “only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project</p>	<p>The deviations in actual is not expected to be more than 10%, since CAPEX is already incurred, and the power generation is based on the LFG availability. Accepted as it is in line with the Guidelines for the assessment of investment analysis, version 5 of EB 62. Invoices and investment analysis based on actual costs have been done, hence accepted.</p> <p>OK, accepted.</p>



Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>3. PP is requested to justify selection of only operating costs for sensitivity analysis and not the operating and maintenance costs in total.</p> <p>4. The breakeven point for electricity generation is not transparent in the PDD. <i>Sensitivity on electricity generation is not given in excel spreadsheet</i></p>		<p>revenues should be subjected to reasonable variation". The selected parameters subject to variation are:</p> <ul style="list-style-type: none"> <li>- 100% of the capex</li> <li>- 100% of the revenue</li> <li>- 68% of the opex (see §3 below)</li> </ul> <p>This is therefore very conservative and in compliance with the guidelines.</p> <p>3. As mentioned above in §2, "only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation". The cost of maintenance of the power plant constitutes 68% of the total OPEX, on average over the period of assessment. Varying this parameter is in compliance with the UNFCCC guidance.</p> <p>4. The break even for electricity generation is the same as for electricity price.</p>	<p>Since the evidences for OPEX and maintenance are different the justification given by PP is accepted.</p> <p>Electricity generation is now not available in the list of parameters taken for sensitivity analysis. Since it is same as electricity price this is accepted.</p> <p>CL9 is closed.</p>
<p>CL 10</p> <p>1. The document submitted to evidence that Malaysia had 112 waste receiving sites in 2008 and only 18 of them are sanitary landfills does not</p>	<p>B.5.6.2, B.5.6.3, B.5.6.4, B.5.7.1</p>	<p>1. The same report with a logo is not available to PP and the web link is not available. The paragraph referring to the</p>	<p>Reference to this report is now removed from the PDD, hence accepted.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>have a cover page, no logo of the Ministry of Housing and Local Government Also this document could be located in the website of Ministry of Housing and Local Government Malaysia. PP is requested to give the document with cover page carrying logo , or provide the web link of the document if available publicly on internet.</p> <p>2. Validation team referred DANIDA study of 2004, as per page 24 of the report only 4 landfills have implemented a LFG recovery system; however the same has been mentioned as 3 projects in the PDD. PP is requested to correct the same.</p>		<p>MHLG report has been deleted of the updated PDD. This suppression does not call into question the outcome of the common practice analysis since it is supported by two other third party reports (UNDP and DANIDA) which confirm that most of the landfills in Malaysia are not properly managed.</p> <p>2. Information in the PDD has been corrected: four landfills instead of 3 (the 4<sup>th</sup> one being Ayer Hitam).</p>	<p>PDD has been corrected and found to be appropriate.</p> <p>CL10 is closed.</p>
<p>CL 11</p> <p>1. Adjustment factor (AF) is taken as zero, PP is requested to justify how this applicable when LFG was recovered from the year 2004 as raised in CAR 4 above.</p> <p>2. PP has documented the sources used to arrive at the grid emission factor and have provided the step-wise working as per the tool to calculate emission factor for an electricity system, however PP is requested to update the EF spreadsheet and the PDD in accordance with the aforesaid tool, version 2.2.1.</p> <p>3. Amount of organic waste type j prevented from disposal in SWDS in the year x (tons). RINA checked the same with the records of the landfill operator and found to be 6,207,684.59 ton for the period from 1995 to 2006. However the same value is not reflected in PDD and the ER calculations. PP is requested to correct the same.</p>	<p>B.6.1.1, B.6.1.2, B.6.2.1, B.6.2.2, B.6.4.1, B.6.5.1</p>	<p>1. As explained in CAR4 and CL6, no LFG was recovered when the project implementation restarted since the plant stopped on 30 May 2007, more than 3 years before.</p> <p>2. The EF spreadsheet and PDD have been updated accordingly.</p> <p>3. Section A.2 of the PDD has been corrected. It shall be noted that previous versions of published PDD refer to a different quantity of waste (5,898,802 tons). It seems that waste volumes provided for years 2005 and 2006 in these previous DD were</p>	<p>PP to refer conclusion against CAR4 and CL6 on the subject. Accepted.</p> <p>Grid EF spreadsheet has been amended to the requirements of the tool version 2.2.1 hence accepted.</p> <p>There is a minor change in the year 1997 also. Since the deviation is minor, less than 0.1% of the overall waste deposited and the emission reductions are based on actual LFG recovered ex-post this justification by the PP is accepted.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>4. Further it is also noted that the values of W<sub>j</sub> (waste composition) at the landfill site is not consistent in the PDD and ER sheets. Moreover, it is also noted that the waste composition specific to the project is available with the landfill operator. PP is requested to justify appropriateness and conservativeness of the default values of IPCC on waste composition selected in ER calculations.</p> <p>5. Recovery rate: ( R<sub>r</sub> ) ; is 60% as per Table in section B.6.2 and B.6.3 of the PDD, this is an assumption by the PP, However, the PP is requested to provide support the same with evidences.</p> <p>6. During site visit it was noted that the flares installed at the site are open flares and the value for flare efficiency chosen by the PP is of enclosed flares. PP is requested to explain the same.</p> <p>7. EC<sub>PJ,flare,y</sub> is the electricity consumed by flare in year y in MWh. The value calculated based on the base power consumption of blowers x 24 x</p>		<p>based on estimation. The quantities used in the current PDD are actual values based on a weighting scale. Monthly tonnages are also submitted to the audit team.</p> <p>4. The waste composition used in the ER calculations was wrong and has been corrected to be in accordance with table 2.3 of the IPCC guidelines. A waste composition for another landfill operated by WLSB is available, nevertheless the waste categorization is less accurate: there are only 3 categories: organic, paper and inorganic. The organic category includes food, wood, textile and garden waste, without any distinction. This results in a less accurate evaluation of BECH<sub>4</sub> since all these 4 categories have different DOC<sub>j</sub> and decay rate k<sub>j</sub>.</p> <p>5. The recovery rate has been assessed using a technical template based on landfill characteristics such as shape of the landfill, quality of the cover, leachate management. The template is provided to the audit team.</p> <p>6. The flare currently installed is an open flare. Nevertheless, it is possible that in the future an enclosed flare be installed. To be conservative, the flare efficiency ratio used in ex-ante ER estimation will be the default value for open flare: 50%.</p> <p>7. The technical specifications of the gas booster skid is submitted to the audit team.</p>	<p>Since the plant has already been commissioned and in operation, the LFG generation estimations using IPCC default values prove to be accurate. Also it was noted by the validation team that incase the organic component is further divided into other subcategories as given in the IPCC estimates, this also yields almost the same result. Hence PP's argument is taken and the IPCC default values are accepted as it is realistic.</p> <p>The recovery rate calculation sheet has been provided, further the amount of LFG generated ex-post is measured and ER is calculated as per the actual values, hence accepted.</p> <p>PDD section B.6.3 has been modified for this change; the ER calculations have been modified assuming a flare efficiency of 50%, hence accepted.</p> <p>PDD and the ER sheets have been revised for this change. Hence accepted.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>365/1000. However it is noted that the power consumption from the chillers are not taken into consideration. PP is requested to include the same in ER calculations and deduct it from baseline emissions. Also PP is requested to submit the technical specification of the flares indicating the power consumption of the flares</p> <p>8. <math>EC_{PJelec,v}</math> is quantity of electricity consumed by the power plant in year <math>v</math>, in MWh, the value assumed is 34.75 kW x 2 nos and 85% from the year August 2011. The PP is requested to make the same transparent in the ER spread sheets and the PDD. Also PP to submit evidences for 85% availability of engines and the technical specification of the engines indicating their power consumption.</p>		<p>In addition to the base power of the gas boosters (2 x 30 kW), the nominal power of the chillers (17 kW) and of the cooler (2 kW) have been taken into account in revised ER spreadsheets.</p> <p>8. The value of 34.75 kW is based on Jenbacher specifications for a JGC 320 engine (see CAR 2). During the first year of operation (from 23 June 2010 to 24 June 2011), the engine operated 5549 hours, which corresponds to an availability of 63%. This low rate takes into account the testing phase of the first months, when the engine started up and was not continuously functioning. It is expected that the power plant will reach a 85% availability factor which is considered as a conservative industry standard.</p> <p>According to the EPA (<a href="http://www.epa.gov/chp/documents/catalog_chptech_reciprocating_engines.pdf">http://www.epa.gov/chp/documents/catalog_chptech_reciprocating_engines.pdf</a>), PB New Zealand Ltd (<a href="http://www.ea.govt.nz/document/2385/download/industry/ec-archive/gpas/">www.ea.govt.nz/document/2385/download/industry/ec-archive/gpas/</a>) or to other registered CDM projects (e.g. <a href="http://www.pwc.com/en_ZA/za/assets/pdf/pwc-annex2-revised-validationreport-petro.pdf">http://www.pwc.com/en_ZA/za/assets/pdf/pwc-annex2-revised-validationreport-petro.pdf</a>), gas engines can reach an availability factor of 90%, nevertheless to be conservative PP assumed a slightly lower rate.</p>	<p>PP has justified the value assumed for engine availability as 85%, with credible external sources. Hence accepted.</p> <p>CL11 is closed.</p>
CL 12	B.7.1.1, B.7.1.2		

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<p>1. PDD is not transparent on the requirement of the methodology for measuring flow of LFG gas that average value taken in a time interval taken is not greater than an hour in ER calculations as required by the methodology.</p> <p>2. Average fraction of methane in LFG continuously measured with a gas analyser and expressed in % (<math>\text{m}^3\text{CH}_4/\text{m}^3\text{LFG}</math>), however it is not clear that the average value taken in a time interval taken is not greater than an hour in ex-post ER calculations as required by the methodology.</p> <p>3. Operation of the energy plant in hours is measured with an hour counter, monitored annually and expressed in hours. Further PP is requested to clarify how the reporting and recording frequency of this parameter is determined according to the requirements of electricity off-taker.</p>		<p>1. Tables of the parameters <math>\text{LFG}_{\text{electricity}}</math>, <math>\text{LFG}_{\text{flare}}</math> and <math>\text{LFG}_{\text{total}}</math> in section B.7.1 of the PDD have been modified.</p> <p>2. Table of the parameter <math>w_{\text{CH}_4}</math> in section B.7.1 of the PDD has been modified.</p> <p>3. Table of the parameter "operation of the energy plant" in section B.7.1 of the PDD has been modified. Reference to the electricity off taker was a typo mistake.</p>	<p>Said modifications have been done in the PDD, hence accepted.</p> <p>Information is now transparently available in section B.7.2, hence accepted.</p> <p>PDD has been corrected appropriately. CL12 is closed.</p>
<p>CL 13 PP is requested to clarify the roles and responsibility of Ably carbon as one of the PP in this project activity and also provide the contract agreement between worldwide landfills and Ably carbon.</p>	B.7.3.1	Ably Carbon provides CDM services to WLSB. Contract is provided but should be kept as CONFIDENTIAL.	Contract document has been provided, CL 13 is closed.
<p>CL 14 The PP has opted for 10 years fixed crediting period. However the same is not available in year and months format</p>	C.2.2	PDD section C.2.2.2 has been modified.	<p>PDD has been corrected. Hence closed.</p> <p>CL14 closed.</p>
<p>CL 15 PP is requested to submit copies of leachate analysis report from authorized agencies also</p>	D.1.1	Leachate analysis is provided	Leachate analysis dated 26/09/2011 is provided, along within the tolerable limits, a few parameters are above the standard

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
detailing the acceptable limits.			specified therein, and however the quality of the treated leachate does not have any direct impact on the project activity.  CL 15 is closed.
<p>CL 16 Summary of stakeholder meeting document provided by the PP is same as what is given in PDD, PP is requested to provide the minutes of meeting. Also PP is requested to make the date of invitation letter transparently in the PDD.</p> <p>PP is also requested to provide the evidences of fax communication of invitation to stakeholder meeting and the number of invitation letters sent and the list of participants who attended the stakeholders meeting.</p>	E.1.1	<p>The minutes of the meeting have been taken in the same format as the PDD section E template; no other meeting report is available.</p> <p>The list of participants and the invitation are provided. 9 invitation letters were sent on 29 April 2011 and 16 people attended the meeting.</p>	<p>OK, List of attendees is provided, 16 stakeholders have attended the meeting dated 11/05/2011.</p> <p>CL16 is closed.</p>



RINA

## CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:

**A. Cyril Augustus Arokiasamy**

*We declare that Mr/Mrs/Ms:*

è qualificato come<sup>1</sup>:  
is qualified as:

**CDM-TEC, CDM-VAL, CDM-VER, CDM-TL, CDM-FIN-EXP,  
GS-VAL, GS-VER, GS-TL, SCS-VAL, SCS-VER, SCS-TL**

per le seguenti aree tecniche:  
for the following technical areas:

**1.1, 1.3, 2.2, 3.1, 4.5, 4.10, 5.1, 11.1, 13.1**

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation from fossil fuel and biomass including thermal electricity from solar	1
1.3	Waste heat/gas/pressure recovered and utilization for power generation at manufacturing industries	1
2.2	Heat Distribution	2
3.1	Energy Demand	3
4.5	Rubber and Plastics	4
4.10	Fuel switching and/or energy efficiency and/or waste heat/gas/pressure recovered and utilization for power generation at manufacturing industries	4
5.1	Chemical process industries	5
11.1	Chemical process industries	11
13.1	Waste Handling and Disposal	13

in accordo alle istruzioni della Divisione Certificazione.  
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	30-06-2010	-
1	18-10-2010	Changes in certificate module
2	17-03-2011	Changes due to new accreditation standard
3	13-05-2011	Changes due to updating of qualification to TL
4	06-06-2011	Annual Revision
5	23-08-2011	Changes due to updating of qualification to verifier

Il Responsabile di Schema  
Scheme Manager

Il Resp. Tecnico della Divisione  
Head of CRT

<sup>1</sup> Legend:

VAL: Validator  
VER: Verifier  
TEC: Technical Expert  
TL: Team Leader  
FIN-EXP: Financial Expert  
DET: Determiner

CDM: Clean Development Mechanism  
VCS: Verified Carbon Standard  
GS: Gold Standard  
SCS: SocialCarbon Standard  
JI: Joint Implementation

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS

*RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports*



RINA

## CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:

**Rekha Menon**

We declare that Mr/Mrs/Ms:

è qualificato come<sup>1</sup>:  
is qualified as:

CDM-TEC, CDM-VAL, CDM-VER, CDM-TL, CDM-FIN-EXP, VCS-VAL, VCS-VER,  
VCS-TL, GS-VAL, GS-VER, GS-TL, SCS-VAL, SCS-VER, SCS-TL

per le seguenti aree tecniche:  
for the following technical areas:

**1.2, 13.1**

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.2	Energy generation from renewable energy sources	1
13.1	Waste Handling and Disposal	13

in accordo alle istruzioni della Divisione Certificazione.  
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	06-03-2008	-
1	04-05-2009	Annual revision
2	14-12-2009	Changes in module structure
3	22-03-2010	Annual revision
4	18-10-2010	Changes in certificate module
5	17-03-2011	Changes due to new accreditation standard
6	06-06-2011	Annual Revision

Il Responsabile di Schema  
Scheme Manager

Il Resp. Tecnico della Divisione  
Head of CRT

<sup>1</sup> Legend:

VAL: Validator  
VER: Verifier  
TEC: Technical Expert  
TL: Team Leader  
FIN-EXP: Financial Expert  
DET: Determiner

CDM: Clean Development Mechanism  
VCS: Verified Carbon Standard  
GS: Gold Standard  
SCS: SocialCarbon Standard  
JI: Joint Implementation

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS

RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports





RINA

## CERTIFICATO DI QUALIFICA GHG GHG QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:  
We declare that Mr/Mrs/Ms:

Nisha Raghavan

è qualificato come<sup>1</sup>:  
is qualified as:

CDM-FIN-EXP

per le seguenti aree tecniche:  
for the following technical areas:

-

AREA TECNICA TECHNICAL AREA	CODICE RINA RINA CODE	SCOPO SETTORIALE SECTORAL SCOPE	CODICE RINA RINA CODE
-	-	-	-

in accordo alle istruzioni della Divisione Certificazione.  
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	20-10-2010	-
1	04-04-2011	Changed module structure

Il Responsabile di Schema  
Scheme Manager

Il Resp. Tecnico della Divisione  
Head of CRT

<sup>1</sup> Legend:

VAL: Validator  
VER: Verifier  
TEC: Technical Expert  
TL: Team Leader  
TEC-FIN: Financial Expert  
DET: Determiner

CDM: Clean Development Mechanism  
VCS: Verified Carbon Standard:  
GS: Gold Standard  
SCS: Social Carbon Standard  
JI: Joint Implementation

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA, quale Validatore/Verificatore VCS, per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, quale Validatore/Verificatore GS, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute quale Validatore/Verificatore SCS, per condurre la Validazione e la Verifica di rapporti SCS

RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, as VCS Validator/Verifier, to carry out Validation and Verification of VCS Projects, by the GS Foundation, as GS Validator/Verifier, to carry out Validation and Verification of GS Projects and by the Ecologica Institute, as SCS Validator/Verifier, to carry out Validation and Verification of SCS Reports



RINA

## CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:  
We declare that Mr/Mrs/Ms:

Rita Valoroso

è qualificato come<sup>1</sup>:  
is qualified as:

**CDM-TEC, CDM-VAL, CDM-VER, CDM-TL, CDM-FIN-EXP  
VCS-VAL, VCS-VER, VCS-TL  
GS-VAL, GS-VER, GS-TL  
SCS-VAL, SCS-VER, SCS-TL**

per le seguenti aree tecniche:  
for the following technical areas:

1.2, 13.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.2	Energy generation from renewable Energy sources	1
13.1	Waste Handling and Disposal	13

in accordo alle istruzioni della Divisione Certificazione.  
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	18-01-10	-
1	03-05-10	Annual Revision
2	18-10-10	Changes in certificate module
3	04-01-11	Removed TAs taken through the ETS/EPD verifications/validations
4	17-03-11	Changes due to new accreditation standard
5	14-07-11	Annual Revision

Il Responsabile di Schema  
Scheme Manager

Il Resp. Tecnico della Divisione  
Head of CRT

<sup>1</sup> Legend:

VAL: Validator  
VER: Verifier  
TEC: Technical Expert  
TL: Team Leader  
FIN-EXP: Financial Expert  
DET: Determiner

CDM: Clean Development Mechanism  
VCS: Verified Carbon Standard  
GS: Gold Standard  
SCS: SocialCarbon Standard  
JI: Joint Implementation

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS

RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports



RINA

## CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:  
We declare that Mr/Mrs/Ms:

Naresh Badhwar

è qualificato come<sup>1</sup>:  
is qualified as:

CDM-TEC, CDM-VAL, CDM-TL, CDM-FIN-EXP,  
VCS-VAL, VCS-TL,  
GS-VAL, GS-TL

per le seguenti aree tecniche:  
for the following technical areas:

1.2, 13.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.2	Energy generation from renewable energy sources	1
13.1	Waste handling and disposal	13

in accordo alle istruzioni della Divisione Certificazione.  
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	06-06-2011	--

Il Responsabile di Schema  
Scheme Manager

Il Resp. Tecnico della Divisione  
Head of CRT

<sup>1</sup> Legend:

VAL: Validator  
VER: Verifier  
TEC: Technical Expert  
TL: Team Leader  
FIN-EXP: Financial Expert  
DET: Determiner

CDM: Clean Development Mechanism  
VCS: Verified Carbon Standard:  
GS: Gold Standard  
SCS: SocialCarbon Standard  
JI: Joint Implementation

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS

RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports