

# UPGRADE OF DOMINICAN POWER PARTNERS' LOS MINA POWER STATION FROM OPEN CYCLE TO COMBINED CYCLE POWER GENERATION

Document Prepared By



Swiss Association for Quality and Management Systems (SQS)

<b>Project Title</b>	Upgrade of Dominican Power Partners' Los Mina power station from open cycle to combined cycle power generation
<b>Version</b>	2.1
<b>Report ID</b>	325239 / P33030.33

<b>Report Title</b>	VCS Validation of the Upgrade of Dominican Power Partners' Los Mina power station from open cycle to combined cycle power generation
<b>Client</b>	DOMINICAN POWER PARTNERS, LDC (DPP)
<b>Pages</b>	79
<b>Date of Issue</b>	02/07/2013
<b>Prepared By</b>	Swiss Association for Quality and Management Systems (SQS)
<b>Contact</b>	Bernstrasse 103, CH-3052 Zollikofen, Switzerland T +41 58 710 35 35 www.sqs.ch
<b>Approved By</b>	Mr Silvio Leonardi
<b>Work Carried Out By</b>	Mr Hansruedi Bader Mr Martin Rügsegger Mr Marco Bedoya Mr David Gazdag

**Summary:**

DOMINICAN POWER PARTNERS, CDC (DPP) has retained SQS to validate the “Upgrade of Dominican Power Partners’ Los Mina power station from open cycle to combined cycle power generation” project (the project).

The proposed project is the conversion of the two open cycle gas turbines (OCGT) into a combined cycle facility. It includes construction of a Heat Recovery Steam Generators (HRSGs) that will take advantage of the open cycle generation of the existing natural gas based power plant in Los Mina, Santo Domingo, Dominican Republic, to produce steam, which will in turn be used to power a 108 MW steam turbine. Los Mina power plant currently includes two 105 MW units, named Los Mina 5 and 6.

The objective of the validation is an independent assessment by a validation/verification body (VVB) of a proposed project activity against the defined set of criteria under the Verified Carbon Standard (VCS) Version 3. Validation is part of the VCS project cycle and will result in a conclusion by the VVB whether the project should be submitted for registration to the VCS Association (VCSA). The ultimate decision on the registration of a proposed project activity rests with the VCSA.

The project conforms to the validation criteria for projects, as set out in VCS Version 3; based on the VCS and ISO requirements listed above the project is eligible for registration by the VCSA.

**Table of Contents**

1 Introduction ..... 4

1.1 Objective ..... 4

1.2 Scope and Criteria ..... 4

1.3 Level of Assurance ..... 5

1.4 Summary Description of the Project ..... 6

2 Validation Process ..... 6

2.1 Method and Criteria ..... 6

2.2 Document Review ..... 7

2.3 Interviews ..... 8

2.4 Site Inspections ..... 12

2.5 Resolution of Any Material Discrepancy ..... 15

3 Validation Findings ..... 15

3.1 Project Design ..... 15

3.2 Application of Methodology ..... 16

3.2.1 Title and Reference ..... 16

3.2.2 Applicability ..... 17

3.2.3 Project Boundary ..... 23

3.2.4 Baseline Scenario ..... 26

3.2.5 Additionality ..... 49

3.2.6 Quantification of GHG Emission Reductions and Removals ..... 49

3.2.7 Methodology Deviations ..... 62

3.2.8 Monitoring Plan ..... 62

3.3 Environmental Impact ..... 67

3.4 Comments by Stakeholders ..... 69

4 Validation Conclusion ..... 70

5 Appendix A: Documents Reviewed ..... 71

6 Appendix B: Certificates of Competence ..... 74

7 Appendix C: Abbreviations ..... 79

8 Appendix D: Validation Protocol ..... 80

## 1 INTRODUCTION

### 1.1 Objective

DOMINICAN POWER PARTNERS, CDC (DPP) has retained SQS to validate the “Upgrade of Dominican Power Partners’ Los Mina power station from open cycle to combined cycle power generation” project (the project). The objective of the validation is an independent assessment by a validation/verification body (VVB) of a proposed project activity against the defined set of criteria under the Verified Carbon Standard (VCS) Version 3.

Validation is part of the VCS project cycle and will result in a conclusion by the VVB whether the project should be submitted for registration to the VCS Association (VCSA). The ultimate decision on the registration of a proposed project activity rests with the VCSA.

### 1.2 Scope and Criteria

The scope of the validation is an independent and objective review of the VCS PD and other documents using a risk-based approach and focusing on the identification of significant risks for project implementation and the generation of verified carbon units (VCUs) against the criteria stated in:

- The Verified Carbon Standard (04/10/2012) 3.3
- Verified Carbon Standard Program Guide (04/10/2012) 3.0
- Verified Carbon Standard Registration and Issuance Process (04/10/2012) 3.4
- Verified Carbon Standard Program Definitions (04/10/2012) 3.4
- ISO 14064-2:2006 – Specification with guidance at project level for quantification, monitoring and reporting of GHG emission reductions or removal enhancements
- ISO 14064-3:2006 – Specification with guidance for the validation and verification of GHG assertions
- ISO 14065-2:2007 – Requirements for GHG validation and verification bodies for use in accreditation or other forms of recognition
- GHG Protocol for Project Accounting, 2005, Chapter 7, guidance related to additionality test 1 common practice
- VCS Project Description form (04/10/2012) 3.1
- ACM0007: Conversion from single cycle to combined cycle power generation --- Version 6.1.0

- “Tool to calculate the emission factor for an electricity system” (Version 03.0.0) EB70, Annex 22
- “Combined tool to identify the baseline scenario and demonstrate additionality” (Version 05.0.0) EB70, Annex 09
- “Tool to determine the remaining lifetime of equipment” (Version 01), EB 50, Annex 15
- Methodological Tool "Upstream leakage emissions associated with fossil fuel use" (Version 01) EB 69, Annex 12
- “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion” (Version 02), EB41, Annex 11
- Guidelines on the Assessment of Investment Analysis (Version 05), EB 62, Annex 05
- Guidelines on the demonstration and assessment of prior consideration of the CDM (Version 04), EB62, Annex 13
- Guidelines on common practice (Version 02) EB69, Annex08

SQS has remained independent during the validation process, and free from bias and conflict of interest. SQS has maintained objectivity throughout the validation to ensure that the findings and conclusions are based on objective evidence generated during the validation.

SQS has maintained trust, integrity, confidentiality and discretion throughout the validation process.

The validation team has employed a risk-based approach, focusing on the identification of significant risks that may substantially affect the project’s GHG emission reductions, i.e. risks associated with the assumptions made and GHG information used.

The purpose of this validation report is its use for the registration of the project. Hence, SQS cannot be held liable by any party for decisions made based on the validation, which will go beyond the purpose mentioned.

### 1.3 Level of Assurance

This report truthfully and accurately reflects SQS’ validation activities, findings, conclusions and reports with reasonable assurance as per VCS Version 3 and ISO 14064-32006 para A.2.3.2.

In addition, SQS has applied materiality of 5% percent in accordance with the requirements for non-„large scale“ projects as defined in VCS Standard Version 3.3.Section 5.3.1 (4).

## 1.4 Summary Description of the Project

The proposed project is the conversion of the two open cycle gas turbines (OCGT) into a combined cycle facility. It includes construction of Heat Recovery Steam Generators (HRSGs) that will take advantage of the open cycle generation of the existing natural gas based power plant in Los Mina, Santo Domingo, Dominican Republic, to produce steam, which will in turn be used to power a 108 MW steam turbine. Los Mina power plant currently includes two 105 MW units, named Los Mina 5 and 6.

DPP's combined cycle project is based on technology that enables recovery of exhausted heat to generate steam to operate a steam turbine for the purpose of power generation, and therefore enables a better utilisation of non-renewable resources. Furthermore, the project enables a higher supply of energy to the local market using the same amount of fuel, and in return enables further development of the country, which is currently limited by its energy supply.

The project will also reduce the existing unit heat rate from 12 000 BTU/kWh to 8 000 BTU/kWh. The final combined cycle configuration will be a 2x2x1 (2 Gas Turbines, 2 Heat Recovery Steam Generators (HRSGs) and 1 Steam Turbine Generator). It is estimated that the upgrade will increase the existing generating net capacity of about 210 MW to 318 MW that would be able to cater for the supply to the grid.

The project is located in the Dominican Republic, Santo Domingo, Los Mina, Avenida Venezuela, Parque Energético. The geographic coordinates of the plant are: Latitude N/S 18.499418° (N/S 18°29' 29.23"), Longitude E/W -69.867831° (E/W 60°52'06.91")

## 2 VALIDATION PROCESS

### 2.1 Method and Criteria

During the validation, SQS has followed the Verified Carbon Standard Program Guide and has integrated its provisions into its own quality management system.

Standard auditing techniques: SQS has applied standard auditing techniques to assess the correctness, accuracy, relevance, completeness, consistency, transparency and conservativeness of the information provided by the project proponent (PP), including, where appropriate but not limited to:

- a) Document review involving: review of data and information to verify the correctness, credibility and interpretation of information, cross-checks between information provided in the PD and information from other sources, if available, and if necessary independent background investigations.
- b) Follow-up actions (on-site visit, telephone, e-mail interviews), including: interviews with relevant stakeholders in the host country, personnel with knowledge of the project design and implementation and cross-checks between information provided by interviewed personnel to ensure that no relevant information has been omitted from the validation.

- c) Reference to available information relating to projects or technologies similar to the proposed VCS project under validation.
- d) Review, based on the approved methodology being applied, of the appropriateness of formulae and correctness of calculations.

Methodology-specific validation protocol: In order to ensure transparency, a validation protocol (VCS Validation Protocol) was customised for the project. The protocol shows, in a transparent manner, criteria (requirements), means of validation and the results from validating the identified criteria. The protocol is included in Appendix C.

The validation team has the necessary skills and competences to undertake the validation as listed in Appendix B: Certificates of Competence.

- I Desk review of the project documents
- II On-site audit and follow-up interviews with the project proponent
- III Resolution of outstanding issues (CARs, CLs) and issuance of the final validation report and opinion

Given the nature of the proposed project – standalone power plant – no sampling was required during the validation process.

The following sections describe each of the above three steps in further detail.

## 2.2 Document Review

The Project Description (PD) submitted by *DPP* and additional background documents related to the project design and baseline, i.e. relevant law, VCS Project Description Template, Approved Methodology and tools under the CDM of Kyoto Protocol, Clarifications (CL) and Corrective Action Requests (CAR) on validation requirements were reviewed against the criteria listed in 1.2.

Furthermore, cross-checks were made between information provided in the PD and information from sources other than those used, (if available) the VVB's sectoral or local expertise and, (if necessary) independent background investigations.

To address SQS corrective action requests and clarification requests, DPP has updated the PD several times, PD Version 4.0 dated 27/05/2013 being the last version, which was submitted to the validation team. After further clarifications all corrective action requests and clarification requests were closed. The validation of the project resulted in 16 Corrective Action Requests 36 Clarification Requests and 2 FARs.

All documents were reviewed under the requirements of the CDM methodologies as these methodologies are approved under VCS Version 3.0.

All documented proofs of evidence have been archived by SQS; they are kept in a secure and retrievable manner for at least two years after the end of the project crediting period.

### 2.3 Interviews

An on-site visit between 20-21/06/2012 including interviews were conducted to confirm selected information and to resolve issues identified in the document review.

The main topics of the interviewees are summarised in the table below:

Date 20/06/2012		
Name	Position	Issue
Mr Obando Freddy	Commercial Director	Financial analysis Contracts Budget Energy price, tariff
Mr Ungar David	Carbon Credit Project Manager	Project boundary Environmental impacts Plant layout plans Construction plans Project plans, maps, planned technology, monitoring organisation Grid emission factor Common practice analysis
Mr Gonzalez Osvaldo	Commercial Planning Manager	Financial analysis Contracts Budget Energy price, tariff
Mr Ben-Dov Ofer	Carbon credit Consultant	Project boundary Environmental impacts Plant layout plans Construction plans Project plans, maps, planned technology, monitoring organisation Grid emission factor Common practice analysis Financial analysis Contracts Budget Energy price, tariff

Mr Cobian Juan	Project Director	Project boundary Environmental impacts Plant layout plans Construction plans Project plans, maps, planned technology, monitoring organisation Grid emission factor Common practice analysis Financial analysis Contracts Budget Energy price, tariff Monitoring organisation Calibration Arrival natural gas Measurement of quantity and NCV
Mr Simenez Jorge	Engineering Manager	Project boundary Environmental impacts Plant layout plans Construction plans Project plans, maps, planned technology, monitoring organisation Grid emission factor Common practice analysis Financial analysis Contracts Budget Energy price, tariff Monitoring organisation Calibration Arrival natural gas Measurement of quantity and NCV

Date 21/06/2012		
Name	Position	Issue
Mr Obando Freddy	Commercial Director	Financial analysis Contracts Budget Energy price, tariff Prior consideration

Mr Ungar David	Carbon Credit Project Manager	Project boundary Environmental impacts Plant layout plans Construction plans Project plans, maps, planned technology, monitoring organisation Grid emission factor Common practice analysis
Mr Gonzalez Osvaldo	Commercial Planning Manager	Financial analysis Contracts Budget Energy price, tariff
Mr Ben-Dov Ofer	Carbon credits Consultant	Project boundary Environmental impacts Plant layout plans Construction plans Project plans, maps, planned technology, monitoring organisation Grid emission factor Common practice analysis Financial analysis Contracts Budget Energy price, tariff
Mr Cobian Juan	Project Director	Project boundary Environmental impacts Plant layout plans Construction plans Project plans, maps, planned technology, monitoring organization Grid emission factor Common practice analysis Financial analysis Contracts Budget Energy price, tariff Monitoring organisation Calibration Arrival natural gas Measurement of quantity and NCV

Mr Simenez Jorge	Engineering Manager	Project boundary Environmental impacts Plant layout plans Construction plans Project plans, maps, planned technology, monitoring organisation Grid emission factor Common practice analysis Financial analysis Contracts Budget Energy price, tariff Monitoring organisation Calibration Arrival natural gas Measurement of quantity and NCV
Ms Tirado Rita	EHS Manager	Project boundary Transboundary impacts Environmental impacts

Date 26/10/2012		
Name	Position	Issue
Mr Moisés Alvarez	DNA Dominican Republic	Authenticity of LoA Contribution to sustainable development

Date 19-22/12/2012		
Name	Position	Issue
Prof. Dr. Thomas Nussbaumer	Professor at Technical University of Luzerne, Switzerland,	Investment costs O&M Costs Additional capacity

Date 13/03/2013		
Name	Position	Issue
Mr Ben-Dov Ofer	Carbon credits Consultant	VCS general requirements Environmental impacts Grid emission factor Common practice analysis Financial analysis Energy price, tariff

Date 15/03/2013		
Name	Position	Issue
Mr Ben-Dov Ofer	Carbon credits Consultant	Environmental impacts Grid emission factor Common practice analysis Financial analysis Energy price, tariff
Mr Gonzalez Osvaldo	Commercial Planning Manager	Financial analysis Contracts Budget Energy price, tariff

Date 02/04/2013		
Name	Position	Issue
Mr Ben-Dov Ofer	Carbon credits Consultant	Financial analysis Energy price, tariff LNG price
Mr Ungar David	Carbon Credit Project Manager	Grid emission factor Common practice analysis
Mr Gonzalez Osvaldo Adalberto Garcia	Commercial Planning Managers	Financial analysis Contracts Budget Energy price, tariff LNG price

Date 16/05/2013		
Name	Position	Issue
Mr Ben-Dov Ofer	Carbon credits Consultant	Financial analysis Energy price, tariff LNG price
Mr Ungar David	Carbon Credit Project Manager	
Freddy Obando	Director	

## 2.4 Site Inspections

A site visit was conducted on 20-21/06/2012 with the objective of acquiring evidence to determine whether a positive validation opinion should be given.

The following table is the agenda for the site visit which shows dates, times, involved parties and department or function related. The validation plan was presented to the client and agreed upon prior to the site visit.

Time		Topic	Function/Department	People interviewed
from	to			
20/06/2012		<b>Main office DPP</b>		
09.30	12.00	Project boundary Environmental impacts Plant layout plans Construction plans Project plans, maps, planned technology, Monitoring organisation Grid emission factor Common practice analysis Financial analysis Contracts Budget Energy price, tariff	Commercial Director Carbon Credit Project Manager Commercial Planning Manager Carbon Market Consultant	Mr Obando Freddy Mr Ungar David Mr Gonzalez Osvaldo Mr Ben-Dov Ofer
20/06/2012		<b>Site visit AES Andres Plant</b>		
14.00	15.30	Monitoring organisation Calibration Arrival natural gas Measurement of quantity, NCV	Commercial Director Engineering Manager Project Director Carbon Credit Project Manager Carbon Market Consultant	Mr Obando Freddy Mr Simenez Jorge Mr Cobian Juan Mr Ungar David Mr Ben-Dov Ofer

20/06/2012		<b>Site visit existing Power Plant, Project site</b>		
15.30	17.30	Project boundary Environmental impacts Plant layout plans Construction plans Project plans, maps, planned	Commercial Director Carbon Credit Project Manager Carbon Market Consultant	Mr Obando Freddy Mr Ungar David Mr Ben-Dov Ofer
21/06/2012		<b>Main office DPP</b>		
08.00	12.00	Grid emission factor Common practice analysis Financial analysis Contracts Budget Energy price, tariff Environmental impacts	Commercial Director Project Manager Commercial Planning Manager Energy Manager Engeneering Manager Project Director EHS Manager Carbon Market Consultant	Mr Obando Freddy Mr Ungar David Mr Gonzalez Osvaldo Mr Garcia Adalberto Mr Simenez Jorge Mr Cobian Juan Ms Tirado Rita Mr Ben-Dov Ofer

## 2.5 Resolution of Any Material Discrepancy

The objective of this phase of the validation is to resolve issues that require further elaboration, research or expansion prior to SQS' positive conclusion on the project design.

Requests: SQS has raised a corrective action request (CAR) if:

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

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

SQS has raised a forward action request (FAR) during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs do not relate to the VCS requirements for registration.

SQS has resolved or "closed out" CARs and CLs only if the PPs have modified the project design, rectified the PD or provided adequate additional explanations or evidence that satisfied SQS' concerns - the summary of requests is enclosed to this report.

## 3 VALIDATION FINDINGS

### 3.1 Project Design

- The proposed project is the conversion of the two open cycle gas turbines (OCGT) into a combined cycle facility. It includes construction of Heat Recovery Steam Generators (HRSGs) that will take advantage of the open cycle generation of the existing natural gas based power plant in Los Mina, Santo Domingo, Dominican Republic, to produce steam, which will in turn be used to power a 108 MW steam turbine. Los Mina power plant currently includes two 105 MW units, named Los Mina 5 and 6.
- DPP's combined cycle project is based on technology that enables recovery of exhausted heat to generate steam to operate a steam turbine for the purpose of power generation, and therefore, enables a better utilisation of non-renewable resources. Furthermore, the project enables a higher supply of energy to the local market using the same amount of fuel, and in return enables further development of the country, which is currently limited by its energy supply.

- The project will also reduce the existing unit heat rate from 12 000 BTU/kWh to 8 000 BTU/kWh. The final combined cycle configuration will be a 2x2x1 (2 Gas Turbines, 2 Heat Recovery Steam Generators (HRSGs) and 1 Steam Turbine Generator). It is estimated that the upgrade will increase the existing generating net capacity of about 210 MW to 318 MW that would be able to cater for the supply to the grid.
- All project components have been covered by the validation process.
- SQS recognizes that the project proponent DPP is helping the country in fulfilling its goals of promoting sustainable development with this project.
- Project start date is not finally set at the time of validation
- The expected emission reduction of an average of 343 517 tCO<sub>2</sub> per year and 3 435 173 tCO<sub>2</sub> for the whole crediting period of 10 years is correct, accurately and conservatively calculated. Therefore, the project is a large scale one. SQS confirms that the calculated emission reductions are most likely to be achieved given that the underlying assumptions do not change. Based on the VCS and ISO requirements listed above, the project is eligible for registration by the VCSA.
- The project is located in the Dominican Republic, Santo Domingo, Los Mina, Avenida Venezuela, Parque Energético. The geographic coordinates of the plant are: Latitude N/S 18.499418° (N/S18°29' 29.23"), Longitude E/W -69.867831° (E/W 60°52'06.91").
- Project compliance with applicable laws, statutes and other regulatory frameworks
- Ownership and other programs
  - As even the project title suggests, DPP owns the Los Mina power station and thus all the equipment within project boundary. This was verified during the OSV. The project first sought CDM registration, but due to financial reasons DPP has decided to move the project under VCS. SQS has been the contracted DOE for the CDM validation, and the CDM registration neither has taken place, nor has it been rejected. There is no legal or any other binding to implement the project, as it has all permits for operation in its current form. The project did not participate in any other GHG emission reduction environmental credit program. The validation team approves that there is no double counting involved in this project activity during this validation.

## 3.2 Application of Methodology

### 3.2.1 Title and Reference

The Project applies the approved CDM methodology ACM0007: Conversion from single cycle to combined cycle power generation, (Version 6.1.0.)

The project applies the following tools which are referenced in ACM 0007, (Version 6.1.0.)

- “Tool to calculate the emission factor for an electricity system” (Version 03.0.0) EB70, Annex 22
- “Combined tool to identify the baseline scenario and demonstrate additionality” (Version 05.0.0) EB70, Annex 09
- “Tool to determine the remaining lifetime of equipment” (Version 01), EB 50, Annex 15
- Methodological Tool "Upstream leakage emissions associated with fossil fuel use" (Version 01) EB 69, Annex 12
- “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion” (Version 02), EB41, Annex 11

SQS confirms that all relevant regulations, specific guidance and/or clarifications were applied, are valid and correctly applied to the project activity with respect to the project boundary, baseline identification, algorithms and formulae used to determine emission reductions, additionality and monitoring methodology.

**3.2.2 Applicability**

All applicability conditions of the methodology are listed and validated in the table below:

Applicability condition of the methodology	Applicability of the project as discussed in the PDD	Cross-check/plausibility, SQS' Statement / Conclusion
The methodology applies to project activities that convert one or several grid connected power units at one site from single cycle to combined cycle mode	The project activity is to convert the existing single cycle turbines into combined cycle by building Heat Recovery Steam Generators	<p>Site visit on 20-21/06/2012, PDD, technical design. Model indication on the installation - Siemens W501D5 (Originally Westinghouse W501D5) – have been cross-checked with official information sources in the internet and it can be confirmed that the existing turbines are designed for single cycle mode – see also <a href="http://maintenancepartners.com/activities/mechanical-maintenance/gas-turbines/">http://maintenancepartners.com/activities/mechanical-maintenance/gas-turbines/</a> - or printout SQS ref. [11].</p> <p>It can be confirmed that the methodology is applicable. Has also been cross-checked with the information provided by Sargent &amp; Lundy in SQS ref. [A.3_1] _Attachment #3.Los Mina CC D5A 2x2X1 Performance, dated 09/03/2012. Is referenced in this report the ASHRAE Handbook 2009 and indicated the basic design of the HRSG (Heat Recovery</p>

		<p>Steam Generator). Are listed the main components of the Siemens W501D5 from point 1 to 18. They only refer to components for single cycle mode (open cycle mode).</p>
<p>The units have an operational history of at least one year with no major retrofit, and at least one unit has an operational history of more than three years with no major retrofit. There is no major retrofit in these time periods</p>	<p>The plant, with its two turbines, has started its commercial operation on 19/05/1996 and converted to NG in 2003. Only Los Mina 5 had retrofit in the last three years. The retrofit cost was US\$ 1.5 MM, which is less than 20% of a new turbine cost (14 252 557 US\$), and is therefore not considered a major retrofit.</p> <p>Sargent &amp; Lundy established a report regarding the expected remaining economic life of the Los Mina Plant – SQS ref. [B.4_1] Los Mina_Depreciation Life Review Final_061812 v3, dated 18/06/2012. It is stated that since 2007 the plant has an equivalent forced outage rate of 1.8%. It is also stated that the number of starts for the unit has decreased in the last few years while the operating hours have increased.</p>	<p>Site visit on 20-21/06/2012, PDD, technical design, Report independent consultants, Sargent &amp; Lundy LLC, 18/06/2012 - SQS ref. [B.4_1].</p> <p>The operational history is considered three years prior to submission of the PD for validation as the project starting date is planned after 01/04/2013. The date of submission of the CDM-PDD for validation is set to 17/05/2012.</p> <p>For conservativeness the operational history from 01/01/2009 until time of submission of the CDM-PDD for validation is taken.</p> <p>In 2009, Generator Rotor exchange was realised for Los Mina 5 – see report SIEMENS, 06/10/2009, SQS ref. [A.3_3], this is not considered as major retrofit as the costs are less than 20% of a new turbine cost. It can be confirmed that the retrofit costs are US\$ 1 500 650. A new open cycle gas turbine costs between 800 and 1 300 \$/kW installed capacity – see <a href="http://www.localpower.org/deb_tech_gt.html">http://www.localpower.org/deb_tech_gt.html</a> or printout SQS ref. [10], this means for 105 000 kW installed capacity for one generator an investment between US\$ 84 000 000 and US\$ 136 500 000. The retrofit was realised in 2009. Inflation between 2009 and 2012 is for 2009 1.4%, for 2010 6.3% and for 2011 8.5% - see <a href="http://www.indexmundi.com/g/g.aspx?c=d&amp;r&amp;v=71">http://www.indexmundi.com/g/g.aspx?c=d&amp;r&amp;v=71</a>. Retrofit costs corrected with inflation are about US\$ 1 755 013.</p> <p>20% of the investment for a new turbine is between US\$ 16 800 000 and</p>

		<p>US\$ 27 300 000. It can be concluded that retrofit costs represent 6.4% and 10.4% of a new generator. Regarding availability of the plant is stated the following in SQS ref. [B.4_1] Los Mina_Depreciation Life Review Final_061812 v3, dated 18/06/2012, Report established through an independent consulting company, Sargent &amp; Lundy, states on page 3: <i>Plant availability figures indicate an effective maintenance program. The plant recently has operated at a relatively high capacity factor: more than 68% during the first half of 2012 and 74% capacity factor in 2011. The plant has demonstrated good reliability, with an equivalent forced outage rate of 1.8 % since 2007. The numbers of starts for the unit has decreased in the last few years while the operating hours have increased, which is favourable to long equipment life,</i> Regarding the information in SQS ref. [B.4_1] Los Mina_Depreciation Life Review Final_061812 v3, dated 18/06/2012, SQS concludes that a forced outage rate of 1.8% since 2007 does not allow a major retrofit.</p>
<p>In case a unit has less than three years operational history: all project power units were designed and commissioned for operation in single cycle mode only. This shall be demonstrated by the PPs by providing relevant documents such as original process diagrams and schemes from the construction of the plant, licenses and/or by an on-site check by the VVB prior to implementation of the project activity.</p>	<p>All the units in Los Mina plant have more than three years operational history.</p>	<p>It can be confirmed that all the units – Los Mina 5 and Los Mina 6 – have more than three years of operational history. This has been cross-checked with the Environmental License –SQS ref. [B_6], dated 24/01/2008.</p> <p>It can be confirmed as correct.</p> <p>It has also been cross-checked with the data of the “Organismo Coordinador del Sistema Eléctrico Nacional Interconectado de la República Dominicana, Inc” – OC-SENI - the official coordinator of the electricity grid – see SQS ref. [B.5.2] and is confirmed as correct – see also <a href="http://www.oc.org.do/">http://www.oc.org.do/</a>. Original Excel-sheets (as attachments to e-mails) delivered from the official</p>

		<p>coordinator have been verified during site visit on 20-21/06/2012 in the office of DPP. Los Mina 5 and 6 are listed plants delivering energy for more than three years – records on SQS ref. [B.5.2], delivered from the official coordinator of the electricity grid are from 2007 onwards.</p>
<p>During the three years prior to the implementation of the project activity and during the crediting period the project power units use(d) only the following fuel types:</p> <p>(a) Fossil fuels; and/or</p> <p>(b) Blends of fossil fuels and bio fuels, where the bio fuel is blended to the fossil fuel in a situation that is outside the control of the PPs (such as regulatory requirements to blend biodiesel with diesel or biogas with natural gas).</p>	<p>The only fuel used by the plant is natural gas. The project activity is not planned to consume any other fuel.</p>	<p>Has been cross-checked with the Liquid Natural Gas Discharge Report, dated 04/01/2012, established by SGS – SQS ref. [B_3]. The configuration of the technical design does not allow another fuel type as natural gas.</p> <p>It can be confirmed that the project power units have been using natural gas since the conversion in the year 2003 – see also SQS ref. [B_1] Historico Data Sheet LNG 2012. This has also been cross-checked with data of the “Organismo Coordinador del Sistema Eléctrico Nacional Interconectado de la República Dominicana, Inc” – OC-SENI - the official coordinator of the electricity grid – see SQS ref. [B.5.4] Generation-Efficiency-NCV and Fuel Consumption of the System for 2007-2011 and is confirmed as correct – see also <a href="http://www.oc.org.do/">http://www.oc.org.do/</a>. Original Excel-sheets (as attachments to e-mails) delivered from the official coordinator have been verified during site visit on 20-21/06/2012 at the office of DPP. Los Mina 5 and Los Mina 6 are listed as open cycle gas turbines for the whole period from 2007 to 2011, SQS confirms that the project’s power units are designed to operate with natural gas and no additional fuel is needed, considered or installed.</p> <p>The project has only been using natural gas for energy production, and during the crediting period will continue to use the same fossil-fuel.</p>

<p>The type of fossil fuel used by the project power units during the crediting period were also used during the most recent three years prior to the implementation of the project activity, except, where applicable, any auxiliary fuel consumption (e.g. for start-ups) which shall not exceed 3% of the total fuel consumption in the units (measured on an energy basis).</p>	<p>The only fuel used by the plant is natural gas. The project activity is not planned to consume any other fuel.</p>	<p>It can be confirmed that the fuel used by the plant is natural gas. This has been cross-checked with the Liquid Natural Gas Discharge Report, dated 04/01/2012, established by SGS. The configuration of the technical design does not allow another fuel type as natural gas.</p> <p>It can be confirmed that the project power units use natural gas since the conversion in the year 2003 - see also SQS ref. [B_1] Historico Data Sheet LNG 2012.</p> <p>This has also been cross-checked with data of the “Organismo Coordinador del Sistema Eléctrico Nacional Interconectado de la República Dominicana, Inc” – OC-SENI - the official coordinator of the electricity grid – see SQS ref. [B.5.4] Generation-Efficiency-NCV and Fuel Consumption of the System for 2007-2011 and is confirmed as correct – see also <a href="http://www.oc.org.do/">http://www.oc.org.do/</a>. Original Excel-sheets (as attachments to e-mails) delivered from the official coordinator have been verified during site visit on 20-21/06/2012 at the office of DPP. Los Mina 5 and Los Mina 6 are listed as open cycle gas turbines for the whole period from 2007 to 2011, the VVB confirms that the project’s power units are designed to operate with natural gas and no additional fuel is needed, considered or installed.</p> <p>The project has only been using natural gas for energy production, and during the crediting period will continue to use the same fossil-fuel.</p>
<p>The project activity does not increase the lifetime of the existing gas turbine or engine during the crediting period.</p>	<p>The expected lifetime of the existing gas turbines is 40 years. Since they were installed in 1996, and the crediting period ends in 2025, the project activity does not increase the lifetime</p>	<p>It can be confirmed that the project activity does not increase the lifetime of the existing gas turbine during the crediting period. This has been cross-checked with the Sargent &amp; Lundy Report, dated 18/06/2012 SQS ref. [B.4_1] which is stating that the remaining lifetime of the</p>

	of the existing gas turbine during the crediting period. In addition, the project is an addition to the plant already in process and does not affect the lifetime of the units.	existing Los Mina combustion turbines is 20 years or more if they continue to be operated within manufacturer recommendation and are maintained properly, including replacement of certain capital parts if required. This means that the existing plant can operate as a minimum until 2032 – hence longer than the planned crediting period. The information has also been cross-checked with SQS ref. [B.4_1]_Los Mina_Depreciation Life Review Final_061812 v3, dated 18/06/2012, Report from Sargent & Lundy. The report states on page 3, that the upgrade to combined cycle will have no affect on the useful life outlook for the two combustion turbines.
<b>Applicability Condition – Tool to calculate the emission factor for an electricity system</b>		As the project substitutes grid electricity, the “Tool to calculate the emission factor for an electricity system” is applicable.
Project activity that substitutes grid electricity, i.e. where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid	The project supplies electricity to the Dominican Republic grid.	The actual plant supplies electricity to the Dominican Republic grid and the project will supply electricity to the Dominican Republic grid. The electricity supplied by the project activity substitutes grid electricity.
Not applicable if the project electricity system is located partially or totally in an Annex I country	The project activity is located in the Dominican Republic, which is as a Non Annex I country	The project electricity system is fully located in the Dominican Republic which is a Non Annex I country.
<b>Applicability Condition – Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion</b>		

<p>CO<sub>2</sub> emissions from fossil fuel combustion are calculated based on the quantity of fuel combusted and its properties</p>	<p>CO<sub>2</sub> emissions from fossil fuel combustion are calculated as instructed by the selected methodology ACM0007</p>	<p>PP does not calculate CO<sub>2</sub> emissions directly based on the quantity of fuel combusted by the project activity but from BTU units delivered and converted with conservative conversion factors to quantity of fuel combusted – see SQS ref.[19] AND [3]. As the delivery of fuel is measured in BTU, this is accepted by the VVB. The calculation can be confirmed as correct.</p>
---	--	--

SQS' validation opinion is that the project activity satisfies each applicability condition of the methodology; therefore, baseline and monitoring Methodology ACM0007, Version 6.1.0, is applicable to the project activity, the criteria are discussed in an exhaustive manner in the PD and supported by the submitted documents. Subsequently, SQS also confirms based on the validation of the baseline identification and additionality steps, that the applicability criteria of the methodology are fully met.

**3.2.3 Project Boundary**

The physical location is described in the PD Chapter 1.9. and the project boundary is described in the PD Chapter 2.3.

The physical coordinates are: Latitude N/S 18.499418° (N/S18°29' 29.23"), Longitude E/W - 69.867831° (E/W 60°52'06.91")

The project activity is restricted to the site of the existing DPP power station. The power station is located at the eastern side of Santo Domingo, in a mixed commercial, industrial, and residential area, densely inhabited low-income community of Los Minas Sur. The site directly abuts neighbourhoods in all directions except to the south, where there is approximately 70 metre buffer of woodland, and to the west, where a small 1 ha industrial campus buffers additional communities.

The project boundary is shown in the PD 2.3. The definition is consistent with the methodology. The national grid has correctly been taken into the project boundary. The boundary was verified during the on-site visit. The VVB visited the existing plant and can confirm the configuration of the existing gas generators as described in the PD. The AES Andres power plant has been visited where the liquid natural gas arrives with ships; its quality was verified – see SQS ref. [B\_3] TT4 1022 BRITISH SAPPHIRE, DISCHARGE REPORT, 03-04/01/2012 – certification of analysis by SGS. From the AES Andres site there is a direct LNG (Liquid Natural Gas) pipeline to the site of the project activity.

The preliminary site plan has also been verified– SQS ref. [A.3\_4], dated 20/01/2012, and compared with the real situation at the existing site of the project. It can be confirmed that the plan is accurate. The coordinates of the project have been consulted and verified – see also SQS ref. [16]. The choice of boundary, sources and gases corresponds to the methodology and are deemed correct by SQS.

No GHG emission within the project boundary is caused by the implementation of the project activity, which contributes more than 1% of the expected annual emission reductions and is not addressed by the applied methodology.

Emission sources included in or excluded from the project boundary:

Source		GHGs	Included?	Justification/ Explanation in the PDD	Cross-Check/plausibility, Statement / Conclusion SQS
<b>Baseline scenario</b>	Dominican Republic grid electricity generation	CO <sub>2</sub>	Yes	Main emission source	PP follows the methodology – can be confirmed as correct.
		CH <sub>4</sub>	No	Excluded for simplification. This is conservative	PP follows the methodology – can be confirmed as correct.
		N <sub>2</sub> O	No	Excluded for simplification. This is conservative	PP follows the methodology – can be confirmed as correct.
	On-site natural gas consumption to operate the project power units in single cycle mode	CO <sub>2</sub>	Yes	An important emission source	PP follows the methodology – can be confirmed as correct.
		CH <sub>4</sub>	No	Excluded for simplification. This emission source is assumed to be very small	PP follows the methodology – can be confirmed as correct.
		N <sub>2</sub> O	No	Excluded for simplification. This emission source is assumed to be very small	PP follows the methodology – can be confirmed as correct.
<b>Project scenario</b>	On-site natural gas consumption to operate the project power units in combined cycle mode	CO <sub>2</sub>	Yes	An important emission source	PP follows the methodology – can be confirmed as correct.
		CH <sub>4</sub>	No	Excluded for simplification. This emission source is assumed to be very small	PP follows the methodology – can be confirmed as correct.
		N <sub>2</sub> O	No	Excluded for simplification. This emission source is assumed to be very small	PP follows the methodology – can be confirmed as correct.
	On-site natural gas	CO <sub>2</sub>	No	No onsite NG consumption to	As there is no supplement fuel (gas) consumption, it has not

consumption to supplement the exhaust heat in operating the steam turbine			supplement the heat	to be considered.
	CH <sub>4</sub>	No	Excluded for simplification. This emission source is assumed to be very small	PP follows the methodology – can be confirmed as correct.
	N <sub>2</sub> O	No	Excluded for simplification. This emission source is assumed to be very small	PP follows the methodology – can be confirmed as correct.

**3.2.4 Baseline Scenario**

According to the Methodology ACM0007, the baseline scenario is identified by using the latest approved version of the “Combined tool to identify the baseline scenario and demonstrate additionality”, adopted by the CDM EB and available at the UNFCCC CDM homepage. In applying the tool, realistic and credible alternatives should be separately determined regarding how power would be generated in absence of the VCS project activity.

The PP applied the valid version of the “Combined tool to identify the baseline scenario and demonstrate additionality”, (Version 05.0.0.).

All assumptions and dates used by the PP are listed in the PDD including their references and sources. All documentation used is relevant for establishing the baseline scenario and is correctly quoted and interpreted in the PDD. Assumptions and dates used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable. Relevant national policies are considered and listed in the PDD – see PDD, sub-step 1b.

- The following steps were applied by the PP, as prescribed by the tool:
- STEP 0. Demonstration that a proposed project activity is the First-of-its-kind
  - STEP 1. Identification of alternative scenarios;
  - STEP 2. Barrier analysis;
  - STEP 3. Investment analysis (if applicable);
  - STEP 4. Common practice analysis.

*STEP 0: Demonstration whether the proposed project activity is the First-of-its-kind*

This step is optional and was not applied as the proposed project activity is not the First-of-its-kind. This can be confirmed by SQS – see also common practice analysis.

*STEP 1. Identification of alternative scenarios*

This step serves to identify all alternative scenarios to the proposed VCS project activity that can be the baseline scenario through the following sub-steps:

Sub-step 1a. Define alternative scenarios to the proposed VCS project activity:  
According to the tool, alternative scenarios available to the project developer should include:

<b>Baseline scenario identified based on the Methodology</b>	<b>Reference in the PDD</b>	<b>Reference check /cross-check /plausibility</b>
<p>S1: The proposed project activity undertaken without being registered as a VCS project activity;</p>	<p>Without VCS the project is financially not viable.</p>	<p>The financial analysis demonstrates that the project without VCS is less attractive. See also Step 3</p>
<p>S2: Where applicable, no investment is undertaken by the PPs but third party(ies) undertake(s) investments or actions which provide the same output to users of the project activity, for example:</p> <ul style="list-style-type: none"> <li>• In case of a greenfield power project, an alternative scenario may be that the PPs would not invest in another power plant but that power would be generated in existing and/or new power plants in the electricity grid.</li> </ul>	<p>The project activity is not a greenfield power project, but an upgrade of an existing power plant; Only DPP is liable for the Los Mina plant, and the waste heat generated in the plant cannot be used anywhere else. Therefore, there is no third party that can undertake investments or actions which use the exhaust heat and provide the same output to users of the project activity. Hence scenario 2 is not an applicable alternative.</p>	<p>Has been verified during site visit and can be confirmed as correct. – S2 is not applicable.</p>
<p>S3: Where applicable, the continuation of the current situation, not requiring any investment or expenses to maintain the current situation, such as inter alia:</p> <ul style="list-style-type: none"> <li>• The continued venting of methane from a landfill;</li> <li>• The continued release of N<sub>2</sub>O from adipic or nitric acid production.</li> </ul>	<p>Scenario 3 is not an applicable alternative since the operation of the plant requires expenses.</p>	<p>S3 is not applicable – the project requires expenses to maintain the current situation. The current situation requires regularly maintenance and personal for the operation – see also Los Mina CC Model v1.6 ver 2013 v5VTPointvNGv2 [21]. There is also an Operating Plant Service Agreement concluded with SIEMENS – see SQS ref. [B.4_1] _Los Mina_Depreciation Life Review Final_061812 v3</p>
<p>S4: Where applicable, the continuation of the current situation, requiring an investment or expenses to maintain the current situation, such as inter alia:</p> <ul style="list-style-type: none"> <li>• The continued use of an existing boiler involving expenses for operation and maintenance;</li> <li>• The continued use of a specific fuel mix for power generation in an existing power plant.</li> </ul>	<p>In the absence of the project, electricity would have continued to be produced by the existing gas turbines in open cycle mode and the hot exhaust gases would be vented to the atmosphere. There is no other use for the waste heat at the Los Mina plant due to the fact that none in the neighbourhood can efficiently utilise the heat nor can this resource be transported over long distances or stored. Currently there are no other technologies available that could</p>	<p>The current situation does require expenses to maintain the current situation. It can also be confirmed that there is a continuing use of gas for power generation. The current situation requires regular maintenance and personal for the operation – see also Los Mina CC Model v1.6 ver 2013 v5VTPointvNGv2 [21]. There is also an Operating Plant Service Agreement concluded with SIEMENS – see SQS ref. [B.4_1] _Los Mina_Depreciation Life Review Final_061812 v3</p>

	<p>use the waste heat. Therefore, in the absence of the project activity, the heat would be exhausted to the atmosphere. Electricity requirements that would have been met by the project activity would be met from existing power plants on the grid and by the addition of new generating sources on the grid, to meet growing demand. Continuation of the current situation, as defined by scenario 4 is, therefore very likely as an alternative scenario to the project.</p>	
<p>S5: Other plausible and credible alternative scenarios to the project activity scenario, including common practices in the relevant sector, which deliver the same output, taking into account, where relevant, examples of scenarios identified in the underlying methodology;</p>	<p>Considering that the project activity is an upgrade of a specific technology and only the owner of the facility can initiate such an upgrade, no other alternatives provide outputs comparable to, or compatible with, the proposed VCS project activity. Furthermore, the alternative of construction a third open cycle unit instead of upgrading the existing units to close cycle is not realistic as this will require the PP to negotiate and secure a new fuel supply contract for the additional fuel required and amendment to its environmental emissions permits which will be very problematic considering the close proximity to a residential area. Hence scenario 5 is not an applicable alternative.</p>	<p>The assumptions of the PP can be confirmed as correct. It can be confirmed that scenario 5 is not an applicable alternative.- see also SQS ref. [2] AES Andres B.V. and Subsidiaries en Ingles, independent auditors report, ERNST&amp;YOUNG, 31/11/2011 referring to the LNG contract with BP until 2023.</p>
<p>S6: Where applicable, the “proposed project activity undertaken without being registered as a VCS project activity” to be implemented at a later point in time (e.g. due to existing regulations, end-of-life of existing equipment, financing aspects).</p>	<p>Since the current operation of the project power plant holds all necessary environmental and operation permits – see SQS ref. [B_6] and [B.5_5] and end-of-life of existing equipment is in more than 20 years – see SQS ref. [B.4_1], there are no identified conditions that could be changed or resolved in the</p>	<p>The assumptions of the PP can be confirmed as correct – S6 is not an applicable alternative. SQS confirms that there are no regulations in DR requiring the conversion from single cycle to combined cycle; therefore the regulatory conditions will be the same in the foreseeable future. This is also confirmed with the</p>

	<p>future and affect the circumstances for the project activity. The proposed project activity undertaken without being registered as a VCS project activity, to be implemented at a later point in time, as defined by scenario 6, is therefore not an applicable alternative.</p>	<p>outcome of the Environment permission license – SQS ref. [B_4]_Disposicion Permiso Ambiental, dated 29/03/2012. There are no requirements for future regulatory prerequisites for the plant. Moreover, the implementation of the combined cycle conversion project in a future period would result in lower returns as the shorter remaining lifetime of the existing open cycle will reduce the remaining lifetime of the entire power plant.</p>
--	---	---

Consequently, the alternative scenarios available to the project developer are:

- S1 The proposed project activity undertaken without being registered as a VCS project activity;
- S4 The continuation of the current practice, i.e. in the absence of the proposed project activity the electricity, to meet the demand in the grid system, will be generated:
  - (1) By the operation of the project power units in single cycle mode;
  - (2) By the operation of existing grid-connected power plants; and
  - (3) By the addition of new generation sources to the grid

The methodology requires specific conditions – beyond the applicability criteria validated in Section 3.8.2 and the explicit baseline scenarios to be met. These conditions are as follows:

	<b>Criteria for ACM0007 baseline &amp; additionality</b>	<b>Project Activity compliance with the requirements</b>
1	<p>When the current practice condition (to continue the operation in open cycle) is assessed, the future estimated load factor should reflect the changes due to new conditions in the grid;</p>	<p>Load factor calculations have been carried out appropriately reflecting the conditions in the grid. The PP uses the software of the OC-SENI - ORGANISMO COORDINATOR DEL SISTEMA ELÉCTRICO NACIONAL INTERCONNECTADO DE LA REPÚBLICA DOMINICANA to compute the needs of the grid –once with the conditions of the current practice and once with the implementation of the project activity - see also remark after table Investment analysis parameter in Section 3.8.11. The original data of the software output has been verified – see SQS ref. [B.4.4_4], [B.4.4_5] and [B.4.4_7] – Excel-sheets. The generation of the current practice condition is computed in Los Mina CC Model v1.6 ver 2013 v5vTPointvNGv2 [21] to show the difference of the NPV.</p>
2	<p>If undertaking investment analysis, then this shall include the revenue generated from the possible increase in electricity produced from the open cycle component in the project situation.</p>	<p>The investment analysis conducted – in order to prove additionality from a financial perspective – has been carried according to this requirement including the increased electricity generation</p>

		<p>revenues associated with the open cycle component as detailed in SQS ref. [B.4.4_4] The investment analysis is based on parameters defined by external sources detailed in Section 3.8.11 of this report. Every scenario – including sensitivity analysis scenarios – is computed with the data’s received from OC-SENI to compare the NPV.</p>
4	<p>This methodology is only applicable where it can be demonstrated that the baseline scenario is the continuation of the current practice, i.e. that in the absence of the proposed project activity the electricity, to meet the demand in the grid system, will be generated:</p> <ol style="list-style-type: none"> <li>1. By the operation of the project power unit(s) in single cycle mode;</li> <li>2. By the operation of existing grid-connected power plants; and</li> <li>3. By the addition of new generation sources to the grid.</li> </ol>	<p>The baseline scenario is the continuation of the current practice. The baseline scenario selection is elaborated in Section 3.8.6 of this report.</p>

Sub-step 1b. Consistency with mandatory applicable laws and regulations:

The identified alternatives are in compliance with all applicable legal and regulatory requirements including the set of laws that compose the legal framework of the energy sector in the Dominican Republic. The PP lists under Sub-step 1b a list of the Legal Framework of the energy sector and the possible implication to scenario S1 and S4. The conclusion is – there are no implications. The list of laws has been cross-checked with official sources – see [http://www.cne.gov.do/app/do/marco\\_leyes.aspx](http://www.cne.gov.do/app/do/marco_leyes.aspx) - and are deemed complete. Law 496-06 and 66-07 are not relevant for the project activity. It can be confirmed that none of the identified alternatives contradicts any legal or regulatory requirements, or poses a risk to do so in the future. Therefore, they are all deemed to be realistic and credible alternatives available to the project developer.

**STEP 2. Barrier analysis**

This step serves to identify barriers and to assess which alternatives are prevented by these barriers by applying the following sub-steps:

Sub-step 2a. Identify barriers that would prevent the implementation of alternative scenarios:

There are no barriers that may prevent alternative scenarios to occur. Furthermore, open cycle thermal power plants have been operating in the Dominican Republic for decades and closed cycle power plants operate in the country. The continuation of current practice by definition does not include the use of a new practice. Therefore, there are no technical barriers that are relevant to the identified alternatives.

Investment barriers:

There are no other investment barriers detected.

Sub-step 2b. Eliminate alternative scenarios which are prevented by the identified barriers:

Since there are no identified barriers faced by the project and by the identified alternatives, the list of remaining alternatives at the end of Step 2 is the same: S1 and S4.

### **STEP 3. Investment analysis**

Since the Los Minas combined cycle plant is a project that modifies a plant with two current open cycle gas turbines, the analysis performed was a comparative analysis of the financial situation without the project vs. the financial situation with the project. For the years 2013 to 2015 the same values were used for the analysis in both situations as the upgrade will only take place in 2016. Only the investment and a two month outage for the combined cycle were added to the project scenario. The model is taking into consideration the current regulatory laws that applied in the Dominican Republic electricity sector. Also the model values the energy and capacity first and then deducts the energy and capacity contracts, just like the Economics Transactions made by the "Organismo Coordinador" the Market Operator.

The data for the future consumption and generation as it appears in the model comes from a separate model called "MOPERD". MOPERD is the standard model used in the DR for the projection and long term planning of the system (official reference to this model was provided to the VVB). MOPERD is an economic dispatch model. The model dispatches the duration curve taking into account: availability, efficiency, maintenances, the entrance of new players, old player that leave the market, fuel prices, demand growth, etc, guarantying the supply of the demand at minimum cost. The generation and the fuel consumption related to the generation used in the financial model come from the MOPERD model and due to the above the values are not constant year to year.

This step determines, through an investment analysis comparison, which of the alternatives remaining after Step 2 is the most economically or financially attractive. If the investment analysis is conclusive, the economically or financially most attractive alternative scenario is considered to be the baseline scenario. If the investment analysis is not conclusive, then the alternative to the project activity with the least emissions among all the alternatives is considered to be the baseline scenario.

Here, the project NPV is selected as the most suitable financial indicator to compare between S1 and S4 since the continuation of the current situation, as defined by scenario 4, does not require investment in new equipment but requires expenses. Furthermore, the decision of investment in Los Mina generation is based on the comparison between the NPVs of the two options. Therefore, this analysis compares the NPV of current practice, and the NPV of the project activity without VCUs.

A detailed analysis of the project investment and electricity tariffs has been submitted to the SQS during validation.

### **The effect of the electricity market in the Dominican Republic on the financial risk of the project**

In order to provide further information about the risks taken by a power generator in the DR market, it is necessary to clarify the business model in which the project will be developed.

Market Power Purchase Agreement (M-PPA) vs. Independent Power Producer (IPP) Model:

- The project's primary revenues will come through a M-PPA. A M-PPA is considered a natural tool for sector participants such as distributors, generators and unregulated users to secure their supply with a specific price and commodity structure. In an M-PPA the parties agree to specific energy and capacity transactions. Negotiated terms include the term, price, payment schedules, guarantees and default provisions. The contracts between generators and distributors and/or large unregulated users are normally in the

form of M-PPAs and any differences between the volumes sold or purchased through the M-PPAs are settled in the spot market.

- The financial settlement of M-PPAs is completely disconnected from the actual dispatch of any particular power generator. As the M-PPAs are financial contracts rather than being tied up to the physical production of the generator, there is no obligation to produce the electricity necessary to fulfil the PPA commitments. Consequently, if a power generator, which entered into a PPA and committed to sell electricity to a customer, does not generate the total amount of electricity needed to satisfy its contractual obligation during a particular month, the power market clearance mechanisms will cover such deficit in the M-PPA by allocating purchases in the spot market at the spot price to be delivered to the buyer under the M-PPA and paid for by the generator. The financial nature of a M-PPA implies that a power generator, even with a high level of contracted capacity, is always facing commodity and volume exposure related to its sales.
- An IPP model is a power company which owns and or operates facilities to generate electric power for sale to a utility, central government buyer or any end user. Their usual contract structure is design to provide a full recovery of the investment since the only source of revenues comes from the supply contract where is common to see full pass-through of the generator costs (including O&M costs) and in this model the off-taker take the dispatch risk, fuel supply risk, collections risk, etc; but at the same time ensure to the entity a reasonable return on their investment paid through the capacity payment. This type of model is usually referred as a physical IPP model, which has less risk from a M-PPA model but at the same time, lower returns, since they are guaranteed and low probability of having any upsides on the business cases during the term of the contract.

The model implemented in the DR for the project is a M-PPA scheme which has additional exposure in terms of risk taking that cannot be fully reflected in the financial model. Therefore, the following points should also be considered as an indication of how conservative the financial analysis is:

- EPC risk: since the EPC has not yet been closed, any extra cost, or delay in the operation start date will be fully burdened by the project, not being able to obtain from the market or the M-PPA additional compensation for such effects.
- Regulatory risk: The project revenues come from the energy sales, capacity sales and ancillary services. The DR regulatory office could take measures to update the methodologies, prices and rules for such markets assumed for the compensation or payment of certain services such as capacity, frequency regulation, among others.
- Government Financial Health: Most of the energy of the project will be contracted with the DISCO (distribution companies own by the government). Historically, the DISCO's financial deficit has been a key risk element to new investment. DISCO financial deficit will continue, extending the need for government subsidy to the upcoming years.
- Capacity Payment: The DR capacity pricing is based on the capital cost of installing a peaking unit in the system and it describes this unit as a gas turbine fuelled by diesel. The regulatory framework in the Dominican electricity market establishes a methodology for allocating firm capacity to each power generation unit. The OC allocates firm capacity to a power generation unit based on many factors, including yearly peak demand, the number of power generation units installed in the Dominican Republic, the capacity of each power generation unit, the level of reliability required by the system and the availability rate of each power generation unit. In addition, the availability rate takes into account the ability to generate without relief for force majeure, lack of fuel or other similar

events. Under the regulatory framework, firm capacity is defined as the power that a generation unit is allowed to provide during the peak demand hours, taking into account each power generation unit's availability and the reliability of such a unit. The aggregate firm capacity of all power generation units for the entire year should equal the aggregate demand estimated for that year. The financial model does not contemplate the potential risk of a price change or a capacity payment mechanism change in the regulation; instead, the financial model contemplates this capacity payment as a constant cash flow, something that is not guaranteed.

- Un-hedged energy: The project has un-hedged energy sales (or spot sales); gross margin depends on the cost of the three commodities used in DR affecting the price at which spot energy is valued and the production costs of our units. Variation of the spread between commodities may reduce the dispatch of the units.
- Ancillary Services Exposure: The DR regulation related to the operational safety and stability of the system demands from the OC to program between 6% to 10% of the total demand as rotating or operative reserve. Andres and DPP are the larger players in this service due to their technology capability to do so. This service is a mandatory service representing an un-hedged position in ancillary services.
- Unit dispatch risk:
  - All power companies in the Dominican electricity system with units available for dispatch are put in order of merit for dispatch. The order of merit determines the price to be paid for the electricity and the order in which each participant is dispatched. Generators are dispatched in order beginning with the generator with the lowest declared variable cost until the demand for electricity by the system is satisfied. The variable cost of the last generator dispatched determines the marginal price of electricity in the market for that hour "the spot price". The Operator and Coordinator Body "OC", publishes a weekly order of merit list that it uses to coordinate the dispatch of the generation units. The order of merit is effective for one week and is the same for the whole week. Dispatched variable cost is based on the price of fuel, the units' efficiency (heat rate), and the nodal factor (or transmission losses due to transportation from the generator to the principal connection point in the grid).
  - The dispatch of each unit in every hour of each week is limited to their order in the merit list of the OC of the DR market. It is important to recall that any contract does not impact or influence in any way the unit dispatch.
  - Another important risk is the transmission system reliability. For example during the years 2010-2012, the generation park from the east were limited due to flow gate restrictions in several main transmission lines of the DR transmission system. This situation limited DPP for a period of time. During that period, impacting its availability to supplying its contract with its own generation, and instead buying from the spot (at a higher price) to supply their contracts portfolio (as a total).

As explained above, the proposed project is an upgrade of the existing power plant, and this upgrade requires a large investment. The relevant financial indicator is therefore the comparison between the NPV of the continuation of the current practice and the NPV of the proposed project. The average  $\Delta$ NPV of all 9 scenarios is \$US -11.6 million which shows how unprofitable this project is. Although it may look like cases 1 and 2 in the above table return a positive result for the proposed project, it is important to remember that the  $\Delta$ NPV represents the value the project generates over 19 years, compared to the current situation, based on an initial investment of about \$US 260 million. From this perspective it is clear that even the best results in case 1 which

is a ΔNPV of \$US 11 million is negligible and not sufficient to consider the proposed project as economically attractive.

Therefore, one alternative remains as a candidate as the most likely scenario: Alternative S4, the continuation of the current situation. This is the baseline scenario.

The parameters used in the financial calculations were validated in the following manner:

Parameter	Value applied	Documentary Proof	Cross-check / plausibility	Statement / Conclusion SQS
Existing capacity	210 MW	SQS ref. [B_6]_Permiso DPP Medio Ambiente y Recursos Naturales 24012008  [A.3_1] Attachment #3.Los Mina CC D5A 2x2X1 Performance, Estimated performance of Westinghouse 501D5A	SQS ref. [B.4.4_2], officially available information on the web regarding installed capacity.  SQS ref. [B_6] B_6_Permiso DPP Medio Ambiente y Recursos Naturales 24012008.  The document SQS ref. [A.3_1] lists the Gross Output in ISO conditions (60.0% humidity and 15.0°C) as of 116.832 MW for each turbine. The document also lists the Gross Out-put in conditions met in the Dominican Republic. They have a variation between 103.234 MW (68.9% humidity and 32.1°C) and 107.911 MW (85.0% humidity and 26.1°C). The value chosen by the PP as of 105 MW for each turbine or 210 MW for both turbines is considered correct.	Information regarding existing capacity is considered correct.
Additional gross capacity	108 MW	SQS ref. [4.4_9], Cost analysis Sargent & Lundy	SQS ref. [B_7] B_7_Permiso Ambiental Modificado Ministerio de Medio Ambiente y Recursos Naturales 02052012. The additional capacity can have a variation regarding the choice of the hardware – see also commercial proposition of Posco E&C, dated 31/10/2012, SQS ref. [B.4.4_16] which states a gross capacity of 112.8 MW with ISO conditions. It is confirmed by a	Information regarding additional capacity is considered correct.

			neutral expert – SQS ref. [15], that an upgrade as of 50% of the existing capacity is realistic.	
New gross capacity	318 MW	See existing capacity and additional gross capacity. The new gross capacity in the financial model – Los Mina CC Model v1.6 ver 2013 v5vTPointvNGv2vT PointvNGv2 [21] is indicated as of 211.1 MW for the existing capacity and 318.9 for the upgraded capacity – the difference for the upgrade is 107.8.	See existing capacity and additional gross capacity	Existing capacity and additional gross capacity are verified and the total can be confirmed as correct. As for the calculation 211.1 MW is used for the existing capacity and 318.9 for the upgraded capacity, the calculation is considered as conservative.
Investment	260 MM US\$	SQS ref. [4.4_9], Cost analysis Sargent & Lundy,  SQS ref. Los Mina CC Model v1.6 ver 2013 v5vTPointvNGv2vT PointvNGv2 [21] SQS ref. [B.4.4_16] Commercial (POSCO 121031) v2 – commercial proposition for the equipment, dated 31/10/2012, is over 165 MM US\$ - not including taxes, VAT, Custom and Import Duties.	The range for a typical gas-fired combine cycle is US\$ 1 600 to US\$ 2 100/kW. The project is slightly above US\$ 2 100/kW. This range is higher than a greenfield combined cycle project. – see also SQS ref. [9], updated capital cost estimates for Electricity Generation Plants, U.S. Energy Information Administration, 11/2010. The correctness of the range of upgrade of gas-fired combine cycle is cross-checked and confirmed by a neutral expert – SQS ref. [15] 15_Nussbaumer_GuD-Projekt_DR_2012_V2.	Investment can be confirmed as correct and in the range.

Generation	Variable between 2 158 GWh and 2 257 GWh	Electricity generation is dependent on the demand of the grid and existing contracts with clients. Los Mina CC Model v1.6 ver 2013 v5vTPointvNGv2vT PointvNGv2 [21]	The PP has to use the software of the OC-SENI - ORGANISMO COORDINATOR DEL SISTEMA ELÉCTRICO NACIONAL INTERCONNECTADO DE LA REPÚBLICA DOMINICANA to compute needs of the grid – see also remark after this table “MOPERD”. The original data of the software output has been verified – see SQS ref. [B.4.4_8] – Excel-sheets. The generation can be confirmed as correct.	The generation of electricity can be confirmed as correct.
Energy price	Variable between 124.5 US\$/MWh and 154.1 US\$/MWh	Electricity price is defined by the demand of the grid, and contracts with clients.	PP uses the spot price indicated in the publically available information of CDEE – Corporación Dominicana de Empresas Eléctricas Estatales. CDEE is a holding company that brings together all government-owned generation, transmission and distribution companies. The spot price has been cross-checked by SQS ref. [B.4.4_12] RESUMEN_TOTAL_Julio_2012.1 – report dated 07/2012. This document is an original settlement of accounts from OC-Seni regarding the power plant. Data of above mentioned document are also presented in SQS ref. [B.4.4_13] OC-GC-14 - 07RETE1207-130817-V1, which is the official report regarding the financial transactions between OC-SENI and the power plant owner.	The energy price can be confirmed as reasonable.
Capacity price	Variable between 8.8 US\$/kW-m and 12.5 US\$/kW-m	Capacity price is given by OC-SENI - ORGANISMO COORDINATOR DEL SISTEMA ELÉCTRICO NACIONAL	The capacity price is cross-checked against public available data of the OC-SENI - see also <a href="http://www.oc.org.do/documentos/upload/OC-GC-PF07-2012.zip">http://www.oc.org.do/documentos/upload/OC-GC-PF07-2012.zip</a> .  The capacity price has been cross-checked by SQS ref.	The capacity price can be confirmed as correct.

		INTERCONNECTA DO DE LA REPÚBLICA DOMINICANA	[B.4.4_12] RESUMEN_TOTAL_Julio_2012.1 – report dated 07/2012. This document is an original settlement of accounts from OC-SENI regarding the power plant. Data of above mentioned document are also presented in SQS ref. [B.4.4_13] OC-GC-14 - 07RETE1207-130817-V1, which is the official report regarding the financial transactions between OC-SENI and the power plant owner.	
Frequency Regulation Incentive	Variable between 9.77 US\$/MWh and 13.57 US\$/MWh	Frequency Regulation Incentive is given by OC-SENI - ORGANISMO COORDINATOR DEL SISTEMA ELÉCTRICO NACIONAL INTERCONNECTA DO DE LA REPÚBLICA DOMINICANA	The Frequency Regulation Incentive is cross-checked against publically available data of the OC-SENI - see also <a href="http://www.oc.org.do/documentos/upload/OC-GC-PF07-2012.zip">http://www.oc.org.do/documentos/upload/OC-GC-PF07-2012.zip</a> .  The Frequency Regulation Incentive has been cross-checked by SQS ref. [B.4.4_12] RESUMEN_TOTAL_Julio_2012.1 – report dated 07/2012. This document is an original settlement of accounts from OC-SENI regarding the power plant. Data of above mentioned document are also presented in SQS ref. [B.4.4_13] OC-GC-14 - 07RETE1207-130817-V1, which is the official report regarding the financial transactions between OC-SENI and the power plant owner.	The Frequency Regulation Incentive can be confirmed as correct
Fuel Cost	Until 2023 DPP has a low price of fuel based on NYMEX gas price and an existing	Fuel costs until 2023: SQS ref. [2] independent auditors report, ERNST&YOUNG, 31/11/2011  Fuel costs after	The fuel costs until 2023 are fixed in a confidentiality agreement with a gas supplier – the contract has been signed in 2002 – see SQS ref. [2] independent auditors report, ERNST&YOUNG, 31/11/2011. The Investment analysis – Los Mina CC Model	The fuel cost can be confirmed as correct.

	<p>fuel supply contract. There is a confidentiality agreement between NYMEX and DPP regarding the fuel costs. The information cannot be provided.</p> <p>Starting 2023 the official projected fuel price of ICE is used.</p> <p>Coal price is used in the model because electricity costs in the DR are tied to coal prices and therefore so does the project income.</p>	<p>2023 are based on the ICE document – SQS ref. [B.4.4_3], sheet “Coal price”.</p>	<p>v1.6 ver 2013 v5vTPointvNGv2vTPointvNGv2 [21] shows the change of the cost structure in 2023. As the fuel costs are introduced in the MOPERED model, also the income structure changes in the same year.</p> <p>Starting 2023 Los Mina CC Model v1.6 ver 2013 v5vTPointvNGv2vTPointvNGv2, the fuel costs are considerably higher and are dependent on the open market. The fuel costs have been cross-checked against this publically available document – <a href="https://www.theice.com/marketdata/reports/ReportCenter.shtml?reportId=10&amp;productId=253&amp;hubId=404#report/10/reportId=10&amp;productId=253&amp;hubId=404">https://www.theice.com/marketdata/reports/ReportCenter.shtml?reportId=10&amp;productId=253&amp;hubId=404#report/10/reportId=10&amp;productId=253&amp;hubId=404</a> print-out SQS ref. [17].</p>	
Variable Cost	<p>Variable costs are constituted of regulators-fees (1% of Sales), spot energy</p>	<p>Variable costs are computed in Los Mina CC Model v1.6 ver 2013 v5vTPointvNGv2vTPointvNGv2 [21]</p>	<p>As the variable costs are computed except for the regulator-fee which is automatically charged by the OC-SENI - ORGANISMO COORDINADOR DEL SISTEMA ELÉCTRICO NACIONAL INTERCONNECTADO DE LA REPÚBLICA DOMINICANA – the</p>	<p>Variable costs can be confirmed as correct.</p>

	purchase, spot capacity purchase and fuel costs (fuel costs – see line above).		result can be confirmed as correct.	
Fixed costs and O&M	<p>In open cycle mode it is variable between 21.1 and 21.8 MM US\$.</p> <p>In combined cycle mode variable between 31.3 and 41.3 MM US\$, - Los Mina CC Model v1.6 ver 2013 v5vTPointvNGv2vTPointvNGv2 [21]</p>	<p>Fixed costs are computed in Los Mina CC Model v1.6 ver 2013 v5vTPointvNGv2vTPointvNGv2 [21]. The variation is explained with the maintenance plan. In 2008 a maintenance plan had been established for the existing plant with the expected lifetime of every part of the plant and the remaining lifetime, taking also into account the replacement value – see SQS ref. [A.3_2] A.3_2_DPP Base 2008</p> <p>Additional info is also in SQS ref. [B.4.4_3], sheet “extra”.</p>	<p>The fixed costs and O&amp;M have been verified in [21] and [B.4.4_3] and are deemed correct. They have been cross-checked against SQS ref. [9], updated capital cost estimates for Electricity Generation Plants, U.S. Energy Information Administration, 11/2010. They are higher but it has to be considered that DPP installation is an upgrade and not a new CCGT as a new CCGT is designed for operation in combined cycle and an upgrade from single cycle to combined cycle demands special constructed components being are more sensitive to maintenance.</p> <p>The O&amp;M costs in open cycle mode have also been cross-checked with the independent report of Sargent &amp; Lundy – SQS ref. [B.4_1] B.4_1_Los Mina_Depreciation Life Review Final_061812 v3, dated 18/06/2012. It states that new simple cycle combustion turbine plants similar to this configuration are currently being estimated as having all-in costs of US\$ 1 000 or more per kW. As the existing capacity of the plant is 210 MW – the actual O&amp;M costs between US\$ 21.1 and 21.8 MM. – are</p>	Fixed costs and O&M costs can be confirmed as correct.

			<p>considered as correct. It has also to be noted that the existing plant is not a new plant. The plant has been commissioned 1996 and upgraded for NLG in 2003.</p> <p>The O&amp;M costs in combined cycle mode have been verified by a neutral expert – SQS ref. [15] 15_Nussbaumer_GuD-Projekt_DR_2012_V2. He states that the financial analysis shows that the O&amp;M costs increase after the upgrade as of around 40% and this is estimated to be reasonable. The difference between O&amp;M costs before and after the upgrade are around US\$ 10 MM. This represents around 4.5% of the investment of the upgrade to combined cycle. This is also estimated as reasonable by the expert.</p>	
<p>Main-tenance</p> <p>See also comments O&amp;M costs.</p>	<p>Variable between US\$ 4.4 (2016) and US\$ 6.4 (2019) MM</p>	<p>Maintenance are presented in Los Mina CC Model v1.6 ver 2013 v5vTPointvNGv2 [21]</p> <p>Additional info is also available in SQS ref. [B.4.4_3], sheet “extra”.</p>	<p>Maintenance is normally included in O&amp;M costs. The PP mentions them separately in the financial analysis. The maintenance costs have been verified in [21] and [B.4.4_3] and are deemed correct. They have been cross-checked against SQS ref. [9], updated capital cost estimates for Electricity Generation Plants, U.S. Energy Information Administration, 11/2010. They are higher but it has to be considered that DPP installation is an upgrade and not an new CCGT</p>	<p>Fixed costs and O&amp;M costs can be confirmed as correct.</p>
<p>Yearly discount rate</p>	<p>13.75%</p>	<p>Following the guidelines on the assessment of investment_Version 05, EB 62, Annex 5</p>	<p>Can be confirmed as in accordance with the guidelines on the assessment of investment_Version 05, EB 62 Annex 5</p>	<p>Can be confirmed as correct.</p>

Interest rate	9.04%	Dominican Republic Risk Free Bonds are around 9.04%	Can be confirmed with public available data – see <a href="http://www.creditopublico.gov.do/ingles/Bonds%20Issues/external/prospectus/DR13Prospectus20030210.pdf">http://www.creditopublico.gov.do/ingles/Bonds%20Issues/external/prospectus/DR13Prospectus20030210.pdf</a>	Can be confirmed as correct
Taxes	25%	Official income tax	See also <a href="http://www.taxrates.cc/html/dominican-republic-tax-rates.html">http://www.taxrates.cc/html/dominican-republic-tax-rates.html</a>	Can be confirmed as correct.
Withholding tax	10%	Official tax in	See also <a href="http://www.deloitte.com/assets/Dcom-Global/Local%20Assets/Documents/Tax/Taxation%20and%20Investment%20Guides/2012/dttl_tax_highlight_2012_DominicanRepublic.pdf">http://www.deloitte.com/assets/Dcom-Global/Local%20Assets/Documents/Tax/Taxation%20and%20Investment%20Guides/2012/dttl_tax_highlight_2012_DominicanRepublic.pdf</a>	Can be confirmed as correct.
ITBIS	16%	Tax on the Transfer of Industrialised Goods and Services (ITBIS)	See also <a href="http://www.drlawyer.com/publications/dominican-republic-tax.html">http://www.drlawyer.com/publications/dominican-republic-tax.html</a>	Can be confirmed as correct.

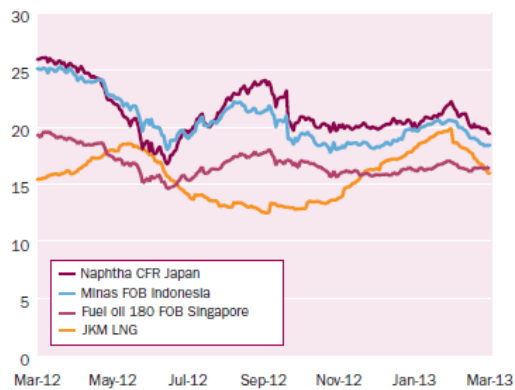
### **Additional explanations on financials**

AES Andres has a long term fuel supply contract for Natural Gas with BP. The price of fuel for this contract is at NYMEX prices. Annually DPP receives 33.6 TBTU of Natural Gas. DPP’s purchase contract price is Andres purchase price (which is NYMEX + 0.2) plus 0.2. So the model has NYMEX +0.4 which is the same. The contract with BP expires in 2023. After that year, DPP takes the assumption that a new LNG supply contract will be referenced to Brent. The actual Henry Hub related LNG contract is expected to be on the US\$ 2-7/MMBTU range on the evaluated period, while a 13% Brent LNG contract is expected to be between US\$11-15/MMBTU. For the model DPP assumes that only 16 TBTU of the NYMEX BP contract are for the Los Minas Plant, in case the plant uses more gas, it will be Brent related.

With respect to DPP model using Brent related LNG instead to NYMEX HH, this comes from the fact that NYMEX HH has broken its relation to the LNG market and just represents the US Natural Gas market. Suppliers are not providing long term price related to NYMEX but to Brent. For example all of DPP LNG purchases outside of 2001 BP contract has been at a percentage of Brent (contracts cannot be shown due to confidential agreement), but a clear evidence can be found in Platts’ quotation when the US NG market is below 4\$/MMBTU(NYMEX HH), the rest of the LNG Market is related to Brent of NBP:

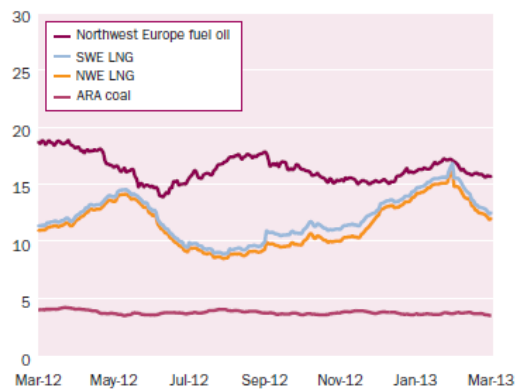
Platts daily LNG markers (\$/MMBtu)			
Mar 19		Change	
<b>DES Japan/Korea Marker (JKM)</b>			
JKM (May)	15.950	0.000	—
H2 Apr	16.150	0.000	—
H1 May	16.000	0.000	—
H2 May	15.900	0.000	—
H1 Jun	15.800	0.000	—
<b>DES Japan/Korea (JKM) Swaps</b>			
Jun	15.750	<a href="http://mark...">http://mark...</a>	
Jul	15.850	0.000	—
Aug	15.950	0.000	—
<b>DES Southwest Europe Marker (SWE)</b>			
SWE (May)	12.500	0.120	▲
H2 Apr	12.700	0.120	▲
H1 May	12.550	0.120	▲
H2 May	12.450	0.120	▲
<b>DES Northwest Europe Marker (NWE)</b>			
NWE (May)	12.000	0.120	▲
H2 Apr	12.200	0.120	▲
H1 May	12.050	0.120	▲
H2 May	11.950	0.120	▲
<b>FOB Middle East</b>			
FOB Middle East (May)	14.300	0.000	—
<b>DES West India</b>			
DES West India (May)	14.850	0.000	—
<b>FOB Australia (netback)</b>			
FOB Australia (May)	14.520	0.000	—

Competitive fuels Asia (\$/MMBtu)



Source: Platts

Competitive fuels Europe (\$/MMBtu)



Source: Platts

DPP long term price (Brent x 12.7%) comes from an average of informal quotation to supplier for the long term price. After 2023 the terminal fee is updated as per a 0.85 US\$/MMBTU of today using the CPI, obtaining the 1.23 US\$/MMBTU value.

**Additional explanation on how do fuel prices translate into PPA prices, and how a fuel price affects a Generator net margin**

As with any generator, DPP current and future Power Purchase Agreements are its natural hedging mechanism for fuel prices change over the life of the asset. In the DR, the typical PPA structure includes a full pass through of the commodity that reflects the power generator fuel price plus a fixed margin to recover its investment and provide reasonable returns on equity (please see above explanation on the electricity market in the DR). That structure provides a more robust business case since it reduces volatility in the forecasted results on variable commodity markets. Usually, as in DPP's case, the plant is not contracted up to its 100% and a minor % is left for spot sales and that provide potential upsides and at the same time are left uncontracted in order to cover any operational situation, such as an increase in the expected forced outage ratio.

On a financial evaluation of such project, it is important to consider that any fuel increase or decrease will be passed to the client in proportion of their PPA size versus the plant's production, meaning that if the power plant production is contracted on 80% contract – 20% spot level, then only 20% of the spot sales are to be affected by the fuel price increase, since the 80% contracted will also see a change in the revenue line as a result of the pass through structure.

In addition, it is important to understand that if the fuel prices change over the life of the plant not just the cost will be affected but also it is likely to see a correlation between the spot prices (electricity market prices) since those are set by the production cost of the marginal unit, which in turn is a direct result of its efficiency and its fuel price. That means that both revenues and costs move when a fuel price change is registered.

#### **Additional explanations on the LNG-Oil price linkage**

During the validation in response of the shale gas revolution in the US, and the consequent natural gas price drop in the US, SQS has validated in detail the LNG price, requesting (CAR#15, CAR#16) further evidence from the PP to show its investment decision.

The PP as described below presented independently verifiable evidence [24, 25, 26, 27, 28] for the LNG – Brent linkage.

Global LNG demand has grown by leaps and bounds since the first commercial cargo was shipped from Algeria to the United Kingdom in 1964. LNG trade that year was a mere 0.2 million tons (MMt), but 46 years later that figure swelled to nearly 220 MMt. Since the mid-1970s, Asia has overtaken Europe as the largest consuming region in the world. The Americas occupy third place, followed by the Middle East, which started LNG imports in 2009.

Asia's dominance of worldwide LNG trade is expected to remain steady through 2020, even as Atlantic Basin and Middle Eastern demand rises.

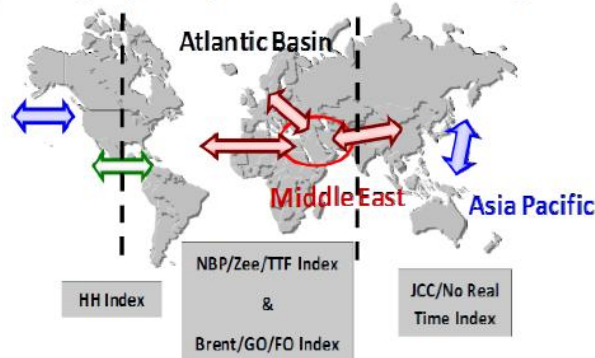
In terms of supply, as of 1997, there were only nine LNG exporters worldwide: Abu Dhabi, Algeria, Australia, Brunei, Indonesia, Libya, Malaysia, Qatar, and the United States (Alaska). Since then, nine additional exporters have entered the market—Trinidad and Tobago and Nigeria in 1999, Oman in 2000, Egypt in 2005, Equatorial Guinea and Norway in 2007, Yemen and Russia in 2009, and Peru in 2010—thereby increasing the total number of LNG exporters to eighteen. During 2015–20, global LNG supply capacity may grow by 12% annually with the start of new LNG export projects and greater production capacity from existing projects.

A key factor affecting the outlook for LNG supply going forward will be the global balance of demand and supply.

Although natural gas is traded internationally, access to gas imports is far more restricted than access to oil imports. Almost every seaport in the world can import at least some volume of oil products; oil transport and storage use relatively simple and cheap infrastructure unlike LNG, which requires specialized and expensive infrastructure due to its cryogenic nature.

The basis on which natural gas is sold and priced varies dramatically between global markets, and unfortunately, there is not true of International LNG Market. In early 2012, gas was sold into Japan for as high as US\$ 18 per million British thermal unit (MMBtu) at the same time that wholesale prices were US\$ 9 per MMBtu in the United Kingdom, less than US\$ 2 per MMBtu in the United States, and US\$ 0.75 per MMBtu in Saudi Arabia.

*Different gas pricing indices used across regions*



Source: FGE.

**Natural Gas Overview: World LNG Prices**

Federal Energy Regulatory Commission • Market Oversight • [www.ferc.gov/oversight](http://www.ferc.gov/oversight)

**World LNG Estimated May 2013 Landed Prices**



Source: Waterborne Energy, Inc. Data in \$US/MMBtu

Updated April 24, 2013 2/10

Most analysts and independent consultants have similar conclusions on how the market can be divided. Natgas.info mentions on their web page that natural gas market could be divide into four groups:

1. Gas to Gas Market: Liberal market with volatile prices generally not linked with other market (North America, United Kingdom). This market is characterised by large numbers of buyer and sellers largely competing without governmental intervention.
2. Price Indexed to substitute energy price: In this market the gas price moves in proportion with other fuels, usually crude oil or oil products quoted by a formula which 'indexes' or is derived from oil prices, trying to match their substitute fuel sold at a discount – on an equivalent energy basis – to oil and oil products (Europe, and to a lesser extent, in South-east Asia).
3. Oil-Linked price Market: Gas price linked directly to oil price. This group is characterised by the traditional LNG markets (Japan, Korea, Taiwan, China and others). Because oil price have gone through wide swings over time, "S-curves" (Sometimes Caps and/or Floors) were introduced at one point in Asian Contracts. S-curves reduced the slope at the upper and lower "Pivot Points"; protecting the buyer at high oil prices and the seller at low oil price. But as oil prices began to move to much higher levels, S-curves increasingly put the seller at a disadvantage implementing a direct oil-linked formula as a percentage of Brent.
4. Regulated Market: Controlled markets with government mandated price. Regulated markets dominate much of the other regions of the world. In these regions, the gas markets are relatively immature and largely controlled by the state. Gas prices may be nationally set (by decree in many cases) and all supply is entered into a gas "pool". The state manages the differences in supply prices, and may choose to sell gas at prices less than the average "pool"-price for political reasons. There is no transparency in prices, no markets, and very little incentive – unless they receive special license from the government – for private sector investment in supply or infrastructure. If the mandated gas prices are artificially low, such as in the Middle East, inefficient consumption of energy often occurs.

Even though there is no such as an international LNG index, the LNG market is driven by an oil-linked price market:

- Virtually all Canadian LNG-export consortia have resolved to index LNG sales to crude oil.
- In much of continental Europe LNG contract prices continue to be set by linkages to Brent or to the spot prices of gas oil and fuel oil.
- Asian LNG prices are generally linked to crude oil prices—in particular to the Japan Custom Cleared price (JCC), also referred to as the "Japan crude cocktail" price. The JCC is the average price of crudes imported into Japan every month and is published by the Ministry of Finance on a monthly basis. Japan is the largest importer of LNG in the world and accounts for over half of all the LNG imports in Asia.

- High project costs, coupled with long-term LNG contracts that are currently in force, ensure that Asian LNG pricing will remain predominantly linked to oil for the foreseeable future, and over the next few years, oil-linked volumes will grow as Australian projects come online.
- Finally, the higher cost structure of projects in Canada and new frontiers such as East Africa ensure that oil-linked pricing will remain a mainstay, given that these projects need this type of linkage to justify multi-billion dollar investments.

Although many expected a gradual convergence of prices in the main regional gas markets, the last few years have seen a great divergence. In 2012, Japanese prices have continued to increase, U.S. prices have continued to fall, and NBP prices have remained generally steady. The three distinct regional markets for gas have thus been restored, and the expected increase in shale gas output in the United States in coming years will ensure that they will maintain very different pricing regimes. This massive disconnect between Hub prices in the United States and Canada versus oil-linked prices in Asia is what is driving the LNG-export proposals in North America. The possible Hub indexation will still be relatively small, and there is no guarantee that all U.S. exports will be sold on a Hub basis. A large portion of U.S. LNG exports will be lifted by aggregators such as BG Group who will sell on an oil-linked basis.

In addition, the VVB requested the PP to show its recent LNG purchases, to prove its Brent linkage. The PP under strict confidentiality has presented the most recent (2011, 2012) LNG purchase agreements [29]. SQS could confirm their validity, and that it was in line with the financial model developed by the PP.

In conclusion, it is the validation opinion of SQS that the market assumptions were done adequately by the PP.

**Sensitivity Analysis for the NPV**

A sensitivity analysis and a turning point analysis has been conducted in order to assess whether the conclusions regarding financial attractiveness are robust to reasonable variations in the critical assumptions. The variables selected for the sensitivity analysis are the energy spot price fuel costs and the unexpected initial costs. The fuel cost variable was chosen because it is the biggest ongoing cost item, and the contingency was chosen as it represents the sensitivity of the economic analysis to changes in the initial investment costs. The range analysed for the fuel costs were ±10% and for the contingency 10% as the base and 5% and 15% as the range. It is important to note that both LNG and coal future prices affect the financial model, on both the O&M costs as well as the anticipated income (see above explanation on the electricity market in the DR). Therefore the fuel cost sensitivity was conducted separately for the affect of a ±10% change in the price of LNG and Coal. See below the 9 scenarios that were analysed with scenario 5 as the base case.

Scenario	1	2	3	4	5	6	7	8	9
Contingency	5.00%	10.00%	15.00%	5.00%	10.00%	15.00%	5.00%	10.00%	15.00%
Fuel Price	10%	10%	10%	0%	0%	0%	-10%	-10%	-10%

The tables below shows a summary of the financial analysis including the sensitivity analysis and the turning point analysis. The base case is represented by case number 5 with no change in fuel prices and contingency at 10%.

In addition to the sensitivity analysis, a turning point analysis was conducted to identify the change in fuel price that would start making the project financially viable. As no official benchmark for the ΔNPV is available, the value "zero" was chosen as a conservative benchmark to indicate the "turning point" from which the project will at least not be worse than the current situation. The results of the turning point analysis appear on the bottom line of the two sensitivity analysis tables above. The values present the change needed in the fuel price to make the ΔNPV "zero". As can be seen in the base case for both Coal and LNG (scenario 5), a drop of 10% in fuel price is needed just to make the ΔNPV "zero".

**Results for Coal price sensitivity:**

Valuation Summary	Scenario								
	1	2	3	4	5	6	7	8	9
NPV with Project (\$M)	\$152	\$145	\$137	\$127	\$120	\$112	\$102	\$95	\$88
NPV without Project (\$M)	\$141	\$141	\$141	\$131	\$131	\$131	\$122	\$122	\$122
ΔNPV (\$M)	\$11	\$4	(\$3)	(\$5)	(\$12)	(\$19)	(\$20)	(\$27)	(\$34)
Fuel price change NPV 0 (%)	-2%	-5%	-7%	-7%	-10%	-13%	-12%	-15%	-18%

**Results for LNG price sensitivity:**

Valuation Summary	Scenario								
	1	2	3	4	5	6	7	8	9
NPV with Project (\$M)	\$172	\$165	\$158	\$127	\$120	\$112	\$87	\$80	\$73
NPV without Project (\$M)	\$149	\$149	\$149	\$131	\$131	\$131	\$113	\$113	\$113
ΔNPV (\$M)	\$23	\$16	\$9	(\$5)	(\$12)	(\$19)	(\$26)	(\$33)	(\$40)
Fuel price change NPV 0 (%)	3%	0%	-3%	-7%	-10%	-13%	-16%	-18%	-20%

**Conclusion of the Sensitivity Analysis:**

As explained above, the proposed project is an upgrade of the existing power plant, and this upgrade requires a large investment. The relevant financial indicator is therefore the comparison between the NPV of the continuation of the current practice and the NPV of the proposed project. The average ΔNPV of all 9 scenarios for the coal sensitivity analysis is \$US -12 million and for the LNG sensitivity analysis \$US -10 million, which shows how unprofitable and risky this project is.

Although it may look like some of the cases return a positive result for the proposed project, it is important to remember that the ΔNPV represents the value the project generates over 19 years, compared to the current situation, based on an initial investment of about \$US 260 million and additional market risks that cannot be reflected in the financial model. The project is in an early stage of its development. There are only first cost estimations. The planned start of the operational phase is 2016. Inflation in Dominican Republic has been for 2010 6.3%, for 2011 8.5% - see

[http://www.indexmundi.com/dominican\\_republic/inflation\\_rate\\_consumer\\_prices.html](http://www.indexmundi.com/dominican_republic/inflation_rate_consumer_prices.html) or print-out SQS ref. [7]. Average inflation since 2010 is 6.329% - see

<http://www.economywatch.com/economic-statistics/country/Dominican-Republic/> or

SQS ref. [8]. Regarding these two aspects, SQS agrees with the PP on the argumentation of the future financial risks.

From this perspective it is clear that even the best results in the sensitivity analysis are negligible and not sufficient to consider the proposed project as economically attractive compared to the fact that the current operation is profitable with minimal associated risk.

Therefore, one alternative remains as a candidate as the most likely scenario: Alternative S4, the continuation of the current situation. This is the baseline scenario.

**STEP 4. Common practice analysis**

The chosen geographical scope of the common practice analysis is the whole of the Dominican Republic. Also regarding the technology type – combined cycle and open cycle – the geographical scope can be confirmed as correct. Since the project is not the first-of-its-kind in the Dominican Republic, the proposed VCS project activity applies measures that are listed in the definitions section above, and therefore Step 4 (a) is applied:

Sub-step 4a(1): Calculate the applicable output range as +/-50% of the design output or capacity of the proposed project activity.

The design output capacity of the proposed project activity is 318 MW. The applicable output range is therefore 318 +/- 50% of 318 = 318 +/- 159.5 = 477.5/158.5 MW.

It can be confirmed that the output range is chosen and calculated correctly.

Sub-step 4a(2): In the applicable geographical area, identify all plants that deliver the same output or capacity within the applicable output range, calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project. Note their number Nall. Registered CDM project activities and project activities undergoing validation shall not be included in this step.

The following plants are in the Dominican Republic and with capacity in the range calculated (i.e. 158.5-477.5) (see DR Power Plants Data 2007-2011, Grid Calculation electronic spreadsheet): AES Andres, CESPМ, San Felipe, Haina, and Itabo. The data source is delivered from the “Organismo Coordinador del Sistema Eléctrico Nacional Interconectado de la República Dominicana, Inc” – OC-SENI - the official coordinator of the electricity grid – see SQS ref. [B.5.2] and is confirmed as correct – see also <http://www.oc.org.do/>. Original Excel-sheets (as attachments to e-mails) delivered from the official coordinator have been verified during site visit on 20-21/06/2012 at the office of DPP. The data of the entire grid has been cross-checked with the information provided on <http://www.oc.org.do/> - parámetros del Sistema and is deemed authentic.

Hence: Nall=5.

Sub-step 4a(3): Within the plants identified in Step 2, identify those that apply technologies different to the technology applied in the proposed project activity. Note their number Ndiff.

The technology of each of the identified plants:

Plant	Technology	Installed Capacity (MW)	Different technologies
AES Andres	Combined cycle	319	No
CESPM	Combined cycle	300 (3 units of 100)	No
SAN FELIPE (also called SMITH & ENRON)	Combined cycle	175	No
HAINA	Steam Turbine and Gas Turbine	238.9 (54+84.9+100)	Yes
ITABO	Steam Turbine	260 (128+132)	Yes

Hence:  $N_{diff}=2$ .

Sub-step 4a(4): Calculate factor  $F=1-N_{diff}/N_{all}$ , representing the share of plants using a technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity.

The calculated factor:  $F=1-2/5=0.6$

The proposed project activity is regarded as “common practice” within a sector in the applicable geographical area if both the following conditions are fulfilled:

- (a) The factor  $F$  is greater than 0.2; and
- (b)  $N_{all}-N_{diff}$  is greater than 3.

The conditions for common practice were examined:

- (a) The factor  $F$ , equals 0.6, hence is greater than 0.2.
- (b)  $N_{all}-N_{diff}=3$ , hence is not greater than 3.

Since not both conditions are fulfilled, the proposed project activity is not regarded as “common practice”. Since the proposed project activity is not regarded as “common practice”, the proposed project activity is additional.

SQS’ validation opinion is that the procedure contained in the methodology to identify the most reasonable baseline scenario has been correctly applied.

It is the opinion of SQS that the most plausible baseline scenario identified is reasonable by validating the assumptions, calculations and rationale used in the PD. The documents and sources referred to in the PD are correctly quoted and interpreted; SQS has cross-checked this information with other verifiable and credible sources, as listed above.

SQS confirms that no alternative scenario has been excluded.

SQS’ validation opinion is that the PD provides a description of the identified baseline scenario and all applicable VCS Version 3 and CDM methodology requirements have been taken into account in the identification of the baseline scenario for the proposed VCS project activity. The approved baseline methodology has been correctly applied to identify the most plausible baseline scenario.

SQS’ validation opinion is that the baseline scenario, identified reasonably, represents what would occur in the absence of the proposed VCS project activity.

### 3.2.5 **Additionality**

The “Combined tool to identify the baseline scenario and demonstrate additionality” was used. See section above for the detailed demonstration of additionality.

### 3.2.6 **Quantification of GHG Emission Reductions and Removals**

The data and parameters used in the equations were verified in the following manner:

The emission reductions ( $ER_y$ ) are calculated according to the procedures prescribed in the UNFCCC CDM approved Methodology ACM0007. ACM0007 requires the emission reductions by the project activity to be calculated as the difference between the baseline emissions ( $BE_y$ ), project emissions ( $PE_y$ ) and emissions due to leakage ( $LE_y$ ).

It has to be noted that the original fuel consumption values are in energy units. The application of the equations was adopted to use energy units instead of mass or volume. It is also discussed as methodology deviation, and it is the opinion of SQS that this results in the same  $ER$  values.

The internal metre of AES Andres – the delivery point of the NLG - registers gas volume in m<sup>3</sup> but this data is not used or archived by DPP systems or process. The historic data in m<sup>3</sup> is not available in a way that can be verified. DPP fuel consumption is archived in MMBTU for the accounting system due to the fuel purchase agreement. All external contracts with the gas supplier only refer to MMBTU and that is why only the MMBTU value can constantly be verified against receipts.

$$ER_y = BE_y - PE_y - LE_y$$

The VVB confirms that the correct formulae to calculate the emission reductions is applied – equation (1) of Methodology ACM0007.

### Baseline Emissions

The baseline emissions (BE<sub>y</sub>) are calculated, as prescribed by ACM0007, according to the following three steps:

- Step 1:** Determination of the baseline emissions for different scenarios of project electricity generation
- Step 2:** Estimating the emission factor for electricity generated in single cycle mode in the baseline (EF<sub>CO2,BL</sub>)
- Step 3:** Determine the emission factor for the grid electricity system (EF<sub>grid,y</sub>)

The VVB confirms that the correct steps have been chosen by the PP.

### **Step 1: Determination of the baseline emissions for different scenarios of project electricity generation**

In the case of Los Mina's project the quantity of electricity generated in the project power units, adjusted for changes to efficiency, (EG<sub>PJ,adj,y</sub>) exceeds the maximum annual quantity of electricity that the project power units could have produced prior to the implementation of the project activity (EG<sub>MAX</sub>), and therefore, baseline emissions are calculated based on case (c) as follows:

$$BE_y = EG_{BL,AVR} \cdot EF_{CO2,BL,y} + (EG_{MAX} - EG_{BL,AVR}) \cdot \min(EF_{CO2,BL,y}; EF_{grid,y}) + (EG_{PJ,adj,y} - EG_{MAX}) \cdot EF_{grid,y}$$

Where:

- BE<sub>y</sub>** = Baseline emissions in year y (tCO<sub>2</sub>/yr)
- EG<sub>PJ,adj,y</sub>** = Quantity of electricity supplied by all project power units to the electricity grid in year y, adjusted for changes to efficiency (MWh/yr)
- EG<sub>BL,AVR</sub>** = Average annual quantity of electricity supplied by all project power units to the electricity grid during the defined operational history (MWh/yr)
- EF<sub>CO2,BL</sub>** = Baseline emission factor of all project power units operated in single cycle mode (tCO<sub>2</sub>/MWh)
- EF<sub>grid,y</sub>** = Emission factor of the electricity grid to which the project power unit is connected (tCO<sub>2</sub>/MWh)

The VVB confirms that the correct baseline emission equation has been chosen – equation (4) of Methodology ACM0007 and is calculated correctly. The chosen case (c) can be confirmed as correct. The calculation is transparently represented in SQS ref. [19].

The maximum annual quantity of electricity that could be generated by the project power units in the baseline scenario (EG<sub>MAX</sub>) is calculated as:

$$EG_{MAX} = CAP_{MAX} \cdot T_{MAX}$$

Where:

- $EG_{MAX}$  = Maximum annual quantity of electricity that could be generated by all project power units in the baseline scenario (MWh/yr)
- $CAP_{MAX}$  = Maximum gross power generation capacity of the project power units prior to the implementation of the project activity (MW)
- $T_{MAX}$  = Maximum amount of time during a year in which the project power units could have operated at full power generation capacity prior to the implementation of the project activity (hours/yr)

The VVB confirms that the correct equation has been chosen – equation (5) of Methodology ACM0007 and is calculated correctly. The calculation is transparently represented in SQS ref. [19].

Since all project power units have more than three years operational history, and since there was no major retrofit during this period in any of the units, then the maximum annual amount of time that the project power units could have operated at full load prior to the validation of the project activity is calculated as follows:

$$T_{MAX} = 8,760 - \frac{\sum_{x=1}^3 HMR_x}{3}$$

Where:

- $T_{MAX}$  = Maximum amount of time during a year in which the project power units could have operated at full power generation capacity prior to the implementation of the project activity (hours/yr)
- $HMR_x$  = Average number of hours during which the plant did not operate due to maintenance or repair in year x (hours/yr)
- $x$  = Each year during the three years operational history

The VVB confirms that the correct equation has been chosen – equation (6) of Methodology ACM0007 and is calculated correctly. The calculation is transparently represented in SQS ref. [19].

The average annual amount of electricity supplied to the electricity grid by the project power units in the three years historical period is calculated according to the equation below. Since both units in Los Mina have at least three year operational history and no major retrofit during this period, this calculation is based on data from both units:

$$EG_{BL,AVR} = \frac{\sum_{x=1}^3 EG_x}{3}$$

Where:

- $EG_{BL,AVR}$  = Average annual quantity of electricity supplied by all project power units to the electricity grid during the three year operational history (MWh/yr)
- $EG_x$  = Quantity of electricity supplied by the project power units with three years operational history and no retrofit in this period, to the electricity grid in year x (MWh/yr)
- $x$  = Each year of the three years operational history.

SQS confirms that the correct equation has been chosen – equation (7) of the Methodology ACM0007 and is calculated correctly. The calculation is transparently represented in SQS ref. [19]. The input values are represented in the same reference, sheet “Los Mina History”. The data source is represented in SQS ref. [B.5\_2] DR Power Plants data 2007-2011, data provided from

Coordination Body of the Interconnected National Electric System (Organismo Coordinador del Sistema Eléctrico Nacional Interconectado, OC SENI) – see <http://184.168.74.190/dnn/INFORMES/Memorias/A%C3%B1o2010.aspx> - see also print-out SQS ref. [14]

The total amount of electricity supplied to the electricity grid by all project power units in year y of the crediting period has to be adjusted for the calculation of baseline emissions so that future energy efficiency improvement measures shall not result in emission reductions. Therefore, the total amount of electricity supplied to the grid ( $EG_{PJ,y}$ ) is conservatively adjusted by applying a discount factor based on the minimum of the monitored efficiencies after the implementation of the project activity, as described in the equations below:

$$EG_{PJ,adj} = EG_{PJ,y} \cdot \frac{\eta_{PJ,min,y}}{\eta_{PJ,y}}$$

With

$$\eta_{PJ,min,y} = \min(\eta_{PJ,1} \dots \eta_{PJ,y})$$

Where:

- $EG_{PJ,adj}$  = Quantity of electricity supplied by all project power units to the electricity grid in year y, adjusted for changes to project power plant efficiency (MWh/yr)
- $EG_{PJ,y}$  = Total amount of electricity supplied to the electricity grid by the project power units in year y (MWh/yr)
- $\eta_{PJ,min,y}$  = Minimum of the yearly average energy efficiency of the project power units monitored during the previous years (1 to y) after the implementation of the project activity for year y
- $\eta_{PJ,1} \dots \eta_{PJ,y}$  = Average energy efficiency of the project power units in years 1 to y of the crediting period

VVB confirms that the correct equation has been chosen – equation (8) and (9) of Methodology ACM007 and is calculated correctly. The calculation is transparently represented in SQS ref. [19].

### **Step 2: Estimating the emissions factor for electricity generated in single cycle mode in the baseline (EFCO2,BL)**

Since all project power units have three years operational history and since there was no major retrofit in these units during this period, the baseline CO<sub>2</sub> emissions factor for the project power units operated in single cycle mode ( $EF_{CO2,BL}$ ) is determined based on the historical performance of the units and calculated as follows:

$$EF_{CO2,BL} = \frac{\sum_{x=1}^3 \sum_i FC_{i,x} \times NCV_{i,x}}{\sum_{x=1}^3 EG_x} \times EF_{CO2,min}$$

Where:

- $EF_{CO2,BL}$  = CO<sub>2</sub> emission factor for electricity generated in single cycle mode in the baseline (tCO<sub>2</sub>/MWh)
- $FC_{i,x}$  = Quantity of fuel type i used by the project power units in year x (mass or volume unit/yr)
- $NCV_{i,x}$  = Net calorific value of the fuel type i used by the project power units in year x (GJ/mass or volume unit)
- $EF_{CO2,min}$  = CO<sub>2</sub> emission factor of the least carbon intensive fuel type used by the project power units during the three years operational history (tCO<sub>2</sub>/GJ)
- $EG_x$

- = Quantity of electricity supplied by the project power units with three years operational history and no retrofit in this period, to the electricity grid in year x (MWh/yr)
- x = Each year of the three years operational history

The VVB confirms that the correct equation has been chosen – equation (10) of Methodology ACM0007 and is calculated correctly. The calculation is transparently represented in SQS ref. [19]. It has to be noted that the original fuel consumption values are in energy units. The application of the equations was adopted to use energy units instead of mass or volume.

The internal metre of AES Andres – the delivery point of the NLG - registers gas volume in m<sup>3</sup> but this data is not used or archived by DPP systems or process. The historic data in m<sup>3</sup> is not available in a way that can be verified. DPP fuel consumption is archived in MMBTU for the accounting system due to the fuel purchase agreement. All external contracts with the gas supplier only refer to MMBTU and that is why only the MMBTU value can constantly be verified against receipts.

### **Step 3: Determine the emissions factor for the grid electricity system (EF<sub>grid,y</sub>)**

The baseline emission factor is calculated as a combined margin (CM), following the six steps in the "Tool to calculate the emission factor for an electricity system" (Version 03.0.0) EB70, Annex 22:

- Step 1.** Identify the relevant electricity systems;
- Step 2.** Choose whether to include off-grid power plants in the project electricity system (optional);
- Step 3.** Select a method to determine the operating margin (OM);
- Step 4.** Calculate the operating margin emission factor according to the selected method;
- Step 5.** Calculate the build margin (BM) emission factor;
- Step 6.** Calculate the combined margin (CM) emission factor.

#### *Step1: Identify the relevant electricity systems*

The Dominican Republic grid is connected through the National Interconnected Electric System (SENI, Sistema Eléctrico Nacional Interconectado); for this, the relevant electric power system is the entire SENI grid, moreover the public information of the SENI is classified for fuel type consumption and for plant production instead of regional production. The SENI grid includes the whole geographical area of the Dominican Republic.

For determining the OM emission factor, it is necessary to determine the net electricity imports. In this case, there are no imports or exports from other systems within the country. All electricity generated is managed through the Interconnected Grid System. Therefore, there is no "Connected Electricity System" in this case as defined in the "Tool to calculate the emission factor for an electricity system".

The information on the grid characteristics is given in the Annual Memories (Memorias Anuales), prepared by the Coordination Body of the Interconnected National Electric System (Organismo Coordinador del Sistema Eléctrico Nacional Interconectado, OC SENI) - see <http://184.168.74.190/dnn/INFORMES/Memorias/A%C3%B1o2010.aspx>. - see also print-out SQS ref. [14] These boundaries include all the geographic areas and infrastructures within the entire Dominican Republic territory, as well as energy transmission and distribution variables inside the Dominican Republic system.

**Step2: Choose whether to include off-grid power plants in the project electricity system (optional)**

The PPs may choose between the following two options to calculate the OM and BM emission factor:

**Option I:** Only grid power plants are included in the calculation.

**Option II:** Both grid power plants and off-grid power plants are included in the calculation.

DPP has chosen **Option I**, and only grid power plants are included in the calculation.

The VVB confirms that the correct Option is chosen – due to the fact that there is no data available with regard to the off-grid power plants, **Option I** has been chosen to calculation the emission factor.

**Step 3: Select a method to determine the operating margin (OM)**

The calculation of the OM emission factor ( $EF_{grid,OM,y}$ ) is based on one of the following methods:

- (a) Simple OM; or
- (b) Simple adjusted OM; or
- (c) Dispatch data analysis OM; or
- (d) Average OM.

The below analysis uses the simple OM method with an *ex-ante*  $EF_{grid,CM,y}$  calculation.

Option (a) can only be used if low-cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.

In the Dominican Republic, low-cost/must-run resources represent well below 50% of total grid generation in the average of the five most recent years: (Units: MWh)

Technology	2007	2008	2009	2010	2011
Hydro Turbine	1729503.29	1348953.257	1422848.514	1392280.469	1484620.166
Combined Cycle	2797049.552	3471787.765	2976522.525	3031642.64	3446520.48
Open Cycle Gas Turbine (OCGT)	364176.7369	338223.0251	465517.9144	1223528.992	1363551.35
Steam Turbine	2393374.261	2341721.6	2507674.548	2471058.298	2242801.027
Gas Turbine	27763.59822	44530.44872	50184.27096	84393.83304	132378.5559
Diesel Engine	3941546.518	3941072.487	3924966.952	4023545.633	3993442.602
Eolic Turbine	0	0	0	0	13745.41869
<b>Low Cost/Must Run Percentage</b>	<b>15.37%</b>	<b>11.74%</b>	<b>12.54%</b>	<b>11.39%</b>	<b>11.82%</b>

This information has been cross-checked with the documents available at

[http://www.cne.gov.do/app/do/sien\\_archivo.aspx](http://www.cne.gov.do/app/do/sien_archivo.aspx) - document Análisis de balances 1970-2011 and can be confirmed as correct. The PP shows this in SQS ref. [20] in a transparent and correct manner. It can be confirmed that the choice of Option (a) is correct and according to the “Tool to calculate the emission factor for an electricity system” (Version 03.0.0) EB70, Annex 22.

For the simple OM, the simple adjusted OM and the average OM, the emissions factor can be calculated using either of the two following data vintages:

- *ex-ante* option
- *ex-post* option

DPP has chosen to use the *ex-ante* option to calculate the emissions factor, and data from years 2007-2011 was used.

VVB confirms that the choice of *ex-ante* option is correct and the data vintage 2007-2011 is the latest available.

**STEP 4: Calculate the operating margin emission factor according to the selected method**

The simple OM emission factor is calculated as the generation-weighted average CO<sub>2</sub> emissions per unit net electricity generation (tCO<sub>2</sub>/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

The simple OM may be calculated by one of the following two options:

**Option A:** Based on the net electricity generation and a CO<sub>2</sub> emission factor of each power unit; or

**Option B:** Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Option B can only be used if the necessary data for Option A is not available.

Since all data for Option A was available, **Option A** was selected for the calculation.

The VVB confirms that the choice of Option A is correct as all data was available.

**Option A: Calculation based on average efficiency and electricity generation of each plant**

Under this option, the simple OM emission factor is calculated based on the net electricity generation of each power unit and an emission factor for each power unit, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

Where:

- $EF_{grid,OMsimple,y}$  = Simple OM CO<sub>2</sub> emission factor in year y (tCO<sub>2</sub>/MWh)
- $EG_{m,y}$  = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
- $EF_{EL,m,y}$  = CO<sub>2</sub> emission factor of power unit m in year y (tCO<sub>2</sub>/MWh)
- m = All power units serving the grid in year y except low-cost/must-run power units
- y = The relevant year as per the data vintage chosen in Step 3

SQS confirms that the correct formula - the formula (1) of the “Tool to calculate the emission factor for an electricity system” (Version 03.0.0) EB70, Annex 22 has been chosen. The PP shows in SQS ref. [20] the calculation in a transparent and correct manner.

The emission factor of each power unit m is determined as follows:

**Option A1.** If for a power unit m data on fuel consumption and electricity generation is available, the emission factor (EF<sub>EL,m,y</sub>) should be determined as follows:

$$EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_{m,y}}$$

Where:

- $EF_{EL,m,y}$  = CO<sub>2</sub> emission factor of power unit m in year y (tCO<sub>2</sub>/MWh)
- $FC_{i,m,y}$  = Amount of fossil fuel type i consumed by power unit m in year y (Mass or volume unit)

$NCV_{i,y}$	= Net calorific value (energy content) of fossil fuel type i in year y (GJ/mass or volume unit)
$EF_{CO_2,i,y}$	= $O_2$ emission factor of fossil fuel type i in year y (tCO <sub>2</sub> /GJ)
$EG_{m,y}$	= Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
m	= All power units serving the grid in year y except low-cost/must-run power units
i	= All fossil fuel types combusted in power unit m in year y
y	= The relevant year as per the data vintage chosen in Step 3

**Option A2.** If for a power unit m only data on electricity generation and the fuel types used is available, the emission factor should be determined based on the CO<sub>2</sub> emission factor of the fuel type used and the efficiency of the power unit, as follows:

$$EF_{EL,m,y} = \frac{EF_{CO_2,m,i,y} \times 3.6}{\eta_{m,y}}$$

Where:

$EF_{EL,m,y}$	= CO <sub>2</sub> emission factor of power unit m in year y (tCO <sub>2</sub> /MWh)
$EF_{CO_2,m,i,y}$	= Average CO <sub>2</sub> emission factor of fuel type i used in power unit m in year y (tCO <sub>2</sub> /GJ)
$\eta_{m,y}$	= Average net energy conversion efficiency of power unit m in year y (ratio)
m	= All power units serving the grid in year y except low-cost/must-run power units
y	= The relevant year as per the data vintage chosen in Step 3

**Option A3.** If for a power unit m only data on electricity generation is available, an emission factor of 0 tCO<sub>2</sub>/MWh can be assumed as a simple and conservative approach.

The OM emission factor is calculated based on **Option A1**, as data on fuel consumption and electricity generation is available.

The VVB confirms the choice of Option A1 as correct – the entire data is publicly available on <http://www.oc.org.do/> - parámetros del Sistema of the National Interconnected Electric System (SENI).

The VVB confirms that the correct formula - formula (2) of the “Tool to calculate the emission factor for an electricity system” (Version 03.0.0) EB70, Annex 22 is used. The PP shows in SQS ref. [20] the calculation in transparent and correct manner.

The calculation has been verified and the result of the calculation can be confirmed as correct and is the following:

$$EF_{grid,OMsimple,y} = 0.812$$

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

To calculate the BM, Option 1 from the tool has been chosen; hence the BM emission factor will be calculated *ex-ante*, based on the most recent information available on units already built for sample group m at the time of PD submission to the VVB for validation. This option does not require monitoring the emission factor during the crediting period.

SQS confirms that the choice of Option 1 is documented in the PDD and the data vintage used for the calculation is the most recent at the time of submission of the PDD for validation.

The sample group of power units m used to calculate the build margin should be determined as per the following procedure, consistent with the data vintage selected above:

- a) Identify the set of five power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently (SET5-units) and determine their annual electricity generation (AEGSET-5-units, in MWh);

The set of five power units that started to supply electricity to the grid most recently, and their annual electricity generation (calculated based on years 2007-2011):

SET 5-unit		
Plant	Comission Year	Average Electricity Generation
MONTE RIO	2003	515,068.68
PIMENTEL II	2009	165,957.15
PINALITO 1	2009	47,398.45
PINALITO 2	2009	45,926.72
PIMENTEL III	2010	262,613.37
AEGSET-5-units		1,036,964.37

- b) Determine the annual electricity generation of the project electricity system, excluding power units registered as CDM project activities ( $AEG_{total}$ , in MWh). Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20% of  $AEG_{total}$  (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) ( $SET \geq 20\%$ ) and determine their annual electricity generation ( $AEG_{SET \geq 20\%}$ , in MWh);

The average annual electricity generation of the project electricity system, excluding power units registered as CDM project activities is:  $AEG_{total} = 11\,795\,436$  MWh, and therefore 20% of  $AEG_{total} = 2\,359\,087$  MWh.

The set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20% of  $AEG_{total}$ :

SET>20%		
AES ANDRES	2003	1,957,604.54
MONTE RIO	2003	515,068.68
PIMENTEL II	2009	165,957.15
PINALITO 1	2009	47,398.45
PINALITO 2	2009	45,926.72
PIMENTEL III	2010	262,613.37
AEGSET>20%		2,994,568.92

- c) From SET5-units and SET≥20% select the set of power units that comprises the larger annual electricity generation (SET<sub>sample</sub>);

The larger annual electricity generation is of SET>20%. SET<sub>sample</sub> is therefore the following list of units: AES ANDRES, MONTE RIO, PIMENTEL II, PINALITO 1, PINALITO 2 & PIMENTEL III.

As no power plant in SET<sub>sample</sub> started to supply electricity to the grid more than 10 years ago, step (d) was not followed:

The BM emissions factor is the generation-weighted average emission factor (t<sub>CO2/MWh</sub>) of all power unit m calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

Where:

- EF<sub>grid,BM,y</sub> = Build margin CO<sub>2</sub> emission factor in year y (t<sub>CO2/MWh</sub>)
- EG<sub>m,y</sub> = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
- EF<sub>EL,m,y</sub> = CO<sub>2</sub> emission factor of power unit m in year y (t<sub>CO2/MWh</sub>)
- m = Power units included in the build margin
- y = Most recent historical year for which electricity generation data is available

Where the CO<sub>2</sub> emission factor of each power unit m (EF<sub>EL,m,y</sub>) was given in Step 4, follow the Option A1 from the tool.

The calculated OM emission factor, as can be seen in the electronic spreadsheet:

$$EF_{grid,BM,y} = 0.541$$

*Step 6: Calculate the combined margin emissions factor*

The calculation of the combined margin (CM) emission factor ( $EF_{grid,CM,y}$ ) is based on the preferred option given by the Tool to calculate the EF: Weighted average CM.

The CM emissions factor is therefore calculated as follows:

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

Where:

- $EF_{grid,BM,y}$  = Build margin CO<sub>2</sub> emission factor in year y (tCO<sub>2</sub>/MWh)
- $EF_{grid,OM,y}$  = Operating margin CO<sub>2</sub> emission factor in year y (tCO<sub>2</sub>/MWh)
- $W_{OM}$  = Weighting of operating margin emissions factor (%)
- $W_{BM}$  = Weighting of build margin emissions factor (%)

Since the project activity is not a wind and solar power generation, the following default values were used for  $W_{OM}$  and  $W_{BM}$ :

$W_{OM} = 0.5$  and  $W_{BM} = 0.5$  for the first crediting period, and  $W_{OM} = 0.25$  and  $W_{BM} = 0.75$  for the second and third crediting period.

The calculated CM emissions factor is, as can be seen in the Excel- spreadsheet:

$$EF_{EL,m,y} = 0.6765$$

The VVB confirms that the correct formulae - formulae (14) of the “Tool to calculate the emission factor for an electricity system” (Version 03.0.0) EB70, Annex 22 is used. The PP shows in SQS ref. [20] the calculation in a transparent and correct manner.

**Project Emissions**

The project emissions (PE<sub>y</sub>), are defined in the “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion”, (Version 02), and are calculated based on the quantity of fuels combusted and the CO<sub>2</sub> emission coefficient of those fuels, as follows:

$$PE_{FC,i,j,y} = \sum_i FC_{i,j,y} \cdot COEF_{i,y}$$

Where:

- $PE_{FC,i,j,y}$  = CO<sub>2</sub> emissions from fossil fuel combustion in process j during the year y (tCO<sub>2</sub>/yr);
- $FC_{i,j,y}$  = Quantity of fuel type i combusted in process j during the year y (mass or volume unit/yr);
- $COEF_{i,y}$  = CO<sub>2</sub> emission coefficient of fuel type i in year y (tCO<sub>2</sub>/mass or volume unit)
- i = fuel types combusted in process j during the year y

The VVB confirms that the correct formula - formula (1) of the “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion” (Version 02) is used. The PP shows in SQS ref. [19] the calculation in a transparent and correct manner.

The CO<sub>2</sub> emission coefficient COEF<sub>i,y</sub> is calculated based on net calorific value and CO<sub>2</sub> emission factor of the fuel type i, as follows:

$$COEF_{i,y} = NCV_{i,y} \cdot EF_{CO_2,i,y}$$

Where:

- COEF<sub>i,y</sub> = CO<sub>2</sub> emission coefficient of fuel type i in year y (tCO<sub>2</sub>/mass or volume unit)
- NCV<sub>i,y</sub> = Weighted average net calorific value of the fuel type i in year y (GJ/mass or volume unit)
- EF<sub>CO<sub>2</sub>,i,y</sub> = Weighted average CO<sub>2</sub> emission factor of fuel type i in year y (tCO<sub>2</sub>/GJ)
- i = Fuel types combusted in process j during the year y

It can be confirmed that NCV<sub>i,y</sub> applied is the IPCC value, upper 95% confidence interval, is conservative – see ref. [19].

The VVB has verified the calculations and confirms that the calculation of the project emissions is calculated correctly and presented in a transparent and correct manner.

### Leakage Emissions

The leakage emissions are associated with the upstream emissions on an increase in fossil fuel use and are determined in the case of Los Mina’s project as follows:

$$LE_y = LE_{upstream,y} + LE_{HR,y}$$

Where:

- LE<sub>y</sub> = Leakage emissions in year y (tCO<sub>2</sub>e/yr)
- LE<sub>upstream,y</sub> = Leakage emissions associated with the upstream emissions of an increase in fossil fuel use in the project activity in year y (tCO<sub>2</sub>e/yr)
- LE<sub>HR,y</sub> = Leakage emissions due to a decrease in the amount of heat recovered from exhaust heat for purposes other than power generation in the project, compared to the most recent year prior to the implementation of the project activity, in year y (tCO<sub>2</sub>e/yr)

The VVB confirms that the PP has used the correct formulae. Furthermore, the VVB confirms that the correct equation is chosen – equation (12) of the Methodology ACM0007.

### Determination of LEHR,y

Since the quantity of heat recovered from the exhaust heat during the most recent year prior to the implementation of the project activity (QHR,x) was zero and therefore was less than 3% of the fossil fuels consumed by the project power units in an energy basis, then emissions from this leakage source are equal to zero and there is no need to calculate LEHR,y.

During site visit on 20-21/06/2012 the VVB could verify and can confirm that there is no installation using exhausting heat in the existing power plant – therefore it can be confirmed that QHR,x prior to the implementation of the project was zero – therefore less than 3%.

### Determination of LE<sub>upstream,y</sub>

In cases where the fuel consumption in the project activity is lower than the historical fuel consumption in the three historical years x, leakage emissions from this source are equal to zero. The PP demonstrates in SQS ref. [19] that the consumption of the gas will increase due to an increasing energy production.

Fuel consumption in the project activity is not lower than the historical fuel consumption, therefore, leakage emissions associated with the upstream emissions from an increase in fossil fuel use in the project activity shall be considered. The leakage emissions are calculated as follows:

$$LE_{upstream,y} = MAX \left[ 0, \left( \left( \sum_i FC_{i,y} \cdot NCV_{i,y} \cdot EF_{i,upstream,CH4} \right) \cdot GWP_{CH4} + LE_{LNG,CO2,y} \right) \times \left( 1 - \frac{\frac{1}{3} \cdot \sum_{x=1}^3 FC_{i,x} \cdot NCV_{i,x}}{\sum_i FC_{i,y} \cdot NCV_{i,y}} \right) \right]$$

Where:

- $LE_{upstream,y}$  = Leakage emissions associated with the upstream emissions of an increase in fossil fuel used in the project activity in the year y (tCO<sub>2</sub>e/yr)
- $FC_{i,y}$  = Quantity of fuel type i used by the project power unit(s) in year y (mass or volume unit/yr)
- $NCV_{i,y}$  = Average net calorific value of the fuel type i used by the project power unit(s) in year y (GJ/mass or volume unit)
- $EF_{i,upstream,CH4}$  = Emission factor for upstream fugitive methane emissions from production, transportation, distribution of fossil fuel i used by the project power unit(s) in year y (tCH<sub>4</sub>/GJ)
- $GWP_{CH4}$  = Global warming potential of methane valid for the relevant commitment period (tCO<sub>2</sub>e/tCH<sub>4</sub>)
- $LE_{LNG,CO2,y}$  = Leakage emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system in year y (tCO<sub>2</sub>e/yr)
- $FC_{i,x}$  = Quantity of fuel type i used by the project power unit(s) in year x (mass or volume unit/yr)
- $NCV_{i,x}$  = Net calorific value of fuel type i used by the project power unit(s) in year x (GJ/mass or volume unit)
- x = Each year of the three years operational history

The VVB confirms that the correct formulae is used by the PP. Furthermore, the VVB confirms that the correct equation is chosen – equation (14) of Methodology ACM0007. The calculation of LE<sub>upstream,y</sub> is presented in SQS ref. [19]. The calculation has been verified and is deemed correct.

Leakage emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, regasification and compression of LNG into a natural gas transmission or distribution system (LE<sub>LNG,CO<sub>2</sub>,y</sub>) are calculated, where applicable, as follows:

$$LE_{LNG,CO2,y} = FC_{LNG,y} \cdot NCV_{LNG,y} \cdot EF_{CO2,upstream,LNG}$$

Where:

- $LE_{LNG,CO2,y}$  = Leakage emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system in year y (tCO<sub>2</sub>e/yr)
- $FC_{LNG,y}$  = Quantity of natural gas produced from LNG used by the project power unit(s) in year y (mass or volume unit/yr)
- $NCV_{LNG,y}$  = Net calorific value of natural gas produced from LNG used by the project power unit(s) in year y (GJ/mass or volume unit)

$EF_{CO_2, upstream, LNG}$  = Emission factor for upstream CO<sub>2</sub> emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, regasification and compression of LNG into a natural gas transmission or distribution system (t CO<sub>2</sub>e/GJ)

The VVB confirms that the correct formulae have been used by the PP. Furthermore, the VVB confirms that the correct equation is chosen – equation (15) of Methodology ACM0007. The calculation of LELNG,CO<sub>2</sub>,Y is presented in SQS ref. [19]. The calculation has been verified and is deemed correct.

The validated ER data is summarised in the table below:

Years	Estimated GHG emission reductions or removals (tCO <sub>2</sub> e)
2016	354 478
2017	346 852
2018	348 361
2019	342 789
2020	338 130
2021	347 015
2022	340 035
2023	345 768
2024	339 751
2025	331 993
<b>Total estimated ERs</b>	<b>3 435 173</b>
<b>Total number of crediting years</b>	10
<b>Average annual ERs</b>	343 517

### 3.2.7 Methodology Deviations

The equations in the methodology assume that the fuel used is measured in mass or weight units and so include conversion to energy units. When using NG it is common to measure energy content as well as refer to energy content in the supply contracts. In such cases mass and/or weight is often not measured or recorded, as in the case of DPP. The PP has used energy data instead of mass or weight and cancelled the conversion to energy. It is the opinion of SQS, that the deviation does not affect the meaning of the equation or the result of the calculations.

### 3.2.8 Monitoring Plan

The monitoring plan described in the PDD was checked by desk-review and on-site visit with the interviewed persons concerning training and implementation.

### Parameters determined ex-ante

SQS has validated the following parameters in line with the methodological and applicable tool requirements and found all of them complying with the respective requirements:

**EGx** Quantity of electricity supplied by the project power unit(s) with three years operational history and no retrofit in this period, to the electricity grid in year x.

Historical data of electricity supplied by the project to the grid in the defined operational history. The data was obtained from the grid coordinator.

**FCi,x** Quantity of fuel type i used by the project power unit(s) in year x.

The data is available for the three most recent years in MMBTU and not in volume or mass units. The value were converted to GJ, using standard conversions – see SQS ref. [4]\_Grid Emission Factor.23-10-2012. The values have been cross-checked with the information from the grid coordinator. The values for the 2009-2011, see conversions, have been found correct.

**NCVi,x** Net calorific value of fuel type i used by the project power unit(s) in year x.

The value is not applicable since the fuel consumption data that is available for the three most recent years is in MMBTU, and not in volume or mass units, NCV for the historical years is not used.

**EFCO<sub>2,min</sub>** CO<sub>2</sub> emission factor of the least carbon intensive fuel type used by the project power unit(s) during the three years operational history.

The project only uses natural gas, therefore this is the fuel used for this parameter. The value was calculated as follows  $EFCO_{2,min} = (54\ 300\ \text{kg/TJ}) / (106) = 0.05430\ \text{tCO}_2/\text{GJ}$  this is in compliance with IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories. SQS confirms that this value is correctly applied and there is no information about CO<sub>2</sub> emission factors of fuels sold on the Dominican Republic gas market.

**EFCO<sub>2,max</sub>** CO<sub>2</sub> emission factor of the most carbon intensive fuel type used by the project power unit(s) during the three years operational history.

The project only uses natural gas, therefore this is the fuel used for this parameter. The value was calculated as follows  $EFCO_{2,max} = (54\ 300\ \text{kg/TJ}) / (106) = 0.05430\ \text{tCO}_2/\text{GJ}$  this is in compliance with IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories. SQS confirms that this value is correctly applied and there is no information about CO<sub>2</sub> emission factors of fuels sold on the Dominican Republic gas market.

**CAPMAX** Maximum gross power generation capacity of the project power unit(s) prior to the implementation of the project activity.

The 210 MW maximum generation capacity determined by performance tests under optimal operational conditions were determined by manufacturer’s specification.

**TMAX** Maximum amount of time during a year in which the project power unit(s) could have operated at full-power generation capacity prior to the implementation of the project activity.

For the project activity, as not all of the power units have three years of operational history, the simplification TMAX equals 8 760 hours/yr has been used by the PP.

**HMRx** Average number of hours during which the plant did not operate due to maintenance or repair in year x (hours).

This parameter is not required if there is less than three years operational history for all project power units, or if a major retrofit occurred in this period. As a simplification, project proponents

may also assume this parameter as zero. Year x refers to each year of the unit's three years operational history.

**N** Default efficiency of the project power unit(s) operated in single cycle mode

This parameter is only required if there is less than three years operational data for all project power units, or if a major retrofit occurred in this period. Since three years operational data for all project power units is available, this parameter is not used.

**QHR,x** Quantity of heat recovered from the exhaust heat during the most recent year prior to the implementation of the project activity.

There was no heat recovery in the open cycle units.

**GWpch4** Global warming potential of methane valid for the relevant commitment period.

21 tCO<sub>2</sub>e/tCH<sub>4</sub> has been correctly applied.

**EGm,y** Net electricity generated by power plant / unit m in year y.

Utility or government records or official publications by the grid coordinator.

**EF.BM,y** Build margin CO<sub>2</sub> emission factor in year y.

Based on COES records [21] the calculation resulted in 0.56934 tCO<sub>2</sub>e/MWh – 2010 [07]

The parameters of the BM calculations from the “Tool to calculate the emission factor for an electricity system” are fixed for the crediting period.

The project adopts the *ex-ante* calculation of emission factor of the grid- EF grid. This calculation process, including the applied parameters and equations, were assessed by the validation team.

None of the data and parameters from the “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil- fuel combustion” are fixed for the crediting period.

### Parameters monitored *ex-post*

According to ACM0007: “Conversion from single cycle to combined cycle power generation” (Version 6.1.0), EB68, Annex 11, Section III, the following parameters are to be monitored:

EGPJ,y	=	Total amount of electricity supplied to the electricity grid by the project power units in year y
FCi,y	=	Quantity of fuel type i used by the project power unit(s) in year y
ηPJ,y	=	Average energy efficiency of the project power units in year y of the crediting period
QHR,y	=	Quantity of heat recovered from the exhaust heat of the project power units for purposes other than power generation in year y
NCVi,y	=	Average net calorific value of the natural gas used by the project power units in year y
EFNG,upstream,CH4	=	Emission factor for upstream fugitive methane emissions from production, transportation, distribution of natural gas used by the project power units in year y

EFC02,upstream,LNG = Emission factor for upstream CO<sub>2</sub> emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system during year y of the project activity

The monitoring procedures of this parameter have been sufficiently identified in the PDD.

EGPJ,y = Total amount of electricity supplied to the electricity grid by the project power units in year y

The data will be measured with electricity metres which are owned by the grid operator. Measurement frequency is continuously, calibration is defined by law every 2 years, responsible for the calibration is the grid operator, and the result is cross-checked with the receipts from sales.

The VVB considers the description as sufficient and that it complies with the methodology.

FCi,y = Quantity of fuel type i used by the project power unit(s) in year y

The PP measures the FCNG,y. The data will be measured continuously with natural gas metres, the consumption will be cross-checked by annual energy balance based on purchased quantities and stock changes and also against purchased fuel invoices.

SQS considers the description as sufficient and that it complies with the methodology.

ηPJ,y = Average energy efficiency of the project power units in year y of the crediting period

The PP will use the direct method or the recognised standards for the measurement of the power plant efficiency. If the efficiency will be chosen, it will refer in terms of the net calorific values of the fuel used and the net electricity produced.

The VVB considers the description as sufficient and that it complies with the methodology.

QHR,y = Quantity of heat recovered from the exhaust heat of the project power units for purposes other than power generation in year y

This parameter has not to be monitored; there is no exhaust heat of the project power units for purposes other than power generation in year y.

SQS considers the description as sufficient and that it complies with the methodology. SQS confirms that there is no exhaust heat of the project power units for purposes other than power generation. This has also been verified during the site visit.

NCVi,y = Average net calorific value of the natural gas used by the project power units in year y

The value will be provided by the fuel supplier in invoices. It is delivered for each fuel delivery – this means each time a ship unloads Liquid Natural Gas (LNG) at the ANDRES site, which is the source of the fuel for DPP. NCV value may vary slightly between ship loads and the equivalent value in BTU/kg; this being measured by a third party – currently by SGS for each load – SQS ref. [B\_3]TT4 1022 BRITISH SAPPHIRE, DISCHARGE REPORT, 03-04/01/2012.

The VVB considers the description as sufficient and that it complies with the methodology.

EFNG,upstream,CH<sub>4</sub> = Emission factor for upstream fugitive methane emissions from production, transportation, distribution of natural gas used by the project power units in year y

The PP applies the value of 0.000296 - Default emission factors, derived from IPCC default Tier 1 emission factors provided in Volume 3 of the 1996 revised IPCC guidelines, by calculating the average of the provided default emission factor range. The emission factor for fugitive upstream emissions for natural gas should include fugitive emissions from production, processing, transport and distribution of natural gas, as indicated in the table of default values above. To the extent that upstream emissions occur in Annex I countries that have ratified the Kyoto Protocol, from 01/01/2008 onwards, these emissions should be excluded, if technically possible, in the leakage calculations.

The VVB considers the description as sufficient and that it complies with the methodology.

EFCO<sub>2</sub>,upstream,LNG = Emission factor for upstream CO<sub>2</sub> emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system during year y of the project activity

Emission factor for upstream CO<sub>2</sub> emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, regasification and compression of LNG into a natural gas transmission or distribution system during year y of the project activity. As no reliable and accurate data on upstream CO<sub>2</sub> emission due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, regasification and compression of LNG into a natural gas transmission or distribution system is available, the PP chooses the default value of 0.006tCO<sub>2</sub>/GJ. Default value has been derived on data published for North American LNG systems. "Barclay, M. and N. Denton, 2005. Selecting offshore LNG process.

[http://www.fwc.com/publications/tech\\_papers/files/LNJO9IIO5p34-36.pdf](http://www.fwc.com/publications/tech_papers/files/LNJO9IIO5p34-36.pdf)  
(IOth April 2006)"

SQS considers the description as sufficient and that it complies with the methodology.

SQS confirms that all parameters listed in the methodology – see parameters listed above – are included in the monitoring plan presented in the VCS PD. It has to be noted that parameter FCI<sub>i,y</sub> - quantity of fuel type i used by the project power unit(s) in year y – has been changed to FCNG<sub>y</sub> as the fuel type used in the project is natural gas. The SQS confirms that there are no other parameters to be monitored *ex-post* related to the applicable tools. The description of the monitoring plan contains all necessary parameters; they are described sufficiently and comply with the methodology.

The following are the steps taken to assess implementation of the monitoring plan and arrangements. SQS assessed the PD and the monitoring arrangements described in the PD. As the project is in a very early stage, the decision to invest in the project is not yet taken; there are no other documents available. During the site visit the VVB conducted interviews with the representative of the project owner. DPP owns already a combined cycle HRSG – AES Andres.

The VVB confirms that the skills and training for the implementation of the monitoring plan are already present – see also SQS ref. [B.4\_1]\_Los Mina\_Depreciation Life Review Final\_061812 v3, dated 18/06/2012, Report from Sargent & Lundy. The report states on page 3 that AES Andres plant also provides support for routine for Los Mina 5 and Los Mina 6 – this means also support for monitoring.

The monitoring arrangements described in the monitoring plan are feasible with the project design. The description of the implementation of the monitoring plan, including data management, quality assurance and quality control procedures are considered sufficient to ensure that the emission reductions achieved by the project activity can be reported *ex-post* and verified. It can be confirmed that the PP is able to implement the monitoring plan. Furthermore, it can be confirmed that the monitoring is in compliance with the ACM0007: “Conversion from single cycle to combined cycle power generation” (Version 6.1.0), EB68, Annex 11.

FAR 2 has been raised regarding the monitoring plan: Training for monitoring, monitoring procedures, monitoring organisation, data management, quality control and quality assurance have to be verified.

It can be confirmed that FAR 2 is not related to the project implementation and not to registration requirements. As the project is in a very early phase of its development, the issues raised in FAR 2 have not been elaborated until now. As the PP belongs to the AES Corporation with experience in 27 countries, the knowledge for training and monitoring is available internally and there is no doubt about the ability of the PP to implement the monitoring plan.

### 3.3 Environmental Impact

DPP holds the environmental permit for the project activity, which ensures that all environmental requirements, as defined by Law No. 64-00, are performed. The environment permit – see SQS ref. [B\_4] Disposicion Permiso Ambiental, dated 29/03/2012 includes the installation of the combined cycle with an output of 108 MW – see first section, PRIMERO.

To further confirm the project’s contribution to the sustainable development of the country, as part of the CDM validation process LoA host party – SQS ref. [F\_1] dated 16/07/2012, has been issued by the DNA of the Dominican Republic.

The authenticity of the LoA was confirmed by a telephone interview on 26/10/2012 with Mr Moisés Alvarez of the DNA of Dominican Republic, the issuer of the LoA. He confirmed the authenticity of the LoA, dated 16/07/2012.

The LoA of the Dominican Republic dated 16/07/2012 includes clear statements that:

- a. Dominican Republic is a Party to the Kyoto Protocol;
- b. participation is voluntary;
- c. the proposed CDM project activity contributes to the sustainable development of Dominican Republic;
- d. it refers to the precise proposed CDM project activity title in the PDD

The project will produce energy by using the heat, generated by the existing turbines. It will therefore produce more energy without increasing significantly pollution. Furthermore, the project is not a greenfield, but will be built as an additional unit at the Los Mina power plant. The project activity’s negative environmental impacts are therefore not greater than the Los Mina plant

without the project, and will mainly occur during the construction period plus the noise of the new turbine.

The project will comply with environmental regulation and any additional requirements made by local authority. An environmental license for the plant's operation together with the project activity has already been given to the plant by the Secretary of Environmental Management– see SQS ref. [B\_4] Disposicion Permiso Ambiental, dated 29/03/2012.

According to the Secretary of Environmental Management, the Subsecretaria de Gestión Ambiental, (SGA), under the Ministry of Environment, the Secretaría de Estado de Medio Ambiente y Recursos Naturales (SEMARENA), an Environmental Impact Assessment (EIA) is not required for this project activity and the Los Mina plant already holds an updated environmental license which only requires the power plant to comply with local regulations, not including any specific conditions.

#### *Impact on the landscape*

The project does not have any impact on the landscape, as it is in the boundaries of the plant.

#### *Impact on fauna and flora*

The cooling technology that was chosen for the project are cooling towers with a total make up water consumption of 2 100 GPM. The water studies have been finalised and results show evidence of a reliable source of underground water for Los Mina power plant. The main source of water will be 4 wells at Los Mina site with a capacity of 500 GPM. Additionally, there will be a well at Ozama River shore that will serve as a backup.

Due to the backup well at the river, the project may have an impact on the fauna and flora in the Ozama River when it is used. Permitting process has been started and any requirements and regulations to minimise the environmental impact will be followed.

#### *Impact on air and climate*

The plant does not pose any risk of emitting more air pollutants to the environment, as the project is planned to consume the same amounts of fuel, and to reduce the temperatures of emitted air. The fact that more electricity will be generated from the same amount of fuel means that less GHG will be emitted per kWh and therefore, the project will have positive impact on mitigating climate change.

During the on-site visit, SQS could observe three barges that operate as power plants in the port: Estrella del Mar, Estrella del Norte and Sultana del Este (capacity and generation information is included in the grid emission calculation), thus confirming that clean energy is not the standard for Dominican Republic and the project implementation would make considerable environmental benefits for the Dominican Republic.

#### *Impact on safety*

The project does not have any impact on the safety and all continuous monitoring of pollution (liquids, solids and gas) will be carried out in the same way they are being carried out without the project activity.

#### *Noise*

The project may have an impact on noise, as the two new HRSGs and the additional turbine will generate noise. During the construction period noise may be created by transportation of material and by construction works.

The project will comply with environmental regulation and any additional requirements made by local authority. An environmental license for the plant's operation together with the project activity, given by the Secretary of Environmental Management, is already given to the plant (DPP's environmental permit, "Permiso Ambiental DEA No.0481-MODIFICADO", 2012).

According to the Secretary of Environmental Management, the Subsecretaria de Gestión Ambiental, (SGA), under the Ministry of Environment, the Secretaría de Estado de Medio Ambiente y Recursos Naturales (SEMARENA), an Environmental Impact Assessment (EIA) is not required for this project activity and the Los Mina plant already holds an updated environmental license which only requires the power plant to comply with local regulation and does not include any specific condition.

In consultation with the above mentioned authority, it was agreed that the only environmental parameter that may change due to the project activity is the noise level. Therefore, an environmental noise analysis was commissioned to establish the current baseline and the results will be submitted for evaluation to the environmental authorities. If additional environmental conditions relating to noise impacts will be agreed upon, DPP will comply and act accordingly.

FAR 1 has been raised regarding Environment impact: Actions to analyse environment impact regarding noise level and legal compliance have to be verified. Report to environment ministry has to be consulted.

It can be confirmed that FAR 1 is not related to the project implementation and not subject to registration requirements.

### 3.4 Comments by Stakeholders

#### *Local stakeholder consultation*

The stakeholder groups that have been identified and interviewed are local residents, affected persons, local political authorities and environmental groups. They have been invited by posters that were hung in the area – see SQS ref. [E.4], [E.5] and [E.6], through announcements in local newspapers - see SQS ref. [4.7] and through advertisement in the company's website – see SQS ref. [E.1]. It is the opinion of SQS that the PP has selected the right groups.

Local stakeholder meeting was held on 05/06/2012, in which the plant manager (Mr Adalberto Garcia) and other staff members presented the project and its benefits. The meeting included a comprehensive presentation on: the Los Mina plant, the future carbon project activity and an explanation on the environmental issues concerning the plant. The 31 stakeholders that participated in the meeting had the opportunity to ask questions and give comments regarding any issue they had. In general comments were very positive.

No one at the meeting voiced objection to the project activity. Most of the questions concerning the future project activity were related to matters regarding possible noise, vibration and water use.

The PP presents in the PD the summary of the answers filled in by 26 participants.

All comments and questions were addressed during the public meeting, and were gathered and documented for further analysis and consideration. The DPP management committed to take the concerns that were raised into account and do the utmost to answer and act upon them.

The summary of the received comments as provided in the PD is complete. The PP has taken due account of the comments received and has described this process in the PD.

The VVB considers that all comments by local stakeholders are considered by the PP and can confirm the adequacy of the procedure.

It can be confirmed that the local stakeholder consultation has been completed before global stakeholder consultation.

SQS' validation opinion is that the local stakeholder consultation is adequate.

#### *Global stakeholder consultation*

The project started the process to be validated and registered as a CDM project, part of it was the global stakeholder consultation on the UNFCCC website where the CDM-PDD Version 1.0 dated 20/06/2012 was published on 23/06/2012 for global stakeholder open for comments for 30 days.

The project activity received no comments – see SQS ref. [5] – printout website UNFCCC, dated 26/10/2012.

## **4 VALIDATION CONCLUSION**

The expected emission reduction of an average of 343 517 tCO<sub>2</sub> per year and 3 435 173 tCO<sub>2</sub> for the whole crediting period of 10 years is correct, accurately and conservatively calculated. Therefore, the project is a large scale one.

The project conforms to the validation criteria for projects, as set out in VCS Version 3, with 2 FARs open to be checked at the first verification. SQS confirms that the calculated emission reductions are most likely to be achieved given that the underlying assumptions do not change. Based on the VCS and ISO requirements listed above, the project is eligible for registration by the VCSA.

**5 APPENDIX A: DOCUMENTS REVIEWED**

No.	Title
01	PDD_form-VVS.02-06-2012
02	PDD_form-VVS.14-06-2012
03	Los Mina.PDD_form-VVS.19-06-2012
04	Los Mina.PDD_form-VVS.21-06-2012
05	Los Mina.PDD_form-VVS.10-08-2012
06	Los Mina.PDD_form-VVS.10-10-2012
07	Los Mina.PDD_form-VVS_23-10-2012
08	Los Mina.PDD_form-VVS_final_26-10-2012
09	Los Mina.PDD_form-VVS_Final_02-11-2012
010	Los Mina.PDD_form-VVS_Final_08-11-2012
011	Los Mina.PDD_form-VVS_Final_23-11-2012
012	Los Mina.PDD_form-VVS_Final_02-12-2012
013	Los Mina.PDD_form-VVS_Final_23-12-2012
014	Los Mina.PDD_form-VVS_Final_26-12-2012
015	Los Mina_VCS_PD_270213
016	Los Mina_VCS_PD_210313
1	Dominicana_CDM feasibility_22-01-2012 Elysium Consultants
2	AES Andres B.V. and Subsidiaries en Ingles, Independent Auditor's Report Financial statements ERNST&YOUNG, 31/12/2011
3	Dominicana_CERs_Calcs.26-12-2012
4	Grid Emission Factor.23-10-2012
5	<a href="http://cdm.unfccc.int/Projects/Validation/DB">http__cdm.unfccc.int_Projects_Validation_DB</a> 26/10/2012
6	6_Dicen mejora el suministro de energía - Elnacional_com_do 29/10/2012
7	<a href="http://www.indexmundi.com/dominican_republic/inflation_rate">http__www.indexmundi.com_dominican_republic_inflation_rate</a> _03/12/2012
8	<a href="http://www.economywatch.com/economic-statistics/cou">http__www.economywatch.com_economic-statistics_cou</a> 03/12/2012
9	Updated Capital Cost Estimates for Electricity Generation Plants, U.S. Energy Information Administration, 11/2010.
10	10 <a href="http://www.localpower.org/deb_tech_gt.html">http__www.localpower.org_deb_tech_gt.html</a> 20121212
11	<a href="http://maintenancepartners.com/activities/mechanical-maintenanc">http__maintenancepartners.com_activities_mechanical-maintenanc</a> 20121212
12	12 Fuel-Conversion_Flyer_a96001-u90-b210-x-4a00 edited by Siemens, 2008
13	SGT6-5000F_ApplicationOverview Siemens, 2008
14	Mem. Organismo martes 6-2012 OC-Seni Memoria Anual 2010
15	Nussbaumer_GuD-Projekt_DR_2012_V2, 20/12/2012
16	DPP Wower Plant, Dominican Republic.kmz – link to Google Earth
17	<a href="https://www.theice.com/marketdata/reports/ReportCenter.shtml">https__www.theice.com_marketdata_reports_ReportCenter.shtml</a> _28/12/2012
18	<a href="http://cdm.unfccc.int/Projects/PriorCDM/notifications_index.htm">http__cdm.unfccc.int_Projects_PriorCDM_notifications_index.htm</a> 17/04/2012
19	Dominicana_VCUs_Calcs.21-05-2013
20	Grid Emission Factor.16.03.13
21	Los Mina CC Model v1.6 ver 2013 v5vTPointvNGv2vTPointvNGv2
22	AA. EDE ESTE. Enmienda al Contrato de Compra de Energía. 06/09/2011

23	AA. Molinos del Ozama. Contrato de Suministro de Electricidad. 21 Marzo 2013
24	LNG Daily 08/01/2013
25	LNG Daily 25/01/2013
26	LNG Daily 06/03/2013
27	LNG Daily 13/05/2013
28	Implications of North American LNG Exports for Asia's Pricing Regime Pacific Energy Summit 2013 · Summit Working Papers · Fesharaki
29	2011, 2012 LNG purchase agreements (confidential)
A.3_1	Attachment #3.Los Mina CC D5A 2x2X1 Performance Sargent&Lundy, 09/03/2012
A.3_2	DPP Base 2008, unedited
A.3_3	Los Mina Unit 5 Generator Rotor Exchange & Bearing Rebabbit Proposal Rev0 Siemens, 06/10/2009
A.3_4	LOS-GA-01 with Construction Laydown Markup 20/01/2012
B.4.4_1	LM_CC_Model_vDec2012v9.1
B.4.4_2	<a href="http://www.elnacional.com.do_nacional_2012_9_24_135854_Dicen-me">http://www.elnacional.com.do_nacional_2012_9_24_135854_Dicen-me</a> 14/10/2012
B.4.4_3	Additional_Info_021112
B.4.4_4	ANUAL - 2012-2021 OpenCycle FILE 1 LOS MINA
B.4.4_5	ANUAL - 2012-2021 OpenCycle FILE 2 LOS MINA
B.4.4_6	ANUAL - 2012-2021_CombinedCycle MISSING FILE
B.4.4_7	ANUAL - 2022-2030 OpenCycle FILE 3 LOS MINA
B.4.4_8	ANUAL 2022-2030_CombinedCycle FILE 4 LOS MINA
B.4.4_9	Cost analysis Sargent&Lundy Capital Cost Difference Summary 10.19.2010 - FILE 6 LOS MINA
B.4.4_10	DPP Project Status Certification 01/11/2012
B.4.4_11	Informe de Desempeño Julio 2012 - FILE 5 LOS MINA
B.4.4_12	RESUMEN_TOTAL_Julio_2012.1
B.4.4_13	OC-GC-14 -07RETE1207-130817-V1 17/08/2012
B.4.4_14	Resolucion SIE-544-2011 30/12/2011
B.4.4_15	121128 Posco Payments 10/2012
B.4.4_16	Commercial (POSCO 121031) v2 31/10/2012
B.4_1	Los Mina_Depreciation Life Review Final_061812 v3 18/06/2012
B.4_2	CONTENIDO v.FINAL 11/09/2012
B.5_1	83. OC-GO-INF-83-2011 Rev. 0 30/11/2011
B.5_2	DR Power Plants data 2007-2011
B.5_3	OC letter 01/05/2012
B.5_4	Generation-Efficiency-NCV and Fuel Consumption of the System for 2007-2011
B.5_5	Certificación Información Página del OC-SENI 21/08/2012
B_1	Historico Data Sheet LNG 2012
B_2	LOS MINA archive log 4-23-2012 12-53-17 AM
B_3	TT4 1022 BRITISH SAPPHIRE, DISCHARGE REPORT, 03-04/01/2012
B_4	Disposicion Permiso Ambiental 29/05/2012
B_5	CONTENIDO v.FINAL1 21/08/2012
B_6	Permiso DPP Medio Ambiente y Recursos Naturales 24/01/2008
B_7	Permiso Ambiental Modificado Ministeria de Medio Ambiente y Recursos Naturales 02/05/2012

E.1	Webpage publication
E.2	Letters of invitation 2 30/05/2012
E.3	Letters of invitation 3 28/05/2012
E.4	Color Poster inedited
E.5	Stakeholder meeting presentation 25/05/2012
E.6	Afiche 1 25/05/2012
E.7	Afiche 2 25/05/2012
E.8	Newspapers 28/05/2012
E.9	STAKEHOLDER MEETING 18/06/2012
E.10	List of attendees 05/06/2012
E.11	Shareholder meeting questionnaire 05/05/22012
F_1	LoA_Carta de Aprobacion Nacional Upgrade of Dominican Power Partners' Los Mina Power station from open cycle to combined (Eng) 16/07/2012
F_2	MoC_signed_060812 06/08/2012
F_3	DPP.Delegación poder Rubiolo, Evaristo 2012 22/05/2012

6 APPENDIX B: CERTIFICATES OF COMPETENCE

Name: Mr Hansruedi Bader

Scopes of expertise:		
1	Energy industries (renewable/non-renewable sources)	X
	TA 1.1: Thermal energy generation from fossil fuels as well as thermal energy from solar	<input type="checkbox"/>
	TA 1.2: Energy generation from renewable energy sources	X
2	Energy distribution	<input type="checkbox"/>
	TA 2.1: Electricity distribution	<input type="checkbox"/>
	TA 2.2: Heat distribution	<input type="checkbox"/>
3	Energy demand	<input type="checkbox"/>
	TA 3.1 Energy demand	<input type="checkbox"/>
4	Manufacturing industries	<input type="checkbox"/>
	TA 4.1: Cement sector	<input type="checkbox"/>
	TA 4.2: Aluminium	<input type="checkbox"/>
	TA 4.3: Iron and steel	<input type="checkbox"/>
	TA 4.4: Refinery	<input type="checkbox"/>
5	Chemical industry	<input type="checkbox"/>
	TA 5.1: Chemical process industries	<input type="checkbox"/>
6	Construction	X
	TA 6.1: Construction	X
7	Transport	<input type="checkbox"/>
	TA 7.1: Transport	<input type="checkbox"/>
8	Mining/mineral production	<input type="checkbox"/>
	TA 8.1: Mining and mineral processes, excluding those included in TA 8.2 below	<input type="checkbox"/>
	TA 8.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/>
9	Metal production	<input type="checkbox"/>
	TA 9.1: Metal production	<input type="checkbox"/>
10	Fugitive emissions from fuels	<input type="checkbox"/>
	TA 10.1: Mining and mineral processes, excluding those included in TA 10.2 below	<input type="checkbox"/>
	TA 10.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/>
11	Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride	<input type="checkbox"/>
	TA 11.1: Chemical process industries	<input type="checkbox"/>
	TA 11.2: GHG capture and destruction	<input type="checkbox"/>
12	Solvents use	<input type="checkbox"/>
	TA 12.1: Chemical process industries	<input type="checkbox"/>
13	Waste handling and disposal	X
	TA 13.1: Waste handling and disposal	X
	TA 13.2: Animal waste management	<input type="checkbox"/>
14	Afforestation and reforestation	<input type="checkbox"/>
	TA 14.1: Forestry	<input type="checkbox"/>
15	Agriculture	<input type="checkbox"/>
	TA 15.1: Agriculture	<input type="checkbox"/>
	TA 15.2: Animal waste management	<input type="checkbox"/>

**Name: Mr Martin Rügsegger**

<b>Scopes of expertise:</b>		
1	Energy industries (renewable/non-renewable sources)	X
	TA 1.1: Thermal energy generation from fossil fuels as well as thermal energy from solar	<input type="checkbox"/>
	TA 1.2: Energy generation from renewable energy sources	X
2	Energy distribution	<input type="checkbox"/>
	TA 2.1: Electricity distribution	<input type="checkbox"/>
	TA 2.2: Heat distribution	<input type="checkbox"/>
3	Energy demand	<input type="checkbox"/>
	TA 3.1 Energy demand	<input type="checkbox"/>
4	Manufacturing industries	X
	TA 4.1: Cement sector	<input type="checkbox"/>
	TA 4.2: Aluminium	<input type="checkbox"/>
	TA 4.3: Iron and steel	X
	TA 4.4: Refinery	<input type="checkbox"/>
5	Chemical industry	<input type="checkbox"/>
	TA 5.1: Chemical process industries	<input type="checkbox"/>
6	Construction	<input type="checkbox"/>
	TA 6.1: Construction	<input type="checkbox"/>
7	Transport	<input type="checkbox"/>
	TA 7.1: Transport	<input type="checkbox"/>
8	Mining/mineral production	<input type="checkbox"/>
	TA 8.1: Mining and mineral processes, excluding those included in TA 8.2 below	<input type="checkbox"/>
	TA 8.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/>
9	Metal production	<input type="checkbox"/>
	TA 9.1: Metal production	<input type="checkbox"/>
10	Fugitive emissions from fuels	<input type="checkbox"/>
	TA 10.1: Mining and mineral processes, excluding those included in TA 10.2 below	<input type="checkbox"/>
	TA 10.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/>
11	Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride	<input type="checkbox"/>
	TA 11.1: Chemical process industries	<input type="checkbox"/>
	TA 11.2: GHG capture and destruction	<input type="checkbox"/>
12	Solvents use	<input type="checkbox"/>
	TA 12.1: Chemical process industries	<input type="checkbox"/>
13	Waste handling and disposal	X
	TA 13.1: Waste handling and disposal	X
	TA 13.2: Animal waste management	<input type="checkbox"/>
14	Afforestation and reforestation	<input type="checkbox"/>
	TA 14.1: Forestry	<input type="checkbox"/>
15	Agriculture	<input type="checkbox"/>
	TA 15.1: Agriculture	<input type="checkbox"/>
	TA 15.2: Animal waste management	<input type="checkbox"/>

Name: Mr David Gazdag

Scopes of expertise:		
1	Energy industries (renewable/non-renewable sources)	<input type="checkbox"/>
	TA 1.1: Thermal energy generation from fossil fuels as well as thermal energy from solar	<input type="checkbox"/>
	TA 1.2: Energy generation from renewable energy sources	<input type="checkbox"/>
2	Energy distribution	<input type="checkbox"/>
	TA 2.1: Electricity distribution	<input type="checkbox"/>
	TA 2.2: Heat distribution	<input type="checkbox"/>
3	Energy demand	X
	TA 3.1 Energy demand	X
4	Manufacturing industries	<input type="checkbox"/>
	TA 4.1: Cement sector	<input type="checkbox"/>
	TA 4.2: Aluminium	<input type="checkbox"/>
	TA 4.3: Iron and steel	<input type="checkbox"/>
	TA 4.4: Refinery	<input type="checkbox"/>
5	Chemical industry	<input type="checkbox"/>
	TA 5.1: Chemical process industries	<input type="checkbox"/>
6	Construction	<input type="checkbox"/>
	TA 6.1: Construction	<input type="checkbox"/>
7	Transport	<input type="checkbox"/>
	TA 7.1: Transport	<input type="checkbox"/>
8	Mining/mineral production	<input type="checkbox"/>
	TA 8.1: Mining and mineral processes, excluding those included in TA 8.2 below	<input type="checkbox"/>
	TA 8.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/>
9	Metal production	<input type="checkbox"/>
	TA 9.1: Metal production	<input type="checkbox"/>
10	Fugitive emissions from fuels	<input type="checkbox"/>
	TA 10.1: Mining and mineral processes, excluding those included in TA 10.2 below	<input type="checkbox"/>
	TA 10.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/>
11	Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride	<input type="checkbox"/>
	TA 11.1: Chemical process industries	<input type="checkbox"/>
	TA 11.2: GHG capture and destruction	<input type="checkbox"/>
12	Solvents use	<input type="checkbox"/>
	TA 12.1: Chemical process industries	<input type="checkbox"/>
13	Waste handling and disposal	<input type="checkbox"/>
	TA 13.1: Waste handling and disposal	<input type="checkbox"/>
	TA 13.2: Animal waste management	<input type="checkbox"/>
14	Afforestation and reforestation	<input type="checkbox"/>
	TA 14.1: Forestry	<input type="checkbox"/>
15	Agriculture	<input type="checkbox"/>
	TA 15.1: Agriculture	<input type="checkbox"/>
	TA 15.2: Animal waste management	<input type="checkbox"/>

**Name: Mr Marco Bedoya**

<b>Scopes of expertise:</b>		
1	Energy industries (renewable/non-renewable sources)	X
	TA 1.1: Thermal energy generation from fossil fuels as well as thermal energy from solar	<input type="checkbox"/>
	TA 1.2: Energy generation from renewable energy sources	X
2	Energy distribution	<input type="checkbox"/>
	TA 2.1: Electricity distribution	<input type="checkbox"/>
	TA 2.2: Heat distribution	<input type="checkbox"/>
3	Energy demand	<input type="checkbox"/>
	TA 3.1 Energy demand	<input type="checkbox"/>
4	Manufacturing industries	X
	TA 4.1: Cement sector	X
	TA 4.2: Aluminium	<input type="checkbox"/>
	TA 4.3: Iron and steel	<input type="checkbox"/>
	TA 4.4: Refinery	<input type="checkbox"/>
5	Chemical industry	<input type="checkbox"/>
	TA 5.1: Chemical process industries	<input type="checkbox"/>
6	Construction	<input type="checkbox"/>
	TA 6.1: Construction	<input type="checkbox"/>
7	Transport	<input type="checkbox"/>
	TA 7.1: Transport	<input type="checkbox"/>
8	Mining/mineral production	X
	TA 8.1: Mining and mineral processes, excluding those included in TA 8.2 below	X
	TA 8.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/>
9	Metal production	<input type="checkbox"/>
	TA 9.1: Metal production	<input type="checkbox"/>
10	Fugitive emissions from fuels	<input type="checkbox"/>
	TA 10.1: Mining and mineral processes, excluding those included in TA 10.2 below	<input type="checkbox"/>
	TA 10.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/>
11	Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride	<input type="checkbox"/>
	TA 11.1: Chemical process industries	<input type="checkbox"/>
	TA 11.2: GHG capture and destruction	<input type="checkbox"/>
12	Solvents use	<input type="checkbox"/>
	TA 12.1: Chemical process industries	<input type="checkbox"/>
13	Waste handling and disposal	X
	TA 13.1: Waste handling and disposal	X
	TA 13.2: Animal waste management	X
14	Afforestation and reforestation	<input type="checkbox"/>
	TA 14.1: Forestry	<input type="checkbox"/>
15	Agriculture	X
	TA 15.1: Agriculture	X
	TA 15.2: Animal waste management	<input type="checkbox"/>

**Name: Mr Silvio Leonardi, PhD**

<b>Scopes of expertise:</b>		
1	Energy industries (renewable/non-renewable sources)	<input checked="" type="checkbox"/>
	TA 1.1: Thermal energy generation from fossil fuels as well as thermal energy from solar	<input type="checkbox"/>
	TA 1.2: Energy generation from renewable energy sources	<input checked="" type="checkbox"/>
2	Energy distribution	<input type="checkbox"/>
	TA 2.1: Electricity distribution	<input type="checkbox"/>
	TA 2.2: Heat distribution	<input type="checkbox"/>
3	Energy demand	<input checked="" type="checkbox"/>
	TA 3.1 Energy demand	<input checked="" type="checkbox"/>
4	Manufacturing industries	<input type="checkbox"/>
	TA 4.1: Cement sector	<input type="checkbox"/>
	TA 4.2: Aluminium	<input type="checkbox"/>
	TA 4.3: Iron and steel	<input type="checkbox"/>
	TA 4.4: Refinery	<input type="checkbox"/>
5	Chemical industry	<input type="checkbox"/>
	TA 5.1: Chemical process industries	<input type="checkbox"/>
6	Construction	<input type="checkbox"/>
	TA 6.1: Construction	<input type="checkbox"/>
7	Transport	<input type="checkbox"/>
	TA 7.1: Transport	<input type="checkbox"/>
8	Mining/mineral production	<input type="checkbox"/>
	TA 8.1: Mining and mineral processes, excluding those included in TA 8.2 below	<input type="checkbox"/>
	TA 8.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/>
9	Metal production	<input type="checkbox"/>
	TA 9.1: Metal production	<input type="checkbox"/>
10	Fugitive emissions from fuels	<input type="checkbox"/>
	TA 10.1: Mining and mineral processes, excluding those included in TA 10.2 below	<input type="checkbox"/>
	TA 10.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/>
11	Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride	<input type="checkbox"/>
	TA 11.1: Chemical process industries	<input type="checkbox"/>
	TA 11.2: GHG capture and destruction	<input type="checkbox"/>
12	Solvents use	<input type="checkbox"/>
	TA 12.1: Chemical process industries	<input type="checkbox"/>
13	Waste handling and disposal	<input checked="" type="checkbox"/>
	TA 13.1: Waste handling and disposal	<input checked="" type="checkbox"/>
	TA 13.2: Animal waste management	<input type="checkbox"/>
14	Afforestation and reforestation	<input checked="" type="checkbox"/>
	TA 14.1: Forestry	<input checked="" type="checkbox"/>
15	Agriculture	<input checked="" type="checkbox"/>
	TA 15.1: Agriculture	<input checked="" type="checkbox"/>
	TA 15.2: Animal waste management	<input type="checkbox"/>

## 7 APPENDIX C: ABBREVIATIONS

BTU	British Thermal Unit
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH <sub>4</sub>	Methane
CL	Clarification Request
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
DNA	Designated National Authority DPP
DPP	Dominican Power Partner
DR	Dominican Republic
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
HRSG	Heat Recovery Steam Generator
IEE	Initial Environmental Examination
IPCC	Intergovernmental Panel on Climate Change
LNG	Liquid Natural Gas
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N <sub>2</sub> O	Nitrous oxide
NGO	Non-governmental Organisation
NPV	Net profit value
ODA	Official Development Assistance
PD	Project Document
PDD	Project Design Document
SQS	Swiss Association for Quality and Management Systems
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCSA	VCS Association
VCU	Verified Carbon Unit

PROTOCOL 1: GENERAL VCS REQUIREMENTS

Requirement	Ref.	MoV	Draft Concl.	Final Concl.	Norm. Ref.
<b>1. Verified carbon standard version 3 requirements for non-AFOLU projects using CDM methodologies</b>					
<b>1.1. General Requirements</b>					
1.1.1. Projects shall meet all applicable rules and requirements set out under the VCS Program, - including the latest version of the VCS Standard [1]. Projects shall be guided by the principles set out in [1] Section 2.4.1 ( <i>Principles</i> ) of the VCS Standard.		DR, I	OK	OK	[1]
Comment: This has been cross-checked by SQS, and found to be correct.					
1.1.2. Is the project activity validated against VCS Version 3? VCS Version 3 is the applicable version of VCS program documents, from 4 October 2012.		DR, I	OK	OK	[1] [3]
Comment: VCS Version 3 has been applied, OK.					
1.1.3. Projects shall apply methodologies eligible under the VCS Program. Methodologies shall be applied in full, including the full application of any tools or modules referred to by a methodology, noting the exception set out in [1] Section 3.14.1. ( <i>Additionality</i> ) The list of methodologies and their validity periods is available on the VCS website.		DR, I	OK	OK	[1]
Comment: Approved, most recent CDM methodology has been used, OK.					
1.1.4. Where projects apply methodologies that permit the project proponent its own choice of model (see VCS document Program Definitions for definition of model), such model shall meet with the requirements set out in [1] Section 4.1.6(2)-(6) and it shall be demonstrated at validation that the model is appropriate to the project circumstances (i.e., use of the model will lead to an appropriate quantification of GHG emission reductions or removals).		DR, I	NA	NA	[1]
Comment					
1.1.5. Where projects apply methodologies that permit the project proponent its own choice of third party default factor or standard to ascertain GHG emission data and any supporting data for establishing baseline scenarios and demonstrating additionality, such default factor or standard shall meet with the requirements set out in [1] Section 4.1.7 of the VCS Standard.		DR, I	NA	NA	[1]
Comment					

Requirement	Ref.	MoV	Draft Concl.	Final Concl.	Norm. Ref.
1.1.6. Projects shall preferentially apply methodologies that use performance methods (see [1] Section 4.1.11 for further information on performance methods) where a methodology is applicable to the project that uses a performance method for determining both additionality and the crediting baseline (i.e., a project shall not apply a methodology that uses a project method where such a performance method is applicable to the project). Methodologies approved under the VCS Program that use performance methods provide a list of similar methodologies that use project methods (that were approved under the VCS Program or an approved GHG program at the time the performance method was developed). Such lists are not necessarily exhaustive but can serve as the starting point for determining whether a performance method is applicable to the project. Following the approval of a methodology that uses a performance method, projects may use any applicable pre-existing methodology that uses a project method for a six-month grace period.		DR, I	NA	NA	[1]

Comment

1.1.7. Where projects apply methodologies from approved GHG programs, they shall comply with any specified capacity limits (see VCS document Program Definitions for definition of capacity limit) and any other relevant requirements set out with respect to the application of the methodology and/or tools referenced by the methodology under those programs. Where the rules and requirements under an approved GHG program conflict with the rules and requirements of the VCS Program, the rules and requirements of the VCS Program shall take precedence.		DR, I	OK	OK	[1]
---	--	-------	----	----	-----

Comment: The CDM methodology has been correctly applied, VCS rules took precedence.

1.1.8. Where the VCSA issues new requirements relating to projects, registered projects do not need to adhere to the new requirements for the remainder of their project crediting periods (i.e., such projects remain eligible to issue VCUs through to the end of their project crediting period without revalidation against the new requirements). The new requirements shall be adhered to at project credit period renewal, as set out in [1] Section 3.8.5.		DR, I	NA	NA	[1]
--	--	-------	----	----	-----

Comment

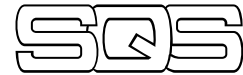
## 1.2. Multiple Project Activities

1.2.1. Projects may include multiple project activities where the methodology applied to the project allows more than one project activity and/or where projects apply more than one methodology.		DR, I	NA	NA	[1]
---	--	-------	----	----	-----

Comment

Requirement	Ref.	MoV	Draft Concl.	Final Concl.	Norm. Ref.
<p>1.2.2. Where more than one methodology has been applied to a project with multiple project activities, the following applies:</p> <ol style="list-style-type: none"> <li>1) Each project activity shall be specified separately in the project description, referencing the relevant methodology.</li> <li>2) All criteria and procedures set out in the applied methodologies in relation to applicability conditions, demonstration of additionality, determination of baseline scenario and GHG emission reduction and removal quantification shall be applied separately to each project activity, noting the following:               <ol style="list-style-type: none"> <li>a) A single set of criteria and procedures for the demonstration of additionality may be applied where the applied methodologies reference the same additionality tool and/or procedures, and where separate demonstration of additionality for each project activity is not practicable. For example, separate demonstration of additionality may not be practicable in project activities that are implemented at a single facility and therefore represent a single investment. The onus is upon the project proponent to demonstrate to the validation/verification body that separate demonstration of additionality is not practicable, failing which separate demonstration of additionality shall be provided. Where a methodology specifies requirements for demonstrating additionality in addition to those specified in the referenced additionality tool and/or procedures, such requirements shall be adhered to.</li> <li>b) The criteria and procedures for identifying the baseline scenario may be combined where the relevant methodologies or the referenced additionality tool and/or procedures specify criteria and procedures for combining baseline scenarios.</li> </ol> </li> <li>3) The criteria and procedures relating to all other aspects of the methodologies may be combined.</li> </ol> <p>1.2.3. Where AFOLU projects are required to undertake non-permanence risk assessment and buffer withholding determination, this shall be done separately for each project activity.</p>		DR, I	NA	NA	[1]
<p>Comment</p>					

Requirement	Ref.	MoV	Draft Concl.	Final Concl.	Norm. Ref.
<b>1.3. Multiple Instances of Project Activities</b>					
1.3.1. Projects may include more than one project activity instance, such as a wind power project that includes a number of wind turbines. Inclusion of further project activity instances subsequent to initial validation of a non-grouped project is not permitted (see [1] Section 3.4 for information on grouped projects). The baseline determination and additionality demonstration for all project activity instances shall be combined (e.g., multiple wind turbines shall be assessed in combination rather than individually).		DR, I	NA	NA	[1]
Comment					
1.3.2. Where a project includes multiple project activity instances from multiple project activities, the project activity instances from each project activity shall be assessed in accordance with [1] Section 3.2 of the VCS Standard.		DR, I	NA	NA	[1]
Comment					
1.3.3. Non-grouped projects with multiple project activity instances shall not exceed any capacity limits to which a project activity is subject.		DR, I	NA	NA	[1]
Comment					
<b>1.4. Grouped Projects</b>					
1.4.1. Grouped projects are projects structured to allow the expansion of a project activity subsequent to project validation. Validation is based upon the initial project activity instances identified in the project description. The project description sets out the geographic areas within which new project activity instances may be developed and the eligibility criteria for their inclusion. New instances meeting these pre-established criteria may then be added to the project subsequent to project validation, as set out in the sections below. These sections provide the requirements for all grouped projects, which are further expanded upon in VCS document AFOLU Requirements. VCS methodologies may also provide additional specifications for grouped projects.		DR, I	NA	NA	[1]
Comment					



Requirement	Ref.	MoV	Draft Concl.	Final Concl.	Norm. Ref.
Baseline Scenario and Additionality					
1.4.2. Grouped projects shall have one or more clearly defined geographic areas within which project activity instances may be developed. Such geographic areas shall be defined using geodetic polygons as set out in [1] Section 3.10.		DR, I	NA	NA	[1]
Comment					
1.4.3. Determination of baseline scenario and demonstration of additionality are based upon the initial project activity instances. The initial project activity instances are those that are included in the project description at validation and shall include all project activity instances currently implemented on the issue date of the project description. The initial project activity instances may also include any planned instances of the project activity that have been planned and developed to a sufficient level of detail to enable their assessment at validation. Geographic areas with no initial project activity instances shall not be included in the project unless it can be demonstrated that such areas are subject to the same (or at least as conservative) baseline scenario and rationale for the demonstration of additionality as a geographic area that does include initial project activity instances.		DR, I	NA	NA	[1]
Comment					
1.4.4. As with non-grouped projects, grouped projects may incorporate multiple project activities (see [1] Section 3.2 for more information on multiple project activities). Where a grouped project includes multiple project activities, the project description shall designate which project activities may occur in each geographic area.		DR, I	NA	NA	[1]
Comment					
1.4.5. The baseline scenario for a project activity shall be determined for each designated geographic area, in accordance with the methodology applied to the project. Where a single baseline scenario cannot be determined for a project activity over the entirety of a geographic area, the geographic area shall be redefined or divided such that a single baseline scenario can be determined for the revised geographic area or areas.		DR	NA	NA	[1]
Comment					

Requirement	Ref.	MoV	Draft Concl.	Final Concl.	Norm. Ref.
1.4.6. The additionality of the initial project activity instances shall be demonstrated for each designated geographic area, in accordance with the methodology applied to the project. Where the additionality of the initial project activity instances within a particular geographic area cannot be demonstrated for the entirety of that geographic area, the geographic area shall be redefined or divided such that the additionality of the instances occurring in the revised geographic area or areas can be demonstrated.		DR	NA	NA	[1]
Comment					
1.4.7. Where factors relevant to the determination of the baseline scenario or demonstration of additionality require assessment across a given area, the area shall be, at a minimum, the grouped project geographic area. Examples of such factors include, inter alia, common practice; laws, statutes, regulatory frameworks or policies relevant to demonstration of regulatory surplus; determination of regional grid emission factors; and historical deforestation and degradation rates.		DR	NA	NA	[1]
Comment					
Capacity Limits					
1.4.8. Where a capacity limit applies to a project activity included in the project, no project activity instance shall exceed such limit. Further, no single cluster of project activity instances shall exceed the capacity limit, determined as follows: <ol style="list-style-type: none"> <li>1) Each project activity instance that exceeds one percent of the capacity limit shall be identified.</li> <li>2) Such instances shall be divided into clusters, whereby each cluster is comprised of any system of instances such that each instance is within one kilometre of at least one other instance in the cluster. Instances that are not within one kilometre of any other instance shall not be assigned to clusters</li> <li>3) None of the clusters shall exceed the capacity limit and no further project activity instances shall be added to the project that would cause any of the clusters to exceed the capacity limit.</li> </ol>		DR	NA	NA	[1]
Comment					

Requirement	Ref.	MoV	Draft Concl.	Final Concl.	Norm. Ref.
Eligibility Criteria					
<p>1.4.9. Grouped projects shall include one or more sets of eligibility criteria for the inclusion of new project activity instances. At least one set of eligibility criteria for the inclusion of new project activity instances shall be provided for each combination of project activity and geographic area specified in the project description. A set of eligibility criteria shall ensure that new project activity instances:</p> <ol style="list-style-type: none"> <li>1) Meet the applicability conditions set out in the methodology applied to the project.</li> <li>2) Use the technologies or measures specified in the project description.</li> <li>3) Apply the technologies or measures in the same manner as specified in the project description.</li> <li>4) Are subject to the baseline scenario determined in the project description for the specified project activity and geographic area.</li> <li>5) Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area. For example, the new project activity instances have financial, technical and/or other parameters (such as the size/scale of the instances) consistent with the initial instances, or face the same investment, technological and/or other barriers as the initial instances.</li> </ol>		DR	NA	NA	[1]
Comment					

Requirement	Ref.	MoV	Draft Concl.	Final Concl.	Norm. Ref.
Inclusion of New Project Activity Instances					
<p>1.4.10. Grouped projects provide for the inclusion of new project activity instances subsequent to the initial validation of the project. New project activity instances shall:</p> <ol style="list-style-type: none"> <li>1) Occur within one of the designated geographic areas specified in the project description.</li> <li>2) Comply with at least one complete set of eligibility criteria for the inclusion of new project activity instances. Partial compliance with multiple sets of eligibility criteria is insufficient.</li> <li>3) Be included in the monitoring report with sufficient technical, financial, geographic and other relevant information to demonstrate compliance with the applicable set of eligibility criteria and enable sampling by the validation/verification body.</li> <li>4) Be validated at the time of verification against the applicable set of eligibility criteria.</li> <li>5) Have evidence of right of use, in respect of each project activity instance, held by the project proponent from the respective start date of each project activity instance (i.e., the date upon which the project activity instance began reducing or removing GHG emissions).</li> <li>6) Be eligible for crediting from the start date of the instance through to the end of the project crediting period (only).</li> <li>7) A right of use arising from the implementation or enforcement of laws, statutes or regulatory frameworks that require activities be undertaken or incentivize activities that generate GHG emission reductions or removals.</li> </ol>		DR	NA	NA	[1]
Comment					
<p>1.4.11. Where inclusion of a new project activity instance necessitates the addition of a new project proponent to the project, such instances shall be included in the grouped project within two years of the project activity instance start date or, where the project activity is an AFOLU activity, within five years of the project activity instance start date. The procedure for adding new project proponents is set out in VCS document <i>Registration and Issuance Process</i>.</p>		DR	NA	NA	[1]
Comment					

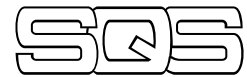
Requirement	Ref.	MoV	Draft Concl.	Final Concl.	Norm. Ref.
Project Description for Grouped Projects					
1.4.12. A grouped project shall be described in a single project description, which shall contain the following (in addition to the content required for non-grouped projects): <ol style="list-style-type: none"> <li>1) A delineation of the geographic area(s) within which all project activity instances shall occur. Such area(s) shall be defined by geodetic polygons as set out in [1] Section 3.10 below.</li> <li>2) One or more determinations of the baseline for the project activity in accordance with the requirements of the methodology applied to the project.</li> <li>3) One or more demonstrations of additionality for the project activity in accordance with the requirements of the methodology applied to the project.</li> <li>4) One or more sets of eligibility criteria for the inclusion of new project activity instances at subsequent verification events.</li> <li>5) A description of the central GHG information system and controls associated with the project and its monitoring.</li> </ol>		DR	NA	NA	[1]

Comment

### 1.5. Methodology Deviations

1.5.1. Deviations from the applied methodology are permitted where they represent a deviation from the criteria and procedures relating to monitoring or measurement set out in the methodology (i.e., deviations are permitted where they relate to data and parameters available at validation, data and parameters monitored, or the monitoring plan). Methodology deviations shall not negatively impact the conservativeness of the quantification of GHG emission reductions or removals, except where they result in increased accuracy of such quantification. Deviations relating to any other part of the methodology shall not be permitted.		DR	CAR#10	OK	[1]
---	--	----	--------	----	-----

Comment: The equations in the methodology assume that the fuel used is measured in mass or weight units and so include conversion to energy units. When using NG it is common to measure energy content as well as refer to energy content in the supply contracts. In such cases mass and/or weight is often not measured or recorded, as in the case of DPP. The PP has used energy data instead of mass or weight and cancelled the conversion to energy. Therefore CAR#10 has been raised, the PP has given enough clarification, and a deviation from the methodology is agreed. It is the opinion of SQS, that the deviation does not affect the meaning of the equation or the result of the calculations.



Requirement	Ref.	MoV	Draft Concl.	Final Concl.	Norm. Ref.
1.5.2. Methodology deviations shall be permitted at validation or verification and their consequences shall be reported in the validation or verification report, as applicable, and all subsequent verification reports. Methodology deviations are not considered to be precedent setting.		DR	CAR#10	OK	[1]

Comment: The equations in the methodology assume that the fuel used is measured in mass or weight units and so include conversion to energy units. When using NG it is common to measure energy content as well as refer to energy content in the supply contracts. In such cases mass and/or weight is often not measured or recorded, as in the case of DPP. The PP has used energy data instead of mass or weight and cancelled the conversion to energy. It is the opinion of SQS, that the deviation does not affect the meaning of the equation or the result of the calculations.

Requirement	Ref.	MoV	Draft Concl.	Final Concl.	Norm. Ref.
<b>1.6. Project Design Deviations</b>					
<p>1.6.1. Deviations from the project description are permitted at verification. The procedures for documenting the deviation depend on whether the deviation impacts the applicability of the methodology, additionality or the appropriateness of the baseline scenario. Interpretation of whether the deviation impacts any of these shall be determined consistent with the CDM Guidelines on assessment of different types of changes from the project activity as described in the registered PDD, mutatis mutandis. The procedures are as follows:</p> <ol style="list-style-type: none"> <li>1) Where the deviation impacts the applicability of the methodology, additionality or the appropriateness of the baseline scenario, the deviation shall be described and justified in a revised version of the project description. This shall include a description of when the changes occurred, the reasons for the changes and how the changes impact the applicability of the methodology, additionality and/or the appropriateness of the baseline scenario. An example of such a deviation is a change in project capacity where a different baseline scenario would be more plausible, the applied methodology would no longer be applicable, or there would be a significant impact on the investment analysis used by the project to demonstrate additionality. Other examples include changes to the project that might have similar impacts such as the addition of new carbon pools or new types of project activities</li> <li>2) Where the deviation does not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario, and the project remains in compliance with the applied methodology, the deviation shall be described and justified in the monitoring report. This shall include a description of when the changes occurred and the reasons for the changes. The deviation shall also be described in all subsequent monitoring reports. Examples of such deviations include changes in the procedures for measurement and monitoring, or project design changes that do not have an impact on the applicability of the methodology, additionality or the appropriateness of the baseline scenario.</li> </ol> <p>Note that project proponents may apply project description deviations for the purpose of switching to the latest version of the methodology, or switching to a different methodology. For example, a project proponent may want to switch to the latest version of a methodology where such version includes additional types of carbon pools or project activities.</p>		DR	NA	NA	[1]
Comment					

Requirement	Ref.	MoV	Draft Concl.	Final Concl.	Norm. Ref.
1.6.2. The deviation shall be assessed by a validation/verification body and the process, findings and conclusions shall be reported in the verification report. The assessment shall determine whether the deviation is appropriately described and justified, and whether the project remains in compliance with the VCS rules. The deviation shall also be reported on in all subsequent verification reports. Project description deviations are not considered to be precedent setting.		DR	NA	NA	[1]
Comment					
1.6.3. The validation/verification body assessing the project description deviation shall be accredited for the applicable sectoral scope for both validation and verification, recognizing that assessment of project description deviations is a validation activity.		DR	NA	NA	[1]
Comment					
<b>1.7. Project Start Date</b>					
1.7.1. The project start date is the date on which the project began generating GHG emission reductions or removals (see VCS document AFOLU Requirements for further specification for AFOLU projects). The rules and requirements on project start date, as well as validation and verification dates, are set out in the sections below. For projects registered under both the VCS Program and an approved GHG program, further specification with respect to the validation deadline is set out in [1] Section 3.11.		DR	OK	OK	[1]
Comment: Project start date is not finally set at the time of validation.					
Non-AFOLU					
1.7.2. Non-AFOLU projects shall complete validation within two years of the project start date. Additional time is granted for non-AFOLU projects to complete validation where they are applying a new VCS methodology. Specifically, projects using a new VCS methodology and completing validation within one year of the approval of the methodology by the VCSA may complete validation within three years of the project start date. Note that new VCS methodology in this context refers to both newly issued VCS methodologies and newly issued VCS revisions to approved GHG program methodologies. The grace period does not apply in relation to any subsequent versions of such new methodologies and new methodology revisions that may be issued.		DR	OK	OK	[1]
Comment: Project start date is not finally set at the time of validation.					

Requirement	Ref.	MoV	Draft Concl.	Final Concl.	Norm. Ref.
<b>1.8. Project Crediting Period</b>					
1.8.1. For non-AFOLU projects and ALM projects focusing exclusively on reducing N <sub>2</sub> O, CH <sub>4</sub> and/or fossil-derived CO <sub>2</sub> emissions, the project crediting period shall be a maximum of ten years which may be renewed at most twice. For all other AFOLU projects other than such ALM projects, the project crediting period shall be a minimum of 20 years up to a maximum of 100 years, which may be renewed at most four times with a total project crediting period not to exceed 100 years. Where projects fail to renew the project crediting period, the project crediting period shall end and the project shall be ineligible for further crediting.		DR	OK	OK	[1]
Comment: The project crediting period shall be ten years.					
1.8.2. Projects registered under other GHG programs are not eligible for VCU issuance beyond the end of the total project crediting period under those programs. For example, a CDM project with a seven year twice renewable project crediting period is not eligible for VCU issuance beyond the end of those 21 years. Where projects have been registered under more than one other GHG program, they are not eligible for VCU issuance after the date that is the earliest end date of all applicable project crediting periods.		DR	OK	OK	[1]
Comment: The project does not seek further VCUs after the crediting period.					
1.8.3. Project crediting periods under the VCS Program shall be renewed as set out in [1] Section 3.8.5		DR	NA	NA	[1]
Comment					
<b>1.9. Project Scale</b>					
1.9.1. Projects are categorized by size according to their estimated average annual GHG emission reductions or removals, as set out below, and materiality requirements for validation and verification differ accordingly, as set out in [1] Section 5.3.1 of the VCS Standard:  1) Projects: Less than or equal to 300,000 tonnes of CO <sub>2</sub> e per year.  2) Large projects: Greater than 300,000 tonnes of CO <sub>2</sub> e per year.		DR	OK	OK	[1]
Comment: The expected emission reduction of an average of 343 517 tCO <sub>2</sub> per year and 3 435 173 tCO <sub>2</sub> for the whole crediting period of 10 years is correct, accurately and conservatively calculated. Therefore, the project is a large scale one.					

Requirement	Ref.	MoV	Draft Concl.	Final Concl.	Norm. Ref.
<b>1.10. Project Location</b>					
<p>1.10.1. Project location shall be specified in the project description as follows:</p> <ol style="list-style-type: none"> <li>1) Project location for non-AFOLU projects shall be specified by a single geodetic coordinate. Where there are multiple project activity instances (see [1] Section 3.3 for more information on multiple project activities), the following applies:               <ol style="list-style-type: none"> <li>a) Where it is reasonable to do so, a geodetic coordinate shall be provided for each instance and provided in a KML file; or</li> <li>b) Where there are a large number project activity instances (e.g., cookstoves or energy efficient light bulbs), at least one geodetic coordinate shall be provided, together with sufficient additional geographic information (with respect to the location of the instances) to enable sampling by the validation/verification body.</li> </ol> </li> <li>2) Project location for grouped projects shall be specified using geodetic polygons to delineate the project's geographic area or areas (see [1] Section 3.4.2 for further information on geographic areas for grouped projects) and provided in a KML file.</li> <li>3) Project location for AFOLU projects shall be specified using geodetic polygons to delineate the geographic area of each AFOLU project activity and provided in a KML file.</li> </ol>		DR, I, OSV	OK	OK	[1]

Comment: Project location is given in details, and has been confirmed during the on-site-visit.

Requirement	Ref.	MoV	Draft Concl.	Final Concl.	Norm. Ref.
-------------	------	-----	-----------------	-----------------	---------------

**1.11. Ownership and Other Programs**

Right of Use

<p>1.11.1. The project description shall be accompanied by documentary evidence establishing conclusively one or more of the following rights of use (see VCS document Program Definitions for definition of right of use) accorded to the project proponent(s):</p> <ol style="list-style-type: none"> <li>1) A right of use arising or granted under statute, regulation or decree by a competent authority.</li> <li>2) A right of use arising under law.</li> <li>3) A right of use arising by virtue of a statutory, property or contractual right in the plant, equipment or process that generates GHG emission reductions and/or removals (where such right includes the right of use of such reductions or removals and the project proponent has not been divested of such right of use).</li> <li>4) A right of use arising by virtue of a statutory, property or contractual right in the land, vegetation or conservational or management process that generates GHG emission reductions and/or removals (where such right includes the right of use of such reductions or removals and the project proponent has not been divested of such right of use).</li> <li>5) An enforceable and irrevocable agreement with the holder of the statutory, property or contractual right in the plant, equipment or process that generates GHG emission reductions and/or removals which vests the right of use in the project proponent.</li> <li>6) An enforceable and irrevocable agreement with the holder of the statutory, property or contractual right in the land, vegetation or conservational or management process that generates GHG emission reductions or removals which vests the right of use in the project proponent.</li> <li>7) A right of use arising from the implementation or enforcement of laws, statutes or regulatory frameworks that require activities be undertaken or incentivize activities that generate GHG emission reductions or removals.</li> </ol>		DR	OK	OK	[1]
---	--	----	----	----	-----

Comment: Ownership has been checked.

Emission Trading Programs and Other Binding Limits		DR	OK	OK	[1]
1.11.2. Where projects reduce GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading, evidence shall be provided that the GHG emission reductions or removals generated by the project have not and will not be otherwise counted or used under the program or mechanism. Such evidence may include:					
1) A letter from the program operator, designated national authority or other relevant regulatory authority that emissions allowances (or other GHG credits used in the program) equivalent to the reductions or removals generated by the project have been cancelled from the program or national cap, as applicable.		DR	NA	NA	[1]
2) Evidence of the purchase and cancellation of GHG allowances equivalent to the GHG emissions reductions or removals generated by the project related to the program or national cap.					
3) Evidence from the program operator, designated national authority or other relevant regulatory authority stating that the specific GHG emission reductions or removals generated by the project or type of project are not within the scope of the program or national cap.					

Comment: The project does not participate in other credit programs.

#### Other Forms of Environmental Credit

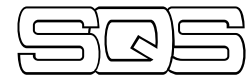
1.11.3. Where projects have created another form of GHG-related environmental credit, such as renewable energy certificates, evidence shall be provided (to the VCS registry administrator) demonstrating that such environmental credits which have been issued during that monitoring period have not been used and have been cancelled from the environmental credit program. Note that this requirement does not apply to non-GHG related environmental credits, such as water or biodiversity credits. .		DR	NA	NA	[1]
---	--	----	----	----	-----

Comment: The project does not participate in other credit programs.

#### Participation under other GHG programs

1.11.4. Projects may be registered under both the VCS Program and either an approved GHG program or a GHG program that is not an approved GHG program. The rules and requirements set out in the sections below apply.		DR	NA	NA	[1]
--	--	----	----	----	-----

Comment: The project does not participate in other GHG programs.



1.11.5. Project proponents shall not claim credit for the same GHG emission reduction or removal under the VCS Program and another GHG program. Projects issuing GHG credits under both the VCS Program and another GHG program shall also comply with the rules and requirements set out in VCS document Registration and Issuance Process.		DR	NA	NA	[1]
--	--	----	----	----	-----

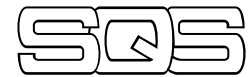
Comment: The project does not participate in other GHG programs.

1.11.6. Projects registered under other GHG programs are not eligible for VCU issuance beyond the end of the total project crediting period under those programs (see [1] Section 3.8.3 for further information).		DR	NA	NA	[1]
---	--	----	----	----	-----

Comment: The project does not participate in other GHG programs.

1.11.7. For projects validated under the CDM as a Program of Activities (PoA), each CDM Program Activity (CPA) shall be registered as a separate project accompanied by its associated Program of Activities Design Document. Each such project shall be validated in accordance with [1] Section 3.11.8(1) below. The project start date for such projects is the date on which the first activity under the Program of Activities began reducing or removing GHG emissions. Where the project start date is before 8 March 2011, validation shall be completed within four years of the project start date; otherwise, validation shall be completed within two years of the project start date (in this case, validation refers to validation of the first CPA under the associated PoA).		DR	NA	NA	[1]
--	--	----	----	----	-----

Comment



Approved GHG Programs

<p>1.11.8. The following applies with respect to projects registered under both the VCS Program and an approved GHG program:</p> <ol style="list-style-type: none"> <li>1) For projects validated under the CDM, the cover page and sections 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13 of the VCS Project Description Template shall be completed. A validation/verification body shall undertake a validation of same, which shall be accompanied by a validation representation, to provide a gap validation for the project's compliance with the VCS rules.</li> <li>2) For projects validated under any other approved GHG program, the cover page and sections of the VCS Project Description Template as specified on the VCS website shall be completed. A validation/verification body shall undertake a validation of same, which shall be accompanied by a validation representation, to provide a gap validation for the project's compliance with the VCS rules.</li> <li>3) The approved GHG program validation (or verification, where the approved GHG program does not have a validation step) or VCS validation shall be completed within the relevant validation deadline as set out in [1] Section 3.7. Validation (or verification) is deemed to have been completed when the validation (or verification) report that is submitted to the relevant program to request registration has been issued.</li> <li>4) AFOLU projects shall comply with the additional requirements set out in VCS document AFOLU Requirements.</li> </ol>		DR	NA	NA	[1]
---	--	----	----	----	-----

Comment: The project does not participate in other GHG programs.

Other GHG Programs

<p>1.11.9. Non-AFOLU projects may be registered under both the VCS Program and a GHG program that is not an approved GHG program where a validation or verification report has been issued under such program (by an entity approved under the program to issue such reports). For such projects, the following applies:</p> <ol style="list-style-type: none"> <li>1) The project start date shall be on or after 19 November 2007.</li> <li>2) A new VCS Project Description Template shall be completed (using a methodology eligible under the VCS Program) and a validation/verification body shall undertake a full validation of same in accordance with the VCS rules. The validation report shall be accompanied by a validation representation.</li> </ol> <p>The validation or verification that is submitted to request registration under the other GHG program shall be completed within the relevant validation deadline set out in [1] Section 3.7. Validation or verification is deemed to have been completed when the validation or verification report that is submitted to the other GHG program to request registration has been issued.</p>		DR	NA	NA	[1]
--	--	----	----	----	-----

Comment: The project does not participate in other GHG programs.

Projects Rejected by Other GHG Programs

<p>1.11.10. Projects rejected by other GHG programs due to procedural or eligibility requirements can be considered under the VCS Program, but the following conditions shall be met:</p> <ol style="list-style-type: none"> <li>1) The project description (where the other GHG program has rejected the project before VCS validation) or monitoring report (where the other GHG program has rejected the project after VCS validation) shall clearly state all GHG programs to which the project has applied for registration and the reason(s) for rejection. Such information shall not be deemed as commercially sensitive information.</li> <li>2) The validation/verification body shall be provided with the rejection document(s), including any additional explanations.</li> <li>3) The project shall be validated against the VCS rules. For projects where the other GHG program has rejected the project after VCS validation, this means a complete revalidation of the project against the VCS rules.</li> </ol>		DR	NA	NA	[1]
---	--	----	----	----	-----

Comment: The project first sought CDM registration, but due to financial reasons Dominican Power Partners decided to move the project under VCS. SQS has been the contracted DOE for the CDM validation, and the CDM registration neither has taken place, nor has it been rejected. There is no legal or any other binding to implement the project, as it has all permits for operation in its current form. The project did not participate in any other GHG emission reduction environmental credit program. The validation team approves that there is no double counting involved in this project activity during this validation.

### 1.12. Project Boundary

1.12.1. The project boundary shall be described (using diagrams, as required) and GHG sources, sinks and reservoirs shall be identified and assessed in accordance with the methodology applied to the project. The project shall justify not selecting any relevant GHG source, sink and reservoirs.		DR, I, OSV	OK	OK	[1]
---	--	------------	----	----	-----

Comment: The project boundary is described in enough detail.

### 1.13. Baseline Scenario

1.13.1. The baseline scenario for the project shall be determined in accordance with the requirements set out in the methodology applied to the project, and the choice of baseline scenario shall be justified.		DR	CAR#10	OK	[1]
--	--	----	--------	----	-----

Comment: CAR#10 has been raised as not the most CDM tools have been used. It has been corrected, and the most recent CDM methodology and tools are used.

1.13.2. Equivalence in type and level of activity of products or services provided by the project and the baseline scenario shall be demonstrated and, where appropriate, any significant differences between the project and the baseline scenario shall be explained.		DR, I	OK	OK	[1]
---	--	-------	----	----	-----

Comment: Enough details are given in the PD. This has been cross-checked during the interviews.

1.13.3. In developing the baseline scenario, assumptions, values and procedures shall be selected that help ensure that net GHG emission reductions and removals are not overestimated.		DR	OK	OK	[1]
---	--	----	----	----	-----

Comment: The ER is conservatively calculated.

**1.14. Additionality**

<p>1.14.1. Additionality shall be demonstrated and assessed in accordance with the requirements set out in the methodology applied to the project.</p> <p>The only exception to this is in respect of activity methods approved under the VCS Program (see [1] Section 4.1.11 for further information on activity methods). Where a VCS module using an activity method is applicable to the project, additionality may be demonstrated using the module in substitution of the additionality requirements set out in the methodology. For example, if a module uses an activity method (i.e., positive list) to deem a project activity additional, the project proponent does not have to follow the additionality requirements in the methodology applied to the project and may instead demonstrate additionality by demonstrating that it meets the applicability conditions and any other criteria of the activity method. Note that only modules may be used in this way. Where a methodology contains an activity method for additionality, the additionality procedures may not be applied in conjunction with a different methodology.</p>		DR	CAR	OK	[1]
--	--	----	-----	----	-----

Comment: Multiple CARs (#10, #11, #15, #16) have been raised, to make the additionally calculations sound. All CARs have been closed.

**1.15. Quantification of GHG Emissions Reductions and Removals**

<p>1.15.1. GHG emissions and/or removals shall be estimated for each GHG source, sink and/or reservoir relevant for the project (including leakage) and the baseline scenario.</p>		DR	OK	OK	[1]
--	--	----	----	----	-----

Comment: The GHG calculation is conservative.

<p>1.15.2. The net GHG emission reductions and removals generated by the project shall be quantified.</p>		DR	OK	OK	[1]
---	--	----	----	----	-----

Comment: GHG reduction is calculated.

**1.16. Monitoring**

Data and Parameters

<p>1.16.1. Data and parameters used for the quantification of GHG emission reductions and/or removals shall be provided in accordance with the methodology.</p>		DR	OK	OK	[1]
---	--	----	----	----	-----

Comment: Data and parameters are provided as per the methodology.

1.16.2. Quality management procedures to manage data and information shall be applied and established. Where applicable, procedures to account for uncertainty in data and parameters shall be applied in accordance with the requirements set out in the methodology.		DR	FAR#2	FAR#2	[1]
--	--	----	-------	-------	-----

Comment: Training for monitoring, monitoring procedures, monitoring organisation, data management, quality control and quality assurance have to be verified during the first verification.

Monitoring Plan

1.16.3. The project proponent shall establish a GHG information system for obtaining, recording, compiling and analyzing data and information important for quantifying and reporting GHG emissions and/or removals relevant for the project (including leakage) and baseline scenario.		DR	OK	OK	[1]
---	--	----	----	----	-----

Comment: The monitoring arrangements described in the monitoring plan are feasible with the project design.

1.16.4. A monitoring plan for the project that includes roles and responsibilities shall be established.		DR	OK	OK	[1]
--	--	----	----	----	-----

Comment: The monitoring plan described in the PDD was checked during desk-review and on-site visit with the interviewed persons concerning training and implementation.

1.16.5. Where measurement and monitoring equipment is used, the project proponent shall ensure the equipment is calibrated according to the equipment's specifications and/or relevant national or international standards.		DR	OK	OK	[1]
---	--	----	----	----	-----

Comment: The monitoring plan described in the PDD was checked during desk-review and on-site visit with the interviewed persons concerning training and implementation.

Monitoring Report

<p>1.16.6. The monitoring report shall include all the data and information as set out in the monitoring requirements of the project description and the applied methodology. It shall be prepared using the VCS Monitoring Report Template and shall include the following:</p> <ol style="list-style-type: none"> <li>1) A summary of the project details.</li> <li>2) The implementation status of the project.</li> <li>3) The data and parameters (both available at validation and monitored) and a description of the monitoring plan.</li> <li>4) The calculation of net GHG emission reductions and removals.</li> <li>5) Any additional information relevant to monitoring.</li> </ol>		DR	NA	NA	[1]
--	--	----	----	----	-----

Comment

<p>1.16.7. Where a monitoring report and associated verification report divide a verification period into vintages, separate VCU issuance records in accordance with vintage periods may be issued, as set out in VCS document Registration and Issuance Process.</p>		DR, I	NA	NA	[1]
---	--	-------	----	----	-----

Comment

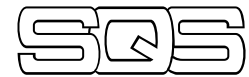
**1.17. Records and Information**

<p>1.17.1. The project proponent shall ensure that all documents and records are kept in a secure and retrievable manner for at least two years after the end of the project crediting period.</p>		DR, I	OK	OK	[1]
--	--	-------	----	----	-----

Comment

<p>1.17.2. For validation, the project proponent shall make available to the validation/verification body the project description, evidence of right of use and any requested supporting information and data needed to support statements and data in the project description and evidence of right of use.</p>		DR, I	NA	NA	[1]
--	--	-------	----	----	-----

Comment



1.17.3. For verification, the project proponent shall make available to the validation/verification body the project description, validation report, monitoring report applicable to the monitoring period and any requested supporting information and data needed to evidence statements and data in the monitoring report.		DR, I	NA	NA	[1]
---	--	-------	----	----	-----

Comment

**1.18. Project Description**

1.18.1. The project and its context shall be described in the project description using the VCS Project Description Template (or approved GHG program project description template where the project is requesting registration under an approved GHG program).		DR, I	OK	OK	[1]
---	--	-------	----	----	-----

Comment: The most recent template is used.

Content of Project Description

<p>1.18.2. The project description shall include the following:</p> <p>1) Project details, which shall include:</p> <ul style="list-style-type: none"> <li>a) The project title, a summary description of the project, the sectoral scope(s) of the project and project type.</li> <li>b) The names, roles and responsibilities of the project proponent(s) and any other entities involved in the project.</li> <li>c) The project start date and project crediting period, and the project scale and the estimated net GHG emission reductions or removals created by the project.</li> <li>d) A description of the project activities, a specification of the project location and geographic boundaries, and a description of conditions prior to project initiation.</li> <li>e) Identification and demonstration of compliance with relevant laws, statutes and other regulatory frameworks, an indication of whether the project has been registered or rejected under any other GHG program and provision of information relevant to the demonstration of compliance with VCS requirements with respect to such, and a demonstration that the project neither has nor intends to generate other forms of GHG related environmental credits for VCUs claimed under the VCS Program (noting that the project may be registered under the VCS Program and another GHG program, as set out in [1] Section 3.11.4).</li> <li>f) Additional information relevant to the project, including eligibility criteria for new instances of project activities for grouped projects, a description of any leakage management plan or mitigation measures and any further information which may relate to the eligibility of the project, risks to net GHG emission reductions or removals, the quantification of net GHG emission reductions or removals, and an indication of commercially sensitive information that has been excluded from the public project description.</li> </ul>		DR, I	OK	OK	[1]
---	--	-------	----	----	-----

Comment: The project description covers all the VCS requirements.

<p>2) The title and reference of the methodologies applied to the project (including the version number), a demonstration that the project activity or activities meet the applicability conditions of the methodology(s) applied to the project, a definition of the project boundary and identification of GHG sources, sinks and reservoirs as well as sources of leakage, a description of the baseline scenario, a demonstration of additionality, and a description of any methodology deviations applied to the project. With respect to the demonstration of additionality, sufficient information shall be provided so that a reader can reproduce the analysis and obtain the same results.</p> <p>3) A description of all data and parameters, available at validation, used for measuring, monitoring and calculating GHG emissions and net GHG emission reductions or removals, a description of all data and parameters monitored, and a description of the monitoring plan</p> <p>4) A calculation of baseline emissions, project emissions, leakage emissions (if applicable) and net GHG emission reductions and removals.</p> <p>5) A summary of any environmental impact assessments conducted.</p> <p>6) A summary of relevant outcomes from any stakeholder consultations conducted.</p> <p>7) Evidence of right of use and a demonstration that net GHG emission reductions or removals generated by the project will not be used for compliance with an emission trading program or to meet binding limits on GHG emissions.</p> <p>8) For AFOLU projects, where required, the project description shall be accompanied by a non-permanence risk analysis prepared in accordance with VCS document AFOLU Non-Permanence Risk Tool.</p>		DR, I	OK	OK	[1]
---	--	-------	----	----	-----

Comment: The project description covers all the VCS requirements.

Commercially Sensitive Information

<p>1.18.3. All information in the project documents shall be presumed to be available for public review, though commercially sensitive information may be protected, as set out in VCS document Registration and Issuance Process, where it can be demonstrated that such information is commercially sensitive. The validation/verification body shall check that any information designated by the project proponent as commercially sensitive meets the VCS Program definition of commercially sensitive information. Information in the project documents related to the determination of the baseline scenario, demonstration of additionality, and estimation and monitoring of GHG emission reductions and removals shall not be considered to be commercially sensitive and shall be provided in the public versions of the project documents.</p>		DR	OK	OK	[1]
--	--	----	----	----	-----

Comment: During the validation the PP has shared commercially sensitive information with SQS, which has been handled appropriately.

**1.19. Applicability Conditions**

<p>1.19.1 The methodology shall use applicability conditions to specify the project activities to which it applies and shall establish criteria that describe the conditions under which the methodology can (and cannot, if appropriate) be applied. Any applicability conditions set out in tools or modules used by the methodology shall also apply (4.3.1).</p>		DR	OK	OK	[1]
--	--	----	----	----	-----

Comment: Methodology specific Protocol has been used for the methodology requirements.

Project Boundary

<p>1.19.2 The methodology shall establish criteria and procedures for describing the project boundary and identifying and assessing GHG sources, sinks and reservoirs relevant to the project and baseline scenarios. Justification for GHG sources, sinks and reservoirs included or excluded shall be provided.</p>		DR, I	OK	OK	[1]
---	--	-------	----	----	-----

Comment: Methodology specific Protocol has been used for the methodology requirements.

<p>1.19.3. In identifying GHG sources, sinks and reservoirs relevant to the project, the methodology shall set out criteria and procedures for identifying and assessing GHG sources, sinks and reservoirs that are controlled by the project proponent, related to the project or affected by the project (i.e., leakage).</p>		DR	OK	OK	[1]
---	--	----	----	----	-----

Comment: Methodology specific Protocol has been used for the methodology requirements.

<p>1.19.4. In identifying GHG sources, sinks and reservoirs relevant to the baseline scenario, the methodology shall:</p> <ol style="list-style-type: none"> <li>1) Set out criteria and procedures used for identifying the GHG sources, sinks and reservoirs relevant for the project.</li> <li>2) Where necessary, explain and apply additional criteria for identifying relevant baseline GHG sources, sinks and reservoirs.</li> <li>3) Compare the GHG sources, sinks and reservoirs identified for the project with those identified in the baseline scenario, to ensure equivalency and consistency.</li> </ol>	DR	OK	OK	[1]
---	----	----	----	-----

Comment: Methodology specific Protocol has been used for the methodology requirements.

Additionality

<p>1.19.5 The methodology shall establish a procedure for the demonstration and assessment of additionality based upon the requirements set out below. Note that such requirements are for methodology development, and projects shall demonstrate and assess additionality in accordance with the requirements set out in the applied methodology.</p>	DR, I	OK	OK	[1]
---	-------	----	----	-----

Comment: The most recent CDM Tools have been used.

1.19.6 Methodologies shall use a project method, performance method and/or activity method to determine additionality. The high level specifications and procedural steps for each approach are set out in Sections 4.6.3 to 4.6.9 below. New methodologies developed under the VCS shall meet this requirement by doing one of the following:

- 1) Referencing and requiring the use of an appropriate additionality tool that has been approved under the VCS or an approved GHG program;
- 2) Developing a full and detailed procedure for demonstrating and assessing additionality directly within the methodology; or
- 3) Developing a full and detailed procedure for demonstrating and assessing additionality in a separate tool, which shall be approved via the methodology approval process, and referencing and requiring the use of such new tool in the methodology.

Comment: Methodology specific Protocol has been used for the methodology requirements.

## 1.20 Quantification of GHG emission reductions and removals

1.20.1 The methodology shall establish criteria and procedures for quantifying GHG emissions and/or removals, and/or carbon stocks, for the selected GHG sources, sinks and/or reservoirs, separately for the project (including leakage) and baseline scenarios.		DR	OK	OK	[1]
---	--	----	----	----	-----

Comment: The most recent CDM methodology and tools are used.

1.20.2 The methodology shall establish criteria and procedures for quantifying net GHG emission reductions and removals generated by the project, which shall be quantified as the difference between the GHG emissions and/or removals, and/or as the difference between carbon stocks, from GHG sources, sinks and reservoirs relevant for the project and those relevant for the baseline scenario. Where appropriate, net GHG emission reductions and removals, and net change in carbon stocks, shall be quantified separately for the project and the baseline scenarios for each relevant GHG and its corresponding GHG sources, sinks and/or reservoirs.		DR, I	OK	OK	[1]
--	--	-------	----	----	-----

Comment: The most recent CDM methodology and tools are used.

## 1.21 Monitoring

1.21.1 The methodology shall describe the data and parameters to be reported, including sources of data and units of measurement.		DR	OK	OK	[1]
---	--	----	----	----	-----

Comment: The most recent CDM methodology and tools are used.

1.21.2 When highly uncertain data and information are relied upon, conservative values shall be selected that ensure that the quantification does not lead to an overestimation of net GHG emission reductions or removals.		DR	OK	OK	[1]
---	--	----	----	----	-----

Comment: The most recent CDM methodology and tools are used.

1.21.3 Metric tonnes shall be used as the unit of measure and the quantity of each type of GHG shall be converted to tonnes of CO <sub>2</sub> e. Consistent with UNFCCC accounting, the six Kyoto Protocol greenhouse gases shall be converted using 100 year global warming potentials derived from the <i>IPCC's Second Assessment Report</i> (which are also available and reprinted in the <i>Fourth Assessment Report</i> ). Ozone-depleting substances shall be converted using 100 year global warming potentials from the <i>Fourth Assessment Report</i> , which provides a full set of factors relevant to ODS methodologies and projects.		DR	OK	OK	[1]
---	--	----	----	----	-----

Comment: The most recent CDM methodology and tools are used.

<p>1.21.4 The methodology shall establish criteria and procedures for monitoring, which shall cover the following:</p> <ul style="list-style-type: none"> <li>1) Purpose of monitoring.</li> <li>2) Monitoring procedures, including estimation, modelling, measurement or calculation approaches.</li> <li>3) Procedures for managing data quality</li> <li>4) Monitoring frequency and measurement procedures</li> </ul>	DR	OK	OK	[1]
--	----	----	----	-----

## PROTOCOL 2: METHODOLOGICAL REQUIREMENTS (INCL. TOOLS)

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
1.	Methodology ACM0007 Conversion from single cycle to combined cycle power generation (Version 06.1.0)				
1.1.	<b>APPLICABILITY</b>				
1.1.1 [10] p.2,3	<p>This methodology applies to project activities that convert one or several grid connected power units at one site from single cycle to combined cycle mode. This methodology applies if the project power unit(s) fulfil the following conditions:</p> <ul style="list-style-type: none"> <li>The unit(s) have an operational history of at least one year with no major retrofit, and at least one unit has an operational history of more than three years with no major retrofit. There is no major retrofit in these time periods.</li> <li>In the case that a unit has less than three years operational history: all project power unit(s) were designed and commissioned for operation in single cycle mode only. This shall be demonstrated by the project participants by providing relevant documents, such as original process diagrams and schemes from the construction of the plant, licenses and/or by an on-site check by the VVB prior to the implementation of the project activity.</li> <li>During the most recent three years prior to the implementation of the project activity and during the crediting period the project power unit(s) use(d) only the following fuel types: <ul style="list-style-type: none"> <li>(a) Fossil fuels; and/or</li> <li>(b) Blends of fossil fuels and biofuels, where the biofuel is blended to the fossil fuel in a situation that is outside the control of the project participants (such as regulatory requirements to blend biodiesel with diesel or biogas with natural gas).</li> </ul> </li> </ul> <p>Note that this methodology does not allow crediting for an increase in the share of biofuels.</p> <ul style="list-style-type: none"> <li>The type(s) of fossil fuels used by the project power unit(s) during the crediting period were also used during the most recent three years prior to the implementation of the project activity, except, where applicable, any auxiliary fuel consumption (e.g. for start-ups) which shall not exceed 3% of the total fuel consumption in the unit(s) (measured on an energy basis).</li> </ul> <p>Moreover, this methodology is applicable under the condition that the project activity does not increase the lifetime of the existing gas turbine or engine during the crediting period, as determined using the "Tool to determine the remaining lifetime of equipment" (i.e. this methodology is applicable up to the end of the lifetime of existing gas turbine or engine, if shorter than crediting period).</p> <p>In addition, the applicability conditions included in the tools referred to above apply.</p>				
	<p>Comment: Applicability has been confirmed together with the additional criteria listed for ACM 0007 projects, (see page 17-23 of Validation report).</p>				

1.2 BASELINE METHODOLOGY PROCEDURE																																																						
[10] p.3	<b>Project boundary</b>																																																					
1.2.1 [10] p.3	<p>The spatial extent of the project boundary includes the project power unit(s) and all other power plants connected to the same grid electricity system. The spatial extent of the project electricity system, including issues related to the calculation of the build margin and operating margin, is defined in “Tool to calculate the emission factor for an electricity system.</p> <p>When determining project emissions, project participants shall include the following emissions sources:</p> <ul style="list-style-type: none"> <li>• CO<sub>2</sub> emissions from on-site consumption of fossil fuels to operate the project power unit(s); and</li> <li>• CO<sub>2</sub> emissions from on-site consumption of fossil fuels, to supplement the exhaust heat used to operate the steam turbine.</li> </ul> <p>When determining baseline emissions, project participants shall include the following emission sources:</p> <ul style="list-style-type: none"> <li>• CO<sub>2</sub> emissions from fossil fuel fired power plants connected to the same electricity system as the project power unit(s); and</li> <li>• CO<sub>2</sub> emissions from operation of the project power unit(s) in single cycle mode.</li> </ul> <p>The emission sources included in or excluded from the project boundary are shown in Table 1. Upstream emissions related to fossil fuels consumed by the project power unit(s) and emissions associated with the a change in the amount of exhaust heat recovery due to the project activity are outside the project boundary and included as leakage emissions.</p>		DR	OK	OK																																																	
Comment: The project boundary has been established correctly.																																																						
1.2.2 [10] p.3	<table border="1"> <thead> <tr> <th></th> <th>Source</th> <th>Gas</th> <th>Included?</th> <th>Justification / Explanation</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Baseline Scenario</td> <td rowspan="3">Grid electricity generation</td> <td>CO<sub>2</sub></td> <td>Yes</td> <td>Main emission source</td> </tr> <tr> <td>CH<sub>4</sub></td> <td>No</td> <td>Excluded for simplification. This is conservative</td> </tr> <tr> <td>N<sub>2</sub>O</td> <td>No</td> <td>Excluded for simplification. This is conservative</td> </tr> <tr> <td rowspan="3">On-site fossil fuel consumption to operate the project power unit(s) in single cycle mode</td> <td rowspan="3"></td> <td>CO<sub>2</sub></td> <td>Yes</td> <td>An important emission source</td> </tr> <tr> <td>CH<sub>4</sub></td> <td>No</td> <td>Excluded for simplification. This emission source is assumed to be very small</td> </tr> <tr> <td>N<sub>2</sub>O</td> <td>No</td> <td>Excluded for simplification. This emission source is assumed to be very small</td> </tr> <tr> <td rowspan="3">Project Activity</td> <td rowspan="3">On-site fossil fuel consumption to operate the project power unit(s) in combined cycle mode</td> <td>CO<sub>2</sub></td> <td>Yes</td> <td>An important emission source</td> </tr> <tr> <td>CH<sub>4</sub></td> <td>No</td> <td>Excluded for simplification. This emission source is assumed to be very small</td> </tr> <tr> <td>N<sub>2</sub>O</td> <td>No</td> <td>Excluded for simplification. This emission source is assumed to be very small</td> </tr> <tr> <td rowspan="3">On-site fossil fuel consumption to supplement the exhaust heat in operating the steam turbine</td> <td rowspan="3"></td> <td>CO<sub>2</sub></td> <td>Yes</td> <td>May be an important emission source</td> </tr> <tr> <td>CH<sub>4</sub></td> <td>No</td> <td>Excluded for simplification. This emission source is assumed to be very small</td> </tr> <tr> <td>N<sub>2</sub>O</td> <td>No</td> <td>Excluded for simplification. This emission source is assumed to be very small</td> </tr> </tbody> </table>		Source	Gas	Included?	Justification / Explanation	Baseline Scenario	Grid electricity generation	CO <sub>2</sub>	Yes	Main emission source	CH <sub>4</sub>	No	Excluded for simplification. This is conservative	N <sub>2</sub> O	No	Excluded for simplification. This is conservative	On-site fossil fuel consumption to operate the project power unit(s) in single cycle mode		CO <sub>2</sub>	Yes	An important emission source	CH <sub>4</sub>	No	Excluded for simplification. This emission source is assumed to be very small	N <sub>2</sub> O	No	Excluded for simplification. This emission source is assumed to be very small	Project Activity	On-site fossil fuel consumption to operate the project power unit(s) in combined cycle mode	CO <sub>2</sub>	Yes	An important emission source	CH <sub>4</sub>	No	Excluded for simplification. This emission source is assumed to be very small	N <sub>2</sub> O	No	Excluded for simplification. This emission source is assumed to be very small	On-site fossil fuel consumption to supplement the exhaust heat in operating the steam turbine		CO <sub>2</sub>	Yes	May be an important emission source	CH <sub>4</sub>	No	Excluded for simplification. This emission source is assumed to be very small	N <sub>2</sub> O	No	Excluded for simplification. This emission source is assumed to be very small				
	Source	Gas	Included?	Justification / Explanation																																																		
Baseline Scenario	Grid electricity generation	CO <sub>2</sub>	Yes	Main emission source																																																		
		CH <sub>4</sub>	No	Excluded for simplification. This is conservative																																																		
		N <sub>2</sub> O	No	Excluded for simplification. This is conservative																																																		
On-site fossil fuel consumption to operate the project power unit(s) in single cycle mode		CO <sub>2</sub>	Yes	An important emission source																																																		
		CH <sub>4</sub>	No	Excluded for simplification. This emission source is assumed to be very small																																																		
		N <sub>2</sub> O	No	Excluded for simplification. This emission source is assumed to be very small																																																		
Project Activity	On-site fossil fuel consumption to operate the project power unit(s) in combined cycle mode	CO <sub>2</sub>	Yes	An important emission source																																																		
		CH <sub>4</sub>	No	Excluded for simplification. This emission source is assumed to be very small																																																		
		N <sub>2</sub> O	No	Excluded for simplification. This emission source is assumed to be very small																																																		
On-site fossil fuel consumption to supplement the exhaust heat in operating the steam turbine		CO <sub>2</sub>	Yes	May be an important emission source																																																		
		CH <sub>4</sub>	No	Excluded for simplification. This emission source is assumed to be very small																																																		
		N <sub>2</sub> O	No	Excluded for simplification. This emission source is assumed to be very small																																																		
Comment: Sources are appropriately defined and justified; omissions are also appropriately justified.																																																						

1.3	PROCEDURE FOR THE SELECTION OF THE BASELINE SCENARIO AND THE DETERMINATION OF ADDITIONALITY				
<p>1.3.1 [10] p.4</p>	<p>Project participants shall use the latest approved version of the “Combined tool to identify the baseline scenario and demonstrate additionality” to demonstrate additionality and identify the most plausible baseline scenario.</p> <p>In applying step 1 of the tool, the following three alternatives should be considered:</p> <p>(a) Proposed project activity undertaken without being registered as a CDM project activity;</p> <p>(b) Continuation of the current practice (to not implementing the project activity);</p> <p>(c) If applicable the “proposed project activity undertaken without being registered as a CDM project activity” undertaken at a later point in time (e.g. due to existing regulations, end-of-life of existing equipment, financing aspects).</p> <p>Moreover, in applying the tool, the following is required:</p> <ul style="list-style-type: none"> <li>When the current practice condition (to continue the operation in open cycle) is assessed, the future estimated load factor should reflect the changes due to new conditions in the grid.</li> <li>If undertaking investment analysis, then this shall include the revenue generated from the possible increase in electricity produced from the open cycle component in the project situation.</li> </ul>		DR	OK	OK
	<p>Comment: The latest approved version of the “Combined tool to identify the baseline scenario and demonstrate additionality” was used to demonstrate additionality and identify the most plausible baseline scenario.</p>				
<p>1.3.2 [10] p.5</p>	<p>When undertaking the common practice analysis for the operation of the project power unit(s) in combined cycle mode:</p> <ul style="list-style-type: none"> <li>Similar activities to the project activity shall mean all single cycle and combined cycle power plants that have an installed capacity within a range of <math>\pm 50\%</math> of the project power plant and that are using one of the fossil fuel types used by the project power unit(s) (except start-up and auxiliary fuels)</li> <li>Relevant geographical area shall in principle be the host country of the proposed CDM project activity. A region within the country could be the relevant geographical area if the framework conditions vary significantly within the country. However, the relevant geographical area should include preferably ten or more such power plants. If less than ten power plants are found in the region the geographical area may be expanded to an area that covers, if possible, ten such power plants within the national grid boundary. In cases where this definition of geographical area is not suitable, the project participants should provide an alternative definition of geographical area.</li> </ul> <p>The project activity is regarded common practice if more than 50% of the assessed power plants operate in combined cycle mode. A power plant is considered to operate in combined cycle mode if any of its units operate in combined cycle mode.</p>		DR	OK	OK
	<p>Comment: The check whether more than 50% of the assessed power plants operate in combined cycle mode has been conducted (they operate in open cycle mode except for one gas based CCGT CDM project and one combined cycle fuel oil plant)</p>				

<p>1.3.3 [10] p.5</p>	<p>This methodology is only applicable where it can be demonstrated that the baseline scenario is the continuation of the current practice, i.e. that in the absence of the proposed project activity the electricity, to meet the demand in the grid system, will be generated:</p> <p>(1) By the operation of the project power unit(s) in single cycle mode; (2) By the operation of existing grid-connected power plants; and (3) By the addition of new generation sources to the grid.</p>	3	DR	OK	OK
<p>Comment: The baseline scenario is the continuation of the current practice therefore, the methodology is applicable.</p>					
<p><b>1.4 EMISSION REDUCTIONS</b></p>					
<p>1.4.1 [10] p.5</p>	<p>Emission reduction are determined as follows:</p> $ER_y = BE_y - PE_y - LE_y$ <p>Where:</p> <p>ER<sub>y</sub> = Emissions reductions in year y (tCO<sub>2</sub>)  BE<sub>y</sub> = Baseline emissions in year y (tCO<sub>2</sub>)  PE<sub>y</sub> = Project emissions in year y (tCO<sub>2</sub>)  LE<sub>y</sub> = Leakage emissions in year y (tCO<sub>2</sub>)</p>	3,5	DR	OK	OK
<p>Comment: Calculations accurately follow the methodological requirements.</p>					
<p><b>1.5 PROJECT EMISSIONS</b></p>					
<p>1.5.1 [10] p.5</p>	<p>Project emissions (PE<sub>y</sub>) should be determined using the “Tool to calculate project or leakage CO<sub>2</sub> emissions” from fossil fuel combustion” PE<sub>y</sub> is referred to in this tool as PE<sub>FC,j,y</sub>, where j corresponds to the combustion of fossil fuels to operate the project power unit(s) and to supplement the exhaust heat in operating the steam turbine.</p> <p>When applying the tool, fuels blended with biofuel should be considered to consist 100% of the fossil fuel used in the blend.</p>	3,5	DR	OK	OK
<p>Comment: Calculations accurately follow the methodological requirements. No fuels blended with biofuel in the project.</p>					

1.6 BASELINE EMISSIONS					
<p>1.6.1 [10] p.6</p>	<p>The baseline scenario is the generation of electricity by the operation of the project power unit(s) in single cycle mode as well as by grid-connected power plants. The project will partially displace electricity generated by the project power unit(s) in the baseline scenario. In addition, it may also displace electricity in the grid, if the quantity of electricity generation by the plant increases as a result of the project activity. However, it is unknown to what extent such an increase is due to the project activity or would have occurred anyway (e.g. due to a change in the electricity demand or availability of other power plants). The calculation of baseline emissions is therefore based on the three cases shown in</p>		DR	OK	OK
<p>Comment:</p>	<p>The baseline scenario is the generation of electricity by the operation of the project power unit(s) in single cycle mode as well as by grid-connected power plants. The baseline emissions are calculated accordingly.</p>				

Step 1: Determination of the baseline emissions for different scenarios of project electricity generation					
1.6.2 [10] p.6.7	<p>The baseline emissions for year <math>y</math> (<math>BE_y</math>) are calculated as follows:</p> <p><b>Step 1: Determination of the baseline emissions for different scenarios of project electricity generation</b></p> <p>Case (a) The quantity of electricity generated in the project power unit(s), adjusted for changes to efficiency, (<math>EG_{PJ,adj,y}</math>) is lower than or equal to the historic average annual generation level (<math>EG_{BL,AVR}</math>).</p> <p>Baseline emissions are calculated as:</p> $BE_y = EG_{PJ,adj,y} \cdot EF_{CO_2,BL}$ <p>Case (b) The quantity of electricity generated in the project power unit(s), adjusted for changes to efficiency, (<math>EG_{PJ,adj,y}</math>) exceeds the historic average annual generation level (<math>EG_{BL,AVR}</math>) but is lower than or equal to the maximum annual quantity of electricity that the project power unit(s) could have produced prior to the implementation of the project activity (<math>EG_{MAX}</math>). Baseline emissions are calculated as:</p> $BE_y = EG_{BL,AVR} \cdot EF_{CO_2,BL,y} + (EG_{PJ,adj,y} - EG_{BL,AVR}) \cdot \min(EF_{CO_2,BL}; EF_{grid,y})$ <p>Case (c) The quantity of electricity generated in the project power unit(s), adjusted for changes to efficiency, (<math>EG_{PJ,adj,y}</math>) exceeds the maximum annual quantity of electricity that the project power unit(s) could have produced prior to the implementation of the project activity (<math>EG_{MAX}</math>). Baseline emissions are calculated as:</p> $BE_y = EG_{BL,AVR} \cdot EF_{CO_2,BL,y} + (EG_{MAX} - EG_{BL,AVR}) \cdot \min(EF_{CO_2,BL}; EF_{grid,y}) + (EG_{PJ,adj,y} - EG_{MAX}) \cdot EF_{grid,y} \quad (4)$ <p>Where:</p> <ul style="list-style-type: none"> <li><math>BE_y</math> = Baseline emissions in year <math>y</math> (<math>tCO_2/yr</math>)</li> <li><math>EG_{PJ,adj,y}</math> = Quantity of electricity supplied by all project power units to the electricity grid in year <math>y</math>, adjusted for changes to efficiency (MWh/yr)</li> <li><math>EG_{BL,AVR}</math> = Average annual quantity of electricity supplied by all project power units to the electricity grid during the defined operational history (MWh/yr)</li> <li><math>EG_{MAX}</math> = Maximum annual quantity of electricity that could be generated by all project power units in the baseline scenario (MWh/yr)</li> <li><math>EF_{CO_2,BL}</math> = Baseline emission factor of all project power units operated in single cycle mode (<math>tCO_2/MWh</math>)</li> <li><math>EF_{grid,y}</math> = Emission factor of the electricity grid to which the project power unit is connected (<math>tCO_2/MWh</math>)</li> </ul>				
	<p>Comment: Step 1 of the baseline calculations has been conducted correctly.</p>				
1.6.3 [10] p.7	<p>The maximum annual quantity of electricity that could be generated by the project power unit(s) in the baseline scenario (<math>EG_{MAX}</math>) is calculated as:</p> $EG_{MAX} = CAP_{max} \cdot T_{max} \quad (5)$ <p>Where:</p> <ul style="list-style-type: none"> <li><math>EG_{MAX}</math> = Maximum annual quantity of electricity that could be generated by all project power units in the baseline scenario (MWh/yr)</li> <li><math>CAP_{max}</math> = Maximum gross power generation capacity of the project power unit(s) prior to the implementation of the project activity (MW)</li> <li><math>T_{MAX}</math> = Maximum amount of time during a year in which the project power unit(s) could have operated at full power generation capacity prior to the implementation of the project activity (hours/yr)</li> </ul>				
			DR	OK	OK

	<p>Comment: <math>EG_{MAX}</math> is calculated correctly.</p>				
<p>1.6.4 [10] p.7</p>	<p>If all project power units have three years operational history, and if there was no major retrofit during this period in any of the units, then the maximum annual amount of time that the project power unit(s) could have operated at full load prior to the validation of the project activity is calculated according to the equation below (Equation 6 in the methodology). Otherwise as a simplification, <math>T_{MAX}</math> equals 8,760 hours/yr.</p> $T_{MAX} = 8,760 - \frac{\sum_{x=1}^3 HMR_x}{3}$ <p>Where:  <math>T_{MAX}</math> = Maximum amount of time during a year in which the project power unit(s) could have operated at full power generation capacity prior to the implementation of the project activity (hours/yr)  <math>HMR_x</math> = Average number of hours during which the plant did not operate due to maintenance or repair in year <math>x</math> (hours/yr)  <math>x</math> = Each year during the three years operational history</p>		<p>DR</p>	<p>OK</p>	<p>OK</p>
	<p>Comment: Calculation is correctly applied; only one unit of the power plant had three years of operational history.</p>				
<p>1.6.5 [10] p.8</p>	<p>The average annual amount of electricity supplied to the electricity grid by the project power unit(s) in the three years historical period is calculated according to the equation below (Equation 7 in the methodology). This calculation should be based on data from only those units that have at least a three years operational history and no major retrofit during this period.</p> $EG_{BL,AVR} = \frac{\sum_{x=1}^3 EG_x}{3}$ <p>Where:  <math>EG_{BL,AVR}</math> = Average annual quantity of electricity supplied by all project power units to the electricity grid during the three year operational history (MWh/yr)  <math>EG_x</math> = Quantity of electricity supplied by the project power unit(s) with three years operational history and no retrofit in this period, to the electricity grid in year <math>x</math> (MWh/yr)  <math>x</math> = Each year of the three years operational history</p>		<p>DR</p>	<p>OK</p>	<p>OK</p>
	<p>Comment: The average annual amount of electricity supplied to the electricity grid by the project power unit(s) in the three years historical period is calculated correctly.</p>				

<p>1.6.6 [10] p.8</p>	<p>The total amount of electricity supplied to the electricity grid by all project power units in year y of the crediting period has to be adjusted for the calculation of baseline emissions so that future energy efficiency improvement measures (e.g. measures that may be implemented after the project activity) shall not result in emission reductions. Therefore, the total amount of electricity supplied to the grid (<math>EG_{PJ,y}</math>) shall be conservatively adjusted by applying a discount factor based on the minimum of the monitored efficiencies after the implementation of the project activity, as described in the equations below:</p> $EG_{PJ,adj,y} = EG_{PJ,y} \cdot \frac{\eta_{PJ,min,y}}{\eta_{PJ,y}}$ <p>with</p> $\eta_{PJ,min,y} = \min(\eta_{PJ,1}, \dots, \eta_{PJ,y})$ <p>Where:</p> <ul style="list-style-type: none"> <li><math>EG_{PJ,adj,y}</math> = Quantity of electricity supplied by all project power units to the electricity grid in year y, adjusted for changes to project power plant efficiency (MWh/yr)</li> <li><math>EG_{PJ,y}</math> = Total amount of electricity supplied to the electricity grid by the project power units in year y (MWh/yr)</li> <li><math>\eta_{PJ,min,y}</math> = Minimum of the yearly average energy efficiency of the project power unit(s) monitored during the previous years (1 to y) after the implementation of the project activity for year y</li> <li><math>\eta_{PJ,1}, \dots, \eta_{PJ,y}</math> = Average energy efficiency of the project power unit(s) in years 1 to y of the crediting period (refer to <math>\eta_{PJ,y}</math> in the monitoring tables)</li> </ul>		DR	OK	OK
<p>Comment: The total amount of electricity supplied to the electricity grid by all project power units in year y of the crediting period has to be adjusted.</p>					
<p><b>Step 2:</b></p>	<p><b>Estimating the emissions factor for electricity generated in single cycle mode in the baseline (<math>EF_{CO_2,BL}</math>)</b></p>				
<p>1.6.7 [10] p.9</p>	<p>If all project power units have a three years operational history and if there was no major retrofit in these unit during this period, then the baseline <math>CO_2</math> emissions factor for the project power unit(s) operated in single cycle mode (<math>EF_{CO_2,BL}</math>) is determined based on the historical performance of the units and calculated according to equation 10. Otherwise, <math>EF_{CO_2,BL}</math> is calculated according to equation 11.</p> $EF_{CO_2,BL} = \frac{\sum_{x=1}^3 \sum_{i=1}^I FC_{i,x} \times NCV_{i,x}}{\sum_{x=1}^3 EG_x} \times EF_{CO_2,min} \quad (10)$ <p>Where:</p> <ul style="list-style-type: none"> <li><math>EF_{CO_2,BL}</math> = <math>CO_2</math> emission factor for electricity generated in single cycle mode in the baseline (t<math>CO_2</math>/MWh)</li> <li><math>FC_{i,x}</math> = Quantity of fuel type i used by the project power unit(s) in year x (mass or volume unit/yr)</li> <li><math>NCV_{i,x}</math> = Net calorific value of the fuel type i used by the project power unit(s) in year x (GJ/mass or volume unit)</li> <li><math>EF_{CO_2,min}</math> = <math>CO_2</math> emission factor of the least carbon intensive fuel type used by the project power unit(s) during the three years operational history (t<math>CO_2</math>/GJ)</li> <li><math>EG_x</math> = Quantity of electricity supplied by the project power unit(s) with three years operational history and no retrofit in this period, to the electricity grid in year x (MWh/yr)</li> <li>x = Each year of the three years operational history</li> </ul>		DR	OK	OK

	Comment: See 1.6.4 above.				
1.6.8 [10] p.9	<p>If three years operational history is not available for all the units or if there was a major retrofit during this period in any of the units, then the CO<sub>2</sub> emission factor for electricity generated in single cycle mode in the baseline (EF<sub>CO<sub>2</sub>,BL</sub>) is determined using the default values for the efficiency of the power units from Annex 1 of the “Tool to calculate the emission factor for an electricity system”, according to the following equation:</p> $EF_{CO_2,BL} = \frac{3.6}{\eta} \times EF_{CO_2,min} \quad (11)$ <p>Where:  EF<sub>CO<sub>2</sub>,BL</sub> = CO<sub>2</sub> emission factor for electricity generated in single cycle mode in the baseline (tCO<sub>2</sub>/MWh)  EF<sub>CO<sub>2</sub>,min</sub> = CO<sub>2</sub> emission factor of the least carbon intensive fuel type used by the project power unit(s) during the three years operational history (tCO<sub>2</sub>/GJ)  η = Default efficiency of the project power unit(s) operated in single cycle mode</p>		DR	OK	OK
	Comment: Correctly applied as one out of the two units has three years of operational history.				
<b>Step 3:</b>	<b>Determine the emissions factor for the grid electricity system (EF<sub>grid,y</sub>)</b>				
1.6.9 [10] p.9,10	<p>The baseline emission factor for the grid (EF<sub>grid,y</sub>) should be calculated as a combined margin emission factor, using the “Tool to calculate the emission factor for an electricity system”.</p> <p>If project participants use the dispatch data analysis method, as described in the “Tool to calculate the emission factor for an electricity system”, the following modification applies:</p> <p>The group n of power plants in the dispatch margin is set of power plants in the top x% of total electricity dispatched by the grid system during hour h, where x% is equal to the greater of either:</p> <ul style="list-style-type: none"> <li>• 10%; or</li> <li>• The project generation during hour h expressed as a percentage of the total grid generation for that hour.</li> </ul>		DR	OK	OK
	Comment: The baseline emission factor for the grid (EF <sub>grid,y</sub> ) has been calculated as a combined margin emission factor, using the “Tool to calculate the emission factor for an electricity system” including the prescription of ACM 0007 described in 3.6.9.				
<b>1.7</b>	<b>LEAKAGE</b>				
1.7.1 [10] p.10	<p>The main emissions potentially giving rise to leakage in the context of the proposed projects are:</p> <p>(i) Emissions associated with the situation that exhaust heat was already recovered prior to the implementation of the project activity, in which case the diversion of this heat to the project power unit(s) may increase emissions elsewhere; and</p> <p>(ii) Emissions associated with extraction, production, transportation, distribution and processing of an increased quantity of fossil fuels consumed by the project activity (LE<sub>upstream,y</sub>).</p>		DR	OK	OK

	<p>Comment: Exhaust heat was not used prior to the project implementation; therefore only upstream leakage is considered.</p>				
<p>1.7.2 [10] p.10</p>	<p>Leakage emissions are calculated as follows:</p> $LE_y = LE_{upstream,y} + LE_{HR,y} \quad (12)$ <p>Where:  <math>LE_y</math> = Leakage emissions in year y (tCO<sub>2</sub>e/yr)  <math>LE_{upstream,y}</math> = Leakage emissions associated with the upstream emissions of an increase in fossil fuel use in the project activity in year y (tCO<sub>2</sub>e/yr)  <math>LE_{HR,y}</math> = Leakage emissions due to a decrease in the amount of heat recovered from exhaust heat for purposes other than power generation in the project, compared to the most recent year prior to the implementation of the project activity, in year y (tCO<sub>2</sub>e/yr)</p>		DR	OK	OK
	<p>Comment: Leakage has been calculated according to the functions prescribed in the methodology.</p>				
<p>1.7.3 [10] p.10,11</p>	<p>Determination of LEHR,y</p> <p>If the quantity of heat recovered from the exhaust heat during the most recent year prior to the implementation of the project activity (<math>Q_{HR,x}</math>) is either less than 3% of the fossil fuels consumed by the project power units in an energy basis or is smaller or equal to the amount of heat recovered from exhaust heat in year y for purposes other than power generation (<math>Q_{HR,y}</math>), then emissions from this leakage source are equal to zero.</p> <p>Otherwise, <math>LE_{HR,y}</math> is calculated as the amount of reduction in heat recovery multiplied by the emission factor for the most carbon intensive fuel used during the operational history of the project power unit(s) according to equation 14. If a fuel blended with biofuels was used in the operational history, then the emission factor for this fuel should be considered to be the emission factor for the fossil fuel used in the blend.</p> $LE_{HR,y} = (Q_{HR,x} - Q_{HR,y}) \cdot EF_{CO_2,max} \quad (13)$ <p>Where:  <math>LE_{HR,y}</math> = Leakage emissions due to a decrease in the amount of heat recovered from exhaust heat for purposes other than power generation in the project, compared to the most recent year prior to the implementation of the project activity, in year y (tCO<sub>2</sub>e/yr)  <math>Q_{HR,x}</math> = Quantity of heat recovered from the exhaust heat of the project power unit(s) during the most recent year prior to the implementation of the project activity (GJ/yr)  <math>Q_{HR,y}</math> = Quantity of heat recovered from the exhaust heat of the project power unit(s) for purposes other than power generation in year y (GJ/yr)  <math>EF_{CO_2,max}</math> = CO<sub>2</sub> emission factor of the of the most carbon intensive fuel type used by the project power unit(s) in the operational history (tCO<sub>2</sub>/GJ)</p>			N/A	N/A
	<p>Comment: Not applicable as no heat was recovered.</p>				

<p>1.7.4 [10] p.11</p>	<p><b>Determination of <math>LE_{upstream,y}</math></b>            In cases where <math>EG_{PJ,adj,y}</math> is smaller than <math>EG_{BL,AVR}</math> (as illustrated by case (a) in Figure 1), then leakage emissions from this source are equal to zero. Otherwise, leakage emissions associated with the upstream emissions of an increase in fossil fuel use in the project activity are calculated as follows:</p> $LE_{upstream,y} = \max \left[ 0, \left( \sum_i (FC_{i,y} \cdot NCV_{i,y} \cdot EF_{i,upstream,CH4}) \cdot GWP_{CH4} + LE_{LNG,CO2,y} \right) \cdot \left( 1 - \frac{\frac{1}{3} \cdot \sum_{x=1}^3 \sum_i FC_{i,x} \cdot NCV_{i,x}}{\sum_i FC_{i,y} \cdot NCV_{i,y}} \right) \right]$ <p>Where:</p> <p><math>LE_{upstream,y}</math> = Leakage emissions associated with the upstream emissions from an increase in fossil fuel use in the project activity in the year <math>y</math> (tCO<sub>2</sub>e/yr)</p> <p><math>FC_{i,y}</math> = Quantity of fuel type <math>i</math> used by the project power unit(s) in year <math>y</math> (mass or volume unit/yr)</p> <p><math>NCV_{i,y}</math> = Average net calorific value of the fuel type <math>i</math> used by the project power unit(s) in year <math>y</math> (GJ/mass or volume unit)</p> <p><math>EF_{i,upstream,CH4}</math> = Emission factor for upstream fugitive methane emissions from production, transportation, distribution of fossil fuel <math>i</math> used by the project power unit(s) in year <math>y</math> (tCH<sub>4</sub>/GJ)</p> <p><math>GWP_{CH4}</math> = Global warming potential of methane valid for the relevant commitment period (tCO<sub>2</sub>e/tCH<sub>4</sub>)</p> <p><math>LE_{LNG,CO2,y}</math> = Leakage emissions due to fossil fuel combustion/ electricity consumption associated with the liquefaction/ transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system in year <math>y</math> (tCO<sub>2</sub>e/yr)</p> <p><math>FC_{i,x}</math> = Quantity of fuel type <math>i</math> used by the project power unit(s) in year <math>x</math> (mass or volume unit/yr)</p> <p><math>NCV_{i,x}</math> = Net calorific value of fuel type <math>i</math> used by the project power unit(s) in year <math>x</math> (GJ/mass or volume unit)</p> <p><math>x</math> = Each year of the three years operational history</p>		DR	OK	OK
<p>Comment:</p>	<p>Leakage emissions associated with the upstream emissions of an increase in fossil fuel use in the project activity are calculated correctly.</p>				

<p>1.7.5 [10] p.11,12</p>	<p>Leakage emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system (<math>LE_{LNG,CO_2,y}</math>) are calculated, where applicable, as follows:</p> $LE_{LNG,CO_2,y} = FC_{LNG,y} \cdot NCV_{LNG,y} \cdot EF_{CO_2,upstream,LNG} \quad (15)$ <p>Where:  <math>LE_{LNG,CO_2,y}</math>: = Leakage emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system in year <math>y</math> (tCO<sub>2</sub>e/yr)  <math>FC_{LNG,y}</math>: = Quantity of natural gas produced from LNG used by the project power unit(s) in year <math>y</math> (mass or volume unit/yr)  <math>NCV_{LNG,y}</math>: = Net calorific value of natural gas produced from LNG used by the project power unit(s) in year <math>y</math> (GJ/mass or volume unit)  <math>EF_{CO_2,upstream,LNG}</math>: = Emission factor for upstream CO<sub>2</sub> emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system (t CO<sub>2</sub>e/GJ)</p>		DR	OK	OK												
<p>Comment: Leakage emission due to fossil fuel combustion associated with the liquefaction, transportation, re-gasification and compression of LNG are calculated correctly.</p>																	
<p><b>1.8 DATA AND PARAMETERS AVAILABLE EX-ANTE</b></p>																	
<p>1.8.1 [10] p.12</p>	<p>In addition to the parameters listed in the tables below, the provisions on data and parameters not monitored in the tools referred to in this methodology apply.</p>		DR	OK	OK												
<p>Comment: Parameters are available according to the methodology</p>																	
<p>1.8.2 [10] p.12</p>	<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td>EG<sub>x</sub></td> </tr> <tr> <td><b>Data unit:</b></td> <td>MWh/yr</td> </tr> <tr> <td><b>Description:</b></td> <td>Quantity of electricity supplied by the project power unit(s) with three years operational history and no retrofit in this period, to the electricity grid in year <math>x</math></td> </tr> <tr> <td><b>Source of data:</b></td> <td>Generation records. Historical data of electricity supplied by the project to the grid in the defined operational history (see Definitions)</td> </tr> <tr> <td><b>Measurement procedures:</b></td> <td></td> </tr> <tr> <td><b>Any comment:</b></td> <td>The consistency of metered net electricity generation should be cross-checked with receipts from sales (if available). Meters should be subject to regular maintenance and calibration. Year <math>x</math> refers to each year of the unit's three years operational history. This parameter is only required if any of the project power unit(s) does not have three years operational history with no major retrofit in this period</td> </tr> </table>	<b>Data / Parameter:</b>	EG <sub>x</sub>	<b>Data unit:</b>	MWh/yr	<b>Description:</b>	Quantity of electricity supplied by the project power unit(s) with three years operational history and no retrofit in this period, to the electricity grid in year $x$	<b>Source of data:</b>	Generation records. Historical data of electricity supplied by the project to the grid in the defined operational history (see Definitions)	<b>Measurement procedures:</b>		<b>Any comment:</b>	The consistency of metered net electricity generation should be cross-checked with receipts from sales (if available). Meters should be subject to regular maintenance and calibration. Year $x$ refers to each year of the unit's three years operational history. This parameter is only required if any of the project power unit(s) does not have three years operational history with no major retrofit in this period		DR	OK	OK
<b>Data / Parameter:</b>	EG <sub>x</sub>																
<b>Data unit:</b>	MWh/yr																
<b>Description:</b>	Quantity of electricity supplied by the project power unit(s) with three years operational history and no retrofit in this period, to the electricity grid in year $x$																
<b>Source of data:</b>	Generation records. Historical data of electricity supplied by the project to the grid in the defined operational history (see Definitions)																
<b>Measurement procedures:</b>																	
<b>Any comment:</b>	The consistency of metered net electricity generation should be cross-checked with receipts from sales (if available). Meters should be subject to regular maintenance and calibration. Year $x$ refers to each year of the unit's three years operational history. This parameter is only required if any of the project power unit(s) does not have three years operational history with no major retrofit in this period																
<p>Comment: Historical data of electricity supplied by the project to the grid in the defined operational history. Data reported by the grid coordinator was used (official confirmation as to the validity of the data from the OC was provided to the VVB).</p>																	
<p>1.8.3 [10] p.12</p>	<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td>FC<sub>i,x</sub></td> </tr> <tr> <td><b>Data unit:</b></td> <td>Mass or volume unit/yr</td> </tr> <tr> <td><b>Description:</b></td> <td>Quantity of fuel type <math>i</math> used by the project power unit(s) in year <math>x</math></td> </tr> <tr> <td><b>Source of data:</b></td> <td>Historical data of annual fuel consumption by the project operating in single cycle mode</td> </tr> <tr> <td><b>Measurement procedures:</b></td> <td></td> </tr> <tr> <td><b>Any comment:</b></td> <td>The data for any direct measurements with mass or volume meters at the plant site should be cross-checked with an annual energy balance that is based on purchased quantities and stock changes. Meters should be subject to regular maintenance and calibration Year <math>x</math> refers to each year of the unit's operational history</td> </tr> </table>	<b>Data / Parameter:</b>	FC <sub>i,x</sub>	<b>Data unit:</b>	Mass or volume unit/yr	<b>Description:</b>	Quantity of fuel type $i$ used by the project power unit(s) in year $x$	<b>Source of data:</b>	Historical data of annual fuel consumption by the project operating in single cycle mode	<b>Measurement procedures:</b>		<b>Any comment:</b>	The data for any direct measurements with mass or volume meters at the plant site should be cross-checked with an annual energy balance that is based on purchased quantities and stock changes. Meters should be subject to regular maintenance and calibration Year $x$ refers to each year of the unit's operational history	3	DR	OK	OK
<b>Data / Parameter:</b>	FC <sub>i,x</sub>																
<b>Data unit:</b>	Mass or volume unit/yr																
<b>Description:</b>	Quantity of fuel type $i$ used by the project power unit(s) in year $x$																
<b>Source of data:</b>	Historical data of annual fuel consumption by the project operating in single cycle mode																
<b>Measurement procedures:</b>																	
<b>Any comment:</b>	The data for any direct measurements with mass or volume meters at the plant site should be cross-checked with an annual energy balance that is based on purchased quantities and stock changes. Meters should be subject to regular maintenance and calibration Year $x$ refers to each year of the unit's operational history																

	<p>Comment: Historical data of annual fuel consumption by the project operating in single cycle mode. The data available for the three most recent years is in MMBTU, and not in volume or mass units. These values were converted to GJ, using standard conversions.</p>																																					
<p>1.8.4 [10] p.13</p>	<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td colspan="2">NCV<sub>i,x</sub></td> </tr> <tr> <td><b>Data unit:</b></td> <td colspan="2">GJ/mass or volume unit</td> </tr> <tr> <td><b>Description:</b></td> <td colspan="2">Net calorific value of fuel type <i>i</i> used by the project power unit(s) in year <i>x</i></td> </tr> <tr> <td><b>Source of data:</b></td> <td colspan="2">The following data sources may be used if the relevant conditions apply:</td> </tr> <tr> <td></td> <td><b>Data source</b></td> <td><b>Conditions for using the data source</b></td> </tr> <tr> <td></td> <td>(a) Values provided by the fuel supplier in invoices</td> <td>This is the preferred source</td> </tr> <tr> <td></td> <td>(b) Measurements by the project participants</td> <td>If (a) is not available</td> </tr> <tr> <td></td> <td>(c) Regional or national default values</td> <td>If (a) is not available  These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances)</td> </tr> <tr> <td></td> <td>(d) IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories</td> <td>If (a) is not available</td> </tr> <tr> <td><b>Measurement procedures:</b></td> <td colspan="2">For (a) and (b): measurements should be undertaken in line with national or international fuel standards. The NCV should be obtained for each fuel delivery, from which weighted average annual values should be calculated For (c): review appropriateness of the values annually For (d): any future revision of the IPCC Guidelines should be taken into account</td> </tr> <tr> <td><b>Any comment:</b></td> <td colspan="2">If more than one fuel is used in the gas turbine or engine, the NCV of the least carbon intensive fuel that has been used before or after project implementation, should be determined. Verify if the values under (a), (b) and (c) are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in (a), (b) or (c) should have ISO17025 accreditation or justify that they can comply with similar quality standards. Year <i>x</i> refers to each year of the unit's operational history</td> </tr> </table>	<b>Data / Parameter:</b>	NCV <sub>i,x</sub>		<b>Data unit:</b>	GJ/mass or volume unit		<b>Description:</b>	Net calorific value of fuel type <i>i</i> used by the project power unit(s) in year <i>x</i>		<b>Source of data:</b>	The following data sources may be used if the relevant conditions apply:			<b>Data source</b>	<b>Conditions for using the data source</b>		(a) Values provided by the fuel supplier in invoices	This is the preferred source		(b) Measurements by the project participants	If (a) is not available		(c) Regional or national default values	If (a) is not available  These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances)		(d) IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	If (a) is not available	<b>Measurement procedures:</b>	For (a) and (b): measurements should be undertaken in line with national or international fuel standards. The NCV should be obtained for each fuel delivery, from which weighted average annual values should be calculated For (c): review appropriateness of the values annually For (d): any future revision of the IPCC Guidelines should be taken into account		<b>Any comment:</b>	If more than one fuel is used in the gas turbine or engine, the NCV of the least carbon intensive fuel that has been used before or after project implementation, should be determined. Verify if the values under (a), (b) and (c) are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in (a), (b) or (c) should have ISO17025 accreditation or justify that they can comply with similar quality standards. Year <i>x</i> refers to each year of the unit's operational history			<p>DR</p>	<p>N/A</p>	<p>N/A</p>
	<b>Data / Parameter:</b>	NCV <sub>i,x</sub>																																				
<b>Data unit:</b>	GJ/mass or volume unit																																					
<b>Description:</b>	Net calorific value of fuel type <i>i</i> used by the project power unit(s) in year <i>x</i>																																					
<b>Source of data:</b>	The following data sources may be used if the relevant conditions apply:																																					
	<b>Data source</b>	<b>Conditions for using the data source</b>																																				
	(a) Values provided by the fuel supplier in invoices	This is the preferred source																																				
	(b) Measurements by the project participants	If (a) is not available																																				
	(c) Regional or national default values	If (a) is not available  These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances)																																				
	(d) IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	If (a) is not available																																				
<b>Measurement procedures:</b>	For (a) and (b): measurements should be undertaken in line with national or international fuel standards. The NCV should be obtained for each fuel delivery, from which weighted average annual values should be calculated For (c): review appropriateness of the values annually For (d): any future revision of the IPCC Guidelines should be taken into account																																					
<b>Any comment:</b>	If more than one fuel is used in the gas turbine or engine, the NCV of the least carbon intensive fuel that has been used before or after project implementation, should be determined. Verify if the values under (a), (b) and (c) are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in (a), (b) or (c) should have ISO17025 accreditation or justify that they can comply with similar quality standards. Year <i>x</i> refers to each year of the unit's operational history																																					
	<p>Comment: Since fuel consumption data that is available for the three most recent years is in MMBTU, and not in volume or mass units, NCV for the historical years is not used</p>																																					

1.8.5 [10] p.14	<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td>EF<sub>CO<sub>2</sub>,min</sub></td> </tr> <tr> <td><b>Data unit:</b></td> <td>tCO<sub>2</sub>/GJ</td> </tr> <tr> <td><b>Description:</b></td> <td>CO<sub>2</sub> emission factor of the least carbon intensive fuel type used by the project power unit(s) during the three years operational history</td> </tr> <tr> <td><b>Source of data:</b></td> <td>The following data sources may be used if the relevant conditions apply: <table border="1"> <thead> <tr> <th>Data source</th> <th>Conditions for using the data source</th> </tr> </thead> <tbody> <tr> <td>(a) Values provided by the fuel supplier in invoices</td> <td>This is the preferred source</td> </tr> <tr> <td>(b) Measurements by the project participants</td> <td>If (a) is not available</td> </tr> <tr> <td>(c) Regional or national default values</td> <td>If (a) is not available  These sources can only be used for liquid fuels and should be based on well-documented, reliable sources (such as national energy balances)</td> </tr> <tr> <td>(d) IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories</td> <td>If (a) is not available</td> </tr> </tbody> </table> </td> </tr> </table>	<b>Data / Parameter:</b>	EF <sub>CO<sub>2</sub>,min</sub>	<b>Data unit:</b>	tCO <sub>2</sub> /GJ	<b>Description:</b>	CO <sub>2</sub> emission factor of the least carbon intensive fuel type used by the project power unit(s) during the three years operational history	<b>Source of data:</b>	The following data sources may be used if the relevant conditions apply: <table border="1"> <thead> <tr> <th>Data source</th> <th>Conditions for using the data source</th> </tr> </thead> <tbody> <tr> <td>(a) Values provided by the fuel supplier in invoices</td> <td>This is the preferred source</td> </tr> <tr> <td>(b) Measurements by the project participants</td> <td>If (a) is not available</td> </tr> <tr> <td>(c) Regional or national default values</td> <td>If (a) is not available  These sources can only be used for liquid fuels and should be based on well-documented, reliable sources (such as national energy balances)</td> </tr> <tr> <td>(d) IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories</td> <td>If (a) is not available</td> </tr> </tbody> </table>	Data source	Conditions for using the data source	(a) Values provided by the fuel supplier in invoices	This is the preferred source	(b) Measurements by the project participants	If (a) is not available	(c) Regional or national default values	If (a) is not available  These sources can only be used for liquid fuels and should be based on well-documented, reliable sources (such as national energy balances)	(d) IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	If (a) is not available	DR	OK	OK
	<b>Data / Parameter:</b>	EF <sub>CO<sub>2</sub>,min</sub>																				
	<b>Data unit:</b>	tCO <sub>2</sub> /GJ																				
<b>Description:</b>	CO <sub>2</sub> emission factor of the least carbon intensive fuel type used by the project power unit(s) during the three years operational history																					
<b>Source of data:</b>	The following data sources may be used if the relevant conditions apply: <table border="1"> <thead> <tr> <th>Data source</th> <th>Conditions for using the data source</th> </tr> </thead> <tbody> <tr> <td>(a) Values provided by the fuel supplier in invoices</td> <td>This is the preferred source</td> </tr> <tr> <td>(b) Measurements by the project participants</td> <td>If (a) is not available</td> </tr> <tr> <td>(c) Regional or national default values</td> <td>If (a) is not available  These sources can only be used for liquid fuels and should be based on well-documented, reliable sources (such as national energy balances)</td> </tr> <tr> <td>(d) IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories</td> <td>If (a) is not available</td> </tr> </tbody> </table>	Data source	Conditions for using the data source	(a) Values provided by the fuel supplier in invoices	This is the preferred source	(b) Measurements by the project participants	If (a) is not available	(c) Regional or national default values	If (a) is not available  These sources can only be used for liquid fuels and should be based on well-documented, reliable sources (such as national energy balances)	(d) IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	If (a) is not available											
Data source	Conditions for using the data source																					
(a) Values provided by the fuel supplier in invoices	This is the preferred source																					
(b) Measurements by the project participants	If (a) is not available																					
(c) Regional or national default values	If (a) is not available  These sources can only be used for liquid fuels and should be based on well-documented, reliable sources (such as national energy balances)																					
(d) IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	If (a) is not available																					
<table border="1"> <tr> <td><b>Measurement procedures:</b></td> <td>For (a) and (b): measurements should be undertaken in line with national or international fuel standards. The NCV should be obtained for each fuel delivery, from which weighted average annual values should be calculated For (c): review appropriateness of the values annually For (d): any future revision of the IPCC Guidelines should be taken into account</td> </tr> <tr> <td><b>Any comment:</b></td> <td>If more than one fuel is used in the gas turbine or engine, the emission factor of the least carbon intensive fuel that has been used before or after project implementation, should be determined. Verify if the values under a), b) and c) are within the uncertainty range of the IPCC default values as provided in Table 1.3, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in (a), (b) or (c) should have ISO17025 accreditation or justify that they can comply with similar quality standards</td> </tr> </table>	<b>Measurement procedures:</b>	For (a) and (b): measurements should be undertaken in line with national or international fuel standards. The NCV should be obtained for each fuel delivery, from which weighted average annual values should be calculated For (c): review appropriateness of the values annually For (d): any future revision of the IPCC Guidelines should be taken into account	<b>Any comment:</b>	If more than one fuel is used in the gas turbine or engine, the emission factor of the least carbon intensive fuel that has been used before or after project implementation, should be determined. Verify if the values under a), b) and c) are within the uncertainty range of the IPCC default values as provided in Table 1.3, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in (a), (b) or (c) should have ISO17025 accreditation or justify that they can comply with similar quality standards																		
<b>Measurement procedures:</b>	For (a) and (b): measurements should be undertaken in line with national or international fuel standards. The NCV should be obtained for each fuel delivery, from which weighted average annual values should be calculated For (c): review appropriateness of the values annually For (d): any future revision of the IPCC Guidelines should be taken into account																					
<b>Any comment:</b>	If more than one fuel is used in the gas turbine or engine, the emission factor of the least carbon intensive fuel that has been used before or after project implementation, should be determined. Verify if the values under a), b) and c) are within the uncertainty range of the IPCC default values as provided in Table 1.3, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in (a), (b) or (c) should have ISO17025 accreditation or justify that they can comply with similar quality standards																					
<table border="1"> <tr> <td><b>Comment:</b></td> <td>The project only uses natural gas, therefore this is the fuel used for this parameter. The value is in compliance with IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories. SQS confirms that this value is correctly applied and there is no information about CO<sub>2</sub> emission factors of fuels sold on the Peruvian gas market.</td> </tr> </table>	<b>Comment:</b>	The project only uses natural gas, therefore this is the fuel used for this parameter. The value is in compliance with IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories. SQS confirms that this value is correctly applied and there is no information about CO <sub>2</sub> emission factors of fuels sold on the Peruvian gas market.																				
<b>Comment:</b>	The project only uses natural gas, therefore this is the fuel used for this parameter. The value is in compliance with IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories. SQS confirms that this value is correctly applied and there is no information about CO <sub>2</sub> emission factors of fuels sold on the Peruvian gas market.																					

1.8.6 [10] p.15	<table border="1"> <tr> <td>Measurement procedures (if any):</td> <td>1. Generation licenses or manufacturer's specification. 2. Using recognized standards for the measurement of the turbine efficiency, such as the ASME PTC 6 (1996) or IEC 60953-3 (2001)</td> </tr> <tr> <td>Any comment:</td> <td>All results of tests have to be documented in the CDM-PDD (including outliers)</td> </tr> </table>	Measurement procedures (if any):	1. Generation licenses or manufacturer's specification. 2. Using recognized standards for the measurement of the turbine efficiency, such as the ASME PTC 6 (1996) or IEC 60953-3 (2001)	Any comment:	All results of tests have to be documented in the CDM-PDD (including outliers)																
	Measurement procedures (if any):	1. Generation licenses or manufacturer's specification. 2. Using recognized standards for the measurement of the turbine efficiency, such as the ASME PTC 6 (1996) or IEC 60953-3 (2001)																			
Any comment:	All results of tests have to be documented in the CDM-PDD (including outliers)																				
<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td>EF<sub>CO2,max</sub></td> </tr> <tr> <td>Data unit:</td> <td>tCO<sub>2</sub>/GJ</td> </tr> <tr> <td>Description:</td> <td>CO<sub>2</sub> emission factor of the most carbon intensive fuel type used by the project power unit(s) during three years operational history</td> </tr> <tr> <td>Source of data:</td> <td>The following data sources may be used if the relevant conditions apply: <table border="1"> <thead> <tr> <th>Data source</th> <th>Conditions for using the data source</th> </tr> </thead> <tbody> <tr> <td>(a) Values provided by the fuel supplier in invoices</td> <td>This is the preferred source</td> </tr> <tr> <td>(b) Measurements by the project participants</td> <td>If (a) is not available</td> </tr> <tr> <td>(c) Regional or national default values</td> <td>If (a) is not available</td> </tr> <tr> <td>(d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories</td> <td>If (a) is not available</td> </tr> </tbody> </table> </td> </tr> </table>	<b>Data / Parameter:</b>	EF <sub>CO2,max</sub>	Data unit:	tCO <sub>2</sub> /GJ	Description:	CO <sub>2</sub> emission factor of the most carbon intensive fuel type used by the project power unit(s) during three years operational history	Source of data:	The following data sources may be used if the relevant conditions apply: <table border="1"> <thead> <tr> <th>Data source</th> <th>Conditions for using the data source</th> </tr> </thead> <tbody> <tr> <td>(a) Values provided by the fuel supplier in invoices</td> <td>This is the preferred source</td> </tr> <tr> <td>(b) Measurements by the project participants</td> <td>If (a) is not available</td> </tr> <tr> <td>(c) Regional or national default values</td> <td>If (a) is not available</td> </tr> <tr> <td>(d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories</td> <td>If (a) is not available</td> </tr> </tbody> </table>	Data source	Conditions for using the data source	(a) Values provided by the fuel supplier in invoices	This is the preferred source	(b) Measurements by the project participants	If (a) is not available	(c) Regional or national default values	If (a) is not available	(d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	If (a) is not available	DR	OK	OK
<b>Data / Parameter:</b>	EF <sub>CO2,max</sub>																				
Data unit:	tCO <sub>2</sub> /GJ																				
Description:	CO <sub>2</sub> emission factor of the most carbon intensive fuel type used by the project power unit(s) during three years operational history																				
Source of data:	The following data sources may be used if the relevant conditions apply: <table border="1"> <thead> <tr> <th>Data source</th> <th>Conditions for using the data source</th> </tr> </thead> <tbody> <tr> <td>(a) Values provided by the fuel supplier in invoices</td> <td>This is the preferred source</td> </tr> <tr> <td>(b) Measurements by the project participants</td> <td>If (a) is not available</td> </tr> <tr> <td>(c) Regional or national default values</td> <td>If (a) is not available</td> </tr> <tr> <td>(d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories</td> <td>If (a) is not available</td> </tr> </tbody> </table>	Data source	Conditions for using the data source	(a) Values provided by the fuel supplier in invoices	This is the preferred source	(b) Measurements by the project participants	If (a) is not available	(c) Regional or national default values	If (a) is not available	(d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	If (a) is not available										
Data source	Conditions for using the data source																				
(a) Values provided by the fuel supplier in invoices	This is the preferred source																				
(b) Measurements by the project participants	If (a) is not available																				
(c) Regional or national default values	If (a) is not available																				
(d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	If (a) is not available																				
	<table border="1"> <tr> <td>Measurement procedures (if any):</td> <td>For (a) and (b): measurements should be undertaken in line with national or international fuel standards. The NCV should be obtained for each fuel delivery, from which weighted average annual values should be calculated For (c): review appropriateness of the values annually For (d): any future revision of the IPCC Guidelines should be taken into account</td> </tr> <tr> <td>Any comment:</td> <td>If more than one fuel is used in the gas turbine or engine, the emission factor of the least carbon intensive fuel that has been used before or after project implementation, should be determined Verify if the values under a), b) and c) are within the uncertainty range of the IPCC default values as provided in Table 1.3, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in (a), (b) or (c) should have ISO17025 accreditation or justify that they can comply with similar quality standards In the case that the fuel is blended with biofuels, only the emission factor for the fossil fuel used in the blend should be considered</td> </tr> </table>	Measurement procedures (if any):	For (a) and (b): measurements should be undertaken in line with national or international fuel standards. The NCV should be obtained for each fuel delivery, from which weighted average annual values should be calculated For (c): review appropriateness of the values annually For (d): any future revision of the IPCC Guidelines should be taken into account	Any comment:	If more than one fuel is used in the gas turbine or engine, the emission factor of the least carbon intensive fuel that has been used before or after project implementation, should be determined Verify if the values under a), b) and c) are within the uncertainty range of the IPCC default values as provided in Table 1.3, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in (a), (b) or (c) should have ISO17025 accreditation or justify that they can comply with similar quality standards In the case that the fuel is blended with biofuels, only the emission factor for the fossil fuel used in the blend should be considered																
Measurement procedures (if any):	For (a) and (b): measurements should be undertaken in line with national or international fuel standards. The NCV should be obtained for each fuel delivery, from which weighted average annual values should be calculated For (c): review appropriateness of the values annually For (d): any future revision of the IPCC Guidelines should be taken into account																				
Any comment:	If more than one fuel is used in the gas turbine or engine, the emission factor of the least carbon intensive fuel that has been used before or after project implementation, should be determined Verify if the values under a), b) and c) are within the uncertainty range of the IPCC default values as provided in Table 1.3, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in (a), (b) or (c) should have ISO17025 accreditation or justify that they can comply with similar quality standards In the case that the fuel is blended with biofuels, only the emission factor for the fossil fuel used in the blend should be considered																				
	Comment: See 1.8.5 above																				
1.8.7 [10] p.15,16	<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td>CAP<sub>max</sub></td> </tr> <tr> <td>Data unit:</td> <td>MW</td> </tr> <tr> <td>Description:</td> <td>Maximum gross power generation capacity of the project power unit(s) prior to the implementation of the project activity</td> </tr> <tr> <td>Source of data:</td> <td>Maximum generation capacity determined by performance tests under optimal operation conditions (optimal load, after maintenance, etc)</td> </tr> </table>	<b>Data / Parameter:</b>	CAP <sub>max</sub>	Data unit:	MW	Description:	Maximum gross power generation capacity of the project power unit(s) prior to the implementation of the project activity	Source of data:	Maximum generation capacity determined by performance tests under optimal operation conditions (optimal load, after maintenance, etc)												
	<b>Data / Parameter:</b>	CAP <sub>max</sub>																			
Data unit:	MW																				
Description:	Maximum gross power generation capacity of the project power unit(s) prior to the implementation of the project activity																				
Source of data:	Maximum generation capacity determined by performance tests under optimal operation conditions (optimal load, after maintenance, etc)																				
<table border="1"> <tr> <td>Measurement procedures (if any):</td> <td>1. Generation licenses or manufacturer's specification. 2. Using recognized standards for the measurement of the turbine efficiency, such as the ASME PTC 6 (1996) or IEC 60953-3 (2001)</td> </tr> <tr> <td>Any comment:</td> <td>All results of tests have to be documented in the CDM-PDD (including outliers)</td> </tr> </table>	Measurement procedures (if any):	1. Generation licenses or manufacturer's specification. 2. Using recognized standards for the measurement of the turbine efficiency, such as the ASME PTC 6 (1996) or IEC 60953-3 (2001)	Any comment:	All results of tests have to be documented in the CDM-PDD (including outliers)	DR	OK	OK														
Measurement procedures (if any):	1. Generation licenses or manufacturer's specification. 2. Using recognized standards for the measurement of the turbine efficiency, such as the ASME PTC 6 (1996) or IEC 60953-3 (2001)																				
Any comment:	All results of tests have to be documented in the CDM-PDD (including outliers)																				
	Comment: The 210 MW maximum generation capacity has been cross-checked with environment license SQS ref. [B_6] Permiso DPP Medio Ambiente y Recursos Naturales 24012008.																				

1.8.8 [10] p.16	<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td><math>T_{max}</math></td> </tr> <tr> <td>Data unit:</td> <td>Hours/yr</td> </tr> <tr> <td>Description:</td> <td>Maximum amount of time during a year in which the project power unit(s) could have operated at full power generation capacity prior to the implementation of the project activity</td> </tr> <tr> <td>Source of data:</td> <td></td> </tr> <tr> <td>Value to be applied:</td> <td>8760 or calculated as per equation 6</td> </tr> <tr> <td>Any comment:</td> <td>If the parameter is calculated, then the DOE shall also validate the information on <math>T_{max}</math> based on expert view on maximum permissible operation hours for similar type of power plants</td> </tr> </table>	<b>Data / Parameter:</b>	$T_{max}$	Data unit:	Hours/yr	Description:	Maximum amount of time during a year in which the project power unit(s) could have operated at full power generation capacity prior to the implementation of the project activity	Source of data:		Value to be applied:	8760 or calculated as per equation 6	Any comment:	If the parameter is calculated, then the DOE shall also validate the information on $T_{max}$ based on expert view on maximum permissible operation hours for similar type of power plants		DR	OK	OK
	<b>Data / Parameter:</b>	$T_{max}$															
Data unit:	Hours/yr																
Description:	Maximum amount of time during a year in which the project power unit(s) could have operated at full power generation capacity prior to the implementation of the project activity																
Source of data:																	
Value to be applied:	8760 or calculated as per equation 6																
Any comment:	If the parameter is calculated, then the DOE shall also validate the information on $T_{max}$ based on expert view on maximum permissible operation hours for similar type of power plants																
<p>Comment: The simplification <math>T_{MAX}</math> equals 8 760 hours/yr has been used by the PP.</p>																	
1.8.9 [10] p.16	<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td><math>HMR_x</math></td> </tr> <tr> <td>Data unit:</td> <td>Hours/yr</td> </tr> <tr> <td>Description:</td> <td>Average number of hours during which the plant did not operate due to maintenance or repair in year <math>x</math> (hours)</td> </tr> <tr> <td>Source of data:</td> <td>Project activity site</td> </tr> <tr> <td>Measurement procedures (if any):</td> <td>Use historical records for such maintenance and repair intervals</td> </tr> <tr> <td>Any comment:</td> <td>This parameter is not required if there is less than three years operational history for all project power unit(s), or if a major retrofit occurred in this period. As a simplification, project proponents may also assume this parameter as zero. Year <math>x</math> refers to each year of the unit's three years operational history</td> </tr> </table>	<b>Data / Parameter:</b>	$HMR_x$	Data unit:	Hours/yr	Description:	Average number of hours during which the plant did not operate due to maintenance or repair in year $x$ (hours)	Source of data:	Project activity site	Measurement procedures (if any):	Use historical records for such maintenance and repair intervals	Any comment:	This parameter is not required if there is less than three years operational history for all project power unit(s), or if a major retrofit occurred in this period. As a simplification, project proponents may also assume this parameter as zero. Year $x$ refers to each year of the unit's three years operational history		DR	OK	OK
	<b>Data / Parameter:</b>	$HMR_x$															
Data unit:	Hours/yr																
Description:	Average number of hours during which the plant did not operate due to maintenance or repair in year $x$ (hours)																
Source of data:	Project activity site																
Measurement procedures (if any):	Use historical records for such maintenance and repair intervals																
Any comment:	This parameter is not required if there is less than three years operational history for all project power unit(s), or if a major retrofit occurred in this period. As a simplification, project proponents may also assume this parameter as zero. Year $x$ refers to each year of the unit's three years operational history																
<p>Comment: Assumed to be zero</p>																	
1.8.10 [10] p.16	<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td><math>\eta</math></td> </tr> <tr> <td>Data unit:</td> <td>-</td> </tr> <tr> <td>Description:</td> <td>Default efficiency of the project power unit(s) operated in single cycle mode</td> </tr> <tr> <td>Source of data:</td> <td>"Tool to calculate the emission factor for an electricity system", Annex 1</td> </tr> <tr> <td>Value to be applied:</td> <td></td> </tr> <tr> <td>Any comment:</td> <td>This parameter is only required if there is less than three years operational data for all project power unit(s), or if a major retrofit occurred in this period</td> </tr> </table>	<b>Data / Parameter:</b>	$\eta$	Data unit:	-	Description:	Default efficiency of the project power unit(s) operated in single cycle mode	Source of data:	"Tool to calculate the emission factor for an electricity system", Annex 1	Value to be applied:		Any comment:	This parameter is only required if there is less than three years operational data for all project power unit(s), or if a major retrofit occurred in this period		DR	N/A	N/A
	<b>Data / Parameter:</b>	$\eta$															
Data unit:	-																
Description:	Default efficiency of the project power unit(s) operated in single cycle mode																
Source of data:	"Tool to calculate the emission factor for an electricity system", Annex 1																
Value to be applied:																	
Any comment:	This parameter is only required if there is less than three years operational data for all project power unit(s), or if a major retrofit occurred in this period																
<p>Comment: This parameter is only required if there is less than three years operational data for all project power units, or if a major retrofit occurred in this period. Since three years operational data for all project power units is available, this parameter is not used.</p>																	
1.8.11 [10] p.16	<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td><math>Q_{HR,x}</math></td> </tr> <tr> <td>Data unit:</td> <td>GJ/yr</td> </tr> <tr> <td>Description:</td> <td>Quantity of heat recovered from the exhaust heat during the most recent year prior to the implementation of the project activity</td> </tr> <tr> <td>Source of data:</td> <td>Site of the recovery process (eg. heat exchanger, etc.)</td> </tr> <tr> <td>Measurement procedures (if any):</td> <td>Calculation from historical records from appropriate metering devices (e.g. temperature, pressure and flow meters for air or feed water)</td> </tr> <tr> <td>Any comment:</td> <td></td> </tr> </table>	<b>Data / Parameter:</b>	$Q_{HR,x}$	Data unit:	GJ/yr	Description:	Quantity of heat recovered from the exhaust heat during the most recent year prior to the implementation of the project activity	Source of data:	Site of the recovery process (eg. heat exchanger, etc.)	Measurement procedures (if any):	Calculation from historical records from appropriate metering devices (e.g. temperature, pressure and flow meters for air or feed water)	Any comment:			DR	OK	OK
	<b>Data / Parameter:</b>	$Q_{HR,x}$															
Data unit:	GJ/yr																
Description:	Quantity of heat recovered from the exhaust heat during the most recent year prior to the implementation of the project activity																
Source of data:	Site of the recovery process (eg. heat exchanger, etc.)																
Measurement procedures (if any):	Calculation from historical records from appropriate metering devices (e.g. temperature, pressure and flow meters for air or feed water)																
Any comment:																	
<p>Comment: No heat recovery occurred.</p>																	
1.8.12 [10] p.16	<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td><math>GWP_{CH_4}</math></td> </tr> <tr> <td>Data unit:</td> <td>tCO<sub>2</sub>e/tCH<sub>4</sub></td> </tr> <tr> <td>Description:</td> <td>Global warming potential of methane valid for the relevant commitment period</td> </tr> <tr> <td>Source of data:</td> <td>IPCC</td> </tr> <tr> <td>Value to be applied</td> <td>For the first commitment period: 21</td> </tr> </table>	<b>Data / Parameter:</b>	$GWP_{CH_4}$	Data unit:	tCO <sub>2</sub> e/tCH <sub>4</sub>	Description:	Global warming potential of methane valid for the relevant commitment period	Source of data:	IPCC	Value to be applied	For the first commitment period: 21		DR	OK	OK		
	<b>Data / Parameter:</b>	$GWP_{CH_4}$															
Data unit:	tCO <sub>2</sub> e/tCH <sub>4</sub>																
Description:	Global warming potential of methane valid for the relevant commitment period																
Source of data:	IPCC																
Value to be applied	For the first commitment period: 21																
<p>Comment: 21 tCO<sub>2</sub>e/tCH<sub>4</sub> has been correctly applied.</p>																	

1.9		MONITORING METHODOLOGY																			
1.9.1 [10] p.17	<p>All data collected as part of monitoring should be archived electronically and be kept at least for two years after the end of the last crediting period. One hundred per cent of the data should be monitored if not indicated otherwise in the tables below. All measurements should be conducted with calibrated measurement equipment according to relevant industry standards.</p> <p>In addition, the monitoring provisions in the tools referred to in this methodology apply.</p>		DR	OK	OK																
	<p>Comment: All requirements of the methodology are met.</p>																				
		Data and parameters monitored																			
1.9.2 [10] p.17	<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td>EG<sub>pj,y</sub></td> </tr> <tr> <td>Data unit:</td> <td>MWh/yr</td> </tr> <tr> <td>Description:</td> <td>Total amount of electricity supplied to the electricity grid by the project power units in year <i>y</i></td> </tr> <tr> <td>Source of data:</td> <td>Generation records</td> </tr> <tr> <td>Measurement procedures (if any):</td> <td></td> </tr> <tr> <td>Monitoring frequency:</td> <td>Continuously</td> </tr> <tr> <td>QA/QC procedures:</td> <td>The consistency of metered net electricity generation should be cross-checked with receipts from sales (if available)</td> </tr> <tr> <td>Any comment:</td> <td></td> </tr> </table>	<b>Data / Parameter:</b>	EG <sub>pj,y</sub>	Data unit:	MWh/yr	Description:	Total amount of electricity supplied to the electricity grid by the project power units in year <i>y</i>	Source of data:	Generation records	Measurement procedures (if any):		Monitoring frequency:	Continuously	QA/QC procedures:	The consistency of metered net electricity generation should be cross-checked with receipts from sales (if available)	Any comment:			DR	OK	OK
	<b>Data / Parameter:</b>	EG <sub>pj,y</sub>																			
Data unit:	MWh/yr																				
Description:	Total amount of electricity supplied to the electricity grid by the project power units in year <i>y</i>																				
Source of data:	Generation records																				
Measurement procedures (if any):																					
Monitoring frequency:	Continuously																				
QA/QC procedures:	The consistency of metered net electricity generation should be cross-checked with receipts from sales (if available)																				
Any comment:																					
<p>Comment: Measurement frequency is continuously, Calibration is by low every 2 years, responsible for the calibration is the grid operator, and the result is cross-checked with the receipts from the sales.</p>																					
1.9.3 [10] p.17,18	<table border="1"> <tr> <td><b>Data / parameter:</b></td> <td>FC<sub>i,y</sub></td> </tr> <tr> <td>Data unit:</td> <td>Mass or volume unit/yr</td> </tr> <tr> <td>Description:</td> <td>Quantity of fuel type <i>i</i> used by the project power unit(s) in year <i>y</i></td> </tr> <tr> <td>Source of data:</td> <td>Onsite measurements</td> </tr> <tr> <td>Measurement procedures (if any):</td> <td> <ul style="list-style-type: none"> <li>Use either mass or volume meters. In cases where fuel is supplied from small daily tanks, rulers can be used to determine mass or volume of the fuel consumed, with the following conditions: The ruler gauge must be part of the daily tank and calibrated at least once a year and have a book of control for recording the measurements (on a daily basis or per shift);</li> <li>Accessories such as transducers, sonar and piezoelectronic devices are accepted if they are properly calibrated with the ruler gauge and receiving a reasonable maintenance;</li> <li>In case of daily tanks with pre-heaters for heavy oil, the calibration will be made with the system at typical operational conditions</li> </ul> </td> </tr> <tr> <td>Monitoring frequency:</td> <td>Continuously</td> </tr> <tr> <td>QA/QC procedures:</td> <td> <p>The consistency of metered fuel consumption quantities should be cross-checked by an annual energy balance that is based on purchased quantities and stock changes.</p> <p>Where the purchased fuel invoices can be identified specifically for the CDM project, the metered fuel consumption quantities should also be cross-checked with available purchase invoices from the financial records</p> </td> </tr> <tr> <td>Any comment:</td> <td></td> </tr> </table>	<b>Data / parameter:</b>	FC <sub>i,y</sub>	Data unit:	Mass or volume unit/yr	Description:	Quantity of fuel type <i>i</i> used by the project power unit(s) in year <i>y</i>	Source of data:	Onsite measurements	Measurement procedures (if any):	<ul style="list-style-type: none"> <li>Use either mass or volume meters. In cases where fuel is supplied from small daily tanks, rulers can be used to determine mass or volume of the fuel consumed, with the following conditions: The ruler gauge must be part of the daily tank and calibrated at least once a year and have a book of control for recording the measurements (on a daily basis or per shift);</li> <li>Accessories such as transducers, sonar and piezoelectronic devices are accepted if they are properly calibrated with the ruler gauge and receiving a reasonable maintenance;</li> <li>In case of daily tanks with pre-heaters for heavy oil, the calibration will be made with the system at typical operational conditions</li> </ul>	Monitoring frequency:	Continuously	QA/QC procedures:	<p>The consistency of metered fuel consumption quantities should be cross-checked by an annual energy balance that is based on purchased quantities and stock changes.</p> <p>Where the purchased fuel invoices can be identified specifically for the CDM project, the metered fuel consumption quantities should also be cross-checked with available purchase invoices from the financial records</p>	Any comment:			DR	OK	OK
	<b>Data / parameter:</b>	FC <sub>i,y</sub>																			
Data unit:	Mass or volume unit/yr																				
Description:	Quantity of fuel type <i>i</i> used by the project power unit(s) in year <i>y</i>																				
Source of data:	Onsite measurements																				
Measurement procedures (if any):	<ul style="list-style-type: none"> <li>Use either mass or volume meters. In cases where fuel is supplied from small daily tanks, rulers can be used to determine mass or volume of the fuel consumed, with the following conditions: The ruler gauge must be part of the daily tank and calibrated at least once a year and have a book of control for recording the measurements (on a daily basis or per shift);</li> <li>Accessories such as transducers, sonar and piezoelectronic devices are accepted if they are properly calibrated with the ruler gauge and receiving a reasonable maintenance;</li> <li>In case of daily tanks with pre-heaters for heavy oil, the calibration will be made with the system at typical operational conditions</li> </ul>																				
Monitoring frequency:	Continuously																				
QA/QC procedures:	<p>The consistency of metered fuel consumption quantities should be cross-checked by an annual energy balance that is based on purchased quantities and stock changes.</p> <p>Where the purchased fuel invoices can be identified specifically for the CDM project, the metered fuel consumption quantities should also be cross-checked with available purchase invoices from the financial records</p>																				
Any comment:																					
<p>Comment: The data will be measured continuously with Natural Gas metres, the consumption will be cross-checked by annual energy balance based on purchased quantities and stock changes and also against purchased fuel invoices.</p>																					

1.9.4 [10] p.18	<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td><math>\eta_{PJ,y}</math></td> </tr> <tr> <td>Data unit:</td> <td>-</td> </tr> <tr> <td>Description:</td> <td>Average energy efficiency of the project power unit(s) in year <math>y</math> of the crediting period</td> </tr> <tr> <td>Source of data:</td> <td>Project activity site</td> </tr> <tr> <td>Measurement procedures (if any):</td> <td>           To calculate the efficiencies:           <ul style="list-style-type: none"> <li>Use the direct method (dividing the net electricity generation by the energy content of the fuels fired during a representative time period) and not the indirect method (determination of fuel supply or heat generation and estimation of the losses);</li> <li>Use recognized standards for the measurement of the power plant efficiency;</li> </ul>           The efficiency has to be referred in terms of the net calorific values of the fuels used and the net electricity produced, i.e. total electricity produced minus internal consumption of electricity         </td> </tr> <tr> <td>Monitoring frequency:</td> <td>Once during each year <math>y</math> of the crediting period. The first calculation shall be made during the first year after implementing the project activity</td> </tr> <tr> <td>QA/QC procedures:</td> <td></td> </tr> <tr> <td>Any comment:</td> <td></td> </tr> </table>	<b>Data / Parameter:</b>	$\eta_{PJ,y}$	Data unit:	-	Description:	Average energy efficiency of the project power unit(s) in year $y$ of the crediting period	Source of data:	Project activity site	Measurement procedures (if any):	To calculate the efficiencies: <ul style="list-style-type: none"> <li>Use the direct method (dividing the net electricity generation by the energy content of the fuels fired during a representative time period) and not the indirect method (determination of fuel supply or heat generation and estimation of the losses);</li> <li>Use recognized standards for the measurement of the power plant efficiency;</li> </ul> The efficiency has to be referred in terms of the net calorific values of the fuels used and the net electricity produced, i.e. total electricity produced minus internal consumption of electricity	Monitoring frequency:	Once during each year $y$ of the crediting period. The first calculation shall be made during the first year after implementing the project activity	QA/QC procedures:		Any comment:			DR	OK	OK
	<b>Data / Parameter:</b>	$\eta_{PJ,y}$																			
Data unit:	-																				
Description:	Average energy efficiency of the project power unit(s) in year $y$ of the crediting period																				
Source of data:	Project activity site																				
Measurement procedures (if any):	To calculate the efficiencies: <ul style="list-style-type: none"> <li>Use the direct method (dividing the net electricity generation by the energy content of the fuels fired during a representative time period) and not the indirect method (determination of fuel supply or heat generation and estimation of the losses);</li> <li>Use recognized standards for the measurement of the power plant efficiency;</li> </ul> The efficiency has to be referred in terms of the net calorific values of the fuels used and the net electricity produced, i.e. total electricity produced minus internal consumption of electricity																				
Monitoring frequency:	Once during each year $y$ of the crediting period. The first calculation shall be made during the first year after implementing the project activity																				
QA/QC procedures:																					
Any comment:																					
<b>Comment:</b> PP will use the direct method or the recognised standards for the measurement of the power plant efficiency. If the efficiency will be chosen, it will refer in terms of the net calorific values of the fuel used and the net electricity produced.																					
1.9.5 [10] p.18	<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td><math>Q_{HR,y}</math></td> </tr> <tr> <td>Data unit:</td> <td>GJ/yr</td> </tr> <tr> <td>Description:</td> <td>Quantity of heat recovered from the exhaust heat of the project power unit(s) for purposes other than power generation in year <math>y</math></td> </tr> <tr> <td>Source of data:</td> <td>Site of the recovery process (eg. heat exchanger, etc.)</td> </tr> <tr> <td>Measurement procedures (if any):</td> <td>Calculation from direct measurements by project participants through appropriate metering devices (e.g. temperature, pressure and flow meters for air or feed water)</td> </tr> <tr> <td>Monitoring frequency:</td> <td>Continuously</td> </tr> <tr> <td>Any comment:</td> <td>Monitoring of this parameter is only required if heat is recovered from the exhaust heat in the most recent year prior to the implementation of the project activity and the amount recovered is more than 3% of energy of the fuel consumed by the project power plant(s) in the same year</td> </tr> </table>	<b>Data / Parameter:</b>	$Q_{HR,y}$	Data unit:	GJ/yr	Description:	Quantity of heat recovered from the exhaust heat of the project power unit(s) for purposes other than power generation in year $y$	Source of data:	Site of the recovery process (eg. heat exchanger, etc.)	Measurement procedures (if any):	Calculation from direct measurements by project participants through appropriate metering devices (e.g. temperature, pressure and flow meters for air or feed water)	Monitoring frequency:	Continuously	Any comment:	Monitoring of this parameter is only required if heat is recovered from the exhaust heat in the most recent year prior to the implementation of the project activity and the amount recovered is more than 3% of energy of the fuel consumed by the project power plant(s) in the same year		DR	OK	OK		
	<b>Data / Parameter:</b>	$Q_{HR,y}$																			
Data unit:	GJ/yr																				
Description:	Quantity of heat recovered from the exhaust heat of the project power unit(s) for purposes other than power generation in year $y$																				
Source of data:	Site of the recovery process (eg. heat exchanger, etc.)																				
Measurement procedures (if any):	Calculation from direct measurements by project participants through appropriate metering devices (e.g. temperature, pressure and flow meters for air or feed water)																				
Monitoring frequency:	Continuously																				
Any comment:	Monitoring of this parameter is only required if heat is recovered from the exhaust heat in the most recent year prior to the implementation of the project activity and the amount recovered is more than 3% of energy of the fuel consumed by the project power plant(s) in the same year																				
<b>Comment:</b> No heat recovery occurred therefore parameter not monitored.																					

1.9.6 [10] p.19	<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td colspan="2">NCV<sub>i,y</sub></td> </tr> <tr> <td><b>Data unit:</b></td> <td colspan="2">GJ/mass or volume unit</td> </tr> <tr> <td><b>Description:</b></td> <td colspan="2">Average net calorific value of the fuel type <i>i</i> used by the project power unit(s) in year <i>y</i></td> </tr> <tr> <td><b>Source of data:</b></td> <td colspan="2">The following data sources may be used if the relevant conditions apply:</td> </tr> <tr> <td></td> <td> <table border="1"> <thead> <tr> <th>Data source</th> <th>Conditions for using the data source</th> </tr> </thead> <tbody> <tr> <td>(a) Values provided by the fuel supplier in invoices</td> <td>This is the preferred source</td> </tr> <tr> <td>(b) Measurements by the project participants</td> <td>If (a) is not available</td> </tr> <tr> <td>(c) Regional or national default values</td> <td>If (a) is not available  These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).</td> </tr> <tr> <td>(d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.</td> <td>If (a) is not available</td> </tr> </tbody> </table> </td> <td></td> </tr> <tr> <td><b>Measurement procedures (if any):</b></td> <td colspan="2">For (a) and (b): measurements should be undertaken in line with national or international fuel standards. The NCV should be obtained for each fuel delivery, from which weighted average annual values should be calculated For (c): review appropriateness of the values annually For (d): any future revision of the IPCC Guidelines should be taken into account</td> </tr> <tr> <td><b>Any comment:</b></td> <td colspan="2">If more than one fuel is used in the gas turbine or engine, the NCV of the least carbon intensive fuel that has been used before or after project implementation, should be determined Verify if the values under (a), (b) and (c) are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in (a), (b) or (c) should have ISO17025 accreditation or justify that they can comply with similar quality standards This parameter is only required to calculate upstream leakage emissions, if applicable</td> </tr> <tr> <td><b>Comment:</b></td> <td colspan="2">Average net calorific value of the natural gas used by the project power units in year <i>y</i>. The value will be provided by the fuel supplier in invoices. It is delivered for each fuel delivery – meaning each time a ship unloads Liquid Natural Gas (LNG) at the ANDRES site. This is the source of the fuel for DPP. NCV value may vary slightly between ship loads and the equivalent value in BTU/kg as it is measured by a third party – currently by SGS for each load – SGS ref. [B_3]TT4 1022 BRITISH SAPPHIRE, DISCHARGE REPORT, 03-04/01/2012.</td> </tr> </table>	<b>Data / Parameter:</b>	NCV <sub>i,y</sub>		<b>Data unit:</b>	GJ/mass or volume unit		<b>Description:</b>	Average net calorific value of the fuel type <i>i</i> used by the project power unit(s) in year <i>y</i>		<b>Source of data:</b>	The following data sources may be used if the relevant conditions apply:			<table border="1"> <thead> <tr> <th>Data source</th> <th>Conditions for using the data source</th> </tr> </thead> <tbody> <tr> <td>(a) Values provided by the fuel supplier in invoices</td> <td>This is the preferred source</td> </tr> <tr> <td>(b) Measurements by the project participants</td> <td>If (a) is not available</td> </tr> <tr> <td>(c) Regional or national default values</td> <td>If (a) is not available  These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).</td> </tr> <tr> <td>(d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.</td> <td>If (a) is not available</td> </tr> </tbody> </table>	Data source	Conditions for using the data source	(a) Values provided by the fuel supplier in invoices	This is the preferred source	(b) Measurements by the project participants	If (a) is not available	(c) Regional or national default values	If (a) is not available  These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).	(d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.	If (a) is not available		<b>Measurement procedures (if any):</b>	For (a) and (b): measurements should be undertaken in line with national or international fuel standards. The NCV should be obtained for each fuel delivery, from which weighted average annual values should be calculated For (c): review appropriateness of the values annually For (d): any future revision of the IPCC Guidelines should be taken into account		<b>Any comment:</b>	If more than one fuel is used in the gas turbine or engine, the NCV of the least carbon intensive fuel that has been used before or after project implementation, should be determined Verify if the values under (a), (b) and (c) are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in (a), (b) or (c) should have ISO17025 accreditation or justify that they can comply with similar quality standards This parameter is only required to calculate upstream leakage emissions, if applicable		<b>Comment:</b>	Average net calorific value of the natural gas used by the project power units in year <i>y</i> . The value will be provided by the fuel supplier in invoices. It is delivered for each fuel delivery – meaning each time a ship unloads Liquid Natural Gas (LNG) at the ANDRES site. This is the source of the fuel for DPP. NCV value may vary slightly between ship loads and the equivalent value in BTU/kg as it is measured by a third party – currently by SGS for each load – SGS ref. [B_3]TT4 1022 BRITISH SAPPHIRE, DISCHARGE REPORT, 03-04/01/2012.		DR	OK	OK
	<b>Data / Parameter:</b>	NCV <sub>i,y</sub>																																				
	<b>Data unit:</b>	GJ/mass or volume unit																																				
	<b>Description:</b>	Average net calorific value of the fuel type <i>i</i> used by the project power unit(s) in year <i>y</i>																																				
<b>Source of data:</b>	The following data sources may be used if the relevant conditions apply:																																					
	<table border="1"> <thead> <tr> <th>Data source</th> <th>Conditions for using the data source</th> </tr> </thead> <tbody> <tr> <td>(a) Values provided by the fuel supplier in invoices</td> <td>This is the preferred source</td> </tr> <tr> <td>(b) Measurements by the project participants</td> <td>If (a) is not available</td> </tr> <tr> <td>(c) Regional or national default values</td> <td>If (a) is not available  These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).</td> </tr> <tr> <td>(d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.</td> <td>If (a) is not available</td> </tr> </tbody> </table>	Data source	Conditions for using the data source	(a) Values provided by the fuel supplier in invoices	This is the preferred source	(b) Measurements by the project participants	If (a) is not available	(c) Regional or national default values	If (a) is not available  These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).	(d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.	If (a) is not available																											
Data source	Conditions for using the data source																																					
(a) Values provided by the fuel supplier in invoices	This is the preferred source																																					
(b) Measurements by the project participants	If (a) is not available																																					
(c) Regional or national default values	If (a) is not available  These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).																																					
(d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.	If (a) is not available																																					
<b>Measurement procedures (if any):</b>	For (a) and (b): measurements should be undertaken in line with national or international fuel standards. The NCV should be obtained for each fuel delivery, from which weighted average annual values should be calculated For (c): review appropriateness of the values annually For (d): any future revision of the IPCC Guidelines should be taken into account																																					
<b>Any comment:</b>	If more than one fuel is used in the gas turbine or engine, the NCV of the least carbon intensive fuel that has been used before or after project implementation, should be determined Verify if the values under (a), (b) and (c) are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in (a), (b) or (c) should have ISO17025 accreditation or justify that they can comply with similar quality standards This parameter is only required to calculate upstream leakage emissions, if applicable																																					
<b>Comment:</b>	Average net calorific value of the natural gas used by the project power units in year <i>y</i> . The value will be provided by the fuel supplier in invoices. It is delivered for each fuel delivery – meaning each time a ship unloads Liquid Natural Gas (LNG) at the ANDRES site. This is the source of the fuel for DPP. NCV value may vary slightly between ship loads and the equivalent value in BTU/kg as it is measured by a third party – currently by SGS for each load – SGS ref. [B_3]TT4 1022 BRITISH SAPPHIRE, DISCHARGE REPORT, 03-04/01/2012.																																					

<p>1.9.7 [10] p. 19,20, 21</p>	<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td>EF<sub>i,upstream,CH4</sub></td> </tr> <tr> <td><b>Data unit:</b></td> <td>tCH<sub>4</sub>/GJ</td> </tr> <tr> <td><b>Description:</b></td> <td>Emission factor for upstream fugitive methane emissions from production, transportation, distribution of fossil fuel <i>i</i> used by the project power unit(s) in year <i>y</i></td> </tr> </table>	<b>Data / Parameter:</b>	EF <sub>i,upstream,CH4</sub>	<b>Data unit:</b>	tCH <sub>4</sub> /GJ	<b>Description:</b>	Emission factor for upstream fugitive methane emissions from production, transportation, distribution of fossil fuel <i>i</i> used by the project power unit(s) in year <i>y</i>																																																																																										
	<b>Data / Parameter:</b>	EF <sub>i,upstream,CH4</sub>																																																																																															
	<b>Data unit:</b>	tCH <sub>4</sub> /GJ																																																																																															
	<b>Description:</b>	Emission factor for upstream fugitive methane emissions from production, transportation, distribution of fossil fuel <i>i</i> used by the project power unit(s) in year <i>y</i>																																																																																															
<table border="1"> <tr> <td><b>Source of data:</b></td> <td colspan="2">The following data sources may be used if the relevant conditions apply:</td> </tr> <tr> <td></td> <td> <table border="1"> <tr> <th>Data source</th> <th>Conditions for using the data source</th> </tr> <tr> <td>(a) Reliable and accurate national data on fugitive CH<sub>4</sub> emissions associated with the production, transportation and distribution of the fuels. GHG inventory data reported to the UNFCCC as part of national communications can be used where country-specific approaches (and not IPCC Tier 1 default values) have been used to estimate emissions</td> <td>This is the preferred source</td> </tr> </table> </td> <td></td> </tr> </table>	<b>Source of data:</b>	The following data sources may be used if the relevant conditions apply:			<table border="1"> <tr> <th>Data source</th> <th>Conditions for using the data source</th> </tr> <tr> <td>(a) Reliable and accurate national data on fugitive CH<sub>4</sub> emissions associated with the production, transportation and distribution of the fuels. GHG inventory data reported to the UNFCCC as part of national communications can be used where country-specific approaches (and not IPCC Tier 1 default values) have been used to estimate emissions</td> <td>This is the preferred source</td> </tr> </table>	Data source	Conditions for using the data source	(a) Reliable and accurate national data on fugitive CH <sub>4</sub> emissions associated with the production, transportation and distribution of the fuels. GHG inventory data reported to the UNFCCC as part of national communications can be used where country-specific approaches (and not IPCC Tier 1 default values) have been used to estimate emissions	This is the preferred source																																																																																								
<b>Source of data:</b>	The following data sources may be used if the relevant conditions apply:																																																																																																
	<table border="1"> <tr> <th>Data source</th> <th>Conditions for using the data source</th> </tr> <tr> <td>(a) Reliable and accurate national data on fugitive CH<sub>4</sub> emissions associated with the production, transportation and distribution of the fuels. GHG inventory data reported to the UNFCCC as part of national communications can be used where country-specific approaches (and not IPCC Tier 1 default values) have been used to estimate emissions</td> <td>This is the preferred source</td> </tr> </table>	Data source	Conditions for using the data source	(a) Reliable and accurate national data on fugitive CH <sub>4</sub> emissions associated with the production, transportation and distribution of the fuels. GHG inventory data reported to the UNFCCC as part of national communications can be used where country-specific approaches (and not IPCC Tier 1 default values) have been used to estimate emissions	This is the preferred source																																																																																												
Data source	Conditions for using the data source																																																																																																
(a) Reliable and accurate national data on fugitive CH <sub>4</sub> emissions associated with the production, transportation and distribution of the fuels. GHG inventory data reported to the UNFCCC as part of national communications can be used where country-specific approaches (and not IPCC Tier 1 default values) have been used to estimate emissions	This is the preferred source																																																																																																
<table border="1"> <tr> <td></td> <td> <table border="1"> <tr> <th colspan="3">(b) Default emission factors</th> </tr> <tr> <th>Activity</th> <th>Unit</th> <th>Default emission factor</th> </tr> <tr> <td colspan="3"><b>Coal</b></td> </tr> <tr> <td>Underground mining</td> <td>1 CH<sub>4</sub> / Mt coal</td> <td>13.4</td> </tr> <tr> <td>Surface mining</td> <td>1 CH<sub>4</sub> / Mt coal</td> <td>0.8</td> </tr> <tr> <td colspan="3"><b>Oil</b></td> </tr> <tr> <td>Production</td> <td>1 CH<sub>4</sub> / PJ</td> <td>2.5</td> </tr> <tr> <td>Transport, refining and storage</td> <td>1 CH<sub>4</sub> / PJ</td> <td>1.6</td> </tr> <tr> <td>Total</td> <td>1 CH<sub>4</sub> / PJ</td> <td>4.1</td> </tr> <tr> <td colspan="3"><b>Natural gas</b></td> </tr> <tr> <td colspan="3"><i>USA and Canada</i></td> </tr> <tr> <td>Production</td> <td>1 CH<sub>4</sub> / PJ</td> <td>72</td> </tr> <tr> <td>Processing, transport and distribution</td> <td>1 CH<sub>4</sub> / PJ</td> <td>89</td> </tr> <tr> <td>Total</td> <td>1 CH<sub>4</sub> / PJ</td> <td>160</td> </tr> <tr> <td colspan="3"><i>Eastern Europe and former USSR</i></td> </tr> <tr> <td>Production</td> <td>1 CH<sub>4</sub> / PJ</td> <td>393</td> </tr> <tr> <td>Processing, transport and distribution</td> <td>1 CH<sub>4</sub> / PJ</td> <td>528</td> </tr> <tr> <td>Total</td> <td>1 CH<sub>4</sub> / PJ</td> <td>921</td> </tr> <tr> <td colspan="3"><i>Western Europe</i></td> </tr> <tr> <td>Production</td> <td>1 CH<sub>4</sub> / PJ</td> <td>21</td> </tr> <tr> <td>Processing, transport and distribution</td> <td>1 CH<sub>4</sub> / PJ</td> <td>85</td> </tr> <tr> <td>Total</td> <td>1 CH<sub>4</sub> / PJ</td> <td>105</td> </tr> <tr> <td colspan="3"><i>Other oil exporting countries / Rest of world</i></td> </tr> <tr> <td>Production</td> <td>1 CH<sub>4</sub> / PJ</td> <td>68</td> </tr> <tr> <td>Processing, transport and distribution</td> <td>1 CH<sub>4</sub> / PJ</td> <td>228</td> </tr> <tr> <td>Total</td> <td>1 CH<sub>4</sub> / PJ</td> <td>296</td> </tr> </table> <p>Note: The emission factors in this table have been derived from IPCC default Tier 1 emission factors provided in Volume 3 of the 1996 Revised IPCC Guidelines, by calculating the average of the provided default emission factor range</p> </td> <td> <p>If (a) is not available.</p> <p>Natural gas emission factors for the location of the project activity should be used. The US/Canada values may be used in cases where it can be shown that the relevant system element (gas production and/or processing/transmission/ distribution) is predominantly of recent vintage and built and operated to international standards.</p> <p>Since the fugitive upstream emissions for coal depends on the source (underground or surface mines), project participants should use the emission factor that corresponds to the predominant source (underground or surface) currently used by coal-based power plants in the region. The emission factor for coal is provided based on a mass unit and needs to be converted in an energy unit, taking into account the net calorific value of the coal</p> </td> <td></td> <td></td> </tr> <tr> <td> <table border="1"> <tr> <td><b>Measurement procedures:</b></td> <td></td> </tr> <tr> <td><b>Any comment:</b></td> <td> <p>The emission factor for fugitive upstream emissions for natural gas should include fugitive emissions from production, processing, transport and distribution of natural gas, as indicated in the table of default values above.</p> <p>To the extent that upstream emissions occur in Annex I countries that have ratified the Kyoto Protocol, from 1 January 2008 onwards, these emissions should be excluded, if technically possible, in the leakage calculations.</p> <p>This parameter is only required to calculate the upstream leakage emissions, if applicable</p> </td> </tr> </table> </td> <td></td> <td></td> <td></td> </tr> <tr> <td> <table border="1"> <tr> <td><b>Comment:</b></td> <td>PP applies the value of 0.000296 - default emission factor, derived from IPCC default Tier 1 emission factors provided in Volume 3 of the 1996 Revised IPCC Guidelines, by calculating the average of the provided default emission factor range.</td> </tr> </table> </td> <td></td> <td></td> <td></td> </tr> </table>		<table border="1"> <tr> <th colspan="3">(b) Default emission factors</th> </tr> <tr> <th>Activity</th> <th>Unit</th> <th>Default emission factor</th> </tr> <tr> <td colspan="3"><b>Coal</b></td> </tr> <tr> <td>Underground mining</td> <td>1 CH<sub>4</sub> / Mt coal</td> <td>13.4</td> </tr> <tr> <td>Surface mining</td> <td>1 CH<sub>4</sub> / Mt coal</td> <td>0.8</td> </tr> <tr> <td colspan="3"><b>Oil</b></td> </tr> <tr> <td>Production</td> <td>1 CH<sub>4</sub> / PJ</td> <td>2.5</td> </tr> <tr> <td>Transport, refining and storage</td> <td>1 CH<sub>4</sub> / PJ</td> <td>1.6</td> </tr> <tr> <td>Total</td> <td>1 CH<sub>4</sub> / PJ</td> <td>4.1</td> </tr> <tr> <td colspan="3"><b>Natural gas</b></td> </tr> <tr> <td colspan="3"><i>USA and Canada</i></td> </tr> <tr> <td>Production</td> <td>1 CH<sub>4</sub> / PJ</td> <td>72</td> </tr> <tr> <td>Processing, transport and distribution</td> <td>1 CH<sub>4</sub> / PJ</td> <td>89</td> </tr> <tr> <td>Total</td> <td>1 CH<sub>4</sub> / PJ</td> <td>160</td> </tr> <tr> <td colspan="3"><i>Eastern Europe and former USSR</i></td> </tr> <tr> <td>Production</td> <td>1 CH<sub>4</sub> / PJ</td> <td>393</td> </tr> <tr> <td>Processing, transport and distribution</td> <td>1 CH<sub>4</sub> / PJ</td> <td>528</td> </tr> <tr> <td>Total</td> <td>1 CH<sub>4</sub> / PJ</td> <td>921</td> </tr> <tr> <td colspan="3"><i>Western Europe</i></td> </tr> <tr> <td>Production</td> <td>1 CH<sub>4</sub> / PJ</td> <td>21</td> </tr> <tr> <td>Processing, transport and distribution</td> <td>1 CH<sub>4</sub> / PJ</td> <td>85</td> </tr> <tr> <td>Total</td> <td>1 CH<sub>4</sub> / PJ</td> <td>105</td> </tr> <tr> <td colspan="3"><i>Other oil exporting countries / Rest of world</i></td> </tr> <tr> <td>Production</td> <td>1 CH<sub>4</sub> / PJ</td> <td>68</td> </tr> <tr> <td>Processing, transport and distribution</td> <td>1 CH<sub>4</sub> / PJ</td> <td>228</td> </tr> <tr> <td>Total</td> <td>1 CH<sub>4</sub> / PJ</td> <td>296</td> </tr> </table> <p>Note: The emission factors in this table have been derived from IPCC default Tier 1 emission factors provided in Volume 3 of the 1996 Revised IPCC Guidelines, by calculating the average of the provided default emission factor range</p>	(b) Default emission factors			Activity	Unit	Default emission factor	<b>Coal</b>			Underground mining	1 CH <sub>4</sub> / Mt coal	13.4	Surface mining	1 CH <sub>4</sub> / Mt coal	0.8	<b>Oil</b>			Production	1 CH <sub>4</sub> / PJ	2.5	Transport, refining and storage	1 CH <sub>4</sub> / PJ	1.6	Total	1 CH <sub>4</sub> / PJ	4.1	<b>Natural gas</b>			<i>USA and Canada</i>			Production	1 CH <sub>4</sub> / PJ	72	Processing, transport and distribution	1 CH <sub>4</sub> / PJ	89	Total	1 CH <sub>4</sub> / PJ	160	<i>Eastern Europe and former USSR</i>			Production	1 CH <sub>4</sub> / PJ	393	Processing, transport and distribution	1 CH <sub>4</sub> / PJ	528	Total	1 CH <sub>4</sub> / PJ	921	<i>Western Europe</i>			Production	1 CH <sub>4</sub> / PJ	21	Processing, transport and distribution	1 CH <sub>4</sub> / PJ	85	Total	1 CH <sub>4</sub> / PJ	105	<i>Other oil exporting countries / Rest of world</i>			Production	1 CH <sub>4</sub> / PJ	68	Processing, transport and distribution	1 CH <sub>4</sub> / PJ	228	Total	1 CH <sub>4</sub> / PJ	296	<p>If (a) is not available.</p> <p>Natural gas emission factors for the location of the project activity should be used. The US/Canada values may be used in cases where it can be shown that the relevant system element (gas production and/or processing/transmission/ distribution) is predominantly of recent vintage and built and operated to international standards.</p> <p>Since the fugitive upstream emissions for coal depends on the source (underground or surface mines), project participants should use the emission factor that corresponds to the predominant source (underground or surface) currently used by coal-based power plants in the region. The emission factor for coal is provided based on a mass unit and needs to be converted in an energy unit, taking into account the net calorific value of the coal</p>			<table border="1"> <tr> <td><b>Measurement procedures:</b></td> <td></td> </tr> <tr> <td><b>Any comment:</b></td> <td> <p>The emission factor for fugitive upstream emissions for natural gas should include fugitive emissions from production, processing, transport and distribution of natural gas, as indicated in the table of default values above.</p> <p>To the extent that upstream emissions occur in Annex I countries that have ratified the Kyoto Protocol, from 1 January 2008 onwards, these emissions should be excluded, if technically possible, in the leakage calculations.</p> <p>This parameter is only required to calculate the upstream leakage emissions, if applicable</p> </td> </tr> </table>	<b>Measurement procedures:</b>		<b>Any comment:</b>	<p>The emission factor for fugitive upstream emissions for natural gas should include fugitive emissions from production, processing, transport and distribution of natural gas, as indicated in the table of default values above.</p> <p>To the extent that upstream emissions occur in Annex I countries that have ratified the Kyoto Protocol, from 1 January 2008 onwards, these emissions should be excluded, if technically possible, in the leakage calculations.</p> <p>This parameter is only required to calculate the upstream leakage emissions, if applicable</p>				<table border="1"> <tr> <td><b>Comment:</b></td> <td>PP applies the value of 0.000296 - default emission factor, derived from IPCC default Tier 1 emission factors provided in Volume 3 of the 1996 Revised IPCC Guidelines, by calculating the average of the provided default emission factor range.</td> </tr> </table>	<b>Comment:</b>	PP applies the value of 0.000296 - default emission factor, derived from IPCC default Tier 1 emission factors provided in Volume 3 of the 1996 Revised IPCC Guidelines, by calculating the average of the provided default emission factor range.			
	<table border="1"> <tr> <th colspan="3">(b) Default emission factors</th> </tr> <tr> <th>Activity</th> <th>Unit</th> <th>Default emission factor</th> </tr> <tr> <td colspan="3"><b>Coal</b></td> </tr> <tr> <td>Underground mining</td> <td>1 CH<sub>4</sub> / Mt coal</td> <td>13.4</td> </tr> <tr> <td>Surface mining</td> <td>1 CH<sub>4</sub> / Mt coal</td> <td>0.8</td> </tr> <tr> <td colspan="3"><b>Oil</b></td> </tr> <tr> <td>Production</td> <td>1 CH<sub>4</sub> / PJ</td> <td>2.5</td> </tr> <tr> <td>Transport, refining and storage</td> <td>1 CH<sub>4</sub> / PJ</td> <td>1.6</td> </tr> <tr> <td>Total</td> <td>1 CH<sub>4</sub> / PJ</td> <td>4.1</td> </tr> <tr> <td colspan="3"><b>Natural gas</b></td> </tr> <tr> <td colspan="3"><i>USA and Canada</i></td> </tr> <tr> <td>Production</td> <td>1 CH<sub>4</sub> / PJ</td> <td>72</td> </tr> <tr> <td>Processing, transport and distribution</td> <td>1 CH<sub>4</sub> / PJ</td> <td>89</td> </tr> <tr> <td>Total</td> <td>1 CH<sub>4</sub> / PJ</td> <td>160</td> </tr> <tr> <td colspan="3"><i>Eastern Europe and former USSR</i></td> </tr> <tr> <td>Production</td> <td>1 CH<sub>4</sub> / PJ</td> <td>393</td> </tr> <tr> <td>Processing, transport and distribution</td> <td>1 CH<sub>4</sub> / PJ</td> <td>528</td> </tr> <tr> <td>Total</td> <td>1 CH<sub>4</sub> / PJ</td> <td>921</td> </tr> <tr> <td colspan="3"><i>Western Europe</i></td> </tr> <tr> <td>Production</td> <td>1 CH<sub>4</sub> / PJ</td> <td>21</td> </tr> <tr> <td>Processing, transport and distribution</td> <td>1 CH<sub>4</sub> / PJ</td> <td>85</td> </tr> <tr> <td>Total</td> <td>1 CH<sub>4</sub> / PJ</td> <td>105</td> </tr> <tr> <td colspan="3"><i>Other oil exporting countries / Rest of world</i></td> </tr> <tr> <td>Production</td> <td>1 CH<sub>4</sub> / PJ</td> <td>68</td> </tr> <tr> <td>Processing, transport and distribution</td> <td>1 CH<sub>4</sub> / PJ</td> <td>228</td> </tr> <tr> <td>Total</td> <td>1 CH<sub>4</sub> / PJ</td> <td>296</td> </tr> </table> <p>Note: The emission factors in this table have been derived from IPCC default Tier 1 emission factors provided in Volume 3 of the 1996 Revised IPCC Guidelines, by calculating the average of the provided default emission factor range</p>	(b) Default emission factors			Activity	Unit	Default emission factor	<b>Coal</b>			Underground mining	1 CH <sub>4</sub> / Mt coal	13.4	Surface mining	1 CH <sub>4</sub> / Mt coal	0.8	<b>Oil</b>			Production	1 CH <sub>4</sub> / PJ	2.5	Transport, refining and storage	1 CH <sub>4</sub> / PJ	1.6	Total	1 CH <sub>4</sub> / PJ	4.1	<b>Natural gas</b>			<i>USA and Canada</i>			Production	1 CH <sub>4</sub> / PJ	72	Processing, transport and distribution	1 CH <sub>4</sub> / PJ	89	Total	1 CH <sub>4</sub> / PJ	160	<i>Eastern Europe and former USSR</i>			Production	1 CH <sub>4</sub> / PJ	393	Processing, transport and distribution	1 CH <sub>4</sub> / PJ	528	Total	1 CH <sub>4</sub> / PJ	921	<i>Western Europe</i>			Production	1 CH <sub>4</sub> / PJ	21	Processing, transport and distribution	1 CH <sub>4</sub> / PJ	85	Total	1 CH <sub>4</sub> / PJ	105	<i>Other oil exporting countries / Rest of world</i>			Production	1 CH <sub>4</sub> / PJ	68	Processing, transport and distribution	1 CH <sub>4</sub> / PJ	228	Total	1 CH <sub>4</sub> / PJ	296	<p>If (a) is not available.</p> <p>Natural gas emission factors for the location of the project activity should be used. The US/Canada values may be used in cases where it can be shown that the relevant system element (gas production and/or processing/transmission/ distribution) is predominantly of recent vintage and built and operated to international standards.</p> <p>Since the fugitive upstream emissions for coal depends on the source (underground or surface mines), project participants should use the emission factor that corresponds to the predominant source (underground or surface) currently used by coal-based power plants in the region. The emission factor for coal is provided based on a mass unit and needs to be converted in an energy unit, taking into account the net calorific value of the coal</p>																	
(b) Default emission factors																																																																																																	
Activity	Unit	Default emission factor																																																																																															
<b>Coal</b>																																																																																																	
Underground mining	1 CH <sub>4</sub> / Mt coal	13.4																																																																																															
Surface mining	1 CH <sub>4</sub> / Mt coal	0.8																																																																																															
<b>Oil</b>																																																																																																	
Production	1 CH <sub>4</sub> / PJ	2.5																																																																																															
Transport, refining and storage	1 CH <sub>4</sub> / PJ	1.6																																																																																															
Total	1 CH <sub>4</sub> / PJ	4.1																																																																																															
<b>Natural gas</b>																																																																																																	
<i>USA and Canada</i>																																																																																																	
Production	1 CH <sub>4</sub> / PJ	72																																																																																															
Processing, transport and distribution	1 CH <sub>4</sub> / PJ	89																																																																																															
Total	1 CH <sub>4</sub> / PJ	160																																																																																															
<i>Eastern Europe and former USSR</i>																																																																																																	
Production	1 CH <sub>4</sub> / PJ	393																																																																																															
Processing, transport and distribution	1 CH <sub>4</sub> / PJ	528																																																																																															
Total	1 CH <sub>4</sub> / PJ	921																																																																																															
<i>Western Europe</i>																																																																																																	
Production	1 CH <sub>4</sub> / PJ	21																																																																																															
Processing, transport and distribution	1 CH <sub>4</sub> / PJ	85																																																																																															
Total	1 CH <sub>4</sub> / PJ	105																																																																																															
<i>Other oil exporting countries / Rest of world</i>																																																																																																	
Production	1 CH <sub>4</sub> / PJ	68																																																																																															
Processing, transport and distribution	1 CH <sub>4</sub> / PJ	228																																																																																															
Total	1 CH <sub>4</sub> / PJ	296																																																																																															
<table border="1"> <tr> <td><b>Measurement procedures:</b></td> <td></td> </tr> <tr> <td><b>Any comment:</b></td> <td> <p>The emission factor for fugitive upstream emissions for natural gas should include fugitive emissions from production, processing, transport and distribution of natural gas, as indicated in the table of default values above.</p> <p>To the extent that upstream emissions occur in Annex I countries that have ratified the Kyoto Protocol, from 1 January 2008 onwards, these emissions should be excluded, if technically possible, in the leakage calculations.</p> <p>This parameter is only required to calculate the upstream leakage emissions, if applicable</p> </td> </tr> </table>	<b>Measurement procedures:</b>		<b>Any comment:</b>	<p>The emission factor for fugitive upstream emissions for natural gas should include fugitive emissions from production, processing, transport and distribution of natural gas, as indicated in the table of default values above.</p> <p>To the extent that upstream emissions occur in Annex I countries that have ratified the Kyoto Protocol, from 1 January 2008 onwards, these emissions should be excluded, if technically possible, in the leakage calculations.</p> <p>This parameter is only required to calculate the upstream leakage emissions, if applicable</p>																																																																																													
<b>Measurement procedures:</b>																																																																																																	
<b>Any comment:</b>	<p>The emission factor for fugitive upstream emissions for natural gas should include fugitive emissions from production, processing, transport and distribution of natural gas, as indicated in the table of default values above.</p> <p>To the extent that upstream emissions occur in Annex I countries that have ratified the Kyoto Protocol, from 1 January 2008 onwards, these emissions should be excluded, if technically possible, in the leakage calculations.</p> <p>This parameter is only required to calculate the upstream leakage emissions, if applicable</p>																																																																																																
<table border="1"> <tr> <td><b>Comment:</b></td> <td>PP applies the value of 0.000296 - default emission factor, derived from IPCC default Tier 1 emission factors provided in Volume 3 of the 1996 Revised IPCC Guidelines, by calculating the average of the provided default emission factor range.</td> </tr> </table>	<b>Comment:</b>	PP applies the value of 0.000296 - default emission factor, derived from IPCC default Tier 1 emission factors provided in Volume 3 of the 1996 Revised IPCC Guidelines, by calculating the average of the provided default emission factor range.																																																																																															
<b>Comment:</b>	PP applies the value of 0.000296 - default emission factor, derived from IPCC default Tier 1 emission factors provided in Volume 3 of the 1996 Revised IPCC Guidelines, by calculating the average of the provided default emission factor range.																																																																																																

DR

OK

OK

<p>1.9.8 [10] p.21</p>	<table border="1"> <tr> <td><b>Data / Parameter:</b></td> <td>EF<sub>CO<sub>2</sub>,upstream,LNG</sub></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Data unit:</b></td> <td>tCO<sub>2</sub>/GJ</td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Description</b></td> <td>Emission factor for upstream CO<sub>2</sub> emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system during year <i>y</i> of the project activity</td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Source of data:</b></td> <td>Where reliable and accurate data on upstream CO<sub>2</sub> emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system is available, project participants should use this data to determine an average emission factor  If reliable and accurate data is not available, then a default value of 0.006 t CO<sub>2</sub>/GJ may be used as a rough approximation.</td> <td></td> <td>DR</td> <td>OK</td> </tr> <tr> <td><b>Any comment:</b></td> <td>Default value has been derived on data published for North American LNG systems. "Barclay, M. and N. Denton, 2005. Selecting offshore LNG process. &lt;<a href="http://www.fwc.com/publications/tech_papers/files/LNJ091105p34-36.pdf">http://www.fwc.com/publications/tech_papers/files/LNJ091105p34-36.pdf</a>&gt; (10th April 2006)"</td> <td></td> <td></td> <td>OK</td> </tr> </table>	<b>Data / Parameter:</b>	EF <sub>CO<sub>2</sub>,upstream,LNG</sub>				<b>Data unit:</b>	tCO <sub>2</sub> /GJ				<b>Description</b>	Emission factor for upstream CO <sub>2</sub> emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system during year <i>y</i> of the project activity				<b>Source of data:</b>	Where reliable and accurate data on upstream CO <sub>2</sub> emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system is available, project participants should use this data to determine an average emission factor  If reliable and accurate data is not available, then a default value of 0.006 t CO <sub>2</sub> /GJ may be used as a rough approximation.		DR	OK	<b>Any comment:</b>	Default value has been derived on data published for North American LNG systems. "Barclay, M. and N. Denton, 2005. Selecting offshore LNG process. < <a href="http://www.fwc.com/publications/tech_papers/files/LNJ091105p34-36.pdf">http://www.fwc.com/publications/tech_papers/files/LNJ091105p34-36.pdf</a> > (10th April 2006)"			OK			
	<b>Data / Parameter:</b>	EF <sub>CO<sub>2</sub>,upstream,LNG</sub>																											
<b>Data unit:</b>	tCO <sub>2</sub> /GJ																												
<b>Description</b>	Emission factor for upstream CO <sub>2</sub> emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system during year <i>y</i> of the project activity																												
<b>Source of data:</b>	Where reliable and accurate data on upstream CO <sub>2</sub> emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system is available, project participants should use this data to determine an average emission factor  If reliable and accurate data is not available, then a default value of 0.006 t CO <sub>2</sub> /GJ may be used as a rough approximation.		DR	OK																									
<b>Any comment:</b>	Default value has been derived on data published for North American LNG systems. "Barclay, M. and N. Denton, 2005. Selecting offshore LNG process. < <a href="http://www.fwc.com/publications/tech_papers/files/LNJ091105p34-36.pdf">http://www.fwc.com/publications/tech_papers/files/LNJ091105p34-36.pdf</a> > (10th April 2006)"			OK																									
<b>Comment:</b>	Emission factor for upstream CO <sub>2</sub> emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system during year <i>y</i> of the project activity. As no reliable and accurate data on upstream CO <sub>2</sub> emission due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system is available, PP chooses the default value of 0.006 tCO <sub>2</sub> /GJ. Default value has been derived on data published for North American LNG systems. "Barclay, M. and N. Denton, 2005. Selecting offshore LNG process.																												

## PROTOCOL 3: TOOL TO CALCULATE THE EMISSION FACTOR FOR AN ELECTRICITY SYSTEM (VERSION 03.0.0)

The ACM0007 methodology requires the use of the “Tool to calculate the emission factor for an electricity system” to determine the CO<sub>2</sub> emission factor for the displacement of electricity generated by power plants in an electricity system, by calculating the “Operating Margin” (OM) and “Build Margin” (BM) as well as the “Combined Margin” (CM).

CHECKLIST TOPIC / QUESTION	Ref.	MoV*	Draft Concl	Final Concl								
<b>H. Tool to calculate the emission factor for an electricity system</b>												
<b>H.1. Justification of the choice of the tool and why it is applicable to the project activity</b>												
H.1.1. Is the applied tool considered the most appropriate one?		DR	OK	OK								
Comment:												
H.1.2. Criterion 1: Is the tool used for the purpose of calculating baseline emissions where a project activity supplies electricity to a grid?		DR	OK	OK								
<table border="1"> <thead> <tr> <th>Applicability checklist</th> <th>Yes / No</th> </tr> </thead> <tbody> <tr> <td>Criterion discussed in the PDD?</td> <td>Yes</td> </tr> <tr> <td>Compliance provable?</td> <td>Yes</td> </tr> <tr> <td>Compliance verified?</td> <td>Yes</td> </tr> </tbody> </table>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	Yes	Compliance provable?	Yes	Compliance verified?	Yes				
Applicability checklist	Yes / No											
Criterion discussed in the PDD?	Yes											
Compliance provable?	Yes											
Compliance verified?	Yes											
Comment:	Electricity is supplied to the National Interconnected grid - SENI.											
H.1.3. Criterion 2: Is the tool used for the purpose of calculating baseline emissions for a project activity that results in savings of electricity that would have been provided by the grid?		DR	N.A.	N.A.								
<table border="1"> <thead> <tr> <th>Applicability checklist</th> <th>Yes / No</th> </tr> </thead> <tbody> <tr> <td>Criterion discussed in the PDD?</td> <td></td> </tr> <tr> <td>Compliance provable?</td> <td></td> </tr> <tr> <td>Compliance verified?</td> <td></td> </tr> </tbody> </table>	Applicability checklist	Yes / No	Criterion discussed in the PDD?		Compliance provable?		Compliance verified?					
Applicability checklist	Yes / No											
Criterion discussed in the PDD?												
Compliance provable?												
Compliance verified?												
Comment:												
H.1.4. Criterion 3: Is the tool used for the purpose of calculating project and leakage emissions in case where a project activity consumes electricity from the grid or results in increase of consumption of electricity from the grid outside the project boundary?		DR	N.A.	N.A.								

CHECKLIST TOPIC / QUESTION		Ref.	MoV*	Draft Concl	Final Concl										
Applicability checklist	Yes / No														
Criterion discussed in the PDD?															
Compliance provable?															
Compliance verified?															
Comment:															
<b>H.2. Description of the parameters included in the tool</b>															
Integrate the required amount of sub-checklists for parameters as given by the tool applied and comment on at least every line answered with "No"															
H.2.1. Parameter: $EF_{grid,CM,y}$ Combined margin CO <sub>2</sub> emission factor for grid connected power generation in year y Unit: tCO <sub>2</sub> /MWh Type: calculated			DR	OK	OK										
<table border="1"> <thead> <tr> <th>Boundary checklist</th> <th>Yes / No</th> </tr> </thead> <tbody> <tr> <td>Parameter discussed in the PDD?</td> <td>YES</td> </tr> <tr> <td>Inclusion / exclusion justified?</td> <td>YES</td> </tr> <tr> <td>Explanation / Justification sufficient?</td> <td>YES</td> </tr> <tr> <td>Consistency with monitoring plan?</td> <td>YES</td> </tr> </tbody> </table>		Boundary checklist	Yes / No	Parameter discussed in the PDD?	YES	Inclusion / exclusion justified?	YES	Explanation / Justification sufficient?	YES	Consistency with monitoring plan?	YES				
Boundary checklist	Yes / No														
Parameter discussed in the PDD?	YES														
Inclusion / exclusion justified?	YES														
Explanation / Justification sufficient?	YES														
Consistency with monitoring plan?	YES														
Comment:		The combined margin is calculated and correctly applied.													
H.2.2. Parameter: $EF_{grid,BM,y}$ Build margin CO <sub>2</sub> emission factor for grid connected power generation in year y Unit: tCO <sub>2</sub> /MWh Type: calculated			DR	OK	OK										
<table border="1"> <thead> <tr> <th>Boundary checklist</th> <th>Yes / No</th> </tr> </thead> <tbody> <tr> <td>Parameter discussed in the PDD?</td> <td>YES</td> </tr> <tr> <td>Inclusion / exclusion justified?</td> <td>YES</td> </tr> <tr> <td>Explanation / Justification sufficient?</td> <td>YES</td> </tr> <tr> <td>Consistency with monitoring plan?</td> <td>YES</td> </tr> </tbody> </table>		Boundary checklist	Yes / No	Parameter discussed in the PDD?	YES	Inclusion / exclusion justified?	YES	Explanation / Justification sufficient?	YES	Consistency with monitoring plan?	YES				
Boundary checklist	Yes / No														
Parameter discussed in the PDD?	YES														
Inclusion / exclusion justified?	YES														
Explanation / Justification sufficient?	YES														
Consistency with monitoring plan?	YES														
Comment:		The build margin is correctly calculated.													
H.2.3. Parameter: $EF_{grid,OM,y}$ Operating margin CO <sub>2</sub> emission factor for grid connected power generation in year y Unit: tCO <sub>2</sub> /MWh Type: calculated			DR	OK	OK										

CHECKLIST TOPIC / QUESTION		Ref.	MoV*	Draft Concl	Final Concl										
<table border="1"> <thead> <tr> <th>Boundary checklist</th> <th>Yes / No</th> </tr> </thead> <tbody> <tr> <td>Parameter discussed in the PDD?</td> <td>YES</td> </tr> <tr> <td>Inclusion / exclusion justified?</td> <td>YES</td> </tr> <tr> <td>Explanation / Justification sufficient?</td> <td>YES</td> </tr> <tr> <td>Consistency with monitoring plan?</td> <td>YES</td> </tr> </tbody> </table>		Boundary checklist	Yes / No	Parameter discussed in the PDD?	YES	Inclusion / exclusion justified?	YES	Explanation / Justification sufficient?	YES	Consistency with monitoring plan?	YES				
Boundary checklist	Yes / No														
Parameter discussed in the PDD?	YES														
Inclusion / exclusion justified?	YES														
Explanation / Justification sufficient?	YES														
Consistency with monitoring plan?	YES														
Comment: Simple OM has been correctly calculated.															
H.2.4. Parameter: $FC_{i,m,y}$ , $FC_{i,y}$ , $FC_{i,j,y}$ , $FC_{i,k,y}$ , $FC_{i,n,y}$ and $FC_{i,n,h}$ Amount of fossil fuel type i consumed by power plant / unit m, j, k or n (or in the project electricity system in case of $FC_{i,y}$ ) in year y or hour h Unit: mass or volume unit Type: official publication			DR	N.A.	N.A.										
<table border="1"> <thead> <tr> <th>Boundary checklist</th> <th>Yes / No</th> </tr> </thead> <tbody> <tr> <td>Parameter discussed in the PDD?</td> <td></td> </tr> <tr> <td>Inclusion / exclusion justified?</td> <td></td> </tr> <tr> <td>Explanation / Justification sufficient?</td> <td></td> </tr> <tr> <td>Consistency with monitoring plan?</td> <td></td> </tr> </tbody> </table>		Boundary checklist	Yes / No	Parameter discussed in the PDD?		Inclusion / exclusion justified?		Explanation / Justification sufficient?		Consistency with monitoring plan?					
Boundary checklist	Yes / No														
Parameter discussed in the PDD?															
Inclusion / exclusion justified?															
Explanation / Justification sufficient?															
Consistency with monitoring plan?															
Comment:															
H.2.6. Parameter: $EF_{CO_2,i,y}$ CO <sub>2</sub> emission factor of fossil fuel type i in year y Unit: tCO <sub>2</sub> /GJ Type:			DR	N.A.	N.A.										
<table border="1"> <thead> <tr> <th>Boundary checklist</th> <th>Yes / No</th> </tr> </thead> <tbody> <tr> <td>Parameter discussed in the PDD?</td> <td></td> </tr> <tr> <td>Inclusion / exclusion justified?</td> <td></td> </tr> <tr> <td>Explanation / Justification sufficient?</td> <td></td> </tr> <tr> <td>Consistency with monitoring plan?</td> <td></td> </tr> </tbody> </table>		Boundary checklist	Yes / No	Parameter discussed in the PDD?		Inclusion / exclusion justified?		Explanation / Justification sufficient?		Consistency with monitoring plan?					
Boundary checklist	Yes / No														
Parameter discussed in the PDD?															
Inclusion / exclusion justified?															
Explanation / Justification sufficient?															
Consistency with monitoring plan?															
Comment:															
H.2.7. Parameter: $EG_{m,y}$ , $EG_y$ , $EG_{j,y}$ , $EG_{k,y}$ and $EG_{n,h}$ Net electricity generated and delivered to the grid by power plant / unit m, j, k or n (or in the project electricity system in case of $EG_y$ ) in year y or hour h Unit: MWh Type: monitored			DR	OK	OK										

CHECKLIST TOPIC / QUESTION		Ref.	MoV*	Draft Concl	Final Concl										
<table border="1"> <thead> <tr> <th>Boundary checklist</th> <th>Yes / No</th> </tr> </thead> <tbody> <tr> <td>Parameter discussed in the PDD?</td> <td>YES</td> </tr> <tr> <td>Inclusion / exclusion justified?</td> <td>YES</td> </tr> <tr> <td>Explanation / Justification sufficient?</td> <td>YES</td> </tr> <tr> <td>Consistency with monitoring plan?</td> <td>YES</td> </tr> </tbody> </table>		Boundary checklist	Yes / No	Parameter discussed in the PDD?	YES	Inclusion / exclusion justified?	YES	Explanation / Justification sufficient?	YES	Consistency with monitoring plan?	YES				
Boundary checklist	Yes / No														
Parameter discussed in the PDD?	YES														
Inclusion / exclusion justified?	YES														
Explanation / Justification sufficient?	YES														
Consistency with monitoring plan?	YES														
Comment: Net electricity generated is correctly calculated and will be monitored.															
H.2.8. Parameter (only for dispatch data OM): $EG_{P,j,h}$ Electricity displaced by the project activity in hour h of year y Unit: MWh Type: monitored <table border="1"> <thead> <tr> <th>Boundary checklist</th> <th>Yes / No</th> </tr> </thead> <tbody> <tr> <td>Parameter discussed in the PDD?</td> <td></td> </tr> <tr> <td>Inclusion / exclusion justified?</td> <td></td> </tr> <tr> <td>Explanation / Justification sufficient?</td> <td></td> </tr> <tr> <td>Consistency with monitoring plan?</td> <td></td> </tr> </tbody> </table>		Boundary checklist	Yes / No	Parameter discussed in the PDD?		Inclusion / exclusion justified?		Explanation / Justification sufficient?		Consistency with monitoring plan?			DR	N.A	N.A.
Boundary checklist	Yes / No														
Parameter discussed in the PDD?															
Inclusion / exclusion justified?															
Explanation / Justification sufficient?															
Consistency with monitoring plan?															
Comment:															
H.2.9. Parameter: (only for dispatch data OM) $\eta_{m,y}$ Average net energy conversion efficiency of power unit m in year y Unit: - Type: <table border="1"> <thead> <tr> <th>Boundary checklist</th> <th>Yes / No</th> </tr> </thead> <tbody> <tr> <td>Parameter discussed in the PDD?</td> <td></td> </tr> <tr> <td>Inclusion / exclusion justified?</td> <td></td> </tr> <tr> <td>Explanation / Justification sufficient?</td> <td></td> </tr> <tr> <td>Consistency with monitoring plan?</td> <td></td> </tr> </tbody> </table>		Boundary checklist	Yes / No	Parameter discussed in the PDD?		Inclusion / exclusion justified?		Explanation / Justification sufficient?		Consistency with monitoring plan?			DR	N.A.	N.A.
Boundary checklist	Yes / No														
Parameter discussed in the PDD?															
Inclusion / exclusion justified?															
Explanation / Justification sufficient?															
Consistency with monitoring plan?															
Comment:															
H.2.10. Do the spatial and technological boundaries as verified on-site comply with the discussion provided by / indication included to the PDD?			DR	Ok	Ok										
Comment:															
<b>H.3. Description of how the baseline methodology procedure is identified and description of the identified baseline procedure</b>															
H.3.1. Is every selection of options offered by the tool correctly justified and is this justification in line with the situation verified on-site?			DR	OK	OK										
Comment: Can be confirmed as correct.															
H.3.2. Are the formulae required for the determination of the Operating Margin correctly presented, enabling a complete identification of parameter to be used and / or monitored?			DR	OK	OK										
Comment: Can be confirmed as correct.															

CHECKLIST TOPIC / QUESTION	Ref.	MoV*	Draft Concl	Final Concl
H.3.3. Is the method to calculate the Operating Margin (Simple OM, Simple Adjusted OM, Dispatch data OM, or Average OM), the most appropriated one?		DR	OK	OK
Comment:	Simple OM is appropriate and has been chosen.			
H.3.4. Are the formulae required for the determination of the Build Margin correctly presented, enabling a complete identification of parameter to be used and / or monitored?		DR	OK	OK
Comment:	Can be confirmed as complete and correct.			
H.3.5. Is the set of power units (the set of five power units that have been built most recently, or the set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently), comprising the larger annual generation?		DR	OK	OK
Comment:	Can be confirmed as correct.			
H.3.6. Are the formulae required for the determination of the Combined Margin correctly presented, enabling a complete identification of parameter to be used and / or monitored?		DR	OK	OK
Comment:	Can be confirmed as complete and correct.			
H.3.7. Are the values used for $w_{OM}$ and $w_{BM}$ correctly applied?		DR	OK	OK
Comment:	Can be confirmed as correctly applied.			
H.3.8. Is the calculation of the operating margin and build margin emission factors documented electronically in a spreadsheet attached to the CDM-PDD. This should include all data used to calculate the emission factors		DR	OK	OK
Comment:	Can be confirmed. Documents are attached.			
H.3.9. Are the default efficiency factors for power plants used according to Appendix I of the tool?		DR	OK	OK
Comment:	Factors have been cross-checked.			
H.3.10. Is the value applied to the CO <sub>2</sub> emission factor of biofuels is zero?		DR	NA	NA
Comment:				

## PROTOCOL 4: SUMMARY OF REQUESTS

No.:	CL 1	Reference:	LoA
VVB request:	LoA has not yet been issued.		
Project participant response:	LoA was sent on 19/07/2012		
VVB conclusion:	VVB confirms reception of the LoA – CL 1 is closed.	Date:	12/09/2012

No.:	CL 2	Reference:	MoC
VVB request:	The MoC has not yet been submitted.		
Project participant response:	The Modalities of Communication form was uploaded to the online folder. Please use the following link: <a href="https://assif.box.com/s/8afe30be286d1e1684e1">https://assif.box.com/s/8afe30be286d1e1684e1</a>		
VVB conclusion:	The MoC has been downloaded and reception can be confirmed.	Date:	12/09/2012

No.:	CL 3	Reference:	CER-Calculation, sheet Additional historical values
VVB request:	The indicated CAPmax is incorrect.		
Project participant response:	CAPmax was changed to 210MW		
VVB conclusion:	Correctness can be confirmed – CL 3 is closed.	Date:	12/09/2012

No.:	CL 4	Reference:	Project description
VVB request:	<p>There is insufficient information and/or supporting documentation for the validation of</p> <ul style="list-style-type: none"> <li>• retrofitting Los Mina 5 in 2009-2010</li> <li>• expected lifetime of existing gas turbines</li> <li>• actual gas consumption</li> <li>• NCV of gas</li> <li>• Electricity generated 2009-2011</li> <li>• Calibration of electricity metre</li> <li>• Financial analysis</li> <li>• Local Stakeholder consultation</li> <li>• Grid emission factor</li> </ul>		
Project participant response:	<p>Retrofitting Los Mina 5 in 2009-2010 – The document "Los Mina Unit 5 Generator Rotor Exchange &amp; Bearing Rebabbit Proposal Rev0" was provided as supporting document.</p> <p>Expected lifetime of existing gas turbines – The document "Los Mina Depreciation Life Review Final_061812 v3" was provided as supporting document.</p> <p>actual gas consumption - Was provided in online sub folder "fuel"</p> <p>NCV of gas – The document "TT4 1022 BRITISH SAPPHIRE, DISCHARGE REPORT, JANUARY 03-04, 2012" was provided in the online Fuel folder. This is an example of SGS verification on the fuel shipments. The energy value is in BTU/kg (on the 2nd page) and was converted using standard conversion values.</p> <p>Electricity generated 2009-2011 - Information was provided to VVB during the site visit directly from the regulator website. There is no technical way to generate an official reports from the</p>		

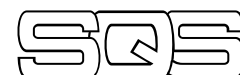
	<p>website</p> <p>Calibration of electricity metre - By law the grid operator calibrates the meters every 2 years. A copy of the regulation was uploaded to the online folder ("Reglamento para la Aplicacion... art. 342"). Please use the following link: <a href="https://assif.box.com/s/924c772024f17b22ae2c">https://assif.box.com/s/924c772024f17b22ae2c</a></p> <p>Financial analysis - DPP provided the financial analysis</p> <p>Local Stakeholder consultation - Please see online sub folder "Local Stakeholders Consultation". You can find invitations, photos, questioners, presentation, list of attendees, translation of proceedings and much more.</p> <p>Grid emission factor - DPP provided a letter from the OC verifying that the data used is official</p>	
VVB conclusion:	Information is verified and deemed complete – CL 4 is closed.	Date: 19/10/2012

No.:	CL 5	Reference:	Data and parameters monitored, QA/QC procedures to be applied
VVB request:	The information concerning the calibration of the electricity metres is unclear.		
Project participant response:	PDD was updated to note that the metres are calibrated every 2 years by the grid operator		
VVB conclusion:	Information has been verified and deemed correct and complete – CL 5 is closed.	Date:	12/09/2012

No.:	CL 6	Reference:	PDD A.1. and A.3.
VVB request:	There is unclear and contradictory information concerning installed capacity (designed capacity), gross capacity, increase of capacity and final capacity.		
Project participant response:	The PDD was updated to original maximum capacity of 210MW and planned upgraded capacity of 318MW		
VVB conclusion:	Information is now clear – CL 6 is closed.	Date:	12/09/2012

No.:	CL 7	Reference:	PDD B.4. Step 4 Common practice analysis
VVB request:	There is insufficient information concerning the identified plants defined in sub-step 4a(3), the source of the data is missing and the table of the plants listed do not indicate the output capacity.		
Project participant response:	The table was updated to include installed capacity of the power plants on the PDD page 18		
VVB conclusion:	Information has been checked and deemed complete – CL 7 is closed.	Date:	12/09/2012

No.:	CL 8	Reference:	PDD B.5.
VVB request:	There is an incorrect equation related to Emission Reduction.		
Project participant response:	Ly was corrected to LEy in the Emission Reduction equation on the PDD page 19		
VVB conclusion:	Corrections have been checked and deemed ok – CL 8 is closed.	Date:	12/09/2012



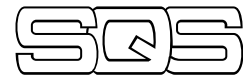
No.:	CL 9	Reference:	PDD B.5.
VVB request:	There is no conclusion concerning the applicability of Leakage Emission.		
Project participant response:	The explanation for the Determination of $LE_{HR,y}$ was updated on the PDD page 32. In addition the explanation regarding determination of $LE_{upstream,y}$ was also updated on the same page.		
VVB conclusion:	PDD has been checked and information is complete – CL 9 is closed.	Date:	12/09/2012

No.:	CL 10	Reference:	PDD B.4. Sub-step 4a(1)
VVB request:	There is an incorrect design output capacity.		
Project participant response:	The PDD was updated to original maximum capacity of 210MW and planned upgraded capacity of 318MW		
VVB conclusion:	Information has been checked and deemed ok – CL 10 is closed.	Date:	12/09/2012

No.:	CL 11	Reference:	PDD B.4.
VVB request:	Last sentences are contradictory. " Since not both conditions are fulfilled, the proposed project activity is regarded as "common practice". Since the proposed project activity is not regarded as "common practice", the proposed project activity is additional."		
Project participant response:	The sentence was corrected to "Since not both conditions are fulfilled, the proposed project activity is <u>not</u> regarded as "common practice". Since the proposed project activity is not regarded as "common practice", the proposed project activity is additional" (Page 19 of the PDD).		
VVB conclusion:	VVB agrees with explanations – CL 11 is closed.	Date:	12/09/2012

No.:	CL 12	Reference:	PDD B.7.1 Data and parameters to be monitored
VVB request:	There is unclear information concerning monitoring frequency of $NCV_{NG,y}$		
Project participant response:	The explanation was updated to the following: "The NCV should be obtained for each fuel delivery, from which weighted average annual values should be calculated. "Fuel delivery" refers to each time a ship unloads LNG at the ANDRES site which is the source of fuel for DPP. NCV value may vary a little between ship loads and the equivalent value in BTU/kg is measured by a "third party" (currently by SGS) for each load. The number of ship loads per year depends on consumption rates, but usually an LNG ship unloads fuel once every few weeks."		
VVB conclusion:	Information is now clear and sufficient – CL 12 is closed.	Date:	12/09/2012

No.:	CL 13	Reference:	C.1.2. Expected lifetime of project activity
VVB request:	There is contradictory information concerning expected lifetime of existing equipment in B.4. Sub-step 1a and expected operational lifetime of project activity in C.1.2.		



Project participant response:	Expected lifetime in section C.1.2 was corrected to 2032 to be in line with B.4. Sub-step 1a and the third party analysis obtained from Sargent & Lundy (dated June 18th 2012) which state that the installed turbines can have 20 years or more of economic operation.	
VVB conclusion:	Information is now correct – CL 13 is closed.	Date: 12/09/2012

No.:	CL 14	Reference:	PDD A.2.4.
VVB request:	The indicated UTM Coordinates and Coordinates in grades, minutes and seconds do not correspond.		
Project participant response:	The UTM Coordinates were removed from the PDD. The coordinates in grades, minutes and seconds that are provided in A.2.4. are correct.		
VVB comment:	Coordinates are not in decimal format.		
Project participant response:	Coordinates in decimal format were added to the PDD		
VVB comment:	The coordinates for the longitude have not the same mathematical value in the two format		
Project participant response.	The coordinates in both formats are for exactly the same location directly from Google Earth. A Google Earth location file was sent to the validator		
VVB conclusion:	Location is clear now - CL 14 is closed.	Date:	19/10/2012

No.:	CL 15	Reference:	Excel sheet ETA
VVB request:	Excel sheet ETA=Pout/Pin: ETA is not calculated although Pout and Pin are given in the same Excel file. Clarify why ETA is not calculated with Pout and Pin. Furthermore ETA for 2015 is 28% (calculated) and not 43% as given by the PP. Clarify on that.		
Project participant response:	ETA was not calculated only for the year 2015, year 2016 to 2024 is calculated as Pout/Pin. Please see below explanation: According to the methodology the potential emission reductions are calculated based on the lowest efficiency during the crediting period to avoid future efficiency upgrades, which has nothing to do with the proposed project, from increasing the amount of CERs. The first year as it appears in the previous version of the spreadsheet is strongly influenced by unstable conditions during the commissioning period and the average efficiency comes out as 28% which does not represent the project real efficiency. This is way we manually set the value to 43%. Due to the above and in order to correctly represent the project efficiency, we have moved the crediting period start date to January 2016 and so will avoid the influenced of the unstable conditions during the commissioning period. Please see the updated calculation spreadsheet, all ETA values are calculated as Pout/Pin.		
VVB conclusion:	Information for ETA is clear now – CL 15 is closed.	Date:	19/10/2012

No.:	CL 16	Reference:	Tool to calculate the emission factor for an electricity system
VVB request:	PDD, calculation of EFgrid, step 1: "Project electricity system" and "connected electricity system" are not clearly defined / identified in the PDD. Clarify on that. PDD, calculation of EFgrid, step 2, table: Explain table-row "Natural gas (MMBtu)".		
Project participant response:	An explanation was added in step 1 that there is no "Connected Electricity System" in this case		



	as defined in the "Tool to calculate the emission factor for an electricity system". There was a mistake in the table in step 2. The table was updated. The correct table also appears on the "Energy Generation by Type" tab of the Grid Emission Factor spreadsheet.	
VVB conclusion:	Information is clear now – CL 16 is closed.	Date: 19/10/2012

No.:	CL 17	Reference:	ER Excel sheet
VVB request:	ER Excel, sheet "DPP Project - Planned Gen&Cons": there is insufficient information concerning the source of the data. The future yearly values vary, submit more information.		
Project participant response:	<p>The data for the future consumption and generation as it appears on the "DPP Project – Planned Gen&amp;Cons" tab comes from the model called "MOPERD". MOPERD is the standard model used in the DR for the projection and long term planning of the system. Please see official reference to this model in the report "PROGRAMACIÓN DE LA OPERACIÓN DE LARGO PLAZO ENERO 2012 – DICIEMBRE 2015" by the OC on page 5. This report was provided separately to SQS and is available on the OC web page.</p> <p>MOPERD is an economic dispatch model. The model dispatch the duration curve taking into account: availability, efficiency, maintenances, the entre of new players, old player that leave the market, fuel prices, Demand growth, etc, guarantying the supply of the demand at minimum cost. The generation and the fuel consumption related to the generation come from the model and due to the above the values are not constant year to year.</p>		
VVB conclusion:	Information and source are deemed correct and clear- CL 17 is closed.	Date:	19/10/2012

No.:	CL 18	Reference:	CERs_Calcs spreadsheet
VVB request:	Quantity of fuel type used ( $FC_{i,x}$ and with that $NCV_{i,x}$ ) is given in MMBTU/yr thus actually not in line with the methodology, though calculation is not wrong. Is there solid evidence that figures for gas in $m^3/yr$ are not accessible? Furthermore in Excel file "LOS MINA archive log 4-23-2012 12-53-17 AM" quantity of gas is given in ft3 thus in volume unit, which contradicts the statement that figures are not available in volume unit.		
Project participant response:	The internal metre does log gas volume in f3 but this data is not used or archived by DPP systems or process. The example that was provided was "fresh" from April 2012 but the historic data is not available in a way that can be verified. DPP fuel consumption is archived in MMBTU for the accounting system due to the fuel purchase agreement. As we showed and documented, all external contracts with the gas supplier only refer to MMBTU and that is why only the MMBTU value can constantly be verified against receipts.		
VVB conclusion:	Information is deemed complete and correct – CL 18 is closed.	Date:	19/10/2012

No.:	CL 19	Reference:	Financial analysis, Excel sheet
VVB request:	Further explanation is needed to explain the decrease of generation and capacity factor from year 2023 on.		
Project participant response:	The Los Mina Plants have a Heat Rate of around 12 000 BTU/kWh, the only reason of its high dispatch until 2023 is the low price of the Fuel based on NYMEX gas price and existing fuel supply contract. After the expiration date of this contract, these units will operate as a peaking		

plant. This is the main reason for the low dispatch after 2022. As reference document we are submitting to SQS the AES Andres Consolidated Financial Statement, in page 43 paragraph 13 (page 45 of the PDF file), there is reference to the fuel contract and its expiration date in 2022.	
VVB conclusion:	Information deemed complete and are accepted – CL 19 is closed. Date: 26/10/2012

No.:	CL 20	Reference:	Financial analysis, Excel sheet
VVB request:	Revenues and costs formulae are not traceable. How results were calculated (missed how assumptions like energy prices were used).		
Project participant response:	We have further modified the structure of the file to be more tractable and transparent. However we can't show how the energy prices and fuel cost are calculated because will be breaking confidentiality agreements.		
VVB conclusion:	Information deemed sufficient regarding the confidentiality agreements – CL 20 is closed.	Date:	26/10/2012

No.:	CL 21	Reference:	Sensitivity analysis PDD LM_CC_Model_vOct2012v9
VVB request:	The values of delta NPV do not seem correct in sheet summary evaluation ALL, Cases and the PDD.		
Project participant response:	The values are correct. This is a comparative analysis. It looks confusing but both the current situation and the proposed project are affected by the change in fuel prices so scenario 2 can have a better NPV than scenario 5. The proposed project will be more efficient in its fuel use and also more contracted, therefore higher fuel costs will affect it less than it will affect the current installation.		
VVB conclusion:	Explanation is accepted and can be confirmed as correct – CL 21 is closed.	Date:	27/12/2012

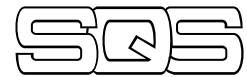
No.:	CL 22	Reference:	Investment analysis, O&M costs, Contingency
VVB request:	There is insufficient information regarding O&M costs and the base case of contingency costs.		
Project participant response:	The base case for contingency is 35% of the total estimated costs of: equipment, EPC, and management. This value is more than reasonable at such an early stage of development in the Dominican Republic when no official proposals from suppliers and service providers are available yet. To support this claim the PP provided as a <b>confidential document</b> a copy of the first EPC proposal for this project that was received in December 2012. The overall EPC cost in this proposal is even higher than the values represented in the economic model by the higher 40% contingency value.		
VVB conclusion:	Information are verified and deemed sufficient – CL 22 is closed.	Date:	27/12/2012

No.:	CL 23	Reference:	Reference to sources
VVB request:	The sources of the information are not referenced e.g. Dominicana_CERs_Calcs. Spreadsheet Los Mina History, source EFCO <sub>2</sub> Spread-sheet conversions, PDD B.7.1. EF <sub>NG,upstream,CH4</sub> .		
Project participant response:	As requested we added a tab that explains the source of data. The sources for the EFCO <sub>2</sub> are described on the Conversion tab. We changed PDD B.7.1 EF <sub>NG,upstream,CH4</sub> to better reflect that the source of data is ACM0007		
VVB conclusion:	Sources of information are verified and deemed correct and sufficient – CL 23 is closed.	Date:	27/12/2012

No.:	CL 24	Reference:	CER Calculation spreadsheet
VVB request:	The formula mentioned on column D, line 7, is not exactly the formula used for the calculation. Information is not added. The same inconsistency is in the PDD B.6.1. Project Emissions.		
Project participant response:	The fact that we are using energy info and not volume and that this is not consistent with the original methodology is already discussed in CL18. The following comment was added to cell D7: "As the original fuel consumption values are in energy units the application of the equation was adopted to use energy units instead of mass or volume". Otherwise it would just be double conversion to end up in the same place.		
VVB conclusion:	The information in cell D7 is verified and deemed sufficient – CL 24 is closed.	Date:	27/12/2012

No.:	CL 25	Reference:	PDD B.4. Baseline Scenario
VVB request:	Sub-step 1b S2 mentions that third parties could undertake investment. The Sargent Lundy Study mentions the possibility that EGE Itabo SA could be the owner of a new part of the project. There is insufficient information regarding the exclusion of this option.		
Project participant response:	In an initial stage of the project there was the possibility of installing another gas turbine (San Lorenzo) in the Los Minas site, and include it in the project. This option was excluded from the analysis as the plant was installed in another site. In any case this was not about someone else owning part of the retrofit, but an idea of a third turbine which is not relevant for the discussion in Sub-step 1b S2.		
VVB conclusion:	Information deemed sufficient – CL 25 is closed.	Date:	28/12/2012

No.:	CL 26	Reference:	PDD B.4. Baseline Scenario
VVB request:	Sub-step 1b S5 Other plausible and credible alternatives is not elaborated sufficiently.		
Project participant response:	Apart for the addition regarding solar and hydro not being relevant (page 13 on top), I do not see what else we can add. There is no point in "inventing" other scenarios if they do not exist.		
VVB conclusion:	VVB accepts the explanation – CL 26 is closed.	Date:	27/12/2012



No.:	CL 27	Reference:	LM_CC Model
VVB request:	The sheet "extra" contains information which is not related to the basic information – e.g. lines 69,70,82 to 92. This document will be made public.		
Project participant response:	The referenced lines were deleted.		
VVB conclusion:	Content of sheet "extra" is verified and answer of PP can be confirmed as correct – CL 27 is closed.	Date:	27/12/2012

No.:	CL 28	Reference:	PDD B.2. Applicability of the methodology
VVB request:	There is insufficient information regarding the retrofit during the last three years of operational history. The submitted document is the offer for the Rotor exchange. The proof for the retrofit is deemed insufficient.		
Project participant response:	The requirement is to show that no "major retrofit" took place in the last three years. As discussed during the site visit, DPP can't show actual costs as they consisted of several cost items of which some are hard to define from regular O&M. The third party offer is the most relevant to show that the associated costs were much less than the 20% benchmark.		
VVB response:	It's unclear if this minor retrofit – rotor exchange – has been realized or not. Submit more information regarding retrofit history regarding the last three years of operational history - e.g. summary of interventions of SIEMENS.		
Project participant response:	The retrofit did take place in 2009 and unit 5 did not operate for several months due to the retrofit as can be seen in the historic operation information.		
VVB conclusion:	Information deemed sufficient – CL 28 is closed.	Date:	27/12/2012

No.:	CL 29	Reference:	EF grid
VVB request:	EF grid is referenced in the PDD B.6.1. Step 6 as of 0.655 and in Dominicana_CERs calculation spreadsheet it is 0.6545. It's not consistent.		
Project participant response:	The value in the PDD was corrected to 0.6545.		
VVB conclusion:	Value is verified and can be confirmed as correct – CL 29 is closed.	Date:	27/12/2012

No.:	CL 30	Reference:	Financial Analysis
VVB request:	There is insufficient information regarding PPAs. There are no supporting documents.		
Project participant response:	Although the Los Minas CC PPA's haven't been already signed, we are using current AES Andres PPA figures for the project analysis. (If need we could include copy of current invoices of the PPAs).		
VVB conclusion:	Information deemed sufficient – CL 30 is closed.	Date:	27/12/2012



No.:	CL 31	Reference:	Financial Analysis
VVB request:	The source of the energy price – sheet coal price – is not available and has to be provided. There is a leak of explanation why coal price is used as PP uses NLG.		
Project participant response:	The same tab has reference to the sources of energy prices which are external. Coal price is used in the model because electricity costs in the Dominical Republic are tied to coal prices and therefore so do the project income. DPP obtain the info through Bloomberg but you can go to <a href="http://www.theice.com">www.theice.com</a> or <a href="http://global.coal.com">global.coal.com</a> and look at the end of day settlements.		
VVB conclusion:	Source reference is verified and can be confirmed as correct – CL 31 is closed.	Date:	27/12/2012

No.:	CL 32	Reference:	Barrier analysis
VVB request:	There is insufficient information regarding barrier analysis. The Investment Analysis –Step 3 – is not considered as barrier.		
Project participant response:	Sub step 2a on page 16 discusses barrier analysis and explains that there are no barriers other than the investment barrier.		
VVB conclusion:	Explanation is accepted – CL 32 is closed.	Date:	27/12/2012

No.:	CL 33	Reference:	Prior consideration
VVB request:	There is insufficient information regarding prior consideration in the PDD. The timeline of the project history is not presented. The request for proposal - Doc no. CCDPP-002/2012) dated 18/06/ 2012, sent to Posco is not submitted.		
Project participant response:	I do not understand this CL. A copy of the Prior Consideration form was sent to SQS and there is more than 6 months between the signature date and the start date.		
VVB conclusion:	As there is no explicit statement in the VVS that information of prior consideration has to be included in the PDD, VVB accepts explanation of PP – CL 33 is closed.	Date:	27/12/2012

No.:	CL 34	Reference:	Existing capacity and future capacity
VVB request:	There is inconsistency between existing and additional capacity in LM_CC_Model, PDD and Commercial (POSCO 121031) v2. Are mentioned for existing capacity 210 respectively 211.1 (rounded from 211.145) MW and for the additional capacity 110 respectively 107.755 MW respectively 112.8 in the Commercial (POSCO 121031) v2. Clear documentation about existing capacity is needed.		
Project participant response:	We stand behind the numbers as provided and believe the inconsistencies are very small and negligible. This has no effect on calculations.		
VVB conclusion:	Regarding the small differences and the conservativeness of the value used, VVB agrees with the explanations of PP – CL 34 is closed.	Date:	27/12/2012

No.:	CL 35	Reference:	LM_CC Model, Investment
VVB request:	Model description in sheet Assumption does not correspond to the cases in the following sheets. The base case is not identified.		
Project participant response:	The model was corrected.		
VVB conclusion:	Correction is verified and confirmed as correct – CL 35 is closed.	Date:	27/12/2012

No.:	CL 36	Reference:	Common practice analysis
VVB request:	It's unclear if open cycle plants are included in the common practice analyses.		
Project participant response:	Open cycle plants were included. Please see table in Step 4a on page 18. 3 of the plant are combined cycle and 3 are open cycle.		
VVB conclusion:	Information is verified and deemed correct – CL 36 is closed.	Date:	27/12/2012

No.:	CAR 1	Reference:	PDD D.2 Environment impact assessment
VVB request:	There is no CDM project related impact assessment information in the PDD. Impact assessment and actions to undertake related to the CDM project are missing.		
Project participant response:	Section D.2 was updated		
VVB conclusion:	Section D.2. has been verified and deemed complete – CAR 1 is closed.	Date:	12/09/2012

No.:	CAR 2	Reference:	PDD B.3. Project boundary
VVB request:	Figure 7 does not include the electric grid.		
Project participant response:	Figure 7 was corrected to include the electric grid		
VVB conclusion:	Figure 7 has been verified and deemed correct – CAR 2 is closed.	Date:	12/09/2012

No.:	CAR 3	Reference:	file format
VVB request:	<p>All Excel files must be in ".xls" format.</p> <p>In the Excel file "Dominicana_CERs_Calcs.07-08-2012.xlsx" in sheet "DPP Project - Planned Gen&amp;Cons" range G7 to H23 links exist to the external document "Los Mina CC Model v1.5.xls". For example "=\ASSIF1\Assif Shared\del\My Documents\Downloads\[Los Mina CC Model v1.5.xls]8. LMCC Model!!\$23"</p> <p>The Excel file must be a stand-alone document.</p>		
Project participant response:	<p>All Excel files were saved in "xls" format</p> <p>All external links were disabled</p>		



VVB conclusion:	Excel files are in correct format – CAR 3 is closed.	Date:	19/10/2012
-----------------	--	-------	------------

No.:	CAR 4	Reference:	Prior consideration
VVB request:	There is insufficient information regarding prior consideration.		
Project participant response:	In late 2011 DPP contracted Elysium Carbon Trade & Investment to perform a feasibility analysis for the registration of the upgrade project under the CDM. In January 2012 the final feasibility was presented to DPP and the results were incorporated in the financial analysis. In April 2012 an official Prior Consideration notice was sent to the UNFCCC and the local DNA (a copy was provided to SQS and reference is also available on the UNFCCC website). The Start Date of the project activity is expected no earlier than March 2013 so there are more than 180 days between the Prior Consideration and the expected start date.		
VVB conclusion:	Information is considered sufficient – CAR 4 is closed.	Date:	04/11/2012

No.:	CAR 5	Reference:	Investment analysis
VVB request:	There is insufficient information regarding the date of the decision to invest in the project.		
Project participant response:	The decision to invest in the project had not been taken yet. Among other things DPP Management and Board are still waiting for detailed technical and financial analysis, final equipment and EPC cost analysis, and CDM registration outcome. A decision regarding the investment is not expected until March 2013. A signed declaration by DPP's president as to the above was provided to SQS.		
VVB conclusion:	The information deemed complete – CAR 5 is closed.	Date:	04/11/2012

No.:	CAR 6	Reference:	Tool to calculate the emission factor of an electricity system
VVB request:	The "Tool to calculate the emission factor of an electricity system" Version 2.1.1 lost its validity.		
Project participant response:	The PDD has been adapted to the "Tool to calculate the emission factor of an electricity system" Version 02.2.0.		
VVB conclusion:	The update is according to the version 02.2.0 of the tool.	Date:	03/12/2012

No.:	CAR 7	Reference:	PDD Appendix 1, MoC, LoA
VVB request:	There is inconsistency regarding the signatory of PDD Appendix 1 and MoC and also regarding the name of the project participant in LoA, MoC and PDD.		
Project participant response:	We could not find any reference to the fact that the same name should be used as the contact person in Appendix 1 and the MoC. One is just a contact person regarding the PDD and the other has the authority to instruct the UNFCCC regarding CER allocation. Project participant name is Dominican Power Partners, LDC, but on local documentation in the Dominican Republic they also use DOMINICAN POWER PARTNERS, LDC in capital letters. Both refer to the same entity. We cannot control which of the two is used on third party documentation and so indicated both as official names in the PDD.		



VVB conclusion:	Supplementary information is included in the validation report – CAR 7 is closed.	Date:	27/12/2012
-----------------	---	-------	------------

No.:	CAR 8	Reference:	PDD front page
VVB request:	The reference to the methodology is missed at the front page of the PDD.		
Project participant response:	Reference to the methodology was added on the front page of the PDD		
VVB conclusion:	Reference is verified and deemed correct – CAR 8 is closed.	Date:	27/12/2012

No.:	CAR 9	Reference:	PD
VVB request:	VCS is not fully applied to the original CDM PDD and supplementing Excel sheets. Reference and use of the VCS Program Documents are missing (like VCS Standard, VCS Program Guide, Program Definitions). VCS nomenclature (like VCU, VVB instead of CER and DOE respectively) is not applied.		
Project participant response:	Reference to the VCS standards and guidance documents was added to section 1.1 Summary Description of the Project and VCS terminology was corrected in the PD.		
VVB request:	Version number of the applicable VCS documents is missing.		
Project participant response:	Version numbers were added to section 1.1.		
VVB conclusion:	VCS requirements are now applied and referenced in the PD. The PD has been completely updated – CAR 9 is closed.	Date:	20/03/2013

No.:	CAR 10	Reference:	PD
VVB request:	Not the most recent tools are used for the applied methodology. Use the most recent tools, including the “Tool to calculate the emission factor for an electricity system”, “Combined Tool to identify the baseline scenario and demonstrate additionality”. ACM007 requests monitoring of mass or volume of gas. The volumes/masses used to calculate the MMBTU need to be archived.		
Project participant response:	Version 4 of the Combined tool to identify the baseline scenario and demonstrate additionality is used and request for registration can be submitted until July 23rd 2013. The PD was updated to reflect Version 3 of the Tool to calculate the emission factor for an electricity system. ACM007 requests to monitoring mass or volume of the gas is discussed in the methodology Deviation section on page 22 as allowed under the VCS. To provide greater accuracy in comparing fuels, especially NG, it is very common in the NG sector to use energy units in commercial deals. Please see the following links: <a href="http://www.tulsagastech.com/measure.html">http://www.tulsagastech.com/measure.html</a> <a href="http://www.spectraenergy.com/content/documents/Media_Resources_PDFs/Understanding_Natural_Gas_Markets.pdf">http://www.spectraenergy.com/content/documents/Media_Resources_PDFs/Understanding_Natural_Gas_Markets.pdf</a> See spot prices graph for NG on page 2 and BTU definition on page 26.		
VVB request:	The deviation is described in the PD – accepted by the VVB. The “Combined Tool to identify the baseline scenario and demonstrate additionality” need to be updated to the latest version as per		

VCS requirements.	
Project participant response:	The Combined tool to identify the baseline scenario and demonstrate additionality was updated to version 5.
VVB conclusion:	All tools are the latest versions as per VVS requirements - CAR 10 is closed.
Date:	26/03/2013

No.:	CAR 11	Reference:	PD
VVB request:	<p>Financial analysis is not transparently described in the VCS PD, it lacks details and references, especially for investment analysis and future cost estimations.</p> <p>Scenarios are not explained in detail, and there is an unclear use of terms.</p> <p>Contingency &gt;30% of total costs, high O+M, confidential data/study is not elaborated. There is a discussion of 9 cases within 2 unclear scenarios.</p>		
Project participant response:	<p>The full functional model of the DPP project was provided to the VVB. Reference and more explanation were added to the model and the PD. EPC costs were updated to reflect current offer. Contingency is now at a base of 10% and a range of 5%-15%.</p>		
VVB request:	<p>It seems that there is envisioned future electricity price drop in the future energy price (very significant for the project's NPV).</p> <p>It is stated that it is linear with the coal price; than as one reference there is given for coal price futures, but checking it:</p> <p><a href="https://www.theice.com/marketdata/reports/ReportCenter.shtml?reportId=10&amp;productId=517&amp;hubId=681#report/10/reportId=10&amp;productId=517&amp;hubId=681">https://www.theice.com/marketdata/reports/ReportCenter.shtml?reportId=10&amp;productId=517&amp;hubId=681#report/10/reportId=10&amp;productId=517&amp;hubId=681</a></p> <p>and there is a constant grow, nowhere to see a drop in the prices as in the financial Excel sheet 3. Dispatch for electricity price.</p>		
Project participant response:	<p>We expect that in the future the energy spot price in the DR will be highly correlated to Coal Prices.</p> <p>For the model we used the same set of data provided from our Corporation for the 2013 Budget process. The reference to this data is:</p> <p><i>Source: 2012 to 2017 based on ICE as of 12/14/2012. 2017 to 2022 escalated at inflation, from 2023 to 2031 we used Excel function Forecast (2018-2022).</i></p> <p>The reason for the drop is that the current energy spot price is highly correlated to Fuel Oil No.6, but that will change in the future, when new coal plants will be installed in the country.</p>		
VVB conclusion:	The general clarification for the financial calculations has been accepted. CAR 11 is closed, for some details of the financial calculations CAR#15 and CAR#16 has been raised.	Date:	26/03/2013

No.:	CAR 12	Reference:	Project history
VVB request:	<p>The project history is not described in detail in the PD. The description of prior consideration needs to be outlined in detail including the local and global stakeholder comments; the date of the decision to invest in the project are missing, and consideration proof by DNA DOM is not referenced.</p>		
Project participant response:	<p>The project history is described both in section 1.1 and 1.10. Reference to the history of the project as a CDM project was added to section 1.1, including reference to the global stakeholder process that was conducted.</p> <p>Prior consideration is proved by the official forms, the DNA letter, and a letter by DPP president</p>		

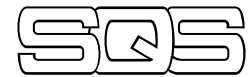
<p>that the investment decision had not been taken yet, and at the time of writing this letter the decision was not expected before Q1 2013.</p> <p>Currently, not all milestones that were identified as conditions to take the investment decision have been reached. Mainly, there are still negotiations regarding the EPC contract and due to the switch from CDM to VCS there is no clarity yet as to the probability of securing additional income from carbon credit. As a result, the investment decision had not been taken yet and is only expected in Q3 2013.</p>	
VVB conclusion:	<p>The project history and prior consideration are now included in the PD - CAR 12 is closed.</p> <p>Date: 22/03/2013</p>

No.:	CAR 13	Reference:	Environmental impact
VVB request:	The environmental impact description is not detailed enough in the PD. This is especially the case for the cooling water.		
Project participant response:	<p>As this is an upgrade of an existing NG power plant the potential additional environmental impacts are very limited and are discussed in chapter 5.</p> <p>The cooling technology that was chosen for the project are Cooling towers with a total make up water consumption of 2,100 GPM. The water studies have been finalized and results show evidence of a reliable source of underground water for Los Mina power plant. The main source of water will be 4 wells at Los Mina site with a capacity of 500 GPM. Additionally there will be a well at Ozama river shore that will serve as a backup.</p> <p>Due to the backup well at the river the project may have impact on the fauna and flora in the Ozama river when it is used. Permitting process has been started and any requirements and regulations to minimize the environmental impact will be followed.</p> <p>The above update was added to chapter 5.</p> <p>Currently the environmental authorities do not have any additional requests regarding the environmental permit.</p>		
VVB conclusion:	<p>The potential environmental impacts are now discussed in the PD. FAR#1 remains open on environmental impacts -CAR 13 is closed.</p> <p>Date: 22/03/2013</p>		

No.:	CAR 14	Reference:	Common practice
VVB request:	<p>Common practice analysis is not detailed enough, and the Guidelines on common practice (Version 02 EB69 Annex08) <a href="http://cdm.unfccc.int/Reference/Guidclarif/meth/meth_guid44.pdf">http://cdm.unfccc.int/Reference/Guidclarif/meth/meth_guid44.pdf</a> is not applied.</p>		
Project participant response:	<p>The common practice analysis follows the detailed instructions in the methodology which is in-line with the requirements and the guideline.</p> <p>The common practice analysis was update to reflect the corrections in the emission grid calculation due to an update in the installed capacity of one of the DR power plants.</p> <p>Additionally regarding the common practice analysis, it was found that the capacity and commissioning date of the Pimentel power plant was wrong in the original data set we received. The correct data is as follows. According with the 2006-OC report "Memorias", Pimentel 1 entered the system in 2006 with 31.4 MW. On the 2007-OC report the capacity was corrected to 31.6 MW. On the 2009-OC report "Memorias", Pimentel 2 entered the system on May 19, 2009 with</p>		

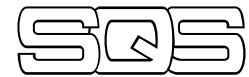
<p>28 MW. On the 2011-OC report (not included at the OC web page as the other ones, because this report was never published officially), Pimentel 3 reports 51.6 MW.</p> <p>Due to the information on the economic transaction of the system, we assume Pimentel 3 commissioning (dual-fuel engines FO6 and NG) take place on may-2011, but we don't have an official source of it.</p> <p>The above updated data changed the common practice analysis and the Pimentel units are not in the range of the analysis. The results of the analysis did not change and the project is still additional.</p> <p>Furthermore, the above updated data changed the BM calculations as two of the Pimentel units entered the range of the last 5 power plant to be commissioned. As a consequence the CM changed and so did the emissions reduction calculations. The spreadsheets and PD were amended accordingly.</p>	
VVB request:	There is a calculation error for Nall-Ndiff.
Project participant response:	Nall-Ndiff was corrected to the value "3".
VVB conclusion:	Common practice has been updated - CAR 14 is closed.
Date:	20/03/2013

No.:	CAR 15	Reference:	PDD front page
VVB request:	<p>In line with CDM requirements the sensitivity analysis not only needs the +/-10% variation impact but also the definition of the turning point at which the key cost/revenue factors(CAPEX and LNG) make the project reach the benchmark (positive NPV) and an assessment of the likelihood of such events. By conducting such analysis the Excel sheet (Los Mina CC Model v1.6 ver 2013 v5vTPointvNGv2.xls) should be extended by the turning point calculations for the key factors. In explaining the likelihood of such events occurring, special attention needs to be given to the NYMEX, Brent related and new LNG prices used in the model. PP needs to clarify and elaborate in the VCS PD how the LNG pricing scenarios have been established, how and why various volumes are accounted under different LNG pricing mechanisms – The VCS PD needs to be extended by the turning point analysis results and an elaborated justification/explanation for the LNG prices and volume assumptions. AES is required to make an explicit disclosure with respect to transfer pricing agreement between the LNG terminal and DPP Los Mina if such an agreement exists, within that please give the reason of the terminal fee jump in 2023. In case AES Dominican has governmental guarantees for capital investment returns regarding the LNG terminal these agreements also need to be disclosed to SQS.</p>		
Project participant response:	<p>The PD was updated to include the turning point analysis results, LNG prices. DPP does not have governmental guarantees for capital investment returns. AES Andres have a long term fuel supply contract for Natural Gas with BP. The price of fuel for this contract is at NYMEX prices. Annually we receive 33.6 TBTU of Natural Gas. The contract with BP expires in <u>2023</u>. After that year, we take the assumption that a new LNG supply contract will be referenced to Brent. The actual Henry Hub related LNG contract is expected to be on the 2-7 US\$/MMBTU range on the evaluated period, while a 13% Brent LNG contract is expected to be between 11-15 US\$/MMBTU. For the model we assume that only 16 TBTU of the NYMEX BP contract are for the Los Minas Plant, in case the plant uses more gas, it will be Brent related.</p> <p>After <u>2023</u> the Terminal Fee its updated as per a 0.85 US\$/MMBTU of today using the CPI, obtaining the 1.23 US\$/MMBTU value.</p>		
VVB request:	<p>The Los Mina CC Model v1 6 ver 2013 v5.xls and the PD need to include the turning point analysis for LNG as it now only covers coal price changes.</p>		



Provide evidence for the LNG – Brent linkage.	
Project participant response:	The Excel sheet has been updated, additional evidence has been provided for the future LNG price.
VVB conclusion:	The Excel sheet has been updated, it now covers both LNG and coal turning point analysis. The PD has been updated to include further evidence on future LNG prices based on Brent, and the PP shared it recent confidential Brent linked LNG contract - CAR 15 is closed.
Date:	05/06/2013

No.:	CAR 16	Reference:	PDD front page
VVB request:	The latest xl-file "Los Mina CC Model v1 6 ver 2013 v5.xls" does not allow full traceability. Using the "Run Scenarios"-feature only updates the final NPVs in cells AD7-AD8; it does not update the full NPV-calculations in lines 19-59. Additionally, the scenario-# in cell AD5 always shows "2".		
Project participant response:	The "Run Scenarios" macro just modify the cell AD5 of "1.1 Scenario" sheet from 1 to 9. If you want to see each scenario you just need to manually change the value in AD5 cell. The macro, after running returns the value to "2".		
VVB request:	The "VCUs Calc"-sheet of " Dominicana_VCUs_Calcs 17-03-2013.xlsx" is not consistent with emissions reductions listed/used in " Los Mina CC Model v1.6 ver 2013 v5vTPointvNG.xls" The " DPP Project - Planned Gen&Cons"-sheet of " Dominicana_VCUs_Calcs 17-03-2013.xlsx" is not consistent with generation data listed/used in " Los Mina CC Model v1.6 ver 2013 v5vTPointvNG.xls" After corrections, the results of the investment analysis have to be verified.		
Project participant response:	We updated the VCU calculations to reflect the updated fuel consumption and energy generation and accordingly updated the VCU calculations on the financial model. Please note that on the financial model we used the exact annual values for the years 2016-2025 and for the years 2026-2031 we used the average amount as there are no VCUs calculations for these years.		
VVB conclusion:	The Excel sheet and the PD has been updated accordingly - CAR 16 is closed.	Date:	05/06/2013



No.:	FAR 1	Reference:	Environment impact
VVB request:	Actions to analyse environment impact and legal compliance have to be verified. This is especially the case for the cooling water. Report to environment ministry has to be consulted.		
Project participant response:	We accept the FAR and will provide all relevant documentation during the first Verification.		
VVB conclusion:	FAR 1 stays open.	Date:	05/06/2013

No.:	FAR 2	Reference:	Monitoring plan
VVB request:	Training for monitoring, monitoring procedures, monitoring organisation, data management, quality control and quality assurance have to be verified.		
Project participant response:	We accept the FAR and will provide all relevant documentation during the first Verification.		
VVB conclusion:	FAR 2 stays open	Date:	05/06/2013