Voluntary Carbon Standard 2007.1

VCS Methodology Element Assessment Report

Name of Validation Body	Date of the issue:
ERM Certification and Verification Services (ERM CVS)	04 April 2011
Report Title:	**Approved by:**
Second Validator Assessment of the methodology element, "Baseline and monitoring methodology for the reduction of jet engine emissions through the use of engine washing technology"	Melanie Eddis Head of Climate Change Services
Client:	**Methodology Title:**
VCS Association	Baseline and monitoring methodology for the reduction of jet engine emissions through the use of engine washing technology

Summary:

ERM Certification and Verification Services (ERM CVS) has performed an assessment of the proposed Voluntary Carbon Standard (VCS) methodology element, "Baseline and monitoring methodology for the reduction of jet engine emissions through the use of engine washing technology." The assessment was performed on the basis of VCS 2007.1 and the VCS Program Normative Guidance Document: Double Approval Process, Version 1.1.

The review of the methodology element documentation and the subsequent follow-up interviews has provided ERM CVS with sufficient evidence to determine the fulfillment of the stated criteria. The methodology element was prepared based on the requirements of VCS 2007.1 and VCS Program Normative Document: Double Approval Process, Version 1.1.

The methodology element belongs to sectoral scope 3 (energy demand).

During the validation process, ERM CVS issued several clarification and corrective action requests – all of which were addressed sufficiently by the methodology element developer.

In summary, it is ERM CVS's conclusion that the proposed VCS methodology element "Baseline and monitoring methodology for the reduction of jet engine emissions through the use of engine washing technology," as described in version 1.5 of 04 April, 2011, meets all relevant VCS requirements for VCS methodology elements.

Work carried out by:	Number of pages:
Braulio Pikman (Lead Validator) Greg Kozak (Validator) Jonathan Avis (Technical Reviewer)	28

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Abbreviations

BP	Baseline Penetration
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CH_4	Methane
CL	Clarification Request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DOE	Designated Operational Entity
GHG	Greenhouse Gas
FAR	Forward Action Request
IPCC	Intergovernmental Panel on Climate Change
ME	Methodology Element
MED	Methodology Element Documentation
MFC	Modelled fuel consumption
PDD	Project Design Document
PP	Project Participant
TSFC	Thrust Specific Fuel Consumption
UTC	United Technologies Corporation
VCS	Voluntary Carbon Standard
VCSA	VCS Association
VCU	Voluntary Carbon Unit
UNFCCC	United Nations Framework Convention on Climate Change

1 Introduction

The VCS Association (VCSA) has commissioned ERM Certification and Verification Services (ERM CVS) as the second validator to perform an assessment of the methodology element "Baseline and monitoring methodology for the reduction of jet engine emissions through the use of engine washing technology."

This report summarizes the findings of the assessment of the methodology element, performed on the basis of the Voluntary Carbon Standard 2007.1 (VCS 2007.1) and the VCS Program Normative Guidance Document: Double Approval Process, Version 1.1.

The Audit Team was provided version 1.4 (dated 10 May, 2010) of the methodology element (ME) along with other relevant methodology element documentation (MED). Based on this documentation, a document review and desktop audit took place which resulted in Corrective Action Requests (discussed later in this report) and revisions to the ME. The final ME version (version 1.5), dated 04 April, 2011, serves as the basis of the final conclusions presented herewith.

1.1 Objective

The purpose of the Methodology Element validation assessment is to have an independent third party assess the proposed Methodology Element's conformance with VCS requirements. Specifically, the purpose of this second methodology element assessment report was, through review of appropriate documentation, to assess whether:

- the methodology's eligibility criteria are appropriate and adequate;
- the approach for determining the project baseline is appropriate and adequate;
- the approach/tools for determining whether the project is additional are appropriate and adequate;
- an appropriate and adequate approach is provided for the definition of the project's physical boundary and sources and types of gases included;
- an appropriate and adequate approach is provided for calculating baseline emissions, project emissions, and emission reductions;
- the approach for calculating leakage is appropriate and adequate;
- the monitoring approach is appropriate and adequate;
- monitored and not monitored data and parameters used in emissions calculations are appropriate and adequate.

The new methodology has to comply with the following VCS 2007.1 requirements:

- All methodologies applying for approval under the VCS Program shall be approved via the double approval process (VCS 2007.1, Section 6.1);
- VCS Program methodologies shall comply with all requirements in the VCS 2007.1 clause 6.1 to 6.4.4 (VCS 2007.1, Section 6.1);
- VCS Program methodologies shall include (VCS 2007.1,Section 6.1):
    - applicability criteria that define the area of project eligibility;
    - a process that determines whether the project is additional or not (based on criteria laid down in VCS 2007.1, Section 6.4);
    - determination criteria for the most likely baseline scenario; and
    - all necessary monitoring aspects related to monitoring and reporting of accurate and reliable GHG emission reductions or removals;

1.2 Scope and Criteria

The validation assessment scope is defined as an independent and objective review of the proposed ME. The validation assessment is conducted using the Voluntary Carbon Standard 2007.1 and the VCS Program Normative Guidance Document: Double Approval Process, Version 1.1 as the criteria.

1.3 Level of Assurance

Per the VCS 2007.1 requirements, the level of assurance for this validation is a reasonable, but not absolute, level of assurance.

1.4 Validation Personnel

The ERM CVS assessment team consisted of the following individuals who were selected based on their GHG validation experience, as well as familiarity with sectoral scope 3 (Energy Demand) and the VCS Program:

- Braulio Pikman – Lead Validator
- Greg Kozak - Validator
- Jonathan Avis – Internal Technical Reviewer

2 Methodology

The validation process employed standard auditing techniques and undertook necessary cross-checks and follow-up actions to ascertain the correctness of the information. The validation team included staff with experience in the relevant sectoral scopes and technical areas within the sectoral scope. The validation report and associated documents have undergone a thorough technical review by ERM CVS before being finalized. The validation consisted of the following key phases:

I. Desk review of documentation including the ME and key supporting documents and references

II. Follow-up interviews

III. Development of a draft validation protocol (discussed below), identifying non-compliances including Corrective Action Requests (CARs) and Clarification Requests (CLs), taking into account findings of the desk review and site visit / interviews

IV. Technical review and independent assessment of validation decision.

In order to ensure transparency, a validation protocol (see Appendix A) was customized for the ME. The protocol shows, in a transparent manner, the criteria (requirements), means of validation and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organizes, details and clarifies the requirements a VCS methodology element is expected to meet.
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The general outline of the protocol is described below:

Checklist Question	Reference	Comment	Draft Conclusion	Final Conclusion
The requirements that the ME should meet	The documents used to check the answer to the checklist question	This section is used to elaborate and discuss the conformance to the checklist question, and to explain the conclusion reached. It includes the means of validation, which explains how conformance with the checklist is justified. For example document review (DR) or interview (I). N/A means not applicable	This is either acceptable based on evidence provided (OK), or a *Corrective Action Request* (CAR) is required due to non-compliance with the checklist question. A request for *Clarification* (CL) is used when the validation team has identified a need for further clarification. A 'Minor Issue' may be recorded for typographical errors or similar minor errors that do not have an impact on the compliance of the ME to the VCS rules but nevertheless should be corrected to improve clarity.	Indicates whether the CAR or CL has been closed out (OK).

The completed validation protocol for this ME is included in Appendix A.

2.1 Review of Documents

A detailed desk review of the ME and all other associated documentation and references were assessed to evaluate the proposed ME against VCS program requirements. The documentation that was reviewed during the assessment is shown below:

DOCUMENT LIST

Reference	Date	Document Title
1	18 November 2008	Voluntary Carbon Standard 2007.1.
2	21 January 2010	VCS Program Normative Document: Double Approval Process, Version 1.1
3	10 May 2010 2 March 2011	Methodology Element, "Reduction of Jet Engine Emissions Through the Use of Engine Washing Technology" Version 1.4 Methodology Element, "Reduction of Jet Engine Emissions Through the Use of Engine

Reference	Date	Document Title
		Washing Technology" Version 1.5
	22 March 2011	Methodology Element, "Reduction of Jet Engine Emissions Through the Use of Engine Washing Technology" Version 1.5
	04 April 2011	Methodology Element, "Reduction of Jet Engine Emissions Through the Use of Engine Washing Technology" Version 1.5
4	May 2010	First Environment, Inc., Methodology Validation Report for United Technologies Corporation
5	22 October 2010	Recontamination cycle threshold calculation methodology.doc Provides real data related to the number of cycles that will result in full contamination of the engines for 3 different fleets
6	13 May 2010	EcoPower CO_2 Emissions Reduction Sample Calcs.pdf Provides an Emissions Reduction calculation example by applying the methodology
7	11 April 2010	EcoPower Engine Wash Process Risk Assessment (4).pdf Provides a third party assessment related to the quality of the waste water used in the washing process
8	13 October 2010	EcoPower PDD Template draft final oct 2010.doc A template for a PDD applying the proposed Methodology not containing any numerical data
9	14 October 2010	Kick-off Meeting Minutes (Pratt & Whitney) 10-14-10.pdf Outcomes of the first validation meeting between the validation team and the Proponent
10	30 October 2009	USEPA regulation (preamble to 40CFR, Parts 86,87,89 et al. - Mandatory Reporting of Greenhouse Gases; Final Rule)
11	22 October 2010	*Use of 10 data points for wash value validation.xls* *Provides a statistical analysis to demonstrate that 100 samples (engine washings) will result in an adequate standard deviation and therefore result in a conservative value.*
12	22 October 2010	Wash benefits and recontamination presentation.pdf Provides real data on the washing cycle as well as side benefits
13	February 2008	AeroStrategy -- Pkg for First Environment.ppt A presentation on maintenance practices that foresees engine washing as a future trend due to carbon trading
14	27 October 2010	Boeing 737 efficiency improvement.docx A summary note about efficiency improvements in the new models of Boeing 737 highlighting the concerns on efficiency that permeate all the sector
15		Contamination rates examples.pdf – documentation supporting the response to CAR 6 concerning the minimum sample size for representative data
16	2006	2006 IPCC Guidelines for National Greenhouse Gas Inventories Chapter 3: Mobile Combustion, Section 3.6 Civil Aviation. Page 3.56 http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_3_Ch3_Mobile_Combustion.pdf
17	6 January 2011	ERMCVS EcoPower Emissions Validation Corrective Action and Clarification responses (2).doc
18	2 February 2011	ERMCVS Response to Pratt Additional Data (email)
19	11 February 2011	EcoPower Engine Wash Carbon Emission Reduction Methodology Validation – Amended Corrective Action and Clarification Requests Plus Minor Issues
20	11 February 2011	ERMCVS EcoPower Emissions Validation Corrective Action and Clarification responses plus minor issues

2.2 Follow-up Interviews

A list of interviewees, and the main topics discussed is presented below:

Date	Name	Position	Subject Discussed
October 2010 – March 2011	Rick Love	Manager, Environmental Programs - UTC	ME eligibility criteria, baseline approach and additionality, project boundary, emissions calculations, and monitoring, data and parameters (among others)

2.3 Resolution of Any Material Discrepancy

The objective of this phase of the assessment was to resolve any outstanding issues that needed to be clarified prior to ERM CVS's validation conclusion on the methodology element. CARs and CLs are raised in the draft validation protocol (Appendix A) and detailed in a separate form included in Appendix B. In this form, note is made of actions taken by the ME developer to close outstanding CARs and respond to CLs:

Draft report corrective action, clarification, or minor issues	Reference to Validation Protocol Checklist Question	Summary of ME developer's response	Final conclusion
List of CARs, CLs and minor issues	Reference to the validation protocol checklist question	Summary of response during the communication with the validation team	Summary of validation team responses and final conclusion.

Clarification Requests (CL): Where insufficient or unclear information is available and clarification or new information is required. A CL is raised specifying what additional information is required.

Corrective Action Requests (CAR): Where a non-conformance arises, the Assessor shall raise a Corrective Action Request (CAR). A CAR is issued, where:

- Mistakes have been made with a direct influence on methodology application
- The VCS requirements have not been met;

The validation process may be halted until this information has been made available to the assessors' satisfaction. Failure to address a CL may result in a CAR. Information or clarifications provided as a result of a CL may also lead to a CAR.

A 'Minor Issue' may be recorded for typographical errors or similar minor errors that do not have an impact on the compliance of the ME to the VCS rules but nevertheless should be corrected to improve clarity.

2.4 Internal Quality Control

The draft and final reports prepared by the validation team, and the validation decision, have been subject to independent Technical Review. The scope of the Technical Review process is to independently assess that all procedures have been followed, necessary requirements have been met, and all conclusions are justified. The final validation decision is based on the findings and conclusions of the validation team, assessing the compliance of the ME with the VCS requirements, and the technical evaluation of the independent technical reviewer. The final report is then approved and signed off by the qualified signatory / final decision maker within ERM CVS.

3 Assessment Findings

The ME validation assessment includes evaluation of elements of the proposed ME against specific VCS program requirements. A summary of the proposed ME's approach and ERM CVS' assessment is provided below.

3.1 Eligibility Criteria

The applicability criteria for the methodology element are clearly defined in the MED. As discussed in Section 3 of the VCS Methodology Validation Protocol Checklist (Appendix A), several CARs and CLs were raised with respect to the ME's applicability criteria. Following closure of these CARs and CLs, ERM CVS was able to confirm that the eligibility criteria were appropriate and that adequate requirements for the project technology, resulting changes

due to project activities, existing operation conditions prior to project activities, project industry sector, and project geography are all defined clearly and properly. The applicability criteria are defined as follows:

1) The project engine washing technology cleans any or all three of the compressive components of an engine: fan, low pressure compressor, and high pressure compressor.

2) The engine washing was performed and completed in compliance with the wash requirements as provided in the engine's maintenance manual, or an alternative specification document as approved by a governing aviation regulatory body, such as the United States Federal Aviation Administration. Compliance with this condition will be indicated by the completion and maintenance supervisor signature on a 'released to service' form. Released to service forms are globally required for all aircraft undergoing any maintenance prior to their being put back into service.

3) The only emission reductions claimed under this methodology are those related to increased propulsive efficiency due to engine washing. The project will not claim any emissions reductions as a result of other measures that result in changes in fuel consumption, e.g., changes in routes, operators' behaviour, etc, or fuel chemical property changes which increase fuel combustion efficiency.

4) The engine is left on-wing during the washing and the engine washing technology is transported to the engine as opposed to removing the engine from the wing and transporting it to another location for the engine wash.

5) The engine washing project will include a minimum of 100 engine washes to assure the methodology adequately compensates for single-engine model data variability.

6) Applicable engines will be only those which during the period for which engine washing benefit is measured have not undergone a modification that could improve efficiency as measured by thrust specific fuel consumption (TSFC).

This methodology is applicable for a ten (10) year crediting period, with two potential renewals.

The criteria identified provide a clear basis for determining the methodology's applicability to potential project activities. ERM CVS concluded that eligibility requirements are appropriate and adequate.

3.2 Baseline Approach

The proposed methodology establishes the baseline scenario as the existing level of propulsive efficiency or the quantity of fuel that would have been used by the jet engines in the absence of the project activity.

To account for the fact that a certain number of engines may be washed in the absence of the project activity, the proposed methodology applies a default five percent discount to overall emission reductions to account for non-additional engine washing. The Methodology developer (Pratt and Whitney) provided the validation team internal market analyses /17/ that identified the number of engine washes that would have occurred in the baseline scenario - approximately 4.4 percent of the estimated market size of 80,000 engine washes per year. ERM CVS concluded that the basis for establishing the discount factor and its application result in a conservative characterization of the baseline scenario.

The approach for determining the project baseline is deemed by ERM CVS to be appropriate and adequate. The requirement that the penetration rate of the project technology in the baseline scenario shall be justified in every PDD during validation and renewal of the crediting period is deemed conservative.

3.3 Additionality

The proposed methodology has adopted the most recent version of the Tool for the demonstration and assessment of additionality as published by the Clean Development Mechanism (CDM) Executive Board in order to evaluate project additionality. ERM CVS determined that this approach is appropriate and adequate.

3.4 Project Boundary

The project's physical boundary is clearly and properly defined as the physical, geographical location of each engine washed by the project technology, and the flight routes on which the emissions reductions occur. The project boundary includes emissions from generators and equipment used to transport engine wash equipment to the wash location.

The sources and types of gases included are also clearly and properly defined in the MED and the justification to include or exclude certain type of gases is reasonable. CH_4 and N_2O emissions in the baseline and project activity are considered negligible, which is consistent with 2006 IPCC Guidelines for National Greenhouse Gas Inventories /16/ and USEPA regulation (preamble to 40CFR, Parts 86,87,89 et al. - Mandatory Reporting of Greenhouse Gases; Final Rule).

ERM CVS determined that the proposed methodology provides an appropriate and adequate approach for the definition of the project's physical boundary and that all relevant emission sources and GHGs are included.

3.5 Emissions

Baseline Emissions

Baseline emissions are determined by multiplying the total quantity of fuel consumed by all engines in a given fleet by the fuel CO_2 emission factor. The CO_2 emission factor for fuel used in jet engines is derived from the carbon content, oxidation factor, and net caloric value of the fuel used in the fleet.

Since data limitations prevent accurate reporting of fuel consumption (i.e., it is common practice for airlines to track fuel consumption at the fleet level, but not on a per engine cycle basis), the baseline fuel consumption for each engine cycle is determined using industry standard models. The ME requires project proponents to demonstrate to the VCS project validator the applicability of the model used to estimate fuel consumption. Acceptable models must be approved by an aircraft engine manufacturer, and include those used in the certification of aircraft engine performance standards.

All formulae and quantification methods were reviewed for accuracy and appropriateness. Following closure of relevant CARs and CLs (see Section 7.1, Appendix A), ERM CVS concluded that the approach to calculate baseline emissions is appropriate and adequate.

Project Emissions

Project emissions are based on emissions from fuel combustion and emissions generated in engine washing process in the project scenario.

Project emissions from fuel combustion are determined by multiplying the total quantity of fuel consumed by all engines in a given fleet by the fuel CO_2 emission factor. The CO_2 emission factor for fuel used in jet engines is derived from the carbon content, oxidation factor, and net caloric value of the fuel used in the fleet.

Similar to fuel consumption determined in the baseline, fuel consumption in the project scenario is determined per engine cycle based on modelled data. However, this modelled value is adjusted based on the average thrust specific fuel consumption (TSFC) benefit realized during the wash cycle.

Project emissions from generators used during engine washing and from the transportation of washing equipment to engines remaining on-wing are appropriately accounted for. Emissions from generators used during engine washing are determined using the fuel consumption from each piece of equipment and a derived CO_2 emission factor based on fuel type. Project emissions from the transportation of washing equipment to the wash location are determined using fuel consumption by vehicles during the transport of engine washing equipment and a derived CO_2 emission factor based on fuel type.

All formulae and quantification methods were reviewed for accuracy and appropriateness. Following closure of relevant CARs and CLs (see Section 7.2, Appendix A), ERM CVS concluded that the methodology's approach to calculate project emissions is appropriate and adequate.

Emission Reductions

Emission reductions are calculated by subtracting project emissions from baseline emissions. The ME specifies that the calculation should be performed for each fleet and then aggregated across all fleets. The relevant determination methods are adequately described and deemed proper. Following closure of relevant CARs and CLs in Appendix A, ERM CVS determined that this approach to calculate emission reductions is appropriate and adequate.

3.6 Leakage

The proposed methodology does not identify any sources of leakage. This is appropriate given that no increases in GHG emissions are expected outside of the project boundary as a result of the project activity.

3.7 Monitoring

All data and parameters required for emissions quantification are described and appropriately defined in the proposed methodology. The proposed methodology requires all measurements to be taken with calibrated measurement equipment according to relevant industry standards. Additionally, the proposed methodology specifies records retention for two years after the end of the last crediting period, consistent with VCS requirements. Quality assurance measures have also been prescribed to further ensure the accuracy and reliability of the emission reduction estimates.

Following closure of relevant CARs and CLs (see Section 9.1, Appendix A), ERM CVS determined that the monitoring approach is appropriate and adequate to obtain the necessary data for emission reductions quantification.

3.8 Data and Parameters

Both monitored and unmonitored data and parameters used in the emissions calculations are defined in the ME clearly and appropriately in order to make it possible for the emission reductions to be estimated and verified. The ME describes the source of data, measurement procedures, and monitoring frequencies that are required, and provides default values where appropriate.

Validation of values adopted for parameters set ex-ante:

Baseline penetration discount factor (BP):
This parameter accounts for the fact that in the baseline, a proportion of engines may be washed anyway due to the baseline penetration of the technology. The technology of engine washing provides benefits that may increase its penetration in the baseline scenario therefore the methodology is designed to only account for the additional market penetration achieved under the project case. ERM CVS was not able to validate that the default value of 0.95 would apply to all projects either now or in the future and therefore CL 5 was raised. The revised methodology includes a requirement for this parameter to be determined for each project at the start of the crediting period and justified in the PDD, therefore ERM CVS can conclude that the approach in the methodology is reasonable and conservative, since the parameter will be determined on a project specific basis and assessed by the validating DOE.

ACFCm:
This parameter represents the number of engine cycles that, in the absence of any engine washings, will lead to a clean engine becoming fully contaminated. The methodology allows project participants to determine this parameter for the individual project, or to adopt a default value of 800 cycles, which is at the lower end of the range (800-1,200) based on previous data analysis and is therefore conservative.

Following closure of relevant CARs and CLs in Appendix A, ERM CVS concluded that the data and parameters included in the ME and the associated requirements for measurement and monitoring are appropriate and sufficient to reduce uncertainty in emission reduction calculations.

3.9 Adherence to the Project-Level Principles of the VCS Program

The proposed methodology was developed in accordance with the requirements of VCS 2007.1 and adequately addresses the principles of relevance, completeness, consistency, accuracy, transparency, and conservativeness.

3.10 Comments by Stakeholders

No stakeholder comments were received for the proposed methodology.

3.11 Eligibility Criteria for Validator

ERM CVS has completed more than 10 validations under the VCS Sectoral Scope 1 Group 1 and therefore fulfills the requirements of Section 4.7.2 of the VCS Program Normative Document: Double Approval Process, Version 1.1. A list of 10 projects validated under Scope Group 1 is included in Appendix C.

4 Validation Opinion

Methodology Title	Baseline and monitoring methodology for the reduction of jet engine emissions through the use of engine washing technology
Methodology Element Version Number / Date	Version 1.5 / 04 April 2011
Sectoral Scope	3 – Energy Demand
Basis of validation / Assessment Criteria	ERM CVS based its validation work on: • VCS 2007.1 • VCS Program Normative Guidance Document: Double Approval Process, Version 1.1
Level of Assurance	Reasonable assurance
Objectives	The purpose of the Methodology Element validation assessment is to have an independent third party assess the proposed Methodology Element's conformance with VCS requirements.
ERM CVS Conclusion	ERM Certification and Verification Services has performed an assessment of the proposed Voluntary Carbon Standard (VCS) methodology element, "Baseline and monitoring methodology for the reduction of jet engine emissions through the use of engine washing technology." The assessment was performed on the basis of VCS criteria for methodology development. It is the opinion of ERM CVS that the methodology element *Baseline and monitoring methodology for the reduction of jet engine emissions through the use of engine washing technology*, Version 1.5, dated 04 April 2011 meets all relevant VCS requirements for VCS methodology elements. ERM CVS recommends that the VCSA approve the methodology element for approval and requests that VCSA approve the methodology element as a VCS methodology element.
Signed on behalf of ERM CVS	
Name:	Melanie Eddis
Date:	04 April 2011

Appendix A: VCS Methodology Validation Protocol Checklist

DR = Document Review (refers to number on Document List)

IV = Interview (refers to number on List of Interviewees)

OK = acceptable
CAR = Corrective Action Request
CL = Clarification Request
FAR = Forward Action Request
NA = Not Applicable

	Checklist Question	Reference	Comment	Draft Conclusion	Final Conclusion
1.	**Conformance with Section 6 (Methodologies) of the VCS 2007.1 – General Requirements**			OK/CAR/CL	OK/ NOT OK
1.1	Has the methodology element developer prepared the methodology in line with Section 6 (Project level requirements) of the VCS 2007.1?	1,3	Yes, except for the issues mentioned in the following sections of this remediation form	CARs and CLs	OK
1.2	Does the proposed methodology adequately address the principles of relevance, completeness, consistency, accuracy, transparency, and conservativeness?	1,3	Yes, except for the issues mentioned in the following sections of this remediation form	CARs and CLs	OK
1.3	Do standards and factors used to derive GHG emission data as well as any supporting data for additionality and baseline scenario(s) meet the requirements below? • publicly available from a reputable and recognised source (e.g. IPCC, published Government data etc); and • reviewed as part of its publication by a recognised competent organization.	1,3	Yes, the data presented meet the requirements of the VCS 2007.1 except for the issues identified in this remediation form	CARs and CLs	OK
2.					OK/ NOT OK
2.1	Has the methodology been rejected by other GHG Programs? If so, what were the reasons for its rejection?		No, this methodology has not been rejected by other GHG programs	OK	OK
2.2	Does the methodology include: a. applicability conditions that define the project eligibility; b. a process that determines whether the project is additional or not (based on criteria laid down in clause 6.4 of the VCS 2007.1); c. determination criteria for the most likely baseline scenario; and d. all necessary monitoring aspects related to monitoring and reporting of accurate and reliable GHG emission reductions or removals.	1	a. Yes b. Yes, the methodology refers to the CDM approved additionality tool that provides all the elements and guidance to demonstrate additionality c. No, the baseline determination criteria are missing d. Yes, except for the issues mentioned in the following sections	CARs and CLs	OK
3.	**Applicability Conditions**				
3.1	Does the methodology identify Applicability conditions by which to assess eligibility?	1	Yes. However the first paragraph in section 3.3 refers to programs instead of projects.	CL1	CL 1 was closed

3.2	Are the methodology's Applicability Conditions appropriate and adequate? Why? If not, explain required changes.	1, 2	Yes, partially. As a general comment, all applicability conditions/criteria must be verifiable and the methodology must provide guidance on how they should be verified during the project validation **First Applicability Condition:** The last phrase is not part of the applicability condition and should be deleted **Second Applicability Condition:** A monitored parameter has not been created to track that the washing process was conducted according to a recognized body as stated in the ACs **Third Applicability Condition:** A procedure to ensure that the parameters TSFC and ΔTSFC - that reflect the propulsive efficiency - are only affected by the washing cycle is missing. It is not clear if both parameters' related data are acquired during the use (flight) or during a performance test conducted before and after washing. **Fourth Applicability Condition:** An appropriate monitored parameter is not tracked to demonstrate that washing is happening on wing **Fifth Applicability Condition:** This is not an applicability condition. This is a requirement of one or several baseline options. **Sixth Applicability Condition:** This is a key applicability condition. The methodology does not provide guidance on what are acceptable means to demonstrate it. Project proponents should consider rephrasing or modifying the AC since it appears from real data provided that the function is not linear in all interval, especially when approaching the $ACFC_m$.	CAR 1 CAR2 CAR 3 CAR 4 CAR 5 CAR 6	CAR 1 is closed CAR 2 is closed CAR 3 is closed. Follow-up CAR (CAR 11) issued, but ultimately closed – see Appendix B CAR 4 is closed CAR 5 is closed CAR 6 is closed
3.3	Do the identified Applicability Conditions provide a clear basis for determining the methodology's eligibility to potential project activities?	1	Partially. At least, an applicability condition describing how to deal with international	CL 2	This CL is closed

			flights should be included. It is not clear how this situation will be managed and how monitoring will be assured in case of international flights		
4.	**Baseline Approach**				
4.1	Is the methodology's approach to establishing the project baseline appropriate and adequate?	1,3	There is no approach to establishing the project baseline. The baseline scenario is pre-determined and is stated to be the existing level of propulsive efficiency or the amount of fuel that would be used without the project activity. A penetration rate for the project technology is introduced in the ER calculation and is stated to be fixed during the entire crediting period	CL 3 CL 4 CL 5	CL3 is closed. Follow-up CAR (CAR 12) issued, but ultimately closed – see Appendix B CL4 is closed due to a modification in the methodology /17/. CL 5 is closed due to information provided /17/. Follow-up CAR (CAR 13) issued, but ultimately closed – see Appendix B
4.2	Did the methodology developer perform a comparative assessment of the implementation barriers and net benefits faced by the project and its alternatives in order to identify the baseline scenario?	1, 3	No, although this is addressed using the "Tool for the demonstration and assessment of additionality."	OK	OK
4.3	Does the application of the methodology result in a baseline scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the proposed project activity?	1, 3	No. Since the penetration rate for the project technology is simply adopted without any justification and limitation, the methodology can not be said to result in a baseline that represents the anthropogenic emissions in the absence of the project activity.	CL 5	CL 5 is closed due to information provided /17/. Follow-up CAR (CAR 13) issued, but ultimately closed – see

					Appendix B
4.4	Do the project activity and the baseline scenario provide the same level of service?	1, 3	Yes. Although this is implicit in the methodology, it is expected that both will deliver the same level of services	OK	**OK**
5.	**Additionality**				
5.1	Does the documentation explain how, through the use of the methodology, it can be demonstrated that a project activity is additional and therefore not the baseline scenario. If so, what are the tools provided by the project participants?	1, 3	No. However, the methodology makes reference to the CDM additionality tool. Since this is an energy efficiency methodology and since the project technology is readily available although still expensive and hence with a low penetration rate, the additionality should be demonstrated in most cases by means of the use of the investment comparison analysis	CL 6	CL 6 is closed
5.2	Is the methodology's approach/basis to determining whether the project is additional appropriate and adequate?	1, 3	Yes, the approach is appropriate since the CDM additionality tool provides a comprehensive guidance on the additionality demonstration. However, given the nature of the project (EE) some guidance would be desirable in terms of what the most appropriate approach to be adopted when using the tool	CL 6	CL 6 is closed
6.	**Project Boundary**				
6.1.	Does the proposed methodology provide an appropriate and adequate approach for the definition of the project's physical boundary and sources and types of gases included?	1	The project boundary is defined by the engines included in the project. There is no guidance related to international flights and how to account them	CL 2	CL 2 is closed
6.2	Does the methodology correctly identify all GHG sources, sinks and reservoirs included in or excluded from the project boundary? Is inclusion / exclusion justified? Is explanation/ justification sufficient?	1	Yes, the sources of emissions are identified Clarification is required on N2O and CH4 emission factors for air flights.	OK CL 7	CL 7 is closed
7.	**Emissions**				
7.1.	<u>Baseline Emissions</u> a) Is the baseline situation of the methodology well described? b) Are all the necessary components of the baseline scenario described under the methodology and well covered under baseline emissions? c) Are the baseline emission equations correct and consistent? d) Offer comments on the conservativeness of baseline emissions.	1, 4, 5	a) and b) No, the baseline situation and components are not well described in two fundamental items: - The parameter MFC is to be determined based on a non specified model. It is stated that the model must be approved by a recognized organization. However, no	CAR 7 CL 5 CL 8	CAR 7 is closed CL 5 is closed. Follow-up CAR (CAR 13) issued,

	e) Offer comments on the practical aspects of estimation of baseline emissions. f) Are the baseline emissions under the VCS-PDD consistent with the methodology? g) Any other comments on baseline emissions.		single example of an acceptable model is provided. The methodology does not provide more specific guidance on this regard and include uncertainty analysis for the parameter. - The penetration rate included in the ER calculation section should be introduced and discussed in the baseline emissions section. - The term ACFCmm that defines a CAP for baseline emissions is mentioned without any explanation (given later in the project emissions section). c) Yes, other equations are correct d) The conservativeness of baseline emissions can not be said to be properly ensured due to lack of more robust information on the penetration rate and uncertainty level of baseline emissions being determined by a non specified model. e) The document on the method to adopt the value for the $ACFC_m$ (#5) should be included as an Annex to the methodology, being a useful example of application. At least one method to determine the MCF should be provided. Some models overestimate fuel consumption as a conservative approach for fuel inventories which is exactly the opposite goal of a VCS methodology where conservatism is to underestimate the baseline emissions. f) The VCS draft PDD does not provide any calculation. However, those were provided in one of the references (#6) and indicate a serious problem regarding the possible signal to noise ratio in the data g) The oxidation factor could be set to 100% in all cases (minor issue). Units of measurement should be clearly related to the metric international system (minor issue) g) No correlation is established between the MCF and the fuel efficiency determined during the project for the pre-washing		but ultimately closed – see Appendix B CL 8 is closed

			situation		
7.2	Project Emissions a) Is the project situation of methodology well described? b) Are all the necessary components of project technology described under the methodology and well covered under project emissions? c) Are the project emission equations correct and consistent? d) Offer your comments on the conservativeness of project emissions. e) Offer comments on the practical aspects of estimation of project emissions. f) Are the project emissions under the CDM-PDD consistent with the methodology? g) Any other comments on project emissions.	1, 4, 5	a) Yes, The project situation is well described b)No, the description of the experiment to determine the TSFC is not transparent and does not provide guidance on how to obtain the fuel efficiency from values of the "Takeoff EGT Margin", "Cruise EGT" and "Cruise fuel flow data". Again, a mathematical model is mentioned (thermodynamic engine model) without any further clarification or description c) Yes, the equations are correct and consistent except for the issues mentioned in a) and b) and the assumption of linearity in the whole interval between the post-washing and the next pre-washing period for the TSFC d) The conservatism of project emissions will be given by their overestimation. Considering the relevance of the signal to noise ratio, it is likely that being conservative could lead to negative emissions reduction e) It is not clear what procedure will be undertaken to monitor the parameters related to the TSFC. Whether they will be monitored on use or in a test conducted before and after washing. f) Project emissions were not calculated in the PDD. A document (#6) with an example calculation was provided and is consistent with the methodology g) The signal to noise ratio is a serious problem and needs to be further assessed. In (#6) the variation obtained for the baseline and project situation is below 1%	CAR 3 CAR 6 CAR 8 CAR 9 CL 8	CAR 3 is closed. Follow-up CAR (CAR 11) issued, but ultimately closed – see Appendix B CAR 6 is closed CAR 8 is closed CAR 9 is closed CL 8 is closed
7.3.	Emission Reductions a) Is the approach provided for calculating emissions reductions appropriate and adequate? Why? b) Offer your comments, whether the technology referred under the methodology can lead to emission reduction as stated under PDD? What are the short-term or long-term risks and uncertainties associated?	1, 4, 5	a) Yes, except for the term BP (penetration discount factor) that should be applied only for the baseline situation (MCF) and not for both. Equation 3 is not correct. b) The biggest problem is that the Emissions reduction could be affected largely by uncertainties not yet quantified	CAR 10	CAR 10 is closed

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8.	**Leakage**				
8.1.	a) Are the leakage emissions covered under methodology adequate enough and conservatively calculated? b) Are the leakage emissions under the VCS-PDD consistent with the methodology? c) Any other comments on leakage emissions.	1	No sources of leakage were identified	OK	OK
9.	**Monitoring**				
9.1.	Is the monitoring approach appropriate and adequate?	1, 4, 5	The monitoring approach is appropriate except for the issues listed above	OK	OK
10.	**Data and Parameters**				
10.1	<u>Data and parameters NOT monitored</u> a) Is the vintage (in relation to the duration of the project crediting period) of data appropriate, indicating the period covered by the data? If not, outline the required changes b) Are the data and the measurement procedures (if any) used adequate, consistent, accurate, reliable and cost effective? Which are problematic (if any)? Outline required changes. c) Are the parameters described in the monitoring methodology consistent with the baseline emission sections? If not, state possible data gaps:	1	a. The vintage is adequate since for the penetration rate there is a requirement to confirm its value at validation and renewal of crediting period. For the parameter ACFCm the default value proposed is conservative and could be replaced by any justified value. b. The proposed measurement procedures are deemed adequate c. Yes, there are no data gaps	OK	OK
10.2	<u>Key data and parameters monitored</u> a) Are the data sources and measurement procedures used adequate, consistent, accurate and reliable? b) Is the monitoring frequency for the data and parameters appropriate? Are the QA/QC procedures are appropriate? If not, outline required changes: c) Are the parameters described in the monitoring methodology consistent with the project and leakage emission sections?	1	a. Yes, data sources are appropriate and consistent. Airplane instrumentation will be used for most critical data b. Yes, procedures for monitoring and QA/QC are appropriate. Airplane instrumentation will be used for most critical data c. Yes, all parameters described are consistent with the correspondent sections	OK	OK
10.3	For all parameters: a. Data unit correctly expressed? b. Clear and appropriate description? c. Source clearly referenced? (if applicable) d. Correct value provided? (if applicable) e. Choice of data correctly justified? (if applicable) f. QA/QC procedures appropriate?	1	a. Yes, data units are correctly expressed and are expressed in metric units (International System of Units). b. Yes, either in definitions or in the monitoring tables there is a clear description c. Yes, whenever the case. d. Yes, all constants were verified to be appropriately mentioned	OK	OK

			e. Yes, whenever the case the choice is explained f. Yes, QA/QC procedures are described and deemed appropriate		
11.	**General**				
	Were there public comments on the proposed methodology? Has the methodology developer demonstrated how it has taken due account of all and any such comments?		There were no public comments on the proposed methodology.	OK	OK

Appendix B: Remediation Form

Request Protocols for Clarification (CL), Corrective (CAR) and Forward Action Requests (FAR), plus minor issues.

Corrective action requests	Reference to checklist question	Summary of project participants' response	Final conclusion
CAR 1: Delete the last phrase of applicability condition 1	3.2	Agreed	The CAR is closed since the action was implemented in the version 1.5 of the methodology
CAR 2: A monitored parameter has not been created to track that the washing process was conducted according to a recognized body as stated in the AC. Please address as necessary.	3.2	A new procedure was described in the respective applicability condition allowing for monitoring its implementation. The documentation related to the procedure was included in the QA/QC procedures of the monitored parameter "w"	This CAR is closed since the form "released to service" and the signature is now part of the QA/QC procedures listed for the parameter "w – wash"
CAR 3: A procedure to ensure that the parameters TSFC and ΔTSFC - that reflect the propulsive efficiency - are only affected by the washing cycle is missing. It is not clear if both parameters' related data are acquired during the use (flight) or during a performance test conducted before and after washing.	3.2, 7.2	It was clarified that all data related on the engine performance are acquired directly from the airplane instrumentation. The methodology was modified to mention these data sources explicitly The DOE gathered technical Information on TSFC from the NASA website http://www.grc.nasa.gov/WWW/K-12/airplane/sfc.html confirming the parameter TSFC is a measure of the efficiency of the engine per unit of force produced (Thrust) expressed in kg of fuel per force N (Newton). Therefore, it is independent of operational conditions (e.g. speed)	The CAR is closed since all data related to the engine is to be acquired by the airplane's data acquisition system and the methodology was modified to mention it explicitly. Further, it is clear now that the parameter TSFC will be only dependent on the engine itself and the washing cycle. A new CAR is created to request the inclusion of a new applicability condition. The new CAR 11 is also closed since the applicability condition was added appropriately (see below)
CAR 4: An appropriate monitored parameter is not tracked to demonstrate that washing is happening on wing. Please address as necessary.	3.2	The system provided by the project proponent only works with the engine on-wing	The CAR is closed. ERM CVS considers that whether the technology to be applied in an individual project involves washing on-wing can be determined up-front at the start of a project, and therefore it would not be necessary to add a monitoring parameter for this. The project description in the PDD would have to include details of the technology to be applied to demonstrate that any proposed project activity meets the applicability criteria, and this would

			be able to be effectively assessed ex-ante by the validating DOE.
CAR 5: The comment is not included in the appropriate section. Please address.	3.2	The applicability condition was deleted	The CAR is closed. The applicability condition is deleted.
CAR 6: The applicability condition is not phrased in a way to accommodate the real situation. Please address as necessary.	3.2, 7.2	The applicability condition was removed and replaced by a new one establishing a minimum set of data to reduce variability and ensure the mathematical function represents the cloud of points with acceptable uncertainty based on the standard deviation estimated for the 95% confidence interval. Additional documentation supporting the proposed procedure was provided.	The CAR is closed since applicability condition was deleted. ERM CVS concluded that this applicability condition is not needed since it is a statement of fact that the decline in TSFC improvement following engine washing will occur in a linear fashion. This is supported by documents /15/ and /17/. A new applicability condition was added and addresses the same issue more appropriately by imposing a minimum set of data.
CAR 7: Provide an acceptable model to estimate fuel consumption including the uncertainty analysis for the results. In being an energy efficiency methodology it is expected that signal to noise ratio could be a problem and no guidance is provided on this regard	7.1	Extensive information was provided and in addition to that, the DOE has identified some public information ratifying the validity and reliability of these models	CAR 7 is closed There are a number of models available to estimate fuel consumption that are widely applied and accepted throughout the aviation industry. The methodology requires the use of 'industry standard models'. The methodology requires that the project proponents must demonstrate to the validating DOE the applicability of the models used to estimate fuel consumption and to calculate $\Delta TSFC_m$. Acceptable models to estimate fuel consumption must have been approved by an aircraft engine manufacturer and therefore the suitability of the model adopted will be properly assessed at the validation stage, including assessment of the impact of the uncertainty of the model.
CAR 8: The parameters "takeoff EGT Margin", "Cruise EGT" and "Cruise fuel flow data" are mentioned in the TSFC description as being necessary to its determination. However, they are neither present in the Monitored Parameters	7.2	The parameters are now listed in the monitoring table and monitoring procedures are provided. QA/QC procedures are also provided	CAR 8 is closed The parameters have been included in the monitoring methodology and are expected to be

Table as independent parameters nor procedures to monitor them are provided. Provide a full description in the equations on how TSFC will be obtained from these parameters or refer to an explicit mathematical model.			measured for each engine before and after washing, and their validity will be cross-checked using engineering judgement by a professional with experience of engine performance analysis.
CAR 9: Please, include more detailed procedures on how ΔTSFCm will be calculated from "takeoff EGT Margin", "Cruise EGT" and "Cruise fuel flow data".	7.2	The procedures are clarified in the methodology	This CAR is closed since / the methodology itself provides the required clarification in section 5.2 (parameters monitored). The description provided is considered to be sufficiently clear and is considered to provide procedures for an accurate calculation of ΔTSFCm.
CAR 10: Please remove the term BP from Equation 3 and apply it directly to the MCF in order to avoid a misunderstanding – the penetration rate should not be applied to project emissions. This will not affect the result but is conceptually more appropriate.	7.3	The modification was accepted and implemented	This CAR is closed. The modification was performed and a new parameter (BP) was created in the methodology to enhance understanding.
CAR 11: There is no applicability condition stating that the engines included in the project will be subjected only to preventive and corrective maintenance not modifying their design characteristics in such a way that the efficiency measured by the TSFC could improve except for the washing technique applied by the project. Please address as necessary.	3.2	A new applicability condition was added stating that Applicable engines will be only those which during the period for which engine washing benefit is measured have not undergone a modification that could improve efficiency as measured by TSFC.	This CAR is closed since there is now an applicability condition precluding the inclusion of benefits not related to the project in the Emissions Reductions
CAR 12: The baseline emissions calculated by the model adopted as the summation of every individual cycle and engine may not surpass the total measured consumption. Therefore, the total consumption should be monitored (new parameter) and the equations to compare the output of the model and the measured consumption should be provided with the lowest being the one to be adopted - conservativeness	4.1	It is common practice for airlines to track fuel consumption at the fleet level, but they do not track fuel consumption to the level of detail (per engine cycle) required to accurately calculate emission reductions per engine cycle	This CAR is closed. The project proponent clarified that the information available will not be usable to check the fuel consumption per cycle since it accounts for other procedures not related to the project, and meanwhile the modelled values will only account for the washing effect (fuel per thrust)
CAR 13: A method to estimate the penetration rate (based on the procedure proposed to the specific project situation) is not provided. A methodology is expected to be applicable to more than one project and the burden of developing a methodology is to generalize as much as possible to expand its application. The determination of the penetration rate for the specific crediting period is to be made in the underlying PDD.	4.1	The methodology now requires that every project assesses the penetration rate at the starting date of the project and at the renewal of the crediting period. In case of adoption of the default 0.95 the PDD will have to justify its suitability	This CAR is closed. The penetration rate is now to be estimated and justified per project at the starting date and at the renewal of the crediting period. The relevant requirement was included in section 4.3 and 5.1 of the methodology.

Clarification requests	Reference to checklist question	Summary of project participants' response	Final conclusion
CL 1: PPs are requested to clarify whether the methodology is applicable to programs or projects under the definition of the CDM for Project activities and Program of Activities. To avoid confusion, it is suggested that the term program is replaced by "Project Activity" if acceptable for PPs. The VCS program includes project activities rather than programs.	3.1	The suggestions were accepted and the methodology was modified accordingly	This CL is closed. The term program was replaced by projects
CL 2: The methodology should provide applicability conditions limiting its application to regions where data can be monitored. It is not clear how international flights will be dealt with and how to avoid double counting issues.	3.3; 6.1	Data will be collected directly from the airplane. No additional risk is foreseen in comparison to other VCS methodologies. Further, the ground data are to be collected as per a standard procedure allowing the calculation of $PE_{WE,y}$	This CL is closed It was clarified that all data related to the engine will be gathered from the airplane itself and data from the washing equipment will be gathered with appropriate forms and are readily available regardless the location of the project
CL 3: Please explain how the methodology deals with the situation where the information available is the amount of fuel being used without the project activity and how this information would be obtained	4.1	Clarification states that total amount of fuel is not to be used as monitored information since it is not possible to cross-check this information with the output of the model adopted. The total amount of fuel is not a monitored parameter.	The CL 3 is closed. The baseline emissions section mentions the total amount of fuel used. However, according to the explanation provided in /17/ it is not possible to correlate this total amount to the individual consumption per cycle since the engines can be replaced and be installed in different airplanes making it difficult if not impossible to correlate values. The DOE agrees with the argument. The methodology does not deal with the situation where the information available is the amount of fuel being used since this information may not comparable to the modelled engine consumption.
CL 4: Please, explain to what point in time the word "existing" refers to in the description of the identification of the baseline scenario, section 4.2 of the methodology.	4.1	The word "existing" was removed from the methodology	CL 4 is closed
CL 5: Please, clarify why the penetration rate would remain fixed during the entire crediting period and whether this penetration rate is applicable to any country where this methodology could be used. Further, provide the rationale	4.1; 7.1	The rationale for the penetration rate was provided and the need for reassessment at the renewal of the crediting period is now required	CL 5 is closed based on the fact that the methodology was revised to require the baseline penetration (BP) rate to be determined for each

for the value adopted in the methodology.			project at the start of each crediting period. A new CAR (CAR 13) was raised to modify the methodology accordingly. The definition of the penetration market for a specific project should be part of the PDD for each individual project activity.
CL 6: Given that the methodology requires the application of the 'Tool for the demonstration and assessment of additionality' which gives 2 options for additionality determination, investment analysis and barrier analysis, please, clarify whether a situation where barrier analysis could be applicable is considered to be realistic for projects applying this methodology.	5.1	At least two possible barriers were listed in the response document /17/.	CL 6 is closed due to the fact that example barriers were presented in the responses provided /17/ and these example barriers demonstrated to ERM CVS the possibility of barrier analysis being used for project activities applying this methodology. It will be up to the DOE validating the PDD to accept them or not. The adoption of the additionality tool is a rigorous and adequate means to demonstrate additionality
CL 7: Please, clarify whether N_2O and CH_4 emissions are negligible for air flights emissions considering some protocols (e.g. GHG Protocol) published some relevant emission factors	6.2	The response clarifies that no relevant emissions of methane and nitrous oxide are expected to happen. International and U.S. references were provided	CL 7 is closed. According to the IPCC (2006) Guidelines for National GHG Inventories /16/ , "little or no N2O emissions occur from modern gas turbines," and "methane may be emitted by gas turbines during idle and by older technology engines, but recent data suggest that little or no CH4 is emitted by modern engines". According to the USEPA regulation (preamble to 40CFR, Parts 86,87,89 et al. - Mandatory Reporting of Greenhouse Gases; Final Rule)" /10/ for the dominant operating modes, jet engines may consume CH4 in the air". For N2O the USEPA rule only requires the reporting of N2O emissions for engine models that incorporate NOX after-treatment technology, since emissions are negligible for engines without NOX after-treatment.
CL 8: Please, clarify how the signal to noise ratio will be dealt with when	7.2	The adoption of a new applicability condition requiring a minimum of 100	CL 8 is closed The methodology has

calculating the TSFC values for pre and post-washing		engine washings resolves the signal to noise ratio issue. This is supported by documents 15 and 17	been revised to include an additional applicability criterion that the engine washing project will include a minimum of 100 engine washes per fleet to ensure that the methodology adequately compensates for single-engine model data variability.

Forward Action Requests	Reference to checklist question	Summary of project participants' response	Final conclusion
N/A	N/A	N/A	N/A

Minor Issues	Reference to checklist question	Summary of project participants' response	Final conclusion
Figure 1 needs correction since the scale for number of washes should go from 800 to 1200 and not to 120. Further, the text "benefit remaining at the end of" seems to be incomplete	n.a.	• The scale was corrected The text "benefit remaining at the end of" was not completed	Closed. Figure 1 now includes all the elements and information described in the text.
The definition of TSFC in section 3.2 of the methodology needs improvement. A specific consumption should refer to something (miles, cycles, etc). The units of measurement are missing. Some parameters of Section 3.2 include units of measurement and some, not.	7.2	The definition was improved	Closed All parameters described in the section 3.2 are properly described and units of measurement were provided
The oxidation factor could be adopted as being one for all cases	7.1, 7.2	An explanation was provided on why to keep the oxidation factor	Closed since the clarification provided is aligned with the IPCC 2006 guidelines /16/
Units of measurement should be fully compliant with the IS. The term ton refers to the short ton while tonne and t refer to metric ton	7.1, 7.2	The relevant changes were made to the methodology	Closed Units of measurement are now in full compliance with the International Metric System

Appendix C: Selection of Projects Validated by ERM CVS Under Sectoral Scope Group 1

Project Title	Project Location	Latest project status	Methodology	Date request submitted	Registration Date
China Niaoerchao Hydropower Project	China	Registered	AMS-I.D.(Scope 1)	14-May-10	24-Feb-11
China Wuyahe Small Hydropower Project	China	Registered	AMS-I.D.(Scope 1)	11-May-10	08-Oct-10
Ganhekou V 201MW Wind Farm Project	China	Registered	ACM0002 (Scope 1)	21-Dec-10	8-Mar-11
Gansu Guazhou Qiaowan Wind Farm Project	China	Registered	ACM0002 (Scope 1)	16-Dec-10	17-Mar-11
Guodian Wuchuan Xiwulanbulang Hongshan Wind Farm Phase I 49.5MW Wind Power Project	China	Registered	ACM0002 (Scope 1)	3-Dec-10	10-Mar-11
Helanshan Phase V 40.5MW Wind-farm Project	China	Registered	ACM0002 (Scope 1)	9-Feb-10	02-Jul-10
Hunan Luxi County 6.4MW Hydropower Project	China	Registered	ACM0002 (Scope 1)	24-Jul-10	10-Dec-10
Longkou Hydropower Project	China	Registered	ACM0002 (Scope 1)	30-Nov-10	12-Feb-11
Shawan Hydropower Station, Dadu River, Sichuan Province	China	Registered	ACM0002 (Scope 1)	22-Oct-10	16-Jan-11
Zhenkang Quanqiaohe Hydropower Project in Yunnan Province	China	Registered	ACM0002 (Scope 1)	30-Mar-10	11-Sep-10