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CDM Validation Report

Enterprise

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Service

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UNFCCC Scope:	1 Energy industries (renewable/non renewable sources) Clean Development Mechanism (CDM)
UNFCCC Methodology:	ACM0002 Consolidated Methodology for Grid Connected Electricity Generation from Renewable Sources Version 12.1.0
UNFCCC Scale:	Large Scale
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Signature

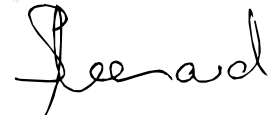


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1 Introduction

1.1 Objective

ecotawa AG has commissioned SQS to perform a validation of the Bac Ha Hydropower Project, Vietnam (hereafter called "the project").

The validation objective is an independent assessment by a Designated Operational Entity (DOE) of a proposed project activity against all defined criteria set for the registration under the Clean Development Mechanism (CDM). Validation is part of the CDM project cycle and will finally result in a conclusion by the executing DOE whether a project activity is valid and should be submitted for registration to the CDM Executive Board (CDM-EB). The ultimate decision on the registration of a proposed project activity rests at the CDM-EB and the Parties involved.

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in

- The Kyoto Protocol, in particular § 12 and modalities and procedures for the CDM
- Decision 2/CMP1 and Decision 3/CMP.1 (Marrakech Accords)
- MODALITIES AND PROCEDURES FOR A CLEAN DEVELOPMENT MECHANISM
- CLEAN DEVELOPMENT MECHANISM VALIDATION AND VERIFICATION MANUAL (ver. 01.2)
- Decisions and specific guidance by the EB published under <http://cdm.unfccc.int>
- ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" Version 12.1.0, EB 58
- Tool for the demonstration and assessment of additionality, version 5.2, EB 39
- Combined tool to identify the baseline scenario and demonstrate additionality, version 03.0.0, EB 60
- Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion, version 2, EB 41
- Tool to calculate the emission factor for an electricity system, version 02.2.0 EB 61 Annex 12
- Guidelines on the Assessment of Investment Analysis, version 04, EB 61, Annex 13

The validation team has used a risk-based approach focusing on the identification of significant risks for project implementation and the generation of CERs.

1.3 Project description

The objective of the Bac Ha Hydropower Project, Vietnam, is to build and operate a hydropower plant with an accumulation reservoir on the Chay river. The proposed project is located in Coc Ly Commune, Bac Ha District, Lao Cai Province in Vietnam.

The project involves the installation of a dam with a cascade with a capacity of 90 MW. The reservoir has an area at maximum water level of 6.9 km² with an energy density of around 13.0 W/m².

The electricity production is estimated to be 378 GWh per year. The project will reduce annually 215,906 tCO₂ by producing electricity with a renewable source thus substituting electricity produced in Vietnam to a large extent by fossil means.

Project participants are:

- Bac Ha Hydropower Joint Stock Company (state-owned corporation) and
- ecotawa AG, Breisacherstrasse 25, CH-4057 Basel, Switzerland

The project activity started upon signing of the construction contract dated 21/02/2005.

The 7-year crediting period will start on 01/07/2011 or registration date whichever is later.

1.4 Validation methodology

The SQS auditors apply standard auditing techniques to assess the correctness of the information provided by the project participants, including, where appropriate, but not limited to:

- (a) Document review, involving: review of data and information to verify the correctness, credibility and interpretation of presented information and cross checks between information provided in the PDD and information from sources other than that used, if available, and if necessary independent background investigations
- (b) Follow-up actions (on-site visit, telephone, email interviews), including: interviews with relevant stakeholders in the host country, personnel with knowledge of the project design and implementation and cross-check of 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 CDM project activity under validation
- (d) Review, based on the approved methodology being applied, of the appropriateness of formulae and correctness of calculations.

If, during the validation of a project activity, the auditor identifies issues that need to be further elaborated upon, researched or added to in order to confirm that the project activity meets the CDM requirements and can achieve credible emission reductions, the auditor shall ensure that these issues are correctly identified, discussed and concluded in the validation report.

The auditor shall raise a corrective action request (CAR) if one of the following occurs:

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

The auditor shall raise a clarification request (CL) if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

The auditor shall raise 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 shall not relate to the CDM requirements for registration.

The auditor shall resolve or "close out" CARs and CLs only if the project participants modify the project design, rectify the PDD or provide adequate additional explanations or evidence that satisfy the SQS's concerns. If this is not done, the SQS shall not recommend the project activity for registration to the CDM Executive Board.

In order to ensure transparency, a validation protocol (Checklist CDM Validation) was customized for the project. The protocol shows, in a transparent manner, 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 CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.
- The validation protocol consists of two tables. The different columns in these tables are described in below Figure.

Validation protocol 1: General CDM Requirements, requirements VVM 1.2 is archived at SQS Headquarter ref. [1001].

Validation protocol 2: Enclosed in this report, appendix G.

Validation protocol 3: Summary of requests is enclosed in this report, appendix F.

Validation Protocol Table 1: Requirement Checklist

<i>Requirement</i>	The requirements the project must meet.
<i>Ref.</i>	Normative references
<i>MoV (Means of Validation)</i>	Explains how conformance with the requirements is investigated. DR = Document Review, I = Interview, N/A = Not Applicable
<i>Comment / Cross Reference</i>	The section is used to elaborate and discuss the conformance to the requirement. May give reference to the PDD or documents.
<i>Draft Concl. / Final Concl. (Draft and/or Final Conclusion)</i>	OK = Conform, CAR = Corrective Action Request, CL = Clarification Request, FAR = Forward Action Request

Validation Protocol Table 2: Summary of Requests

<i>No.:</i>	The requests (CAR, CL, FAR) are numbered and listed in this section.
<i>Reference:</i>	Reference to the checklist question number in Table 1 where the Request is explained.
<i>Validator findings / request:</i>	The section is used to elaborate and discuss the request. May give reference to the PDD or documents.
<i>Project proponent response:</i>	The responses given by the client or other project participants during the communications with the validation team should be summarised in this section.
<i>Validator conclusion:</i>	This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 1, under "Final Conclusion".
<i>Date:</i>	Date when request was closed.

2 Validation Opinion

2.1 Summary of the validation conclusions

Based on

- PDD Bac Ha Hydropower Project, Vietnam, Version 1.4, dated 15/06/2011
- Consulted documents listed in Annex C
- ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” Version 12.1.0, EB58
- Tool for the demonstration and assessment of additionality, version 5.2, EB 39
- Combined tool to identify the baseline scenario and demonstrate additionality, version 03.0.0, EB 60
- Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion, version 2, EB41
- Tool to calculate the emission factor for an electricity system version 02.2.0, EB 61, Annex 12. At the time the baseline of the official Grid Factor was calculated by the DNA of Vietnam, , version 1.1, EB 35 annex 12 of the tool was used because only this version was available.
- Guidelines on the Assessment of Investment Analysis, version 04, EB 61, Annex 13
- Validation and Verification Manual Version 01.2, EB55
- Site visit on 08/09/2010

it is SQS' opinion that the project “Bac Ha Hydropower Project, Vietnam” described in PDD Version 1.4, dated 15/06/2011 with the crediting period from 01/07/2011 to 30/06/2018 meets all relevant criteria of the listed references in paragraph 1.2 and correctly applies the approved methodology and therefore, SQS requests the registration of given CDM project.

SQS confirms that the approved consolidated baseline and monitoring methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” Version 12.1.0 EB58 is applicable for this project activity and that the criteria are discussed in an exhaustive manner in the PDD and supported by the submitted documents. Furthermore, the approved methodology is correctly applied and therefore, SQS requests the registration of given CDM project.

2.2 Summary of the validation methodology and process used and the validation criteria applied

The validation process has been carried out using the methodology described in paragraph 1.4. This has included a desk review of the PDD and its annexes and additional documents listed in the Appendix C of this report, an on-site visit on 08/09/2010 and interviews (see Appendix B) and an inspection of the project site.

20 CLs have been raised. All of them are closed.

9 CARs have been raised. All of them are closed without exception.

4 FARs have been raised and have been accepted by PP without exception.

2.3 Description of project components or issues not covered by the validation process

All project components were covered by the validation process.

2.4 Statement on the validation of the expected emission reductions

SQS confirms that the calculation of the expected emission reduction of 215,906 tCO_{2e} per year and 215,906 tCO_{2e} for the first 7 years crediting period is carried out in a transparent and conservative manner, so that the calculated emission reductions are most likely to be achieved, given that the underlying assumptions do not change. .SQS confirms that the starting date of the first crediting period is planned for 01/07/2011 or registration date, whichever is later.

2.5 Statement whether the proposed CDM project activity meets the stated criteria

Based on the observations made during the validation process, SQS concludes that the proposed project is accurate, conservative, relevant, complete, credible and reliable and meets the stated criteria..

3 Validation Findings

3.1 Approval

A letter of approval by the host country Vietnam was requested and was issued with the date of 17/05/2011, Ref: 17/2011/DMHCC-BCD, SQS ref. [62].

The Letter of Approval (LoA) /from the DNA of Vietnam confirms in accordance with VVM Version 01.2 paragraph 45:

- Vietnam is a Party to the Kyoto Protocol (point 1 of LoA issued)
- The participation is voluntary (point 2 of LoA issued)
- The project contributes to sustainable development in Vietnam (point 3 of LoA issued)
- The LoA refers exactly to the project title "Bac Ha Hydropower Project, Vietnam"

SQS confirms that the letters refer precisely to the proposed CDM project activity title in line with the title in the PDD "Bac Ha Hydropower Project, Vietnam". In addition, the LoA statements are clear and unambiguous with respect to all required content such as Kyoto Protocol ratification status and voluntary participation. The Vietnamese LoA also confirms that the proposed CDM project activity contributes to the sustainable development of Vietnam.

Switzerland, as the second party involved, has issued the letter of approval dated on 25/02/2011 [61].

The Letter of Approval (LoA) /from the DNA of Switzerland confirms in accordance with VVM Version 01.2 paragraph 45:

- Switzerland is a Party to the Kyoto Protocol (point 1 of LoA issued)
- The participation is voluntary (point 2 of LoA issued)
- The LoA refers exactly to the project title "Bac Ha Hydropower Project, Vietnam"

Both are considered as authentic without doubts and are unconditional. SQS received these letters from the project participant directly.

The SQS validation team was able to confirm the authenticity of the LoA issued by the DNA of Vietnam by searching the online available project database of the DNA of Vietnam and by identifying the status of the project listed as project 155 with approval letter issued. The SQS validation team was able to confirm the authenticity of the LoA issued by DNA of Switzerland by conducting a phone interview with Mr. Yvan Keckeis (senior policy officer responsible for CDM related issues within the DNA of Switzerland and issuer of the received LoA) on 06/06/2011.

SQS confirms that the approval of participation is valid for the proposed project participant – see [62] and [61]. SQS considers the Letters of Approval are in accordance with paragraphs 45 – 48 of the VVM version 1.2 (EB 55, Annex 1, paragraph 49).

Letters of approval do not contain additional specification of the project activity, such as the PDD version number.

Have been raised:

CL 5: The LoA's have to be submitted to the auditors. ⇨ LoA's have been submitted – CL 5 is closed.

3.2 Participation

The names of the two project participants “Bac Ha Hydropower Joint Stock Company (state-owned corporation) (Vietnam)” and “ecotawa AG (private entity) (Switzerland)” are listed in the PDD in tabular form in section A.3. This information is consistent with the contact information details of the project participants as provided in Annex I of the latest version of the PDD. No entities other than those approved as project participants are included in these sections of the PDD.

The participation of Bac Ha Hydropower Joint Stock Company (state-owned corporation) is approved are approved by means of the Letter of Approval of the host party. The participation of ecotawa AG is approved by means of the Letter of Approval of Switzerland. The letter of approval are issued, thus SQS’s confirmation of participation by a Party to the Kyoto Protocol can be given.

By reviewing the latest version of the completed Modalities of Communication Form (F-CDM-MOC) for the project activity signed by both project participants, the validation team was able to confirm that this form is correctly completed. The names and authorized signatories of the project participants indicated in the MoC are consistent with the ones in the PDD.

3.3 Project design document

The latest available version of the template: CLEAN DEVELOPMENT MECHANISM PROJECT DESIGN DOCUMENT FORM (CDM-PDD) Version 03 – in effect as of: 28 July 2006 has been used.

The validation team can confirm that the PDD version 1.4, dated 15/06/2011 is based on the currently valid PDD template version 03 and is completed in accordance with the applicable guidance document.

3.4 Project description

The description of the project activity contained in the PDD is understandable and gives a good picture of the project. Its content was confirmed to be realistic by means of an on-site visit and interviews with local project participants on 08/09/2010.

Main changes between the PDD (Version 1.0 25/08/2010 published for the 30 days stakeholder commenting period and the final version (version 1.4, dated 15/06/2011), submitted for registration are issues related to the CARs, CLs and FARs identified during validation. The key PDD changes are as follows
DNA of Vietnam released after the first publication of the PDD an official combined margin (CM). The final version of the PDD included the new combined margin and thus the whole emission reduction estimation changed.

Raised:

CL 1: Shall be translated in full or partially and submitted to DOE the following documents:

File 4 feasibility in full, File 5 MOU in full, File 6 in full, File 7 in full, File 11 in full, File 13 in full, File 14 in full, File 15 in full, File 16 in full, File 18 in full, File 22 in full, File 23 in full, File 24 in full, File 25 in full, File 26 in full, File 27 relevant parts, File 34 in full, File 36 in full, File 37 in full, File 38 in full, File 39 in full, File 40 in full, File 41 in full, File 46 in full ⇒ All documents are attached to the answers of the validation requests. The translations are marked the following way File xyEN (e.g. File 4EN technical Design Stage 1.pdf) – CL 1 is closed.

CL 2: PP shall indicate the full English title of the document 11. ⇒ The file 11 has been translated in full. The English title of this document is:

BOARD OF DIRECTORS – INFRASTRUCTURE DEVELOPMENT & CONSTRUCTION CORPORATION

Regarding: Approve technical design of phase 2 – Bac Ha hydropower plant.

BOARD OF DIRECTORS – CL 2 is closed.

CL 3: PP shall submit the following documents: MOC (Modalities of Communication, Confirmation Non-

ODA, Grid-connecting approval, Business License, PDF printout of referenced Internet-links in PDD, PDF printout referenced in submitted documents as File 1, Contract overview, Land use rates on decision of peoples committee in VN and E, Approval of compensation values of land in VN and E, Land compensation list, Investment license, Approval of EIA in VN and E, Loan evidences, Construction schedule, Purchasing contract for equipment ⇒ - PDF printout file 1 is attached, The MoC is attached, Non ODA confirmation is attached, Business license is attached (see File 50 VN/EN), Grid connecting approval is attached (File 58 VN/EN), Contract overview attached (see 57), Land use rates on decision of PC are attached (file 52 a/b/c: EN and VN), Approval of compensation values of land (file 52 a/b/c: EN and VN), Investment license (see file 50 EN and VN), Approval of EIA (see file 36 in EN and VN), Loan evidence (see file 53 in EN and VN), Construction schedule (see file 54 in EN and VN), Purchasing contract for equipment (see file 14 VN and EN), For all documents submitted a complete doc-list is attached – CL 3 is closed.

CL 4: The PDD shall have an unequivocal identification; name and version number.

Current name: CDM-Executive Board – it can be integrated in the foot-line so it's visible on every page and identified. ⇒ A footer has been added – CL 4 is closed.

CL 20: The MOC has to be submitted. ⇒ MOC is submitted – CL 20 is closed.

The coordinates of the project activity mentioned in the PDD are:

22°30'24"N 104°11'42"E

They have been verified and are deemed correct.

It is SQS's opinion that the project description is accurate and complete.

3.5 Baseline and monitoring methodology

3.5.1 General requirement

The project applies a large-scale methodology:

- Approved consolidated baseline and monitoring methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" Version 12.1.0, EB58

The project applies the following tools:

- Tool for the demonstration and assessment of additionality, version 5.2, EB 39
- Combined tool to identify the baseline scenario and demonstrate additionality, version 03.0.0, EB 60, Annex 7
- Tool to calculate project or leakage CO2 emissions from fossil fuel combustion, version 2, EB41
- Tool to calculate the emission factor for an electricity system version 2.2.0, EB 61, Annex 12. At the time the baseline of the official Grid Factor was calculated by the DNA of Vietnam, version 1.1, EB 35 annex 12 of the tool was used because only this version was available.
- Guidelines on the Assessment of Investment Analysis, version 04, EB 61, Annex 13

Raised:

CAR 9: PP missed to use the latest available Guidelines ⇒ PDD is adapted to the latest available version of Combined tool to identify the baseline scenario and demonstrate additionality, version 03.0.0, EB 60, Annex 7, Tool to calculate the emission factor for an electricity system version 2.2.0, EB 61, Annex 12, Guidelines on the Assessment of Investment Analysis, version 04, EB 61, Annex 13 – CAR 9 is closed.

3.5.2 Applicability of the selected methodology to the project activity

Applicability Criteria ACM0002	Project Activity as discussed in the PDD	Means of validation and Validation Opinion
The project activity is the installation or modification/retrofit of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal	The project is the installation of a new hydro power plant with an accumulation reservoir.	On site visit, Construction schedule, reference [54], Equipment contract, reference [14].

power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit.		
In case of hydro power plants, one of the following must apply: The project activity is implemented in an existing reservoir, with no change in the volume of the reservoir; or The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the power activity, as per definitions given in the Project Emissions section, is greater than 4 W/m ²	The project activity results in a new reservoir with a power density of 13.0 W/m ² .	Power-Density calculation is based on ref. [11], Feasibility Study Plant load factor, where are mentioned the surfaces of the reservoirs. See also PDD A.4.3
The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available.	This is the case, please refer to section B.4.	Consistency between ACM0002 and PDD has been verified and can be confirmed.

SQS confirms that the approved consolidated baseline and monitoring methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” Version 12.1.0, EB58 is applicable for this project, that the criteria’s are discussed in an exhaustive manner in the PDD and supported by the submitted documents.

3.5.3 Project boundary

Requirements ACM0002	Sources of evidences	Validation Opinion
Project power plant	PDD Section A.4.3. Figure 1	Figure 2 includes Power plant – site visit on 08/09/2010 confirmed description in the PDD – requirements are fulfilled.
All power plants connected physically to the electricity system that the CDM project power plant is connected to.	PDD B.6.1 Baseline emissions, Step 1	Project boundary includes correct electricity system – in this case the national grid (EVN). Requirements are fulfilled.
Baseline Emissions: CO ₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity <ul style="list-style-type: none"> CO₂ emission CH₄ N₂O 	PDD B.3 Table 5 PDD B.3 Table 5 PDD B.3 Table 5	CO ₂ emission is defined as main emission source CH ₄ is not included as defined in ACM0002 N ₂ O is not included as defined in ACM0002 Validator conclusion: Requirements are fulfilled.
Project activity For hydropower plants, emission of CH ₄ from the reservoir <ul style="list-style-type: none"> CO₂ emission CH₄ N₂O 	PDD B.3 Table 5 PDD B.3 Table 5 PDD B.3 Table 5	CO ₂ is not included as defined i ACM0002 CH ₄ is included as defined in ACM0002 N ₂ O is not included as defined

		in ACM0002 Validator conclusion: Requirements are fulfilled
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The spatial and conceptual project boundary is defined in the PDD chapter B.3. The project boundary is shown in Figure 2. in the PDD "Project Boundary". The definition is consistent with the methodologies of ACM0002. SQS' lead auditor, Hansruedi Bader, conducted an on-site visit (08/09/2010). The boundary was verified during the on-site visit. The detailed plans, the construction schedule and the coordinates of the project have been consulted and verified. The choice of boundary, sources and gases correspond to the methodology and are rated justified by SQS.

Raised:

CAR 1: The national grid has to be included to the project boundary ⇒ Section B.3 is the project boundary and includes the national grid. Section A.4.3. is the project technology – CAR 1 is closed.

CAR 5: The Back-up generator has to be included in the project boundary. ⇒ No. See CAR 2. The backup generator is not part of project emissions based on ACM0002 – CAR 2 is closed. The validator can confirm, due to the limited potential usage, that back-up diesel generators, which are not addressed by the applied methodology, will not result in Greenhouse gas emissions in more than 1% of the overall expected average annual emissions reductions.

3.5.4 Baseline identification

As it is a new grid-connected renewable power plant, the baseline scenario is the electricity delivered to the grid by the project activity.

The Emission Factor is - in accordance to ACM0002 and Tool to calculate the emission factor for an electricity system, version 02 EB 50, annex 14., derived after calculating combined margin (CM) according to the procedures prescribed in the "Tool to calculate the Emission Factor for an electricity system". Simple OM is chosen and a proof for the correctness of the choice is given under B.6.1. All applicable steps are considered explained and proved in the PDD under B.6.1. and calculation under B.6.3. The combined margin has been verified by the DOE at the office of the Department of Meteorology, Hydrology and Climate Change in Hanoi and is deemed correct.

All the assumptions and data used by the project participants are listed in the PDD, including their references and sources.

All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD.

Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable.

The PDD also provides an accurate and auditable description of the baseline scenario which includes the continued use of fossil fuel power plants to supply electricity to the grid.

Raised:

CAR 3: The calculated emission factor (0.59512) is not conservative. The document "Ministry of Natural Resources and Environment, 2010

http://www.noccop.org.vn/Data/vbpg/Airvariable_Idoc_vnHe%20so%20phat%20thai.pdf" calculates a factor of 0.5764. The calculation of the GHG emission reductions must be recalculated ⇒ The PDD has been adapted. See new file 17. As the number of CERs changed also the finance file has been updated see new File 33 – CAR 3 is closed.

CAR 4: As the official GF of Vietnam has been calculated with the "Tool to calculate the emission factor for an electricity system" Version 01.1, this tool has to be referenced. ⇒ The tool 2.0 is used. The official calculation is updated to usage of the version of the tool 2.0 as the version 1.1. is not anymore valid since 9.2009 – CAR 4 is closed.

3.5.5 Algorithms and/or formulae used to determine emission reductions

The review has been done in the office of the Department of Meteorology, Hydrology and Climate Change in Hanoi (who calculated the official GF for the DNA) on 16 and 17 November 2010. The DNA report transparently lays out all the steps and methodological choices necessary to arrive at the final GF. Our review showed that Mr. Quang (editor of the official document SQS ref. [49]) applied the baseline methodology correctly to calculate project/baseline emissions, leakage and emission reductions. Data sources are referenced. The values used were found to be plausible and conservative.

SQS is satisfied that there are no project activity GHG emissions which will contribute more than 1% of the expected ER/year and which are not addressed in the applied methodology.

SQS concludes that the selected methodology, ACM0002 and Tool to calculate the emission factor for an electricity system, version 1.1, EB 35 annex 12 was the only available version at the time of the calculation, the methodology is applied and selected correctly by the Department of Meteorology, Hydrology and Climate Change in Hanoi.

Parameters, options selected and the mathematical operations used for the ex-ante estimation of the project's emission reductions are correct, plausible and conservative as per the methodology applied. As ex-ante option is selected, monitoring is not required.

PP is using the calculated combined margin by the Department of Meteorology, Hydrology and Climate Change in Hanoi as input data for the calculation of the grid emission factor according the Tool to calculate the emission factor for an electricity system version 02.2.0, EB 61, Annex 12.

All assumptions and data used by the PP are listed in the PDD, including their references and sources. All estimates of the baseline emissions are reasonable, correctly quoted and could be replicated using the data and parameter values provided in the PDD.

SQS also concludes that in the case of the calculation of the Grid emission factor of Vietnam, the output value does not change using Tool to calculate the emission factor for an electricity system, version 1.1, EB 35 annex 12 or Tool to calculate the emission factor for an electricity system version 02.2.0, EB 61, Annex 12.

3.6 Additionality of project activity

Following "Tool for the demonstration and assessment of additionality, version 5.2, EB 39", PP identified at step 1 two alternatives:

Alternative 1: The proposed project activity undertaken without being registered as a CDM project activity;
Alternative 2: Continuation of the current situation with power from the Vietnamese grid (no project activity or other alternatives undertaken).

Alternative 1 is feasible and complies with Vietnamese current laws and regulations but without assistance of CDM the project is not attractive.

Alternative 2 - does not face with any barrier from the current law and regulation because the project owner has no obligation to build or invest in the power plant to supply electricity for the local area.

The main barrier identified is the investment barrier. This is clearly described in section B.5. in the PDD and DOE confirms that this is appropriate.

3.6.1 *Prior consideration of the clean development mechanism*

Evidence to assess prior consideration of the project and start date were assessed at the project site during the validation visit. Documentation was confirmed as authentic as original company stamped documents were supplied and crosscheck was performed by interview with PP and comparison with other documents (such as construction schedule and approval dates). Has been consulted the original of the Directive of the General Director dated 28/04/2004 – SQS ref. [19].

A CMD-Board was established on 25/01/2005 – SQS ref. [34] before project start.

Start date of the project activity was set to 21/02/2005 which is the date when the contract for civil works for the project was signed – see SQS ref. [18]. Prior consideration of the CDM was shown during the interview on site visit with a chronological milestone list considering CDM with documentary proof and consideration of running the project as CDM project dated 28/04/2004 which states that the project is not feasible without the CDM.

The CDM activity complies with the requirement of EB41 Annex 46 because the project activity started prior to validation and prior 02/08/2008 and is thus considered an existing project activity in line with EB 49 Annex 22.

Evidences for continued actions to secure CDM status is evidenced with SQS ref. [19], Construction contract, [20] MoU Carbotech 18/12/2006, [48] MoU ecotawa 15/05/2008 and [21] CDM project development contract 24/06/2009.

SQS confirms that this is appropriate.

The time elapsed between continuous actions is less than 2 years in line with point 6b of EB 49 Annex 22.

In compliance with the requirements of the Guidance on prior consideration of CDM Version 03 the validation team has assessed the above documented evidences presented by the PP by means of documentation review and on-site interview. On that basis, the validation team confirms that those documented evidences are authentic. It is also confirmed that the time gap between any two documented evidences of continuing and real actions taken to secure the CDM status is less than 2 years. The validation team thus concluded that the project has sufficiently demonstrated its continuing and real actions taken to secure the project CDM status in parallel with its implementation.

3.6.2 *Identification of alternatives*

In identifying alternatives to the proposed project, two options were identified including the proposed project activity undertaken without being registered as a CDM project activity.

The explanation is deemed reasonable and complete, in line with the Tool for the demonstration and assessment of additionality (ver 05.2).

3.6.3 *Investment analysis*

The financial returns of the proposed project are insufficient to justify the investment according to the validated IRR of 10.6% compared to a benchmark of 11.70%.

The parameters used in the financial calculations have been validated based on an assessment of the sources presented in the PDD. The main source of inputs to the investment model which led to the investment decision is the Verification Result of Cost estimation from the Feasibility Study Report, realized by an external, independent company, dated 28/11/2004, SQS ref. [4]. DOE can also confirm that values in the PDD are fully consistent with this referenced document. The following table lists the issues mentioned in "Guidelines on the assessment of Investment Analysis" Version 04, EB 61, Annex 13. The date of investment decision is as of 15/02/2005 when all the information for decision taking were available including the FSR, dated 28/11/2004, SQS ref [4], including financial feasibility, it's revised version dated 06/01/2005 – SQS ref.

[7], the technical design approval of the Minister of Industry (MOI), dated 11/01/2005 – SQS ref. [6] and the agreement with EVN defining the electricity selling price – the tariff dated 22/10/2004.

EB Guideline	Project	Validation
3: Period of assessment	The period of assessment taken is 25 years. This is in accordance with the guidance "In general a minimum period of 10 years and a maximum of 20 year will be appropriate" The project is taking a longer period which is more conservative. The salvage value at the end of the period is included based on the technical life-span.	The Decision 206/2003/+D-BTC of the ministry of finance has been consulted and confirms the statement of the PP. The chosen lifespan can be considered as appropriate and conservative.
4: Salvage value	Salvage value: The salvage value is included. The technical life-span was taken based on EB 50 Annex 15 as 150,000 hrs for hydro turbines (generators and transformers 30 years; to be conservative for all equipment the 150,000 hours was taken which is 36 years at annual operating hours). For construction the salvage value is based on the lifespan of 40 years according to Decision No. 2014/QD-BCN dated 13 June 2007 by the Ministry of Industry	The financial analysis is calculated over a period of 25 years, the salvage value is respected in the calculations – see SQS ref. [33], sheet Principles, General Information and sheet Financial analysis incl. CDM. DOE can confirm that the fair value is calculated. 40 year lifespan for construction according to Decision No. 2014/QD-BCN dated 13 June 2007 by the Minister of Industry Annex 1 SQS ref. [3].
5: Depreciation and other non-cash items	Depreciation and other non-cash items such as amortization are not included when calculating the IRR. Taxes and duties have not been included. This is in line point 11 as the IRR is calculated pre-tax as recommended in this point.	Can be confirmed by the DOE, only taxation on natural is considered according to the Guideline.
6: Time of assessment	All input values are based on data available as of February 2005. The decision was taken after the approval of the technical design stage 1 (File 6). At this time the feasibility study Version 1 was available (11.2004, File 4) and a MOU for electricity selling had been signed (10/2004) (File 5).	Date of Establishment of the feasibility Study Report (FSR) is 28/11/2004 – SQS ref. [4]. Included is also Estimation of investment sums. The extract of the estimated investment is also reproduced and translated in Excel-sheet – SQS ref. [8]. The datas of the FSR are used in financial analysis – SQS ref. [33]. Technical design has been approved at 11/01/2005 – SQS ref. [6] MoU with EVN (Electricity of Vietnam) has been signed on 22/10/2004 – SQS ref. [5]. The investment decision has been taken on 15/02/2005 Project start is 21/05/2005 – date of signature of the contract civil works – see SQS ref. [18]. DOE confirms that the listed input values are consistently applied in all calculations.
7: Cessation of implementation	Not relevant for project	Can be confirmed by the DOE.
8: Provision of spreadsheet	Spreadsheet is provided	Spreadsheet -SQS ref. [33] Bac Ha finance, contains all investment analysis. DOE confirms that the results can be reproduced. The spreadsheet will be available to the executive Board, UNFCCC Secretariat and others contracted.
9: Finance expenditures	Financing expenditures are not included when calculating the project IRR (see point 5)	DOE has verified Financial analysis and can confirm that the costs of financing expenditures are not included in the calculation of project IRR.
10: Equity IRR	The project IRR and not equity IRR is calculated.	Can be confirmed by the DOE.

11: Taxation	Taxation is not included and a pre-tax benchmark is applied.	DOE has verified the Financial analysis – sheet, Principles, General Information where is mentioned that only pre-tax project is taken – this is the natural resource tax. – see SQS ref. [6] natural resource tax - what is in accordance with the Guideline. DOE confirms the correctness.
12 - 18: Benchmark selection	The applied benchmark is the local commercial lending rate as a project IRR is used. The benchmark is based on publicly available data sources of the State Bank of Vietnam. No internal company benchmark is used.	DOE has verified project IRR through official documents provided – SQS ref. [1] As proofed through SQS ref. [1], commercial interest rate is 150% of the base rate according to the decision of the State Bank of Vietnam. Is chosen accordingly to Guideline the base rate given in the annual report of the State Bank of Vietnam.
19: If the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate	A benchmark approach is used.	As the alternative to the project activity is the supply of electricity from a grid, is not to be considered an investment approach. PP considered a benchmark approach according to the Guideline.
20: Choice of Variables for sensitivity analysis	Sensitivity analysis is made assuming following changes: <ul style="list-style-type: none"> • 10% lower investment costs • 10% lower operational costs • 10% higher income from electricity sale These are all important cost/revenue variables.	For the investment, PP has chosen the total of the investment. PP has chosen the total of the operational costs and the total of the revenues – the sale of electricity. The likelihood of conditions, such as decrease in construction/operational costs, will only ever go up in a normal economic cycle. Vietnam is experiencing high inflation. So drop in costs is unlikely. DOE has assessed the financial parameters and the financial analysis without CDM revenues – SQS ref. [33] and the variations of the parameters and can confirm the correctness of the calculation and the variation.
21: Range of variation of sensitivity analysis	The sensitivity analysis covers a range of $\pm 10\%$. Additionally an ex-post assessment is made and a cross comparison if data ranges and their variations are plausible	Sensitivity analysis is shown in SQS ref. [33] sheet graphs. The parameter chosen are correct, the range of variation chosen is 10%, all has been verified on the sheet and the IRR is never higher than 11.6% - so lower than the Benchmark of 11.7%. The likelihood that the scenario will result in the project activity passing the benchmark can be excluded – see comments after this table concerning the sensitivity analysis.

Core Data used for Financial Assessment

Item	Unit	Value	Data Source	Validation
Local commercial lending rate	Percentage	11.7%	Base rate of State Bank of Vietnam is 7.8% plus 50% Date: Decision 93/QĐ-NHNN dated 27/01/2005	According to the country's civil code, commercial interest rate being 150% of the base rate, 11.7% is the benchmark used according to the decision of the State Bank of Vietnam SBV decision 93/QĐ-NHNN dated 27/01/2005, applied date February 1st, 2004 - SQS ref. [1] and the Vietnamese Civil Law codes Article 476 SQS ref. [63]. The benchmark is the most recent one at time of investment decision on 15/02/2005. The benchmark is chosen according to the Guideline.

				<p>SQS confirms that the lending rate is chosen according to the Guideline, has been verified on www.sbv.gov.vn and is correct.</p> <p>The calculation of the benchmark has been compared with recent registered projects and the correctness is confirmed.</p> <table><tr><th>Project</th><th>Benchmark</th></tr><tr><td>Nam Pia</td><td>14.30%</td></tr><tr><td>Nam Tha (Nam Tha 5+ Nam Tha 6)</td><td>13.55%</td></tr><tr><td>Nam Chien 2</td><td>13.01%</td></tr></table>	Project	Benchmark	Nam Pia	14.30%	Nam Tha (Nam Tha 5+ Nam Tha 6)	13.55%	Nam Chien 2	13.01%
Project	Benchmark											
Nam Pia	14.30%											
Nam Tha (Nam Tha 5+ Nam Tha 6)	13.55%											
Nam Chien 2	13.01%											
Period of assessment	Years	30	According to guidance point 3 a maximum period of 20 years is considered as appropriate. Taking 25 years of operation and a total of 30 years including construction is thus very conservative. The fair value at the end of the period is included.	The Decision 206/2003/+D-BTC of the ministry of finance has been consulted and confirms the statement of the PP. The chosen lifespan can be considered and confirmed as appropriate and conservative.								
Salvage value <ul style="list-style-type: none">- Construction- Equipment- Total	Million VND	193,895 122,798 316,493	The technical life-span was taken based on EB 50 Annex 15 as 150,000 hrs for hydro turbines (generators and transformers 30 years; to be conservative for all equipment the 150,000 hours was taken which is 36 years at annual operating hours) For construction 40 years was taken which is even more conservative	The financial analysis is calculated over a period of 25 years, the salvage value is respected in the calculations – see SQS ref. [33], sheet Principles, General Information and sheet Financial analysis incl. CDM. 40 year lifespan for construction. This lifespan chosen by the PP has been cross-checked with the Decision No. 2014/QD-BCN dated 13 June 2007 by the Minister of Industry Annex 1 SQS ref. [3] –which indicates also 40 years for construction. Based on the mentioned consulted and compared documents, DOE can confirm that the fair and conservative value is calculated.								
Operating hours	Hours	4,204	Based on FSR, 2005, (File 7), p.2-12 realized by an external company, date of document 06/01/2005	Based on feasibility study made by Power Construction Consulting Company No. 1 – SQS ref. [7], dated 06/01/2005 in accordance with EB 48 Annex 11 “Guidelines For The Reporting And Validation Of Plant Load Factors” II.3.b The PLF has been compared to other hydroplants in Vietnam and can thus be considered in a cross-check as reasonable and conservative.								
				<table><tr><th>Project</th><th>PLF in operating hours</th></tr><tr><td>Pao Cu Sang</td><td>3,608</td></tr><tr><td>DakMi 4C</td><td>3,840</td></tr></table>	Project	PLF in operating hours	Pao Cu Sang	3,608	DakMi 4C	3,840		
Project	PLF in operating hours											
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				<table><tr><td>Nam Chan</td><td>3,947</td></tr><tr><td>La La</td><td>4,033</td></tr><tr><td>Nam Cat</td><td>4,082</td></tr><tr><td>Bac Ha</td><td>4,204</td></tr><tr><td>Ho Nui Coc</td><td>4,240</td></tr><tr><td>Quang Tin</td><td>4,250</td></tr><tr><td>Dak Mi 4</td><td>4,255</td></tr><tr><td>DakRTih</td><td>4,423</td></tr><tr><td></td><td></td></tr></table>	Nam Chan	3,947	La La	4,033	Nam Cat	4,082	Bac Ha	4,204	Ho Nui Coc	4,240	Quang Tin	4,250	Dak Mi 4	4,255	DakRTih	4,423		
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Ho Nui Coc	4,240																					
Quang Tin	4,250																					
Dak Mi 4	4,255																					
DakRTih	4,423																					
Production capacity	MW	90	Based on technical FSR (File 6), p.2. dated 11.1.2005	The generation capacity is consistent with the technical design approval of the Minister of Industry (MOI), dated 11/01/2005 – SQS ref. [6] and the Feasibility Study Report, dated 28/11/2004, SQS ref. [4] and it's re-vised version dated 06/01/2005 – SQS ref. [7], It is also consistent with Equipment contract – SQS ref. [14].All documents have been ana-lyzed and the value can be confirmed as correct.																		
Total electricity generated per annum	MWh	378,360	Calculated with operating hours and 90 MW capacity	The installed capacity will be 90 MW as described above. The Calculations have been done with the capacity of 90 MW. The product of 90 MW with 4,204 operation hours is 378,360 MWh and can be confirmed by the DOE.																		
Internal usage of electricity	Percentage	1%	FSR, 2004, p. 22-6 (File 4)	<p>The internal use usage of electricity is described in Feasibility Study Report, SQS ref. [4], dated 28/11/2004 and can be confirmed by the DOE. The value and has been crosschecked with other registered projects and is confirmed as conservative. – see Project 3389 : Dak Strong 2 and Pro-ject 3396 : Chau Thon Hydropower Project.</p> <p>SQS also reviewed the Decision No. 2014/QD-BCN dated 13 June 2007 by the Minister of Industry which states for hydro-plants > 30MW 0.5-1% Annex 1. The value of the energy document is thus in accordance also with governmental decisions.</p>																		
Electricity sold to the grid per annum	MWh	374,576	Calculated based on total pro-duced minus internal usage	DOE confirms that 99% of 378,360 MWh is 374,576 MWh.																		
Electricity sale price	tsd VND / MWh	593	Based on MOC signed with EVN, 2004 File 5 p.1 Date of document: 22/10/2004	<p>MoC with EVN, dated 22/10/2004, SQS ref. [5] has been verified and the price can be confirmed. MoC states the price of 593,2 Dong per KWh and 3.8 cent/kWh.</p> <p>This was cross-checked against the Tentative Decisions on Assessment of Economy and Finance for Electrici-ty Generation Projects (Decision 2014/QD-BCN as announced by the Ministry of Industry (13/06/2007) stat-</p>																		

				<p>ing that hydropower projects' power purchase price are in the range of 2.7 to 5.2 cent/kWh during the dry season and 2.5 to 5.0 cent/kWh during the rainy season respectively. Thus, it is both appropriate as well as conservative as it is on the higher side of the applicable range. It should also be noted that according to the Electricity Law 2005, electricity generators will have the right to sell electricity under a definite-term contract.</p> <p>The experienced inflation during the last years in Vietnam has devaluated the Vietnam Dong significantly against the US-Dollar – currency used in Decision 2014/QD-BCN.</p> <p>The Tariff price of Bac Ha has been assessed against recent registered large scale projects as well, and it was found to be more conservative. e.g.</p> <p>Project 4236: Ban Coc Hydropower Project: 590 VND/kWh, Project 3532 : Song Chung Hydropower Project: 607 VND/kWh</p> <p>DOE confirms that PP applies the correct value.</p>
Annual operational cost	Percentage	0.5%	FSR, Vol 1, p. 22-6 (File 4) Date of document: 28/11/2004	<p>Feasibility Study Report, dated 28/11/2004 – SQS ref. [4].</p> <p>Decision No. 2014/QD-BCN dated 13/06/2007 by the Minister of Industry – SQS ref. states that maintenance and Operating costs for hydropower plants with a capacity > 30MW can be calculated with 05%-1% of the capital invested. Has been assessed the FSR and the Decision No. 2014/QD-BCN and it can be confirmed that PP has chosen the most conservative value.</p>
Investment Construction with equipment installation Equipment cost Miscellaneous Backup	Million VND		1,470,077 775,579 410,239 150,616 133,643	<p>Based on Feasibility Study Report, dated 28/11/2004 – SQS ref. [4] , the contract for Civil works – SQS ref. [18] and the contract for electro mechanic equipment – SQS ref. [14] DOE can confirm that values in the PDD are fully consistent with this referenced document.</p> <p>The appropriateness of the cost has cross-checked by reviewing the Vietnamese Master plan for Electricity production, "National Development Plan for Electricity, Period 2006-2015, Vision 2025 (June 2006)" which states that per kW investment costs for hydropower projects in Vietnam have a range of 15 million VND/kW to 25 million VND/kW. As the per kW cost of this project is found to be</p>

				<p>16,334 million VND/kW, it was deemed that the overall investment cost is reasonable and correctly applied.</p> <p>The project investment costs have also been compared with other projects in USD.(the exchange rate is taken at the month of the investment decision)</p> <table><tr><th>Project</th><th>MW</th><th>Million USD/MW</th></tr><tr><td>Ho Nui Coc</td><td>1.9</td><td>1.03</td></tr><tr><td>Bac Ha</td><td>90</td><td>1.08</td></tr><tr><td>La La</td><td>3</td><td>1.13</td></tr><tr><td>Nam Chan</td><td>2.1</td><td>1.14</td></tr><tr><td>Pao Cu Sang</td><td>10.5</td><td>1.16</td></tr><tr><td>Quang Tin</td><td>5</td><td>1.17</td></tr><tr><td>Dak Mi 4</td><td>180</td><td>1.25</td></tr><tr><td>DakRTih</td><td>144</td><td>1.34</td></tr><tr><td>DakMi 4C</td><td>18</td><td>1.36</td></tr><tr><td>Nam Cat</td><td>3.2</td><td>1.48</td></tr></table> <p>After assessment of all referenced documents, SQS assumes that the cost is appropriate and conservative.</p>	Project	MW	Million USD/MW	Ho Nui Coc	1.9	1.03	Bac Ha	90	1.08	La La	3	1.13	Nam Chan	2.1	1.14	Pao Cu Sang	10.5	1.16	Quang Tin	5	1.17	Dak Mi 4	180	1.25	DakRTih	144	1.34	DakMi 4C	18	1.36	Nam Cat	3.2	1.48
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DakMi 4C	18	1.36																																			
Nam Cat	3.2	1.48																																			
Natural resources tax	Percentage	2%	2% of electricity output valued at the selling price (see above) based on Ministry of Finance Decree No.68/1998/ND-CP dated September 3, 1998 on Regulating in detail the implementation of the amended Ordinance on Resource Tax Art 7 point 3 and Annex number VII point 2 (see File 9new)Date of document: 03/09/1998	DOE has verified the document Decree No.68/1998/ND-CP dated September 3, 1998 on Regulating in detail the implementation of the amended Ordinance on Resource Tax of the Ministry of Finance providing guidelines on natural resource tax applicable to natural water used for producing hydro-electricity – SQS ref. [9] and confirms the correctness.																																	
Price of CERs	USD /tCER	167	11 USD based on estimate of World Bank projection 1.2004 p. IV (File 10); USD to VND exchange rate based on median exchange rate mid February 2005 based on www.oanda.com/convert/classic	The document SQS-ref. [10] edited by the INTERNATIONAL EMISSIONS TRADING ASSOCIATION IETA, dated June 2004, has been verified. The data of the PP can be confirmed.																																	

The above mentioned copies of the feasibility reports were once again cross-checked against the PDD, and the DOE has conducted a further examination of the computations in the spreadsheet in addition to the procedures to ensure correctness applied during validation.

All referenced documents have been verified and reviewed by the DOE and it can be confirmed that the values are correct.

All the input values used in the investment analysis (such as values used for the benchmark calculation, operating hours, internal consumption and total investment) were applicable at the time of investment decision.

A sensitivity analysis has been realized with following parameters.

IRR Base Case and Sensitivity to Parameter Changes Excluding CER Revenues

Case	IRR
Base case	10.56%
10% lower investment cost	11.66%
10% lower operational cost	10.6%
10% higher income from electricity sale	11.6%
Benchmark	11.70%

In all cases the IRR is clearly lower than the benchmark i.e. the project in absence of CDM is financially non-feasible.

The appropriateness of the sensitivity analysis and its conservativeness have been checked by the validator through the following elements:

- The latest investment calculation dated August 2009 showed a 51% higher investment than the one originally planned. With this investment level the IRR would be 6.5% and thus 38% lower than the original value. This clearly shows that the investment value taken for calculation purposes is very conservative and that it is highly improbable that the investment cost would be lower than anticipated. The cost increase was due among others to a doubling of compensation costs and a doubling of road construction costs. As equipment is imported and due to inflation the VND has been devalued therefore and price of imported goods is raising, the investment costs will be higher than estimated. The reality has been that the investment value has increased.
- While the investment cost increased by 51% the last assumed price paid for electricity has only increased by 9% from 593 VND/kWh to 646 VND/kWh – see SQS ref. [26]. Taking the last investment cost and the last price assumption the IRR of the project would be 7.3% instead of 10.5% i.e. 30% lower than the originally anticipated IRR.
- Insurance costs have not been included as no quote is available yet to proof data. This is relevant for the operational costs as latter will increase with the insurance cost. This indicates that a sensitivity analysis with a 10% lower operational expenditures than planned is conservative.
- No tax and finance costs have been included for calculation of the IRR. With tax costs the IRR will however decrease

The project IRR would be improved in consideration of CERs revenue, where an IRR of 12.2% would be expected which is higher than the benchmark of 11.7%.

DOE has used its local and sectoral experience to confirm that the underlying assumptions are accurate and appropriate and the financial calculations are correct.

Have been raised:

CL 16: PP shall demonstrate that the costs of the Hydropower plant are in line with other comparables projects ⇒ Bac Ha has an investment of 1.08 million USD per MW. This value has been compared with 9 other hydropower plants in Vietnam where data is available (full FSRs available thus data can be fully checked). The average investment value was 1.23 million per MW and the median value was 1.17 million USD/MW with the lowest value being 1.03 million USD/MW. This corresponds to a run-of the river 1,9MW plant (Ho Nui Coc). The investment value is thus comparable and rather at the lower end compared with other plants i.e. conservative. See File “comparison hydros” attached – CL 16 is closed.

CL 17: PP shall submit Decision No. 2014/QD-BCN dated 13 June 2007 by the Ministry of Industry for the validation of the Electricity sale price ⇒ We have submitted. This is for plausibility and cross-check pur-

pose ONLY as this government decision was made after investment decision date. See File 3e – CL 17 is closed.

CL 18: PP shall submit more information about the plant load factor – comparison with other projects in the same region ⇒ Bac Ha has a PLF of 4,204 operating hours per annum. This value has been compared with 9 other hydropower plants in Vietnam where data is available (full FSRs available thus data can be fully checked). The average PLF 4,075 hours and the median value was 4,082 hours. The PLF is thus comparable and rather at the higher end compared with other plants i.e. conservative. See File “comparison hydros” attached – CL 18 is closed.

CL 19: PP shall indicate a clear date for the investment decision. Is referenced in B.5. Table 6 Prior considerations, 28/04/2004 as decision date, is mentioned in File 19: Pursuant to the Decision 808/QD-HDQT dated Mar 4, 2004 of the Director Board of Infrastructure Development and Construction Corporation regarding the Investment in Bac Ha Hydropower Project in the Chay river, Lao Cai province. ⇒ Date is 15.2.2005. File 19 cited in Table 4 is not the investment decision. This is the Board decision which indicates that a CDM expert should be consulted. No prior decision was taken. The final design was available only 11.2004 (File 4); the financial feasibility was available as of 1.2005 (File 7); this final design was approved by the MOI as of 11.1.2005 (File 6), and the MOU for electricity sale had been realized 10.2004 (File 5). Based on that the company could take mid 2.2005 the investment decision and sign end of 2/2005 the first construction contract. – CL 19 is closed.

CAR 6: Although the numbers correctly are according to this, but correct in the footnote (17) commercial interest rate to base rate plus 50%. ⇒ Footnote 17 has been corrected ⇒ Has also to be corrected in Table 9: Core Data Used for Financial Assessment ⇒ Has been corrected in table 9 – CAR 6 is closed.

CAR 7: PP shall correct point 17 of investment principles according to EB 51 Annex 58 „Guidelines on the Assessment of Investment Analysis“ Version 03. Point 17 is the choice of the variables related to the total of project costs or project revenue. ⇒ Point 17 is guidance sensitivity analysis (parameters) and point 18 range. PDD has been clarified – CAR 7 is closed.

CAR 8: PP shall provide data for financial assessment applicable at time on investment decision. The PDD gives the financial expenditures from the FSR dated 28/11/2004 – this is after investment decision ⇒ The investment decision is as of 15.2.2005 when all the information for decision taking were available including the technical design approval of the MOI dated 1.2005. See also CL19. See revised PDD also Version 1.3 – CAR 8 is closed.

CAR 9: PP missed to use the latest available Guidelines ⇒ PDD is adapted to the latest available version of Combined tool to identify the baseline scenario and demonstrate additionality, version 03.0.0, EB 60, Annex 7, Tool to calculate the emission factor for an electricity system version 2.2.0, EB 61, Annex 12, Guidelines on the Assessment of Investment Analysis, version 04, EB 61, Annex 13 – CAR 9 is closed.

DOE confirms that the underlying assumptions are appropriate and the financial calculations are correct.

3.6.4 Barrier analysis

Step 3 (Barrier analysis) is not performed according to the choice of Step 2 (Investment analysis).

SQS confirms that there is no obligation to proceed to step 3 if step 2 is chosen.

3.6.5 Common practice analysis

The chosen geographical scope of the common practice analysis is the whole of Vietnam. This is deemed reasonable because EVN makes no distinction – see SQS ref. [29] in policy between power plants in the North or South. There are no sub-grids, for example. So selecting the whole grid as geographical scope is appropriate.

PP has chosen for the Common practice analysis the Group ≥ 50 MW and ≤ 100 MW according Vietnam Construction Code – TXDVN 285:2002 , SQS ref. [28].

In 2004 the government promulgated a new strategy on the development of electricity sources in Vietnam. According to this strategy, the market is liberalized and the role of EVN is basically limited to hydro-power projects larger than 100 MW (Art. 3). Due to changes in the market structure, power plants commissioned 2004 or later are compared with the proposed project. The comparable project category based on the categorization of the MOI and Vietnam Construction Code are thereby hydro power projects with an installed capacity of between 50 and 100 MW.

Compared power plants are commissioned 2004 or later with the proposed project. CDM project are excluded of the comparison. The source of the power plants is the Summary on operation of national power system in 2009, published by EVN – SQS ref. [32].

Only 5 plants defined in the Group (6 with the Song Con plant who is a CDM Project and a private owned plant - so excluded from the comparison). Finally, there are only three comparable power plants in the size of Bac Ha in Vietnam.

The Master Plan for Electricity EVN shows that hydro loses importance from generation around 40% in the year 2010 to 27% in the year 2020 while coal increases considerably. Thermal power stations have a higher priority and are considered more attractive while hydro is not common practice.

Since mid 2007 Vietnam experienced a period of high inflation and consequently high interest rates. This fact increases the barrier for investing in hydropower-projects with a large initial investment and a long gestation period. The comparable hydropower plants without CDM did not face this problem in the same magnitude as their construction period was mainly prior to the high inflation period.

DOE can confirm that the proposed CDM project activity is not common practice.

3.7 Monitoring plan

The monitoring plan described in the PDD was checked by desk-review and on-site.

Parameters determined ex-ante

The project adopts the ex-ante calculation of emission factor of the grid. This calculation process, incl. the applied parameters and equations, were assessed by the validation team in accordance with the Tool to calculate the emission factor for an electricity system/Version 02.2.0.

Parameters monitored ex-post

According to the documentation review and the on-site interview with the representative from the project owner, the following parameters are to be monitored:

- a) the net electricity supplied to the grid, namely, the electricity supplied to the grid by the project and the electricity delivered from the grid to the project;
- b) the installed capacity; and
- c) surface area of the reservoir at the full water level.

The monitoring procedures of those parameters have been sufficiently identified in the PDD.

The net electricity supplied to the grid will be monitored by a 3 phase meter calibrated by the Vietnam's Directorate for Standards and Quality (STAMEQ) and validated by EVN, hourly measurement and monthly recording. Moreover, this data will be checked against electricity sale receipts.

The installed capacity of the project will be recorded based on recognized standards.

The Surface of reservoir will be indirectly measured by the water level. Latter is measured automatically by installed equipment.

The validation team thus confirmed that the parameters identified to be monitored are complete in accordance with the selected methodology.

Management system and quality assurance

The project owner is reported to be responsible for management of monitoring and reporting of the project with support from ecotawa AG and its local partner. The management team for monitoring of the project is identified in the PDD.

Detailed procedures have been developed in the PDD as follows:

- Data to be monitored;
- Operational and Management Structure for Monitoring plan;
- Monitoring of the net electricity supplied to the grid by the project;
- Monitoring of the installed capacity and surface area of the reservoir;
- Quality assurance and quality control;
- Data management and training program; and
- Verification.

The monitoring arrangements described in the monitoring plan of the PDD have been assessed by the validation team, by means of documentation review, interviewing with the representative from the project owner and on-site observation. On that basis the effective implementation of the monitoring plan is considered feasible. The validation team considered that the project owner is capable to implement the monitoring plan.

DOE's confirms the compliance of the monitoring plan with the requirements of the methodology and that it is feasible to be implemented. PP has established a CDM board for implementing and monitoring the CDM project activities – SQS ref. [34]. Team leader is the vice-director; members from the staff of engineering, economic, planning and human resources department. During the onsite visit DOE assessed the monitoring plan and arrangements with the Team leader – see Appendix B, Interviews.

The net energy input to the grid will be measured by EVN (State company of Electricity). EVN also owns the measurement equipment and is responsible for its calibration. PP also installs a second meter for Quality assurance purpose only. Readings are based on the EVN meter.

The annual monitoring reports and data quality check will be realized by ecotawa AG through its Vietnamese partner.

It is DOE's opinion that the project participant's ability to implement and follow the monitoring plan is positive.

Have been raised:

FAR 1: The monitoring manual and the training documents have to be established. ⇒ To be concluded at the verification stage.

FAR 2: The detailed organization of the monitoring team has be verified. ⇒ To be concluded at the verification stage.

FAR 3: The installed capacity has to be verified. ⇒ To be concluded at the verification stage.

3.8 Sustainable development

The Letters of Approval are issued. The confirmation of sustainable development by the host party DNA is confirmed – see SQS ref. [61] and [62]. The host Party's DNA confirmed the contribution of the project to the sustainable development of the host Party.

Have been raised

CL 5: The letters of approval have to be submitted ⇒ The LoA of VN and Switzerland are submitted – CL 5 is closed.

3.9 Local stakeholder consultation

The stakeholder groups that have been identified and interviewed are local residents, farmers, affected persons and local political authorities. Staff members from the local environment protection agency also attended. In SQS' opinion, these are groups affected by the project, and the project participants selected the right groups.

66 households with 325 inhabitants are dislocated and 866 households with 4,449 inhabitants are affected – SQS ref. [13]. The concerned people's committees have been involved in the compensation and resettlement process and have approved the plan for compensation, support and resettlement – see SQS ref. [24], [25], [46].

The dislocated had several options: Choice between two resettlement zones, choice of compensation of farmland in two hamlets and financial support for livelihood.

Have been conducted 126 interviews with stakeholders in June 2010 by a private company - see SQS ref. [59]. They have also been interviewed for positive or negative impact on quality of local public living and signification environmental impacts of the project. Are identified by the stakeholders following major impacts: Loss of land, pollution and dust during construction as negative impacts and remaining or increasing production, new jobs, socio-economic development as positives impacts.

100% of interviewed stakeholders are satisfied with the project – surely due to the professional way the process have been conducted initially by PECC1 and later by Bac Ha HPP JSC.

The Stakeholder consultation process has been conducted according to the criteria of the WCD (World Convention of Dams) and to the compensation of affected habitants – see also SQS ref. [011].

Have been visited the resettlement zones during the site visit on 08/09/2010.

During the on-site visits, the validators were able to verify that a safe and professional solution will be implemented and that the project participants have responded properly to that issue. SQS is satisfied about the manner that the consultation of local stakeholders has been conducted.

3.10 Global stakeholder consultation

The PDD (Version 1.0 dated 25/08/2010) was published from 08/09/2010 to 07/10/2010 on the UNFCCC website. No comments were received.

3.11 Environmental impacts

According to Vietnamese law, hydropower plants need to have their environmental impacts assessed with an Environmental Impact Assessment (EIA), Environmental Impact Evaluation (EIE) or Environment Protection Commitment. The requirement as to which is required depends on the specific project (generally determined based on its reservoir size). The Bac Ha project has undergone an EIA – SQS ref. [35]. This EIA was approved by the Ministry of Environment and Nature in the Decision No. 888/QĐ-BTNMT dated 11/06/2007 SQS ref. [36]. In EIA several impact sources are listed during construction phase and Operation phase. PP discusses the list of impacts in PDD Section D1 in detail and actions are described.

Following table shows the main sources defined in the EIA, discussed in the PDD including the validation opinion.

Potential Environmental Impacts	Recommendations Given by EIA	Actions Taken by Project	Validation opinion
Construction and Preparation Period			

Air and noise pollution being basically mud and dust from transportation and construction vehicles, dust from concrete mixing	Covering canvas for all vehicles transporting materials, spray water, vehicles must comply with standards etc.	Implemented; see equipment registration documents, road watering contracts etc	Measures have been defined – SQS ref. [39] and it has been verified during on site visit by the validators.
Solid waste from worker's camp and construction activities	Waste collection in camps and clearance of vegetation in reservoir area		Has been verified during on site visit by the validators and deemed to be ok.
Terrain and geomorphology impacts	Compliance with regulations; however no significant impact expected		
Water pollution due to waste from maintenance & cleaning such as mechanical oil, lubricants etc, due to workers camp and due to decaying biomass when filling the reservoir. Change of water flows and water quality.	Divert water through tunnel, comply with regulations, build septic tank at camp and collect oils/lubricants etc.	Contract No.01/2010/QTDK/BHHC-CNX for regular environmental monitoring at Bac Ha HPP between Bac Ha HPP JSC and Green Industry MTV TV MT JSC.	Has been verified during on site visit by the validators and deemed to be ok.
Safety issues	Comply with regulations labour and safety	Regulations and safety standards of Bac Ha.	Has been verified during on site visit by the validators and deemed to be ok.
Operation Period			
Change of hydro-geographical system, land erosion and sedimentation, change of water quality, create semi-flooder regions along the reservoir, land-use change, inundated biomass, less sand downstream	Regular monitoring, comply with regulations (e.g. discharge rate, forestry)	Contract No.01/2010/QTDK/BHHC-CNX for regular environmental monitoring at Bac Ha HPP between Bac Ha HPP JSC and Green Industry MTV TV MT JSC.	See FAR 4

Have been raised:

FAR 4: The contract No.01/2010/QTDK/BHHC-CNX for regular environmental monitoring at Bac Ha HPP between Bac Ha HPP JSC and Green Industry MTV TV MT JSC. Have to be consulted and the monitoring has to be verified.

PP has defined and realized actions and methods to reduce negative impacts. During site visits, the validators could verify that the actions are realized.

3.12 Validation protocol

In order to ensure transparency and organize the corrective or additional information and measures a validation protocol was established for the project. The protocol shows in transparent manner the criteria (requirements), the means of validation and the results from validating the identified criteria including any resulting CAR, FAR and CL.

4 List of Interviewees and Documents reviewed

The on-site audit and interviews were done according to the on-site visit program (see appendix A) which was communicated to the project owner in advance of the audit.

The following stakeholders have been interviewed during the validation (see appendix B).

The following documents have been assessed during the validation (see appendix C).

5 Validation Team and Reviewer

The following matrix shows the names and roles of the members of the validation team and the reviewer.

The reviewer is not a member of the validation team.

Certificates of competence for each validation team member are included in appendix D to this report.

Name	Role (1)	Country	Duties				
			Desk review	On-site audit	Resolution of CAR & CL	Report	Technical review
Hansruedi Bader	LA	Switzerland	X	X	X	X	
Claudio Ronchetti	TM	Switzerland	X	X			
Jürg Liechti	TR	Switzerland					X

(1) LA = Lead auditor/assessor; TM = Team member; TE = Technical expert (if any); TR = Technical reviewer

6 Quality Control

Cross-checks and / or other plausibility checks undertaken during validation are mentioned in the report or in the protocol. The draft validation report, including the initial validation findings, underwent an internal review (by a member of the validation team) before being submitted to the project participants. The final validation report underwent a review for final approval carried out by a reviewer (not a member of the validation team) before requesting registration of the project activity. The reviewer is qualified in accordance with SQS's qualification scheme for CDM validation and verification.

7 Appendix A: On-Site Visit Program

Time from to		Subject	Function Department	Person(s) to contact
08/09/2010		Office Bac Ha Hydro-power JSC		
08.00	10.30	Meet & greet, kick-off, review PDD Financial Audit PDD Monitoring, VVM Requirements	Vice director Bac Ha Hydro-power JSC Vice Head Director of Technical Department Bac Ha Hydropower JSC Director of General Contractor Vice Director General Contractor General Contractor Chief Engineer Resettled Person, Farmer Vice Chairman Ta Thang people's committee Vice Chairman of Coc Ly people's committee Bac Ha Hydropower JSC, Land Management officer Ecotawa Inc CDM Consultant Teta Consultant Co SQS Switzerland SQS Switzerland	Mr. Ta Van Tuan Mr. Bui Aang Vu Mr. Dao Ding Chien Mr. Vu Van Ninh Mr. Nguyen Trung Kien Mr. Dang Van Hai Mr. Thao Seo Vu Mr. Leng Van Chu Mr. Hoang Minh Toan Mr. Daniel Wunderlin Mr. Tran Tien Dung Mr. Hansruedi Bader Mr. Claudio Ronchetti

14/06/2010		Building site		
08.00	10.30	Visit Building Site	Vice director Bac Ha Hydro-power JSC Vice Head Director of Technical Department Bac Ha Hydropower JSC Director of General Contractor Vice Director General Contractor General Contractor Chief Engineer Bac Ha Hydropower JSC, Land Management officer Ecotawa Inc CDM Consultant Teta Consultant Co SQS Switzerland SQS Switzerland	Mr. Ta Van Tuan Mr. Bui Aang Vu Mr. Dao Ding Chien Mr. Vu Van Ninh Mr. Nguyen Trung Kien Mr. Dang Van Hai Mr. Daniel Wunderlin Mr. Tran Tien Dung Mr. Hansruedi Bader Mr. Claudio Ronchetti

8 Appendix B: Interviews

Family Name	First Name	Organisation	Function	Issues
Mr. Ta	Van Tuan	Bac Ha Hydropower JSC	Vice Director Chief of CDM group	Prior considerations, board decisions, financial and technical aspects of the project. Construction schedule, environment impacts, management of the build- ing site Contract list, invoices, contract management Environment impacts, Water flow management, Legal compliance of the project, Flora Monitoring
Mr. Bui	Aang Vu	Bac Ha Hydropower JSC	Vice Head Director of Technical De- partment	Resettlement, Compens- ation, Environment im- pacts, Water flow man- agement, Financial as- pects of compensation, choice of affected per- sons, Legal Compliance
Mr. Hoang	Minh Toan	Bac Ha Hydropower JSC	Land Manager offi- cer	Resettlement, Compens- ation, choice of affected persons
Mr. Dao	Ding Chien	General Contractor	Director	Construction schedule, environment impacts, management of the build- ing site Contract list, invoices, contract management Environment impacts
Mr. Vu	Van Ninh	General Contractor	Deputy Director	Construction schedule, environment impacts, management of the build- ing site Contract list, invoices, contract management Environment impacts
Mr. Nguyen	Trung Kien	General Contractor	Chief Engineer	Construction schedule, environment impacts, management of the build- ing site Contract list, invoices, contract management Environment impacts
Mr. Dang	Van Hai	Farmer	Resettled Person	Resettlement, Compens- ation, choice of affected persons
Mr. Thao	Seo Vu	Ta Thang people's Committee	Vice Chairman	Resettlement, Compens- ation, choice of affected persons

Mr. Leng	Van Chu	Coc Ly people's Committee	Vice Chairman	Resettlement, Compensation, choice of affected persons
Mr. Wunderlin	Daniel	Ecotawa inc	Consultant	Additionality, Methodology, Project development, PDD Requests
Mr. Tran	Tien Dung	Teta Consultant Co	Consultant	Resettlement, Compensation, Environment impacts, Water flow management, Financial aspects of compensation, choice of affected persons

9 Appendix C: Documents reviewed

SQS Reference	PP Reference
[01]	PDD Bac Ha version 1.0, PP, 25/08/2010
[02]	PDD Bac Ha version 1.1, PP, 30/11/2011
[03]	PDD Bac Ha version 1.2, PP, 15/05/2011
[04]	
[011]	WCD Report, PP
[1]	File 1, State Bank of Vietnam, 2009, Base Interest Rate and Decision No. 16/2008/QD-NHNN dated 16 May 2008 of the Governor of the State Bank
[2]	File 2, IMF, Vietnam: Statistical Appendix 2007
[3]	File 3, MOI, Providing of Regulations on calculation and analysis of economy-finance-investment and electricity purchasing frame for the electricity project, Số 2014/QĐ-BCN, 2007
[4]	File 4, PEEC1, FSR, Technical design - Stage 1, Vol. 1: General description (revision), 28/11/2004
[5]	File 5, EVN, MOU between EVN and LICOGL: Selling and Purchasing Electricity of Bac Ha HPP JSC, Lao Cai Province, 22/10/2004
[6]	File 6, Decision No.75/QĐ-NLĐK of Minister of Industry Ministry: Approval for technical design - stage 1 for Bac Ha HPP on Chay River, Lao Cai Province, 11/01/2005
[7]	File 7, PEEC1, Technical design - Stage 1, Annex 4 - Hydraulic-Economic Energy (revision), 2005
[8]	File 8, details finance investment based on PEEC documents, 2004
[9]	File 9, MOF, CIRCULAR Guiding natural resource tax on natural water used for hydroelectricity generation, No: 05/2006/TT-BTC, 2006
[9]	File 9new, MOF, Ministry of Finance Decree No.68/1998/ND-CP dated September 3, 1998 on Regulating in detail the implementation of the amended Ordinance on Resource Tax, 03/09/1998
[10]	File 10, World Bank, Estimating the Market Potential for the Clean Development Mechanism, 2004
[11]	File 11, Decision No.48/08/QĐ-HDQT-BTT of the Director Board of Infrastructure Development and Construction Corporation: Approval for technical design - stage 2 of Bac Ha HPP, 18/01/2008
[12]	File 12, Bac Ha HPP JSC, Summarizing human resource and construction equipment on the site of Bac Ha HPP
[13]	File 13, Bac Ha HPP JSC, Compensation chart of Bac Ha HPP JSC, 02/10/2009
[14]	File 14, Contract No.082004-1-BM-HD-0001 between Bac Ha HPP JSC and VEIC - NORINCO INTL: supply of electromechanic equipment and technical services, 2008
[15]	File 15, Official letter No. 1054/CV-TVD-P19 of PEEC1 on connecting Bac Ha HPP to national grid, 05/06/2009
[16]	File 16, PEEC1, Technical design - Stage 2, Vol. 1.2: Description of equipment and technology, 2007
[17]	File 17, ecotawa AG, CM and CER calculation, 2010
[18]	File 18, Contract No.09/TDBH-HD between Bac Ha HPP Project Management Board and LICOGL 14 on foundation hole of water diversion works, 21/02/2005
[19]	File 19, Infrastructure Development and Construction Corporation, Bac ha HPP Management Board, 4124/TCT-QLDA, 28/04/2004
[20]	File 20, Carbotech, MOU, 18/12/2006
[21]	File 21, ecotawa, CDM development contract, 24/06/2009
[22]	File 22, Decision No.276/09/BHHC-HDQT-QĐ: Approval for adjustment to total investment, 13/08/2009
[23]	File 23, PEEC1, Feasibility study - Hydraulic - economic Energy (revision), 2003
[24]	File 24, Decision No. 1156/QĐ-UBND People's Committee of Lao Cai Province approving the plan for compensation, support and resettlement of Bac Ha HPP, 22/05/2007
[25]	File 25, Decision No.2592/QĐ-UBND of LaoCai province People's Committee: Approval for additional adjustment expense for compensation, support and resettlement of Bac Ha HPP, 15/09/2009
[26]	File 26, Bac Ha HPP JSC, Bac Ha HPP: Financial, Economic Analysis Report, 2009
[27]	File 27, Vietnam Construction Code TXDVN 285:2002
[28]	File 28, MOI, Decision 3454/QĐ-BCN on approval for nationwide planning of small scale hydropower, 18/10/2005

[29]	File 29, Decision No. 176/2004/Qd-Ttg: Approving The Strategy On Development Of Vietnam Electricity Industry In The 2004-2010 Period, With Orientations Towards 2020, 05/10/2004
[30]	File 30, EVN, Brief Introduction to Electricity Sector in Vietnam, 2006
[31]	File 31, IMF, IMF Country Report Vietnam 2009
[32]	File 32, EVN, energy report 2009 annexes, 2010
[33]	File 33, ecotawa AG, Financial spreadsheets, 2010
[34]	File 34, Decision No. 04/TDBH/KT-KH of Director of Bac Ha HPP Project Management Board: establishment of CDM Monitoring Team, 25/01/2005
[35]	File 35, PEEC1, EIA report, 2007
[36]	File 36, Decision No. 888/QD-BTNMT of MONRE: Approval for EIA of Bac Ha HPP, 11/06/2007
[37]	File 37, Official letter No.317/SCN-KT of Lao Cai Province Department of Industry regarding registration of equipment and toxic chemicals of specific safety requirements for industry, 02/11/2005
[38]	File 38, Official letter No.82/TDBH-Kt of Bac Ha Project Management Board regarding report on registration and appraisal process, 09/11/2005
[39]	File 39, Official letter 212/TDBH-KT of Bac Ha Project Mangement Board: assigning General contractor to prevent dust at construction site, 15/11/2007
[40]	File 40, Contract No.21.11 XN/HDKT between Truong Giang construction and transport co-operative and LICOI 18: Road watering for dust prevention, Bac Ha HPP, 21/12/2007
[41]	File 41, Contract for Science and Technology Service No.01/2010/QTDK/BHHC-CN: Regular environmental monitoring at Bac Ha HPP between Bac Ha HPP JSC and Green Industry MTV TV MT JSC, 2010
[42]	File 42, Regulation No. 460CT/NQ-BHLD on labor safety and hygiene in Bac Ha HPP construction site (Lao Cai), 06/05/2005
[43]	File 43, Contract No.46HD/BM/TDBH between Bac Ha HPP Project Management Board and Lung Lo Construction Company: Explosives detection, Bac Ha HPP Project, 13/01/2008
[44]	File 44, Safety regulation in Bac Ha HPP construction site of general contractor management board of Bac Ha construction., 15/10/2007
[45]	File 45, Decision of Director of construction general contractor: Reward & punishment regulations for labor safety-environmental hygiene-natural disaster prevention-fire prevention on Bac Ha HPP construction site, 05/11/2009
[46]	File 46, Decision No. 38/09/BHHC-HDQT-QD: Approval for adjustment to total investment, 15/02/2009
[47]	File 47, stakeholder interview summary, 2010
[48]	File 48, ecotawa, MOU, 15/05/2008
[49]	File 49, Ministry of Natural Resources and Environment, Calculation of Grid emission factor Vietnam, 26/03/2010
[50]	File 50, Department of Planning & Investment – Lao Cai Province, Business Registration Office, Business Registration Certification, 18/02/2008, 14/04/2009
[51]	File 51, Lao Cai Province, Peoples Committee, Land use right certificate, 19/09/2008
[52a]	File 52a, Si Ma Cai District, Peoples Committee, Approval for cost of compensation and land clearance, 14/12/2007
[52b]	File 52b, Bac Ha District, People's Committee, Approval for cost of compensation by land clearance, 25/09/2007
[52c]	File 52c, Muong Khuon District People's Committee, Approval for cost of compensation loss by land clearance, 14/12/2007
[53]	File 53, Vietnam Bank for Agriculture and Rural development, Credit contract, 30/10/2006
[54]	File 53, Bac Ha hydropower JSC, Revised construction schedule, 21/09/2010
[55]	File 55, Government, Allowance change of project name, 23/02/2004
[56]	File 56, Government Office, Allowance changing investor, 07/04/2008
[57]	File 57, ecotawa AG, Contract Project development, 24/06/2009
[58]	File 58, EVN, Connection agreement, 21/04/2009
[59]	File 59, Interviews with Stakeholders, July 2010
[60]	File 60 Public stakeholder consultation – print out from unfccc-site
[61]	LoA CH Bac Ha . Federal Department of the Environment, Transports, Energy and Communications DETEC, Switzerland, 25/02/2011
[62]	LoA Vietnam Bac Ha Department of Meteorology, Hydrology and Climate change, 17/05/2011
[63]	Vietnamese Civil Law codes.pdf

[75]	
[1001]	VVM1.2 Validaton protocol 1

9 Appendix D: Certificates of competence

Name: Mr Hansruedi Bader

Scopes of expertise:		
1	Energy industries (renewable/non-renewable sources) TA 1.1: Thermal energy generation from fossil fuels as well as thermal energy from solar TA 1.2: Energy generation from renewable energy sources TA 1.3: Other energy industries	X X X <input type="checkbox"/>
2	Energy distribution TA 2.1: Electricity distribution TA 2.2: Heat distribution	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
3	Energy demand TA 3.1 Energy demand	<input type="checkbox"/> <input type="checkbox"/>
4	Manufacturing industries TA 4.1: Cement sector TA 4.2: Aluminium TA 4.3: Iron and steel TA 4.4: Refinery TA 4.5: Other manufacturing industries	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
5	Chemical industry TA 5.1: Chemical process industries	<input type="checkbox"/> <input type="checkbox"/>
6	Construction TA 6.1: Construction	X X
7	Transport TA 7.1: Transport	<input type="checkbox"/> <input type="checkbox"/>
8	Mining/mineral production TA 8.1: Mining and mineral processes, excluding those included in TA 8.2 below TA 8.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
9	Metal production TA 9.1: Metal production	<input type="checkbox"/> <input type="checkbox"/>
10	Fugitive emissions from fuels TA 10.1: Mining and mineral processes, excluding those included in TA 10.2 below TA 10.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
11	Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride TA 11.1: Chemical process industries TA 11.2: GHG capture and destruction	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
12	Solvents use TA 12.1: Chemical process industries	<input type="checkbox"/> <input type="checkbox"/>
13	Waste handling and disposal TA 13.1: Waste handling and disposal TA 13.2: Animal waste management	X X <input type="checkbox"/>
14	Afforestation and reforestation TA 14.1: Forestry	<input type="checkbox"/> <input type="checkbox"/>
15	Agriculture TA 15.1: Agriculture TA 15.2: Animal waste management	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Name: Mr Claudio Ronchetti

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	X
	TA 1.2: Energy generation from renewable energy sources	X
	TA 1.3: Other energy industries	<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"/>
	TA 4.5: Other manufacturing industries	<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	
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	
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	

Name: Mr Jürg Liechti, PhD

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	X
	TA 1.2: Energy generation from renewable energy sources	X
	TA 1.3: Other energy industries	X
2	Energy distribution	X
	TA 2.1: Electricity distribution	X
	TA 2.2: Heat distribution	X
3	Energy demand	X
	TA 3.1 Energy demand	X
4	Manufacturing industries	X
	TA 4.1: Cement sector	X
	TA 4.2: Aluminium	X
	TA 4.3: Iron and steel	X
	TA 4.4: Refinery	X
	TA 4.5: Other manufacturing industries	X
5	Chemical industry	X
	TA 5.1: Chemical process industries	X
6	Construction	<input type="checkbox"/>
	TA 6.1: Construction	<input type="checkbox"/>
7	Transport	X
	TA 7.1: Transport	X
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	X
	TA 9.1: Metal production	X
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	X
	TA 11.1: Chemical process industries	X
	TA 11.2: GHG capture and destruction	<input type="checkbox"/>
12	Solvents use	X
	TA 12.1: Chemical process industries	X
13	Waste handling and disposal	X
	TA 13.1: Waste handling and disposal	X
	TA 13.2: Animal waste management	
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"/>

10 Appendix E: Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CH ₄	Methane
CL	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IEE	Initial Environmental Examination
IPCC	Intergovernmental Panel on Climate Change
LFG	Landfill Gas
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
SQS	Swiss Association for Quality and Management Systems
UNFCCC	United Nations Framework Convention on Climate Change

11 Appendix F: Summary of requests

No.:	CL 1	Reference: Submitted documents
Validator request:	Shall be translated in full or partially and submitted to DOE the following documents: <ul style="list-style-type: none"> - File 4 feasibility in full - File 5 MOU in full - File 6 in full - File 7 in full - File 11 in full - File 13 in full - File 14 in full - File 15 in full - File 16 in full - File 18 in full - File 22 in full - File 23 in full - File 24 in full - File 25 in full - File 26 in full - File 27 relevant parts - File 34 in full - File 36 in full - File 37 in full - File 38 in full - File 39 in full - File 40 in full - File 41 in full - File 46 in full 	
Project owner response:	All documents are attached to the answers of the validation requests. The translations are marked the following way File xyEN (e.g. File 4EN technical Design Stage 1.pdf)	
Validator conclusion:	DOE agrees – CL 1 is closed.	Date: 05/02/2011

No.:	CL 2	Reference: File 11
Validator request:	PP shall indicate the full English title of the document 11	
Project owner response:	The file 11 has been translated in full. The English title of this document is: BOARD OF DIRECTORS – INFRASTRUCTURE DEVELOPMENT & CONSTRUCTION CORPORATION Regarding: Approve technical design of phase 2 – Bac Ha hydropower plant. BOARD OF DIRECTORS	
Validator conclusion:	DOE agrees – CL 2 is closed	Date: 05/02/2011

No.:	CL 3	Reference: Documents to submit
Validator request:	PP shall submit the following documents <ul style="list-style-type: none"> - MOC (Modalities of Communication) - Confirmation Non-ODA - Grid-connecting approval - Business License - PDF printout of referenced Internet-links in PDD - PDF printout referenced in submitted documents as <ul style="list-style-type: none"> o File 1 - Contract overview - Land use rates on decision of peoples comitee in VN and E - Approval of compensation values of land in VN and E - Land compensation list - Investment license - Approval of EIA in VN and E - Loan evidences - Construction schedule - Purchasing contract for equipment 	
Project owner response:	<ul style="list-style-type: none"> - PDF printout file 1 is attached -The MoC is attached. - Non ODA confirmation is attached - Business license is attached (see File 50 VN/EN) - Grid connecting approval is attached (File 58 VN/EN) - Contract overview attached (see 57) - Land use rates on decision of PC are attached (file 52 a/b/c: EN and VN) - Approval of compensation values of land (file 52 a/b/c: EN and VN) - Investment license (see file 50 EN and VN) - Approval of EIA (see file 36 in EN and VN) - Loan evidence (see file 53 in EN and VN) - Construction schedule (see file 54 in EN and VN) - Purchasing contract for equipment (see file 14 VN and EN) For all documents submitted a complete doc-list is attached	
Validator conclusion:	DOE agrees- CL 3 is closed.	Date: 05/02/2011

No.:	CL 4	Reference: PDD in general
Validator request:	The PDD shall have an unequivocal identification; name and version number. Current name: CDM-Executive Board – it can be integrated in the foot-line so it's visible on every page and identified.	
Project owner response:	A footer has been added	
Validator conclusion:	DOE agrees – CL 4 is closed.	Date: 05/02/2011

No.:	CL 5	Reference: VVM Art. 47 LoA's
Validator request:	The letters of approval have to be submitted.	
Project owner response:	The letters of approval are submitted.	
Validator conclusion:	DOE agrees – CL 5 is closed.	Date: 26/05/2011

No.:	CL 6	Reference: File 10
Validator request:	Indicate where in the PDD or other documents is referenced File 10.	
Project owner response:	The File is referenced in table 10.	
Validator conclusion:	DOE agrees – CL 6 is closed.	Date: 05/02/2011

No.:	CL 7	Reference: PDD A.2. – PDD A.4.3. Table 1
Validator request:	The yearly production of electricity shall be the same (378 GWh versus 374 GWh) or is the difference the own electricity use of the plant?	
Project owner response:	The difference is the internal consumption of electricity – see PDD A.4.3. footnote 9	
Validator conclusion:	DOE agrees – CL7 is closed.	Date: 05/02/2011

No.:	CL 8	Reference: PDD A.4.3. Table 1 and table 3
Validator request:	The turbine capacity has to be verified and has to be consistent.	
Project owner response:	The turbine capacity is 90MW rated capacity. The assembly capacity as stated in table 3 (92.8MW) is always higher than the rated capacity. A sentence including the rated capacity has been added in table 3	
Validator conclusion:	DOE agrees – CL 8 is closed.	Date: 05/02/2011

No.:	CL 9	Reference: PDD A.2. PDD A.4.3. Table 3
Validator request:	Verification for consistence grid connection and transmission line.	
Project owner response:	A.2 has been adapted to table 3	
Validator conclusion:	DOE agrees – CL 9 is closed.	Date: 05/02/2011

No.:	CL 10	Reference: Project name
Validator request:	The project was earlier named Nale HPP – the name has been changed to Bac Ha HPP – this aspect has to be documented and proved that it's the same project.	
Project owner response:	The investor of the project was changing. During this process also the name of the project was changed. This change is documented with the file 54 and 55 which are in both languages - English and Vietnamese submitted.	
Validator conclusion:	DOE agrees – CL 10 is closed.	Date: 05/02/2011

No.:	CL 11	Reference: PDD B.6.1 Table 15 Footnote 37
Validator request:	The footnote 37 should reference the File 32	
Project owner response:	This is not File 32. However the CM has been changed to the official document thus changing the source anyway	
Validator conclusion:	DOE agrees – CL 11 is closed.	Date: 05/02/2011

No.:	CL 12	Reference: A.4.5. Public funding
Validator request:	The signed confirmation of Non-ODA has to be submitted.	
Project owner response:	The Non-ODA is attached to these answers.	
Validator conclusion:	DOE agrees – CL 12 is closed.	Date: 05/02/2011

No.:	CL 13	Reference: MOC
Validator request:	The Form “Modalities of Communication” has to be submitted.	
Project owner response:	The MoC is attached to these answers.	
Validator conclusion:	DOE agrees – CL 13 is closed.	Date: 05/02/2011

No.:	CL 14	Reference: E.1. Stakeholders' comments
Validator request:	In file 43 the findings of the stakeholder interviews are summarised. Provide 11 scanned samples of the original interviews. The requested numbers are (line A): 7, 23, 31, 45, 57, 61, 72, 73, 81, 101, 115	
Project owner response:	The interviews have been scanned and added to these answers, see attached file 59.	
Validator conclusion:	DOE agrees – CL 14 is closed.	Date: 05/02/2011

No.:	CL 15	Reference: File 14 English version
Validator request:	The file cannot be opened. PP shall verify the document.	
Project owner response:	File 14 has been attached again	
Validator conclusion:	File is readable now- CL 15 is closed.	Date: 25.05.2011

No.:	CL 16	Reference: B.5. Investment analysis
Validator request:	PP shall demonstrate that the costs of the Hydropower plant are in line with other comparables projects.	
Project owner response:	Bac Ha has an investment of 1.08 million USD per MW. This value has been compared with 9 other hydropower plants in Vietnam where data is available (full FSRs available thus data can be fully checked). The average investment value was 1.23 million per MW and the median value was 1.17 million USD/MW with the lowest value being 1.03 million USD/MW. This corresponds to a run-of the river 1,9MW plant (Ho Nui Coc). The investment value is thus comparable and rather at the lower end compared with other plants i.e. conservative. See File "comparison hydros" attached	
Validator conclusion:	DOE agrees- CL 16 is closed.	Date: 25/05/2011

No.:	CL 17	Reference: B.5. Investment analysis
Validator request:	PP shall submit Decision No. 2014/QD-BCN dated 13 June 2007 by the Ministry of Industry for the validation of the Electricity sale price	
Project owner response:	We have submitted. This is for plausibility and cross-check purpose ONLY as this government decision was made after investment decision date. See File 3e.	
Validator conclusion:	DOE agrees- CL 17 is closed.	Date: 25/05/2011

No.:	CL 18	Reference: B.5. Investment analysis
Validator request:	PP shall submit more information about the plant load factor – comparison with other projects in the same region.	
Project owner response:	Bac Ha has a PLF of 4,204 operating hours per annum. This value has been compared with 9 other hydropower plants in Vietnam where data is available (full FSRs available thus data can be fully checked). The average PLF 4,075 hours and the median value was 4,082 hours. The PLF is thus comparable and rather at the higher end compared with other plants i.e. conservative. See File "comparison hydros" attached	
Validator conclusion:	DOE agrees- CL 18 is closed.	Date: 25/05/2011

No.:	CL 19	Reference: B.5. Investment analysis
Validator request:	PP shall indicate a clear date for the investment decision. Is referenced in B.5. Table 6 Prior considerations, 28/04/2004 as decision date, is mentioned in File 19: Pursuant to the Decision 808/QD-HDQT dated Mar 4, 2004 of the Director Board of Infrastructure Development and Construction Corporation regarding the Investment in Bac Ha Hydropower Project in the Chay river, Lao Cai province.	
Project owner response:	Date is 15.2.2005 File 19 cited in Table 4 is not the investment decision. This is the Board decision which indicates that a CDM consultant shall be sought. No decision was taken prior. The final design was available only 11.2004 (File 4); the financial feasibility was available as of 1.2005 (File 7); this final design was approved by the MOI as of 11.1.2005 (File 6), and the MOU for electricity sale had been realized 10.2004 (File 5). Based on that the company could take mid 2.2005 the investment decision and sign end of 2/2005 the first construction contract.	
Validator conclusion:	DOE agrees – CL 19 is closed.	Date: 02/06/2011

No.:	CL 20	Reference: MOC
Validator request:	The MOC has to be submitted.	
Project owner response:	MOC is submitted.	
Validator conclusion:	DOE agrees – CL 20 is closed.	Date: 02/06/2011

No.:	CAR 1	Reference: PDD A.4.3. Project boundary
Validator request:	The national grid has to be included to the project boundary.	
Project owner response:	Section B.3 is the project boundary and includes the national grid. Section A.4.3. is the project technology.	
Validator conclusion:	DOE agrees- CAR 1 is closed.	Date: 05/02/2011

No.:	CAR 2	Reference: PDD B.6.3 Project Emissions
Validator request:	Back-up installation (diesel generator) have to be introduced to project emissions and B.7.1. – Data and parameters monitored.	
Project owner response:	ACM002 does not include backup generators using fossil fuel as project emissions. PE _{FF} is for solar and geothermal projects as listed on page 6 as well as page 16 of the methodology. Also no leakage emissions are included (see page 11 of meth). The request of the DOE is thus not in accordance with the methodology.	
Validator conclusion:	DOE agrees- CAR 2 is closed.	Date: 05/02/2011

No.:	CAR 3	Reference:	B.6.1 Baseline Emissions
Validator request:	The calculated emission factor (0.59512) is not conservative. The document "Ministry of Natural Resources and Environment, 2010 < http://www.noccop.org.vn/Data/vbpq/Airvariable_ldoc_vnHe%20so%20phat%20thai.pdf >" calculates a factor of 0.5764. The calculation of the GHG emission reductions must be recalculated.		
Project owner response:	The PDD has been adapted. See new file 17. As the number of CERs changed also the finance file has been updated see new File 33		
Validator conclusion:	DOE agrees- CAR 3 is closed.	Date:	05/02/2011

No.:	CAR 4	Reference:	B.1 Tools
Validator request:	As the official GF of Vietnam has been calculated with the "Tool to calculate the emission factor for an electricity system" Version 01.1, this tool has to be referenced.		
Project owner response:	The tool 2.0 is used. The official calculation is updated to usage of the version of the tool 2.0 as the version 1.1. is not anymore valid since 9.2009		
Validator conclusion:	DOE agrees- CAR 4 is closed.	Date:	05/02/2011

No.:	CAR 5	Reference:	A.4.3
Validator request:	The Back-up generator has to be included in the project boundary.		
Project owner response:	No. See CAR 2. The backup generator is not part of project emissions based on ACM0002.		
Validator conclusion:	DOE agrees- CAR 5 is closed.	Date:	05/02/2011

No.:	CAR 6	Reference:	PDD B.5. Investment principles
Validator request:	Although the numbers correctly are according to this, but correct in the footnote (17) commercial interest rate to base rate plus 50%.		
Project owner response:	Footnote 17 has been corrected		
Validator response:	Has also to be corrected in Table 9: Core Data Used for Financial Assessment.		
Project owner response:	Has been corrected in table 9		
Validator conclusion:	DOE agrees – CAR 6 is closed.	Date:	25/05/2011

No.:	CAR 7	Reference:	PDD B.5.Table 8 Investment principles
Validator request:	PP shall correct point 17 of investment principles according to EB 51 Annex 58 „Guidelines on the Assessment of Investment Analysis“ Version 03. Point 17 is the choice of the variables related to the total of project costs or project revenue.		
Project owner response:	Point 17 is guidance sensitivity analysis (parameters) and point 18 range. PDD has been clarified.		
Validator conclusion:	DOE agrees – CAR 7 is closed.	Date:	25/05/2011

No.:	CAR 8	Reference:	PDD B.5.Table 8 Investment principles
Validator request:	PP shall provide datas for financial assessment applicable at time on investment decision. The PDD gives the financial expenditures from the FSR dated 28/11/2004 – this is after investment decision.		
Project owner response:	The investment decision is as of 15.2.2005 when all the information for decision taking were available including the technical design approval of the MOI dated 1.2005. See also CL19 See revised PDD also Version 1.3		
Validator conclusion:	DOE agrees – CAR 8 is closed.	Date:	02/06/2011

No.:	CAR 9	Reference:	Tools and Guidelines
Validator request:	PP missed to use the latest available Guidelines.		
Project owner response:	PDD is adapted to the latest available version of <ul style="list-style-type: none"> - Combined tool to identify the baseline scenario and demonstrate additio-nality, version 03.0.0, EB 60, Annex 7 - Tool to calculate the emission factor for an electricity system version 2.2.0, EB 61, Annex 12 - Guidelines on the Assessment of Investment Analysis, version 04, EB 61, Annex 13 		
Validator conclusion:	DOE agrees – CAR 9 is closed.	Date:	17/06/2011

No.:	FAR 1	Reference:	PDD B.7. Monitoring methodology
Validator request:	The monitoring manual and the training documents have to be established.		
Project owner response:	To be concluded at the verification stage.		
Validator conclusion:		Date:	

No.:	FAR 2	Reference:	PDD B.7. Monitoring methodology
Validator request:	The detailed organization of the monitoring team has to be verified.		
Project owner response:	To be concluded at the verification stage.		
Validator conclusion:		Date:	

No.:	FAR 3	Reference:	PDD B.7. Monitoring methodology
Validator request:	The installed capacity of the hydro power plant has to be verified.		
Project owner response:	To be concluded at the verification stage.		
Validator conclusion:	Date:		

No.:	FAR 4	Reference:	
Validator request:	The contract No.01/2010/QTDK/BHHC-CNX for regular environmental monitoring at Bac Ha HPP between Bac Ha HPP JSC and Green Industry MTV TV MT JSC. Have to be consulted and the monitoring has to be verified		
Project owner response:	To be concluded at the verification stage.		
Validator conclusion:	Date:		

**Swiss Association for Quality and
Management Systems (SQS)**

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Appendix F: CDM Validation Protocol

(Version 6 – in effect of 14/06/2011)

Enterprise

Business account:

Company:

Address:

319648

ecotawa AG

Breisacherstrasse 25

CH-4057 Basel

Phone:

Fax:

E-Mail:

Contact person:

+41 61 206 95 21

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switzerland@ecotawa.com

Mr. Daniel Ignaz Wunderlin

Service

Audit/Assessment:

Audit/Assessment beginning/end:

Project name:

GBZ/Report-No.:

CDM Validation

26/08/2010 – 21/06/2011

Bac Ha Hydropower Project, Vietnam

321323/P30075.33

UNFCCC Scope(s)/Technical area(s):

UNFCCC Methodology:

UNFCCC Scale:

1 Energy industries (renewable/non renewable sources)

ACM0002 Consolidated Methodology for Grid Connected
Electricity Generation from Renewable Sources Version 12.1.0

Large Scale

Team of auditors/assessors:

Mr Hansruedi Bader

Mr Claudio Ronchetti

Protocol 2: Methodological requirements (incl. tools)

	Topic / Question	Ref	MoV	Draft Concl	Final Concl										
3	Methodology ACM0002 version 12														
3.1	General applicability														
3.1.1	<p>This methodology is applicable to grid-connected renewable power generation project activities that</p> <p>(a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant)</p> <p>(b) involve a capacity addition</p> <p>(c) involve a retrofit of (an) existing plant(s)</p> <p>(d) involve a replacement of (an) existing plant(s).</p> <table><tr><th>Applicability checklist</th><th>Yes / No / NA</th></tr><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><tr><td>Is the option correctly presented and confirmed?</td><td>Yes</td></tr></table>	Applicability checklist	Yes / No / NA	Criterion discussed in the PDD?	Yes	Compliance provable?	Yes	Compliance verified?	Yes	Is the option correctly presented and confirmed?	Yes	1, PD D	DR	OK	ok
Applicability checklist	Yes / No / NA														
Criterion discussed in the PDD?	Yes														
Compliance provable?	Yes														
Compliance verified?	Yes														
Is the option correctly presented and confirmed?	Yes														
	Comment / Cross Reference: Applicability thoroughly discussed: Bac Ha Hydropower Project is a new grid-connected plant.														
3.1.2	<p>Applicability Criterion 1</p> <p>The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types:</p> <ul style="list-style-type: none">- hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir),- wind power plant/unit, geothermal power plant/unit, - solar power plant/unit,- wave power plant/unit or tidal power plant/unit; <table><tr><th>Applicability checklist</th><th>Yes / No / NA</th></tr><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></table>	Applicability checklist	Yes / No / NA	Criterion discussed in the PDD?	Yes	Compliance provable?	Yes	Compliance verified?	Yes	1, PD D	DR	OK	ok		
Applicability checklist	Yes / No / NA														
Criterion discussed in the PDD?	Yes														
Compliance provable?	Yes														
Compliance verified?	Yes														
	Comment / Cross Reference: Applicability thoroughly discussed: Bac Ha Hydropower Project is a new hydropower plant.														

3.1.3	<p>Applicability Criterion 2</p> <p>In the case of capacity additions, retrofits or replacements (except for wind, solar, wave or tidal power capacity addition projects which use to calculate the parameter $EG_{PJ,y}$): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity;</p> <table><tr><td>Applicability checklist</td><td>Yes / No / NA</td></tr><tr><td>Criterion discussed in the PDD?</td><td>Yes</td></tr><tr><td>Compliance provable?</td><td>NA</td></tr><tr><td>Compliance verified?</td><td>NA</td></tr></table> <p>Comment / Cross Reference: Bac Ha Hydropower Project is a new plant.</p>	Applicability checklist	Yes / No / NA	Criterion discussed in the PDD?	Yes	Compliance provable?	NA	Compliance verified?	NA	PD D	DR	NA	
Applicability checklist	Yes / No / NA												
Criterion discussed in the PDD?	Yes												
Compliance provable?	NA												
Compliance verified?	NA												
3.1.3	<p>Applicability Criterion 3</p> <p>In case of hydro power plants, one of the following conditions must apply:</p> <table><tr><td>Applicability checklist</td><td>Yes / No / NA</td></tr><tr><td>The project activity is implemented in an existing reservoir, with no change in the volume of reservoir</td><td>NA</td></tr><tr><td>The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m²</td><td>NA</td></tr><tr><td>The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m²</td><td>Yes</td></tr></table> <p>Comment / Cross Reference: The Bac Ha Hydropower Project results in a new reservoir with a power density of 13.0 W/m².</p>	Applicability checklist	Yes / No / NA	The project activity is implemented in an existing reservoir, with no change in the volume of reservoir	NA	The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m ²	NA	The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m ²	Yes	PD D File 11	DR	OK	ok
Applicability checklist	Yes / No / NA												
The project activity is implemented in an existing reservoir, with no change in the volume of reservoir	NA												
The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m ²	NA												
The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m ²	Yes												

3.1.3	<p>Applicability Criterion 4</p> <p>In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is “the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance.</p> <table><tr><th>Applicability checklist</th><th>Yes / No / NA</th></tr><tr><td>Criterion discussed in the PDD?</td><td>Yes</td></tr><tr><td>Compliance provable?</td><td>NA</td></tr><tr><td>Compliance verified?</td><td>NA</td></tr></table> <p>Comment / Cross Reference: Bac Ha Hydropower Project is a new plant.</p>	Applicability checklist	Yes / No / NA	Criterion discussed in the PDD?	Yes	Compliance provable?	NA	Compliance verified?	NA	PD D	DR	NA			
Applicability checklist	Yes / No / NA														
Criterion discussed in the PDD?	Yes														
Compliance provable?	NA														
Compliance verified?	NA														
3.2	Description of the sources and gases included in the project boundary														
	Integrate the required amount of sub-checklists for sources and gases as given by the methodology applied and comment on at least every line answered with “No”														
3.2.1	<p>Baseline</p> <p>CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.</p> <table><tr><th>Boundary checklist</th><th>Yes / No</th></tr><tr><td>Source and gas(es) 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></table>	Boundary checklist	Yes / No	Source and gas(es) discussed in the PDD?	Yes	Inclusion / exclusion justified?	Yes	Explanation / Justification sufficient?	Yes	Consistency with monitoring plan?	Yes	PD D	DR	CAR	ok
Boundary checklist	Yes / No														
Source and gas(es) discussed in the PDD?	Yes														
Inclusion / exclusion justified?	Yes														
Explanation / Justification sufficient?	Yes														
Consistency with monitoring plan?	Yes														
	<p>The baseline is the electricity generated by grid-connected mainly fossil fuel power plants. CAR 1 The national grid is not included in the project boundary. PP answer: Section B.3 is the project boundary and includes the national grid. Section A.4.3. is the project technology.</p> <p>Comment / Cross Reference: CAR 2: Back-up installation (diesel generator) are not introduced in project emissions and B.7.1. – Data and parameters monitored. PP answer: ACM002 does not include backup generators using fossil fuel as project emissions. PEFF is for solar and geothermal projects as listed on page 6 as well as page 16 of the methodology. Also no leakage emissions are included (see page 11 of meth). The request of the DOE is thus not in accordance with the methodology.</p>														

3.2.2	Project Activity	PD D	DR	NA											
	For geothermal power plants, fugitive emissions of CH ₄ and CO ₂ from non-condensable gases contained in geothermal steam.														
	<table><tr><th>Boundary checklist</th><th>Yes / No</th></tr><tr><td>Source and gas(es) discussed in the PDD?</td><td>NA</td></tr><tr><td>Inclusion / exclusion justified?</td><td>NA</td></tr><tr><td>Explanation / Justification sufficient?</td><td>NA</td></tr><tr><td>Consistency with monitoring plan?</td><td>NA</td></tr></table>					Boundary checklist	Yes / No	Source and gas(es) discussed in the PDD?	NA	Inclusion / exclusion justified?	NA	Explanation / Justification sufficient?	NA	Consistency with monitoring plan?	NA
	Boundary checklist					Yes / No									
	Source and gas(es) discussed in the PDD?					NA									
	Inclusion / exclusion justified?					NA									
Explanation / Justification sufficient?	NA														
Consistency with monitoring plan?	NA														
Comment / Cross Reference: Bac Ha Hydropower Project is a not a geothermal plant.															
3.2.3	Project Activity	PD D	DR	NA											
	CO ₂ emissions from combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants.														
	<table><tr><th>Boundary checklist</th><th>Yes / No</th></tr><tr><td>Source and gas(es) discussed in the PDD?</td><td>NA</td></tr><tr><td>Inclusion / exclusion justified?</td><td>NA</td></tr><tr><td>Explanation / Justification sufficient?</td><td>NA</td></tr><tr><td>Consistency with monitoring plan?</td><td>NA</td></tr></table>					Boundary checklist	Yes / No	Source and gas(es) discussed in the PDD?	NA	Inclusion / exclusion justified?	NA	Explanation / Justification sufficient?	NA	Consistency with monitoring plan?	NA
	Boundary checklist					Yes / No									
	Source and gas(es) discussed in the PDD?					NA									
	Inclusion / exclusion justified?					NA									
Explanation / Justification sufficient?	NA														
Consistency with monitoring plan?	NA														
Comment / Cross Reference: Bac Ha Hydropower Project is a not a solar or geothermal plant.															
3.2.3	Project Activity	PD D	DR	OK	ok										
	For hydro power plants, emissions of CH ₄ from the reservoir.														
	<table><tr><th>Boundary checklist</th><th>Yes / No</th></tr><tr><td>Source and gas(es) 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></table>					Boundary checklist	Yes / No	Source and gas(es) discussed in the PDD?	Yes	Inclusion / exclusion justified?	Yes	Explanation / Justification sufficient?	Yes	Consistency with monitoring plan?	Yes
	Boundary checklist					Yes / No									
	Source and gas(es) discussed in the PDD?					Yes									
	Inclusion / exclusion justified?					Yes									
Explanation / Justification sufficient?	Yes														
Consistency with monitoring plan?	Yes														
Comment / Cross Reference: CH ₄ is considered as main emission source; the power density of the project activity is more than 10 W/m ² . Therefore, the project emission in line with the methodology is 0.															
3.3	Description of how the baseline scenario is identified and description of the identified baseline scenario														

3.3.1	If the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:	PD D	DR	OK	ok								
	<table><tr><th>Baseline identification checklist</th><th>Yes / No</th></tr><tr><td>Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.</td><td>Yes</td></tr><tr><td>Explanation / Justification sufficient?</td><td>Yes</td></tr><tr><td>Compliance provable?</td><td>Yes</td></tr></table>					Baseline identification checklist	Yes / No	Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.	Yes	Explanation / Justification sufficient?	Yes	Compliance provable?	Yes
	Baseline identification checklist					Yes / No							
	Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.					Yes							
	Explanation / Justification sufficient?					Yes							
Compliance provable?	Yes												
	Comment / Cross Reference: “Tool to calculate the emission factor for an electricity system” has been used, explanation is sufficient.												
3.3.2	If the project activity is a capacity addition to existing grid-connected renewable power plant/unit, the baseline scenario is the following:	PD D	DR	NA									
	<table><tr><th>Baseline identification checklist</th><th>Yes / No</th></tr><tr><td>In the absence of the CDM project activity, the existing facility would continue to supply electricity to the grid at historical levels, until the time at which the generation facility would likely be replaced or retrofitted (DATE_{BaselineRetrofit}). From that point of time onwards, the baseline scenario is assumed to correspond to the project activity, and no emission reductions are assumed to occur.</td><td></td></tr><tr><td>Explanation / Justification sufficient?</td><td></td></tr><tr><td>Compliance provable?</td><td></td></tr></table>					Baseline identification checklist	Yes / No	In the absence of the CDM project activity, the existing facility would continue to supply electricity to the grid at historical levels, until the time at which the generation facility would likely be replaced or retrofitted (DATE _{BaselineRetrofit}). From that point of time onwards, the baseline scenario is assumed to correspond to the project activity, and no emission reductions are assumed to occur.		Explanation / Justification sufficient?		Compliance provable?	
	Baseline identification checklist					Yes / No							
	In the absence of the CDM project activity, the existing facility would continue to supply electricity to the grid at historical levels, until the time at which the generation facility would likely be replaced or retrofitted (DATE _{BaselineRetrofit}). From that point of time onwards, the baseline scenario is assumed to correspond to the project activity, and no emission reductions are assumed to occur.												
	Explanation / Justification sufficient?												
Compliance provable?													
	Comment / Cross Reference: Bac Ha Hydropower Project is a new hydropower plant.												

3.3.3	If the project activity is the retrofit or replacement of existing grid-connected renewable power plant/unit(s) at the project site, the following step-wise procedure to identify the baseline scenario shall be applied:		PD D	DR	NA											
	<table><tr><td>Step 1 realistic and credible alternative baseline scenarios for power generation</td><td>Yes / No</td></tr><tr><td>Is Step 1 to identify realistic and credible alternative baseline scenarios for power generation correctly applied using the "Combined tool to identify the baseline scenario and demonstrate additionality?"</td><td></td></tr><tr><td>Do the options considered include P1, P2 and P3?</td><td></td></tr><tr><td>Explanation / Justification sufficient?</td><td></td></tr><tr><td>Compliance provable?</td><td></td></tr></table>						Step 1 realistic and credible alternative baseline scenarios for power generation	Yes / No	Is Step 1 to identify realistic and credible alternative baseline scenarios for power generation correctly applied using the "Combined tool to identify the baseline scenario and demonstrate additionality?"		Do the options considered include P1, P2 and P3?		Explanation / Justification sufficient?		Compliance provable?	
	Step 1 realistic and credible alternative baseline scenarios for power generation	Yes / No														
	Is Step 1 to identify realistic and credible alternative baseline scenarios for power generation correctly applied using the "Combined tool to identify the baseline scenario and demonstrate additionality?"															
	Do the options considered include P1, P2 and P3?															
	Explanation / Justification sufficient?															
	Compliance provable?															
	<table><tr><td>Step 2 Barrier Analysis</td><td>Yes / No</td></tr><tr><td>Is Step 2 correctly applied by using Step 2 of the "Combined tool to identify the baseline scenario and demonstrate additionality?"</td><td></td></tr><tr><td>Explanation / Justification sufficient?</td><td></td></tr><tr><td>Compliance provable?</td><td></td></tr></table>						Step 2 Barrier Analysis	Yes / No	Is Step 2 correctly applied by using Step 2 of the "Combined tool to identify the baseline scenario and demonstrate additionality?"		Explanation / Justification sufficient?		Compliance provable?			
	Step 2 Barrier Analysis	Yes / No														
	Is Step 2 correctly applied by using Step 2 of the "Combined tool to identify the baseline scenario and demonstrate additionality?"															
	Explanation / Justification sufficient?															
	Compliance provable?															
	<table><tr><td>Step 3 Investment Analysis</td><td>Yes / No</td></tr><tr><td>Apply an investment comparison analysis, if more than one alternative is remaining after Step 2 and if the remaining alternatives include scenarios P1 and P3.</td><td></td></tr><tr><td>Has the investment comparison analysis been applied following Step 3 of the "Combined tool to identify the baseline scenario and demonstrate additionality?"</td><td></td></tr><tr><td>Apply a benchmark analysis, if more than one alternative is remaining after Step 2 and if the remaining alternatives include scenarios P1 and P2.</td><td></td></tr><tr><td>Has the benchmark analysis been applied following Step 2b of the "Tool for the demonstration and assessment of additionality?"</td><td></td></tr></table>						Step 3 Investment Analysis	Yes / No	Apply an investment comparison analysis, if more than one alternative is remaining after Step 2 and if the remaining alternatives include scenarios P1 and P3.		Has the investment comparison analysis been applied following Step 3 of the "Combined tool to identify the baseline scenario and demonstrate additionality?"		Apply a benchmark analysis, if more than one alternative is remaining after Step 2 and if the remaining alternatives include scenarios P1 and P2.		Has the benchmark analysis been applied following Step 2b of the "Tool for the demonstration and assessment of additionality?"	
	Step 3 Investment Analysis	Yes / No														
	Apply an investment comparison analysis, if more than one alternative is remaining after Step 2 and if the remaining alternatives include scenarios P1 and P3.															
	Has the investment comparison analysis been applied following Step 3 of the "Combined tool to identify the baseline scenario and demonstrate additionality?"															
	Apply a benchmark analysis, if more than one alternative is remaining after Step 2 and if the remaining alternatives include scenarios P1 and P2.															
Has the benchmark analysis been applied following Step 2b of the "Tool for the demonstration and assessment of additionality?"																
Comment / Cross Reference: Bac Ha Hydropower Project is a new hydropower plant.																
In case of any modification or retrofit of existing facilities: Is data available to determine the historic production level?		PD D	DR	NA												
Comment / Cross Reference: Bac Ha Hydropower Project is a new hydropower plant.																
In case of any modification or retrofit of existing facilities: Have conservative assumptions been applied in order to estimate the point in time when the existing equipment needs to be replaced?		PD D	DR	NA												
Comment / Cross Reference: Bac Ha Hydropower Project is a new hydropower plant.																

3.3.6	Describe why the alternative scenarios are credible and realistic?	PD D	DR	OK	ok
	Comment / Cross Reference: First alternative is without CDM. The second one is the continuation of the current situation. Both are realistic.				
3.3.7	Can the list of alternatives considered to be complete, why? Is as base-line scenario the project activity without being registered as CDM project included?	PD D	DR	OK	ok
	Comment / Cross Reference: Yes, two scenarios are enough; the ACM0002 consolidated methodology only requires one alternative that would be more attractive than the proposed project activity. Yes, the project activity without CDM is included.				
3.3.8	In case several different facilities, technologies, outputs or services are present in the project, are separately alternative scenarios for each of them included? Have realistic combinations been considered as project scenario?	PD D	DR	OK	ok
	Comment / Cross Reference: Bac Ha Hydropower Project is one new hydropower plant.				
3.3.9	Does the project identify correctly and exclude those options not in line with regulatory or legal requirements?	PD D	DR	OK	ok
	Comment / Cross Reference: Regulatory and legal requirements are considered, and both alternatives are consistent with laws and regulations.				
3.3.10	If a scenario does not comply with the mandatory laws and regulations; it is clearly demonstrated that the law and/or regulation is systematically not enforced in the country?	PD D	DR	NA	
	Comment / Cross Reference: Both scenarios comply with laws and regulations.				
3.3.11	Changes are required for methodology implementation in 2nd and 3rd crediting periods: Has the continued validity of the baseline been correctly assessed?	PD D	DR	OK	ok
	Comment / Cross Reference: Default values have only been set for the first crediting period.				

Tool to calculate the emission factor for an electricity system

According to ACM0002 baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. Thus ACM0002 requires the use of the "Tool to calculate the emission factor for an electricity system" to determine the combined margin (CM) CO₂ emission factor.

This checklist is related to the validation of the combined margin published by the Department of Meteorology, Hydrology and Climate Change in Hanoi.

	Topic / Question	Ref	MoV	Draft Concl	Final Concl	
4	Tool to calculate the emission factor for an electricity system					
4.1	Justification of the choice of the tool and why it is applicable to the project activity.					
4.1.1	Is the applied tool considered the most appropriate one?		DR	Ok	Ok	
	Comment / Cross Reference: The tool required by ACM0002.					
4.1.1	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	
	Applicability checklist					Yes / No
	Criterion discussed in the PDD?					Yes
	Compliance provable?					Yes
	Compliance verified?					Yes
	Comment / Cross Reference:					
4.1.1	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	Ok	Ok	
	Applicability checklist					Yes / No
	Criterion discussed in the PDD?					Yes
	Compliance provable?					Yes
	Compliance verified?					yes
	Comment / Cross Reference:					
4.1.1	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	
	Applicability checklist					Yes / No
	Criterion discussed in the PDD?					yes
	Compliance provable?					yes
	Compliance verified?					yes

MoV = Means of Validation, DR = Document Review, I = Interview, N/A = Not Applicable

CAR = Corrective Action Request, CL = Clarification Request, FAR = Forward Action Request

	Topic / Question	Ref	MoV	Draft Concl	Final Concl										
	Comment / Cross Reference:														
4.2	Description of the parameters included in the tool														
	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”														
4.2.1	<div>Parameter: $EF_{grid,CM,y}$ Combined margin CO2 emission factor for grid connected power generation in year y Unit: tCO2/MWh Type: calculated</div> <table><tr><th>Boundary checklist</th><th>Yes / No</th></tr><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></table>	Boundary checklist	Yes / No	Parameter discussed in the PDD?	yes	Inclusion / exclusion justified?	yes	Explanation / Justification sufficient?	yes	Consistency with monitoring plan?	yes		DR	Ok	Ok
Boundary checklist	Yes / No														
Parameter discussed in the PDD?	yes														
Inclusion / exclusion justified?	yes														
Explanation / Justification sufficient?	yes														
Consistency with monitoring plan?	yes														
	Comment / Cross Reference:														
4.2.2	<div>Parameter: $EF_{grid,BM,y}$ Build margin CO2 emission factor for grid connected power generation in year y Unit: tCO2/MWh Type: calculated</div> <table><tr><th>Boundary checklist</th><th>Yes / No</th></tr><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></table>	Boundary checklist	Yes / No	Parameter discussed in the PDD?	yes	Inclusion / exclusion justified?	yes	Explanation / Justification sufficient?	Yes	Consistency with monitoring plan?	Yes		DR	ok	Ok
Boundary checklist	Yes / No														
Parameter discussed in the PDD?	yes														
Inclusion / exclusion justified?	yes														
Explanation / Justification sufficient?	Yes														
Consistency with monitoring plan?	Yes														
	Comment / Cross Reference:														
4.2.3	<div>Parameter: $EF_{grid,OM,y}$ Operating margin CO2 emission factor for grid connected power generation in year y Unit: tCO2/MWh Type: calculated</div> <table><tr><th>Boundary checklist</th><th>Yes / No</th></tr><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></table>	Boundary checklist	Yes / No	Parameter discussed in the PDD?	yes	Inclusion / exclusion justified?	Yes	Explanation / Justification sufficient?	Yes	Consistency with monitoring plan?	yes		DR	Ok	Ok
Boundary checklist	Yes / No														
Parameter discussed in the PDD?	yes														
Inclusion / exclusion justified?	Yes														
Explanation / Justification sufficient?	Yes														
Consistency with monitoring plan?	yes														
	Comment / Cross Reference:														

	Topic / Question	Ref	MoV	Draft Concl	Final Concl										
4.2.4	<p>Parameter: $FC_{i,m,y}$, $FC_{i,y}$, $FC_{i,j,y}$, $FC_{i,k,y}$, $FC_{i,n,y}$ and $FC_{i,n,h}$</p> <p>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</p> <p>Unit: mass or volume unit</p> <p>Type: official publication</p> <table><tr><th>Boundary checklist</th><th>Yes / No</th></tr><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></table> <p>Comment / Cross Reference:</p>	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?															
4.2.5	<p>Parameter: $EF_{CO_2,i,y}$</p> <p>CO2 emission factor of fossil fuel type i in year y</p> <p>Unit: tCO2/GJ</p> <p>Type:</p> <table><tr><th>Boundary checklist</th><th>Yes / No</th></tr><tr><td>Parameter discussed in the PDD?</td><td>Y</td></tr><tr><td>Inclusion / exclusion justified?</td><td>Y</td></tr><tr><td>Explanation / Justification sufficient?</td><td>Y</td></tr><tr><td>Consistency with monitoring plan?</td><td>Y</td></tr></table> <p>Comment / Cross Reference:</p>	Boundary checklist	Yes / No	Parameter discussed in the PDD?	Y	Inclusion / exclusion justified?	Y	Explanation / Justification sufficient?	Y	Consistency with monitoring plan?	Y		DR	n/a	n/a
Boundary checklist	Yes / No														
Parameter discussed in the PDD?	Y														
Inclusion / exclusion justified?	Y														
Explanation / Justification sufficient?	Y														
Consistency with monitoring plan?	Y														
4.2.6	<p>Parameter: $EG_{m,y}$, EG_y, $EG_{j,y}$, $EG_{k,y}$ and $EG_{n,h}$</p> <p>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</p> <p>Unit: MWh</p> <p>Type: monitored</p> <table><tr><th>Boundary checklist</th><th>Yes / No</th></tr><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></table> <p>Comment / Cross Reference:</p>	Boundary checklist	Yes / No	Parameter discussed in the PDD?	Yes	Inclusion / exclusion justified?	Yes	Explanation / Justification sufficient?	Yes	Consistency with monitoring plan?	Yes		DR	Ok	Ok
Boundary checklist	Yes / No														
Parameter discussed in the PDD?	Yes														
Inclusion / exclusion justified?	Yes														
Explanation / Justification sufficient?	Yes														
Consistency with monitoring plan?	Yes														
4.2.7	<p>Parameter (only for dispatch data OM): $EGP_{J,h}$</p> <p>Electricity displaced by the project activity in hour h of year y</p> <p>Unit: MWh</p> <p>Type: Monitored</p>		DR	Ok	Ok										

	Topic / Question		Ref	MoV	Draft Concl	Final Concl	
	Boundary checklist		Yes / No				
	Parameter discussed in the PDD?		Yes				
	Inclusion / exclusion justified?		Yes				
	Explanation / Justification sufficient?		Yes				
	Consistency with monitoring plan?		Yes				
	Comment / Cross Reference:						
4.2.8	Parameter: (only for dispatch data OM) $\eta_{m,y}$						
	Average net energy conversion efficiency of power unit m in year y						
	Unit: -Type:						
	Boundary checklist		Yes / No				
	Parameter discussed in the PDD?		Yes				
	Inclusion / exclusion justified?		Yes				
	Explanation / Justification sufficient?		Yes				
	Co s tency wit monitoring plan?		Yes				
	Comment / Cross Reference:						
	4.2.9	Do the spatial and technological boundaries as verified on-site comply with the discussion provided by / indication included to the PDD?					
		Comment / Cross Reference:					
	4.3	Description of how the baseline methodology procedure is identified and description of the identified baseline procedure					
	4.3.1	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 / Cross Reference:							
4.3.2	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 / Cross Reference:						
4.3.3	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 / Cross Reference:						
4.3.4	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 / Cross Reference:						
4.3.5	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).			DR	Ok	Ok	

	Topic / Question	Ref	MoV	Draft Concl	Final Concl
	comprising the larger annual generation?				
	Comment / Cross Reference:				
4.3.6	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 / Cross Reference:				
4.3.7	Are the values used for w_{OM} and w_{BM} correctly applied?		DR	Ok	Ok
	Comment / Cross Reference:				
4.3.8	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 / Cross Reference:	The Grid Emission Factor has been verified by the DOE at the office of the Department of Meteorology, Hydrology and Climate Change in Hanoi and is deemed correct. The data sheets of the calculation of the Grid Emission Factor can only be consulted at the office of the Department of Meteorology, Hydrology and Climate Change in Hanoi. For this reason, the data sheets are not referenced in this checklist.			
4.3.9	Are the default efficiency factors for power plants used according to annex I of the tool?		DR	Ok	Ok
	Comment / Cross Reference:				