

# VALIDATION REPORT

ELECTRICITY GENERATING  
AUTHORITY OF THAILAND

MAE KLONG HYDROPOWER PROJECT

**Report No: Report No: 09CDM 1011- 09/356**

**Date: 2013-01-30**

TÜV NORD CERT GmbH  
JI/CDM Certification Program  
Langemarckstraße, 20  
45141 Essen, Germany  
Phone: +49-201-825-3335  
Fax: +49-201-825-3290  
[www.tuev-nord.de](http://www.tuev-nord.de)  
[www.global-warming.de](http://www.global-warming.de)

<b>Validation Report:</b>	<b>Report No.</b>	<b>Rev. No.</b>	<b>Date of 1<sup>st</sup> issue:</b>	<b>Date of this rev.</b>
	09CDM1011 – 09/356	0	2013-01-30	2013-01-30
<b>Project:</b>	<b>Title:</b>	<b>Initial PDD Version:</b>	<b>Final PDD Version</b>	
	Mae Klong Hydropower Project	2009-07-21 Version 1	2013-01-29 Version 5	
<b>Client:</b>	Electricity Generating Authority of Thailand	<b>Client ref:</b>	Mr. Sompop Phuangjit	
<b>Project Participant(s):</b>	<b>Host Party:</b>	<b>Other involved parties:</b>		
	Thailand	None		
<b>Applied methodology/ies:</b>	<b>Title:</b>	<b>No.:</b>	<b>Scope / TA:</b>	
	Grid connected renewable electricity generation	AMS.I-D ver. 17	1 / 1.2	
<b>Validation team / Technical Review and Final Approval</b>	<b>Validation Team:</b>	<b>Technical review:</b>	<b>Final approval:</b>	
	Cheong, Chun Yuen (Robert) (TL) Saowalak Thongsong (A) Nattapon Vasasmith (A)	Jochen Schubert, Markus Knödelseder	Martin Saalmann	
<b>Expected Emission reductions: [t CO<sub>2e</sub>]</b>	<b>Expected emission reductions over the first crediting period:</b>		<b>(Expected) starting date of the crediting period:</b>	
	292,187t CO <sub>2e</sub>		2014-01-01	
<b>Confidential content:</b>	<input type="checkbox"/> Yes		<input checked="" type="checkbox"/> No	
<b>Summary of Validation Opinion:</b>	<input checked="" type="checkbox"/> Positive validation opinion		<input type="checkbox"/> Negative validation opinion	
	<p>In detail the conclusions can be summarised as follows:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> The project is in line with all relevant host country criteria (Thailand) and all relevant UNFCCC requirements for CDM. Project activity approval have been obtained from DNA of Thailand vide the Letter of Approval (HCA) dated 2010-04-28. There is only one entity involved and no other entity involved as the sponsor country.</li> <li><input checked="" type="checkbox"/> The project additionality is sufficiently justified in the PDD.</li> <li><input checked="" type="checkbox"/> The monitoring plan is transparent and adequate.</li> <li><input checked="" type="checkbox"/> The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 292,187t CO<sub>2e</sub> are most likely to be achieved within the (1<sup>st</sup> renewable) crediting period.</li> <li><input checked="" type="checkbox"/> The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation.</li> </ul>			
<b>Document information:</b>	<b>Filename:</b>			<b>No. of pages:</b>
	2013-01-30 MAE KLONG HPP FVR_Clean			156

## Abbreviations

<b>Amphur</b>	District
<b>BAU</b>	Business As Usual
<b>BOT</b>	Bank of Thailand
<b>CA</b>	Corrective Action / Clarification Action
<b>CAPM</b>	Capital Asset Pricing Model
<b>CAR</b>	Corrective Action Request
<b>CDM</b>	Clean Development Mechanism
<b>CER</b>	Certified Emission Reduction
<b>CL</b>	Clarification Request
<b>CO<sub>2</sub></b>	Carbon dioxide
<b>CO<sub>2e</sub></b>	Carbon dioxide equivalent
<b>DEDE</b>	Department of Alternative Energy Development and Efficiency
<b>DIT</b>	Department of Industrial Trade
<b>DNA</b>	Designated National Authority
<b>EB</b>	CDM Executive Board
<b>EGAT</b>	Electricity Generating Authority of Thailand
<b>EIA</b>	Environmental Impact Assessment
<b>EPC</b>	Engineering, Procurement and Construction
<b>EPPO</b>	Energy Policy and Planning Office
<b>FAR</b>	Forward Action Request
<b>GSP</b>	Global Stakeholder Period
<b>IEE</b>	Initial Environmental Evaluation
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>IPP</b>	Independent Power Producers
<b>IRR</b>	Internal Rate of Return
<b>LOI</b>	Letter of Intend
<b>LoA</b>	Letter of Approval
<b>MLR</b>	Minimum Loan Rate / Minimum Lending Rate
<b>MTHB</b>	Million Thai Baht (Thai Currency)
<b>O&amp;M</b>	Operation and Maintenance
<b>ONEP</b>	Office of National Resources and Environmental Policy and Planning
<b>PDP</b>	Power Development Plan
<b>PDD</b>	Project Design Document
<b>PEA</b>	Provincial Electricity Authority
<b>PLF</b>	Plant Load Factor
<b>PP</b>	Project Proponent

---

<b>PPA</b>	Power Purchase Agreement
<b>QC/QA</b>	Quality control/Quality assurance
<b>RD</b>	The Revenue Department of Thailand
<b>RID</b>	Royal Irrigation Department
<b>ROE</b>	Return of Equity / Cost of Equity
<b>SET</b>	Stock Exchange of Thailand
<b>TBM</b>	Thai Bond Market Association
<b>TGO</b>	Thailand Greenhouse Gas Management Organization (Public Organization)
<b>THB</b>	Thai Baht (Thai Currency)
<b>TOU</b>	Time of Use
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>VSPP</b>	Very Small Power Producers
<b>VVM</b>	Validation and Verification Manual

<b>Table of Contents</b>	<b>Page</b>
1 OBJECTIVE / SCOPE .....	7
2 GHG PROJECT DESCRIPTION.....	7
2.1 Project Characteristics	7
2.2 Involved Parties and Project Participants	8
2.3 Project Location	8
2.4 Technical Project Description	9
3 METHODOLOGY AND VALIDATION SEQUENCE.....	10
3.1 Validation Steps	10
3.2 Contract review	10
3.3 Appointment of team members and technical reviewers	11
3.4 Consideration of Public Stakeholder Comments	12
3.5 Validation Protocol	12
3.6 Review of Documents	13
3.7 Follow-up Interviews	13
3.8 Project comparison	14
3.9 Resolution of Clarification and Corrective Action Requests	15
3.9.1 Definition	15
3.9.2 Draft Validation	15
3.9.3 Final Validation	15
3.10 Technical review	16
3.11 Final approval	16
4 VALIDATION FINDINGS .....	17
5 VALIDATIONASSESSMENT SUMMARY.....	38
5.1 General Description of the Project Activity	38
5.1.1 Participation	38
5.1.2 Contribution to Sustainable Development	38
5.1.3 PDD editorial Aspects	38
5.1.4 Technology to be employed.	39
5.1.5 Small Scale Projects	39
5.2 Project Baseline, Additionality and Monitoring Plan	39
5.2.1 Application of the Methodology	40
5.2.2 Project Boundary	40
5.2.3 Baseline Identification	41
5.2.4 Calculation of GHG Emission Reductions	41
5.2.5 Additionality Determination	42
5.2.6 Monitoring Methodology	49
5.2.7 Monitoring Plan	49
5.2.8 Project Management Planning	50

---

5.2.9	Crediting Period	51
5.2.10	Environmental Impacts	51
5.2.11	Comments by Local Stakeholders	51
6	VALIDATION OPINION .....	53
7	REFERENCES .....	54
	ANNEX 1: VALIDATION PROTOCOL.....	62
	ANNEX 2: ASSESSMENT OF BASELINE IDENTIFICATION.....	126
	ANNEX 3: ASSESSMENT OF FINANCIAL PARAMETERS.....	127
	ANNEX 4: ASSESSMENT OF BARRIER ANALYSIS .....	153
	ANNEX 5: OUTCOME OF THE GSCP .....	154
	ANNEX 6: STATEMENTS OF COMPETENCE OF ALL INVOLVED PERSONNEL.....	155

## 1 OBJECTIVE / SCOPE

The purpose of a validation is to have an independent third party assess the project design. In particular the project's baseline, the monitoring plan (MP), and the project's compliance with

- the requirements of Article 12 of the Kyoto Protocol;
- the CDM modalities and procedures as agreed in the Marrakech Accords under decision 3/CMP.1
- the annex to the decision;
- subsequent decisions made by COP/MOP & CDM Executive Board and
- other relevant rules, including the host country legislation and sustainability criteria

are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria. Validation is seen as necessary to provide assurance to stakeholders on the quality of the project and its intended generation of certified emission reductions (CERs).

The validation scope is given as a thorough independent and objective assessment of the project design including especially: the correct application of the methodology, the project's baseline study, additionality justification, local stakeholder commenting process, environmental impacts and monitoring plan, which are included in the PDD and other relevant supporting documents, to ensure that the proposed CDM project activity meets all relevant and applicable CDM criteria.

The information included in the PDD and the supporting documents were reviewed against the requirements as set out by the UNFCCC. The validation team has, based on the requirements in the Validation and Verification Manual<sup>VVM</sup>, carried out a full assessment of all evidences to assess the compliance of the project with the key areas as outlined in section V.E. and V.F. of the VVM (version 01.2, EB 55).

The validation is based on the information made available to TÜV NORD JI/CDM CP and on the contract conditions.

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

## 2 GHG PROJECT DESCRIPTION

### 2.1 Project Characteristics

Essential data of the project is presented in the following Table 2-1.

**Table 2-1: Project Characteristics**

Item	Data		
Project title	Mae Klong Hydropower Project		
Project size	<input type="checkbox"/> Large Scale <input checked="" type="checkbox"/> Small Scale		
Project Scope (according to UNFCCC sectoral scope numbers for CDM)	<input checked="" type="checkbox"/>	1	Energy Industries (renewable- /non-renewable sources)
	<input type="checkbox"/>	2	Energy distribution
	<input type="checkbox"/>	3	Energy demand
	<input type="checkbox"/>	4	Manufacturing industries
	<input type="checkbox"/>	5	Chemical industry
	<input type="checkbox"/>	6	Construction
	<input type="checkbox"/>	7	Transport
	<input type="checkbox"/>	8	Mining/Mineral production
	<input type="checkbox"/>	9	Metal production
	<input type="checkbox"/>	10	Fugitive emissions from fuels (solid, oil and gas)
	<input type="checkbox"/>	11	Fugitive emissions from production and consumption of halocarbons and hexafluoride
	<input type="checkbox"/>	12	Solvents use
	<input type="checkbox"/>	13	Waste handling and disposal
	<input type="checkbox"/>	14	Afforestation and Reforestation
	<input type="checkbox"/>	15	Agriculture
Applied Methodology	AMS-I.D version 17		
Technical Area(s)	1.2		
Crediting period	<input checked="" type="checkbox"/> Renewable Crediting Period (7 y) <input type="checkbox"/> Fixed Crediting Period (10 y)		
Start of crediting period	2014-01-01		

## 2.2 Involved Parties and Project Participants

The following parties to the Kyoto Protocol and project participants are involved in this project activity (Table 2-2).

**Table 2-2: Project Parties and project participants**

Characteristic	Party	Project Participant
Host party	Thailand	Electricity Generating Authority of Thailand
Other involved party/ies	None	None

## 2.3 Project Location

The details of the project location are given in table 2-3:

**Table 2-3: Project Location**

No.	Project Location
Host Country	Thailand
Region:	Kanchanaburi Province
Project location address:	Mae Klong river in the Kanchanaburi Province of Thailand
Latitude:	13° 57' 09.1946"N
Longitude:	99° 37'32.453"E



## 2.4 Technical Project Description

The technical key data are provided in table 2-4 below

**Table 2-4:** Technical data of the project activity

Parameter	Unit	Value
<b>Turbines</b>		
<b>Unit #1</b>		
Type	-	GZC19-WP-315
Rated Power	MW	6.4
Rated Head	m	9.2
Rated Flow	m/s	75.56
Rated Speed	r/min	166.7
Runaway Speed	r/min	463
Layout Type		Horizontal Axis
<b>Unit #2</b>		
Type	-	GZC19-WP-315
Rated Power	MW	6.4
Rated Head	m	9.2
Rated Flow	m/s	75.56
Rated Speed	r/min	166.7
Runaway Speed	r/min	463
Layout Type		Horizontal Axis
<b>Generators</b>		
<b>Unit #1</b>		
Type	-	SFW6176-36/3800
Rated Capacity	kVA	7265.9
Rated Power	kW	6,176
Rated Voltage	V	6,600
Rated Current	A	635.6
Rated Frequency	Hz	50
<b>Unit #2</b>		
Type	-	SFWG6176-36/3800
Rated Capacity	kVA	7265.9
Rated Power	kW	6,176
Rated Voltage	V	6,600
Rated Current	A	635.6
Rated Frequency	Hz	50

### 3 METHODOLOGY AND VALIDATION SEQUENCE

#### 3.1 Validation Steps

The validation of the project consisted of the following steps:

- Contract review
- Appointment of team members and technical reviewers
- Publication of the project design document (PDD)
- Desk review of the PDD and supporting documents
- Validation planning
- On-Site assessment
- Background investigation and follow-up interviews with personnel of the project developer and its contractors
- Draft validation reporting
- Resolution of corrective actions (if any)
- Final validation reporting
- Technical review
- Final approval of the validation

The sequence of the validation is given in the table 3.1 below:

**Table 3.1:** Validation sequence

Topic	Time
Assignment of validation	2009-09-10
Submission of PDD for global stakeholder commenting process	2009-09-12 to 2009-10-11
On-site visit date	2009-11-19 to 20 and 2009-11-25
Draft reporting finalised	2010-03-24
Final reporting finalised	2013-01-30
Technical review on final reporting finalised	2013-01-30

#### 3.2 Contract review

To assure that

- the project falls within the scopes for which accreditation is held,

- the necessary competences to carry out the validation can be provided,
- Impartiality issues are clear and in line with the CDM accreditation requirements

a contract review was carried out before the contract was signed.

### 3.3 Appointment of team members and technical reviewers

On the basis of a competence analysis and individual availabilities, a validation team, consisting of one team leader and 2 additional team members, as well as the Technical Review personnel were appointed.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the table 3-2 below.

**Table 3-2:** Involved Personnel

	Name	Company	Function <sup>1)</sup>	Qualification Status <sup>2)</sup>	Scheme competence <sup>3)</sup>	Technical competence <sup>4)</sup>	Host country Competence	On-site visit
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Cheong, Chun Yuen (Robert)	TÜV NORD (Malaysia)	TL	SA	<input checked="" type="checkbox"/>	1.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Saowalak Thongsong	TÜV NORD (Thailand)	TM <sup>A)</sup>	A	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Nattapon Vasasmith	TÜV NORD (Thailand)	TM <sup>A)</sup>	A	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Markus Knödseder	TÜV NORD Cert	TR <sup>B)</sup>	A	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Dr. Jochen Schubert	TÜV NORD Cert	TR <sup>B)</sup>	SA	<input checked="" type="checkbox"/>	1.2	<input type="checkbox"/>	-
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Martin Saalman	TÜV NORD Cert	FA <sup>B)</sup>	SA	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

<sup>1)</sup> TL: Team Leader; TM: Team Member, TR: Technical review; OT: Observer-Team, OR: Observer-TR; FA: Final approval

<sup>2)</sup> GHG Auditor Status: A: Assessor; LA: Lead Assessor; SA: Senior Assessor; T: Trainee; TE: Technical Expert

<sup>3)</sup> GHG auditor status (at least Assessor)

<sup>4)</sup> As per S01-MU03 or S01-VA070-A2 (such as 1.1, 1.2, ...)

<sup>5)</sup> In case of verification projects

<sup>A)</sup> Team Member: GHG auditor (at least Assessor status), Technical Expert (incl. Host Country Expert or Verification Expert), not ETE

<sup>B)</sup> No team member

All the team members contributed to the review of documents, the assessment of the project activity and to the preparation of this report under the leadership of the team leader.

Statements of competence for the above mentioned team members are enclosed in annex 6 of this report.

### **3.4 Consideration of Public Stakeholder Comments**

Acc. to the modalities and procedures the draft PDD, as received from the project participants, has been made publicly available on the dedicated UNFCCC CDM website prior to the validation activity commenced. Stakeholders have been invited to comment on the PDD within the 30 days public commenting period.

In case comments are received, they are taken into account during the validation process. The comments and the discussion of the same are documented in annex 5 of this report.

### **3.5 Validation Protocol**

In order to ensure consideration of all relevant assessment criteria, a validation protocol is used. The protocol shows, in a transparent manner, criteria and requirements, means of validation and the results from pre-validating the identified criteria. The validation protocol reflects the generic CDM requirements each CDM project has to meet as well as project specific issues as applicable. The validation protocol serves the following purposes:

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

The validation protocol is described in Figure 1.

<b>Validation Protocol Table A-1: Requirement checklist</b>				
<b>Checklist Item</b>	<b>Validation Team Comment</b>	<b>Reference</b>	<b>Draft Conclusion</b>	<b>Final Conclusion</b>
<i>The checklist items in Table A-1 are linked to the various requirements the project should meet. The checklist is organised in various sections. Each section is then further sub-divided as per the requirements of the topic and the individual project activity.</i>	<i>The section is used to elaborate and discuss the checklist item in detail. It includes the assessment of the validation team and how the assessment was carried out. The reporting requirements of the VVM shall be covered in this section.</i>	<i>Gives reference to the information source on which the assessment is based on</i>	<i>Assessment based on evidence provided if the criterion is fulfilled (OK), or a CAR, CL or FAR (see below) is raised. The assessment refers to the draft validation stage.</i>	<i>In case a corrective action or a clarification the final assessment at the final validation stage is given.</i>

**Figure1:** Validation protocol table

The completed validation protocol is enclosed in Annex 1 to this report.

### 3.6 Review of Documents

The published PDD and supporting background documents related to the project design and baseline were reviewed.

Furthermore, the validation team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

### 3.7 Site Visit and Follow-up Interviews

The validation team has carried out a site visit in order to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for CDM.

During validation the validation team has performed interviews to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarized in table 3-3.

**Table 3-3:** Interviewed persons and interview topics

<b>Interviewed Persons / Entities</b>	<b>Interview topics</b>
Project proponent representatives Electricity Generating Authority of Thailand	<ul style="list-style-type: none"> <li>- Project Schedule and current status of plant design</li> <li>- Technical details of the project realization, project feasibility, designing, operational life time,</li> <li>- Host Government Approval</li> </ul>

Interviewed Persons / Entities	Interview topics
Project consultant : Agrinergy Ltd.	<ul style="list-style-type: none"> <li>- Approval procedures and status</li> <li>- Monitoring and measurement equipment and system.</li> <li>- Financial aspects</li> <li>- Crediting period</li> <li>- Project activity starting date</li> <li>- CER allocation / ownership</li> <li>- Baseline study assumptions</li> <li>- Additionality</li> <li>- Sustainable development issues</li> <li>- Monitoring of the project</li> <li>- Analysis of local stakeholder consultation</li> <li>- Roles &amp; responsibilities of the project participants w.r.t. project management, monitoring and reporting</li> <li>- National Legislation</li> <li>- Editorial issues of the PDD</li> <li>- Business License and structure of the EGAT</li> <li>- IEE report</li> </ul>
Local authority of Royal Irrigation Department (RID)	<ul style="list-style-type: none"> <li>- The operation of the Dam to manage the water for irrigation, capacity of water supply</li> <li>- The rules and regulations for the project activity between EGAT and RID according to project activity.</li> </ul>
Local authority of Provincial Power Authority (PEA)	<ul style="list-style-type: none"> <li>- The distribution line of the power supply in the area of Mae Klong Dam located.</li> <li>- The power supply situation in the area</li> <li>- The rules and regulations for the project activity between EGAT and the PEA according to project activity.</li> </ul>
Local Stakeholder	<ul style="list-style-type: none"> <li>- The acknowledgement regards the project activity since before, during construction, and expectation after the project activity in operation.</li> <li>- The situation of water and power supply.</li> </ul>

A comprehensive list of all interviewed persons is part of section 7 'References'.

### 3.8 Project comparison

The validation team has compared the proposed CDM project activity with similar projects or technology that have similar or comparable characteristics and with similar projects in the host country in order to obtain additional information esp. regarding:

- Project technology

- Additionality issues
- Reasons for reviews, requests for reviews and rejections within the CDM registration process.

## 3.9 Resolution of Clarification and Corrective Action Requests

### 3.9.1 Definition

A **Corrective Action Request (CAR)** will be established where:

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence the project results,
- the requirements deemed relevant for validation of the project with certain characteristics have not been met or
- there is a risk that the project would not be registered by the UNFCCC or that emission reductions would not be able to be verified and certified.

A **Clarification Request (CL)** will be issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

A **Forward Action Request (FAR)** will be issued when certain issues related to project implementation should be reviewed during the first verification.

### 3.9.2 Draft Validation

After reviewing all relevant documents and taken all other relevant information into account, the validation team issues all findings in the course of a draft validation report and hands this report over to the project proponent in order to respond on the issues raised and to revise the project documentation accordingly.

### 3.9.3 Final Validation

The final validation starts after issuance of the proposed corrective action (CA) of the CARs, CLs and FARs by the project proponent. The project proponent has to reply on those and the requests are “closed out” by the validation team in case the response is assessed as sufficient. In case of raised FARs the project proponent has to respond on this, identifying the necessary actions to ensure that the topics raised in this finding are likely to be resolved at the latest during the first verification. The validation team has to assess whether the proposed action is adequate or not.

In case the findings from CARs and CLs cannot be resolved by the project proponent or the proposed action related to the FARs raised cannot be assessed as adequate, no positive validation opinion can be issued by the validation team.

The CAR(s) / CL(s)/ FAR(s) are documented in chapter 4.

### **3.10 Technical review**

Before submission of the final validation report a technical review of the whole validation procedure is carried out. The technical reviewer is a competent GHG auditor being appointed for the scope this project falls under. The technical reviewer is not considered to be part of the validation team and thus not involved in the decision making process up to the technical review.

As a result of the technical review process the validation opinion and the topic specific assessments as prepared by the validation team leader may be confirmed or revised. Furthermore reporting improvements might be achieved.

### **3.11 Final approval**

After successful technical review of the final report an overall (esp. procedural) assessment of the complete validation will be carried out by a senior assessor located in the accredited premises of TÜV NORD.

Only after this step the request for registration can be started (in case of a positive validation opinion).



## 4 VALIDATION FINDINGS

In the following table the findings from the desk review of the published PDD, visits, interviews and supporting documents are summarised:

**Table 4-1:** Summary of CARs, CLs and FARs issued

Validation topic <sup>1)</sup>	No. of CAR	No. of CL	No. of FAR
General description of project activity (A) <ul style="list-style-type: none"> <li>- Project specification</li> <li>- Technical project description</li> <li>- Participation</li> <li>- Contribution to sustainable development</li> <li>- PDD editorial aspects</li> <li>- Technology to be employed</li> </ul>	3	2	-
Project Baseline, Additionality and Monitoring Plan (B) <ul style="list-style-type: none"> <li>- Application of the Methodology</li> <li>- Project Boundary</li> <li>- Baseline identification</li> <li>- Calculation of GHG emission reductions               <ul style="list-style-type: none"> <li>Project emissions</li> <li>Baseline emissions</li> <li>Leakage</li> </ul> </li> <li>- Additionality determination</li> <li>- Monitoring Methodology</li> <li>- Monitoring Plan</li> <li>- Project management planning</li> </ul>	6	7	-
Duration of the Project / Crediting Period (C)	1	1	-
Environmental impacts (D)	-	-	-
Stakeholder Comments (E)	-	1	-
<b>SUM</b>	<b>10</b>	<b>11</b>	<b>-</b>

<sup>1)</sup> The letters in brackets refer to the validation protocol

**Table 4-2:** PDD versions used for assessments

Version Nr.	Assessment Round
PDD v. 1 (Published)	Reference of initial findings
PDD v. 2	DOE Assessment #1

Version Nr.	Assessment Round
PDD v. 3	DOE Assessment #2
PDD v. 4	Response to Technical Review # 1
PDD v. 5 (Final)	Response to Technical Review # 2

The following tables include all raised CARs, CLs and FARs. For an in depth evaluation of all validation items it should be referred to the validation protocols (see Annex 1).

The findings of validation process are summarized in the tables below.

Finding	A1		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The Letter of Approvals from the host country have not been submitted.		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The proposed project has received the Host Country Approval (HCA) from Thai DNA (TGO). The host country approval letter is provided to the DOE.		
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>The letter of approval has been checked and the approval letter was issued by the board of Thailand Greenhouse Gas Management Organization (Public Organization) authorized DNA as the name published on the UNFCCC website.<sup>/LOA/</sup></p> <p>The LoA, TGO No.:02/281 date 2010-04-28 confirmed that "Electricity Generating Authority of Thailand" is the entity from the host country to develop the "Mae Klong Hydropower Project" project activity and the project title is the same as the PDD.</p> <p>The approval was issued to project activity unconditionally. In addition, the DNA confirmed that the project contributes to sustainable development in the host country.</p> <p>By means of document review the team concluded that the project was approved by the authorized DNA. Therefore, the CAR is CLOSED.</p>		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding	A2		
<b>Classification</b>	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section A.2: The baseline and project activity scenario are not described clearly.		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	PDD has been revised to clearly mention the baseline and project activity.		
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-</i>	<p>The validation team has reviewed the revised PDD version 2 in detail. The baseline and project activity situation are explained in section A.2.</p> <p>The capacity and equipment's specification in PDD version 3 was checked</p>		

Finding	A2
1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.	with the technical specification and matches. <sup>71b)</sup> Therefore, CL is CLOSED.
<b>Conclusion</b> Tick the appropriate checkbox	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	A3
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> Describe the finding in unambiguous style; address the context (e.g. section)	Section A.4.1.4, PP needs to provide the latitude and longitude up to second level for the unique identification of proposed project activity.
<b>Corrective Action #1</b> This section shall be filled by the PP. It shall address the corrective action taken in details.	The latitude and longitude up to second level has now been added in section A.4.1.4.
<b>DOE Assessment #1</b> The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.	The Geographic Coordinates have been revised in section A.4.1.4 of PDD version 2. The latitude of 13° 57' 09.1946" N' and longitude of 99° 37'32.453" E' for the location of the power house is included. The revised Geographic Coordinates is in accordance to the construction site where had been confirmed checked with handheld GSP during on-site visit. Therefore, CAR is CLOSED.
<b>Conclusion</b> Tick the appropriate checkbox	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	A4
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> Describe the finding in unambiguous style; address the context (e.g. section)	PDD version 1, the PP is requested to demonstrate the following in section A.4.2: 1) Technical features of the major components of the proposed project activity; and 2) The electricity consumed for start up the hydropower plant, including source of power supply for auxiliaries consumption in case of emergency or breakdown.
<b>Corrective Action #1</b> This section shall be filled by the PP. It shall address the corrective action taken in details.	1. The project involves installation of two generators of 6.176 MW and two turbines of 6.4 MW each to generate 12.35 MW of electricity at 6.6kV which will be stepped up to 22kV to export from the Mae Klong Powerhouse to existing Provincial Electricity Authority (PEA) transmission line. All the net generated electricity will be exported to the PEA. In section A.4.2 has been revised to add the technical features of major component of the proposed project activity. Specification of the equipment document has been provided to the DOE. Source of the document are Agreement no: EGAT 47-O33239-2-3-6Q-EGAT-7/2550-MKHP between EGAT and ST Power Engineering Corp. Ltd and

Finding	A4
	<p><a href="http://www.cgturbine.com/otherbar386.htm">http://www.cgturbine.com/otherbar386.htm</a>.</p> <p>2. Start up electricity for auxiliaries of turbine will be imported from PEA to open a guide vane, which is a part of the turbine controlling the water flow to the turbine. The backup power supply in the event of power plant shut down (in case of emergency and Power plant maintenance) will be grid supply. All the electricity imported from the grid will be monitored. The guide vane consumes very small amount of electricity from PEA at the first starting up. Project emissions for start up of guide vanes have not been accounted for since this is part of the baseline. However, during operating period, electricity consumed by guide vanes are taken account of as auxiliary consumption.</p>
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>1) Technical feature of the major component<sup>7/10</sup> was checked and it is in accordance with the technical information demonstrated in the section A.4.2 of revised PDD version 2. Therefore, CL is CLOSED.</p> <p>2) The description regarding the power consumed to start up the hydropower plant, and backup power in case of emergency or plant breakdown is checked and it has been demonstrated in the section A.4.2 of PDD version 2. Therefore, CL is CLOSED.</p>
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<p><input type="checkbox"/> To be checked during the first periodic verification</p> <p><input type="checkbox"/> Additional action should be taken (finding remains open)</p> <p><input checked="" type="checkbox"/> The finding is closed</p>

Finding	A5
<b>Classification</b>	<input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section A.4.3 in PDD version 1, PP is requested to explain why the estimated emission reductions in the first year is low compared to other years (2nd, 3rd...) of the crediting period.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	That was an error. It has been changed in the revised PDD.
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>The section A.4.3 in PDD version 2 was checked. The summary of emission reductions was updated. The summary of the first year until the final year of 1<sup>st</sup> crediting period is estimated to be the same amount. The estimation is correct and it is in accordance with the start date of the crediting period specified in section C.2.1.1 and the ER sheet.</p> <p>Therefore, CL is CLOSED.</p>
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<p><input type="checkbox"/> To be checked during the first periodic verification</p> <p><input type="checkbox"/> Additional action should be taken (finding remains open)</p> <p><input checked="" type="checkbox"/> The finding is closed</p>

Finding	B1
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR

Finding	B1
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section B.1 the additional applicable guidance documents are not demonstrated.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Section B.1 of the PDD has been revised accordingly.
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Section B.1 of the revised PDD version 2 has been checked and the "Guidelines on the Demonstration of Additionality of Small-scale project version 09.0 (EB 68, Annex 27). The guideline referred is correct as it is applicable for small scale project activity. The correct name of the guideline and the version has been checked and confirmed that it is the latest version on the UNFCCC website which effective since 2012-07-12 onward. Therefore, CAR is CLOSED.
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	B2
<b>Classification</b>	<input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section B.2: PP needs to provide the reference to substantiate that grid is predominately fossil-fuel fired in order to justify the applicability criteria 1 of the applied methodology AMS-I.D version 14.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The revised PDD has been updated according to the new AMS.I-D version 17.

Finding	B2
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>The revised PDD version 2 has been checked. However, the new methodology AMS.I-D version 17 is now applied since the AMS-I.D is no longer valid.</p> <p>The justification of the applicability in section B.2 has been checked and they are updated according to the latest version.</p> <p>By mean of interviewed project participant during on-site, and reviewed related documents, the team therefore confirmed each stipulate applicability criterion is met as following:</p> <ol style="list-style-type: none"> <li>1) The proposed project activity generates power by utilizing the water of Mae Klong River.<sup>/PAL/</sup></li> <li>2) The electricity supplied by the project activity to the grid will replace existing and planned electricity generation at the National grid, the majority of which is Combined Cycle and Thermal power based.<sup>/DEDE/</sup></li> <li>3) The project activity is a new install power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant).<sup>/SD/PAL/</sup></li> <li>4) The project activity has no reservoir and it is implemented on a run-of-river.<sup>/PAL/</sup></li> <li>5) The proposed project activity capacity below 15MW installed.<sup>/SD/</sup></li> <li>6) The project activity does not the addition of renewable energy generation units at an existing renewable power generation facility and not a retrofit project activity.<sup>/SD/PAL/</sup></li> </ol> <p>Therefore, CL is CLOSED.</p>
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	B3
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section B.3, PP is requested to draw a schematic diagram to represent the project boundary.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The project boundary has been drawn Section B.3. It shows water flow and electricity generation in different colour.
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>The validation team has checked the schematic diagram in Section B.3 of the revised PDD version 2.</p> <p>The water stream and electricity stream are included in the diagram. Therefore, the CAR is closed.</p>
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed



Finding	B4								
Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR						
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Annex 3 of PDD version 1, PP does not indicate how the baseline information has been established.								
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Annex 3 of the PDD has been revised accordingly. As per tool, <u>Tool to calculate the emission factor for an electricity system, Version 2.2.1</u> (EB 63,Annex 19) “For grid power plants, use a 3-year generation-weighted average, based on the most recent data available. The Grid Emission Factor is calculated based on the most recent data available from the Thailand Electrical Report 2008.								
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>The baseline grid emission factor in PDD and excel sheet were updated according to the <u>Tool to calculate the emission factor for an electricity system, Version 2.2.1</u> (EB 63, Annex 19).</p> <p>The grid emission factor calculation is determined based on the available generation data published by the Department of Alternative Energy Development and Efficiency (DEDE) regarding “Thailand Electrical Report year 2008”.</p> <p>The vintage electricity data from year 2006, 2007 and 2008 was applied. For the CO<sub>2</sub> emission factor of each fossil fuel type <i>j</i>, the value applied is the lower default data from IPCC<sup>/IPCC/</sup> whereas the NCV of each fuel type used the host country data from “Thailand Electrical Report year 2008”<sup>/DEDE/</sup>.</p> <p>The method applied for determining the Grid Emission Factor can be summarized as following:</p> <ol style="list-style-type: none"><li>1) Operating Margin Emission Factor (<math>EF_{grid,OM,y}</math>) which is determined ex-ante. PP has demonstrated that Low-cost/must-run resource constitutes less than 50% of total grid generation by using the average of five most recent from 2004 to 2008; therefore, the simple OM method is applied. The emission factor of each power unit <i>m</i>, was determined according to Option B regarding only one grid system in Thailand. Therefore, the off-grid power plant system is excluded (Step 2 option I) and it is justified in accordance with the tool<sup>/TCEF/</sup>.</li><li>2) Build Margin Emission Factor (<math>EF_{grid,BM,y}</math>) is determined according to ex-ante (Option I). The BM calculation had included the weighted average emission factor from the set of recent power plants which are not registered as CDM into the set comprised at least 20% of generation. In addition, the power plants which started to supply electricity more than 10 years are excluded from the group.</li><li>3) The Combined Margin Emission Factor (<math>EF_{grid,CM,y}</math>) is calculated by the weighted average Combined Margin method, Option a). The fraction 0.5 is applied for <math>w_{OM}</math> and <math>w_{BM}</math>.</li></ol> <p>The results of the calculation for <math>EF_{grid,OM,y}</math>, <math>EF_{grid,BM,y}</math> and <math>EF_{grid,CM,y}</math> are demonstrated below:</p> <table><tr><td><math>EF_{grid,OM,y}</math></td><td>0.543</td></tr><tr><td><math>EF_{grid,BM,y}</math></td><td>0.569</td></tr><tr><td><math>EF_{grid,CM,y}</math></td><td>0.556</td></tr></table> <p>The validation team has reviewed the calculation as demonstrated above,</p>			$EF_{grid,OM,y}$	0.543	$EF_{grid,BM,y}$	0.569	$EF_{grid,CM,y}$	0.556
$EF_{grid,OM,y}$	0.543								
$EF_{grid,BM,y}$	0.569								
$EF_{grid,CM,y}$	0.556								

Finding	B4
	<p>and also cross checked the input data applied with the data published in "Thailand Electrical Report year 2008"<sup>/DEDE/</sup> and IPCC<sup>/IPCC/</sup> and confirmed that they are consistent.</p> <p>Hence the team concluded that the baseline grid emission factor is established correctly according to the tool <u>Tool to calculate the emission factor for an electricity system, Version 2.2.1</u>, (EB 63, Annex 19). Therefore, CAR is CLOSED.</p>
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	B5
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section B5 of PDD version 1, the PP is requested to document how the CDM was seriously considered in the decision to implement the project activity.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	In section B.5 of the revised PDD, chronology of events has been mentioned. Relevant documents have now been provided to the DOE.
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments(#2, #3, etc.) shall be added.</i>	<p>Section B.5 of the revised PDD version 2 is reviewed. The evidence for each event has been provided.</p> <p>However, it is not clear how the CDM benefits essential for implementation of the project activity on 2010-01-08. Therefore, CAR is OPENED.</p>
<b>Corrective Action #2</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<p>EGAT has considered CDM revenues for the hydro project since its inception.</p> <p>On 07/11/2006, the governor of EGAT announced the formation of a CDM committee and distributed the responsibilities to committee members.</p> <p>As evidenced from this document, the governor also authorized the committee members to confirm the feasibility of the projects before deciding to apply for CDM status (Clause 2 (2)). Subsequently in a meeting of the Board on 17/08/2007, the governor announced the guidelines to develop CDM projects to reduce GHG emissions.</p> <p>Alongside this the committee members were in discussion with CER buyers like JBIC, Kansai Electric to generate CER revenue to make the project financially feasible to undertake. Finally, in a Board meeting on 10/01/2008, EGAT took the investment decision to develop the project as a CDM project.</p> <p>Thus, in accordance with paragraph 6(a), Annex 13, EB62, the CDM benefits have been a decisive factor in the decision to proceed with the proposed project activity.</p>
<b>DOE Assessment #2</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments(#2, #3, etc.) shall be added.</i>	<p>According to the explanation from PP, the document dated 2006-11-07 was checked.<sup>/CM1/</sup> It is the minutes of meeting for settled CDM committee. The EGAT's governor has assigned the following responsibilities and authorities to the CDM committee:</p> <ol style="list-style-type: none"> <li>1. Appoint policy and action plan for cooperating in CDM project and also Carbon credit trading in accordance with the climate change strategy and national projects consideration' regulations; and</li> </ol>



Finding	B5
	<p>2. Consider feasibility of projects; and 3. Appoint person in charge and form a committee.</p> <p>Therefore, CDM committee had to review the feasibility study of Mae Klong HPP and propose the feasibility study report to the top management.</p> <p>After that on 2007-08-17, EGAT's governor had announced the guidelines to develop CDM projects. The project activity was also included in the list of CDM projects to be developed by the EGAT's guidelines. The notification no. 18/2550 dated 2007-08-17 which was signed by EGAT's governor was checked and confirmed.<sup>/CM2/</sup></p> <p>On 2008-01-10, the Mae Klong Hydropower Project was officially approved by the CDM committee for development project activity as CDM.<sup>/CM3/</sup></p> <p>The above listed of events have demonstrated that CDM benefits are a decisive factor for implementation of the project activity. The CDM committee was formed by ordering of the top management (EGAT's Governor).</p> <p>Later, the feasibility study has been reviewed and considered by the CDM committee as per the authorized order by top management.<sup>/CM1/</sup> Then, the official decision has been made on 2008-01-10.<sup>/CM3/</sup></p> <p>By means of assessment the team concluded the decision made on 2008-01-10 has considered that CDM benefits are a decisive factor to implement the project activity. Therefore, CAR is CLOSED.</p>
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	B6
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	PDD version 1, Section B5 footnote 7, PP is requested to substantiate the evidence for Tariff 2.27 baht/kWh applied and 2.12 baht/kWh in the PPA.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	A supporting letter has been submitted to the DOE by director of Environment division of EGAT stating that the tariff of this project activity is 2.27 THB/kWh and average for total 6 HPP is 2.12 baht/kWh which same rate submitted to EGAT cabinet for approval on 30 <sup>th</sup> Oct 2007.
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>The confirmation letter issued by EGAT date 2010-01-14 was checked.<sup>/ADD1.2/</sup></p> <p>The budgetary tariff rate was approved by the cabinet 2.27 THB/kWh on 2007-10-30 for Mae Klong HPP. The tariff rate 2.12 THB/kWh is an average tariff rate as approved by cabinet for 6 HPP.</p> <p>In the revised IRR calculation sheet version 2,<sup>/IRR/</sup> PP has applied the tariff rate to be the TOU rate 2.30 THB/kWh. However, it is not clear why the 2.30 THB/kWh from the TOU rate is applied instead of the cabinet approved rate.</p> <p>Therefore, CAR is OPENED.</p>
<b>Corrective Action #2</b>	The most accurate tariff, which was available at Board decision date is

Finding	B6
<p><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i></p>	<p>conservatively calculated from Term of Use document of EGAT signed with PEA.</p> <p>Below is the summary of different tariffs to confirm that the rate applied is appropriate:</p> <ul style="list-style-type: none"> <li>(i) Calculated based on Term of Use (TOU) 2005: 2.30 THB/kWh (inclusive of Ft). Details of the calculation have been provided to the DOE.<sup>/ADD1.1/</sup></li> <li>(ii) Submitted tariff for budget approval to EGAT Cabinet (30 Oct 2007) : <ul style="list-style-type: none"> <li>- for Mae Klong Hydro project: 2.27 THB/kWh,<sup>/ADD1.2/</sup></li> <li>- average tariff for all 6 hydro projects: 2.12 THB/kWh</li> </ul> </li> </ul> <p>Thus, this tariff is in line with the “Guidelines on the assessment of Investment analysis” as the <i>Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant.</i></p> <p>Hence, tariff of 2.30 THB/KWh is the most appropriate tariff to be used in the financial analysis.</p>
<p><b>DOE Assessment #2</b></p> <p><i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<p>The evidence provided for the calculation of TOU tariff rate<sup>/ADD1.1/</sup> was checked against the Power Purchase Agreement (PPA) signed between PEA and EGAT.<sup>/PPA/</sup></p> <p>The tariff rate as stated in the contract<sup>/PPA/</sup> will vary according to the generation time and nominal voltage supplied by the project activity.</p> <p>For the tariff rate calculated by the PP,<sup>/ADD1.1/</sup> the amount of electricity generation during Peak and Off-peak hours were derived based on the condition specified in the PPA. However, the percentage of electricity generation at Peak hours which was charged at higher rate is determined to be higher when compared to the value obtained from the PPA<sup>/D1.1/</sup>. The team cross checked the tariff calculation sheet compared with the actual rate replicated from the condition in the PPA<sup>/D1.1/</sup> and the tariff determined by the PP of 2.30 THB/kWh<sup>/ADD1.1/</sup> is conservative. The detail of assessment has been explained in the annex 3.</p> <p>For the budgetary tariff rate 2.27 THB/kWh for Mae Klong HPP, it was the rate approved by the cabinet. In addition, the rate 2.12 THB/kWh was averaged from the rate approved by cabinet for 6 HPPs.<sup>/ADD1.2/</sup> They were not demonstrated clearly how the value are determined. In addition, the rate approved by cabinet was not the actual tariff that will be obtained during project activity implementation.</p> <p>In order to increase the IRR beyond the benchmark, the tariff needs to be increased approximately 43% to 3.28 THB/kWh. The team has checked the historical wholesale tariff rate of country as reported on the EPPO website,  <a href="http://www.eppo.go.th/power/data/STATUS_VSPP_Sep%202011.xls">http://www.eppo.go.th/power/data/STATUS_VSPP_Sep%202011.xls</a>;  hence, the team confirms that the host country tariff rate has never been reached at 3.28 THB/kWh.</p> <p>By means of assessment, the team concluded that tariff rate applied 2.30 THB/kWh is appropriate and reflects the actual rate, as the value has been derived from the agreement between EGAT and PEA signed on 2005-12-22.<sup>/PPA/</sup> The contract signed between PEA and EGAT was checked and it is reliable. Furthermore, the tariff 2.30 THB/kWh is checked and it is derived conservatively. Therefore, CAR is CLOSED.</p>

Finding	B6
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	B7
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section B.5: The parameters in the financial spreadsheet need to be further demonstrated how they have been derived. The source for each parameter should be traceable.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The revised IRR sheet has been revised. The source of investment cost is based on the FSR established year 2006. The recurring costs were estimated by EGAT's experience for developed the hydropower plant. The sources of derivation the cost are attached.
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The revised IRR sheet was checked. The link and source are now included and traceable. However, it is not clear how the following cost items have been determined: 1) RID payment 2) Land rental 3) What is the working capital 7% applied? Therefore, CAR is still OPENED.
<b>Corrective Action #2</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	1) The RID cost is estimated based on the rate in MoU and water flow through Mae Klong Dam as data provided by RID. The evidences attached. 2) Land rental is estimated by EGAT from the actual land measured by Department of Treasury in Kanchanaburi Province. 3) Working capital interest rate is calculated as annual average minimum lending rate (MLR) charged by Financial Institutions in Thailand. 7.21% rate. The interest rate is based on the MLR year 2007 from January to December.
<b>DOE Assessment #2</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	1) The Memorandum of Understanding (MoU) dated 2007-04-17 was checked and the cost charged for water at $0.0064 \text{ THB/m}^3$ <sup>/ADD4.1/</sup> was identified. For annual average water flow 3,279 million $\text{m}^3$ is the value determined from the average water flow through Mae Klong Dam year 1982 to 2000. <sup>/ADD4.2/</sup> Therefore, the cost of water to be paid to RID is derived correctly based on the cost charged per $\text{m}^3$ of water as stated in the MoU and hydrological flow at the Mae Klong Dam. <sup>/ADD4.1/ADD4.2/</sup> The evidences substantiated for cost of water charged by RID and the annual average water flow through Mae Klong Dam were checked and reliable since the MoU was signed by EGAT and RID. In addition, the amount of water flow through the dam was checked and confirmed by interviews with the authority of Royal Irrigation Department at the Dam <sup>/IM05/</sup> . Therefore, CAR is CLOSED. 2) The evidence regarding Land Rental Cost to confirm the estimated cost applied by PP was checked. The letter issued by the Treasury Office of Kanchanaburi Area. <sup>/ADD2.1/</sup> explained the land rent cost for the project activity. The rental area was measured during 2007 by the Treasury Office of the Kanchanaburi Area. The information obtained

Finding	B7
	<p>was used to estimate the rental cost and transaction fee as per the Regulation on Provision of Occupied Land Managed by the Office of Treasury (B.E. 2547) year 2004. The rental cost and transaction fee for the land occupied by the project activity are charged at the rate 3.6 THB per square Wah per month for the occupied land 38-2-74 Rais.<sup>/ADD2.1/ADD2.2/</sup></p> <p>The estimated rental cost for occupied area 38-2-74 Rais is checked. The conversion factors stated in the Act of Measurement and Weighing B.E. 2542 announced by the Department of Industrial and Trade (DIT) on 7<sup>th</sup> April 1999 defined the following conversion factor applied for land:<sup>/DIT/</sup></p> <p>1 Rai = 1,600 m<sup>2</sup>  1 Ngarn = 400 m<sup>2</sup>  1 square Wah = 4 m<sup>2</sup></p> <p>Hence total cost per annum at 668 kTHB is determined correctly to total area 15,474 square Wahs. Then, the rental rate for the occupied land is determined 668 kTHB/year. This rate will be paid annually for 30 years operational lifetime.</p> <p>In addition, the team has reviewed the land rental stated in the Memorandum of Understanding between EGAT and Local Treasury Department, which was established on 2008-06-010.<sup>/ADD2.2/</sup> The annual rental payment rate is charged the same rate 668 kTHB/year; however, this cost is excluded additional fee 0.232 kTHB which charged for every 3 years.</p> <p>Therefore, the team concluded that the cost applied is appropriate since it was the cost estimated by the PP and it was confirmed by the Treasury Office of Kanchanaburi Area. The document was checked and it is reliable as it was issued and signed by the authorized government sector which manages the land occupied in Kanchanaburi Province where the project activity is located. In addition, the letter from the Treasury Office of Kanchanaburi Area demonstrated that the value determined is valid before the decision was made. Therefore, CAR is CLOSED.</p> <p>3) The interest on the working capital is estimated by the cost charged by the Financial Institute. It is determined by an interest rate of 7.21% charged for one month of electricity sold to the grid. The interest rate of 7.21% is based on the average MLR year 2007. The rate is checked and it is obtained from the average of the maximum MLR and minimum MLR rate published on the Bank of Thailand website from January to December 2007.  <a href="http://www.bot.or.th/English/Statistics/FinancialMarkets/InterestRate/Pages/StatInterestRate.aspx">http://www.bot.or.th/English/Statistics/FinancialMarkets/InterestRate/Pages/StatInterestRate.aspx</a></p> <p>According to the guideline EB 62 annex 5 para) 10 states "for the calculation of equity IRR only the portion of investment costs which is financed by equity should be considered as the net cash outflow". The working capital interest rate of 7.21% of one month electricity sold is applicable because the financial analysis was demonstrated by the equity IRR. In addition, the amount of 7.21% of one month electricity sold is conservative because the interest for the portion financed by the equity is higher. Hence, the working capital in accordance to EB62 annex 5 is conservative. Therefore, CAR is CLOSED.</p>
<b>Conclusion</b>	<input type="checkbox"/> To be checked during the first periodic verification

Finding	B7
Tick the appropriate checkbox	<input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	B8
<b>Classification</b>	<input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	PDD version 1, section B.5: 1. The project participant is requested to substantiate how the Plant Load Factor (PLF) of 70.45% is derived. 2. Why is only the Plant Load Factor (PLF) considered in the sensitivity analysis?
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	1. PLF has been calculated by Civil & Hydro Power Engineering Division of EGAT based on the historical discharge data from Royal Irrigation Department and simulated by specific spreadsheet program. The model is significant tool for assessment of the reservoir status and power operation. The certified letter has now been provided to the DOE. 2. Sensitivity has been done for Investment Cost, Tariff and PLF and the output has been added in the revised PDD.
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	1. The plant load factor calculation which is verified and signed by the external party was checked. <sup>/PLF1/</sup> As stated in the letter, the value is determined according to the historical water discharge at the dam. The plant capacity determines the water discharged at the dam and is then applied to determine Plant Load Factor (PLF). The team has replicated the PLF by using the estimated plant capacity of 12MW in the FSR and it matches. In addition, the team also verified the Engineering License of the 3 <sup>rd</sup> party who signed and approved the PLF calculation and confirmed that the person is authorized and reliable. <sup>/PLF2/</sup> Therefore, the team concluded that the plant load factor of 70.45% is correct and is in accordance with paragraph 3b) of EB 48 annex 11. Therefore, the CL is CLOSED. 2. The revised PDD version 2 section B.5 has been checked and the parameter for the sensitivity analysis was updated by including the recurring cost (+/- 10%). The parameters applied for sensitivity analysis are now demonstrated using the following four items: <ul style="list-style-type: none"> <li>• Investment cost (+/- 10%)</li> <li>• Electricity tariff (+/- 10%)</li> <li>• Plant load factor (+/- 10%)</li> <li>• Recurring cost (+/- 10%)</li> </ul> For the recurring cost as demonstrated in the IRR sheet is contained the expense which paid annually. The validation team concluded that the parameters constitute more than 20% of either the total project costs or total project revenues has been accounted for in the sensitivity analysis. These four parameters are subjected to a reasonable variation +/- 10% and in accordance with the "GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS". Therefore, the CL is CLOSED.



Finding	B8
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	B9
<b>Classification</b>	<input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The following shall be substantiated: 1) Ratio 60:40 in the equity IRR 2) How is the benchmark of 13.21% been derived
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	1. During FSR preparation, it was assumed that the project will be financed with Debt and Equity. However, before the investment decision date, it was decided that the project will be 100% equity financed. Revised financial sheet (with 100% equity capital structure) has now been provided to the DOE. Based on the resolution by the cabinet. Since on 4 <sup>th</sup> Oct 2005, Cabinet Resolution approved "Public Debt Management Plan for fiscal year 2006" and all 5 hydro projects (including proposed project activity) were mentioned for both domestic and international loan. On 15 <sup>th</sup> August 2006: Cabinet Resolution approved revised "Public Debt Management Plan for fiscal year 2006 (revision 4), all hydro projects has been removed due to some technical issue. Since then until the latest cabinet resolution approved for the "Public Debt Management Plan for fiscal year 2008" which the resolution issued by the Cabinet on 18 <sup>th</sup> Sept 2007, has no project activity included. The evidences of Cabinet resolution has been substantiated since 4 <sup>th</sup> Oct 2005 to 18 <sup>th</sup> Sept 2007 are attached to prove that the proposed project activity is 100% Equity Financed.  2. EGAT internal benchmark for power generation is 14.68% and for whole company is 13.21%. Thus, to be conservative, PDD has been revised to change the benchmark to 13.21% instead of 14.68%. The report prepared by the external party is attached. Thus, the most conservative benchmark is 13.21% and same has been applied to the project activity.
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	1. The Cabinet Resolution for the Approval of Public Debt Management Plan year 2005, 2006, 2007 and 2008 <sup>/EQ1/EQ2/EQ3/EQ4/</sup> have been checked. The 100% equity which the owner invested for project activity without loan approval was based on the cabinet resolution since year 2006 <sup>/EQ2/</sup> . EGAT is the State Enterprise that is operated and managed according to the <i>Electrical Generating Authority of Thailand Act 1968</i> <sup>/EGAT/</sup> . As stated in item 4, paragraph 41 and 42, the budgetary for loan and debt shall be approved by the cabinet. <sup>/EGAT/</sup> Therefore, the Cabinet Resolution for the Approval of Public Debt Management Plan is acceptable and it is reliable since the document has been published by the Deputy Secretary General to the Cabinet, who authorized and signed the document. The detail of assessment is explained in the annex 3. Hence 100% equity is acceptable. CL CLOSED.

Finding	B9																																																	
	<p>2. The internal benchmark 13.21% of EGAT corporate benchmark is applied. This applied value is lower than the 14.68% benchmark of EGAT's power sector which is conservative.</p> <p>In addition, the value is derived according to international financial analysis method used CAPM formula based on the financial parameter in the study report from Stern Steward &amp; Co., Ltd established for EGAT.<sup>/BM1/BM1A/</sup> The value has been assessed and correct.</p> <p>However, PP shall provide the evidence to confirm the statement in PDD version 4 section B5 to demonstrate that “Since EGAT is the only possible project developer who can develop hydro power plant of capacity &gt;1 MW in Thailand, internal company benchmark is more appropriate.” Therefore, the CL is OPEN.</p>																																																	
<b>Corrective Action #2</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<p>It has been found out that apart from public entity, private entities can also develop hydro power projects. For example, a Private Company named M.S.K Marketing Co. Ltd owns 7.5 MW hydro project in Thailand. Evidence: “status_VSPP” has now been provided to the DOE.</p> <p>Since both public and private companies can develop hydro power project in Thailand, benchmark shall be based on the parameters that are standard in the market. The equity IRR is selected as the financial indicator to demonstrate additionality of the project. The required/expected return on equity or ROE is an appropriate benchmark for equity IRR in line with the paragraph 12 of the investment guideline and is also publicly published by the Stock Exchange of Thailand (SET).</p> <p>Return on Equity calculated based on market data “Utilities and Energy” Sector has been removed incomparable companies.</p> <p>Companies which face the same risk profile as the proposed project have been included in the calculation of Cost of Equity. The general stock market index “Energy and Utilities” includes 26 companies involved in a diverse range of activities which includes: operation of water pipeline systems, manufacturing of electrical equipment, manufacturer/distribution of petroleum based products, aviation fuel services and petroleum fuel refining/sales. For the purpose of calculating the benchmark, only six companies involved in the production/sale of electricity have been included.</p> <table><tr><th colspan="7">Listed Electricity Generation Companies in Thailand<sup>1</sup></th></tr><tr><th>Company</th><th>ROE 2003</th><th>ROE 2004</th><th>ROE 2005</th><th>ROE 2006</th><th>ROE 2007</th><th>Average</th></tr><tr><td>Banpu Public Company Limited</td><td>13.35%</td><td>16.03%</td><td>24.73%</td><td>16.32%</td><td>21.87 %</td><td>18.46 %</td></tr><tr><td>Electricity Generating Public Company Limited</td><td>26.02%</td><td>17.28%</td><td>13.83%</td><td>18.14%</td><td>21.89 %</td><td>19.43 %</td></tr><tr><td>Glow Energy Public Company Limited</td><td>N/A</td><td>19.17%</td><td>17.08%</td><td>21.76%</td><td>17.26 %</td><td>18.82 %</td></tr><tr><td>Ratchaburi Electricity Generating Holding Public Co.</td><td>22.93%</td><td>24.39%</td><td>20.24%</td><td>18.45%</td><td>16.15 %</td><td>20.43 %</td></tr><tr><td>Sahacogen</td><td>25.26%</td><td>19.88%</td><td>18.81%</td><td>20.70%</td><td>16.59 %</td><td>20.25 %</td></tr></table>	Listed Electricity Generation Companies in Thailand <sup>1</sup>							Company	ROE 2003	ROE 2004	ROE 2005	ROE 2006	ROE 2007	Average	Banpu Public Company Limited	13.35%	16.03%	24.73%	16.32%	21.87 %	18.46 %	Electricity Generating Public Company Limited	26.02%	17.28%	13.83%	18.14%	21.89 %	19.43 %	Glow Energy Public Company Limited	N/A	19.17%	17.08%	21.76%	17.26 %	18.82 %	Ratchaburi Electricity Generating Holding Public Co.	22.93%	24.39%	20.24%	18.45%	16.15 %	20.43 %	Sahacogen	25.26%	19.88%	18.81%	20.70%	16.59 %	20.25 %
Listed Electricity Generation Companies in Thailand <sup>1</sup>																																																		
Company	ROE 2003	ROE 2004	ROE 2005	ROE 2006	ROE 2007	Average																																												
Banpu Public Company Limited	13.35%	16.03%	24.73%	16.32%	21.87 %	18.46 %																																												
Electricity Generating Public Company Limited	26.02%	17.28%	13.83%	18.14%	21.89 %	19.43 %																																												
Glow Energy Public Company Limited	N/A	19.17%	17.08%	21.76%	17.26 %	18.82 %																																												
Ratchaburi Electricity Generating Holding Public Co.	22.93%	24.39%	20.24%	18.45%	16.15 %	20.43 %																																												
Sahacogen	25.26%	19.88%	18.81%	20.70%	16.59 %	20.25 %																																												

<sup>1</sup> Source: <http://www.set.or.th/en/company/companylist.html>

Finding	B9						
	(Chonburi) Public Company Limited					%	%
	SPCG Public Company Limited	N/A	38.79%	22.32%	26.43%	8.14 %	23.92 %
	<b>Average:</b>	21.89%	22.59%	19.50%	20.30%	16.99 %	20.22 %
	<b>Average for 3 years:</b>						18.93 %
	<p>Annual report for Glow Energy Public Company Limited and SPCG Public Company Limited is not publicly available for 2003. Hence 5 yrs average ROE is not representative benchmark. Thus, in the PDD ROE is calculated using 3 yrs data only. The calculated ROE is 18.93% over the three years prior to the decision to invest in the project (2005-2007).</p> <p>Additional information is provided in the attached spreadsheet to demonstrate how the companies have been classified.</p> <p>Generally speaking, when benchmark is calculated based on market data, data are taken for a longer period rather than one year. Due to market uncertainty and unknown factors, one year data is not representative to apply appropriately to calculate the benchmark. Thus, 3-5 years data is more appropriate which will address the volatility associated with business cycles. For instance, Thailand economic condition was not good in 2011 due to flood. Similarly in 2010, there was lot of political uncertainty in the country. The average ROE is 16.99%, 18.93% and 20.22% for year 1, year 3 and year 5 respectively.</p> <p>Thus, the chosen benchmark of 13.21% is still conservative.</p> <p>Please note that there was a typo in previous responses that the calculated benchmark of 13.21% is internal benchmark. 13.21% was not consistently used by EGAT in past as hurdle rate and hence is not internal benchmark. However, it has been conservatively calculated by EGAT before project activity's board decision date using data from independent third party consultant "Stern Steward &amp; Co., Ltd" and Thai Bond Market.</p>						
<b>DOE Assessment #2</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>PP has demonstration of the ROE in the "Energy&amp;Utilities" Sector published in the Stock Exchange of Thailand website. For the companies who are not involved in electricity production have been removed in order to determine the ROE 18.93%.</p> <p>The demonstration of the 18.93% ROE<sup>/ROE/</sup> was reviewed by the team. The web link provided for all companies are appeared since they have been registered under the Stock Exchange of Thailand and the information published on the website, <a href="http://www.set.or.th/listedcompany/static/listedCompanies_en_US.xls">http://www.set.or.th/listedcompany/static/listedCompanies_en_US.xls</a>.</p> <p>There are 26 companies in total appeared under the "Energy &amp; Utilities" Sector which match to the list of companies demonstrated in the excel sheet provided by PP. <sup>/ROE/set/</sup> Since some of the companies among 26 companies are not producing electricity; therefore, they were removed. There are 6 companies considered and they are involved for the electricity production which could be confirmed by means of checking the company webpage.</p> <p>The annual reports downloaded for the years 2003 to 2007 for the 6 companies are submitted to the team. <sup>/ANR/</sup> The value applied in the excel sheet has been checked that they match to the value indicated in the</p>						



Finding	B9
	<p>annual report for those 6 companies.<sup>/ANR/ROE/</sup> Therefore, the values 16.99%, 18.93%, and 20.01% are determined correctly. The raw data to determine the ROE has been checked and is confirmed.<sup>/ANR/</sup></p> <p>In addition, the team has checked the cost of equity benchmark 13.21%. The value is derived based on the EGAT corporate financial report published by Stern Steward &amp; Co<sup>/BM/BM1A/</sup> by using the Capital Asset Pricing Model (CAPM).</p> <p>In conclusion the validation team accepted the applied benchmark since it is the most conservative one from several options and it has been calculated by a company with the necessary expertise.</p> <p>Therefore, CL is CLOSED.</p>
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	B10
<b>Classification</b>	<input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section B.6.2: PP is requested to remove parameters which is not related to project as listed in methodology and subscribed tools.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Section B.6.2 has been revised to add only three parameters i.e. $EF_{grid,OM}$ , $EF_{grid,BM}$ and $EF$ of subscribed tool. These parameters have been fixed ex-ante for the crediting period.
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Section B.6.2 of the revised PDD version 2 is checked. There are three parameters which are listed not to be monitored and consist of $EF_{grid,OM}$ , $EF_{grid,BM}$ and $EF_{grid,CM}$ . Therefore, the team concluded that the parameters listed in the section B.6.2 are in accordance with the applied methodology and subscribed tools. CL is CLOSED.
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	B11
<b>Classification</b>	<input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section B.7.1, PP is requested to clarify how the electricity generated exported to the grid is measured.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<p>The monitoring parameters have been revised in the PDD.</p> <p><math>EG_{import,y}</math>, <math>EG_{export,y}</math> and <math>EG_{BL,y}</math> will be monitored instead of <math>EG_{aux,y}</math> and <math>EG_{gross,y}</math>.</p> <p>The Emission reduction is only claimed on the <i>Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y</i> as per AMS 1 D. and net electricity is calculated as <math>EG_{export,y} - EG_{import,y}</math>.</p> <p><math>EG_{export,y}</math> and <math>EG_{import,y}</math>: EGAT will install two-way meter. Thus, both export</p>

Finding	B11
	<p>and import of power to EGAT will be recorded in the same meter.  <math>EG_{BL,y}</math> will be calculated by subtracting Total export – Total import [<math>EG_{export,y} - EG_{import,y}</math>].            In case, EGAT meter is malfunctioning, all data can be cross checked with PEA meter, which will be installed outside the project boundary, and will also measure electricity imported &amp; exported to project activity and will send Sales invoice to EGAT. A line diagram has been provided to the DOE to show the connectivity.            Please note that EGAT will not measure the electricity supplied to RID. All generated electricity will be supplied to PEA and PEA will export it to RID. However, EGAT will be invoiced for the electricity supplied to RID.</p>
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>The revised PDD version 2, section B.7.1 was checked. The monitoring parameters listed in the PDD are as following:</p> <ol style="list-style-type: none"> <li>1) Power supplied by the project activity to the grid in year y, <math>EG_{export,y}</math></li> <li>2) Imported power purchased from the Grid in year y, <math>EG_{import,y}</math></li> <li>3) Net electricity exported by the project activity in year y, <math>EG_{BL,y}</math></li> </ol> <p>The description to monitor and the frequency for each parameter was checked in accordance with the applied methodology. <sup>(AMSID)</sup>            Therefore, the CAR is CLOSED.</p>
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	B12
<b>Classification</b>	<input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The data management has not been included to ensure the QA/AC procedure.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Section B.7.2 of the PDD has been revised to add on further details on data management.
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The revised PDD version 2 was assessed the description of data management during the monitoring period is included in section B.7.2. Therefore, the team concluded that the description of the data management has been described to ensure the QA/QC during the monitoring period. Therefore the CL is CLOSED.
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

General	B13
<b>Classification</b>	<input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR

General	B13
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	PP is requested to clarify what is the total project capacity will be implemented since 12MW addressed in the FSR whereas the following capacity stated in the EPC contract: <ul style="list-style-type: none"> <li>• Generator 2x6.176MW</li> <li>• Turbine 2X2.64MW.</li> </ul>
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The estimated generation capacity during Board decision was 12 MW. However, during ordering of the Equipment, the supplier cannot provide the exact specification and the actual generator and turbine capacity is 12.35 (6.176*2) MW and 12.8 (6.4 * 2) MW respectively. To be conservative, Investment cost is based on 12 MW whereas Revenues is based on 12.35 MW i.e Cash Inflow is Higher (12.35 MW) and Cash outflow is lower (12 MW).
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The team has checked and confirmed that the financial sheet is revised by applying 12.35 MW actual capacity to determine the project's revenue while the investment cost and all expenses remained unchanged. The result show that the equity IRR is increased but it is still lower than the benchmark. Therefore, the explanation is acceptable since the revised IRR sheet is conservative. CL is CLOSED.
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	C1
<b>Classification</b>	<input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The start date of the project activity has been checked. The date of execution of the EPC contract is 2008-12-11 and not 2008-12-15.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	There was a typographical error in the webhosted PDD. The date of execution of the EPC contract on 2008-12-11 is addressed in PDD.
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The revised PDD version 2 was checked and the date 2008-12-11 has been addressed in section C.1.1. The date is consistence with the date shown in contract. <sup>ISD/</sup> Also, the date defined is in accordance to the CDM glossary of term. Therefore, CL is closed.
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Duration of the Project	C2
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR

Duration of the Project	C2
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section C.2.1.1 of PDD version 1: The start date of crediting period is not realistic.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Starting date of first crediting period in section C.2.1.1 has been revised in PDD. It has been mentioned in the PDD: "01/01/2013 or on the date of registration of the CDM project activity, whichever is later."
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Section C.2.1.1 of PDD version 2 was reviewed. The start date of crediting period is revised to "01/01/2013 or on the date of registration of the CDM project activity, whichever is later". However, the revised date is not appropriate due to the validation timeline cannot be met. The date should be revised. Therefore, CAR is OPENED.
<b>Corrective Action #2</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Starting date of first crediting period in section C.2.1.1 is revised. It has been mentioned in the PDD: "01/01/2014 or on the date of registration of the CDM project activity, whichever is later."
<b>DOE Assessment #2</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Section C.2.1.1 of PDD version 3 was checked. The start date of crediting period is revised to "01/01/2014 or on the date of registration of the CDM project activity, whichever is later". The revised date is appropriate. Therefore, CAR is CLOSED.
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	E1
<b>Classification</b>	<input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	PDD version 1, Section E: 1. The evidence regarding the local stakeholder consultation meeting which posted by use of a newspaper has not been provided. 2. The outcome of local stakeholder meeting should be addressed in PDD.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	1. Evidence for the newspaper notice has been provided to the DOE and has been attached. 2. Section E.1 and E.2 has been revised to add summary of the meeting in the updated PDD.
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	1. The Naew Na newspaper dated 2009-02-04 <sup>/SHCP1/</sup> was checked and the invitation for the stakeholder meeting has been posted and it can be confirmed the description in section E of PDD version 2 is correct. Therefore, CL is CLOSED. 2. The outcome and detail of stakeholder meeting as carried out on 2009-06-22 is summarized in the section E.1 and E.2. The description was checked and is consistent with the stakeholder meeting report

Finding	E1
	dated 2009-07-28 <sup>/SHCP2/</sup> . Therefore, CL is CLOSED.
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

## **5 VALIDATIONASSESSMENT SUMMARY**

### **5.1 General Description of the Project Activity**

#### **5.1.1 Participation**

##### **LOA**

The Letter of Approval was issued according to the title “Mae Klong Hydropower Project” by Thailand Greenhouse Gas Management Organization (Public Organization), TGO. The host country letter, TGO No.02/281 dated 2010-04-28<sup>/LOA/</sup> was checked and confirmed that the LoA fully matched the CDM requirements. Also, TGO is the authorized DNA of Thailand as the name is listed on the UNFCCC website.<sup>/unfccc/</sup>

There is only one entity, Electricity Generating Authority of Thailand involved in the project activity which the participant checked and matches to the approval issued by Thai DNA.

The approval stated that project activity contributes to sustainable development in Thailand and hereby further confirms:

1. Thailand ratified the United Nations Framework Convention on Climate Change on 28 December 1994 and Kyoto Protocol on 28 August 2002; and
2. The voluntary participation of Electricity Generating Authority of Thailand in the proposed CDM project activity.

The LoA is assessed to be valid and authentic which is signed by the authorized person of DNA.

In the course of validation, CAR.A1 was raised and closed out.

(Please refer to section A.1 of table A-1 of the validation protocol attached in Annex 1 for detail assessment).

#### **Project Participants**

There is only one project participant for this CDM project activity from Thailand (Host Country). The DOE has the contractual agreement with Electricity Generating Authority of Thailand.<sup>/VCS/</sup>

(Please refer to section A.1 of table A-1 of the validation protocol attached in Annex 1 for detail assessment).

#### **5.1.2 Contribution to Sustainable Development**

The authorized representative of the host country party is the Thailand Greenhouse Gas Management Organization (Public Organization), TGO (DNA of Thailand). The DNA of Thailand has confirmed that this CDM project activity complies with the

sustainable development criteria in Thailand as per Thai DNA requirements of the environmental, economic and social development (section A.2 PDD) vide Letter of Approval TGO No.02/281 dated 2010-04-28<sup>/LOA/</sup>.

(Please refer to section A.2 of the table A-1 of the validation protocol attached in Annex 1 for detail assessment).

### **5.1.3 PDD editorial Aspects**

The Project Design Document presented by the project participant applied the latest CDM-SSC-PDD template form published on the UNFCCC website (CDM-SSC-PDD version 03 effective from 2006-12-22).

The PDD was completed as according to the Guidelines for Completing the Project Design Document, version 05 issued from EB34, Annex 9.

(Please refer to section A.4 of the table A-1 of the validation protocol attached in Annex 1 for detail assessment).

### **5.1.4 Technology to be employed**

A physical site visit was conducted on 2009-11-19, 2009-11-20 and 2009-11-25 to confirm the description in the PDD does reflect the real situation of the proposed CDM project activity and the technological parameters of the hydropower plant indicated in A.4.2 of the PDD are consistent with the equipment contract. The project does not involve alteration of the existing installation or process.<sup>/SD/</sup>

A clear description of the project scenario and the scenario existing prior to the start of the implementation of the project which is also the baseline scenario is provided in section A.2, and A.4.2 of the PDD. The project supplies renewable energy based on using hydropower to generate electricity and supply to the Thai grid. The technology employed is environmentally safe and sound.

CL.A2 and CL.A4 were raised in this content and successfully closed out.

(Please refer to section A.4 of the table A-1 of the validation protocol attached in Annex 1 and Chapter 2 of this report for detail assessment).

### **5.1.5 Small Scale Projects**

The project activity is a Type I SSC-CDM project activity. The installed capacity of the project activity is less than 15MW which is the threshold of type I SSC-CDM project activity. The project activity has applied correctly the Indicative Simplified baseline and monitoring methodologies of AMS-I.D version 17. The project activity has demonstrated the additionality of the project as according to the guidelines on the demonstration of additionality of small-scale project activities (version 9), EB 68 annex 27.



All related tools (e.g. Tool to calculate the emission factor of an electricity system version 2.2.1) had been used to calculate the emission reductions of the project activity.

The project activity is not a de-bundled part of a large scale project. The validation team has interviewed and conducted a search in the UNFCCC website to confirm that the project activity was not involved in any registration of a previous project activity within 2 years and there was no similar project category and technology/measure within 1km of the project boundary of the proposed small-scale activity at the closest point of a larger project activity.

(Please refer to section A.5 of the table A-1 of the validation protocol attached in Annex 1 for detail assessment).

## **5.2 Project Baseline, Additionality and Monitoring Plan**

### **5.2.1 Application of the Methodology**

During the time of publishing of PDD, the project applied the approved methodology AMS-I.D “Grid Connected Renewable Electricity Generation” version 14 and the prescribed tool “Tool to calculate the emission factor of an electricity system, version 1.1.

However, the methodology in the final PDD has been upgraded to version 17, approved at EB 61 meeting and prescribed tool “Tool to calculate the emission factor of an electricity system, version 2.2.1 approved at EB 63 are applied.

The applied methodology version is available at the UNFCCC website for AMS-I.D version 17 which is valid from 2011-06-17 onwards and subscribed tool “Tool to calculate the emission factor of an electricity system, version 2.2.1 is valid from 2011-09-29 onwards.

All the applicability conditions of the methodology AMS-I.D are met, and the project activity is not expected to result in emissions including project emissions, leakage, and any other significant emissions not addressed by the applied methodology.

The applied methodology and methodological tools are available at UNFCCC website of <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved>.

The project activity is not expected to result in significant emissions related both to project and leakage, other than those listed in the methodology.

In conclusion, it is assessed that the project applies a valid version of an approved methodology.

CAR.B1, CL.B2 and CAR.B4 has been raised in this content and closed out successfully.

(Please refer to section B.1 of the table A-1 of the validation protocol attached in Annex 1 for detail assessment).



### 5.2.2 Project Boundary

The project spatial boundary as stated in section A.4.1.4 of PDD is in accordance with the proposed location stated in feasibility studies. At the time of the on-site assessment, the validation team was able to visit the project site to check the actual location with a handheld GPS unit and confirmed this with google earth.

According to the applied methodology AMS-I.D version 17, the spatial extent of the project boundary covers the hydropower plant and the Thailand grid. <sup>/PDD/</sup>

Due to the guideline<sup>/GCP/</sup> and methodology<sup>/AMSID/</sup> is not mandatory for small scale project activities to demonstrate the GHG emissions source. However, the supporting documented evidence provided by PPs along with the on-site observations, means the boundary is presented below:

	GHG involved	Description
Baseline emission	CO <sub>2</sub>	Major emission source of electricity generation by Thailand grid is fossil fuel which replaced the electricity generation by project activity.
Project Emission	NA	No supplementary fossil fuel is required for power generation, therefore project emission is considered as zero.
Leakage	NA	Considered as “zero” as per AMS.I.D./ Ver17

No emission sources which are created by the project activity and are not addressed by the approved methodology were detected during validation.

CAR.A3 and CAR.B3 were raised and closed out

(Please refer to section B.2 of the table A-1 of the validation protocol attached in Annex 1 for detail assessment).

### 5.2.3 Baseline Identification

The baseline scenario of the project activity is the continuation of electricity generated from the Thai national grid system (which is mainly fossil fuel based power stations).

As according to the Validation and Verification Manual (version 1.2 EB 55 Annex 1) if the approved methodology applied by the CDM project activity describes the baseline scenario, no further baseline alternative analysis is required. Since the project activity is an installation of newly-grid connected run-of-river hydropower plant, the baseline scenario is the electricity delivered to the grid by the project activity which 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”.

The Grid Emission Factor has been calculated by the PP. As according to page 3 item 12 of the AMS-I.D version 17, the validation team has verified the calculation Grid emission factor calculation prepared by the PP. The calculation of the EF is according to the “Tool to calculate the emission factor for an electricity system version 02.2.1”. The validation team had compared the data input in the calculations with the available generation data provided by the Department of Alternative Energy Development and Efficiency as published in “Thailand Electrical Report year 2008”.<sup>/DEDE/</sup> The calculation from the PP has been assessed compared with the subscribed tool to calculate the emission factor for an electricity system version 2.2.1. According to the electricity distribution system in Thailand there is only one grid system; therefore, The GEF calculation had not included any captive (Off-grid) generations for option I.

The operation margin (OM) of the grid was calculated according to simple OM. Option A has been chosen to calculate the EF of the Grid. The data of net electricity generation and a CO<sub>2</sub> emission factor of each power unit are not available; therefore, the emission factor of each power unit *m* was determined using Option B. The Simple OM was calculated using the data of all operational fossil fuel fired power plants generating electricity to the grid for year 2006, 2007 and 2008.

The build margin (BM) of the grid was calculated according to Option 1 (ex-ante approach). The BM calculation had included the weighted average emission factor from set recently power plants in group comprised at least 20% of generation. None of the power plants in group was registered as CDM /or started supply electricity for more than 10 years.

The results of the calculation which established by PP are as follows:

Operating Margin	0.543
Build Margin	0.569
Combine Margin	0.556

The project participant has further demonstrated that all relevant policies and circumstances have been identified and correctly considered in the PDD in accordance with the guidance by the Board.

In summary, the identification of the baseline scenario is reasonably represented. The baseline scenario is identified in line with the AMS-I.D version 17.

CL.B2, and CAR.B4 were raised and closed out.

(Please refer to section B.3 of the table A-1 of the validation protocol attached in Annex 1 for detail assessment).

## 5.2.4 Calculation of GHG Emission Reductions

The PDD applies steps and equations to calculate baseline emissions, project emissions, leakage and emission reductions as per the requirements of the

methodology AMS-I.D version 17 and the latest version of the methodological tool “Tool to calculate the emission factor for an electricity system” version 2.2.1.

The GHG emission reductions calculations demonstrated in the PDD and the excel spreadsheet has reflected the correct equations of methodological choices. Furthermore, all equations are applied correctly.

For the data and parameters not to be monitored throughout the crediting period (i.e. they are determined only once and thus remain fixed throughout the crediting period), it is assessed that all data sources, assumptions and calculations are correct, applicable to the project and contribute to a conservative estimate of the emission reductions.

(Please refer to section B.5-B.6 of the table A-1 of the validation protocol attached in Annex 1 for detail assessment).

The emission reductions ( $ER_y$ ) of the project activity are the difference between the baseline emissions ( $BE_y$ ), project emissions ( $PE_y$ ) and the leakage emissions ( $L_y$ ) as follows:

$$ER_y = BE_y - PE_y - LE_y$$

#### **Baseline emission:**

$BE_y$  is calculated by multiplying the net electricity generated ( $EG_y$ ) with the combined margin emission factor ( $EF_{CO_2}$ ) as follows:

$$BE_y = EG_{BL,y} \times EF_{CO_2,grid,y}$$

The emission factor ( $EF_{grid,CM,y}$ ) 0.556tCO<sub>2</sub>/MWh is calculated by following the “Tool to calculate the emission factor for an electricity system” version 2.2.1 in a conservative manner.<sup>/GEF/</sup> It is determined as ex-ante and the combined margin (CM), calculated using the weighted average factors of operating margin ( $EF_{OM}$ ) and build margin ( $EF_{BM}$ ).

Default Net calorific value (NCV) from the national average default value is applied since the data is available in the annual report from “Electric Power in Thailand 2008”. For CO<sub>2</sub> emission factor ( $EF_{CO_2}$ ) is applied data of each fossil fuel type obtained from 2006 IPCC Guidelines for National Greenhouse Gas Inventories<sup>/IPCC/</sup>.

The calculation of the grid emission factor was included in Annex 3 of PDD. The validation team has cross-checked the data vintage and calculations and were assessed to be correct and consistent according to the tool to calculate the emission factor for an electricity system version 02.2.1.

The emission coefficient was determined using the data for vintage year 2006 to 2008 available at the time of the PDD publication.

#### **Project emissions:**

The project activity will not install any fossil fuel based generators.. According to AMS I.D, the project emissions of proposed project are considered as zero.

According to the ACM0002 version 13, “Emissions from water reservoirs of hydro power plants ( $PE_{HP,y}$ ), is accounted for hydropower project activities that result in new

*single or multiple reservoirs and hydro power project activities that result in the increase of single or multiple existing reservoirs, project proponents”.*

This is not applicable to the project activity due to project activity is a hydropower project with installation on an existing reservoir which has been constructed and operated for the irrigation proposed for more than 3 years.

The project emission of CH<sub>4</sub> and CO<sub>2</sub> emissions from the reservoirs are not applicable.

### Leakage

According to the methodology AMS-I.D, leakage need not be considered unless the used technology equipment is transferred from another project activity.

### Emission reductions:

The estimated annual net generated electricity by the run-of-river hydropower plant project activity is 75,074 MWh.

According to above information, the emission reductions of the project is calculated as following:

$$ER_y = BE_y - PE_y - LE_y$$

PE<sub>y</sub> is considered zero since there is no reservoir. For ex-ante the diesel consumption is considered as zero since no stand by diesel generator.

LE<sub>y</sub> is considered to be zero since the project is new as according to methodology AMS-I.D version 17, paragraph 22.

The emission reductions as follows:

$$ER_y = BE_y - PE_y$$

$$\begin{aligned} BE_y &= EG_{BL,y} \times EF_{CO_2, grid,y} \\ &= 75,074 \text{ MWh} \times 0.556 \text{ tCO}_2\text{e/MWh} \\ &= 41,741 \text{ tCO}_2\text{e/y} \end{aligned}$$

PE<sub>y</sub> is considered zero in ex-ante

Therefore:

$$ER_y = 41,741 \text{ tCO}_2\text{e} - 0 \text{ tCO}_2\text{e} = \mathbf{41,741 \text{ tCO}_2\text{e/y}}$$

Hence, the annual GHG emission reductions for the first crediting period are estimated ex-ante as 41,741 tCO<sub>2</sub>e.

The emissions reductions have been confirmed by the validation team by cross-checking the emissions reduction calculations process against all referenced data sources and the requirements of applied methodology and methodological tools that:

- a) All data sources and assumptions used by the project are listed and referenced in the PDD, appropriately and the calculations are correct and are applicable to the proposed CDM project activity and will result in a conservative estimate of the emission reductions;

- b) All documentation used by project participants are the basis for these assumptions and source of data are as follows:
  - i) 2006 IPCC default values;<sup>/IPCC/</sup>
  - ii) Thai Electrical Report 2008;<sup>/DEDE/</sup>
  - iii) Other available data.
- c) All values used in the PDD are considered reasonable in the context of the proposed CDM project activity;
- d) The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions;
- e) All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD.

## 5.2.5 Additionality Determination

### Consideration of CDM in decision making (if project start before validation)

The starting date given in the PDD is before the validation started. It is confirmed that this date has been reported in accordance with the glossary of CDM terms. The start date of the project activity is 2008-12-11 which is the date of signing the contract with Chongqing Water Turbine Works Co. Ltd , Sumit Grade Ltd. Part. , and ST Power Engineering Corporation Limited.<sup>/SD/</sup>

At the time of contract sign dated 2008-12-11, the EB 62 annex 13 had not come effective. There was only the *“Guidelines on the demonstration and assessment of prior consideration of CDM” EB41 annex 46 (version 1)* available effective which it required project participant to inform a Host Party DNA **and/or** the UNFCCC secretariat within six months of the project activity start date. The team has reviewed the letter of intention for CDM and it was submitted on 2008-11-27 to the Thai DNA<sup>/LOI/</sup>. Therefore, this is in compliance to the prior consideration guideline EB41 annex 46 (version 1).

Later, the EB48 annex 61 *“Guidelines on the demonstration and assessment of prior consideration of CDM” (version 2)* came into effective on 2009-07-17. The guideline required project participant must inform a Host Party DNA **and** the UNFCCC secretariat within six months of the project activity start date.

The project start date is defined as 2008-12-11 which is after 2008-08-02 and the PP is required to notify the host party DNA and UNFCCC according to EB62 Annex 13. However at that time, EB41 Annex 46 was available which para 2 states the PP is required to inform either the DNA and/or UNFCCC. The PP has submitted a notification to the DNA on 2008-11-27 which is earlier than the project start date. Therefore, the notification to the DNA is in compliance to EB 41 Annex 46 para 2.

Since PP had sent the notification to the host country DNA<sup>/LOI/</sup> on the development of the proposed hydropower project as a CDM activity. In addition, the project participants provide a transparent and clear presentation of the milestones for project implementation and CDM consideration in the PDD. The information provided have

been substantiated with documented evidences which have been verified by the validation team. The documents have been assessed as reliable. Furthermore the project owner was interviewed to cross check the information. The documentation and oral confirmations are consistent.

There is no gap which is greater than 2 years from the first documented evidence to create the CDM committee and member until the contracting of the DOE for the validation of the project activity.

The chronicle events for CDM prior consideration are listed in Timelines Section B.5 of PDD. Below is a summary of the major events:

1. Creating CDM committee and members 2006-11-07.<sup>/CM1/</sup>
2. Announcement of Guideline to develop CDM project to reduce GHG dated 2007-08-17.<sup>/CM2/</sup>
3. Board decision for CDM (BOD) dated 2008-01-10.<sup>/CM3/</sup>
4. Contract agreement signed date 2008-12-11 Chongqing Water Turbine Works Co. Ltd.<sup>/SD/</sup>
5. The CDM consultation agreement with Agrinergy dated 2008-09-09.<sup>/CM5/</sup>
6. Prior CDM consideration Letter sent to TGO ( Thai DNA) dated 2008-11-27 and TGO respond for Letter of Intent (LoI) on 2008-12-11.<sup>/LOI/</sup>
7. Invitation for stakeholder consultation meeting via an announcement in Naew Na newspaper dated 2009-02-04.<sup>/SHCP1/</sup>
8. Local stakeholders consultation dated 2009-06-22.<sup>/SHCP2/</sup>
9. PDD published at UNFCCC website on 2009-09-12.<sup>/unfccc/</sup>

In the content of validation, CAR.B5 was raised and closed out.

(Please refer to section B.4.2 of the table A-1 of the validation protocol attached in Annex 1 for detail assessment).

### **Application of methodology / methodological tools**

The additionality was justified in accordance with the requirements derived from the applied approved CDM methodology and the applied methodological tools referred to therein. Since the project activity is a small scale project activity, the project participant has demonstrated the additionality of the project activity in accordance with the guidelines on the demonstration of additionality of small-scale project activities (version 9), EB 68 annex 27.

### **Alternatives**

As according to paragraph/clause 83 and 105 of the VVM version 01.2 of EB55, if the approved methodology that is selected by the proposed CDM project activity prescribes the baseline scenario, no further analysis of alternative is required. Referring to paragraph/clause 10 to 12 of AMS-I.D version 17, the baseline scenario is being prescribed. Therefore the project activity is not required to demonstrate



alternatives unless it is a Greenfield project activity where the guidance in the methodology is superseded by the tool as stated in paragraph/clause 82 of the VVM version 01.2 EB55.

(Please refer to section B.4.3 of the table A-1 of the validation protocol attached in Annex 1 for detail assessment).

## Investment analysis

The project participants chose the benchmark approach to demonstrate the investment analysis (financial barrier as according to guidelines on the demonstration of additionality of small-scale project activities (version 9), EB 68 annex 27.

The investment analysis was demonstrated according to the guidelines on assessment of investment analysis version 05.

The applied benchmark was chosen based on the internal cost of equity and has been determined based upon the Capital Asset Pricing Model (CAPM). The formula applied for the benchmark is:

$$R_e = R_f + \beta_l(MRP)$$

Where:

$R_e$	Expected return on equity
$R_f$	Risk free return on an investment
$\beta_l$	Equity Beta (levered)
MRP	Market Risk premium

The applied model is an internationally known and applied in making investment decision.

Electricity Generating Authority of Thailand (EGAT) is one of the entity who authorized for the electricity generation of the country<sup>EGAT/iflr/</sup>; therefore, the cost of equity benchmarks/expected returns which are used by the PP is derived in accordance to EB62 annex 5.

The benchmark chosen by the PP is the cost of equity determined from CAPM formula. The 13.21% is determined for EGAT corporate level which is lower than 14.68% calculated from the same basis using the EGAT's financial report established for power sector.<sup>/BM1/BM2/</sup> Hence the benchmark of the corporate cost of equity 13.21% is more conservative and applied.

The team also validated the benchmark determined using CAPM formula and cross checking the parameters applied against the EGAT financial report which was established by the external financial company, Stern Stewart & Co. The data used for the benchmark calculation, as established by the external financial company, is sourced from the data as a reliable financial institute and which is publicly available and accessible.

The DOE concludes the following suitability of benchmark applied in the investment analysis:



- a) Equity IRR was identified as the financial/economic indicator for the project type;
- b) It is ensured that any risk premiums applied in determining the benchmark reflect the risks associated with the project type;
- c) It is reasonable to assume that no investment would be made at a rate of return lower than the benchmark.

The project developer made a decision to develop the project as CDM on 2008-01-10, the project participants made a decision based on the investment in the Feasibility Study Report<sup>/FSR/</sup> which established before the decision made for CDM. Apart from the investment cost as stated in the FSR, the other recurring cost are taken from the regulation and the experience by developing the hydropower project in the country which the team has assessed and concluded that the cost is derived from the reliable source of data and valid at the time of decision made.

According to the FSR, it is established by EGAT who is the entity of Thailand authorized and experienced in hydropower plant projects in the country. There is no existing hydropower projects currently registered in Thailand under the CDM. Hence the team has validated the IRR input value by assessing the literature regarding the development of run-of-river hydropower<sup>/BC/ETSAP/</sup> to check the value applied in the financial analysis sheet. Also, cross checks of the value has been made to similar hydropower CDM projects in the region. Hence the team confirms that:

- a) The data provided in the FSR forms the basis of the decision to proceed with the investment in the project in consideration of CDM benefits, i.e. that the period of time between the FSR (June 2006) and the investment decision (2008-01-10)/CM3/ is about 1 year and 7 months. The DOE assessed this time period is acceptable that it is unlikely that the input values would have materially changed. The DOE came to this result based on analyzing the consumer price index, which increased during the recent years. However, the investment cost stated in the FSR which is applied with not be included in the incremental values.
- b) The values used in the PDD and equity IRR calculation spreadsheet are fully consistent with the FSR, governmental regulations or other sources as indicated in Annex 3 to this report. All these sources were used to decide whether an investment will be conducted.
- c) The input values from the FSR, governmental regulations and other can be confirmed as valid and applicable at the time of the investment decision by cross checking on the basis of specific local and sectoral expertise, interviews and background research.

The project participant has demonstrated the sensitivity analysis of the project activity is in accordance with the requirement of the guidelines on assessment of investment analysis version 05 and to further justify the additionality. The project participant has included the following in the sensitivity analysis:

1. Initial investment cost (decrease by 10% and 10%)
2. Electricity tariff (increase by 10% and 10%)

3. Plant load factor (increase by 10% and 10%)

4. Recurring cost (decrease by 10% and 10%)

CAR.B6, CAR.B7, CL.B8, and CL.B9 were raised and successfully closed out.

An in depth assessment of each parameter is provided in section B.4.4 of the table A-1 attached in annex 1 along with the assessment financial parameter in annex 3 of the validation protocol..

### **Barrier analysis**

The financial return of the project activity is a barrier. The financial / investment barrier has been discussed above. The investment barrier demonstrated in section B.5 of the PDD prevents the implementation of the project.

(Please refer to section B.4.5 of the table A-1 of the validation protocol attached in Annex 1 for detail assessment).

### **Common practice analysis**

The project activity is a small scale CDM project activity. The demonstration of common practice analysis is not applicable.

### **Summary**

The procedure to justify the additionality of the project activity derived from the methodology or required methodological tools that have been applied correctly and are transparently and sufficiently documented in the PDD. Considering all statements above, it is confirmed that the project activity is additional because anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the project activity.

### **5.2.6 Monitoring Methodology**

The monitoring plan is in compliance with the requirements of the methodology AMS-I.D version 17. The amount of electricity supplied to the grid will be monitored using a calibrated electricity meter. The project participant has not considered back-up power for the project activity, which is imported from the Grid.

Whenever electricity is imported from the grid, the amount imported will be monitored from the “two-way” electricity meter. Therefore, the annual electricity exported to the grid (which is used to determine the emission reduction) is compensated for.

CL.B11 and CL.B12 were raised and closed out.

(Please refer to section B.6 of the table A-1 of the validation protocol attached in Annex 1 for detail assessment).

## 5.2.7 Monitoring Plan

The monitoring arrangements are described appropriately in section B.7.1 of the PDD. The monitoring plan covers all monitoring parameters addressed in the methodology AMS-I.D version 17 and in the tool to calculate the emissions factor of an electricity system version 2.2.1.

According to AMS-I.D version 17, the following parameters are required to be monitored:

Parameter according to AMS-I.D ver. 17	Stipulated in section B.7.1 of the PDD (Yes/No)	Remark
CO <sub>2</sub> emission factor of the Grid Electricity in year y ( $EF_{CO_2,y}$ )	No	The emission factor will be applied as an ex-ante value as permitted by the tool to calculate the emission factor for an electricity system version 2.2.1.
Quantity of net electricity supplied to the Grid in year y ( $EG_{BL,y}$ )	Yes	Refer to $EG_{facility,y}$ in AMS-I.D.
Installed capacity of the hydro power plant after the implementation of the project activity ( $Cap_{PJ}$ )	No	According to ACM0002 version 13, $PE_{HP,y}$ is applicable for the project activity with resulting in new single /or multiple reservoirs and hydro power project activities that result in the increase of single or multiple existing reservoirs. Hence this is not applicable to the project activity since the project is a new hydropower plant with installation on the existing reservoir and the reservoir is constructed and operated for more than 3 years. Therefore, $Cap_{PJ}$ and $A_{PJ}$ are not applicable.
Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full ( $A_{PJ}$ )	No	
The quantity of diesel combusted during the year y in the event of a black out of the plant ( $FC_{i,j,y}$ )	No	The expected emissions from the diesel generator usage is less than 1% of the total annual emission reduction. Furthermore, the main back-up electricity is imported from the Grid which is monitored via $EG_{facility,y}$

The validation team concluded that the monitoring plan to be implemented is feasible and within the project design. Proper descriptions have been provided in section B.7.1 of the PDD to describe the measuring methods and procedures to be applied.

The PDD has stipulated information on all the parameters according to the Guideline for Completing the Simplified Project Design Document (CDM-SSC-PDD) and the Form for Proposed New Small Scale Methodologies version 05.

The monitoring plan has included the QA/QC procedure (e.g. calibration and cross-checking) to ensure the emissions reductions achieved can be reported ex-post and verified.

(Please refer to 5.2.6 above and section B.6 of the table A-1 of the validation protocol attached in Annex 1 for detail assessment).

### **5.2.8 Project Management Planning**

The project participant will provide the necessary training and maintenance needs to operate the hydropower plant. The project participant will outsource the training needs when it is required. This has been verified by means of on-site assessment and interviews with the project participant. During the on-site assessment the validation team has also interviewed authorized persons concerned with the project activity. The validation team found that the authorized person has sufficient experience in operating a hydropower plant as he is employed by EGAT and has gained experience with other hydropower plants.

The validation team has also reviewed the task description table of the project activity. The project participant has proposed assigning a designated Project Manager who will be responsible for monitoring emission reductions of the project activity. The Project Manager will also oversee all staff involved with the collection of data and records.

(Please refer to section B.6 of the table A-1 of the validation protocol attached in Annex 1 for detail assessment).

### **5.2.9 Crediting Period**

The project participant has decided to apply the renewable crediting period (7 years). The starting date is defined as 2014-01-01 or on the date of registration of the CDM project activity, whichever is later.

In this content CAR.C2 was raised and closed out.

(Please refer to section C of the table A-1 of the validation protocol attached in Annex 1 for detail assessment).

### **5.2.10 Environmental Impacts**

As per the host country requirement of the Environmental Quality Act 1992, the project participant is exempted from conducting the EIA. However, the project participant is required to prepare the Initial Environmental Evaluation.

(Please refer to section D of the table A-1 of the validation protocol attached in Annex 1 for detail assessment).

### **5.2.11 Comments by Local Stakeholders**

The local stakeholder's consultation was officially conducted on 2009-06-22 by carried out meeting with Local community/sub-district administration board members of Amphur Tha-muang, Kanchanaburi province. <sup>/SHCP2/</sup>

The stakeholders were invited via invitation letter and newspaper announcement (The Naew-Na Newspaper). The newspaper announcement was made on 2009-02-04. <sup>/SHCP1/</sup>

The summary of the comments raised during the stakeholder consultation are addressed in section E.2 of the PDD. The responses from the project participant have also been reflected in section E.2 of the PDD.

There were no negative comments raised during the stakeholder consultation. Some of the participants requested a clearer picture of the project activity which was sufficiently provided by the PP.

CL.E1 has been issued and closed out.

(Please refer to section E of the table A-1 of the validation protocol attached in Annex 1 for detail assessment).

## 6 VALIDATION OPINION

Electricity Generating Authority of Thailand has commissioned the TÜV NORD JI/CDM Certification Program (CP) to validate the project “Mae Klong Hydropower Project” with regard to the relevant requirements of the UNFCCC d CDM project activities, as well as criteria for consistent project operations, monitoring and reporting. UNFCCC criteria include article 12 of the Kyoto Protocol, the modalities and procedures for CDM (Marrakech Accords) and the relevant decisions by COP/MOP and CDM Executive Board

In the course of the pre-validation 11 Corrective Action Requests (CARs) and 10 Clarification Requests (CLs) were raised and successfully closed.

The review of the project design documentation and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders and NGOs have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfilment of the stated criteria.

In detail the conclusions can be summarised as follows:

- The project is in line with all relevant host country criteria (Thailand) and all relevant UNFCCC requirements for CDM. Project activity approval has been obtained from DNA of Thailand via the Letter of Approval (HCA) dated 2010-04-28.
- The project additionality is sufficiently justified in the PDD.
- The monitoring plan is transparent and adequate.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 292,187 tCO<sub>2</sub>e are most likely to be achieved within the (1<sup>st</sup> renewable) crediting period.

The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation.

Bangkok, 2013-01-30



Cheong, Chun Yuen (Robert)  
TÜV NORD JI/CDM CP  
Validation Team Leader

Essen, 2013-01-30



Martin Saalmann  
TÜV NORD JI/CDM CP  
Final Approval

## 7 REFERENCES

**Table 7-1:** Documents provided by the project participant

Reference	Document
/ADD1.1/	Electricity tariff determination according to PPA dated 2005-12-22
/ADD1.2/	EGAT's confirmation letter issued date 2010-01-14 the budgetary of electricity tariff was approval by the cabinet on 2007-10-30
/ADD2.1/	The Letter regarding the estimation cost for land rental as issued by the Treasury Department of Kanchanaburi Province date 2012-06-25
/ADD2.2/	Memorandum of Understanding (MOU) for Land rental between EGAT and Treasury Office of Kanchanaburi Area dated 2008-06-10
/ADD3/	Prasae hydropower project financial analysis, August 2004
/ADD4.1/	Memorandum of Understanding (MOU) between EGAT and RID dated 2007-04-17
/ADD4.2/	Historical water flow rate at Mae Klong Dam from 1982 to 2000
/ADD5/	Feasibility study to develop the Songkhla Combined Heat Cycle, established in May 2004
/BM1/	EGAT's Corporate Benchmark Calculation (13.21%)
/BM1A/	EGAT's Financial Analysis Report established by Sterns & Steward Co.,Ltd dated 2006-02-23
/BM2/	EGAT's power sector benchmark calculation (14.68%)
/CG/	Geological Coordination of the project activity conducting the measurement by PP
/CM1/	Creating CDM committee and members, report of meeting dated 2006-11-07
/CM2/	Announcement of Guideline to develop CDM project to reduce GHG dated 2007-07-17
/CM3/	Board Meeting decision for develop CDM dated 2008-01-10 (Management decision date)



Reference	Document
/CM4/	The CDM consultation proposal submitted by Agrinergy dated 2008-04-03
/CM5/	CDM consultation agreement with Agrinergy dated 2008-09-09
/DEDE/	Report of Electric Power in Thailand year 2008
/EQ/	Notification for the Cabinet Resolution on Public Debt Management Plan 2006 to 2008: 1) Resolution on Public Debt Management Plan year 2006 from Cabinet meeting dated 2005-10-04; (Notification dated 2005-10-07) 2) Resolution on Public Debt Management Revised Plan year 2006 from Cabinet meeting dated 2006-08-15; (Notification dated 2006-08-21) 3) Resolution on Public Debt Management Plan year 2007 from Cabinet meeting dated 2006-10-31 (Notification dated 2006-11-01) 4) Resolution on Public Debt Management Plan year 2008 from Cabinet meeting dated 2007-09-18; (Notification dated 2007-09-19)
/ETSAP/	Energy Technology Systems Analysis Programme, Technology Brief E12 (May 2010)
/FSR/	Mae Klong Hydropower Feasibility Study Report and project description no. 211200-49-07, July 2006 (undated)
/GEF/	Grid Emission Factor and Emission Reduction Calculation sheet 1. Version 1 dated 2009-07-21 2. Version 2 dated 2010-07-14 3. Version 3 dated 2012-06-15
/IEE/	Initial Environmental Evaluation report August 2009 (undated)
/IRR/	Emission reduction calculation and Financial Analysis excel sheet 1) Version 1 dated 2009-07-21 2) Version 2 dated 2012-06-14 3) Version 3 dated 2012-11-30 4) Version 4 dated 2013-01-21 (Final version)
/LOA/	Letter of Approval from Thai DNA, TGO no. 02/277 dated 2010-04-28
/LOI/	1) Letter of Intent submitted to TGO dated 2008-11-27 2) TGO Confirmed the receiving letter of intention to develop the Mae Klong HPP as CDM project activity dated 2008-12-11
/MOC/	Modalities of Communication dated 2011-05-14
/PAL/	Project Activity Layout: 1) Tailrace and overall project location drawing

Reference	Document
	2) Overview of Mae Klong Dam
/PDD/	Project Design Document named "Mae Klong Hydropower Project": 1) PDD version 1 dated 2009-07-21 (hosted from 2009-09-12 to 2009-10-11) 2) PDD version 2 dated 2012-06-14 3) PDD version 3 dated 2012-11-30 4) PDD version 4 dated 2013-01-21 5) Final PDD version 5 dated 2013-01-29
/PLF1/	Plant load factor calculation
/PLF2/	Confirmation of Plant Load Factor issued by the Licensed Engineer (undated)
/PI/	Payment invoice for Mae Klong HPP updated to December 2012
/PPA/	Power purchase Agreement between EGAT and PEA dated 2005-12-22
/PS/	Project scheduling
/SD/	Engineering, Procurement and Construction Contract dated 2008-12-11
/SHCP1/	Announcement of stakeholder consultation on newspaper dated 2009-02-04
/SHCP2/	Stakeholder Consultation Meeting Report dated 2009-07-28
/SLP/	Single Line Diagram for Mae Klong Hydropower Project 2011-10-17
/TD/	Equipment technical specification (attachment of contract signed dated 2008-12-11)
/VCS/	Validation Contract Signed dated 2009-08-31

**Table 7-2:** Background investigation and assessment documents

Reference	Document
/AMSID/	AMS-I.D: Grid Connected Renewable Electricity Generation (Version 17)
/aAaB/	Guidelines on the demonstration of additionality of small-scale project activities , version 9 (EB 68 annex 27)
/BC/	Small Hydro Generation Building Block Profile, Prepared by Stothert

Reference	Document
	Engineering Ltd. March 2003
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/DEDE/	Electric Power in Thailand year 2008
/DEP/	Royal Decree: Revenue Code No. 145 BE. 2527 for Depreciation of Asset (year 1984)
/DIT/	Act of Measurement and Weighing B.E. 2542 which was announced by the Department of Industrial and Trade (DIT) dated 7 <sup>th</sup> April 1999
/EGAT/	The Electrical Authority of Thailand Act year 1968
/ETSAP/	Energy Technology Systems Analysis Programme, Technology Brief E12, May 2010 ( <a href="http://www.etsap.org">www.etsap.org</a> )
/GAIA/	Guidance on the Assessment of Investment Analysis Version 05
/GCP/	UNFCCC: Guidance for Completing the CDM-SSC-PDD" version 05 EB 34 Annex 9.
/GDCP/	Glossary of CDM terms, version 5
/GG/	GENERAL GUIDELINES FOR SSC CDM METHODOLOGIES, version 19 (EB69 annex 27)
/IPCC/	<ul style="list-style-type: none"> <li>• IPCC Good Practice Guidance &amp; Uncertainty Management in National Greenhouse Gas Inventories, 2000</li> <li>• Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual</li> </ul>
/LR/	Law and regulations : Type and capacity of the project or business to be required for the Environmental Impact Assessment (EIA) and reporting format announced by The Ministry of Natural Resources and Environment Department B.E. 2552 (2009)
/PDD-T/	Project Design Document Form for Small Scale CDM Project Activities (CDM-SSC-PDD) – Version 03
/PLFT/	Guidelines for the Reporting and Validation of Plant Load Factors, version 01 (EB48 annex 11)

Reference	Document
/KP/	Kyoto Protocol (1997)
/MA/	Decision 3/CMP. 1 (Marrakesh – Accords & Annex to decision (17/CP.7))
/RIDL/	Royal Irrigation Acts (Issue 4) BE. 2518, date 1975-05-02
/SSCX2/	Decision 4 / CMP.1 annex II, small scale CDM project activity
/TCEF/	Tool to calculate emission factor for an electricity system version 2.2.1
/TRLE/	Tool to determine the remaining lifetime of equipment, version 01 (EB50 annex 15)
/VCS/	Validation Contract Signed dated 2009-08-31
/VVM/	Validation and Verification Manual (Version 01.2, Annex 1, EB 55)

**Table 7-3:** Websites used

Reference	Link	Organisation
/dede/	<a href="http://www.dede.go.th">http://www.dede.go.th</a>	Department of Alternative Energy Development and Efficiency website
/dna/	<a href="http://www.tgo.or.th/">http://www.tgo.or.th/</a>	Thailand Greenhouses Gas Management Organization (Public), DNA of Thailand
/bot/	<a href="http://www.bot.or.th/Thai/Statistics/FinancialMarkets/InterestRate/Pages/StatInterestRate.aspx#">http://www.bot.or.th/Thai/Statistics/FinancialMarkets/InterestRate/Pages/StatInterestRate.aspx#</a>	Bank of Thailand Website (MLR rate)
/cd4cdm/	<a href="http://www.cd4cdm.org">www.cd4cdm.org</a>	UNEP Riso Centre
/eppo/	<a href="http://www.eppo.go.th/info/index.html">http://www.eppo.go.th/info/index.html</a>	Energy Policy and Planning Office of Thailand website (access for the list of IPP and VSPP)
/ipcc/	<a href="http://www.ipcc-nggip.iges.or.jp">www.ipcc-nggip.iges.or.jp</a>	IPCC publications
/rid/	<a href="http://www.rid.go.th">http://www.rid.go.th</a>	Royal Irrigation Department of Thailand website
/tax/	<a href="http://www.rd.go.th/publish/6044">http://www.rd.go.th/publish/6044</a>	Thai Corporate Income Tax

Reference	Link	Organisation
	<a href="#">0.html</a>	
/tmb/	<a href="http://www.thaibma.or.th/">http://www.thaibma.or.th/</a>	Thai Bond Market Association website
/unfccc/	<a href="http://cdm.unfccc.int">http://cdm.unfccc.int</a>	UNFCCC

**Table 7-4:** List of interviewed persons

Reference	Mol <sup>1</sup>		Name	Organisation / Function
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Chanin Areepitak	EGAT / Hydro Project Manager
	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms	Jitaree Keoyote	EGAT / Environmental
	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Choungchote Ratanasen	EGAT
	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Sompop Phuangjit	EGAT
	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms	Somjai Bannag	EGAT
	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms	Kaniknan Patomnuphong	EGAT
	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Dr. Narin Phoawanich	EGAT
	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Wattana Kongtahworn	EGAT
	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Wanchai Hongcherdchai	EGAT/ Finance
	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms	Sasiluksana Khansiri	EGAT
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Surawuth Buaonwan	Summit Grade Ltd. Part / Project Engineer
/IM03/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Amnat Pakdeekul	Local Stake holder at Moo 2 Amphor Tha Muang / Agriculturist

Reference	Mol <sup>1</sup>		Name	Organisation / Function
	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms	Prapaporn Buaklay	Local Stake holder at Moo 2 Amphor Tha Muang / Agriculturist
	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Saichol Sukkasem	Local Stake holder at Moo 2 Amphor Tha Muang / Agriculturist
/IM04/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Pornsak Satiensuwikanon	Provincial Electricity Authority (PEA) / Engineer 5
/IM05/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Chalermwat Intachaisri	Royal Irrigation Dam (RID)/ Water Management Authority
	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Sittisak Sugsaisakon	Agrinergy Ltd. / Project Management
/IM06/	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Varsha Tripathi	Agrinergy Ltd./ Analyst
	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Somkiat Chitphomphai	Agrinergy Ltd.

<sup>1)</sup> Means of Interview: (Telephone, E-Mail, Visit)

# ANNEX

- A1:** Validation Protocol
- A2:** Assessment of Baseline Identification
- A3:** Assessment of Financial Parameters
- A4:** Assessment of Barrier analysis
- A5:** Outcome of the GSCP
- A6:** Appointment certificates of the team members



## ANNEX 1: VALIDATION PROTOCOL

**Table A-1:** Requirements Checklist

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<b>A. General Description of Project Activity</b>				
<b>A.1. Approval</b> <i>The written approval of the parties involved is a mandatory requirement</i>				
<p>A.1.1. Has the project provided written approvals of all parties involved? (EB 55 Annex 1, § 44)  <i>Indicate whether a letter of approval has been received, with a clear reference to the supporting documentation.</i>  <i>Indicate whether this letter was provided to the DOE by the project participants or directly by the DNA</i></p>	<p><i>Description:</i>  According to Section A.3 and Annex I of PDD, the party involved is the only one party from Thailand.  At the time of on-site visit the Host Country Approval (HCA) from Thailand was not available.</p> <p><i>Justification of evidences:</i>  During the on-site assessment, the written approval has not been made available as the project participant is waiting for such approval from the host country.</p> <p><i>Conclusion:</i>  This will be further assessed when the HCA is submitted.  Refer to CAR.A1 raised.</p>	/IM01/	CAR.A1	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<p>A.1.2. Are the approvals issued from organisations listed as DNAs on the UNFCCC CDM website?</p> <p>(EB 55 Annex 1, §§44, 47, 48, 49 (b), 49 (c), 53)</p> <p><i>Indicate the means of validation employed to assess the authenticity, i.e. in case of doubt whether LoA has been verified with the DNA. Further describe which entity submitted the LoA for validation.</i></p>	<p><i>Description:</i></p> <p>During the time of validation, it cannot be proved whether the approval is issued by the listed DNA on the UNFCCC website.</p> <p><i>Justification of evidences:</i></p> <p>During the on-site assessment, the written approval has not been made available as the project participant is waiting for such approval from the host country.</p> <p><i>Conclusion:</i></p> <p>Please see CAR.A1.</p>	/IM01/	CAR.A1	OK
<p>A.1.3. Do the written approvals confirm that the corresponding party is a Party to the Kyoto Protocol?</p> <p>(EB 55 Annex 1, § 45(a))</p>	<p><i>Description:</i></p> <p>Please refer A.1.1 and A.1.2.</p> <p><i>Justification of evidences:</i></p> <p>During the on-site assessment, the written approval has not been made available as the project participant is waiting for such approval from the host country.</p> <p><i>Conclusion:</i></p> <p>Please see CAR.A1.</p>	/IM01/	CAR.A1	OK
<p>A.1.4. Do the written approvals confirm that the participation is voluntary?</p> <p>(EB 55 Annex 1, § 45(b))</p>	<p><i>Description:</i></p> <p>Please refer A.1.1 and A.1.2.</p> <p><i>Justification of evidences:</i></p>	/IM01/	CAR.A1	OK

<b>Checklist Item</b> (incl. guidance for the validation team)	<b>Validation Team Comments</b> (justification and substantiation of information, data and evidences)	<b>Ref.</b>	<b>Draft Concl.</b>	<b>Final Concl.</b>
	<p>During the on-site assessment, the written approval has not been made available as the project participant is waiting for such approval from the host country.</p> <p><i>Conclusion:</i> Please see CAR.A1.</p>			
<p>A.1.5. Does the written approval from the host country confirm<sup>7</sup> that the project contributes to the sustainable development in the country? (EB 55 Annex 1, § 45(c))</p>	<p><i>Description:</i> Please refer A.1.1 and A.1.2.</p> <p><i>Justification of evidences:</i> During the on-site assessment, the written approval has not been made available as the project participant is waiting for such approval from the host country.</p> <p><i>Conclusion:</i> Please see CAR.A1.</p>	/IM01/	<del>CAR.A1</del>	OK
<p>A.1.6. Do the written approvals refer to the precise project title in the PDD submitted for registration or an additional specification of the project activity, e.g. PDD version number? (EB 55 Annex 1, §§ 45(d), 50)</p>	<p><i>Description:</i> Please refer A.1.1 and A.1.2.</p> <p><i>Justification of evidences:</i> During the on-site assessment, the written approval has not been made available as the project participant is waiting for such approval from the host country.</p> <p><i>Conclusion</i> Please see CAR.A1.</p>	/IM01/	<del>CAR.A1</del>	OK

<b>Checklist Item</b> (incl. guidance for the validation team)	<b>Validation Team Comments</b> (justification and substantiation of information, data and evidences)	<b>Ref.</b>	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p>A.1.7. Are the written approvals unconditional with regard to A.1.3 to A.1.6?</p> <p>(EB 55 Annex 1, § 46)</p>	<p><i>Description:</i></p> <p>Please refer A.1.1 and A.1.2.</p> <p><i>Justification of evidences:</i></p> <p>During the on-site assessment, the written approval has not been made available as the project participant is waiting for such approval from the host country.</p> <p><i>Conclusion:</i></p> <p>Please see CAR.A1.</p>	<p>/IM01/</p>	<p><del>CAR.A1</del></p>	<p>OK</p>
<p>A.1.8. Is the information regarding the project participants listed in section A3 and in Annex 1 of the PDD internally consistent to each other?</p> <p>(EB 55 Annex 1, § 51)</p>	<p><i>Description:</i></p> <p>Please refer A.1.1 and A.1.2.</p> <p><i>Justification of evidences:</i></p> <p>During the on-site assessment, the written approval has not been made available as the project participant is waiting for such approval from the host country.</p> <p><i>Conclusion:</i></p> <p>Please see CAR.A1.</p>	<p>/IM01/</p>	<p><del>CAR.A1</del></p>	<p>OK</p>
<p>A.1.9. Are all project participants listed in the PDD approved at least by one Party involved?</p> <p>(EB 55 Annex 1, § 51)</p> <p><i>Indicate whether the participation of the project participant(s) has been approved by a Party to the Kyoto Protocol.</i></p> <p><i>Describe the means of validation employed to draw this</i></p>	<p><i>Description:</i></p> <p>Please refer A.1.1 and A.1.2.</p> <p><i>Justification of evidences:</i></p> <p>During the on-site assessment, the written approval has not been made available as the project participant is waiting for</p>	<p>/IM01/</p>	<p><del>CAR.A1</del></p>	<p>OK</p>

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<i>conclusion.</i>	such approval from the host country.  <i>Conclusion:</i> Please see CAR.A1.			
A.1.10.Are any other project participants approved but not listed in the PDD? (EB 55 Annex 1, § 52)	<i>Description:</i> Please refer A.1.1 and A.1.2.  <i>Justification of evidences:</i> During the on-site assessment, the written approval has not been made available as the project participant is waiting for such approval from the host country.  <i>Conclusion:</i> Please see CAR.A1.	/IM01/	<del>CAR.A1</del>	OK
A.1.11.Does the DoE have a direct contractual relationship with the PP? (EB 55 Annex 1, § 51; EB 50 Annex 48, §§ 7–9) <i>Check whether the PPs listed in the published PDD are still listed in the PDD going to be submitted to request for registration.</i>	<i>Description:</i> The DOE TÜV NORD CERT GmbH has a direct contractual relationship with Electricity Generating Authority of Thailand.  <i>Justification of evidences:</i> The contractual agreement between TUV NORD CERT GmbH and Electricity Generating Authority of Thailand was checked to confirm that the DOE has a direct contractual relationship with the PP.  <i>Conclusion:</i> The DOE has a direct contract with host country PP.	/IM01/ /VCS/	OK	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<b>A.2. Contribution to Sustainable Development</b>  <i>The project's contribution to sustainable development is assessed.</i>				
<p>A.2.1. Has the host country confirmed that the project assists it in achieving sustainable development?</p> <p>(EB 55 Annex 1, §§ 125–127)  <i>Contains a statement confirming whether the letter of approval by the DNA of the host party confirmed the contribution of the project to the sustainable development of the Host Party.</i></p>	<p><i>Description:</i>  As the host country letter of approval is not available, it cannot be confirmed that the sustainable development goals of the proposed project activity have been achieved.</p> <p><i>Justification of evidences:</i>  During the on-site assessment, the written approval has not been made available as the project participant is waiting for such approval from the host country.</p> <p><i>Conclusion:</i>  Please refer CAR.A1.  Further assessment will be conducted after the receiving the host country approval.</p>	/IM01/	CAR.A1	OK
<p>A.2.2. Will the project create other environmental or social benefits than GHG emission reductions?</p> <p>(EB 55 Annex 1, §§ 125–127)  <i>Describe the other positive aspects not related to GHG emission reduction on the environment.</i></p>	<p><i>Description:</i>  The proposed project activity will create the environmental and the social benefits other than GHG emission reduction. The run-of-river hydropower project will be established at the existing Mae Klong Dam located.</p> <p>The purpose of Mae Klong Dam is normally for the irrigation in the local area. According to the installation of the project activity, apart from the irrigation purpose; electricity will be</p>	/PDD/ /IM01/ /IM03/ /on-site/	OK	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	<p>also generated and supplied to the local grid.</p> <p>The electricity generated by the project activity will be delivered to the grid and will provide social benefit in terms of reducing black out problems in the area. Due to the electricity generated by the project activity it will be further supplied to the Provincial Electricity Authority (PEA) at Kanchanaburi Province.</p> <p><i>Justification of evidences:</i></p> <p>The project participant was interviewed and the site visit was conducted and it can be confirmed the project will create the environmental and social benefits besides GHG emission reduction.</p> <p><i>Conclusion:</i></p> <p>By means of on-site assessment, the validation team concludes that the project will create other environmental or social benefits besides GHG emission reductions.</p>			
<p><b>A.3. PDD editorial aspects</b></p> <p><i>The PDD used as a basis for validation shall be prepared in accordance with the latest template and guidance from the CDM Executive Board available on the UNFCCC CDM website.</i></p>				
A.3.1. Has the latest version of the PDD form been applied?	<i>Description:</i>	/PDD/	OK	OK



Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
(EB 55 Annex 1, § 55)	<p>The PDD has applied the latest version of the “Project design document form (CDM-SSC-PDD)-version 03” which matches the scale and type of the proposed project activity.</p> <p><i>Justification of evidences:</i></p> <p>The validation team has assessed the PDD format and cross checked it with the valid version of the PDD template available at the UNFCCC website.</p> <p><i>Conclusion:</i></p> <p>By mean of assessment, the team concluded that the valid version of the PDD form is applied.</p>	/PDD-T/ /unfccc/		
<p>A.3.2. Has the PDD been duly filled in accordance with the latest guidance(s)?</p> <p>(EB 55 Annex 1, §§ 56–57)</p>	<p><i>Description:</i></p> <p>The PDD has been applied the latest guideline “Guidelines for completing the simplified project design document (CDM-SSC-PDD) and the form for proposed new small scale methodologies (CDM-SSC-NM)” version 05, the version valid for submission of registration which publicly available on the UNFCCC website.</p> <p><i>Justification of evidences:</i></p> <p>The validation team has assessed the PDD and the “Guidelines for completing the simplified project design document (CDM-SSC-PDD) and the form for proposed new small scale methodologies (CDM-SSC-NM)” version 5 which accessed from the UNFCCC website.</p> <p><i>Conclusion:</i></p> <p>By means of assessment, the team concluded that the PDD</p>	/unfccc/ /GCP/ /PDD/	OK	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	is completed in accordance with the latest guidance.			
<b>A.4. Technology to be employed</b> <i>Validation of project technology focuses on the project engineering, choice of technology and competence/maintenance needs. The DOE should ensure that environmentally safe and sound technology and know-how is used.</i>				
<p>A.4.1. Does the PDD contain a clear, accurate and complete project description?</p> <p>(EB 55 Annex 1, §§ 58–59, 64)</p> <p><i>The PDD shall contain a clear description of the project activity which provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation.</i></p> <p><i>Pl. consider esp. chapters A.2, A.4.2 and A.4.3 (in case of LSC PDD) for assessment.</i></p> <p><i>§64 (a) Describe the process undertaken to validate the accuracy and completeness of the project description.</i></p> <p><i>§64 (b) Contain the DOE's opinion on the accuracy and completeness of the project description.</i></p>	<p><i>Description:</i></p> <p>The project description is given in various parts of the PDD (esp. In sections A.2 and A.4.2). In general the project description cannot be assessed as clear, accurate, complete and sufficient to provide the reader with a profound understanding of the project activity. There are some technical data and information provided in the PDD which was not clear.</p> <p><i>Justification of evidences:</i></p> <p>For assessment the validation team has reviewed the PDD in detail and carried out a site visit to interview the project proponents<sup>/IM01/</sup>.</p> <p><i>Conclusion:</i></p> <p>Refer to CL.A2, CL.A4 and CL.B13 raised.</p>	<p>/PDD/ /IM01/ /on site/</p>	<p><del>CL.A2</del> <del>CL.A4</del> <del>CL.B13</del></p>	<p>OK OK OK</p>
A.4.2. Is this description in accordance with the real situation or (in case of greenfield projects) is it	<i>Description:</i>	/FSR/	<del>CAR.A3</del>	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
most likely that the project will be implemented acc to the project description?	<p>The description of the proposed project activity is a Greenfield project activity. The proposed project activity is the installation of two turbine generators of approximate 6MW each and delivered electricity to the Provincial Electricity Authority (PEA) transmission line.</p> <p>The project activity is a run-of-river hydropower project, the canal is excavated to be the intake water to the turbines where the power house will be constructed. Then the turbines will be installed across the excavated canal on the sideway stream of the existing dam.</p> <p>The diverging water stream in front of dam gate will flow into the excavated canal which further drives turbines for generating the electricity. Later this channel joins the river further downstream. The project activity is located where Mae Klong Dam is located in Kanchanaburi Province, Thailand. The proposed project activity is during the constructing phase at the time of on-site visit.</p> <p><i>Justification of evidences:</i></p> <p>The PDD was assessed in detail. The project participant, Provincial Electricity Authority at Kanchanaburi province, Royal Irrigation Dam at Mae Klong Dam and the CDM consultant were interviewed during the on-site visit. The project activity information in the feasibility study report and the plant layout has been checked during site visit.</p> <p><i>Conclusion:</i></p>	/PDD/ /PAL/ /IM01/ /IM05/ /IM06/ /on site/	<del>GLA4</del> <del>GLA5</del> <del>GLB13</del>	OK OK OK

<b>Checklist Item</b> (incl. guidance for the validation team)	<b>Validation Team Comments</b> (justification and substantiation of information, data and evidences)	<b>Ref.</b>	<b>Draft Concl.</b>	<b>Final Concl.</b>
	Refer to CAR A3, CL A4, CL A5 and CL B13 raised.			
<p>A.4.3. In case the project involves alteration of the existing installation or process, is a clear description available regarding the differences between the project and the pre-project situation?</p> <p>(EB 55 Annex 1, §§ 63–64) <i>Describe the steps taken to validate this issue.</i></p>	<p><i>Description:</i> The project activity is new and there are no alterations. This has been checked during site visit by carrying out interviews to project participant and assessed to the equipment and machine signed contract.</p> <p><i>Justification of evidences:</i> The PDD was assessed in detail. On-site visit and interviews were carried out and confirmed.</p> <p><i>Conclusion:</i> The validation team concludes that the proposed project activity does not involve alterations of the existing installation or process. Therefore, this is not applicable to the proposed project activity.</p>	/SD/ /PDD/ /IM01/ /on site/	OK	OK
<p>A.4.4. Does the project design engineering reflect current good practices?</p> <p><i>Consider the equipment specifications, literature (e.g. EU BREF papers) and professional experiences. Describe the process undertaken to assess the engineering.</i></p>	<p><i>Description:</i> This project design engineering reflects good practice that is not available in the host country.</p> <p><i>Justification of evidences:</i> The PDD was assessed in detail. The project participant<sup>/IM01/</sup> was interviewed. Relevant documents relating to the contract agreement<sup>/SD/</sup> have been validated.</p> <p><i>Conclusion:</i></p>	/SD/ /PDD/ /IM01/ /on site/	OK	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	The validation team concludes that the design engineering reflects current good practice.			
<p>A.4.5. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?</p> <p><i>Describe the process undertaken to assess the state of the art technology.</i></p>	<p><i>Description:</i> The proposed project activity uses state of the art technology, which is not available in the host country.</p> <p><i>Justification of evidences:</i> The validation team has interviewed the project participant and conducted an on-site visit. The contract agreement has been signed for the bulb turbine generator<sup>/SD/</sup>.</p> <p><i>Conclusion:</i> The validation team has confirmed that the project applies state of the art technology in this industrial sector which is not available in the host country.</p>	<p>/SD/ /PDD/ /IM01/ /on site/</p>	OK	OK
<p>A.4.6. Does the project make provisions for meeting training and maintenance needs?</p> <p><i>Describe the process undertaken to assess the maintenance and training needs.</i></p>	<p><i>Description:</i> The project has made provisions to provide necessary training and maintenance needs to operate the project activity. The operators will be trained on general knowledge regarding the equipment installed, operation, inspection, maintenance, calibration and emergency responds. In addition, the manual and related documentation will be provided by the technology provider for further implementation by the project participant.</p> <p><i>Justification of evidences:</i></p>	<p>/IM01/ /IM02/ /SD/</p>	OK	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	<p>The validation team has interviewed the project participants regarding the training program to be provided to the operators. The contract between the project participant and the technology provider will provide the maintenance service to the proposed project activity and was validated and states that engineers from the technology provider will be stationed at the project activity location to operate and provide support until the project is handed over to the project owner.</p> <p><i>Conclusion:</i></p> <p>The validation team has concluded that the project participants will be provided with adequate training and maintenance knowledge for the operation of the proposed project activity.</p>			
<p><b>A.5. Small scale project activity</b></p> <p><i>It is assessed whether the project qualifies as small-scale CDM project activity</i></p>				
<p>A.5.1. Does the project qualify as a small scale CDM project activity as defined in decision 4 / CMP.1 annex II?</p> <p>(EB 55 Annex 1, §§ 135–136 (a))</p>	<p><i>Description:</i></p> <p>The proposed project activity is the newly installed bulb turbine generation system with the installed capacity 6MW x 2 units, which is below the threshold of SSC projects of type I. Renewable energy project activities with a maximum output capacity of equivalent up to 15 megawatts.</p> <p><i>Justification of evidences:</i></p> <p>The validation team assessed the relevant documents of the</p>	<p>/SD/ /PDD/ /SSCX2/</p>	<p>OK</p>	<p>OK</p>

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	<p>contract signed agreement and interviewed the project participant to confirm that the proposed project activity is qualified as small scale project activity.</p> <p><i>Conclusion:</i></p> <p>The validation team concludes that the proposed project is qualified as a small scale CDM project activity as defined in decision 4 / CMP.1 annex II.</p>			
<p>A.5.2. Does the project apply one of the approved small scale categories and any methodology and tool referred therein?</p> <p>(EB 55 Annex 1, § 136 (b))</p> <p><i>Check, if applicable the expiry dates of the applied methodology. Further, take into consideration the general guidance to the methodologies<sup>2</sup>, which provide guidance on equipment capacity, equipment performance, sampling and other monitoring related issues.</i></p>	<p><i>Description:</i></p> <p>The proposed project activity with an electricity generation capacity at 12MW approximately; therefore, the AMS-I.D is applied since it is a small scale project.</p> <p><i>Justification of evidences:</i></p> <p>The methodology and tools applied in the PDD were reviewed and cross checked with the UNFCCC website.</p> <p><i>Conclusion:</i></p> <p>The validation team concludes the proposed project activity applies the approved small scale methodology and tools referred to therein.</p>	<p>/PDD/ /unfccc/ /AMSID/</p>	OK	OK
<p>A.5.3. Is the small scale project activity not a debundled component of a larger project activity?</p> <p>(EB 55 Annex 1, § 136 (c))</p>	<p><i>Description:</i></p> <p>The proposed project activity is the small scale project activity. It is not the de-bundled component of a large scale project activity. There is no registered small-scale CDM</p>	<p>/IM01/ /on site/ /unfccc/</p>	OK	OK

<sup>2</sup><http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html>



<b>Checklist Item</b> (incl. guidance for the validation team)	<b>Validation Team Comments</b> (justification and substantiation of information, data and evidences)	<b>Ref.</b>	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p><i>Describe the steps taken to validate this issue. Pl refer to the Compendium of guidance on debundling (EB 54, Annex 13).</i></p>	<p>project activity or an application to register another small-scale CDM project activity:</p> <ul style="list-style-type: none"> <li>• With the same project participants;</li> <li>• In the same project category and technology/measure; and</li> <li>• Registered within the previous 2 years; and</li> <li>• Whose project boundary is within 1 km of the project boundary of the proposed small scale activity at the closest point.</li> </ul> <p>However, the PDD should clearly explain this issue.</p> <p><i>Justification of evidences:</i></p> <p>During the site visit and interviews, it was confirmed that no similar projects have been registered in the past 2 years.</p> <p>The validation team checked with websites of UNFCCC and CD4CDM to confirm there are no similar projects registered by the project participant, within the same location and in the past 2 years.</p> <p><i>Conclusion:</i></p> <p>The validation team concludes that the proposed project activity is a small scale project activity which is not a de-bundled component of a larger project activity.</p>	<p>/cd4cdm /</p>		
<p>A.5.4. Is an assessment of the environmental impacts of the proposed SSC CDM project</p>	<p><i>Description:</i></p> <p>The proposed project activity does not fall into the criteria</p>	<p>/IM01/ /LR/</p>	<p>OK</p>	<p>OK</p>

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
activity required by the host Party? (EB 55 Annex 1, § 136 (d))	that required an environmental impact assessment by the host country, Thailand. <i>Justification of evidences:</i> Knowledge of the host country validation team and review of the regulation issued by the Office of Natural Resources and Environmental Policy and Planning, Thailand. <i>Conclusion:</i> By means of the knowledge of the host country competence team members, the proposed project activity is not required to conduct an environmental impact assessment by the host country.			
<b>B. Project Baseline, Additionality and Monitoring Plan</b>				
<b>B.1. Application of the Methodology</b>				
B.1.1. Does the project apply an approved and applicable CDM methodology and a valid version thereof? (EB 55 Annex 1, § 65) <i>Describe the steps taken to validate this issue.</i>	<i>Description:</i> The project activity has applied the approved methodology AMS-I.D version 14, which is valid from 2009-07-31 to 2009-10-29 and will be valid for registration submission until 2010-07-29. <i>Justification of evidences:</i> To ensure that the applied methodology is approved by the	/PDD/ /unfccc/ /AMSID/	GLB2	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	<p>EB, the PP has not chosen the available latest version, from the methodologies section of UNFCCC CDM website at the time of submitted the PDD for publication</p> <p><a href="http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html">http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html</a>)</p> <ol style="list-style-type: none"> <li>1. The validation team has compared the version of the methodology stated in the PDD with the methodologies section of the UNFCCC website. As stated on the website, the validity version of AMS-I.D version 14 is from 2009-07-31 to 2009-10-29 and will be valid for registration submission until 2010-07-29.</li> <li>2. The grace period for registration can be submitted until 2010-07-29.</li> </ol> <p><i>Conclusion:</i></p> <p>The validation team concluded that the project activity had applied a valid and an approved applicable CDM methodology at the time of PDD submission for GSC period during 2009-09-12 to 2009-10-11.</p> <p>However, the methodology version has been revised during the validation process due to the registration submission cannot be met the timeline on 2010-07-29.</p> <p>Refer to CL.B2 raised for further assessment.</p>			

<b>Checklist Item</b> (incl. guidance for the validation team)	<b>Validation Team Comments</b> (justification and substantiation of information, data and evidences)	<b>Ref.</b>	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p>B.1.2. Is the applied CDM methodology identical with the version available on the UNFCCC website?</p> <p>(EB 55 Annex 1, §§ 65, 70)</p> <p><i>Describe the steps taken to validate this issue.</i></p>	<p><i>Description:</i></p> <p>The methodology applied at the time of web hosting at UNFCCC is identical with the version available on UNFCCC website.</p> <p><i>Justification of evidences:</i></p> <p>The updated version 14 of the methodology applied is valid from 2009-07-31 to 2009-10-29. Also grace period for registration can be submitted until 2010-07-29.</p> <p><a href="http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html">http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html</a></p> <p><i>Conclusion:</i></p> <p>The validation team concluded that the project activity had applied an approved and applicable CDM methodology and a valid version at the time of PDD submission for GSC period during 2009-09-12 to 2009-10-11. Nonetheless, CL.B2 has been raised.</p>	<p>/unfccc/ /AMSID/</p>	<p><del>CL.B2</del></p>	<p>OK</p>
<p>B.1.3. Are all applicability criteria in the methodology, the applied tools or any other methodology component referred to therein fulfilled?</p> <p>(EB 55 Annex 1, §§ 66(a)–(b), 68, 71, 76)</p> <p><i>Describe for each applicability criterion listed in the selected approved methodology the steps taken to assess the information contained in the PDD.</i></p>	<p><i>Description:</i></p> <p>The proposed project activity is the newly installed renewable run-of-river hydropower project with a power generation capacity of less than 15MW.</p> <p>The AMS-I.D version 14 was applied at the time of PDD web-hosting for comment period 2009-09-12 to 2009-10-11. According to the AMS-I.D version 14, the proposed project activity is applicable as per the following criteria:</p> <p>Criterion 1: The project activity is the generation of</p>	<p>/unfccc/ /AMSID/ /PDD/</p>	<p><del>CL.B2</del></p>	<p>OK</p>

<b>Checklist Item</b> (incl. guidance for the validation team)	<b>Validation Team Comments</b> (justification and substantiation of information, data and evidences)	<b>Ref.</b>	<b>Draft Concl.</b>	<b>Final Concl.</b>
	<p>hydropower that will be fed into the national grid. In the absence of the project activity this power would have been produced by fossil fuel fired generation units in the grid thus meeting the requirements. Therefore, the criterion 1) is met.</p> <p>Criterion 2: The project activity utilizes renewable resources in the installation of two turbines of 6MW each thus remaining under the 15MW limit required by the methodology. Therefore, the criterion 2) is applicable.</p> <p>Criterion 3: The project activity is not a co-generation unit. Thus, this criterion is not applicable for the project activity. Therefore, the criteria 3) is fulfilled.</p> <p>Criterion 4: There was no power generation on site before the project activity. Therefore, this is not applicable.</p> <p>Criterion 5: There is no existing power generation on the site of the project activity thus negating this condition. Thus this is not applicable.</p> <p>The proposed project activity is a newly installed run-of-river hydropower plant with estimated capacity 12MW. There is no power generation on-site before and no existing power generation on the site. Therefore, the criterion 1) and 2) are applicable.</p> <p>The project activity has fulfilled the applicable tools or other methodology component required by the approved methodology. The following tools and guidelines have been applied by the project activity:</p> <ol style="list-style-type: none"> <li>1. Tool to calculate the emission factor of an electricity system version 1.1.</li> </ol>			

<b>Checklist Item</b> (incl. guidance for the validation team)	<b>Validation Team Comments</b> (justification and substantiation of information, data and evidences)	<b>Ref.</b>	<b>Draft Concl.</b>	<b>Final Concl.</b>
	<p>2. Attachment A to Appendix B of the Simplified Modalities and Procedures for SSC-CDM project activities.</p> <p><i>Justification of evidences:</i></p> <p>The following were checked during the on-site visit by means of document review and interview of PP.</p> <p>1) The project activity is a run-of-river hydropower generation unit that will supply the electricity to an electrical distribution system.</p> <p>2) The total installed capacity of the project activity is less than 15MW.</p> <p>3) The project activity is not a combine heat and power system.</p> <p>4) The project activity is not involved the addition of renewable energy generation units at an existing renewable power generation facility.</p> <p>5) The project activity is renewable energy generation with new generating facility unit.</p> <p>6) The project activity is not the new unit has both renewable and non-renewable components.</p> <p><i>Conclusion:</i></p> <p>Please refer CL.B2 for further assessment.</p>			

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<p>B.1.4. In case one or more applicability criteria have not been met, has the validation team requested clarification to, revision of or deviation from the methodology in accordance with the latest guidelines?</p> <p>(EB 55 Annex 1, §§ 72–75)</p>	<p><i>Description:</i> Please refer B.1.3 the proposed project activity fulfilled all applicable criteria of the applied methodology.</p> <p><i>Justification of evidences:</i> The PDD is checked and the result is consistent with all applicable criterion stipulated in the methodology.</p> <p><i>Conclusion:</i> For further assessment please see CL.B2.</p>	/AMSID/ /PDD/	CL.B2	OK
<p>B.1.5. Is the project in accordance with every other stipulation or requirement mentioned in all sections of the methodology and in guidances for approved methodologies provided by the CDM EB?</p> <p>(EB 55 Annex 1, § 69, 71)</p> <p><i>Describe the steps taken to check whether the proposed project activity meets all the other possible stipulations and /or limitations mentioned in all sections of the approved methodology selected.</i></p>	<p><i>Description:</i> The proposed project activity met all applicable requirements as prescribed in the assessment at B.1.3.</p> <p><i>Justification of evidences:</i> All requirements stipulations have been checked with the methodology.</p> <p><i>Conclusion:</i> For further assessment please see CL.B2.</p>	/AMSID/ /PDD/	CL.B2	OK
<p><b>B.2. Project Boundaries</b></p> <p><i>Project Boundaries are the limits and borders defining the GHG emission reduction project</i></p>				
<p>B.2.1. Are the project's spatial boundaries (geographical) clearly defined?</p>	<p><i>Description:</i> The proposed project activity is a run-of-river hydropower</p>	/on site/	CAR.A3	OK



<b>Checklist Item</b> (incl. guidance for the validation team)	<b>Validation Team Comments</b> (justification and substantiation of information, data and evidences)	<b>Ref.</b>	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p>(EB 55 Annex 1, §§ 67(a), 78–80) <i>Provide information on how the validation of the geographical boundary has been performed either based on reviewed documented evidence or by describing what was observed/viewed during a site visit.</i></p>	<p>which located at Ban Muang Chum, Amphor Tha Muang in Kanchanburi province, of Thailand. The geographic coordinates of the project at the power house are not clearly demonstrated. The project boundary encompasses the physical and geographical site of the renewable generation source. Thus, the boundary covers installation of the turbine generators units with estimated capacity 12 MW.  <i>Justification of evidences:</i> The physical location and the boundary have been checked on the map, during the site visit and the initial environmental report.  <i>Conclusion:</i> Refer to CAR.A3 and CAR.B3 raised.</p>	<p>/TD/ /PDD/ /IEE/</p>	<p>CAR.B3</p>	<p>OK</p>
<p>B.2.2. Are all sources and GHGs included in the project boundary as required in the applied methodology?  (EB 55 Annex 1, §§ 67(a), 78–80) <i>Provide information on how the validation of the GHGs and sources has been performed either based on reviewed documented evidence or by describing what was observed/viewed during a site visit.</i></p>	<p><i>Description:</i> This section is not applicable for small-scale projects as per the PDD completion guidelines and the applied methodology.  <i>Justification of evidences:</i> The PDD was assessed in detail. The interview and site visit was carried out and cross checked with the methodology.  <i>Conclusion:</i> NA</p>	<p>/AMSID/ /PDD/</p>	<p>NA</p>	<p>NA</p>
<p>B.2.3. In case the methodology allows to choose whether a source and/or gas is to be included, is the choice sufficiently explained and</p>	<p><i>Description:</i> Please see B.2.2.</p>	<p>/AMSID/ /PDD/</p>	<p>NA</p>	<p>NA</p>

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
justified? (EB 55 Annex 1, §§ 67(a), 78–80) <i>Confirm if the justification provided by the PPs is reasonable, based on assessment of supporting documented evidence provided by the PPs or by onsite observations.</i>	<i>Justification of evidences:</i> The assessment was carried out by document review, on-site assessment, and interviews. <i>Conclusion:</i> NA.	/on-site/		
<b>B.3. Baseline Identification</b> <i>The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner.</i>				
B.3.1. What possible baseline scenarios have been considered? (EB 55 Annex 1, §§ 67(b), 83) <i>Fill in all alternatives in table A-2.</i>	<i>Description:</i> The baseline scenario of the project activity according to AMS-I.D version 14 is electricity generated multiplied by the combined margin of Thailand National Grid. <i>Justification of evidences:</i> 1. The validation team cross-checked the VVM and AMS-I.D version 14. The methodology defines that if the project is an installation of new grid-connected renewable power plant, the baseline scenario is the electricity delivered to the grid by the project activity that otherwise would have 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	/PDD/ /AMSID/	CL.B2 <del>GAR.B4</del>	OK OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	<p>the “Tool to calculate the emission factor for an electricity system” version 1.1.</p> <p>2. The validation team has reviewed the baseline calculation (combined margin) provided by the project participant to confirm the baseline scenario. The most recent new generation sources within the Thailand Grid have operated since year 2007. The fossil fuel used for power generation is mainly from coal, gas and oil. The justification of the “electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid connected power plants” is justified through the Operating Margin of the Thailand grid system.</p> <p><i>Conclusion:</i> The baseline scenario considered for the project activity is the national grid of Thailand. Please refer to CL B2 and CAR B4 for further assessment.</p>			
<p>B.3.2. Is the list of alternatives complete? (EB 55 Annex 1, §§ 67(b), 83)</p> <p><i>Describe how it was validated that all alternatives are plausible and no plausible alternative is excluded from the consideration</i></p>	<p><input checked="" type="checkbox"/> All plausible alternative scenarios listed in the approved methodology have been considered. In the course of document review and site visit, it has been validated that no other alternatives which supply comparable outputs and / or services are to be taken into consideration. Thus no plausible scenario has been omitted.</p> <p><input type="checkbox"/> The following alternative scenarios/options have been omitted. Corresponding CAR(s)/CL(s) has /have been issued</p>	/PDD/ /AMSID/	OK	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<p>B.3.3. What has been identified as the baseline scenario?</p> <p>(EB 55 Annex 1, §§ 81–82, 86)</p> <p><i>Describe the chosen BL scenario, taking into consideration the technology that would be employed and / or the activities that would take place in the absence of the proposed CDM project activity.</i></p>	<p><i>Description:</i> The baseline is the electricity generated by the project activity multiplied by the emission factor of the Thailand national grid. In the absence of the project activity, electricity will continue to be supplied from the grid generated by fossil fuel.</p> <p><i>Justification of evidences:</i> The review of the PDD, the methodology and during the site visit to assess the baseline scenario. Relevant documents were assessed during site visit.</p> <p><i>Conclusion:</i> The validation team is convinced that the baseline scenario will continue in the absence of the project activity.</p>	/PDD/ /AMSID/	OK	OK
<p>B.3.4. Has the baseline scenario been determined according to the methodology?</p> <p>(EB 55 Annex 1, §§ 82, 87(e))</p> <p><i>Describe how it is validated that the identification of the most plausible baseline scenario is carried out in accordance with the applied methodology and applied methodological tools. Please refer to table A-2.</i></p>	<p>For details of the assessment regarding the evaluation of the baseline scenario pl. refer to table A-2.</p> <p><input checked="" type="checkbox"/> The determination has been carried out as per the procedure contained in the applied methodology.</p> <p><input type="checkbox"/> The following CARs / CLs have been identified with respect to the selection of the baseline scenario:</p>	/PDD/ /AMSID/	OK	OK
<p>B.3.5. Has any plausible alternative scenario been excluded?</p> <p>(EB 55 Annex 1, § 83)</p> <p><i>Describe how it is validated that no plausible alternative</i></p>	<p>For details of the assessment regarding the evaluation of the baseline scenario pl. refer to table A-2.</p> <p><input checked="" type="checkbox"/> No plausible baseline scenario has been excluded.</p> <p><input type="checkbox"/> The following plausible baseline scenarios have been excluded though no adequate justification has been provided for elimination. The following CARs / CLs have</p>	/PDD/ /AMSID/	OK	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<i>scenario has been excluded.</i>	been issued:			
<p>B.3.6. Is the identified baseline scenario reasonable and has the baseline scenario been determined using conservative assumptions where possible, including relevant references and sources?</p> <p>(EB 55 Annex 1, §§ 84–86(a)–(c))</p> <p><i>Describe whether the choice of the identified baseline scenario is reasonable by validating the <u>key assumptions, calculations and rationales</u> used in the PDD. Describe whether these are listed, relevant and <u>conservatively interpreted</u> in the PDD.</i></p>	<p><input checked="" type="checkbox"/> The baseline scenario is reasonable and has been determined using conservative assumptions where possible. Please refer to comments in table A-2 and sections B.3.2 to B.3.5 above.</p> <p><input type="checkbox"/> The following CARs / CLs have been issued because assumptions used in the baseline determination have been assessed to be not conservative</p>	<p>/PDD/ /AMSID/</p>	OK	OK
<p>B.3.7. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?</p> <p>(EB 55 Annex 1, §§ 85, 87(d))</p> <p><i>Describe whether the PP has shown that all relevant policies and circumstances have been identified and correctly considered in the PDD in accordance with the guidance by the Board. Pl. consider the guidance EB 22 annex 3 (regarding E+ and E- policies).</i></p>	<p><i>Description:</i></p> <p>There is no baseline scenario which takes into account relevant national and/or sectoral policies, macro-economic trends and political aspirations related to project activity.</p> <p><i>Justification of evidences:</i></p> <p>The regulations of the host country as per the announcement by the National Energy Policy and Plan Office Committee dated 2006-12-04 for the Thailand PDP 2004, <a href="http://www.eppo.go.th/nepc/kpc/kpc-108.htm">http://www.eppo.go.th/nepc/kpc/kpc-108.htm</a> has been assessed.</p> <p><i>Conclusion:</i></p> <p>The E plus policy is not applicable for the project activity.</p>	/eppo/	OK	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<p>B.3.8. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?</p> <p>(EB 55 Annex 1, § 87(a)–(c))</p> <p><i>Describe whether the documents and sources referred to in the PDD are correctly quoted and clearly referenced.</i></p>	<p><i>Description:</i></p> <p>The baseline scenario determination is compatible with the available data. Some relevant literature and sources have not being referenced in the respective sections of the PDD. The baseline scenario of the project activity is the continuation of fossil fuel power generation. Since the information available in the host country is the data published by Department of Alternative Energy Development and Efficiency (DEDE), this resource is considered the most reliable information.</p> <p><i>Justification of evidences:</i></p> <p>The validation team has reviewed the emission calculation which was prepared by PP.</p> <p><i>Conclusion:</i></p> <p>Refer to CAR.B4 raised.</p>	<p>/AMSID/ /PDD/ /DEDE/</p>	<p>CAR.B4</p>	<p>OK</p>
<p>B.3.9. Does the PDD contain a <i>verifiable</i> description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed CDM project activity.</p> <p>(EB 55 Annex 1, § 86)</p>	<p><i>Description:</i></p> <p>The proposed project activity is a renewable energy of run-of-river hydropower plant. The bulb turbines generators are transferred technology from China. The electricity generated from the project activity will be exported to the Provincial Electricity Grid of Thailand.</p> <p>With the absence of the proposed CDM project activity, the amount of electricity which would be generated by the proposed project activity would continue to be generated by the fossil fuel grid system.</p> <p><i>Justification of evidences:</i></p>	<p>/AMSID/ /PDD/</p>	<p>CAR.B4</p>	<p>OK</p>

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	Assessment of the PDD with regards to the description of the identified baseline scenario and site visit. Then, it was cross checked with the applied methodology.  <i>Conclusion:</i> Please refer CAR.B4.			
<b>B.4. Additionality Determination</b> <i>The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.</i>				
<b>B.4.1. Methodology</b>				
B.4.1.1. Does the PDD describe how the project is additional and does the additionality justification follow the requirements of the applied methodology and/or methodological tools?  (EB 55 Annex 1, §§ 67(d), 94–95) <i>Describe how it is validated that additionality justification is carried out in accordance with the applied methodology and/or applied methodological tools. Further focus your assessment on the reliability and credibility of data, rationales and assumptions, justifications and documentations provided by the PP.</i>	<i>Description:</i>  The project activity is described to be additional using attachment A to Appendix B of the Simplified modalities and procedures for CDM small-scale project activities. The project activity has been determined to be additional using the investment analysis as a barrier. The project activity is not financially attractive without the assistance of CDM revenue.  <i>Justification of evidences:</i> The baseline of the project activity is the grid emission factor. 1. The investment barrier is demonstrated using benchmark analysis. 2. The investment barrier has been demonstrated according to the “Guidance on the Assessment of Investment	/AMSID/ /PDD/ /aAaB/ /GAIA/	<del>CAR.B1</del>	OK



Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	Analysis". Conclusion: Please refer to CAR.B1 raised.			
<b>B.4.2. Consideration of CDM before project start</b>				
<p>B.4.2.1. Is the project starting date reported in accordance with the CDM glossary of terms?</p> <p>(EB 55 Annex 1, § 99, 104(a))</p> <p><i>Assess why the chosen starting date can be considered as the earliest date at which either the implementation or construction or real action of a project has begun or will begin.</i></p> <p><i>Check that no other activities related to the project that happened before the identified start date can be considered as start date. In this context please also take into consideration infrastructural expenses if they are relevant (in terms of costs and importance for the project implementation) in the specific context of the project activity. Appropriate evidence should be given.</i></p>	<p>Description: The project starting date indicated in the PDD has been defined 2008-12-15 which has not been substantiated by providing any evidence. According to the glossary of CDM terms the starting date of the project is the earliest date at which either the implementation or construction or real actions action of the project begins.</p> <p>Justification of evidences: By means of interviews and by checking the contract agreement during the site visit, the objective evidence related to the project starting date was assessed. Furthermore, an interview was conducted to clarify the date when the contract was signed.</p> <p>Conclusion: Refer to CL C1.</p>	<p>/SD/ /PDD/ /IM01/</p>	<p><del>CL C1</del></p>	<p>OK</p>
<p>B.4.2.2. In case the project start date is on or after 2<sup>nd</sup> August 2008 has the PP informed the DNA and UNFCCC about the intension to seek CDM status?</p> <p>(EB 55 Annex 1, §§ 99–101)</p>	<p>Description: Section C.1.1 in the PDD indicates that the project start date is 2008-12-15 which is after 2008-08-02.</p> <p>Justification of evidences: An interview was conducted to clarify the date when the</p>	<p>/LOI/ /SD/ /PDD/ /IM01/</p>	<p>OK</p>	<p>OK</p>

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<i>Describe whether such a notification has been provided by the project participants within six months of the project activity start date; if NOT it shall be determined that the CDM was not seriously considered.</i>	contract was signed. The notification has been sent to the DNA of Thailand. <i>Conclusion:</i> The project starting date indicated in the PDD has been defined as 2008-12-15 which is after 2008-08-02.			
B.4.2.3. In case the project start date is before commencing of validation and 2 <sup>nd</sup> August 2008, was the incentive from the CDM seriously considered and are details given in the PDD?  (EB 55 Annex 1, §§ 100, 102) <i>Describe whether the evidence to support such consideration is adequately and transparently described in the PDD.</i>	<i>Description:</i> As indicated in section C.1.1 of the PDD the project start date is 2008-12-15 which referred to the contract signed. <i>Justification of evidences:</i> The project start date is after 2008-08-02. <i>Conclusion:</i> For further assessment, see CL.C1.	/SD/ /PDD/ /IM01/	<del>CL.C1</del>	OK
B.4.2.4. How and when was the decision to proceed with the project taken? <i>Describe the steps taken to validate the starting date.</i>	<i>Description:</i> In section B.5 of PDD version 1 it has not been described that the decision to proceed with the development of the project was taken by the Board of Director. <i>Justification of evidences:</i> By means of interviews, document review of PDD and minutes of Board of Director meeting. <i>Conclusion:</i> According to the assessment in B.4.2.1 to B.4.2.3, the PDD does not clearly describe the decision made by the	/CM3/ /PDD/ /IM01/	<del>CAR.B5</del>	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	management to go for CDM; therefore, CAR.B5 is raised.			
<p>B.4.2.5. Is the project start date consistent with the available evidences? (EB 55 Annex 1, § 102)</p> <p><i>Describe the evidence assessed regarding the prior consideration of the CDM (if necessary). Describe whether the evidence to support such consideration is adequately and transparently described in the PDD.</i></p>	<p><i>Description:</i> Please see the assessment in B.4.2.3.</p> <p><i>Justification of evidences:</i> By means of interviews with the PP during the site visit, the objective evidence of the project starting date was assessed.</p> <p><i>Conclusion:</i> Refer to CL.C1 was raised.</p>	<p>/PDD/ /IM01/</p>	CL.C1	OK
<p>B.4.2.6. Was the decision to proceed with the project taken by a person which has the authority to do so? (EB 55 Annex 1, § 102(a))</p> <p><i>Describe the steps taken to validate this issue.</i></p>	<p><i>Description:</i> Please see the assessment B.4.2.4.</p> <p><i>Justification of evidences:</i> Refer to B.4.2.4</p> <p><i>Conclusion:</i> The decision taken to proceed with the development of the project activity was made by the Board of Director (BOD) as described in Section B.5 of PDD. Refer to CAR.B5.</p>	<p>/CM3/ /PDD/ /IM01/</p>	CAR.B5	OK
<p>B.4.2.7. How was the CDM involved in the decision making process? (EB 55 Annex 1, § 102)</p> <p><i>Describe why CDM was a decisive factor in the decision</i></p>	<p><i>Description:</i> Please see the assessment B.4.2.4.</p> <p><i>Justification of evidences:</i></p>	<p>/CM3/ /PDD/ /IM01/</p>	CAR.B5	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<i>making process.</i>	By means of interviews, a document review of the PDD and minutes of Board of Director (BOD) meeting to confirm that the incentives from CDM were considered.  <i>Conclusion:</i> Refer to CAR.B5.			
B.4.2.8. Do the evidences provided doubtlessly prove that continuous and real actions were taken in order to secure the CDM status?  (EB 55 Annex 1, § 102; EB 62 Annex 13 § 7)	<i>Description:</i> Please see the assessment B.4.2.4.  <i>Justification of evidences:</i> In section B.5 of PDD version 1 the continuous and real actions taken to secure CDM status have not been described. Also, related document and the board of meeting were assessed.  <i>Conclusion:</i> Refer to CAR.B5.	/CM3/ /LOI/ /PDD/ /IM01/	CAR.B5	OK
B.4.2.9. Is the gap of documented evidences to secure the CDM status less than 3 years and are the evidences relevant for substantiating the action taken, credible, reliable and complete?  (EB 62 Annex 13 § 8)	<i>Description:</i> Please see the assessment B.4.2.4.  <i>Justification of evidences:</i> The timeline relating to the prior consideration has been checked by means of documented evidence and interviews.  1. Board of Director (BOD) minutes of meeting 2. CDM consultancy services	/CM3/ /PDD/ /IM01/ /IM06/	CAR.B5	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	<i>Conclusion:</i> Refer to CAR.B5.			
<p>B.4.2.10. Did implementation of the project ceased after its commencement and did implementation recommence after consideration of the CDM?</p> <p>(EB 62 Annex 5, § 7) <i>Describe the reasons for ceasing the project and explain why the incentive from CDM was necessary to recommence the implementation.</i></p>	<p><i>Description:</i> The PDD did not indicate that the project activity ceased after the start date. During the on-site visit, civil construction had begun.</p> <p><i>Justification of evidences:</i> By means of document review of the above and on-site visit interview.</p> <p><i>Conclusion:</i> The validation team concluded that the project activity did not cease after its commencement</p>	<p>/SD/ /PDD/ /IM01/ /IM02/</p>	OK	OK
<p>B.4.2.11. Can the CDM involvement in the decision assessed as serious?</p> <p>(EB 55 Annex 1, § 104(b)–(c)) <i>Describe whether or not the project would have been undertaken without the incentive of the CDM.</i></p>	<p><i>Description:</i> Refer to B.4.2.4.</p> <p><i>Justification of evidences:</i> By means of interviews, document review of the PDD and minutes of Board of Director (BOD) meeting, it can be demonstrated that the incentive from CDM was considered.</p> <p><i>Conclusion:</i> Refer to CAR B5 raised.</p>	<p>/CM3/ /PDD/ /IM01/</p>	CAR.B5	OK
<b>B.4.3. Identification of alternatives Step 1</b>				

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
(in case of SSC projects pl. skip steps 1 and 2 if appropriate)				
<p>B.4.3.1. Does the list of alternatives contain the status-quo situation, the project not undertaken as a CDM project as well as all other viable means of supplying the outputs or services that are to be supplied by the proposed CDM project activity?</p> <p>(EB 55 Annex 1, §§ 105–107) Describe the steps taken to validate this issue on the basis of your local and sectoral knowledge.</p>	<p><i>Description:</i></p> <p>The proposed project activity is justified as a small scale run-of-river hydropower project. Therefore, this is not applicable.</p> <p><i>Justification of evidences:</i></p> <p><i>Conclusion:</i></p>	/AMSID/ /PDD/	NA	NA
<p>B.4.3.2. Have all realistic alternatives been identified to the project?</p> <p>(EB 55 Annex 1, §§ 105–107) Describe whether the list of alternatives is credible and complete. Describe how it is validated that the alternatives are realistic.</p>	<p><i>Description:</i></p> <p>The proposed project activity is justified as a small scale run-of-river hydropower project. Therefore, this is not applicable.</p> <p><i>Justification of evidences:</i></p> <p><i>Conclusion:</i></p>	/AMSID/ /PDD/	NA	NA
<p>B.4.3.3. Do all identified alternatives comply with enforced legislations?</p> <p>(EB 55 Annex 1, §§ 106(c)) Describe the steps taken to validate this issue. Refer to the legislations.</p>	<p><i>Description:</i></p> <p>The proposed project activity is justified as a small scale run-of-river hydropower project. Therefore, this is not applicable.</p> <p><i>Justification of evidences:</i></p> <p><i>Conclusion:</i></p>	/AMSID/ /PDD/	NA	NA

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<b>B.4.4. Investment analysis Step 2</b>  <i>In case the investment analysis as per step 2 is chosen to justify the additionality Annex 2 "Assessment of Financial Parameters" has to be used to provide additional details of the calculation parameters..</i>				
<p>B.4.4.1. Does the PDD provide evidence that the project would not be the most economically or financially attractive alternative or economically / financially feasible without the revenues from the sale of CERs?</p> <p>(EB 55 Annex 1, § 108)</p>	<p><i>Description:</i></p> <p>In section B.5 of PDD version 1, the project participants have demonstrated that the project is financially not attractive without the CERs revenue.</p> <p>A sensitivity analysis was applied to further demonstrate the additionality of the project activity.</p> <p><i>Justification of evidences:</i></p> <p>The benchmark 13.21% of the project activity is derived from the determination of the internal cost of equity benchmark.</p> <p>The validation team has cross checked the financial values input in the financial excel calculation but the data is not available for review and assessment.</p> <p>The sensitivity analysis includes variation of plant load factor.</p> <p><i>Conclusion:</i></p> <p>From the review of the financial calculations, the project is not attractive to invest in without CER revenue. However,</p>	<p>/PDD/  /aAaB/</p>	<p><del>CAR.B6</del> <del>CAR.B7</del> <del>CAR.B8</del> CL.B9</p>	<p>OK OK OK OK</p>



Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	CAR.B6, CAR.B7, CAR.B8, CL.B9 were raised.			
<p>B.4.4.2. Is an appropriate analysis method chosen for the project (simple cost analysis, investment comparison analysis or benchmark analysis)?</p> <p>(EB 55 Annex 1, § 108; EB 39 Annex 10)</p> <p><i>Describe why the selected analysis method is appropriate under consideration of potential revenues and costs, potential project alternatives and potential available benchmark values.</i></p>	<p><i>Description:</i></p> <p>Since the project has an income from the sale of electricity, a benchmark analysis is applied.</p> <p>The project participant decided to choose the financial viability as the benchmark analysis. This is in accordance with attachment A in Appendix B of the SSC modalities and procedures. The proposed project provides electricity as the final product output to sell to the provincial grid.</p> <p><i>Justification of evidences:</i></p> <p>The project activity has other sources of revenue, in this case the sale of electricity. Since the project does not consider any alternative, a simple cost analysis and investment comparison is not appropriate to demonstrate the financial analysis. The benchmark applied is the EGAT's cost of equity at the time of the investment decision being taken at the Board meeting to invest in the project.</p> <p><i>Conclusion:</i></p> <p>Refer to CAR.B1 and CL.B9 were raised.</p>	<p>/PDD/ /aAaB/</p>	<p><del>CAR.B4</del> <del>CL.B.9</del></p>	<p>OK OK</p>
<p>B.4.4.3. Is a clear, viewable and unprotected Excel spreadsheet available for the investment calculation?</p> <p>(EB 55 Annex 1, § 110; EB 51, Annex 58, §8)</p> <p><i>Describe the steps taken to validate this issue.</i></p>	<p><input type="checkbox"/> Yes, a clear, viewable and unprotected Excel spreadsheet is available.</p> <p><input checked="" type="checkbox"/> No, a respective Excel spreadsheet needs to be made available for investment calculation.</p> <p>In this context the following additional findings have been</p>	<p>/IRR/ /IM01/</p>	<p><del>CAR.B7</del> <del>CL.B9</del></p>	<p>OK OK</p>

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	identified: Please see CAR.B7 and CL.B9.			
<p>B.4.4.4. Does the period chosen for the investment analysis reflect the technical lifetime of the project activity or in case a shorter period is chosen, is the fair value of the project activity's assets at the end of the investment analysis period (as a cash inflow) included?</p> <p>(EB 55 Annex 1, § 109; EB 62 Annex 5, § 3 – 4) Describe how the technical lifetime / period chosen for calculating financial parameter(s) is reviewed and which documents were utilised in the course of review. Describe furthermore the approach used to check the inclusion of a potential fair value.</p>	<p><i>Description:</i></p> <p>The period chosen for the investment analysis reflected the technical lifetime of the project activity of 30 years as indicated in Section.C.1.2 of PDD. The project participant chose a lifetime of 30 years which was used assess the cash flows for the equity IRR.</p> <p><i>Justification of evidences:</i></p> <p>The technical life time of the turbine and generator has been assessed along with the contract of Royal Irrigation Department during the on-site visit to confirm the technical lifetime for project activity.</p> <p><i>Conclusion:</i></p> <p>As indicated in the financial spreadsheet, the period chosen for the investment analysis reflected the technical lifetime of the project activity. However, there is no fair value included into the inflow cash at the final year.</p> <p>Please refer to CAR.B7.</p>	<p>/IRR/ /ADD4.1 /PDD/</p>	CAR.B7	OK
<p>B.4.4.5. Is the (remaining) technical lifetime of existing or project equipment defined in accordance with the guidance of the <i>Tool to determine the remaining lifetime of equipment</i>?</p>	<p><i>Description:</i></p> <p>The proposed project activity is a run-of-river with newly installed plant.</p> <p><i>Justification of evidences:</i></p> <p>During the onsite assessment, the validation team has found</p>	<p>/PDD/ /SD/ /on-site/</p>	OK	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
(EB 50 Annex 15)	<p>the river channel and the turbine are newly installed. As according to the tool to determine the remaining lifetime of equipment, EB 50 annex 15, the scope and applicability of the tool is used for project activities which involve the replacement of existing equipment with new equipment or which retrofit existing equipment as part of energy efficiency improvement activities.</p> <p><i>Conclusion:</i> Therefore, the tool is not applicable to this project activity.</p>			
<p>B.4.4.6. Is the fair value calculated in accordance with local accounting regulations (where available) or international best practice?</p> <p>(EB 55 Annex 1, § 109; EB 62 Annex 5, § 4) <i>State the accounting regulations applied for calculating the fair value and describe why these are applicable under the project specific circumstances. Describe potential mismatches between regulations and the approach applied for calculating the fair value.</i></p>	<p><i>Description:</i> There is no fair value taken into account at the final year of the investment analysis.</p> <p><i>Justification of evidences:</i> The Excel spreadsheet and PDD have adopted a conservative approach in determining the residue asset value.</p> <p><i>Conclusion:</i> Please refer to CAR.B7.</p>	/IRR/ /PDD/	CAR.B7	OK
<p>B.4.4.7. Is the book value as well as the expectation of the potential profit or loss included in the fair value calculation?</p> <p>(EB 55 Annex 1, § 109; EB 62 Annex 5, § 4)</p>	<p><i>Description:</i> There is no fair value taken into account at the final year of financial analysis.</p> <p><i>Justification of evidences:</i> The indication in the excel sheet and PDD has been reviewed.</p>	/IRR/ /PDD/	CAR.B7	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	<i>Conclusion:</i> Please refer to CAR.B7.			
B.4.4.8. Are depreciation and other non-cash related items only considered in the tax calculation and not as cash outflow? (EB 55 Annex 1, § 109; EB 62 Annex 5, § 5)	<i>Description:</i> The depreciation is included in tax calculation as the financial indicator.  <i>Justification of evidences:</i> The financial analysis has been reviewed by the validation team and shows a depreciation and some non-cash items included in the calculations.  <i>Conclusion:</i> Please refer to CAR.B7.	/IRR/ /PDD/	CAR.B7	OK
B.4.4.9. Were the input values used in the investment analysis valid and applicable at the time of the investment decision? (EB 55 Annex 1, § 109,112; EB 62 Annex 5, § 6) <i>In case the basis for input values is a Feasibility Study Report (FSR) describe how it has been ensured that the period in time between the finalisation of the FSR and the investment decision is sufficiently short so that it is unlikely that input values would have materially changed. Further confirm the consistency of values in FSR and PDD.</i>	<i>Description:</i> The input values used in the investment analysis are valid and applicable at the time of the investment decision. However, it is not clear where the data applied in the financial analysis has been derived from.  <i>Justification of evidences:</i> The validation team has reviewed the financial spreadsheet and conducted an on-site interview with the PP on the validity of the data applied.  <i>Conclusion:</i> CAR.B7 and CL.B9 are issued.	/IRR/ /PDD/	CAR.B7 CL.B9	OK OK
B.4.4.10. Is the plant load factor (PLF) chosen in a conservative manner, taking into account	<i>Description:</i> It is not clear how the PLF stated in the excel spreadsheet	/IRR/ /PDD/	CAR.B8	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
that the PLF may be different in the framework of demonstrating additionality and calculating the ex-ante ER? (EB 48, Annex 11)	has been determined. According to EB 48, annex 11 paragraph 3, the PLF should be determined as ex-ante. <i>Justification of evidences:</i> The validation team has reviewed the financial spreadsheet and conducted the on-site interview with the PP on the validity of the data applied. <i>Conclusion:</i> A CAR.B8 is raised so that the PP can substantiate how the PLF was derived.			
B.4.4.11. In case of project IRR: Are the costs of financing expenditures (loan repayments and interests) excluded from the calculation of project IRR? (EB 55 Annex 1, § 109; EB 62 Annex 5, § 9)	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Yes, the costs of financing expenditures have been included. <input type="checkbox"/> No, this requirement is not met. In this context the following additional findings have been identified: N/A	/IRR/ /PDD/	NA	NA
B.4.4.12. In cases where a post-tax benchmark is applied please ensure that actual interest payable is taken into account in the calculation of income tax. (EB 55 Annex 1, § 109; EB 62 Annex 5, § 11) <i>If this is not the case, ensure that taxation is excluded from the investment analysis.</i> <i>As per the guidance it is recommended to select a pre-tax benchmark in order to describe the steps taken in assessing this</i>	<input type="checkbox"/> N/A <input type="checkbox"/> Yes, the interest has been taken into account. <input checked="" type="checkbox"/> No, this requirement is not met. In this context the following additional findings have been identified: Refer CL.B9.	/IRR/ /PDD/	<del>CL.B9</del>	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<i>requirement.</i>				
<p>B.4.4.13. In case of equity IRR: Is the part of the investment costs, which is financed by equity, considered as net cash outflow and is the part financed by debt excluded in net cash outflow?</p> <p>(EB 55 Annex 1, § 109; EB 62 Annex 5, § 10)</p>	<p><input type="checkbox"/> N/A</p> <p><input type="checkbox"/> Yes, in- and outflows have been considered correctly.</p> <p><input checked="" type="checkbox"/> No, this requirement is not met.</p> <p>In this context the following additional findings have been identified:</p> <p>Refer CL.B9.</p>	<p>/IRR/ /PDD/</p>	CL.B9	OK
<p>B.4.4.14. Is the type of benchmark chosen appropriate for the type of IRR calculated (e.g. local commercial lending rates or weighted average costs of capital for project IRR; required/expected returns on equity for equity IRR)?</p> <p>(EB 55 Annex 1, § 111; EB 62 Annex 5, §§12 – 18)</p> <p><i>In case risk premiums are applied precisely describe its suitability to reflect the risks associated with the project activity, considering the project type and market situation.</i></p>	<p><i>Description:</i> Since the equity IRR has been applied, the benchmark chosen is the internal EGAT's cost of equity.</p> <p><i>Justification of evidences:</i> The validation team have reviewed the financial spreadsheet and conducted an on-site interview with the PP on the validity of the data applied.</p> <p><i>Conclusion:</i> Refer CL.B9.</p>	<p>/IRR/ /BM1/</p>	CL.B9	OK
<p>B.4.4.15. Is the benchmark value suitable for the project activity and is it reasonable to assume that no investment would be made at a rate of a lower return than the benchmark?</p> <p>(EB 55 Annex 1, § 109; EB 62 Annex 5, §§13 – 18)</p> <p><i>Describe whether it is reasonable to assume that a lower rate of</i></p>	<p><i>Description:</i> The internal benchmark is selected and suitable for the project activity since the project activity income is the electricity to be sold to the grid.</p> <p>According to the country's regulations EGAT are the only entity which can develop large scale hydropower generation.</p>	<p>/IRR/ /BM1/</p>	CL.B9	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<i>return would consequently result in the baseline scenario.</i>	<p>However, the project developer has demonstrated using the financial analysis that the return is lower than the benchmark.</p> <p><i>Justification of evidences:</i> The validation team has reviewed the financial spreadsheet and conducted an on-site interview with the PP on the validity of the data applied.</p> <p><i>Conclusion:</i> Please refer CL.B9.</p>			
<p>B.4.4.16. Is it ensured that the project cannot be developed by other developers than the PP?</p> <p>(EB 55 Annex 1 § 109; EB 62 Annex 5, §§ 13 – 14)</p> <p><i>Describe why the benchmark does not include the subjective profitability expectations or risk profile of the project developer. If applicable assess the past financial behaviour of the entity during at least the last 3 years in relation to similar projects.</i></p>	<p><i>Description:</i> The project activity is run-of-river hydropower generation plant, which involves the installation of bulb turbine generators at the existing dam. The benchmark extracted for the project activity is the EGAT's cost of equity.</p> <p><i>Justification of evidences:</i> During site visit, the source of the data applied for the benchmark was not made available to the validation team for assessment.</p> <p><i>Conclusion:</i> Please see CL.B9.</p>	/BM1/ /IM01/ /IRR/	<del>CL.B9</del>	OK
<p>B.4.4.17. Was the benchmark consistently used in the past for similar projects with similar risks?</p> <p>(EB 55 Annex 1, § 112(c))</p>	<p><i>Description:</i> Refer B.4.4.17.</p> <p><i>Justification of evidences:</i></p>	/BM1/ /IM01/ /IRR/	<del>CL.B9</del>	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	The source of the data applied for the EGAT's cost of equity is not made available to the validation team for assessment. <i>Conclusion:</i> Please see CL.B9.			
<p>B.4.4.18. Does the PDD and related spreadsheets contain a sensitivity analysis and does the same contain variation of parameters which may vary throughout the project lifetime,</p> <p>(EB 55 Annex 1, §§ 109–110(e); EB 62 Annex 5, § 20-21)</p> <p><i>Describe relevance of parameters used in the sensitivity analysis as well as their likeliness to vary during the project's lifetime. Parameters which are fixed on the basis of contracts, PPAs etc. may not be subject to variation and not adequate.</i></p>	<p><i>Description:</i></p> <p>The PDD in section B.5 and the financial spreadsheets contain a sensitivity analysis.</p> <p><i>Justification of evidences:</i></p> <p>The validation team has checked the variation applied for the sensitivity analysis. The variation applied to demonstrate the sensitivity is only the PLF.</p> <p><i>Conclusion:</i></p> <p>Please refer CAR.B8.</p>	/PDD/ /IRR/	CAR.B8	OK
<p>B.4.4.19. Were only variables that constitute more than 20% of either total project costs or total project revenues subjected to reasonable variation?</p> <p>(EB 55 Annex 1, § 109; EB 62 Annex 5, § 20)</p>	<p><i>Description:</i></p> <p>As demonstrated in Section B.5 of PDD, only the PLF is demonstrated in the sensitivity analysis. Also, the variable applied to demonstrate additionality using the financial indicators of Plant Load Factor (PLF) is not in accordance with the guidelines.</p> <p>There are some variables that constitute more than 20% of either total project costs or project income which materially impacts on the financial analysis. These are the:</p> <p>1) Initial investment cost</p>	/PDD/ /IRR/	CAR.B8	OK



Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	2) O&M cost 3) Electricity tariff 4) Plant Load Factor (PLF)  <i>Justification of evidences:</i> The team has assessed the PDD and the financial analysis spreadsheet. All the parameters, which are included in the sensitivity analysis, have a financial impact on the analysis. As according to clause 17 of EB 62 Annex 5, the investment cost, O&M cost, electricity tariff have not been included as one of the parameter to subject variation.  <i>Conclusion:</i> Please refer to CAR.B8.			
B.4.4.20. Have parameters, constituting less than 20% of total project costs or revenues, been identified with potential material impact on the financial parameter?  (EB 55 Annex 1, § 109; EB 62 Annex 5, § 20) <i>Describe whether those parameters are considered in the sensitivity analysis?</i>	<i>Description:</i> Refer B.4.4.20.  <i>Justification of evidences:</i> The PDD and financial spreadsheet have been assessed and checked with regards to the costs that have an material impact.  <i>Conclusion:</i> Please refer to CAR.B8.	/PDD/ /IRR/	CAR.B8	OK
B.4.4.21. Is the range of variation reasonable in the specific context of the project activity, taking into consideration historic trends in	<i>Description:</i> Refer B.4.4.20.	/PDD/ /IRR/	CAR.B8	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
the business sector? (EB 55 Annex 1, § 109; EB 62 Annex 5, § 21) <i>Describe whether the range of variation is appropriate with focus on historic developments, e.g. price of oil / labour etc., energy potential in the region in question.</i>	<i>Justification of evidences:</i> The PDD and financial spreadsheet have been assessed and checked with regards to the costs that have an material impact.  <i>Conclusion:</i> Please refer to CAR.B8.			
<b>B.4.5. Barrier analysis Step 3 or SSC additionality assessment</b>				
B.4.5.1. Are there any barriers given which have a clear and direct impact on the financial returns of the project? (EB 55 Annex 1, §§ 115, 134, 137) <i>In case of LSC projects those issues cannot be considered as barriers and shall be assessed in the investment analysis. In case of SSC projects the same fundamentals as for LSC projects shall apply, i.e. the assessment of the investment barrier according to EB 62 Annex 5.</i>	<i>Description:</i> The proposed project activity is a small scale project activity. The only barrier analysis that has been used is the Investment Analysis (please see section B.4.4.1 – B.4.4.22 above). No other barriers (e.g. technology or prevailing practice barrier) have been demonstrated.  <i>Justification of evidences:</i> According to the guidelines on the demonstration of additionality of small-scale project activities, the project participant is only required to demonstrate at least one of the barriers.  <i>Conclusion:</i> The additionality of the SSC project activity has been demonstrated using the investment barrier.	/AMSID/ /PDD/ /aAaB/	OK	OK
B.4.5.2. Are the barriers described risk related (e.g technology failure, other performance	<i>Description:</i> Refer to B.4.5.1.	/AMSID/ /PDD/	OK	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
related risks)? (EB 55 Annex 1, §§ 116, 134, 137) <i>Are there other barriers or barriers due to prevailing practice existent which would have led to higher emissions?</i>	<i>Justification of evidences:</i> <i>Conclusion:</i>	/aAaB/		
B.4.5.3. Has the unavailability of means of finance for the project been described and adequately substantiated? Do evidences doubtlessly prove that the financing of the project was assured only due to the benefit of the CDM? (EB 55 Annex 1, §§ 116, 137, EB 50 Annex 13, §9)	<i>Description:</i> Refer to B.4.5.1. <i>Justification of evidences:</i> <i>Conclusion:</i>	/AMSID/ /PDD/ /aAaB/	OK	OK
B.4.5.4. How is it justified and evidenced that the barriers given in the PDD are real? (EB 55 Annex 1, § 116(a))	<i>Description:</i> Refer to B.4.5.1. <i>Justification of evidences:</i> <i>Conclusion:</i>	/AMSID/ /PDD/ /aAaB/	OK	OK
B.4.5.5. How is it justified that one or a set of real barriers prevent(s) the implementation of the project activity and do not prevent the implementation of at least one of the alternatives? (EB 55 Annex 1, § 116(b))	<i>Description:</i> Refer to B.4.5.1. <i>Justification of evidences:</i> <i>Conclusion:</i>	/AMSID/ /PDD/ /aAaB/	OK	OK
B.4.5.6. Does the review of relevant background information on the nature of the company(ies) and entity(ies) involved in	<i>Description:</i> Refer to B.4.5.1.	/AMSID/ /PDD/	OK	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
the financing and implementation of the project sufficiently justify that the barriers related to the lack of access to capital, technologies and skilled labour are real? (EB 50 Annex 13, §4)	<i>Justification of evidences:</i> <i>Conclusion:</i>	/aAaB/		
B.4.5.7. Has it been demonstrated in an objective way how the CDM alleviates each of the identified barriers to a level that the project is not prevented anymore from occurring by any of the barriers? (EB 50 Annex 13, §5)	<i>Description:</i> Refer to B.4.5.1. <i>Justification of evidences:</i> <i>Conclusion:</i>	/AMSID/ /PDD/ /aAaB/	OK	OK
B.4.5.8. Would provision of additional financial means lead to the mitigation of the barrier(s) demonstrated? (EB 50 Annex 13, §7) <i>Describe why provision of additional financial means would not lead to mitigation of the barrier(s) demonstrated and hence analysing the project's additionality within the framework of an investment analysis is inappropriate. .</i>	<i>Description:</i> Refer to B.4.5.1. <i>Justification of evidences:</i> <i>Conclusion:</i>	/AMSID/ /PDD/ /aAaB/	OK	OK
<b>B.4.6. Common practice analysis Step 4</b> (in case of SSC projects skip this step)				
B.4.6.1. Is the defined region for the common practice analysis appropriate for the technology/industry type?	<i>Description:</i> The proposed project activity is a small scale project activity; therefore, this is not applicable.	/PDD/	NA	NA

<b>Checklist Item</b> (incl. guidance for the validation team)	<b>Validation Team Comments</b> (justification and substantiation of information, data and evidences)	<b>Ref.</b>	<b>Draft Concl.</b>	<b>Final Concl.</b>
(EB 55 Annex 1, § 120(a)) <i>Describe why the project activity is not common practice in a transparent and unambiguous manner. If a region other than the entire host country is chosen, describe why this region is more appropriate.</i>	<i>Justification of evidences:</i>  <i>Conclusion:</i>			
B.4.6.2. To what extent similar projects have been undertaken in the relevant region? (EB 55 Annex 1, § 120(b))	<i>Description:</i> The proposed project activity is a small scale project activity; therefore, this is not applicable. <i>Justification of evidences:</i> <i>Conclusion:</i>	/PDD/	NA	NA
B.4.6.3. In case similar projects are identified, are there any key differences between the proposed project and existing or ongoing projects and what kind of differences are observed? (EB 55 Annex 1, § 120(c))	<i>Description:</i> The proposed project activity is a small scale project activity; therefore, this is not applicable. <i>Justification of evidences:</i> <i>Conclusion:</i>	/PDD/	NA	NA

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<b>B.5. Ex-Ante Calculation of GHG Emission Reductions</b>  <i>It is assessed whether the ex-ante calculations of project emissions, baseline emissions, leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified. Furthermore calculation of emission reductions shall be assessed.</i>				
<p>B.5.1. Are the equations applied correctly according to the applied approved methodology?</p> <p>(EB 55 Annex 1, §§ 67(c), 89–90, 92)</p> <p><i>Describe clearly the steps taken to assess whether the methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions. Further take into consideration that all estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD.</i></p>	<p><input type="checkbox"/> The equations applied for calculation are correctly applied according to the approved methodology.</p> <p><input checked="" type="checkbox"/> The following mistakes have been identified in this context:</p> <p><i>Description:</i> The equations applied have not been demonstrated clearly enough to ensure that they comply with the methodology.</p> <p><i>Justification of evidences:</i> The validation team has reviewed the PDD and has applied the relevant equation using the information in the PDD. The outcome is the same as the information in the PDD.</p> <p>The validation team has compared the equations and parameters illustrated in the PDD with the approved simplified methodology AMS-I.D version 14. The team also verified the equations, parameters and options illustrated in the PDD against the Tool to calculate the emission factor of</p>	<p>/PDD/ /AMSID/ /ETSAP/ /on site/</p>	<p><del>GL-B2</del> <del>CAR-B4</del></p>	<p>OK OK</p>

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	<p>the electricity system version 01.1.</p> <p>Please refer to section B.1.3 for justification on the applicability of the methodology.</p> <p>The project activity will not have any leakage as the equipment will be purchased new.</p> <p>There are no project emissions since the project activity is not involved in the combustion of fossil fuels. Also, the project activity is established as a run-of-river scheme in which there is no reservoir<sup>/ETSAP/</sup>.</p> <p><i>Conclusion:</i> For further assessments please refer CL.B2 and CAR.B4.</p>			
<p>B.5.2. In case the methodology allows for different methodological choices, are the equations applied properly justified and have they been used reflecting the other methodological choices (i.e. baseline identification)?</p> <p>(EB 55 Annex 1, §§ 90–91)</p> <p><i>Assess the correct selection and application of methodological choices. Describe whether proper justification has been provided (based on the choice of the baseline scenario, context of the project activity and other evidence provided) and whether the correct equations have been used reflecting the relevant methodological choices.</i></p>	<p><i>Description:</i></p> <p>The methodology applied to this project does not indicate any other references to other methodologies.</p> <p><i>Justification of evidences:</i></p> <p>The project activity is a hydropower project activity. According to AMS-I.D version 14, there is no other choice of methodology applicable for hydropower project.</p> <p>The validation team has reviewed the PDD and the choice of the tools applied.</p> <p>The project participants have chosen to apply the “Tool to calculate the emission factor for an electricity system” to calculate the Thailand grid emission factor. The validation team has validated the calculations to confirm the formula</p>	<p>/PDD/ /AMSID/ /IRR/</p>	<p><del>CL.B2</del> <del>CAR.B4</del></p>	<p>OK OK</p>

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	and the source of data applied for calculation. <i>Conclusion:</i> For further assessments please refer CL.B2 and CAR.B4.			
<p>B.5.3. Have conservative assumptions been used when calculating the project emissions?</p> <p>(EB 55 Annex 1, §§ 90–91)</p> <p><i>Describe clearly the steps taken to assess whether all the assumptions and data used by the PP are listed in the PDD including references and sources and are conservatively interpreted in the PDD.</i></p>	<p><i>Description:</i></p> <p>The project activity is the run-of-river hydropower project type, in accordance with the applied methodology there are no project emissions during the project implementation.</p> <p><i>Justification of evidences:</i></p> <p>The validation team has reviewed the PDD and interviewed the project developer during the on-site visit.</p> <p><i>Conclusion:</i></p> <p>Please refer to CL.B10.</p>	<p>/PDD/ /AMSID/ /on site/</p>	CL.B10	OK
<p>B.5.4. Does the implementation of the project activity lead to GHG emissions within the project boundary which are expected to contribute more than 1% of the overall expected average annual emission reductions, which are not addressed by the methodology?</p> <p>(EB 55 Annex 1, § 77)</p>	<p><i>Description:</i></p> <p>The proposed project activity is a run-of-river hydropower project involving the installation of a bulb turbine and generator on the existing dam. According to AMS-I.D, for most renewable energy project activities, the project emissions are equal to zero.</p> <p><i>Justification of evidences:</i></p> <p>The validation team has reviewed the PDD and methodology along with having checked the details during the onsite visit.</p> <p><i>Conclusion:</i></p>	<p>/PDD/ /AMSID/ /on site/</p>	OK	OK



Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	It is not possible that the GHG emissions contribute to more than 1%.			
<p>B.5.4.1. Has a plant load factor (PLF) been defined ex-ante and considered for determination of baseline emissions?</p> <p>(EB 48 Annex 11, §§ 1, 3–4)</p> <p><i>Describe why the PLF is conservative in the framework of calculating emissions reductions and whether the PLF is the same in the framework of demonstrating additionality by applying the investment analysis. Note, in order to be conservative in both cases the PLF may be different.</i></p>	<p><i>Description:</i> It is not clear how the PLF shown in the spreadsheet has been determined. According to EB 48, annex 11 paragraph 3, the PLF should be determined as ex-ante.</p> <p><i>Justification of evidences:</i> There were no documents available to assess the PLF during the on-site visit.</p> <p><i>Conclusion:</i> Since the PLF is not clearly substantiated, finding CL.B8 was raised.</p>	/IRR/ /PDD/	CL.B8	OK
<p>B.5.5. Are all data sources and assumptions appropriate and parameters which remain fixed throughout the crediting period correct, applicable to the project and will lead to a conservative estimation of emission reductions?</p> <p>(EB 55 Annex 1, § 91)</p> <p><i>Describe clearly the steps taken to assess whether the values used for the fixed parameters are considered reasonable, correct and applicable in the context of the project activity. Check esp. chapter 6.2 of the PDD.</i></p>	<p><i>Description:</i> The ex-ante data and parameters are stated in section B.6.2 of the PDD and remain fixed throughout the crediting period.</p> <p><i>Justification of evidences:</i> In the PDD, the following are identified to remain as fixed parameters throughout the crediting period.</p> <ol style="list-style-type: none"> <li>1. Consumption of fossil fuel by the existing grid connected power plants (Mt, mcbm, kl), <math>F_{i,j,y}</math></li> <li>2. Generation of electricity by the existing connected grid power plants (GWh), <math>GEN_{j,y}</math></li> <li>3. Net calorific value of the fuel combusted in the grid based power plants used in the determination of the</li> </ol>	/PDD/ /AMSID/	CL.B10	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	<p>emission factor (TJ/kt), <math>NCV_i</math></p> <ol style="list-style-type: none"> <li>4. Tonnes of carbon dioxide per energy unit of fuel in the grid based plants used in the determination of the emission factor (<math>tCO_2/TJ</math>), <math>EF_{CO_2,i}</math></li> <li>5. Oxidation factor applied to the combustion of fuels in the grid based plants for the determination of the emission factor (%) , <math>OXID_i</math></li> <li>6. Consumption of fossil fuel by existing grid connected power plants (Mt, mcbm, kl), <math>F_{i,m,y}</math></li> <li>7. Generation of electricity by existing grid connected power plants (GWh), <math>GEN_{m,y}</math></li> <li>8. Grid carbon dioxide emission factor (<math>tCO_2/MWh</math>), <math>EF_{CO_2}</math></li> </ol> <p>Lists of parameter demonstrated in the PDD were checked against the parameter required by methodology and tool.</p> <p><i>Conclusion:</i></p> <p>Refer to CL.B10.</p>			
<p>B.5.6. Are all ex-ante calculation values for monitoring parameters (as defined as per chapter B.7.1) reasonable?</p> <p>(EB 55 Annex 1, § 91)</p> <p><i>Describe clearly the steps taken to assess whether the values used for the monitoring parameters are considered reasonable, applicable and conservative in the context of</i></p>	<p><input type="checkbox"/> All "Values of data to be applied for the purpose of calculating expected emissions reductions" are considered to be reasonable, applicable and conservative.</p> <p><input checked="" type="checkbox"/> The following mistakes have been identified in this context: Please see CL.B11.</p>	/PDD/	<del>CL.B11</del>	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<i>the project activity</i>				
<p>B.5.7. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change. <i>Describe the steps taken to validate this issue.</i></p>	<p><i>Description:</i> The emissions reductions are real, measurable and give long term benefits in terms of mitigating climate change.</p> <ol style="list-style-type: none"> <li>1. Reduce the dependent on fossil fuel for electricity generation</li> <li>2. Reduce the emissions of CO<sub>2</sub> into the atmosphere generated by the fossil fuel power plants.</li> </ol> <p><i>Justification of evidences:</i> The validation team has reviewed the power generation documents of the host country Thailand. The national grid is dominated by fossil fuel.</p> <p><i>Conclusion:</i> The project activity will help to reduce the demand for energy generation using fossil fuels. Therefore, the emission reductions are real, measurable and give long-term benefits related to the mitigation of climate change.</p>	/DEDE/	OK	OK
<p><b>B.6. Monitoring of Emission Reductions</b> <i>It is assessed whether the monitoring plan is appropriate for the project activity and in line with the applied methodology.</i></p>				
B.6.1. Are all monitoring parameters required by the applied methodology contained in the	<i>Description:</i>	/AMSID/	<del>CL-B11</del>	OK

<b>Checklist Item</b> (incl. guidance for the validation team)	<b>Validation Team Comments</b> (justification and substantiation of information, data and evidences)	<b>Ref.</b>	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p>monitoring plan?</p> <p>(EB 55 Annex 1, §§ 67(e), 121, 123(a), 124)</p> <p><i>Assess whether all applicable parameters listed in the methodology are included in the monitoring plan.</i></p> <p><i>Pl. check further whether the selection of parameters not to be monitored (section B.6.2) is appropriate and in line with the applied methodology.</i></p> <p><i>In case of different approaches can be chosen acc. to the methodology assess whether the selection of parameters is justified and correct.</i></p>	<p>The proposed project activity is a renewable run-of-river hydropower generation project activity. Therefore, the monitoring parameter that shall be included in the monitoring plan is as according to AMS-I.D.</p> <p>The monitored parameters stated in section B.7.1 of the PDD are as follows:</p> <ol style="list-style-type: none"> <li>1. Gross electricity generated by the project activity (MWh), <math>EG_{gross,y}</math></li> <li>2. Auxiliary Consumption (MWh), <math>EG_{aux,y}</math></li> </ol> <p><i>Justification of evidences:</i></p> <p>By means of document review and interviews with the project developer on the monitoring aspect of the project operation.</p> <p>Applicable parameters, which are listed in section B.7.1 of the PDD were checked with the methodology, monitoring schematic and related tool.</p> <p><i>Conclusion:</i></p> <p>Refer to CL.B11 raised.</p>	/PDD/		
<p>B.6.2. Are the means of monitoring of all parameters contained in the monitoring plan feasible and in accordance with the requirements of the applied methodology?</p> <p>(EB 55 Annex 1, § 123(a)–(b), 124)</p>	<p><i>Description:</i></p> <p>The parameters contained in the monitoring plan are feasible. It has a label, data unit, description, source of data, measurement equipment, and QA/QC procedures.</p> <p>The monitoring plan indicates that the project activity will be</p>	/AMSID/ /PDD/	<del>CL.B11</del>	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<p><i>Assess whether the provided information for all parameters w.r.t.</i></p> <ul style="list-style-type: none"> <li>a) <i>Label (name of the data / parameter)</i></li> <li>b) <i>data unit</i></li> <li>c) <i>description</i></li> <li>d) <i>source of data</i></li> <li>e) <i>measurement equipment / method / procedure</i></li> <li>f) <i>monitoring frequency</i></li> <li>g) <i>QA/QC procedures</i></li> </ul> <p><i>are appropriately described and in compliance with the requirements of the methodology..</i></p>	<p>monitored throughout the crediting period.</p> <p><i>Justification of evidences:</i></p> <p>Section B.7.1 of the PDD described the parameters to be monitored.</p> <p>The monitoring parameters and the provided information were verified and compared with the methodology and the related tools. The description is in line with the related tools and methodology. Specific information is described appropriately.</p> <p><i>Conclusion:</i></p> <p>Refer to B.6.1 above CL.B11.</p>			
<p><b>B.6.3. Are all parameters presented as per international standards?</b></p> <ul style="list-style-type: none"> <li>a) <i>Format: Standard format (e.g. 1,000 representing one thousand and 1.0 representing one).</i></li> <li>b) <i>Units: Values shall be directly given in SI units – or additionally to original units transferred to SI.</i></li> <li>c) <i>Short scale naming system: (Only) million = 10<sup>6</sup> and billion 10<sup>9</sup> shall be used.</i></li> </ul> <p><i>Please refer to the International System of Units (SI) as published within Guidance 11/08.</i></p>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Standard formats have been used</li> <li><input checked="" type="checkbox"/> SI units were used – or added</li> <li><input checked="" type="checkbox"/> The short scale naming is correct</li> </ul> <p>In this context the following additional findings have been identified:</p> <p>N/A</p>	/AMSID/ /PDD/	OK	OK
<p><b>B.6.4. Have all means of implementing the monitoring plan, e.g. equations necessary for</b></p>	<p><i>Description:</i></p> <p>The applied equations for the ex-post emissions reductions</p>	/AMSID/ /PDD/	<del>CL.B11</del>	OK

<b>Checklist Item</b> (incl. guidance for the validation team)	<b>Validation Team Comments</b> (justification and substantiation of information, data and evidences)	<b>Ref.</b>	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p>ex-post emission reduction calculation, been described clearly and in line with the methodology?</p> <p>(EB 55 Annex 1, §§ 123(b), 124)</p> <p><i>Check whether all necessary equations have been provided in the PDD. Pl. consider that ex-post and ex-ante calculations might be different.</i></p> <p><i>Please consider that additional equations might be necessary to calculate auxiliary parameters.</i></p>	<p>calculations and monitored data /parameter are described in the PDD section B.6 and B.7.1.</p> <p><i>Justification of evidences:</i></p> <p>By means of reviewing the monitoring plan and the applied equations which have been provided in the PDD. During the site visit it was observed some of monitoring parameters related to the project activity are not included in the plan.</p> <p><i>Conclusion:</i></p> <p>Refer to CL.B11.</p>			
<p>B.6.5. Is it likely that the monitoring arrangements described in the PDD can properly be implemented in the context of the project activity?</p> <p>(EB 55 Annex 1, § 124(c))</p> <p><i>Assess whether the described monitoring arrangements are sufficient and realistic to enable a thorough monitoring. Pl. consider also special monitoring conditions, e.g. downtimes of monitoring equipment etc.</i></p>	<p><i>Description:</i></p> <p>The Project Participant is planning to set up the CDM monitoring group to implement the data collection, maintenance and calibration of equipment, recording and archiving of collected data. The role and responsibility of the personnel had been defined in PDD.</p> <p><i>Justification of evidences:</i></p> <p>The project participant had been interviewed and confirmed that new staff will be hired to implement and maintain the project. The Roles and responsibilities of the personnel have been described in Section B.7.2 of PDD.</p> <p><i>Conclusion:</i></p> <p>The monitoring arrangements are considered sufficient that they can be implemented appropriately</p>	<p>/PDD/ /AMSID/ /IM01/</p>	<p>OK</p>	<p>OK</p>

<b>Checklist Item</b> (incl. guidance for the validation team)	<b>Validation Team Comments</b> (justification and substantiation of information, data and evidences)	<b>Ref.</b>	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p>B.6.6. Are the QA/QC procedures appropriate sufficient to ensure the emission reductions achieved from the project activit can be reported ex-post and verified?</p> <p>(EB 55 Annex 1, § 124(b))</p> <p><i>Please consider the description given in section B.7.2. Describe which QA/QC provisions are considered. Address Quality Management System provisions, calibration and maintenance of equipment. Address further any review procedures.</i></p>	<p><i>Description:</i></p> <p>The relevant provisions are described in section B.7.2 where a general and sufficient description is given, considering the project is in construction stage.</p> <p>A quality management system is not yet implemented at the project activity since the project is still in the construction phase. A CDM project management office is foreseen to be established and it will be decided who is in charge of all CDM related issues including data handling and review of the same, calibration and maintenance procedures.</p> <p>A corresponding training program will be provided for the personnel involved with CDM related issues.</p> <p>The instrumentation will be in line with manufacturer's requirements and will meet national or sectoral standards. They shall be operated and maintained in line with the corresponding national regulations.</p> <p><i>Justification of evidences:</i></p> <p>Section B.7.2 of PDD described the brief QA/QC activities. Annex 4 not described the monitoring information.</p> <p>During the on-site visit, the project developer has been interviewed and it has been established that the relevant QA/QC procedures will be developed when the project begins operation.</p> <p><i>Conclusion:</i></p>	<p>/AMSID/ /PDD/ /IM01/</p>	<p>CL-B12</p>	<p>OK</p>

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	Refer to CL.B12.			
<p>B.6.7. Are procedures identified for data management?</p> <p>(EB 55 Annex 1, § 124(b))</p> <p><i>Check whether appropriate provisions are considered for data management including responsibilities, what records to keep, storage area of records and how to process performance documentation</i></p> <p><i>Check further the data archiving provisions for the project activity and ensure that provisions are made to archive data for the whole crediting period + 2 years.</i></p>	<p><i>Description:</i></p> <p>The data management has been defined in PDD and explains where the data will be summarized, calculated and recorded as an electronic file at the end of every month. All the data will be kept for two years after the end of crediting period.</p> <p><i>Justification of evidences:</i></p> <p>The validation team has reviewed the relevant section of the PDD and interviewed the project participants to ensure their understanding of this requirement.</p> <p><i>Conclusion:</i></p> <p>Although the data management had been defined in PDD, a more detailed description is required for the QA/QC procedure. Refer to CL.B12.</p>	<p>/PDD/ /AMSID/ /IM01/</p>	CL.B12	OK
<p><b>C. Duration of the Project/ Crediting Period</b></p> <p><i>It is assessed whether the temporary boundaries of the project are clearly defined.</i></p>				



Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<p>C.1. Is the project's operational lifetime clearly defined and evidenced?</p> <p><i>Check whether the project lifetime is correctly defined. Consider the guidance on the assessment of investment analysis (annex to the additionality tool).</i></p> <p><i>Check in case of phased implementation this has been reflected throughout the whole PDD incl. the financial assessment, if applicable.</i></p>	<p><i>Description:</i></p> <p>The project operational lifetime is defined as 30 years as referred to the Memorandum of Understanding (MOU) between Royal Irrigation of Dam (RID) and the Electricity Generating Authority of Thailand (EGAT) dated 2007-04-17.</p> <p><i>Justification of evidences:</i></p> <p>The Memorandum of Understanding (MOU) between the Royal Irrigation of Dam (RID) and the Electricity Generating Authority of Thailand (EGAT) has been reviewed and compare with the bulb turbine life time as provided by technology provider.</p> <p>The validation team has carried out some research on registered renewable run-of-river hydro projects and the operational lifetime indicated in the range 21-40 years.</p> <p><i>Conclusion:</i></p> <p>By means of assessment, the operational lifetime of 30 years is defined based on the MOU and is deemed appropriate and consistently applied for the IRR calculation.</p>	<p>/IM01/ /PDD/ /MOU/ /unfccc/</p>	<p>OK</p>	<p>OK</p>
<p>C.2. Is the start of the crediting period clearly defined and reasonable?</p> <p><i>Check whether the envisaged starting date of the crediting period is realistic, taking into consideration the times needed for validation and registration.</i></p>	<p><i>Description:</i></p> <p>The starting date of the crediting period is defined on 2010-09-01 which is assessed as not reasonable. Due to the project still being during the construction phase. Also by interviewing the PP the validation team were informed that the completion of project activity construction will be later.</p>	<p>/PDD/ /IM01/ /PS/</p>	<p><del>OK</del></p>	<p>OK</p>

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	<p><i>Justification of evidences:</i> By means of PDD review the project scheduling and interviews with the project participant, the expected commissioning date of the proposed project activity would be in 2011 which is later than the date defined in PDD. Therefore, the starting date of the crediting period is considered as not appropriate.</p> <p><i>Conclusion:</i> Please see CL.C2.</p>			
<p><b>D. Environmental Impacts</b></p> <p><i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the DOE.</i></p>				
<p>D.1.1. Are there any Host Party requirements for an Environmental Impact Assessment (EIA)? (EB 55 Annex 1, §§ 131–133) <i>Check the host party regulations, regarding EIA.</i></p>	<p><i>Description:</i> The project activity is a run-of-river hydropower plant with estimated capacity 12MW. There are no host party requirements for an Environmental Impact Assessment for this project activity.</p> <p><i>Justification of evidences:</i> According to the host country Act B.E. 2552<sup>LR</sup>, there is no specified need for an EIA for the run-of-river hydropower plant projects but only for the combined heat power generation with 10MW specified. However, the project participant is required to conduct an</p>	<p>/PDD/ /IEE/ /LR/</p>	<p>OK</p>	<p>OK</p>

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	<p>Initial Environmental Evaluation (IEE) for LoA issuance. Therefore, IEE was provided and assessed by the validation team.</p> <p><i>Conclusion:</i></p> <p>An EIA is not required for the project activity in accordance to host country national regulations.</p>			
<p>D.1.2. In case an Environmental Impact Assessment (EIA) is requested by the host party, has it been carried out and if applicable duly approved?</p> <p>(EB 55 Annex 1, §§ 131–133) <i>Check the EIA and its approval, if applicable.</i></p>	<p><i>Description:</i></p> <p>Not applicable, please refer to D.1.1.</p> <p><i>Justification of evidences:</i></p> <p><i>Conclusion:</i></p>	<p>/PDD/ /LR/</p>	OK	OK
<p>D.1.3. Has an analysis of the environmental impacts of the project activity been sufficiently described and in line with the host party environmental legislation?</p> <p>(EB 55 Annex 1, §§ 130–132) <i>Check the PDD (section D). Check whether the project will create any adverse environmental effects.</i> <i>Check the relevant national environmental legislation.</i></p>	<p><i>Description:</i></p> <p>The PDD has explained that the proposed project activity does not have any significant environment impacts. An Initial Environmental Evaluation<sup>/IEE/</sup> had been conducted as required by the host country TGO in lieu of the sustainable criteria for obtaining the HCA.</p> <p><i>Justification of evidences:</i></p> <p>The assessment of Initial Environmental Evaluation (IEE) was made available to the validation team for review.</p> <p><i>Conclusion:</i></p> <p>According to the environmental legislation, the EIA is not required for the project activity. However, IEE has been conducted which showing that no significant impact from the</p>	<p>/PDD/ /IEE/</p>	OK	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
	project activity.			
<b>D.1.4. Are transboundary environmental impacts considered in the analysis?</b> (EB 55 Annex 1, §§ 131–133) <i>Check the documents and local official sources / expertise regarding transboundary environmental impacts.</i>	<i>Description:</i> The proposed project activity is located in Kanchanaburi Province the Western region of Thailand. <i>Justification of evidences:</i> By means of document reviews, the on-site visit and Google searches, the project activity is far away from any boundary of any country. <i>Conclusion:</i> The validation team has concluded that there are no transboundary environmental impacts.	/PDD/ /IEE/ /IM01/	OK	OK
<b>E. Stakeholder Comments</b> <i>The DOE should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.</i>				
<b>E.1. Have relevant local stakeholders been invited to consultation prior to the publication of the PDD?</b> (EB 55 Annex 1, § 128) <i>Check by means of document review and interviews with local stakeholders if and when a local stakeholder</i>	<i>Description:</i> The relevant local stakeholders have been invited to the meeting; however, the description regarding the invitation process and the date of the meeting implementation is not indicated in the PDD. <i>Justification of evidences:</i>	/PDD/ /IM02/ /IM04/	<del>CL-E1</del>	OK

Checklist Item (incl. guidance for the validation team)	Validation Team Comments (justification and substantiation of information, data and evidences)	Ref.	Draft Concl.	Final Concl.
<i>consultation process has been carried out.</i>	<p>The PDD has been reviewed. Interviews with the project participants and the stakeholders in the area were carried out during the site visit.</p> <p><i>Conclusion:</i></p> <p>Please refer to CL.E1.</p>			
<p>E.2. Can the local stakeholder consultation process be assessed as adequate?</p> <p>(EB 55 Annex 1, § 129(a)–(c))</p> <p><i>Describe what assessment steps have been undertaken to assess the adequacy of the stakeholder consultation process. Give a final opinion on the adequacy.</i></p> <p><i>Please consider the following requirements in this context:</i></p> <p>(a) <i>Comments by local stakeholders that can reasonably be considered relevant for the proposed CDM project activity, have been invited;</i></p> <p>(b) <i>The summary of the comments received as provided in the PDD is complete;</i></p> <p>(c) <i>The project participants have taken due account of any comments received and have described this process in the PDD.</i></p>	<p><i>Description:</i></p> <p>The consultation meeting was arranged by the involved parties from EGAT and Agrinergy. The presentation included the overall situation of Clean Development Mechanism (CDM) and the CDM status of the proposed project activity as stated in the PDD along with the one to one discussions for the final part of the presentation about the impacts which could occur from the proposed project activity.</p> <p>However, the local stakeholder consultation process addressed in the PDD cannot be assessed as adequate regard the invitation process, comments received and the date of the meeting was not clearly indicated.</p> <p><i>Justification of evidences:</i></p> <p>The assessment was conducted through interviews with local stakeholders, the project participant and Agrinergy during the site visit.</p> <p><i>Conclusion:</i></p> <p>CL.E1 has been raised to PP.</p>	/PDD/ /IM01/ /IM03/ /IM06/	<del>CL.E1</del>	OK

## ANNEX 2: ASSESSMENT OF BASELINE IDENTIFICATION

**Table A-2:** Assessment of Baseline Identification (EB 55 Annex 1 §§83 – 86)

<input checked="" type="checkbox"/>	Baseline is predefined by the methodology
<input type="checkbox"/>	Assessment of baseline see below

Baseline Alternatives identified	In line with the Methodology?	Eliminated	Reasons for elimination / non-elimination from list of alternatives	Evidence used	DOE Assessment	
					Appropriateness of elimination	Assessment of validation team (results and means of assessment)
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	

### ANNEX 3: ASSESSMENT OF FINANCIAL PARAMETERS

**Table A-3:** Assessment of Financial Parameters (EB 55 Annex 1, §§ 111, 112, 114/ in case financial parameters stem from FSR §113,)

<input type="checkbox"/>		No financial parameters are used for additionality justification				
<input checked="" type="checkbox"/>		Assessment of all financial parameters see below				
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
Total Investment Cost	861,500	kTHB	Feasibility Study Report no. 211200-49-07, in July 2006  CDM registered project no. 1736 and 3719  Payment invoice for Mae Klong HPP updated to December 2012	/FSR/  /unfccc/  /PI/	<input checked="" type="checkbox"/>	<i>Description:</i> The total investment cost of the project is taken from the FSR which was established in July 2006 before the time of decision made by PP's Board of Director (BOD). The investment costs included the following cost items: 1. Preliminary Work: 35,200 kTHB - for land foundation at the project activity site. 2. Civil Work: 249,760 kTHB - for construction and included establishment of the water channel to establish the water approach channel. 3. Electro-mechanical Equipment: 475,550 kTHB - for project activity equipment and installation comprised of power house crane, turbines generators, installation, and equipment transportation. 4. Transmission Line: 14,300 kTHB –for the transmission system in the project activity and connection line to the transmitting point with PEA. 5. Engineering Service: 37,740 kTHB –for the engineering project management and corporation during the construction. 6. Project Administration: 15,100 kTHB–for the administration

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
						<p>work during construction of project activity until commissioning.</p> <p>7. Import Duties and Taxes: 33,850 kTHB - for import tax duty of equipment, turbines and generators.</p> <p><i>Justification:</i> The investment cost of similar run-of-river hydropower projects which registered as CDM projects has been checked. Due to there is no hydropower project in Thailand has been registered under the CDM. Therefore, the CDM projects in the region and from Malaysia has been reviewed and compared There are two hydropower projects (no. 1736 and 3719) registered as a small scale CDM projects in Malaysia. The investment costs of the two hydropower projects are replicated at 2,380 US/kW and 2,560 US/kW respectively. <sup>/unifccc/</sup> The investment cost for both referred projects are higher than the project activity cost which replicated at 2,169 US/kW.</p> <p>During the on-site validation, the project activity was constructing. The project activity work status and scope has been confirmed by interviewed the subcontractors from Summit Grade Ltd. Part. <sup>/IM02/</sup> At the moment, the project activity has not yet been commissioned as planned. Its progress is delayed; therefore, the progress of project activity and actual payment invoices cumulative up to December year 2012 at 845,620 kTHB has been checked and</p>



<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
						<p>confirmed.<sup>/PI/</sup>            To consider the ctual cost 845,620 kTHB for the basis of toal investment cost, the IRR of project activity would be increased from 8.63% to 8.79% which is still below benchmark 13.21%.            In order to make the IRR accross the benchmark, the investment cost has to reduce 45% or at 473,825 kTHB which is unlikely happend since the actual cost is now consumed higher.            Meanwhile, the team has checked the project activity progress and there are some activity is remaing and not completion as plan. The actual work progress until present is 97%.<sup>/IM01/</sup> The estimated cost from the FSR year 2006 is not deviated from the actual consumed. Hence the team concluded that the FSR and its assumption from 2006 were still valid and relevant at the time of investment decision in 2008.</p> <p><i>Conclusion:</i>            The investment cost applied is appropriate and the value is valid during the time of decision made.</p>
Annual O&M cost	13,219	kTHB	Feasibility Study Report of Prasae HPP, August 2004	/ADD3/	<input checked="" type="checkbox"/>	<p><i>Description:</i>            The O&amp;M cost is estimated by PP using the same assumption for the feasibility study report for Prasae Hydropower plant.<sup>/ADD3/</sup></p> <p><i>Justification:</i>            The O&amp;M cost for Praesae HPP was checked and it consisted of</p>

<input type="checkbox"/>	No financial parameters are used for additionality justification															
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below															
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT											
					Correctness of value applied	Comment										
			CDM registered project no. 2372, 2971, 3034, 3256, 3589 and 4236	/unfccc/		<p>three tasks as following:</p> <table><tr><th colspan="2">O&amp;M cost for Prasae HPP</th></tr><tr><th>Tasks</th><th>Estimated Cost</th></tr><tr><td>1. Civil work</td><td>1.00% of Civil work cost</td></tr><tr><td>2. Hydro equipment work</td><td>2.50% investment costs</td></tr><tr><td>3. Transmission line work</td><td>1.00% of investment costs</td></tr></table> <p>The team cross checked the estimation in the IRR sheet and the same assumption is applied. The annual O&amp;M cost as estimate by PP is approximate 1.53% of the investment cost. The annual O&amp;M cost is cross checked with other hydropower projects in the region which have been registered under the CDM.<sup>/unfccc/</sup> The cost applied for project reference no. 2372, 2971, 3034, 3256, 3589 and 4236.<sup>/unfccc/</sup> are shown at 1%-2% of investment cost. By comparing the O&amp;M cost applied by the project activity of 1.53% of the investment cost, falls within the range 1%-2% as applied by the reference hydropower projects. In addition, the team has checked the financial sheet by varied the O&amp;M cost to reach lower range applied by reference project at 1% of the investment cost. The O&amp;M cost will be reduced by at least 33% from actual cost. The replicated equity IRR is increased to be 8.93% which is still below the benchmark of 13.21%.</p>	O&M cost for Prasae HPP		Tasks	Estimated Cost	1. Civil work	1.00% of Civil work cost	2. Hydro equipment work	2.50% investment costs	3. Transmission line work	1.00% of investment costs
O&M cost for Prasae HPP																
Tasks	Estimated Cost															
1. Civil work	1.00% of Civil work cost															
2. Hydro equipment work	2.50% investment costs															
3. Transmission line work	1.00% of investment costs															

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
						<p><i>Conclusion:</i> By means of the assessment the team came to the conclusion that the cost applied is appropriate and the value is valid at the time that the decision was made.</p>
Installed Capacity	12.35	MW	Technical Specification	/TD/	<input checked="" type="checkbox"/>	<p><i>Description:</i> The installed capacity of the hydropower plant is the actual capacity as stated in the contract agreement signed between EGAT and technology provider. /SD/</p> <p><i>Justification:</i> The actual capacity is slightly increased compared with the capacity considered at the time of decision which was made on 2008-01-10. Therefore, CL.B13 was raised and PP has provided the new financial analysis sheet. The higher capacity 12.35MW which is the actual installed capacity is applied to demonstrate the higher amount of electricity sold to the grid. Therefore, the equity IRR is increased and is conservative. The team has validated the capacity which was considered during the time of the decision made. The capacity specified in the FSR no. 211200-49-07, July 2006<sup>/FSR/</sup> was checked with the actual technical specification. /TD/ The 12.35MW reflects the actual capacity installed which is conservative compared to the value which was valid at the time of the investment decision being made. The equity IRR is increased</p>

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
						to 8.63% which is still below the benchmark. <i>Conclusion:</i> By means of assessment, the team concluded that the actual capacity 12.35 MW as demonstrated for the revenue analysis is appropriate and conservative.
Annual net electricity generation	75,074	MWh	Technical Specification  PLF calculation  Proof of PLF signed by civil engineer	/TD/  /PLF1/  /PLF2/	<input checked="" type="checkbox"/>	<i>Description:</i> The annual electricity generation by the project activity is determined from the actual installed capacity of the turbine generator 12.35MW with the auxiliary loss 1.5%.  <i>Justification:</i> The value has been determined from the following parameters: 1) Technical specification of 12.35MW; <sup>/TD/</sup> 2) Plant load factor of 70.45%; <sup>/PLF/</sup> 3) Estimated 1.5% auxiliary load consumed by project activity. The value has been cross checked with the auxiliary load of hydropower projects in the region. The auxiliary load applied is demonstrated at 1%-2% of the hydropower project in Vietnam <sup>/unifccc/</sup> . Hence a 1.5% auxiliary load applied is in the range 1%-2% total capacity as applied by other hydropower projects; therefore, the value of 1.5% auxiliary is appropriate.  The team has reviewed the formula and link to calculate the annual net electricity generation and cross checked each parameter applied and can confirm that they are determined

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
						correctly. <i>Conclusion:</i> By means of assessment the team concluded that the estimated annual electricity generation is appropriate.
Annual RID payment	21,115	kTHB	Feasibility Study Report no. 211200-49-07, in July 2006  MOU signed between EGAT and RID on 2007-04-17  Historical water flow rate at Mae Klong Dam from 1982 to 2000	/FSR/  /ADD4.1/  /ADD4.2/	<input checked="" type="checkbox"/>	<i>Description:</i> The annual fee that EGAT must pay to the Royal Irrigation Department (RID). The following parameter is applied into the estimation: 1. Cost of water 0.0064THB/m <sup>3</sup> ; /ADD4.1/ 2. The amount of water to operate the hydropower project 3,299 million m <sup>3</sup> per year. /ADD4.2/ <i>Justification:</i> 1. The cost of water 0.0064THB/m <sup>3</sup> was checked and consistent with the cost defined in the Memorandum of Understanding (MOU) dated 2007-04-17 /ADD4.1/. 2. The amount of 3,299 million m <sup>3</sup> per year is consistent with the annual average water flow through the Mae Klong Dam which replicated from historical record year 1982 to year 2000 /ADD4.2/. In addition, the average water flow at dam had been cross checked by means of interviewed the authority of RID at Mae Klong Dam /IM06/ and it was confirmed. <i>Conclusion:</i> By means of the assessment the team concluded that the cost applied is appropriate since it has been determined based on the payment rate stated in the MOU which was valid at the time the

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
						decision was made. Also, the average hydrological flow rate of Mae Klong Dam had been determined from historical records which was also confirmed the same by the RID at Mae Klong Dam. Hence the sources of data applied were checked and they were reliable as it was confirmed and valid at the time the decision was made.
Annual Insurance	6,461	kTHB	<p>Feasibility study to develop the Songkhla Combined Heat Cycle, established in May 2004</p> <p>Small Hydro Generation Building Block Profile, Prepared by Stothert Engineering Ltd. March 2003</p>	<p>/ADD5/</p> <p>/BC/</p>	<input checked="" type="checkbox"/>	<p><i>Description:</i> The insurance cost is estimated at 0.75% of investment. It is estimated the same insurance cost applied for other power plants which were recently developed by PP at that time.</p> <p><i>Justification:</i> The DOE has checked the insurance cost with the most recent developed by the power plant, which is the Songkhla Combined Cycle Power Plant and the same fraction of 0.75% of the investment cost is defined.<sup>/ADD5/</sup></p> <p>In addition, the team has also validated the value by reviewing the study of "SMALL HYDRO GENERATION BUILDING BLOCK PROFILE"<sup>/BC/</sup>, published in March 2003.</p> <p>The range of annual insurance for small hydropower is indicated to be between 0.25% and 1% of the capital cost. Therefore, the fraction of the insurance cost is 0.75% of investment cost falls within range stated in the study.<sup>/BC/</sup></p>

<input type="checkbox"/> No financial parameters are used for additionality justification						
<input checked="" type="checkbox"/> Assessment of all financial parameters see below						
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
						<p><i>Conclusion:</i> By means of the assessment, an investment cost of 0.75% is applied for the insurance cost and is deemed appropriate.</p>
Annual Work Capital Interest of	1,033	kTHB	Bank of Thailand website <a href="http://www.bot.or.th/English/Statistics/EconomicAndFinancial/Pages/index.aspx">http://www.bot.or.th/English/Statistics/EconomicAndFinancial/Pages/index.aspx</a>	/bot/	<input checked="" type="checkbox"/>	<p><i>Description:</i> The cost of finance is charged by the Financial Institute for working capital cost. The average interest rate of the MLR is 7.21% and is applied for one month of revenue from electricity sold to PEA.<sup>/bot/</sup></p> <p><i>Justification:</i> According to the EB 62 annex 5 paragraph 10 it is stated that “in the calculation of equity IRR only the portion of investment costs which is financed by equity should be considered as the net cash outflow”; therefore, the annual interest of one month’s revenue from electricity sold out is conservative compared to interest from the portion of the investment cost that would be loaned. In addition, the interest rate of 7.21% was checked and it is derived correctly from the average of the maximum MLR and minimum MLR in year 2007 according to the rate published on the Bank of Thailand website.<sup>/bot/</sup></p> <p><i>Conclusion:</i> By means of assessment the team concluded that the working capital interest charged by Financial Institute is applicable and is in accordance to the GUIDELINES ON THE ASSESSMENT OF</p>

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
						INVESTMENT ANALYSIS, EB62 annex 5
Land rent	668	kTHB	<p>Letter from Office of Kanchanaburi Area Treasury dated 2012-06-25</p> <p>Memorandum of Understanding for Land Rent between EGAT and Kanchanburi Area Treasury Department dated 2008-06-10</p>	<p>/ADD2.1/</p> <p>/ADD2.2/</p>	<input checked="" type="checkbox"/>	<p><i>Description:</i> The cost that EGAT will pay to the Treasury Department of Thailand for the area occupied by the project activity. The cost is estimated based on the area measured by the Treasury Office of Kanchanaburi Area in year 2007.</p> <p><i>Justification:</i> The confirmation letter issued by the Treasury Office of Kanchanaburi Area.<sup>/ADD2.1/</sup> was checked. The rental cost and transaction fee for land occupied by project activity are charged 3.6 THB per square Wah per month. The total area occupied by project activity was measured at 38-2-74 Rai.<sup>/ADD2.1/</sup></p> <p>The estimated rental cost for occupied area 38-2-74 Rais is checked by applied the conversion factor as stated in the Act of Measurement and Weighing B.E. 2542 which was announced by the Department of Industrial and Trade (DIT) on 7<sup>th</sup> April 1999. Therefore, the area as replicated for 38-2-74 Rais to be 15,474 Square Wah is correct. Hence total cost per annum at 668 kTHB is determined correctly. Then, the rental rate 668 kTHB/year will be paid annually for 30 years operational lifetime. In addition, the team has reviewed the land rental stated in the</p>



<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
						<p>Memorandum of Understanding between EGAT and Local Treasury Department, which was established on 2008-06-010.<sup>/ADD2.2/</sup> The annual rental payment rate is charged the same rate 668 kTHB/year; however, this cost is excluded additional fee 0.232 kTHB which charged for every 3 years.</p> <p><i>Conclusion:</i> By means of assessment the team concluded that the cost applied is appropriate. The letter issued by the Treasury Office of Kanchanaburi Area<sup>/ADD2.1/</sup> under Treasury Department of Thailand explained and confirmed that the cost applied was determined since year 2004. In addition, the cost applied is slightly lower than actual cost which will be paid as stated in the Memorandum of Understanding between PP and Local Treasury Department<sup>/ADD2.2/</sup>. Therefore, the land rental cost applied is appropriate and conservative.</p>
Pay for Community Development Fund (During Construction)	618	kTHB	<a href="http://www.eppo.go.th/cdf/about_cdf.html">http://www.eppo.go.th/cdf/about_cdf.html</a> Feasibility Study Report no. 211200-49-07, in July 2006  Project Construction	/eppo/  /FSR/  /PS/	<input checked="" type="checkbox"/>	<p><i>Description:</i> The cost is expected to be paid during the construction phase for the local community development fund and is paid as per the following regulation, Electrical for Commercial Act year 2007. This payment end when the project activity begins supply of electricity to the Provincial Electricity Authority (PEA).</p> <p><i>Justification:</i> The regulation regarding the community development fund was</p>

<input type="checkbox"/>	No financial parameters are used for additionality justification						
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below						
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT		
					Correctness of value applied	Comment	
			Schedule			<p>checked and it is established under the National Energy Policy Office committee on 2007-06-04 <a href="http://www.eppo.go.th/cdf/about_cdf.html">http://www.eppo.go.th/cdf/about_cdf.html</a>. As stated in the regulation, the power plant developer has to pay an annual rate of 50 kTHB/MW /or minimum fee 500 kTHB per annual start when the date of power plant signed the contract until the date electricity supplied to the grid. The estimate of the payment has been checked and it is expected to be paid annually for period of 4 years which the duration 4 years is referred to the FSR.<sup>/FSR/</sup> However, the team has cross checked the project scheduling plan during on-site which was settled after the construction signed and the period defined at 3 years. To comparing the time frame with other registered hydropower projects in the region,<sup>/unfccc/</sup> the construction period before plant operation is 2-4 years. To be conservativeness, the team has replicated the IRR by reduced the period of payment to community development fund from 4 years to 2 years. The IRR is not significant changed which is only 0.01% increase.</p> <p><i>Conclusion:</i> By means of assessment, the team concluded that the cost applied is estimated correctly and in accordance with the national regulation which valid at the time of decision made. Hence the value is appropriate.</p>	

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
Pay for Community Development Fund (After supply of electricity)	1,501	kTHB	<a href="http://www.eppo.go.th/cdf/about_cdf.html">http://www.eppo.go.th/cdf/about_cdf.html</a>	/eppo/	<input checked="" type="checkbox"/>	<p><i>Description:</i> The cost is expected to be paid annually for the local community development fund. It is the payment as per the regulation, Electrical for Commercial Act year 2007. This payment will be paid annually and will be started when the project activity suppliers electricity to the Provincial Electricity Authority (PEA) and until end of operational lifetime.</p> <p><i>Justification:</i> The regulation regarding the community development fund was checked and it is established under the National Energy Policy Office announced on 2007-06-04 <a href="http://www.eppo.go.th/cdf/about_cdf.html">http://www.eppo.go.th/cdf/about_cdf.html</a>. As stated in the regulation, the power plant has to pay an annual rate of 0.02 THB/kWh for annual net sold amount 75,074 kWh. This rate will be paid from the date the power plant starts to supply electricity to the grid. Therefore, this cost is expected to pay the community fund from when the plant begins operation.</p> <p><i>Conclusion:</i> By means of assessment, the team concluded that the cost applied is estimated correctly and in accordance with the national regulation, which is valid at the time that the decision was made. Hence the value is appropriate.</p>

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
Free electricity to RID	250	MWh	Memorandum of understanding dated 2007-04-17	/ADD4.1/	<input checked="" type="checkbox"/>	<p><i>Description:</i> The amount of electricity supplied to the RID is based on the condition defined in the MoU dated 2007-04-17<sup>/ADD4.1/</sup>.</p> <p><i>Justification:</i> The MoU between EGAT and RID<sup>/ADD4.1/</sup> was checked and confirmed that EGAT have to supply electricity to RID 250MWh for 30 years.</p> <p>This amount of electricity will be supplied to the Royal Irrigation Department at Mae Klong Dam. This amount of electricity will be indirect supplied by the local grid, Provincial Electricity Authority (PEA) based on the actual amount of electricity consumed but not exceeding 250 kWh a year. The invoice will be further submitted to EGAT for payment. Therefore, this amount of electricity applied to deduct from net generation is appropriate and conservative.</p> <p><i>Conclusion:</i> By means of assessment, the team concluded that the value applied is appropriate and it is valid at the time of decision being made.</p>
Operational Life time	30	years	Memorandum of understanding dated 2007-04-17	/ADD4.1/	<input checked="" type="checkbox"/>	<p><i>Description:</i> The operational life time is based on the period that the Royal Irrigation Department (RID) allows EGAT to utilize water at Mae Klong Dam to operate the hydropower plant.</p> <p><i>Justification:</i> The MoU date 2007-04-17, para) 2.1 was checked and confirmed that 30 years is the period that the RID gave permission to EGAT</p>

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
						<p>to utilize water at Mae Klong Dam and to operate the hydropower plant.</p> <p>In addition, the operational life time was cross checked and compared with other CDM hydropower projects.</p> <p>There are no hydropower projects in Thailand and which have been registered under the CDM; therefore, the one in Vietnam was checked and the operational lifetime specified is 30 to 45 years<sup>/unfccc/</sup>. Therefore, a 30 year operational lifetime applied falls within the range of the operational lifetime for other hydropower projects in Vietnam.</p> <p><i>Conclusion:</i></p> <p>By means of assessment, the team concluded that the period applied is appropriate.</p>
Depreciation	14,582	kTHB	Revenue Code No. 145 BE. 2527 for Depreciation of Asset (year 1984)	/DEP/	<input checked="" type="checkbox"/>	<p><i>Description:</i></p> <p>The annual depreciated cost of the fixed assets is applied for 30 years operational lifetime.</p> <p>The straight-line cost of the fixed assets is 437,450 kTHB will be depreciated for 30 years which applied annually. The total cost of the fixed assets consisted of the following items as stated in the FSR<sup>/FSR/</sup>:</p> <ol style="list-style-type: none"> <li>1) Mechanical Equipment: 230,000 kTHB</li> <li>2) Electrical Equipment: 169,500 kTHB</li> <li>3) Powerhouse and crane: 4,950 kTHB</li> <li>4) Gate and Trashrack: 18,700 kTHB</li> <li>5) Transmission line: 14,300 kTHB</li> </ol>

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
						<p><i>Justification:</i> The total cost of the fixed assets was checked and matched to the cost specified in the FSR. In addition, the depreciation cost applied is checked and it is in accordance to the host country tax regulations for deduction depreciated cost of asset.<sup>/DEP/</sup> The cost of assets was depreciated annually at the same rate. It was applied for 30 years has been checked and it is correct; hence, no fair value remains as cash-inflow in the final year is also accepted.</p> <p><i>Conclusion:</i> By means of assessment the depreciation cost applied is appropriate and in accordance to paragraph 5 of EB 62 annex 5.</p>
Tax	30	%	Thai Corporate Income Tax <a href="http://www.rd.go.th/publish/6044.0.html">http://www.rd.go.th/publish/6044.0.html</a>	/tax/	<input checked="" type="checkbox"/>	<p><i>Description:</i> The corporate tax rate of Thailand.</p> <p><i>Justification:</i> The team has checked to the tax regulation of the country as published on the Revenue Department website, <a href="http://www.rd.go.th/publish/6044.0.html">http://www.rd.go.th/publish/6044.0.html</a>.</p> <p><i>Conclusion:</i> Hence, the team confirms that the rates applied in the financial calculations sheet are in accordance with the tax regulation of the country.</p>

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
Benchmark (Return of Equity)	13.21	%	EGAT financial report established by Sterns & Steward Co.Ltd on 2006-02-23	/BM1A/	<input checked="" type="checkbox"/>	<p><i>Description:</i> The return on equity applied for the project activity has been derived based on the financial parameters established by Sterns Steward &amp; Co. on 2006-02-23<sup>/BM1A/</sup> which proposed EGAT consider further investment analysis.</p> <p><i>Justification:</i> The team has assessed EGAT's corporate cost of equity benchmark and the power sector cost of equity as calculated based on the EGAT corporation and EGAT's power sector financial study reports established by Sterns Steward &amp; Co. on 2006-02-23.<sup>/BM1A/</sup> The result of the benchmark calculation demonstrated at 13.21% for EGAT's corporation and 14.68% for the power sector respectively.<sup>/BM1/BM2/</sup> Due to the fact that EGAT's corporate benchmark is lower; 13.21% has been considered by PP.</p> <p>The cost of equity is determined by using the financial parameter which established by external financial company, Sterns Steward &amp; Co. by utilizing the Capital Asset Pricing Model (CAPM). The CAPM defines the compensation of investors for the investments. One part of the formula is related to the time value of money (risk free rate) compensating for the investment over a time period, the other part represents the risks for investment. This is calculated by taking a risk measure, called beta (<math>\beta</math>). The beta</p>
			Benchmark calculation sheet for 13.21% ROE	/BM1/		
			Benchmark calculation sheet 14.68% ROE for power sector	/BM2/		
			<a href="http://www.thaibma.or.th/PriceYeild.html">http://www.thaibma.or.th/PriceYeild.html</a>	/tmb/		

<input type="checkbox"/>	No financial parameters are used for additionality justification													
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below													
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT									
					Correctness of value applied	Comment								
						<p>compares the returns of the asset to the market over a period of time and to the market premium. The formula correctly applied is as following:</p> $R_e = R_f + \beta_l (MRP)$ <p>Where:</p> <table><tr><td>R<sub>e</sub></td><td>Expected return on equity</td></tr><tr><td>R<sub>f</sub></td><td>Risk free return on an investment</td></tr><tr><td>B<sub>l</sub></td><td>Equity Beta (levered)</td></tr><tr><td>MRP</td><td>Market Risk premium</td></tr></table> <p>The team has assessed and confirmed that the formula applied is correct and appropriate as the formula is broadly applied for financial analysis.</p> <p>The team also validated each parameter applied to determine the benchmark using the principal established by 3<sup>rd</sup> party. The parameters applied in the Capital Asset Pricing Model (CAPM) formula is cross checked with the EGAT financial report established by the external party. In addition, publicly available data of the country<sup>/tax/tbm/</sup> were checked to confirm that the correct value is applied.</p> <p>The Capital Asset Pricing Model (CAPM) is applied to determine the benchmark using the following parameters:</p> <p><b>Risk Free Rate, R<sub>f</sub>: 5.07%</b></p>	R <sub>e</sub>	Expected return on equity	R <sub>f</sub>	Risk free return on an investment	B <sub>l</sub>	Equity Beta (levered)	MRP	Market Risk premium
R <sub>e</sub>	Expected return on equity													
R <sub>f</sub>	Risk free return on an investment													
B <sub>l</sub>	Equity Beta (levered)													
MRP	Market Risk premium													



<input type="checkbox"/> No financial parameters are used for additionality justification						
<input checked="" type="checkbox"/> Assessment of all financial parameters see below						
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
						<p>The value is taken from the government bond rate yield which is available published on the Thai Bond Market Association website<sup>/tbm/</sup> in August 2007. The maximum long term run 20 years has been cross checked with the yield rate on the date of the decision made 2008-01-10</p> <p>This value has been cross checked by accessed to the Thai Bond Market Association website<sup>/tbm/</sup> and the value as published on the website is higher than the value applied.</p> <p>Hence the team concluded that the value applied is appropriate and conservative.</p> <p><b>Market Risk Premium, MRP : 8.00%</b></p> <p>The value is stated in the report from the financial consultant, Sterns Steward&amp;Co. The consultant has derived the Market Risk Premium of the country base on the country rating from the Moodys website (<a href="http://www.moodys.com">www.moodys.com</a>) and S&amp;P Institute which is publicly available and a reliable source. Hence the method derived and source of data referred to were checked and the value derived is correct and appropriate.</p> <p><b>Levered Beta, B<sub>L</sub> : 1</b></p> <p>The value is determined using the principal stated in the report from the financial consultant, Sterns Steward&amp;Co. dated 2006-02-23<sup>/BM1A/</sup> and the following formula and value are applied:</p> <p>Levered beta = Unlevered Beta * [1 + (1 - Tax Rate) * Debt/</p>

<input type="checkbox"/>	No financial parameters are used for additionality justification													
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below													
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT									
					Correctness of value applied	Comment								
						<p>Equity.</p> <table border="1"> <thead> <tr> <th>Value</th> <th>Source of Data</th> </tr> </thead> <tbody> <tr> <td>Tax rate : 30%</td> <td>The corporate tax rate of the country.</td> </tr> <tr> <td>Debt/Equity : 1.48</td> <td>The value is derived by Sterns Steward &amp; Co.<sup>/BM1/</sup></td> </tr> <tr> <td>Unlevered Beta : 0.5</td> <td>The value is derived by Sterns Steward &amp; Co.<sup>/BM1/</sup></td> </tr> </tbody> </table> <p>The team assessed the benchmark calculation sheet<sup>/BM1/</sup> and cross check the value applied with the financial report, which is established by the financial consultant, Sterns Steward &amp; Co. dated 2006-02-23<sup>/BM1A/</sup> and considered that the document is reliable. In addition, the other value used for risk free rate and corporate tax rate which applied to determine the benchmark are taken from the publicly available source from the host country which is assessed reliable.<sup>/tbm/tax/</sup> Therefore, the benchmark as referred to above is calculated correctly from the reliable source which is publically accessible and valid at the time of decision made.</p> <p><i>Conclusion:</i> By means of assessment, the team concluded that the corporate return on equity benchmark is 13.21% and has been derived</p>	Value	Source of Data	Tax rate : 30%	The corporate tax rate of the country.	Debt/Equity : 1.48	The value is derived by Sterns Steward & Co. <sup>/BM1/</sup>	Unlevered Beta : 0.5	The value is derived by Sterns Steward & Co. <sup>/BM1/</sup>
Value	Source of Data													
Tax rate : 30%	The corporate tax rate of the country.													
Debt/Equity : 1.48	The value is derived by Sterns Steward & Co. <sup>/BM1/</sup>													
Unlevered Beta : 0.5	The value is derived by Sterns Steward & Co. <sup>/BM1/</sup>													

<input type="checkbox"/>						
No financial parameters are used for additionality justification						
<input checked="" type="checkbox"/>						
Assessment of all financial parameters see below						
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
						correctly and the financial parameter as reported established by the external party has been validated as it is reliable. Hence the benchmark is derived in accordance to the EB62 annex 5. Also, the value of 13.21% benchmark, after tax, as taken from the EGAT corporate report is conservative and appropriated to the type of equity IRR post tax.
Plant Load Factor	70.45	%	PLF calculation  Proof of PLF signed by civil engineer  Historical water flow rate at Mae Klong Dam from 1982 to 2000	/PLF1/  /PLF2/  /ADD4.2/	<input checked="" type="checkbox"/>	<p><i>Description:</i> The PLF has been calculated by EGAT based on the water flow rate at the Mae Klong Dam. /PLF1/PLF2/ADD4.2/</p> <p><i>Justification:</i> Due to EGAT, who is the entity authorised and experienced for the implementation of hydropower plants in the country, the plant load factor is therefore owned and calculated by EGAT. However, the calculated PLF from EGAT has been verified by the external party who is authorised to do so. The confirmation letter issued by the external party for the PLF calculation was assessed. /PLF1/ Also, the engineering license for the person who verified the PLF calculation has been checked and confirmed. /PLF2/ In addition, the team has cross checked the PLF from other registered CDM projects in the region. The PLF of hydropower project in Vietnam can be demonstrated below: /unfccc/</p>

<input type="checkbox"/>	No financial parameters are used for additionality justification						
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below						
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT		
					Correctness of value applied	Comment	
						<b>Reference no.</b>	<b>Plant Load Factor (%)</b>
						2372	35.11
						3942	58.79
						3396	44.60
						3514	57.08
Tariff	2.30	THB/kWh	Calculated from the tariff rate in power purchase agreement 2005-12-22  PPA between EGAT and PEA dated 2005-12-22	/ADD1.1/  /PPA/	<input checked="" type="checkbox"/>	Therefore, the PLF of 70.45% seems conservative since the value is higher than any of the compared PLFs of reference projects. <i>Conclusion:</i> By means of assessment the team concluded that the PLF of 70.45% is appropriate and it is in accordance with regards to guideline EB 48 annex 11.	
						<i>Description:</i> The tariff is determined according to the Power Purchase Agreement (PPA) on 2005-12-22 <sup>/PPA/</sup> . As stated in the contract, the tariff rate is charged according to the Time of Use (TOU) rate, which is the rate varied according to the Peak time, Off-peak time and the transmission voltage supply.	
						<i>Justification:</i> The PPA was checked and the electricity tariff sell price is charged according to the TOU tariff which is the combination of wholesale tariffs and fuel charged tariff (Ft). <sup>/PPA/</sup>	
						<b>Wholesales Tariff:</b> The price is varied according to the generation time, which is separated into Peak and Off-peak hours, and a higher tariff rate will be paid for the electricity supplied during Peak	

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
						<p>hour.</p> <p>As stated in the PPA, the duration for Peak and Off-peak hours are demonstrated below: <sup>/PPA/</sup></p> <ol style="list-style-type: none"> <li>1) Peak hour : <ol style="list-style-type: none"> <li>a. 9.00 am to 10.00 pm from Monday to Friday; and</li> <li>b. 9.00 am to 10.00 pm of the Agricultural day.</li> </ol> </li> <li>2) Off-peak hour : <ol style="list-style-type: none"> <li>a. 10.00 pm to 9.00 am. on Monday to Friday; and</li> <li>b. 0.00 am to 24.00 pm on Saturday and Sunday.</li> <li>c. 0.00 am to 24.00 pm on public holidays (excludes the compensation day and the Agricultural day)</li> </ol> </li> </ol> <p>Based on Peak and Off-peak hours and the tariff rate defined in PPA, the team therefore replicated the wholesales tariff.</p> <p>There are at least 15 days a year of public holidays in Thailand which is demonstrated on the bank of Thailand website <a href="http://www.bot.or.th/English/FinancialInstitutions/Flholiday/Pages/2554.aspx">http://www.bot.or.th/English/FinancialInstitutions/Flholiday/Pages/2554.aspx</a>. However, only 12 days apply which do not include the compensation days. The rate is therefore determined at 1.78 THB/kWh.</p> <p>However, the wholesale tariff rate determined by PP is determined according to the condition below by exclusion of the public holidays and is charged at the Off-Peak rate: <sup>/ADD1.1/</sup></p> <ol style="list-style-type: none"> <li>1) Peak hour: 9.00 am. to 10.00 pm on Monday to Friday; and</li> <li>2) Off-peak hour: 10.00 pm to 9.00 am on Monday to Friday</li> </ol>

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
						<p>and 0.00 am to 24.00 pm on Saturday and Sunday.</p> <p>Therefore, the wholesale tariffs determined by PP are conservative, the wholesales tariff in which the Ft is determined at 1.8165THB/kWh.</p> <p><b>Fuel Charge (Ft):</b> According to the PPA, a fixed tariff rate of 0.481 THB/kWh will be charged per unit of electricity generated.</p> <p>Therefore, the total tariff rate determined by PP of 2.3 THB/kWh is conservative because the rate is determined to be higher than the rate replicated from the PPA of 2.261 THB/kWh. The team cross checked the calculation tariff rate spreadsheet<sup>ADD1.1/</sup> and compared with the actual rate replicated from the condition in the PPA and concluded that the tariff determined by PP is conservative.</p> <p>For the tariff rate of 2.27 THB/kWh as approved by the cabinet has been checked and it is lower than the actual rate applied. Therefore, the actual rate 2.30 THB/kWh which derived from the PPA is accurate and it is conservative since this is the actual rate will be obtained during project operation.</p> <p>To make the IRR above the benchmark, the tariff would be increased around 43% to be 3.28 THB/kWh which is the historical electricity tariff of the country has never been reached. The rate reported on the EPPO website was checked and confirmed <a href="http://www.eppo.go.th/power/data/STATUS_VSPP_Sep%202011">http://www.eppo.go.th/power/data/STATUS_VSPP_Sep%202011</a>.</p>

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
						<p><u>xls.</u></p> <p><i>Conclusion:</i></p> <p>By means of assessment the team concluded that the tariff rate of 2.30 THB/kWh is derived correctly and the estimation is based on the power purchased agreement which is the actual contract and valid at the time of decision made.</p>
Equity Share	100	%	<p>Electrical Generating Authority of Thailand Act year 1960</p> <p>Notification for the Cabinet Resolution on Public Debt Management Plan issued as the following dated:</p> <ul style="list-style-type: none"> <li>• 2005-10-07</li> <li>• 2006-08-21</li> <li>• 2006-11-01</li> </ul>	<p>/EGAT/</p> <p>/EQ1/ /EQ2/ /EQ3/ /EQ4/</p>	<input checked="" type="checkbox"/>	<p><i>Description:</i></p> <p>The 100% equity is approved by the cabinet at the time prior to the decision made</p> <p><i>Justification:</i></p> <p>EGAT is the organization who operates and manages the business according to the regulation named, <i>Electrical Generating Authority of Thailand Act 1968</i>; as stated in the item 4, paragraph 41 and 42, the budgetary for loan and debt shall be approved by the cabinet.<sup>/EGAT/</sup></p> <p>The team therefore assessed the evidence the cabinet resolution for approved “Public Debt Management Plan” for fiscal year 2006 to 2008. The documents are issued by the Deputy Secretary General to the Cabinet dated 2005-10-07, 2006-08-21, 2006-11-01, and 2007-09-19.<sup>/EQ1/EQ2/EQ3/EQ4/</sup></p> <p>As a result, it is clearly indicated that the project activity was withdrawn from the list of approved projects for public debt according to the cabinet resolution for revision of Public Debt Management Plan year 2006 dated 2006-08-15.<sup>/EQ2/</sup> Therefore, the project activity had not been approved for the public debt since</p>

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
			<ul style="list-style-type: none"> <li>2007-09-19</li> </ul>			<p>then.  <i>Conclusion:</i>            By means of assessment the team concluded that the cabinet resolution for “Public Debt Management Plan” from 2006 until 2008 shows that the project activity is not approved for debt.            Also, the notification of the cabinet resolution were assessed as reliable due to the documents issued and signed by the <i>Deputy Secretary General to the Cabinet</i> who informed the outcome of the cabinet meeting to the public.            Therefore, the documents are considered to be reliable and valid during the time when the decision was made. Hence the 100% equity applied is appropriate.</p>



## ANNEX 4: ASSESSMENT OF BARRIER ANALYSIS

**Table A-4:** Assessment of Barrier Analysis (EB 55 Annex 1, §118)

<input checked="" type="checkbox"/>		No barrier parameters are used for additionality justification		
<input type="checkbox"/>		Assessment of barriers see below		
Kind of Barrier (invest, tech, other)	Description of Barrier	Evidence used	Assessment of validation team	
			Appropriateness of information source	Explanation of final result
			<input checked="" type="checkbox"/>	

## ANNEX 5: OUTCOME OF THE GSCP

**Table A-5:** Outcome of the Global Stakeholder Consultation Process

(§§ 40-42, VVM Version 1.2)

<input checked="" type="checkbox"/>	No comments were received during the global stakeholder consultation period					
<input type="checkbox"/>	Comments were received during the global stakeholder consultation period. The comments (in unedited form) and the consideration/response of the validation team are presented below:					
Comment No.:	Comment by:	Inserted on:	Subject	Comment <sup>*)</sup>	Action taken by the validation team to take due account on the comment <sup>*)</sup>	Conclusion (incl. CARs CLs or FARs)

<sup>\*)</sup>In case clarifications have been requested by the validation team corresponding rows shall be added







**TUV NORD**  
Certification

### Statement of Competence

Agreement and authorization according to the procedures of the TÜV NORD JI/CDM Certification Program

**Mr. Markus Knödlseider**

SCHEME	STATUS	VALID UNTIL
CDM	Assessor (Validation, Verification) Technical Reviewer	2014-09-05
VCE / ISO 14001:2	Assessor Technical Reviewer	2014-09-05


Authorization status for technical areas within sectoral scopes

CODE	TECHNICAL AREA	TR SUBCATEGORIES
15.1	Waste Handling and Disposal	15.1.1 Waste management 15.1.2 Wastewater management

276 – Rev. 1, Date: 2012-09-28

276\_2011050\_20120928\_1401.doc

ISO 14001:2011-09-05\_1401.doc



**TUV NORD**  
Certification

### Statement of Competence

Agreement and authorization according to the procedures of the TÜV NORD JI/CDM Certification Program

**Ms. Saowalak Thongsong**

SCHEME	STATUS	VALID UNTIL
CDM	Assessor (Validation, Verification)	2013-09-14
VCE	Assessor	2013-09-14

Authorization status for technical areas within sectoral scopes

CODE	TECHNICAL AREA	TR SUBCATEGORIES
5.1	Chemical Process Industries	
11.1	Chemical Process Industries	
12.1	Chemical Process Industries	
13.1	Waste handling and disposal	

143 – Rev. 2, Date: 2011-09-19

143\_2011050\_20110919\_1401.doc

ISO 14001:2011-09-05\_1401.doc