Validation report form for renewal of crediting period for CDM project activities

(Version 02.0)

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION	
Title and UNFCCC reference number of the project activity	Nam Ngan Hydropower Project; UNFCCC ref: 3858
Number and duration of the next crediting period	Second crediting period, 13/12/2017-12/12/2024 (both days included)
Version number of the validation report for RCP	02
Completion date of the validation report for RCP	28/03/2018
Version number of PDD to which this report applies	2.1
Project participants	1. Nam Mu Hydropower Joint Stock Company 2. Swiss Carbon Assets Ltd. 3. Energy and Environment Consultancy Joint Stock Company
Host Party	Viet Nam
Applied methodologies and standardized baselines	AMS-I.D. ver.18 - Grid connected renewable electricity generation
Mandatory sectoral scopes linked to the applied methodologies	01
Conditional sectoral scopes linked to the applied methodologies	NA
Estimated amount of annual average GHG emission reductions or GHG removals by sinks in the next crediting period	47,927
Name and UNFCCC reference number of the DOE	Earthood Services Private Limited Ref No. E-0066
Name, position and signature of the approver of the validation report for RCP	 Kaviraj Singh Earthood Services Private Limited

SECTION A. Executive summary

>> The Nam Ngan Hydropower Project involves the construction of a two-unit hydropower plant, which is located on the Nam Ngan stream between Viet Lam and Quang Ngan communes, Vi Xuyen district in Ha Giang province of Vietnam. The installed capacity of the project is 13.5 MW and estimated annual gross power generation is 58,030 MWh.
The project's purpose is to generate and to supply renewable electricity to the national grid connected via 110 kV and connected to Vietnam national grid.

Total estimated annual average emission reduction for this crediting period is 47,927 tCO_{2e}

Scope of Validation
The scope of the services provided by Earthood Services Private Limited for the project is to perform validation of the renewable of crediting period for the project activity. The scope of validation is to assess the claims and assumptions made in the revised project design document (PDD) against the UNFCCC criteria, including but not limited to, CDM PS, CDM VVS, applied methodology and other relevant rules and requirements established for CDM project activities.

Validation Process
The validation process is undertaken by validation team that involves the following:

- the desk review of documents and evidences submitted by the project participant in context of the reference CDM rules and guidelines issued by CDM EB,
- undertaking site visit, interview or interactions with the representative of the project participant,
- reporting audit findings with respect to clarifications and non-conformities and the closure of the findings, as appropriate and
- preparing a draft validation report for renewable of crediting period complying with the CDM requirements

An independent Technical Review team reviews the validation report prepared by validation team. The final validation report that is accepted by Technical Reviewer is then approved on behalf of Earthood Services Private Limited and processed further as per CDM procedures.

Conclusion
The review of the PDD, supporting documentation and subsequent follow-up actions (onsite visit and interviews) has provided Earthood with sufficient evidence to determine the fulfilment of stated criteria.
Earthood is of the opinion that the project activity "Nam Ngan Hydropower Project" as described in the final PDD version 2.1 dated 19/03/2018 meets all relevant requirements of CDM, meets host country criteria and has correctly applied the methodology "AMS-I.D.- Grid connected renewable electricity generation" version 18.0. Therefore, the project is being recommended to CDM EB for request for its renewable of crediting period.

SECTION B. Validation team, technical reviewer and approver

B.1. Validation team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interview(s)	Validation findings
1.	Team Leader	IR	Mandal	Amit Ranjan	Central office	Y	Y	Y	Y
2.	Validator	IR	Mandal	Amit Ranjan	Central office	Y	Y	Y	Y
3.	Meth Expert (AMS-I.D)	IR	Mandal	Amit Ranjan	Central office	Y	Y	Y	Y
4.	Technical	IR	Mandal	Amit Ranjan	Central office	Y	Y	Y	Y

	Expert (TA 1.2)								
5.	Local expert	EI	Ha	Nguyen Manh	Central office	Y	N	N	Y

B.2. Technical reviewer and approver of the validation report for RCP

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	Mahawar	Abhishek	Central Office
2.	Technical Expert (TA 1.2)	IR	Mahawar	Abhishek	Central Office
3.	Approver	IR	Singh	Kaviraj	Central Office

SECTION C. Means of validation

C.1. Desk/document review

>> The validation for the renewable of crediting period is performed primarily as a document review of the project design document version 01 dated 20/11/2017 and the final version (final) 2.1 dated 19/03/2018. The cross checks between information provided in the PDD and information from sources other than those used, if available, the validation team's sectoral or local expertise and, if necessary, independent background investigations.

The complete list of documents/evidences assessed by validation team is included under Appendix 3.

C.2. On-site inspection

Duration of on-site inspection: 04/12/2017 to 08/12/2017				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Opening meeting	Vi Xuyen district in Ha Giang province of Vietnam	04/12/2017	Amit Ranjan Mandal
2.	Project implementation and operation (project boundary, technology, project equipment, monitoring and metering equipment) as per registered PDD		04/12/2017	Amit Ranjan Mandal
3.	Applicability of methodology(ies)		04/12/2017	Amit Ranjan Mandal
4.	Project boundary and emission sources included in the project boundary.		04/12/2017	Amit Ranjan Mandal
5.	Baseline validity, impact of national & sectoral policies.		04/12/2017	Amit Ranjan Mandal
6.	Monitoring plan (validity of ex-ante parameters)		08/12/2017	Amit Ranjan Mandal
7.	Closing meeting		08/12/2017	Amit Ranjan Mandal

C.3. Interviews

No.	**Interviewee**			**Date**	**Subject**	**Team member**
	Last name	**First name**	**Affiliation**			
1.	Nguyen Quang	Phuong	Project Manager, Energy and Environment Consultancy.	04/12/2017 - 08/12/2017	PDD description, baseline, emission reduction calculations etc.	Amit Ranjan Mandal
2.	Nguyen Viet	Ky	Vice Director, Nam Ngan HPP	04/12/2017 - 08/12/2017	Project implementation, commissioning, operation, Monitoring equipments details, calibration etc.	Amit Ranjan Mandal
3.	Pham	Hang	Project Manager, Energy and Environment Consultancy	04/12/2017 - 08/12/2017	PDD description, baseline.	Amit Ranjan Mandal
4.	Pham	Huong	Project Assistant, Energy and Environment Consultancy	04/12/2017 - 08/12/2017	Project details, training details etc.	Amit Ranjan Mandal
5.	Nguyen	Quynh Anh	Project Assistant, Energy and Environment Consultancy	04/12/2017 - 08/12/2017	PDD description	Amit Ranjan Mandal
6.	Nguyen Anh	Thu	Project Manager, Energy and Environment Consultancy	04/12/2017 - 08/12/2017	PDD description	Amit Ranjan Mandal
7.	Ma trang	Duc	Operator, Nam Ngan HPP	04/12/2017 - 08/12/2017	Operation and Maintenance	Amit Ranjan Mandal
8.	Pham Duc	Han	Shift Leader, Nam Ngan HPP	04/12/2017 - 08/12/2017	Calibration, monitoring equipments, record keeping etc.	Amit Ranjan Mandal

C.4. Sampling approach

>> No sampling approach was applied.

C.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised

Area of validation findings	No. of CL	No. of CAR	No. of FAR
Compliance with PDD form	-	CAR#02, CAR#03	-
Application and selection of methodologies and standardized baselines	-	CAR#06	-
Validity of original baseline or its update	CL#01	-	-
Estimated emission reductions or net anthropogenic removals	-	CAR#04, CAR#05	-
Validity of monitoring plan	-	CAR#07	-
Crediting period	-	-	-
Project participants	-	-	-
Post-registration changes	-	-	-
Others (please specify)	-	-	-
Total	01	06	00

SECTION D. Validation findings

D.1. Compliance with PDD form

Means of validation	The PDD form used is CDM-PDD-FORM version 10.1/04/, which is the appropriate form, and the latest version available at the time of validation. All the sections of the form were filled as per the guidelines and gave all the relevant details
Findings	NO findings were raised.
Conclusion	The updated PDD has been found to be completed using the valid version of the PDD form.

D.2. Application and selection of methodologies and standardized baselines

Means of validation

The PDD employs the approved baseline methodology AMS-I.D: Grid connected renewable electricity generation --- Version 18.0/11/.

The applicability condition of the methodology AMS-I.D (Version 18) is presented as follows:

Applicability criteria as per methodology	Justification from PP	MoV
This methodology is applicable to project activities that (a) install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); (d) involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) involve a replacement of (an) existing plant(s).	The proposed project involves the installation of a new hydropower plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity. Hence, applicable.	The proposed project activity is a hydro power project. The same is confirmed from the commissioning certificate of the plant. The assessment team has also confirmed this during onsite assessment and found correct. Thus, this criteria is applicable to the project activity.
Hydropower plant with	The project activity	The same is confirmed

	reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: • The project activity is implemented in an existing reservoir with no change in the volume of reservoir; • The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m2; • The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m2	constructs a new reservoir and the power density of the power plant, as per definitions given in the Project Emissions section, is 10.63 W/m^2 which is much greater than 4 W/m^2. Applicable.	during onsite assessment. It is observed that the reservoir is available and it is a new reservoir. The power density calculation is provided in the PDD and is found correct. Hence, this criteria is applicable to the project activity.
	If the new unit has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	The project does not incorporate a mix of renewable and non-renewable components. This criterion is therefore not applicable. The total installation capacity of the proposed project is 13.5 MW, which is within the limit of 15 MW stipulated for the chosen (small-scale) methodology. Not applicable.	The project activity is a hydro power project and there is no non-renewable component in the project activity. The same is confirmed during onsite assessment. Hence, this criteria is not applicable.
	Combined heat and power (co-generation) systems are not eligible under this category.	There is no combined heat and power component in the project activity. Not applicable.	The project activity is not a combined heat and power system. The project activity is a hydro

		power project and is confirmed during onsite assessment. Hence, this criteria is not applicable.
In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	The project activity does not involve the addition of renewable energy generation units at an existing facility.	The project activity does not involve addition of renewable energy generation in an existing facility. The same is confirmed during onsite assessment. Hence, this criteria is not applicable.
In case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15MW.	The project activity does not involve the retrofit or replacement of (an) existing unit(s).	The project activity is a new hydro power project. The assessment team has confirmed the same during onsite assessment and commissioning certificate. Hence, this criteria is not applicable.
In case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type I-methodologies such as "AMS-I.C.: Thermal energy production with or without electricity" shall be explored.	The project activity does not involve the landfill gas, waste gas, wastewater treatment and agro-industries projects	The project activity does not involve landfill gas, wastewater treatment or agro-industries project. The project activity is a new hydro power project. The assessment team has confirmed the same during onsite assessment and commissioning certificate. Hence, this criteria is not applicable.
In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply	The project activity involves the construction of a hydropower plant.	The project activity is a hydro power project and does not involve use of biomass. The same is confirmed during onsite assessment. Hence, this criteria is not applicable.

Findings	CAR #06 was raised and resolved.
Conclusion	The validation team confirms that; (a) It has critically assessed each applicability condition listed in the selected methodology and the relevant information contained in the PDD against these criteria. (b) The selected methodology for the proposed CDM project activity is applicable. The methodology was found to be in accordance with the applicable requirements in the CDM project standard for project activities version 01.

D.3. Validity of original baseline or its update

Means of validation

In line with the CDM project standard for project activities (Version 1.0)/01/ project participants has demonstrated the validity of the original baseline or update it in accordance with paragraphs 287−290.
The project activity is the installation of a greenfield power plant and therefore as per AMS-I.D Version 18/11/, para 19, for the greenfield power projects; The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid.
The continuation of existing baseline was validated as per the Methodological Tool "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" version 03.0.1, EB-66, Annex-47/18/.

Step 1: Assess the validity of the current baseline for the next crediting period
Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies
The current baseline scenario was verified from the current national and/or sectoral policies and circumstances which may impact the constituents of the power plants supplying the grid.
Based on the review of the current national/sectoral policies it is confirmed that there is no policies which mandate the generation of electricity from hydro power and the policies are same as available during the registration of the project activity.

Step 1.2 Assess the impact of circumstances
The scenario of fuel used in the baseline scenario has remained similar to the fuels available at the time of validation. Therefore, it is considerable to accept that the circumstances have remained same.

Step 1.3 Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.
The hydro power generation is not mandated by the governing authorities in Viet Nam; therefore continuation of the baseline is the likely scenario.

Step 1.4 Assessment of the validity of the data and parameters
The following parameters have been updated:

Parameter	value	Justification
Grid Emission Factor of Viet Nam	0.83425	The emission factor has been calculated and published by the host country DNA of Vietnam using the latest relevant EF tool and data available at the time of calculation/publication. The combined margin emission factor is calculated in line with "Tool to calculate the

			emission factor for an electricity system" Version 05.0/17/ from the values provided by the DNA of Vietnam. The calculation is also found in compliance with the "Tool to calculate the emission factor for an electricity system" Version 06.0

The other fixed ex-ante parameters which are used for the calculation of grid emission factors are removed from the PDD which is found in line with para 290 of the CDM PS for PA version 1.0/01/.
Based on the above steps the continuation of the original baseline has been established and therefore the current baseline does not require to be updated.

The baseline's validity was found acceptable according to the VVS version 01 para 407/3/.

Findings	CAR#04 was raised and resolved
Conclusion	The DOE has accepted and validates the original baseline for this monitoring period in the updated PDD. The baseline scenario is found to be valid in accordance with the methodology/11/ and VVS version 01/3/.

D.4. Estimated emission reductions or net anthropogenic removals

Means of validation

The applied methodology AMS-I.D version 18.0 defines the methodological steps and choices to determine project emissions, baseline emissions, leakage and emission reductions for the project activity.

Project Emission:

For most renewable project activities, PE_y = 0. However, for the following categories of project activities, project emissions have to be considered following the procedure described in the version 17.0 of "ACM0002: Grid-connected electricity generation from renewable sources"/23/:

a) Emissions related to the operation of geothermal power plants
b) Emissions from water reservoirs of hydro power plants

Thus, The project emission for Nam Ngan hydropower project is:
$PE_y = PE_{HP,y}$

Where, $PE_{HP,y}$: Emission from reservoir

For hydro power 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 shall account for CH4 and CO2 emissions from the reservoirs.

The emissions from the reservoir ($PE_{PD,y}$)

For hydropower project activity that results in new reservoirs and/or the increase of existing reservoirs, the power density (PD) of the project activity shall be calculated as follows:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}}$$

Where:

	PD Power density of the project activity, in W/m^2. Cap_{PJ} Installed capacity of the hydro power plant after the implementation of the project activity (W). Cap_{BL} Installed capacity of the hydro power plant before the implementation of the project activity (W). For new hydro power plants, this value is zero. A_{PJ} Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2). A_{BL} Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero. If the *PD* is greater than 4 W/m^2 and less than or equal to 10 W/m^2: $$PE_{HP,y} = \frac{EF_{\text{Res}} \times TEG_y}{1000}$$ Where: $PE_{HP,y}$ Emission from reservoir expressed as tCO_2e/year EF_{Res} is the default emission factor for emissions from reservoirs, and the default value as per EB23 is 90 Kg CO_2e /MWh. TEG_y Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year *y* (MWh). If *PD* is greater than 10 W/m^2, then: $PE_{HP,y} = 0.$ PP has provided the calculation of PD and it is observed that PD is greater than 10W/m^2. Hence, project emission is zero which is considered to be correct by the assessment team. **Baseline Emissions** Baseline emissions include only CO_2 emissions from electricity generation from fossil fuel fired power plants that are displaced due to the project activity, calculated as follows: $$BE_y = EG_{BL,y}. EF_{CO2,grid,y}$$ Where BE_y Baseline emissions in year *y* (tCO_2/yr). $EG_{BL,y}$ Quantity of net electricity generation supplied by the hydropower plant to the grid as a result of the implementation of the CDM project activity in year *y* (MWh) $EF_{CO2,grid,y}$ CO_2 emission factor of the grid in year *y* **Grid emission factor:** The **combined margin** is calculated in accordance with the "Tool to calculate the emission factor for an electricity system" version 5.0/17/ which has been updated in the PDD based on the data and calculation provided by the DNA of Vietnam.

	The **Weighted average CM** is used, and the W_{OM} = 0.25 and W_{BM} = 0.75. The grid emission factor as calculated is **0.83425** tCO_2/MWh. **Leakage:** According to the methodology, no leakage emissions are considered. **Emission Reductions** Emission reductions are calculated as follows: $ER_y = BE_y – PE_y - LEy$ Where: ER_y = Emission reduction in year y (t CO_2e/yr) BE_y = Baseline emissions in year y (t CO_2e/yr) PE_y = Project emissions in year y (t CO_2e/yr)
Findings	CAR#05 was raised and resolved.
Conclusion	The emission reductions or net anthropogenic GHG removals in the updated PDD comply with the applicable requirements in the CDM project standard for project activities version 01. The final GHG estimated annual average emission reductions over the crediting period of seven years in the PDD version 2.1 dated 19/03/2018 are 47,927 tCO_2e.

D.5. Validity of monitoring plan

Means of validation

The monitoring plan given in the updated PDD complies with the registered monitoring plan. The values of ex-ante parameter and monitored parameters can be found in the table given below.

Parameters fixed ex-ante:

SN o.	Parameter	Value in updated PDD	Assessment
1.	CO_2 emission factor of the grid ($EF_{grid,y}$)	0.83425	The EF is calculated and published by Ministry of Natural resources and Environment Department of Meteorology, Hydrology and Climate change. The CM emission factor is calculated in line with "Tool to calculate the emission factor for an electricity system" Version 05.0/17/. The assessment team has checked the calculation in line with the latest Tool "Tool to calculate the emission factor for an electricity system" version 6.0/24/ and the calculation is found correct. Hence, the calculation is also in compliance of latest version of the Tool. The assessment team has checked the value from the document published by Host country DNA dated 17/03/2017 and found correct. The calculation is found in line with the with "Tool to calculate the emission factor for an electricity system" Version 05.0/17/.
2.	Installed capacity of	0	This is a green-field project. This value does not exist prior to the

	hydropower plant before the implementation of the project activity (**Cap_{BL}**)		implementation of the project activity. The same is confirmed during onsite assessment. Hence, the considered value is considered correct and accepted.
3.	Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full. For new reservoirs, this value is zero (**A_{BL}**)	0	This is a green-field project. This value does not exist prior to the implementation of the project activity. The same is confirmed during onsite assessment. Hence, the considered value is considered correct and accepted.
4.	Default emission factor for emissions from reservoirs (**EF_{res}**)	90 $kgCO_2e$/ MWh.	The value is a default value as per EB23, hence considered correct and accepted.

Project participant has updated data and parameters in accordance with the "Methodological tool: Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period".
Following parameters that were determined ex-ante used for the calculation of grid emission factor and not monitored during the crediting period, are no longer valid and are not included in the revised PDD:

1. **FCi,m,y:** Amount of fossil fuel type *i* consumed by power plant / unit *m* in year *y.* This data is provided by Institute of Energy – EVN, 2007 via a data providing contract.
2. **NCVi,y:** Net calorific value (energy content) of fossil fuel type i in year y. This data is provided by Institute of Energy – EVN, 2007 via a data providing contract.
3. **EFCO2,i,y**: CO2 emission factor of fossil fuel type i in year y. This data is Default value of the IPCC 2006 Guidelines
4. **EGm,y**: Net electricity generated and delivered to the grid by power plant/unit m in year y. This data is provided by Institute of Energy – EVN, 2007 via a data providing contract.

The change is found in line with para 290 of CDM PS for PA version 1.0/01/.

Monitored parameters:

Sl.no.	Parameter and Unit	Monitoring Frequency	Assessment
1	Electricity supplied by the proposed hydropower plant to the national grid (**$EG_{y,export}$**); MWh	Continuously measurement and monthly recording	The parameter will be measured parameter. Two-way power meters will be installed at the grid-connected point to measure the amount of electricity supplied to the grid by the proposed hydropower plant by the positive direction. The readings of electricity meter will

				be continuously measured by the power meter and monthly recorded. The recorded data will be confirmed by the joint balance sheet which will be signed by the representatives of EVN and the project owner. Electronic data will be archived within the crediting period and 2 years after the end of the crediting period. Meters will be calibrated periodically; once in every two years. The assessment team has confirmed the above during onsite assessment and found the details correct.	
	2.	Electricity supplied by the grid to the proposed hydropower plant ($EG_{y, import}$), MWh	Continuously measurement and monthly recording	The parameter will be measured parameter. Two-way power meters will be installed at the grid-connected point to measure the amount of electricity supplied to the grid by the proposed hydropower plant by the positive direction. The readings of electricity meter will be continuously measured by the power meter and monthly recorded. The recorded data will be confirmed by the joint balance sheet which will be signed by the representatives of EVN and the project owner. Electronic data will be archived within the crediting period and 2 years after the end of the crediting period. Meters will be calibrated periodically; once in every two years. The assessment team has confirmed the above during onsite assessment and found the details correct.	

3.	Electricity output produced by the Nam Ngan Hydropower plant and supplied to the national electricity grid ($EG_{BL,y}$), MWh	Calculated from $\mathbf{EG_{y,\ import}}$ and $EG_{y,\ export}$.	Calculating by subtracting $\mathbf{EG_{y,\ import}}$ from $EG_{y,export}$. Data will be archived within the crediting period and 2 years after the end of the crediting period. The assessment team has confirmed the above during onsite assessment and found the details correct.
4.	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full ($\mathbf{A_{PJ}}$), m^2	Yearly.	The parameter is measured from topographical surveys, maps, satellite pictures, etc. annually and is for the calculation of power density. The assessment team has confirmed the above during onsite assessment and found the details correct.
5.	Installed capacity of the hydro power plant after the implementation of the project activity ($\boldsymbol{Cap_{PJ}}$), W	-Yearly	The source of data is name plate details of installed equipment. The parameter is used for the calculation of power density. The assessment team has confirmed the above during onsite assessment and found the details correct.
6.	Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied internal loads, in year y($\boldsymbol{TEG_y}$), MWh/yr	Continuously measurement and monthly recording	The parameter will be measured parameter. Two-way power meters will be installed at the grid-connected point to measure the amount of electricity supplied to the grid by the proposed hydropower plant by the positive direction. The readings of electricity meter will be continuously measured by the power meter and monthly recorded. The recorded data will be confirmed by the joint balance sheet which will be signed by the representatives of EVN and the project owner. Electronic data will be archived within the crediting period and 2

				years after the end of the crediting period. Meters will be calibrated periodically; once in every two years. The assessment team has confirmed the above during onsite assessment and found the details correct.
Findings	CAR#07 was raised and resolved.			
Conclusion	The parameter fixed ex-ante and monitored, which are a part of the monitoring plan are in line with the registered PDD/05/ and was found to be acceptable as per the para 415 of the VVS version 01/03/.			

D.6. Crediting period

Means of validation	Crediting period renewal has been requested, the previous crediting period for the previous monitoring period was 13 December 12 - 12 December 17 (Renewable). An email dated 12/09/2017 sent by the PP indicates the notification sent to UNFCCC for the intent of renewal of crediting period as per para 280 of the PS version 1.0/01/. by the PP; therefore the next start date for the crediting period for the current request for renewal of the crediting period is 13/12/2017 and the crediting period is 13/12/2017- 12/12/2024.
Findings	No findings is raised.
Conclusion	The next crediting period of the project activity commences on the day immediately after the expiration of the of the first crediting period i.e. 13 December 12 - 12 December 17. This found to be in compliance with VVS version 01 para 415/3/.

D.7. Project participants

Means of validation	The names of the PP in the new updated PDD is 'Nam Mu Hydropower Joint Stock Company, Swiss Carbon Assets Ltd. And Energy and Environment Consultancy Joint Stock Company' (Private entity) which was found to be in line with the latest MoC/8/. Swiss carbon Assets Ltd. Is added as new entity. The details is also checked at UNFCCC webpage at https://cdm.unfccc.int/Projects/DB/RWTUV1279520903.5/view and found correct.
Findings	CAR#03 was raised and resolved.
Conclusion	The name of the project participant in the updated PDD are consistent with the names of the project participant in the latest version of MoC/8/.

D.8. Post-registration changes

Type of post-registration changes (PRCs)	**Confirmation** (Y/N)	**Validation report for PRCs**	
		Version	**Completion date**
Temporary deviations from the registered monitoring plan, applied methodologies or applied standardized baselines	N	NA	NA
Corrections	N	NA	NA
Change to the start date of the crediting period of the project activity	N	NA	NA
Inclusion of a monitoring plan	N	NA	NA
Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools	N	NA	NA
Changes to the project design	N	NA	NA
Changes specific to afforestation and reforestation project activities	N	NA	NA

SECTION E. Internal quality control

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The draft validation report for renewable of crediting period prepared by the validation team was reviewed by an independent technical review team to confirm if the internal procedures established and implemented by ESPL were duly complied with and such opinion/conclusion is reached in an objective manner that complies with the applicable CDM rules/requirements. The technical review team is collectively required to possess the technical expertise of all the technical area/sectoral scope the project activity relates to. All team members of technical review team were independent of the validation team.

The technical review process may accept or reject the validation opinion or raise additional findings in which case these must be resolved before requesting for registration. The technical review process is recorded in the internal documents of ESPL and the additional findings gets included in the report.

The final report approved by the technical reviewer is authorized by Managing Director and issued to PP and/or submitted for request for renewal of crediting period, as appropriate on behalf of ESPL.

SECTION F. Validation opinion

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ESPL has completed the validation of renewable of crediting period for "Nam Ngan Hydropower Project" bearing UNFCCC reference number 3858.

The validation for renewal of its crediting period was performed on the basis of rules and requirements defined by UNFCCC for the CDM project activities.

The Nam Ngan Hydropower Project involves the construction of a two-unit hydropower plant, which is located on the Nam Ngan stream between Viet Lam and Quang Ngan communes, Vi Xuyen district in Ha Giang province of Vietnam. The installed capacity of the project is 13.5 MW and estimated annual gross power generation is 58,030 MWh.

The project's purpose is to generate and to supply renewable electricity to the national grid connected via 110 kV and connected to Vietnam national grid.

The project activity replaced carbon intensive fuel which would have otherwise used to generate the electricity.

It is demonstrated that the project is not a likely baseline scenario and the emission reductions attributable to the project are, hence, additional to any that would occur in the absence of the proposed CDM project activity. The project correctly applies the approved small scale methodology AMS-I.D - Grid connected renewable electricity generation, version 18.0/11/. and is assessed against latest valid CDM PS, VVS and PS and/or other applicable CDM Decisions/Tools/Guidance/Forms.

The proposed CDM project activity is likely to achieve the anticipated emission reductions stated in the PDD provided the underlying assumptions do not change. The expected emission reductions (annual average) from the project activity are estimated to be 47,927 tCO_2e per year over the selected 7 years crediting period starting from 13/12/2017. The proposed CDM project activity is likely to achieve the anticipated emission reductions stated in the PDD provided the underlying assumptions do not change.

ESPL has informed the project participants of the validation outcome through the draft validation report and final validation report. In case of negative validation outcome, the final validation report is only submitted to PP. The final validation report contains the information with regard to fulfilment of the requirements for validation, as appropriate.

ESPL applied the following validation process and methodology using a competent validation team;

- the desk review of documents and evidences submitted by the project participant in context of the reference CDM rules and guidelines issued by CDM EB,
- undertaking/conducting site visit, interview or interactions with the representative of the project participant,
- reporting audit findings with respect to clarifications and non-conformities and the closure of the findings, as appropriate and
- preparing a draft validation opinion based on the auditing findings and conclusions
- technical review of the draft validation opinion along with other documents as appropriate by an independent competent technical review team
- finalization of the validation opinion (this report)

The review of the PDD, supporting documentation and subsequent follow-up actions (onsite visit and interviews) have provided ESPL with sufficient evidence to determine the fulfilment of stated criteria.

ESPL is of the opinion that the project activity “Nam Ngan Hydropower Project” as described in the final PDD version 2.1 dated 19/03/2018 meets all relevant requirements of CDM, meets host country criteria and has correctly applied the methodology AMS-I.D - Grid connected renewable electricity generation, version 18.0/11/. Therefore, the project is being recommended to CDM EB for request for renewable of crediting period.

Appendix 1. Abbreviations

	Full texts
ACM	Approved Consolidated Methodology
AM	Approved Methodology
ACM	Approved Consolidated Methodology
BE	Baseline Emission
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CH4	Methane
CL	Clarification Request
CM	Combined Margin
CO2	Carbon di oxide
CP	Crediting Period
DNA	Designated National Authority
DR	Desk Review
DOE	Designated Operational Entity
EB	Executive Board
ESPL	Earthood Services Private Limited
EVN	Electricity Corporation of Vietnam
FAR	Forward Action Request
GHG	Green House Gas
GSC/GSP	Global Stakeholder Consultation Process
GW	Giga Watt
GWh	Giga Watt hour
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
kW	kilo Watt
kWh	kilo Watt hour
LoA	Letter of Approval/Authorization
LSC	Local Stakeholder Consultation Process
MoC	Modalities of Communication
MoV	Means of Validation
MP	Monitoring Plan
MW	Mega Watt
MWh	Mega Watt hour
ODA	Official Development Assistance
OM	Operating Margin
PA	Project Activity
PCP	Project Cycle Procedure
PDD	Project Design Document
PE	Project Emission
PLF	Plant Load Factor
PoA DD	Programme of Activities Design Document
PP	Project Participant
PS	Project Standard
RFR	Request for Registration
tCO2e	tonnes of Carbon di Oxide equivalent
UNFCCC	United Nations Framework Convention on Climate Change
V	Version
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers

Competence Statement			
Name	Amit Ranjan Mandal		
Country	India		
Education	Master of Science (Energy Management)		
Experience	9.5 yrs		
Field	Environmental, Energy, CDM		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	ACM0002, AMS.I.D		
Local expert	YES (India)		
Financial Expert	YES		
Technical Reviewer	YES		
TA Expert	YES (TA 1.2, TA 3.1)		
Reviewed by	Abhishek Mahawar	**Date**	01/03/2018
Approved by	Ashok Kumar Gautam	**Date**	01/03/2018

Competence Statement			
Name	Nguyen Manh Ha		
Country	Vietnam		
Education	Master of Engineering, Military Technical Academy		
Experience	20+ years		
Field	Wastewater treatment		
Approved Roles			
Team Leader	No		
Validator	No		
Verifier	No		
Methodology Expert	No		
Local expert	Vietnam		
Financial Expert	No		
Technical Reviewer	No		
TA Expert	No		
Reviewed by	Abhishek Mahawar	**Date**	17/01/2018
Approved by	Ashok Kumar Gautam	**Date**	17/01/2018

Competence Statement	
Name	Abhishek Mahawar

Country	India		
Education	B. Tech. (Chemical Engineering) MBA (Finance)		
Experience	9 Years +		
Field	Climate Change & Environment		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D, AMS I.F. and ACM0002		
Local expert	YES (India)		
Financial Expert	YES		
Technical Reviewer	YES		
TA Expert	YES (1.2)		
Reviewed by	Ashok Gautam	**Date**	01/03/2018
Approved by	Kaviraj Singh	**Date**	01/03/2018

Appendix 3. Documents reviewed or referenced

S.No.	Author	Title	References to the document	Provider
1.	UNFCCC	Standard: CDM PS	Ver. 1	Others
2.	UNFCCC	Standard: CDM PCP	Ver. 1	Others
3.	UNFCCC	Standard: CDM VVS	Ver. 1	Others
4.	UNFCCC	Form: CDM-PDD-FORM	Ver. 10.1	Others
5.	PP	Registered/Approved PDD	Version 2.3 dated 26/04/2010	PP
6.	PP	For 2nd Crediting Period Final PDD	Version 2.1 dated 19/03/2018	PP
7.	DNA- Switzerland	Letter of Approval	Dated 20/06/2014	Others
8.	Swiss carbon Assets ltd.	Signed MoC Form	Dated 08/07/2016	PP
9.	Nam Mu Hydropower Joint Stock Company	ER Sheet (draft)	-	PP
10.	Nam Mu Hydropower Joint Stock Company	ER Sheet (corresponding to final PDD)	Version 2.1 dated 19/03/2018	PP
11.	UNFCCC	AMS-I.D: Grid connected renewable electricity generation	Version 18.0	Others
12.	Swiss carbon Assets ltd.	Notification sent to UNFCCC for the intent of renewal of crediting period	Dated 12/09/2017	PP
13.	Nam Mu Hydropower Joint	PPA between EVN and Nam Mu Hydropower Joint Stock Company	April 2011	PP

	Stock Company			
14.	Ministry of industry and trade	Operation certificate	Dated 02/07/2009	PP
15.	Vice director of ministry	Permission for use of water	Dated 08/04/2011	PP
16.	Nam Mu Hydropower Joint Stock Company	Monitoring manual	June 2009	PP
17.	UNFCCC	Tool to calculate the emission factor for an electricity system	Version 5.0	Others
18.	UNFCCC	Tool for "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period'	Version 03.0.1	Others
19.	CONG HOA HOA VIET NAM	Commissioning certificate	Dated 15/06/2009 and 18/06/2009	PP
20.	Nam Mu Hydropower Joint Stock Company	Contract for supply of equipment	Dated 25/052007	PP
21.	Nam Mu Hydropower Joint Stock Company	Reservoir area	2017	PP
22.	TÜV NORD CERT GmbH	Validation report	Dated 19/07/2010	Others
23.	UNFCCC	Methodology ACM0002, version 17.0	2017	Others
24.	UNFCCC	Tool to calculate the emission factor for an electricity system	Version 6.0	Others

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. CL from this validation

CL ID	01	**Section no.**	-	**Date :**14/12/2017
Description of CL				
PP is requested to provide following documents: 1. Commissioning certificate for the project activity. *2.* Evidence for operational lifetime of the project. 3. Feasibility study report. *4.* Other statutory clearance documents from government Authorities.				
Project participant response				**Date :** 11/01/2018
1. Commissioning certificate will be provided together with the response of 1st finding *2. Operational lifetime of the project is calculated from lifetime of turbine. Specifically, expected lifetime of turbine is 150,000 hours (EB 50, annex 15), annual utilisation hour is 4298 hours (FSR), so expected operational lifetime of project activity is 35 years. But the lifetime is considered is 30 years as a conservative approach.* *3. Feasibility study report will be provided together with the response of 1st finding* *4. Statutory clearance documents will be provided together with the response of 1st finding*				
Documentation provided by project participant				

The list of documents that are provided in this submission: *1. "Commercial operation date of Nam Ngan HPP.pdf" which is supportive for commissioning certificate* *2. "Feasibility Study Report"* *3. "Statutory clearance document"*
DOE assessment **Date:** 31/01/2018
1. Commercial operation date of Nam Ngan HPP has been provided by PP. The date of commissioning is found consistent with the details provided in PDD. Hence, accepted and closed. 2. The operational lifetime is considered from EB 50, annex 15 which is 150,000 hours. As per feasibility report the annual operation hour is 4298 hours. So, lifetime arrived is 35 years. However, PP has considered the lifetime of the project as 30 years which is conservative which is consistent with the registered PDD and hence, accepted and closed out. 3. Feasibility study report provided by PP. The assessment team has reviewed the document and found it consistent with the details provided in PDD. 4. Other statutory clearances as applicable to the project activity is provided by the PP. CL#01 is closed.

Table 2. CAR from this validation

CAR ID	02	**Section no.**	-	**Date :**14/12/2017
Description of CAR				
In section A.1 of the PDD, the estimated generation is mentioned same as in the registered PDD; however, the estimated emission reduction mentioned is more than the value mentioned in the registered PDD. PP is requested to justify the difference in estimated emission reduction.				
Project participant response				**Date :**11/01/2018
In section A.1, although the estimated generation is same as in the registered PDD, the emission factor applied in the renewal PDD is 0.83425 tCO_2/MWh which is more than the value applied in the register PDD. Therefore the estimated emission reduction is more than the value mentioned in the registered PDD.				
Documentation provided by project participant				
1. "DNA_EF2017.pdf" which is supportive for emission factor value applied in the renewal PDD *2. "3858 ER Calculation 2nd.xlsx"*				
DOE assessment				**Date:** 31/01/2018
PP has clarified the reason for difference in estimated emission reduction in the revised PDD as compared to the registered PDD. The grid emission factor is revised and is as per the latest available factor provided by host country DNA. Hence, CAR#02 is closed.				

CAR ID	03	**Section no.**	D.7	**Date :**14/12/2017
Description of CAR				
There is a change in parties involved in the Project activity. PP is requested to clarify the same. PP is also requested to provide the Letter of Approval from the parties involved in the project activity.				
Project participant response				**Date :11/01/2018**
The Letter of Approval from Swiss Carbon Assets Ltd is provided with the response of the 1st finding				
Documentation provided by project participant				
"3858_LOA_Switzerland.pdf"				
DOE assessment				**Date:** 31/01/2018
Swiss Carbon Assets Ltd. Is involved as party to the project. The LoA from Switzerland is provided by the PP. The assessment team has checked the LoA and found correct, hence accepted. CAR#03 is closed.				

CAR ID	04	**Section no.**	D.3	**Date :**14/12/2017
Description of CAR				

The latest version of "Tool to calculate emission factor for an electricity system" is version 6.0 as available in UNFCCC webpage. The PDD mentions the version 5.0 of the Tool.
Project participant response **Date :**11/01/2018
The tool used to calculate emission factor published by DNA in 2017 is version 5.0. Because PP is not required to calculate emission factor, so the tool will not be mentioned in the PDD.
Documentation provided by project participant
"DNA_EF2017.pdf" which is supportive for emission factor value applied in the renewal PDD
DOE assessment **Date:** 31/01/2018
The grid emission factor is provided by the host country (Vietnam) DNA. The latest published document provided by the Vietnam DNA is checked by the assessment team and it is observed that "Tool to calculate emission factor for an electricity system" version 5.0 is used and is transparently mentioned in the document. Hence, CAR#04 is closed.

CAR ID	05	**Section no.**	D.4, ER sheet	**Date :**14/12/2017
Description of CAR				
PP is requested to provide the estimated emission reduction calculation sheet. PP is also requested to provide the latest report of Emission Factor of Vietnam Electricity system, published by Department of Climate Change (DNA Vietnam), Ministry of Natural Resources and Environment in March, 2017.				
Project participant response				**Date :11/01/2018**
The estimated emission reduction calculation sheet is provided with the response of the 1st finding *The latest report of Emission Factor published by DNA Vietnam is provided with the response of the 1st finding*				
Documentation provided by project participant				
1. *"3858 ER Calculation 2nd.xlsx"* 2. *"DNA_EF2017.pdf"*				
DOE assessment				**Date:** 31/01/2018
The ER calculation sheet is provided by the PP. The assessment team has reviewed the ER sheet and found the calculations correct. Hence, accepted. The latest report of Emission Factor published by DNA Vietnam is provided by the PP and is found correct and consistent. CAR#05 is closed.				

CAR ID	06	**Section no.**	D.2	**Date :**14/12/2017
Description of CAR				
The applicability criteria as discussed in section B.2 of the PDD is not in line with the approved methodology AMS-I.D version 18.0.				
Project participant response				**Date :**11/01/2018
The applicability criteria in section B.2 of the PDD was fixed to consist with the methodology AMS-I.D version 18.0				
Documentation provided by project participant				
"3858 PDD 2nd – Track change.docx"				
DOE assessment				**Date:** 26/02/2018

The applicability criteria in now discussed in line with the latest version of applied methodology AMS-I.D version 18.0. The assessment team has reviewed the revised PDD and found it correct and consistent with the applied methodology. CAR#06 is open in view of TR comments: • Stepwise demonstration of establishment and description of baseline scenario is not discussed as per Tool "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" version 03.0.1, EB-66, Annex-47. • Section B.5 of the PDD is not in line with the registered PDD. PP needs to provide the details in section B.5 as per the registered PDD. • The PDD template document reference is not mentioned in the document. CAR#06 is open.
Project participant response **Date :27/02/2018**
• *Stepwise demonstration was discussed as per Tool "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" in Section B.4. "Establishment and description of baseline scenario"* • *The details in section B.5 were provided as per registered PDD.* • *The PDD template document reference was mentioned in the end of the document.*
Documentation provided by project participant
"3858 PDD 2nd – Track change – 27022018"
DOE assessment **Date:** 28/02/2018
The Assessment team has reviewed the PDD and found it correct and in line with the requirements. The document reference is also provided in the PDD. Hence, CAR#06 is closed.

CAR ID	07	**Section no.**	D.5	**Date :**14/12/2017
Description of CAR				
The and parameters fixed ex-ante as discussed in section B.6.2 of the revised PDD is not consistent with the registered PDD version 2.3. The monitoring parameter TEG_y is not mentioned in section B.7.1 of the revised PDD whereas this parameter is mentioned under monitoring parameters in registered PDD version 2.3.				
Project participant response				**Date :**11/01/2018
Because PP is not required to calculate emission factor, some parameter fixed ex-ante which was used to calculate EF_{OM} and EF_{BM} are not mentioned in the revised PDD. *The monitoring parameter TEG_y is added in the section B.7.1 of the revised PDD.*				
Documentation provided by project participant				
"3858 PDD 2nd – Track change.docx"				
DOE assessment				**Date:** 31/01/2018
It is observed that the combined margin emission factor is calculated by the PP from the values of operating margin and build margin emission factor provided by host country DNA. Further, the correction made in PDD for data fined ex-ante is found correct and in line with para 290 of CDM-PS for PA, hence accepted by the assessment team. CAR#07 is closed.				

Table 3. FAR from this validation

FAR ID	xx	**Section no.**		**Date:** DD/MM/YYYY
Description of FAR				
-				
Project participant response				**Date:** DD/MM/YYYY
-				
Documentation provided by project participant				
-				
DOE assessment				**Date:** DD/MM/YYYY
-				

There is no FAR.

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Document information

Version	*Date*	*Description*
02.0	31 October 2017	Revision to align with the requirements of the “CDM validation and verification standard for project activities” (version 01.0).
01.0	23 March 2015	Initial publication.

Decision Class: Regulatory
Document Type: Form
Business Function: Renewal of crediting period
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