

**CLEAN DEVELOPMENT MECHANISM  
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)  
Version 03 - in effect as of: 22 December 2006**

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**Revision history of this document**

| <b>Version Number</b> | <b>Date</b>      | <b>Description and reason of revision</b>                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01                    | 21 January 2003  | Initial adoption                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 02                    | 8 July 2005      | <ul style="list-style-type: none"> <li>The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document.</li> <li>As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <a href="http://cdm.unfccc.int/Reference/Documents">http://cdm.unfccc.int/Reference/Documents</a>.</li> </ul> |
| 03                    | 22 December 2006 | <ul style="list-style-type: none"> <li>The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.</li> </ul>                                                                                                                                                                                                                                                      |

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**SECTION A. General description of small-scale project activity****A.1 Title of the small-scale project activity:**

La La Hydropower Project, Vietnam

Version 1.7

16/03/2011

**A.2. Description of the small-scale project activity:**

The project activity is to build and operate a hydropower plant with an accumulation reservoir in the Tan Lap, Tan Long Commune, Huong Hoa District, Quang Tri Province of Vietnam.

La La hydropower plant is owned and built by Mai Linh Energy JSC.

The hydropower plant will install three turbines of 1MW each totaling 3MW installed capacity with a projected average annual production of 12.1 million kWh. The power station is based on a dam with a reservoir area at maximum water level of 31,000m<sup>2</sup>. The energy intensity is around 100 W/m<sup>2</sup>. The electricity produced will be fed into the national grid with a 22 kV single circuit transmission line from La La Hydropower project to the Khe Sanh station. The project started construction in February 2008 and will enter into operations mid 2011.

The project will reduce GHG emissions by annually 6,905 tCO<sub>2</sub> by producing electricity with a renewable source thus substituting electricity produced in Vietnam to a large extent by fossil means.

The contribution to sustainable development is:

- Reduced GHG emissions through producing energy with a renewable source
- Reduced local air pollution, especially particle matter and sulfur bio-oxide caused by thermal power plants, especially coal plants as used by Vietnam.
- Renewable energy sources and technology is promoted thus diversifying energy sources and securing energy supply for a sustained economic growth of Vietnam.
- Creation of 331 additional jobs during construction<sup>1</sup> and 18 permanent jobs<sup>2</sup> during hydropower plant operations.

No people had to be dislocated due to the reservoir.

**A.3. Project participants:**

| Name of Party involved<br>(host) indicates a host Party) | Private and/or public entity(ies) project<br>participants (as applicable) | Kindly indicate if the Party<br>involved wishes to be |
|----------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------|
|----------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------|

<sup>1</sup> Document 12: The figure on the organizational set-up for the construction of the La La hydro power plant, Mai Linh

<sup>2</sup> Document 1, chapter 1, p.6: Investment project - Basic engineering design - Volume 1: Description, Phan Phan Hai, P.Q.H Hydro Power Consulting Ltd Company, 2007

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|                                      |                                      | considered as project participant (Yes/No) |
|--------------------------------------|--------------------------------------|--------------------------------------------|
| Socialist Republic of Vietnam (host) | Mai Linh Energy JSC (private entity) | No                                         |
| Switzerland                          | ecotawa AG (private entity)          | No                                         |

**A.4. Technical description of the small-scale project activity:****A.4.1. Location of the small-scale project activity:****A.4.1.1. Host Party(ies):**

Socialist Republic of Vietnam

**A.4.1.2. Region/State/Province etc.:**

Quang Tri Province

**A.4.1.3. City/Town/Community etc:**

Huong Hoa District  
, Tan Long Commune, Tan Lap

**A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :****Map 1: Project Site**

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The geographical coordinates are: 16°35'45" N - 106°40'44" E

**A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:**

Type I: Renewable energy projects

Category ID: Grid connected renewable electricity generation

Sectoral scope 01: Energy industries (renewable sources)

The unit is a renewable energy generation plant with a capacity of 3 MW and is thus below the eligibility limit of 15 MW for a small-scale CDM project activity.

The hydropower plant has three Francis turbines. The total generation capacity is 3 MW. The hydropower plant is based on an accumulation reservoir.

**Table 1: Characteristics of the Hydropower Plant**

| Parameter                                     | Unit              | Value  |
|-----------------------------------------------|-------------------|--------|
| Assembly capacity (3 generators of 1MW each)  | MW                | 3      |
| Maximum rated flow rate                       | m <sup>3</sup> /s | 4.2    |
| Operating hours per year                      | hours             | 4,033  |
| Average annual power production               | MWh               | 12,100 |
| Internal usage of electricity                 | percentage        | 0.98%  |
| Electricity production for the grid per annum | MWh               | 11,980 |
| Rated transformer capacity                    | kVA               | 1,250  |

Source: Investment project - Basic engineering design - Volume 1: Issued on October 2007, Author: Engineer Phan Phan Hai, P.Q.H Hydro Power Consulting Ltd Company Description (**Doc1**)

**Table 2: Characteristics of the Reservoir**

| Parameter                             | Unit                   | Value  |
|---------------------------------------|------------------------|--------|
| Reservoir area at maximum water level | km <sup>2</sup>        | 0.031  |
| Reservoir area at normal water height | km <sup>2</sup>        | 0.0299 |
| Total capacity                        | million m <sup>3</sup> | 0.0929 |
| Useful capacity                       | million m <sup>3</sup> | 0.0276 |
| Length of dam                         | meter                  | 110    |
| Maximum height of dam                 | meter                  | 14     |

Source: Investment project - Basic engineering design - Volume 1: Issued on October 2007, Author: Engineer Phan Phan Hai, P.Q.H Hydro Power Consulting Ltd Company Description (**Doc1**); Construction design drawing. No. TĐ-2007-03A-KDM-TC.01, 02, 03 (**Doc N8**)

The grid connection scheme consists of an underground cable of 0.15km and a hanged cable of 6.20km with a 22 kV single circuit transmission line from La La hydropower project to the Khe Sanh station.

**Table 3: Equipment**

| Equipment   | Specifications                                             |
|-------------|------------------------------------------------------------|
| Turbines    | Francis type turbines produced by Ganfa China (3 turbines) |
| Generators  | 1,250 kVA generators produced by Ganfa China (3 units)     |
| Transformer | 1,250 kVA transformers produced by Ganfa China (3 units)   |

Source: Contract No. 06-08/HĐKT for electric equipments production and engineering service, dated Jun 10 2008 (**Doc N7**)

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The technologies are imported from China. They therefore contribute to the sustainable development aspect of the project via technology transfer.

**Figure 1a: Plant Layout Photos**

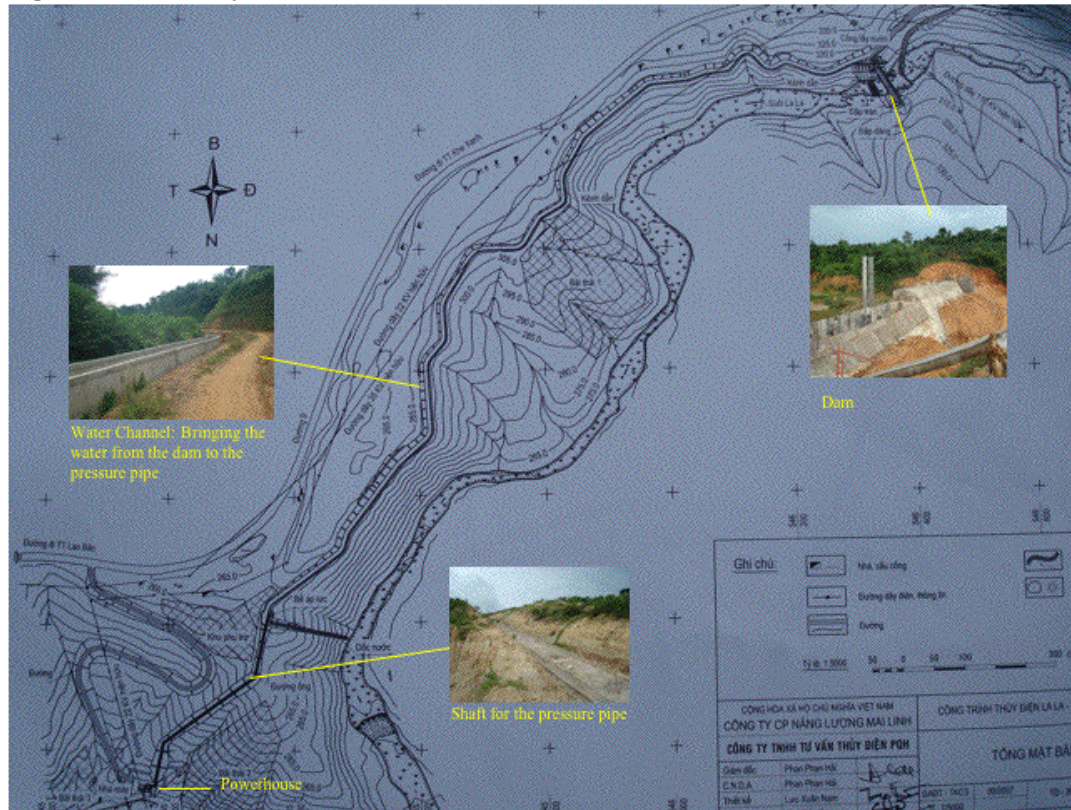
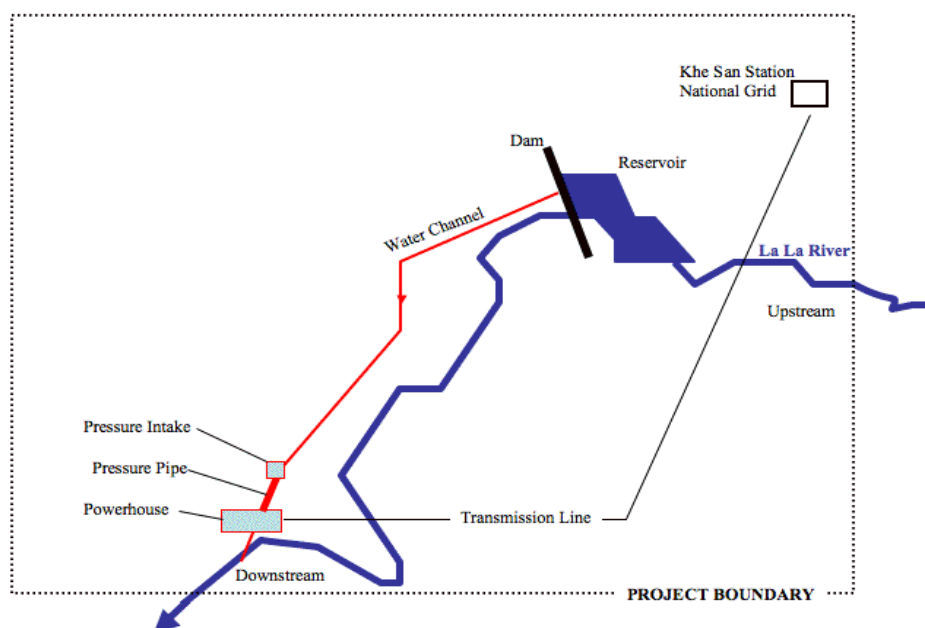


Figure 1b: Schematic Plant Layout

**A.4.3 Estimated amount of emission reductions over the chosen crediting period:**

| Years                                                                                           | Estimation of annual emission reductions in tCO <sub>2eq</sub> |
|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| 2011 (8 months)                                                                                 | 4,603                                                          |
| 2012                                                                                            | 6,905                                                          |
| 2013                                                                                            | 6,905                                                          |
| 2014                                                                                            | 6,905                                                          |
| 2015                                                                                            | 6,905                                                          |
| 2016                                                                                            | 6,905                                                          |
| 2017                                                                                            | 6,905                                                          |
| 2018 (4 months)                                                                                 | 2,301                                                          |
| <b>Total estimated reductions (tonnes of CO<sub>2eq</sub>)</b>                                  | <b>48,334</b>                                                  |
| Total number of crediting years                                                                 | 7                                                              |
| <b>Annual average of the estimated reductions over the crediting period (tCO<sub>2eq</sub>)</b> | <b>6,905</b>                                                   |

**A.4.4. Public funding of the small-scale project activity:**

There is no Official Development Assistance in this project and the project will not receive any public funding from Parties included in Annex I.

**A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:**

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There is no registered small-scale CDM project activity or an application to register another small-scale CDM project activity with the same project participants, in the same project category, within 1 kilometer and registered within the previous 2 years. The proposed project is thus not a debundled component of a large-scale project activity according to Appendix C of the simplified modalities and procedures for small-scale CDM project activities and Annex 27 EB 36 “Compendium of guidance on the debundling for SSC project activities”.

**SECTION B. Application of a baseline and monitoring methodology****B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:**

AMS.I.D. Version 16

Grid connected renewable electricity generation

Other methodologies and Tools used for this project activity:

- Tool to calculate the emission factor for an electricity system, Version 02

**B.2 Justification of the choice of the project category:**

The methodology is for grid connected renewable electricity generation as realized by the project.

The project has a capacity of 3 MW and is thus below the maximum eligibility limit of 15 MW.

The project activity results in new reservoirs and the power density of the power plant is greater than 4 W/m<sup>2</sup>: The power station is based on a dam with a reservoir area at maximum water level of 31,000m<sup>2</sup>. The energy intensity is about 100 W/m<sup>2</sup>. Thus this condition is fulfilled.

The project is no co-generation system, does not involve the addition of renewable energy generation units and is no retrofit or modification of an energy generation unit but a new renewable energy generation unit.

The project thus complies with all eligibility criteria for AMS.I.D.

**B.3. Description of the project boundary:**

The project boundary is the physical, geographical site of the renewable generation source. Figure 1a and 1b in chapter A.4.2. delineates the plant layout and the project boundary.

**B.4. Description of baseline and its development:**

The baseline scenario is the electricity that would otherwise be 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.

Baseline emissions are defined in methodology AMS-I.D. as the kWh produced by the renewable generating unit multiplied by an emission coefficient calculated in a transparent and conservative

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manner. The emission factor is calculated as the combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the ‘Tool to calculate the emission factor for an electricity system’. Chapter B.6. includes the calculation of the CM. For formulas see chapter B.6.

**B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:**

The additionality of the project is determined using the Attachment A to Appendix B of the simplified modalities and procedures for small scale project activities and EB 35 Annex 34 Guideline on “Non-binding best practice examples to demonstrate additionality for SSC project activities”.

The project starting date is defined as the date on which the construction contract was signed. The project activity thus started prior validation and prior 2.8.2008 and is thus considered an existing project activity in line with EB 49 Annex 22.

The following table shows the steps taken between project start up to actual project operations demonstrating that CDM was seriously considered in the decision to implement the project activity. According to point 7 of the same guideline the project must show real and continuous action to secure CDM. Gaps between such real and continuous action is less than 2 years.

**Table 4: Chronology Project Start to Project Operations**

| Date                             | Milestone                                                                                | Documentary Proof                                                                 |
|----------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 18/11/2007                       | Board consideration of CDM                                                               | Meeting minute of Mai Linh Energy JSC No. 03/2007/BB-ML on Lala HPP (Document 11) |
| 10-12/2007                       | Stakeholder consultation                                                                 | See chapter E1 for details                                                        |
| 12/02/2008                       | Project starting date: Signature of construction contract (construction start 16.2.2008) | Contract JSC (File 5)                                                             |
| 28/08/2008                       | Contract signature CDM development ecotawa AG                                            | Document 20: MoU                                                                  |
| 02/05/2009                       | ERPA between Mai Linh Energy JSC and ecotawa AG                                          | Document 21: ERPA                                                                 |
| 03/11/2009                       | Appointment of DOE                                                                       | Contract DOE                                                                      |
| 08/01/2010                       | Gold Standard Stakeholder Meeting                                                        | Meeting report and attendance list                                                |
| 14/01/2010                       | Start Global Stakeholder Consultation UNFCCC                                             | UNFCCC website                                                                    |
| 21/04/2010                       | LOA Vietnam received                                                                     |                                                                                   |
| 27/09/2010                       | LOA Switzerland received                                                                 |                                                                                   |
| Previewed<br>05<br>/2<br>01<br>1 | Expected operational start                                                               |                                                                                   |

The Board meeting November 2007 considered CDM as a requirement for the project to be feasible. August 2008 then the project owner signed a CDM development contract with ecotawa AG and May 2009 the ERPA was signed. The validator was contracted early November 2009 and the GSC started January 2010. The project owner has thus shown clear steps of continuous action with less than 2 years

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between actions in line with point 6b of EB 49 Annex 22 which states” The project participant must indicate, by means of reliable evidence, that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation. Evidence to support this should include, *inter alia*, contracts with consultants for CDM/PDD/methodology services, Emission Reduction Purchase Agreements » The project signed in the two years since Board consideration a contract with a consultant as well as an ERPA.

The main barrier identified is the investment barrier.

## INVESTMENT BARRIER

This section determines if the project activity is financially feasible in absence of CER revenues. The steps used and the procedures follow the Guidance on the Assessment of Investment Analysis as included as Annex in the methodological tool “Tool for the Demonstration and Assessment of Additionality” Version 5.2.

### Determine Appropriate Analysis Method

Options as listed in the additionality tool include:

1. Simple cost analysis
2. Investment comparison analysis
3. Benchmark analysis

The project activity generates income other than CER revenues. Thus option 1 is not appropriate. The 2 options included are the project with or without revenue of CER. The baseline case has no investment. Thus the investment comparison analysis is not appropriate. Therefore the option 3 benchmark analysis is chosen as appropriate analysis method.

### Determine Suitable Indicator

The financial/economic indicator chosen is the IRR as it is considered as the most suitable indicator for the project type. The IRR is taken as it can be easily compared to a financial benchmark. The IRR is capable of comparing the investment decision of the project with a financial benchmark and thus gives an indication of the financial profitability of the investment.

The financial analysis is based on a standard market parameter as benchmark. As benchmark the commercial lending rate used in Vietnam is used. The State Bank of Vietnam (SBV) fixes the maximum loan interest rate. All commercial banks applied this same maximum commercial interest rate. This rate was 12.4% in VND at the time of financial analysis<sup>3</sup>. The rate is slightly lower than the interest rate for the loan for the project which includes commissions (12.6%). The benchmark is also lower than the IMF commercial lending rate for the same period being 13.7%<sup>4</sup>. The benchmark is thus clearly justified and conservative. The benchmark chosen is the commercial interest rate in Vietnam. The appropriateness of

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<sup>3</sup> Base rate of State Bank of Vietnam is 8.25% plus 50%; Base rate source: State Bank of Vietnam, Annual Report 2007, page 35; Spread according to Directive of SBV (document 25)

<sup>4</sup> <http://www.imf.org/external/pubs/ft/scr/2007/cr07386.pdf>

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the commercial lending rate is given as the company could finance the investment with a commercial credit. The usage of this benchmark also corresponds to the Annex Guidance on the Assessment of Investment Analysis of the Additionality tool point 11: “In cases where a benchmark approach is used the applied benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR.” The project uses the local commercial lending rate as it is based on a project IRR.

Following principles are used for all calculations:

- The period of assessment taken is 30 years. This is more than the proposed maximum period of 20 years as in the guideline point 3 but close to the technical lifetime of the equipment used in the project. It is also in accordance with the guidelines for feasibility studies of power plant projects of the MOI Annex I which states for hydropower projects with less than 30 MW a lifetime of 20-40 years<sup>5</sup>. The salvage value of equipment is considered.
- Depreciation and other non-cash items such as amortization are deducted to arrive at the taxable profit and then added back to profit after tax to compute IRR. This is in accordance with the Annex to the Tool point 5.
- All calculations are based on data available as of 18.11.2007.e. before project start. All input values were known at this point of time i.e. are based on information available at or before 18.11.2007 (see dates of cited documents). This is in accordance with the Annex 58, EB 51 point 6.
- Financing expenditures are deducted to arrive at the taxable profit and then added back to profit after tax to compute IRR. This is in accordance with the Annex 58 EB 51 point 8.
- Sensitivity analysis is made assuming 10% change of investment costs, 10% change of operational costs, and 10% change of energy sales differentiated in 10% change of price and 10% change of plant load factor. The incidence of operational costs is low, however their variation is include being the only annual operational cost factor. These are the variables which constitute more than 20% of cost respectively revenue in accordance with the Annex 58, EB 51 points 16 and 17.

The following table shows the core data used for the financial assessment.

**Table 5: Core Data Used for Financial Assessment**

| Item                          | Unit       | Value | Data Source                                                                                                                                                                                                                                     |
|-------------------------------|------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Local commercial lending rate | percentage | 12.4% | Base rate of State Bank of Vietnam is 8.25% plus 150% <sup>6</sup>                                                                                                                                                                              |
| Period of assessment          | years      | 30    | In accordance with the technical life-span of the equipment. According to guidance point 3 a maximum period of 20 years is considered as appropriate. Taking 30 is thus very conservative. The fair value at the end of the period is included. |

<sup>5</sup> File N5

<sup>6</sup> Base rate source: Document 25, State Bank of Vietnam, Annual Report 2007, page 35; See also SBV document N3 with the interest rate as of 1.11.2007 as published; Spread according to Directive of SBV. The IMF published for May 2007 a nominal interest rate in Vietnam of 13.7% which is higher than the base-rate used therefore showing the conservativeness of the base rate (see <http://www.imf.org/external/pubs/ft/scr/2007/cr07386.pdf>)

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|                                        |               |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------|---------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Total electricity generated per annum  | MWh           | 12,099                            | Based on 3MW installed capacity and 4,033 hours per annum operation; Phan Phan Hai, P.Q.H Hydro Power Consulting Ltd Company (10.2007): Investment project - Basic engineering design - Volume 1                                                                                                                                                                                                                                                                                                                             |
| Internal usage of electricity          | Percentage    | 0.98%                             | Phan Phan Hai, P.Q.H Hydro Power Consulting Ltd Company (10.2007): Investment project - Basic engineering design - Volume 1)                                                                                                                                                                                                                                                                                                                                                                                                 |
| Electricity sold to the grid per annum | MWh           | 11,980                            | Total –internal usage of electricity; Phan Phan Hai, P.Q.H Hydro Power Consulting Ltd Company (10.2007): Investment project - Basic engineering design - Volume 1                                                                                                                                                                                                                                                                                                                                                            |
| Electricity sale price (fixed)         | tsd VND / MWh | 644                               | Phan Phan Hai, P.Q.H Hydro Power Consulting Ltd Company (10.2007): Investment project - Basic engineering design - Volume 1 Tariffs are negotiated per project with no general price or price change for renewable energy projects being applied. The price is based on the price range for economic feasibility analysis set by the MOI Annex I . The feasibility report sets a fixed price for the 30-year time frame (table 10.2. and 10.3, document 1). Also all costs are fixed and not indexed according to inflation. |
| Annual operational cost                | Percentage    | 1.5%                              | Percentage of investment for construction, equipment and transmission line based on Decision No. 2014/QĐ-BCN dated 13 June 2007 by the Minister of Industry which states for hydroplants < 30MW 1-2%                                                                                                                                                                                                                                                                                                                         |
| Insurance cost                         | Million VND   | 200                               | Insurance contract (p. 3 and 4) equivalent to 0.44% of equipment and construction investment                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Investment                             | Million VND   | 53,503                            | Phan Phan Hai, P.Q.H Hydro Power Consulting Ltd Company (10.2007): Investment project - Basic engineering design - Volume 1                                                                                                                                                                                                                                                                                                                                                                                                  |
| Depreciation rate per annum            | Percentage    | 10% / 5%                          | 10% equipment and 5% civil works according to Vietnamese accounting principles which is in conformity with Decision 206/2003/QĐ-BTC dated 12/12/2003..                                                                                                                                                                                                                                                                                                                                                                       |
| Income tax rate                        | Percentage    | 0% / 5% / 10%                     | The project receives a tax incentive for being located in a preferential zone. Decision No 11/2005/QĐ-TTg dated 12/01/2005 of the Prime Minister providing regulations of Lao Bao economic and trade, Quang Tri Province. According to Art. 20 companies have following tax preferences: 0% for the first 4 years; 5% for the next 9 years and 10% thereafter . This is significantly lower than normal corporate tax of 28%.See also Decree No.24-2007/ND-CP issued by the Ministry of Finance, Government of Viet Nam.     |
| Natural resources tax                  | Percentage    | 2% at a fixed price of 750VND/kWh | Based on sales revenues according to Circular No. 42/2007/ TT-BTC of April 27, 2007, Ministry of Finance providing guidelines on natural resource                                                                                                                                                                                                                                                                                                                                                                            |

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|                    |               |        |                                                                                                                                                                                                                                              |
|--------------------|---------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    |               |        | tax applicable to natural water used for producing hydro-electricity                                                                                                                                                                         |
| Loan amount        | Million VND   | 37,451 | 70% of total investment; Phan Phan Hai, P.Q.H Hydro Power Consulting Ltd Company (10.2007): Investment project - Basic engineering design - Volume 1                                                                                         |
| Loan interest rate | Percentage    | 12.6%  | Phan Phan Hai, P.Q.H Hydro Power Consulting Ltd Company (10.2007): Investment project - Basic engineering design - Volume 1                                                                                                                  |
| CERs per annum     | tons          | 6,905  | See A.4.3                                                                                                                                                                                                                                    |
| Price of CERs      | tsd VND /tCER | 370    | 17.5 Euro as of mid November 2007 for secondary CERs OTC based on Point Carbon; Euro to VND exchange rate based on median exchange rate 18.11.2007 based on <a href="http://www.oanda.com/convert/classic">www.oanda.com/convert/classic</a> |

Table 6 and figure 2 show the financial profitability of the investment in absence of the CER including the sensitivity analysis and comparing the values with the benchmark.

**Table 6: IRR Base Case and Sensitivity to Parameter Changes Excluding CER Revenues**

| Case                                           | IRR   |
|------------------------------------------------|-------|
| Base case                                      | 10.6% |
| 10% lower investment cost                      | 12.0% |
| 10% lower operational cost                     | 10.7% |
| 10% higher income from electricity sale        | 12.0% |
| 10% higher plant load factor (operating hours) | 12.0% |
| Benchmark                                      | 12.4% |

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

In all cases the probability of lower costs or higher income are low:

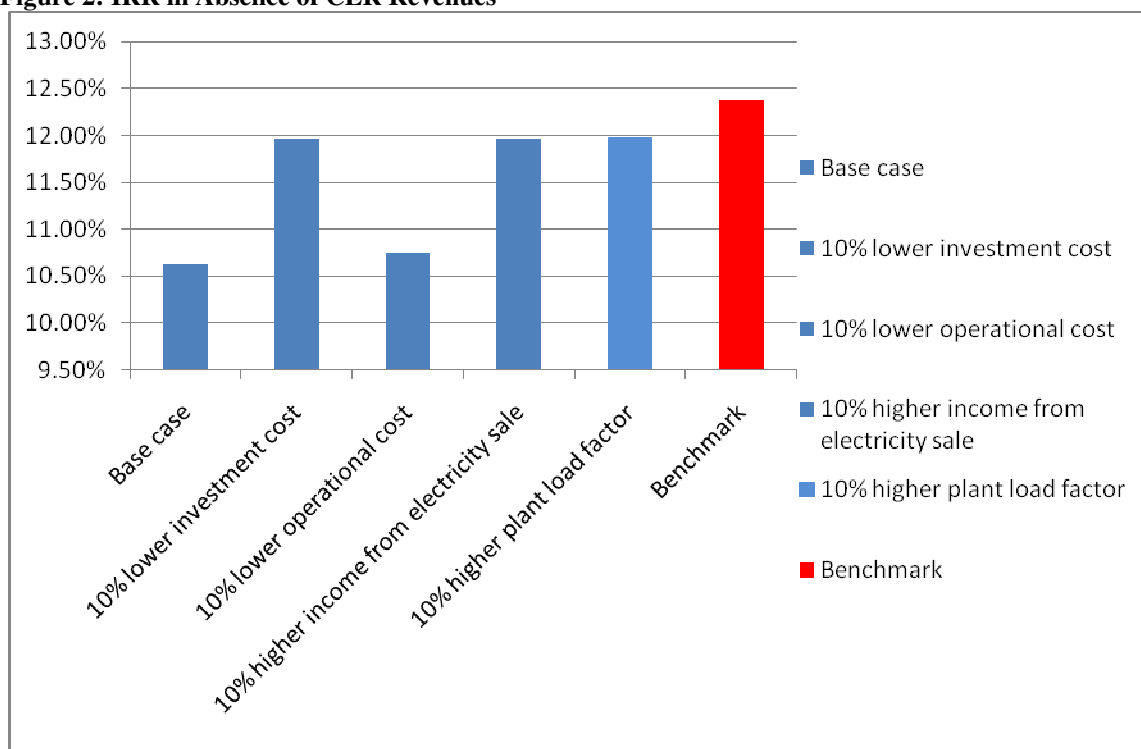
- A revised feasibility study October 2008 showed a 7.4% higher investment than the one originally planned end 2007 (Construction design - Volume 5: Total investment estimation). Investment costs are thus higher than expected and not 10% lower than in the sensitivity case of lower investment.
- Revenues are fixed due to the fixed electricity price as assumed in the feasibility report. Thus it is not probable that revenues increase. Also all costs are assumed as fixed and thus this assumption is consistent with all other parameters.
- Internal electricity consumption is less than 1% while EVN estimates these in general as 2% (this affects the revenues). Revenues are thus calculated in a very generous manner and might in practice well be lower (based on EVN estimates, see above), but not higher.
- The plant load factor was determined by an external company (Engineer Phan Phan Hai, P.Q.H Hydro Power Consulting Ltd Company Description). The number of operating hours for the base case with 4,033 hours is in the normal range. Even with 10% more hours the IRR is still below the benchmark and 10% more operating hours is highly improbable. This is corroborated by operating hours of the most recent 10 small-scale hydros in Vietnam presented for validation as

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CDM projects with a median operating hours of 4,133 i.e. close to LaLa. Based on the last 10 small-scale hydros Vietnam which entered validation as DM project with a 95% confidence interval the upper boundary of operating hours is 4,409 hours. This is lower than the sensitivity case used in Lala with 4,436 hours. Thus it is considered as highly improbable that the operating hours exceed this level<sup>7</sup>.

- Costs are not adjusted to the inflation rate. According to the State Bank of Vietnam at the time of decision taking the inflation rate was 8%<sup>8</sup> while the actual recorded inflation rate 2007 was 8.3% and in the year 2008 23.1% (IMF data<sup>9</sup>). Higher inflation rates lead to higher operational costs as latter are fixed in VND and are local cost. Taking the inflation rate of 8% the project IRR drops to 10% i.e. gets even lower than under the current static conditions.

**Figure 2: IRR in Absence of CER Revenues**



With the CDM the project is however profitable and financially feasible as can be seen in the following table. The access to CDM finance is thus decisive for project success and implementation.

**Table 7: IRR with and without CER Revenues**

|                                    | IRR   |
|------------------------------------|-------|
| IRR base case without CER revenues | 10.6% |
| IRR with CER revenues              | 15.2% |

<sup>7</sup> See Document N10

<sup>8</sup> Document 25 p. 21

<sup>9</sup> <http://www.imf.org/external/pubs/ft/weo/2009/01/pdf/tables.pdf>

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|           |       |
|-----------|-------|
| Benchmark | 12.4% |
|-----------|-------|

**B.6. Emission reductions:****B.6.1. Explanation of methodological choices:****PROJECT ACTIVITY EMISSIONS**

Project activity emissions are 0.

The power density of the project is greater than 10 W/m<sup>2</sup> and therefore

$$PE_{HP,y} = 0$$

Based on ACM002 Version 10 formula (4)

**BASELINE EMISSIONS**

In order to calculate the baseline emissions methodology AMS-I.D. is used in conjunction with the “Tool to calculate the emission factor for an electricity system (Version 02)”.

$$BE_y = EG_y \times EF_{grid,CM,y} \quad (1)$$

Where:

|                  |                                                                                |
|------------------|--------------------------------------------------------------------------------|
| $BE_y$           | Baseline emissions in the year “y” (tCO <sub>2</sub> )                         |
| $EG_y$           | Electricity supplied by the project activity to the grid in the year “y” (MWh) |
| $EF_{grid,CM,y}$ | Combined margin in the year “y” (tCO <sub>2</sub> /MWh)                        |

**Step 1: Identify the relevant electricity systems**

The project is grid-connected to the national grid. Vietnam has one national grid. This is defined as the relevant electricity power system.

For imports from connected electricity systems located in another host country(ies), the emission factor is 0 tons CO<sub>2</sub> per MWh.

**Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)**

Option I is chosen and only grid power plants are included in the calculation.

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

The simple OM is used. According to the Tool any of the four methods can be used, however, the simple OM method (option a) can only be used if low-cost/must-run resource constitute less than 50% of total grid generation in the average of the five most recent years. No geothermal, wind, nuclear and solar generation facilities connected to the grid are operating.

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**Table 8: Low-Cost/Must-Run Power Plants in Vietnam (2004-2008)<sup>10</sup>**

|                              | 2004       | 2005       | 2006       | 2007       | 2008       |
|------------------------------|------------|------------|------------|------------|------------|
| Hydro low-cost/must run MWh  | 17.858.651 | 16.365.438 | 19.508.244 | 22.385.232 | 25.933.762 |
| Total generation GWh         | 44.974.169 | 50.330.468 | 57.160.493 | 66.348.589 | 74.689.636 |
| Percentage low-cost/must run | 39,71%     | 32,52%     | 34,13%     | 33,74%     | 34,72%     |

**Source:** MONRE, official CM (File N11)

Low-cost/must-run facilities had on average 34.77% of total electricity generation and thus clearly less than 50% of total grid generation.

The ex-ante option is taken based on a 3-year generation-weighted average, based on the most recent data available at the time of submission of the PDD to the DOE for validation.

#### Step 4: Calculate the operating margin emission factor according to the selected method

The simple OM emission factor is calculated as the generation-weighted average CO<sub>2</sub> emissions per unit net electricity generation (tCO<sub>2</sub>/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants. The ex-ante option is taken based on a 3-year generation-weighted average, based on the most recent data available at the time of submission of the PDD to the DOE for validation. The data vintage taken is 2006-2008. The data is based on the official data for the Combined Margin in Vietnam.

Data per power plant on fuel consumption is available based on fuel usage per kWh (plant efficiency). Therefore Option A is employed.

$$EF_{grid,OMsimple,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad (2)$$

Where:

|                        |                                                                                                   |
|------------------------|---------------------------------------------------------------------------------------------------|
| $EF_{grid,OMsimple,y}$ | Simple operating margin CO <sub>2</sub> emission factor in year y (tCO <sub>2</sub> /MWh)         |
| $EG_{m,y}$             | Net quantity of electricity generated and delivered to the grid by power unit $m$ in year y (MWh) |
| $EF_{EL,m,y}$          | CO <sub>2</sub> emission factor of power unit $m$ in the year y (tCO <sub>2</sub> /MWh)           |
| $m$                    | All power units serving the grid in year y except low-cost/must run power plants / units          |
| $y$                    | Last 3 years available                                                                            |

<sup>10</sup> Sources: Summary Report on the Operation of the Vietnamese National Electricity System in the Years 2003-2007, EVN/National Electricity System Dispatch Centre - Department for Electricity System Operation, Hanoi, January, 2008; includes EVN plus private generators supplying the grid

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The emission factor is determined as follows for plants where the fuel consumption is known (Option A1):

$$EF_{EL,m,y} = \frac{\sum_{i,m} FC_{i,m,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_{m,y}} \quad (3)$$

Where:

|                |                                                                                                     |
|----------------|-----------------------------------------------------------------------------------------------------|
| $EF_{EL,m,y}$  | CO <sub>2</sub> emission factor of power unit $m$ in the year $y$ (tCO <sub>2</sub> /MWh)           |
| $FC_{i,m,y}$   | Amount of fossil fuel type $i$ consumed by power unit $m$ in year $y$ (mass or volume unit)         |
| $NCV_{i,y}$    | Net calorific value of fossil fuel type $i$ in the year $y$ (GJ / mass or volume unit)              |
| $EF_{CO2,i,y}$ | CO <sub>2</sub> emission factor of fossil fuel type $i$ in the year $y$ (tCO <sub>2</sub> /GJ)      |
| $EG_{m,y}$     | Net quantity of electricity generated and delivered to the grid by power unit $m$ in year $y$ (MWh) |
| $m$            | All power units serving the grid in year $y$ except low-cost/must run power plants / units          |
| $i$            | All fossil fuels combusted in power unit $m$ in year $y$                                            |
| $y$            | Last 3 years available                                                                              |

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

$$EF_{EL,m,y} = \frac{EF_{CO2,m,i,y} \times 3.6}{\eta_{m,y}} \quad (7)$$

Where:

|                  |                                                                                                                    |
|------------------|--------------------------------------------------------------------------------------------------------------------|
| $EF_{EL,m,y}$    | CO <sub>2</sub> emission factor of power unit $m$ in year $y$ (tCO <sub>2</sub> /MWh)                              |
| $EF_{CO2,m,i,y}$ | Average CO <sub>2</sub> emission factor of fuel type $i$ used in power unit $m$ in year $y$ (tCO <sub>2</sub> /GJ) |
| $\eta_{m,y}$     | Average net energy conversion efficiency of power unit $m$ in year $y$ (ratio)                                     |
| $m$              | All power units serving the grid in year $y$ except low-cost/must-run power units                                  |
| $y$              | Last 3 years available                                                                                             |

### Step 5: Identify the group of power units to be included in the build margin

The sample group of power units  $m$  used to calculate the build margin consists of either:

- The set of five power units that have been built most recently, or
- The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

The set of power units that comprises the larger annual generation is used. A power unit is considered to have been built at the date when it started to supply electricity to the grid. In the case of Vietnam the set of power capacity additions that comprise 20% of the system is used, as this comprises the larger annual generation.

The build emission factor is determined ex-ante based on the most recent information available at the time of PDD submission for validation.

**Step 6: Calculate the build margin emission factor**

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad (4)$$

Where:

|                  |                                                                                             |
|------------------|---------------------------------------------------------------------------------------------|
| $EF_{grid,BM,y}$ | Build margin CO <sub>2</sub> emission factor in the year $y$ (tCO <sub>2</sub> /MWh)        |
| $EG_{m,y}$       | Net electricity generated and delivered to the grid by power unit $m$ in the year $y$ (MWh) |
| $EF_{EL,m,y}$    | CO <sub>2</sub> emission factor of power unit $m$ in the year $y$ (tCO <sub>2</sub> /MWh)   |
| $m$              | Power units included in the build margin                                                    |
| $y$              | Most recent year for which data is available (2008)                                         |

The CO<sub>2</sub> emission factor for each power unit is determined per guidance step 4(a) using the option B2.

**Step 7: Calculate the combined margin emission factor**

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \quad (5)$$

Where:

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

The default values for weighting  $w_{OM}$  and  $w_{BM}$  of 0.5 are used as the project is a hydropower plant in the 1<sup>st</sup> crediting period.

**LEAKAGE EMISSIONS**

No leakage emissions are included. No equipment is transferred from another activity

**EMISSION REDUCTIONS**

$$ER_y = BE_y - PE_y - LE_y \quad (6)$$

Where:

|        |                                                         |
|--------|---------------------------------------------------------|
| $ER_y$ | Emission reductions in the year $y$ (tCO <sub>2</sub> ) |
| $BE_y$ | Baseline emissions in year $y$ (tCO <sub>2</sub> )      |
| $PE_y$ | Project emissions in year $y$ (tCO <sub>2</sub> )       |
| $LE_y$ | Leakage emissions in year $y$ (tCO <sub>2</sub> )       |

**B.6.2. Data and parameters that are available at validation:**

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|                                                                                                             |                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Data / Parameter:</b>                                                                                    | <b>FC<sub>i,m,y</sub></b>                                                                                                         |
| Data unit:                                                                                                  | Mass or volume unit                                                                                                               |
| Description:                                                                                                | Amount of fossil fuel type <i>i</i> consumed by power plant <i>m</i> in the year <i>y</i>                                         |
| Source of data used:                                                                                        | MONRE, 2010 (File N11)                                                                                                            |
| Value applied:                                                                                              | See B.6.3.                                                                                                                        |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Data years 2006/7/8 used i.e. 3 most recent years prior validation. Once for 1 <sup>st</sup> crediting period determined ex-ante. |
| Any comment:                                                                                                | Data based on fuel efficiency factor per power plant (fuel usage in relation to net electricity generation) as reported by EVN    |

|                                                                                                             |                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Data / Parameter:</b>                                                                                    | <b>EG<sub>m,y</sub></b>                                                                                                           |
| Data unit:                                                                                                  | MWh                                                                                                                               |
| Description:                                                                                                | Net electricity generated by power plant <i>m</i> in the project electricity system in the year <i>y</i>                          |
| Source of data used:                                                                                        | MONRE, 2010 (File N11)                                                                                                            |
| Value applied:                                                                                              | See B.6.3.                                                                                                                        |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Data years 2006/7/8 used i.e. 3 most recent years prior validation. Once for 1 <sup>st</sup> crediting period determined ex-ante. |
| Any comment:                                                                                                | Gross electricity generated minus internal power consumption as reported by EVN                                                   |

|                                                                                                             |                                                  |
|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| <b>Data / Parameter:</b>                                                                                    | <b>NCV<sub>i</sub></b>                           |
| Data unit:                                                                                                  | TJ/Gg                                            |
| Description:                                                                                                | Net calorific value of fossil fuel type <i>i</i> |
| Source of data used:                                                                                        | MONRE, 2010 (File N11)                           |
| Value applied:                                                                                              | per power plant                                  |
| Justification of the choice of data or description of measurement methods and procedures actually applied : |                                                  |
| Any comment:                                                                                                |                                                  |

|                          |                                                                                                               |
|--------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Data / Parameter:</b> | <b>EF<sub>CO<sub>2</sub>,i</sub></b>                                                                          |
| Data unit:               | tCO <sub>2</sub> /TJ                                                                                          |
| Description:             | CO <sub>2</sub> emission factor of fossil fuel type <i>i</i>                                                  |
| Source of data used:     | IPCC 2006 guidelines, Chapter 1 Vol. 2 table 1.4, lower limit of the uncertainty at a 95% confidence interval |

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|                                                                                                             |                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Value applied:                                                                                              | Anthracite Coal: 94.6<br>Other Bituminous coal: 89.5<br>Natural gas: 54.3<br>Fuel Oil: 75.5<br>Diesel oil: 72.6 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Once for 1 <sup>st</sup> crediting period                                                                       |
| Any comment:                                                                                                |                                                                                                                 |

|                                                                                                             |                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Data / Parameter:</b>                                                                                    | <b>EF<sub>grid,CM</sub></b>                                                                                                                                       |
| Data unit:                                                                                                  | tCO <sub>2</sub> /MWh                                                                                                                                             |
| Description:                                                                                                | Combined Margin CO <sub>2</sub> emission factor for grid connected power generation                                                                               |
| Source of data used:                                                                                        | See B.6.3. and above sources                                                                                                                                      |
| Value applied:                                                                                              | 0.5764                                                                                                                                                            |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Once for 1 <sup>st</sup> crediting period<br>As per Tool Version 02 “Tool to calculate the emission factor for an electricity system”<br>OM: 0.6465<br>BM: 0.5064 |
| Any comment:                                                                                                |                                                                                                                                                                   |

**B.6.3 Ex-ante calculation of emission reductions:**

Annex 3 details all calculations.

Table 9 resumes all data for the calculation of emission reductions.

**Table 9: Calculation of Emission Reductions**

| Parameter                                           | Value                        |
|-----------------------------------------------------|------------------------------|
| Operating margin (weighted average years 2006-2008) | 0.6465 tCO <sub>2</sub> /MWh |
| Build margin (year 2008)                            | 0.5064 tCO <sub>2</sub> /MWh |
| Combined margin                                     | 0.5764 tCO <sub>2</sub> /MWh |
| Annual energy generation to the grid                | 11,980 MWh                   |
| Annual emission reductions                          | 6,905 tCO <sub>2</sub>       |

**B.6.4 Summary of the ex-ante estimation of emission reductions:**

| Year            | Estimation of project activity emissions (tCO <sub>2e</sub> ) | Estimation of baseline emissions (tCO <sub>2e</sub> ) | Estimation of leakage (tCO <sub>2e</sub> ) | Estimation of overall emission reductions (tCO <sub>2e</sub> ) |
|-----------------|---------------------------------------------------------------|-------------------------------------------------------|--------------------------------------------|----------------------------------------------------------------|
| 2011 (8 months) | 0                                                             | 4,603                                                 | 0                                          | 4,603                                                          |

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|                                 |          |               |          |               |
|---------------------------------|----------|---------------|----------|---------------|
| 2012                            | 0        | 6,905         | 0        | 6,905         |
| 2013                            | 0        | 6,905         | 0        | 6,905         |
| 2014                            | 0        | 6,905         | 0        | 6,905         |
| 2015                            | 0        | 6,905         | 0        | 6,905         |
| 2016                            | 0        | 6,905         | 0        | 6,905         |
| 2017                            | 0        | 6,905         | 0        | 6,905         |
| 2018 (4 months)                 | 0        | 2,301         | 0        | 2,301         |
| <b>Total (tCO<sub>2e</sub>)</b> | <b>0</b> | <b>48,334</b> | <b>0</b> | <b>48,334</b> |

**B.7 Application of a monitoring methodology and description of the monitoring plan:****B.7.1 Data and parameters monitored:**

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Data / Parameter:</b>                                         | <b>PEG<sub>v,net</sub></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Data unit:                                                       | MWh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Description:                                                     | Net electricity supplied by the project activity to the grid, in the year y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Source of data to be used:                                       | EVN sales receipt and on-site metering                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Value applied                                                    | 11,980 per annum; 2010 6 months operation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Description of measurement methods and procedures to be applied: | Electricity output will be measured by the 3 phase meter.<br>The net electricity export/supplied to the grid is the difference between the measured quantities of the grid electricity export and the import.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Monitoring frequency                                             | Hourly measurement and monthly recording                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| QA/QC procedures to be applied:                                  | Check with sales receipt.<br>The meter with an accuracy of $\pm 0.5\%$ is calibrated by the Vietnam's Directorate for Standards and Quality (STAMEQ) and validated by EVN and recalibrated at appropriate intervals according to manufacturer specifications, but at least once in 3 years. The main meters owned by EVN will be calibrated annually through EVN or EVN mandated company.<br><br>Measuring equipment is certified to national or IEC standards and calibrated according to the national standards and reference points or IEC standards.<br><br>Cross check net electricity supplied to a grid as gross energy generation in the project activity power plant minus the auxiliary/station electricity consumption, technical losses and electricity import from the grid to the project power plant measured at the grid interface/connection used for billing purposes. |
| Any comment:                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

|                            |                                                                                              |
|----------------------------|----------------------------------------------------------------------------------------------|
| <b>Data / Parameter:</b>   | <b>CAP<sub>PJ</sub></b>                                                                      |
| Data unit:                 | W                                                                                            |
| Description:               | Installed capacity of the hydro power plant after the implementation of the project activity |
| Source of data to be used: | Project site                                                                                 |
| Value applied              | 3,000,000                                                                                    |

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|                                                                  |                                                                |
|------------------------------------------------------------------|----------------------------------------------------------------|
| Description of measurement methods and procedures to be applied: | Determine the installed capacity based on recognized standards |
| Monitoring frequency                                             | Yearly                                                         |
| QA/QC procedures to be applied:                                  |                                                                |
| Any comment:                                                     |                                                                |

|                                                                  |                                                                                                                                          |
|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Data / Parameter:</b>                                         | <b>A<sub>PJ</sub></b>                                                                                                                    |
| Data unit:                                                       | m <sup>2</sup>                                                                                                                           |
| Description:                                                     | Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full |
| Source of data to be used:                                       | Project site                                                                                                                             |
| Value applied                                                    | 31,000                                                                                                                                   |
| Description of measurement methods and procedures to be applied: | Measured from topographical surveys, maps, satellite pictures, etc                                                                       |
| Monitoring frequency                                             | Yearly                                                                                                                                   |
| QA/QC procedures to be applied:                                  |                                                                                                                                          |
| Any comment:                                                     |                                                                                                                                          |

All data collected as part of monitoring should be archived electronically and be kept at least for 2 years after the end of the last crediting period.

|                                                  |
|--------------------------------------------------|
| <b>B.7.2 Description of the monitoring plan:</b> |
|--------------------------------------------------|

Mai Linh Energy established CDM Implementation & Monitoring Group (CDM group). Following persons were appointed to this group:

- Mr. Tran Van Minh (Deputy managing director of Mai Linh Energy) was appointed as person in charge of the CDM project (he is also the CDM group leader)
- Mr. Hoang Van Hien, Head of Technical & Planning Department
- Mr. Phan Ngoc Duong, Head of Financial & Accounting Department
- Mr. Nguyen Hoang Thang, Hydro power plant manager

The CDM group has following responsibilities:

- Working with outside CDM partners (consulting company, validation party)
- Managing CER payment
- Preparing data for CDM activities
- Monitoring and reporting data: operation time (hours), amount of electricity production and sold to EVN
- Keeping CDM records
- Reporting to Management board

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The produced and sold electricity will be measured by electric metering devices installed in the electric system (Doc1 - chapter 6, page 15). The operational parameters will be displayed in electricity meters installed in the main control board, such as, power active P (MW) and power reactive Q (MVar) of the generator; E (MWh); U (V); f (Hz).

**Description of the metering system**

Net electricity generation of the project will be calculated based on the monitored amount of electricity delivered to the grid through the use of on-site metering equipment at the outgoing feeder of LaLa hydropower plant. This metering system belongs to EVN and will be calibrated and maintained through EVN. EVN will pay the project owner according to the net production (outgoing minus ingoing electricity) The meter system which will be located in a secure, sealed housing, will meet the standards of EVN and the Vietnamese Quality standards. The project owner installs a 2nd meter for QA purpose only. Readings are based on the EVN meter.

The calibration process must comply with the Article 33 of Circular No 27/2009/ TT – BCT of Ministry of Industry and Trade dated 25 September 2009 on regulating the metering of electricity in competitive electricity generation market<sup>11</sup>.

**Quality Assurance**

The second meter will be used to cross check the primary EVN meter. To check that the data has been recorded correctly, the monthly monitored data will be cross checked with the generation records produced by EVN to pay Mai Linh Power Energy.

The meters have an accuracy of 0.5%. The main meters owned by EVN will be calibrated annually through EVN or EVN mandated company. The remaining meters will be maintained and calibrated by the project owner.

In case of electricity fall out a diesel generator will produce electricity in order to assure the safety of the power plant.

In case the error of the main meter exceeds the permitted level, the backup meter will be used to measure output of electricity exports to the grid. In case both the main and the back-up metering systems fail, the project owner and the power company (EVN) will jointly calculate a conservative estimate of power supplied to the grid. The assumptions used to estimate net electricity supply to the grid will be signed by both a representative of the project owner as well as a representative of the power company (EVN). As EVN has to pay this electricity the amount will be conservatively estimated.

**Data Collection and Management**

- The electricity supplied by the project to the grid will be automatically monitored by the two meters
- The data is measured on a hourly basis and monthly reports are generated.

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<sup>11</sup> Doc N12

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- All records of electricity generation output will be archived in paper form and electronically and will be kept at least for 2 years after the end of the last crediting period.
- Paper invoices are collated by the Project Manager and archived and will be kept at least for 2 years after the end of the last crediting period.

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

|                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)</b> |
|---------------------------------------------------------------------------------------------------------------------------------------------------|

Completion date: 15/09/2009

The PDD was developed by Dr. Jürg M. Grütter of ecotawa AG. Staff involved in the elaboration of this PDD are also Daniel Wunderlin, ecotawa AG as well as staff of the Vietnamese partner of ecotawa AG EPRO Consulting JSC.

ecotawa AG is responsible for the baseline determination of the project.

Contact person: Jürg M. Grütter

[jgruetter@gmail.com](mailto:jgruetter@gmail.com)

[www.ecotawa.com](http://www.ecotawa.com)

ecotawa AG is also project participant as listed in Annex 1.

|                                                                                     |
|-------------------------------------------------------------------------------------|
| <b>SECTION C. Duration of the <u>project activity</u> / <u>crediting period</u></b> |
|-------------------------------------------------------------------------------------|

|                                                     |
|-----------------------------------------------------|
| <b>C.1 Duration of the <u>project activity</u>:</b> |
|-----------------------------------------------------|

|                                                             |
|-------------------------------------------------------------|
| <b>C.1.1. <u>Starting date of the project activity</u>:</b> |
|-------------------------------------------------------------|

12/02/2008

Signature of construction contract

|                                                                             |
|-----------------------------------------------------------------------------|
| <b>C.1.2. <u>Expected operational lifetime of the project activity</u>:</b> |
|-----------------------------------------------------------------------------|

30 years.

For construction non-defined as construction is maintained and repaired on a continuous base. For hydro turbines 150,000 hours based on EB 50 Annex 15 default value. This corresponds to 37 years based on assumed yearly operation hours. Transformers 30 years (EB 50 Annex 15 default value). The minimal part (transformers) is taken to be conservative.

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**C.2 Choice of the crediting period and related information:****C.2.1. Renewable crediting period****C.2.1.1. Starting date of the first crediting period:**

01/05/2011 or after registration whichever is later

**C.2.1.2. Length of the first crediting period:**

7 years, 0 months

**C.2.2. Fixed crediting period:****C.2.2.1. Starting date:**

Not applicable

**C.2.2.2. Length:**

Not applicable

**SECTION D. Environmental impacts****D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:**

Hydropower plants in Vietnam must meet the following environmental requirements:

- Land-law: approved by National Assembly in Nov. 26 2003
- Environmental protection law: approved by National Assembly in Nov. 29 2005
- Decree No.181/2004/NĐ-CP dated Oct. 29 2004 of the Government on the Land-law 2003 implementation
- Decree No.198/2004/NĐ-CP dated Dec. 03 2004 of the Government on the land used fee
- Decree No.80/2006/NĐ-CP dated Jun. 09 2006 of the Government providing detailed guidance on the implementation of the Environmental protection law

Decision No. 281/QĐ-UBND dated 04 Feb 2006 of Quang Tri People Committee approved the La La project environmental impact assessment report (document 3).

The permit for surface water exploitation and usage is only issued 6 months before operation. Mid September 2009 the project was waiting for this approval from MONRE.

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**D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:**

An EIA<sup>12</sup> was realized and approved by national government.

The main environmental impacts of the project, recommendations given and actions taken are listed in table 10.

**Table 10: Environmental Impacts, Recommendations and Actions Taken**

| Potential Environmental Impacts                                                       | Recommendations Given by EIA                                                                                   | Actions Taken by Project                                                        |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| <b>Construction Period</b>                                                            |                                                                                                                |                                                                                 |
| Air and noise pollution being basically dust and emissions from construction vehicles | Watering of roads and using only registered vehicles                                                           | Only registered vehicles were used controlled by the project                    |
| Land use change                                                                       | Compensation of affected people                                                                                | Compensation was realized (see section E)                                       |
| Water pollution due to construction (camp, cement mixing)                             | Collect water from camp                                                                                        | Construction workforce lived at local homes and no camp was installed           |
| <b>Operation Period</b>                                                               |                                                                                                                |                                                                                 |
| Erosion and sedimentation at reservoir sites and downstream                           | Regularly check for erosion, tree protection and usage of silt sewer to release sedimentation in the reservoir | Tree planting was realized and silt sewer for releasing sedimentation was built |
| Water pollution due to disintegrated biomass when flooding reservoir                  | Cut down and collect trees while doing surface clearance in reservoir                                          | In practice the surface area is very small with few trees                       |

## **SECTION E. Stakeholders' comments**

### **E.1. Brief description how comments by local stakeholders have been invited and compiled:**

Due to the reservoir no people have been dislocated. However farm land of surrounding people was affected. Decision No. 1658/QĐ-UBND dated 28 Aug 2008 of Quang Tri province People's committee approved the compensation expenditure of the La La hydropower project<sup>13</sup> and Decision No. 121/QĐ-UBND dated 20 Jan 2008 of Quang Tri province People's committee approved additional compensation expenditure of the La La hydropower project<sup>14</sup>. 130 households got compensation for loss of farmland. The indemnification was determined based on the legal framework of the national government and the province. The planned compensation cost was VND 1,764 million while the actually paid compensation costs was 4,577 million VND i.e. nearly factor 3 higher.

Stakeholder comments have been complied in the process of conducting the EIA through the independent company in charge of the EIA<sup>15</sup> based on interviews of people in the region based on a semi-

<sup>12</sup> Quang Tri Environmental Monitoring & Engineering Center, 2008, document 2

<sup>13</sup> Document 6

<sup>14</sup> Document 7

<sup>15</sup> Document 10

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structured interview taking into account potential positive and negative impacts of the project and the opinion of the stakeholders. Interviews were performed at the site of the people, all in the Huong Hoa District. Interviews were performed between October and December 2007. The interview structure is included in Annex 5. People in the region interviewed included:

- The Chairman of the people's committee of Tan Lap commune
- Staff of the people's committee of Tan Lap commune
- Local farmers and workers

|                                               |
|-----------------------------------------------|
| <b>E.2. Summary of the comments received:</b> |
|-----------------------------------------------|

Stakeholders perceived following major impacts:

- Loss of land
- Limited air pollution (during construction activities)
- Some considered the risk of reservoir erosion to be serious, some not
- The project improves local livelihood through electricity generation, economic development and income as well as job creation

The overwhelming response was positive.

|                                                                           |
|---------------------------------------------------------------------------|
| <b>E.3. Report on how due account was taken of any comments received:</b> |
|---------------------------------------------------------------------------|

The project compensated the people for land lost and even increased the compensation above original values. The question of air pollution was addressed through using only registered vehicles during the construction period. The risk of reservoir erosion is being addressed through tree plantation<sup>16</sup> and through construction of a silt sewer. Thus all the comments raised by stakeholders have been taken into account by the project.

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<sup>16</sup> Document 16

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**Annex 1****CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY**

|                  |                                                            |
|------------------|------------------------------------------------------------|
| Organization:    | Mai Linh Energy JSC                                        |
| Street/P.O.Box:  | km 83, Highway No. 9, Lao Bao District                     |
| Building:        |                                                            |
| City:            | Quang Tri Province                                         |
| State/Region:    |                                                            |
| Postfix/ZIP:     |                                                            |
| Country:         | Vietnam                                                    |
| Telephone:       | (+84) 053 6295888                                          |
| FAX:             | (+84) 053 3777799                                          |
| E-Mail:          | <a href="mailto:dir.nlg@mailinh.vn">dir.nlg@mailinh.vn</a> |
| URL:             |                                                            |
| Represented by:  |                                                            |
| Title:           |                                                            |
| Salutation:      | Mr.                                                        |
| Last Name:       | Pham                                                       |
| Middle Name:     | Tien                                                       |
| First Name:      | Khoa                                                       |
| Department:      |                                                            |
| Mobile:          |                                                            |
| Direct FAX:      |                                                            |
| Direct tel:      |                                                            |
| Personal E-Mail: |                                                            |

|                 |                                                                    |
|-----------------|--------------------------------------------------------------------|
| Organization:   | ecotawa AG                                                         |
| Street/P.O.Box: | Eulerstr. 77                                                       |
| Building:       |                                                                    |
| City:           | Basel                                                              |
| State/Region:   | BS                                                                 |
| Postfix/ZIP:    | 4051                                                               |
| Country:        | Switzerland                                                        |
| Telephone:      | ++ 41 61 206 95 21                                                 |
| FAX:            | ++ 41 61 206 95 26                                                 |
| E-Mail:         | <a href="mailto:dwunderlin@ecotawa.com">dwunderlin@ecotawa.com</a> |
| URL:            | <a href="http://www.ecotawa.com">www.ecotawa.com</a>               |
| Represented by: |                                                                    |
| Title:          | CEO                                                                |
| Salutation:     |                                                                    |
| Last Name:      | Wunderlin                                                          |
| Middle Name:    |                                                                    |
| First Name:     | Daniel                                                             |
| Department:     |                                                                    |
| Mobile:         |                                                                    |
| Direct FAX:     | ++41 61 206 95 26                                                  |
| Direct tel:     | ++41 61 206 95 21                                                  |

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|                  |                                                                    |
|------------------|--------------------------------------------------------------------|
| Personal E-Mail: | <a href="mailto:dwunderlin@ecotawa.com">dwunderlin@ecotawa.com</a> |
|------------------|--------------------------------------------------------------------|

**Annex 2**

**INFORMATION REGARDING PUBLIC FUNDING**

There is no Official Development Assistance in this project and the project will not receive any public funding from Parties included in Annex I.

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**Annex 3****BASELINE INFORMATION****Table A.1 Fuel consumption, emissions and power generation of fossil plants in the most recent 3 years (2006, 2007, 2008)**

| <b>Power plants</b>               | <b>Fuel consumption</b><br>Coal, oil: kton<br>Gas: mm <sup>3</sup> ) | <b>Power generating to the grid</b><br>(GWh) | <b>Emission (t CO<sub>2</sub>)</b> |
|-----------------------------------|----------------------------------------------------------------------|----------------------------------------------|------------------------------------|
| <b>2006</b>                       |                                                                      |                                              |                                    |
| Coal thermal power plants         | 5,645.86                                                             | 8,989.230                                    | 11,823,610                         |
| Gas turbines                      |                                                                      | 26,542.978                                   | 12,479,578                         |
| - Gas turbine using gas           | 5,743,235.28                                                         | 18,838.764                                   | 12,244,651                         |
| - Gas turbine using petroleum oil | 70.14                                                                | 233.582                                      | 234,927                            |
| - Add-on (steam/heat)             | 0                                                                    | 7,470.632                                    | 0                                  |
| Diesel thermal power plant        | 397.65                                                               | 1,043.991                                    | 1,327,593                          |
| Diesel power plant using FO       | 16.60                                                                | 80.000                                       | 51,642                             |
| Diesel power plant using DO       | 6.39                                                                 | 25.000                                       | 20,495                             |
| Imported power                    |                                                                      | 937.000                                      | 0                                  |
| Total                             |                                                                      | 37,618.119                                   | 25,702,918                         |
| <b>2007</b>                       |                                                                      |                                              |                                    |
| Coal thermal power plants         | 6,386.09                                                             | 9,836.548                                    | 13,272,897                         |
| Gas turbines                      |                                                                      | 29,474.918                                   | 13,116,063                         |
| - Gas turbine using gas           | 5,910,941.84                                                         | 20,023.591                                   | 12,570,669                         |
| - Gas turbine using petroleum oil | 163.27                                                               | 557.880                                      | 545,394                            |

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|                                   |              |            |            |
|-----------------------------------|--------------|------------|------------|
| - Add-on (steam/heat)             | 0            | 8,893.447  | 0          |
| Diesel thermal power plant        | 614.06       | 1,834.409  | 2,046,368  |
| Diesel power plant using FO       | 25.15        | 104.626    | 79,867     |
| Diesel power plant using DO       | 9.16         | 42.000     | 29,088     |
| Imported power                    |              | 2,629.000  | 0          |
| Total                             |              | 43,921.501 | 28,544,283 |
| <b>2008</b>                       |              |            |            |
| Coal thermal power plants         | 6,483.99     | 10,055.394 | 13,378,811 |
| Gas turbines                      |              | 33,857.135 | 14,716,799 |
| - Gas turbine using gas           | 6,839,114.84 | 22,396.231 | 14,535,266 |
| - Gas turbine using petroleum oil | 54.35        | 183.088    | 181,533    |
| - Add-on (steam/heat)             | 0            | 11,277.816 | 0          |
| Diesel thermal power plant        | 534.59       | 1,481.880  | 1,784,825  |
| Diesel power plant using FO       | 22.48        | 90.465     | 71,385     |
| Diesel power plant using DO       | 3.73         | 15.000     | 11,879     |
| Imported power                    |              | 3,220.000  | 0          |
| Total                             |              | 48,719.874 | 29,963,699 |

Table A.2 Total emission and power generation fossil plants of the most recent 3 years

|                                            | 2006       | 2007       | 2008       | Total              |
|--------------------------------------------|------------|------------|------------|--------------------|
| Total power generation fossil plants (MWh) | 37,618,119 | 43,921,501 | 48,719,874 | <b>130,259,494</b> |

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|                                    |            |            |            |                   |
|------------------------------------|------------|------------|------------|-------------------|
| Total emission (tCO <sub>2</sub> ) | 25,702,918 | 28,544,283 | 29,963,699 | <b>84,210,900</b> |
|------------------------------------|------------|------------|------------|-------------------|

**Table A.3 Result of OM emission factor**

| Year         | Total power generation fossil plants (MWh) | Total emission(tCO <sub>2</sub> ) | OM <sub>2008</sub><br>(tCO <sub>2</sub> /MWh) |
|--------------|--------------------------------------------|-----------------------------------|-----------------------------------------------|
|              | A                                          | B                                 | ( $\sum B / \sum A$ )                         |
| 2006         | 37,618,119                                 | 25,702,918                        |                                               |
| 2007         | 43,921,501                                 | 28,544,283                        |                                               |
| 2008         | 48,719,874                                 | 29,963,699                        |                                               |
| <b>Total</b> | <b>130,259,494</b>                         | <b>84,210,900</b>                 | <b>0.6465</b>                                 |

**Table A.4 Calculation of BM emission factor in 2008**

| Power plant                                         | COD year | Fuel consumption<br>(Coal, oil: kton<br>Gas: mm <sup>3</sup> ) | Power generated to the grid<br>(MWh) | Emission (t CO <sub>2</sub> ) |
|-----------------------------------------------------|----------|----------------------------------------------------------------|--------------------------------------|-------------------------------|
| The set of 5 power plants most recently constructed |          |                                                                |                                      |                               |
| A Vuong                                             | 2008     | Hydropower                                                     | 168,103.50                           |                               |

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|                                                                                                    |      |            |          |                     |           |
|----------------------------------------------------------------------------------------------------|------|------------|----------|---------------------|-----------|
| Tuyen Quang                                                                                        | 2008 | Hydropower |          | 1,136,112.18        |           |
| Dai Ninh                                                                                           | 2008 | Hydropower |          | 1,145,108.50        |           |
| Nhon Trach                                                                                         | 2008 | Gas        | 166.38   | 544,808.60          | 378,023   |
| Ca Mau 1&2                                                                                         | 2007 | Gas        | 647.24   | 2,106,807.24        | 1,431,048 |
|                                                                                                    |      | Add-on     |          | 2,728,872.00        |           |
| <b>Total</b>                                                                                       |      |            |          | <b>7,829,812.02</b> |           |
| <b>The set of power plants most recently constructed contributes 20% of total power generation</b> |      |            |          |                     |           |
| A Vuong                                                                                            | 2008 | Hydropower |          | 168,103.50          |           |
| SROC Phu Mieng IDICO                                                                               | 2006 | Hydropower |          | 241,556.00          |           |
| Se San 3A                                                                                          | 2006 | Hydropower |          | 394,895.70          |           |
| Tuyen Quang                                                                                        | 2008 | Hydropower |          | 1,136,112.18        |           |
| Dai Ninh                                                                                           | 2008 | Hydropower |          | 1,145,108.50        |           |
| Se San 3                                                                                           | 2006 | Hydropower |          | 1,131,614.00        |           |
| Quang Tri                                                                                          | 2007 | Hydropower |          | 250,804.40          |           |
| Uong Bi 2                                                                                          | 2007 | Coal       | 281,759  | 532,000.00          | 581,018   |
| Na Duong                                                                                           | 2005 | Coal       | 532      | 627,930.00          | 883,846   |
| Cao Ngan                                                                                           | 2007 | Coal       | 526      | 708,693.00          | 1,081,146 |
| Formosa                                                                                            | 2004 | Coal       | 495      | 560,295.00          | 1,291,303 |
| Nhon Trach                                                                                         | 2008 | Gas        | 166.38   | 544,808.60          | 378,023   |
| Ca Mau 1&2                                                                                         | 2007 | Gas        | 647.24   | 2,106,807.24        | 1,431,048 |
|                                                                                                    |      | Add-on     |          | 2,728,872.00        |           |
| Phu My 2.2                                                                                         | 2004 | Gas        | 1,159.75 | 4,141,980.00        | 2,510,751 |

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|                                               |      |     |                                   |                      |                  |
|-----------------------------------------------|------|-----|-----------------------------------|----------------------|------------------|
| Phu My Nitrogen                               | 2006 | Gas | 56.15                             | 4,716.00             | 133,868          |
| CAI LAN - VINASHIN                            | 2007 | FO  | 22.48                             | 90,465.01            | 71,385           |
| <b>Total</b>                                  |      |     |                                   | <b>16,514,761.12</b> | <b>8,362,386</b> |
| <b>Result of BM emission calculation (BM)</b> |      |     |                                   |                      |                  |
| Total emission                                |      |     | 8,362,386 (tCO <sub>2</sub> )     |                      |                  |
| Total power generation                        |      |     | 16,514,761 (MWh)                  |                      |                  |
| <b>BM<sub>2008</sub></b>                      |      |     | <b>0.5064 tCO<sub>2</sub>/MWh</b> |                      |                  |

Total electricity output for the Vietnam power grid in 2008 is 74,689,635.97MWh

20% of this output is: 14,937,927 MWh

The 5 most recent plants constitute with 7,829,812 thus less than 20%

**Table A.5 Calculation of Combined Margin**

|   |                                          |                       |               |
|---|------------------------------------------|-----------------------|---------------|
| A | Estimated operating margin emission rate | tCO <sub>2</sub> /MWh | <b>0.6465</b> |
| B | Estimated build margin emission rate     | tCO <sub>2</sub> /MWh | <b>0.5064</b> |
| C | Estimated baseline emission rate         | tCO <sub>2</sub> /MWh | <b>0.5764</b> |

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**Annex 4**  
**MONITORING INFORMATION**

Details see chapter B.7.2.

## Annex 5: Stakeholder Survey

### I. Background:

1. Full name:
2. Gender:
3. Address:
4. How long have you been in local area? \_\_\_\_\_ years
5. Work in:

### II. Environmental impact assessment investigation ( *Preparing and construction stages* )

1. Do you know about the “LaLa HHP – Quang tri province” project?
 

☐ yes
☐ no
2. According to you, Do the project activities cause direct impacts on your family’s living?
 

☐ loss of land
☐ resettlement

☐ Health
☐ social evils
3. Is there any historical monument in the project area?
 

☐ yes
☐ no

 If yes, what type of historical monument?
 

☐ Temple, pagoda
☐ famous landscape

☐ Reserve
4. According to you, is there any forest in the project area?
 

☐ yes
☐ no

 If yes, what type of forest?
 

☐ Watershed
☐ other forest

☐ Artificial forest
☐ primeval forest

☐ Protective forest
5. According to you, how the project activities will impact on the forest?
 

☐ loss of land
☐ loss of valuable animals and plants
6. According to you, are there rare and valuable animals in the project area?
 

☐ yes
☐ no
7. How many rivers are there in the local area? Name:

.....

.....

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8. According to you, do the project activities cause the pollution of air in the project area?

☐ yes

☐ no

Air pollution level:

☐ Serious

☐ normal

☐ No

How are your recommends to mitigate that affects?

.....  
 .....

9. According to you, do the project activities cause the pollution of noise in the project area?

☐ High

☐ normal

☐ No

10. According to you, do the project activities cause the pollution of water source in the project area?

☐ High

☐ normal

☐ no

### **III. Environmental impact assessment investigation ( water storage and operate stages):**

*According to you, the operation of La la HHP will cause:*

1. Water supply capacity:

☐ Waterless

☐ normal

☐ Enough

2. Agricultural production: Do the local area have enough water for irrigation?

☐ yes

☐ no

3. Aquaculture

☐ Waterless

☐ normal

☐ Enough

4. Tourist development

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☐ yes☐ no

5. flood and drought

☐ Reduce☐ no reduce☐ Increase

6. Risk of reservoir erosion

☐ serious☐ not serious

7. risk of quality of surface water reducing

☐ High☐ normal☐ not polluted**IV Project management process assessment**

1. Do you know are there other negative impacts in the project area? If yes, please to supplement

.....

.....

.....

2. Do you know the methods that were mentioned to mitigate negative impact on quality of local public living?

☐ enough☐ not enough☐ too much

3. What is your general opinion about La La project?

**Annex 6: List of Documents Submitted to DOE**

Document 1: P.Q.H Hydro Power Consulting Ltd Company, Investment project - Basic engineering design - Volume 1: Description, Phan Phan Hai, , 2007

Document 2: Center for environmental technology and monitoring of Quang Tri province, EIA, 2008

Document 3: Quang Tri province people's committee, approval EIA, 2008

Document 4: Mai Linh Energy JSC, Drawing No. TĐ-2007-03A.NM.Đ-03 of relay protection method and measurement system, 2009

Document 5: Mai Linh Energy JSC, Construction Contract, 2008

Document 6: Quang Tri province people's committee, Decision No. 1658/QĐ-UBND dated 28 Aug 2008 of Quang Tri province People's committee for approving the compensation expenditure of the La La hydropower project, 2008

Document 7: Quang Tri province people's committee, Decision No. 121/QĐ-UBND dated 20 Jan 2008 of Quang Tri province People's committee for the additional compensation expenditure of the La La hydropower project, 2008

Document 8: Quang Tri province people's committee, Decision No. 831/QĐ-UBND dated 11 May 2008 of Quang Tri province People's committee on the land recover for the La La hydropower project, 2008

Document 9: IMF, Vietnam Statistical Appendix, 2007

Document 10: Stakeholder survey interview results, 2008

Document 11: Mai Linh Energy JSC, Meeting minute of Mai Linh Energy JSC No. 03/2007/BB-ML on Lala HPP, 2007

Document 12: Mai Linh Energy JSC, The figure on the organizational set-up for the construction of the La La hydro power plant, Mai Linh, 2009

Document 13: Ecotawa AG, Combined Margin, 2009

Document 14: Ecotawa AG, Finance spreadhseet, 2009

Document 15: Point Carbon, secondary CER prices, 2008

Document 16: Mai Linh Energy JSC, Tree planting plan in La La HPP prepared by Mai Linh Energy JSC Trade Union, 2009

Document 17: , Power Energy Engineering Consulting Company No.1, LaLa grid connection scheme, 2009

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Document 18: Mai Linh Energy JSC, Letter No. 56/2008/CV-ML.EJSC dated Oct 30 2008 of Mai Linh Energy JSC send to Electric Energy Company No.3 for completing procedure for Lala grid connection & selling electricity, 2008

Document 19: P.Q.H Hydro Power Consulting Ltd Company, Construction design - Volume 5, 2008

Document 20: Ecotawa/ Mai Linh Energy JSC, MoU, 2008

Document 21: Ecotawa/ Mai Linh Energy JSC, ERPA, 2009

Document 22: Decision No 11/2005/QĐ-TTg dated 12/01/2005 of the Prime Minister providing regulations of Lao Bao economic and trade, Quang Tri Province, 2005

Document 23: Civil Code No. 33/2005/QH11, 2005

Document 24: Map of location, 2009

Document 25: State Bank of Vietnam, annual report 2007

Document 26: MOI, Decision No. 2014/QĐ-BCN dated 13 June 2007

Document 27: Circular No. 05/2006/TT-BTC dated 19/01/2006 of the Ministry of Finance providing guidelines on natural resource tax applicable to natural water used for producing hydro-electricity, 2006

Document 28: SBV. Directive No. 5001/NHNN-CSTT, 2008

Document N1: Huu Hai , Institute of Energy Science – Vietnam Science & Technology institute, 2009, Nam Cat feasibility design

Document N2: Insurance contract

Document N3: SBV, interest rate

Document N4: KPMG (2007), Corporate Tax Rate Survey 2006

Document N5: MOI (2007), Số 2014/QĐ-BCN Decision Providing of Regulations on calculation and analysis of economy-finance-investment and electricity purchasing frame for the electricity project

Document N6: Electricity trading contract Ho Nui Coc Hydropower Plant, 9.2009

Document N7: Contract No. 06-08/HĐKT for electric equipments production and engineering service, dated Jun 10 2008

Document N8: Construction design drawing. No. TĐ-2007-03A-KDM-TC.01, 02, 03

Document N10: ecotawa, Operating hours of small scale CDM hydro projects of Vietnam under validation as of 15.11.2010, 2010

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Document N11: File 43, MONRE, No: 151 /KTTVBDKH, Official Combined Margin Vietnam, 26/03/2010

Document N12: EVN, Circular on meter calibration, 25/07/2009

Document N13: MOI, Decision Promulgation on Avoided Cost Tariff for 2009 No. 74/QD-DTDL, 24/12/2008

IEA: NCV fuels Vietnam, 2008

CER spreadsheet (includes Combined Margin), ecotawa AG, 2011

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