CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

Project title: Phuong Mai 3 Wind Power Project
Version 2.1: PDD for requesting registration
Completion date: 07/11/2012

A.2. Description of the project activity:

Project Entity and Purpose of the Project Activity

The Phuong Mai 3 Wind Power Project is being developed by Central Wind Power Joint Stock Company. The project aims to construct and operate a 21MW- wind power plant. It will be located in the Cat Chanh commune, in Phu Cat district of Binh Dinh province in south central Viet Nam. It is hereafter referred to as "the project activity". The Phu Cat district is one of the poorest[1] areas of the country.

The project with an installed capacity 21 MW will generate approximately 55,597 MWh/year of power to the national grid by using wind turbines. The main items of equipment (wind turbine-generators) will be imported from a foreign manufacturer. This will contribute to the transfer of technology to Viet Nam.

The proposed project will offset the combustion of thousands of tonnes of fossil fuels, which are used to generate electricity for the Viet Nam electricity grid, resulting in estimated emission reductions of 31,978 tCO_2 /year during the first seven year crediting period. In doing so, this project will help preserve non-renewable resources by promoting the exploitation and use of wind resources, especially in Viet Nam where the contribution of wind energy to overall electricity is still minor.

Contribution to Sustainable Development

The proposed projects has positive impacts with respect to the environment (offsetting fossil fuel use and lowering greenhouse gas emissions), society (providing jobs, development of infrastructures), technological progress (technology transfer) and economically (satisfying growing energy demands and thus aiding the country and region to develop and alleviate poverty). Further, in order to meet the growing demand for electricity as the country develops, Viet Nam imports electricity from China[2]. The implementation of the proposed project will reduce this need which

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[1] The Phu Cat district has been identified as Geographical areas with extreme socio-economic difficulties in Government Decree 124/2008/ND-CP issued on 11/12/2008 (available on http://www.itpc.gov.vn/investors/how_to_invest/law/2009-02-24.891508/mldocument_view/?set_language=en, accessed on 07/03/2012)

[2] Viet Nam will continue to import electricity from China.it is expected that total import from China may accounts for 4 % of commercial electricity in Viet Nam (source:

will bring environmental benefits as China has a grid emission factor much higher than that of Viet Nam. This will also help in improving Viet Nam's balance of payments.

A.3. Project participants:

Name of Party Involved(*) ((host) indicates a host Party)	Private and/or public entity(ies) Project participants(*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Socialist Republic of Viet Nam (host)	Private Entity: Central Wind Power Joint Stock Company	No
Switzerland	Private Entity: Vitol S.A.	No
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

Central Wind Power Joint Stock Company: a company set up mainly for generating and supplying electricity, based in Quy Nhon city, Binh Dinh province, Viet Nam.
Vitol S.A.: is one of the largest traders in the world's energy marketplace. They are a major supplier of petroleum to Viet Nam's state-owned PetroViet.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

Socialist Republic of Viet Nam

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

Binh Dinh province

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

Cat Chanh commune, Phu Cat district

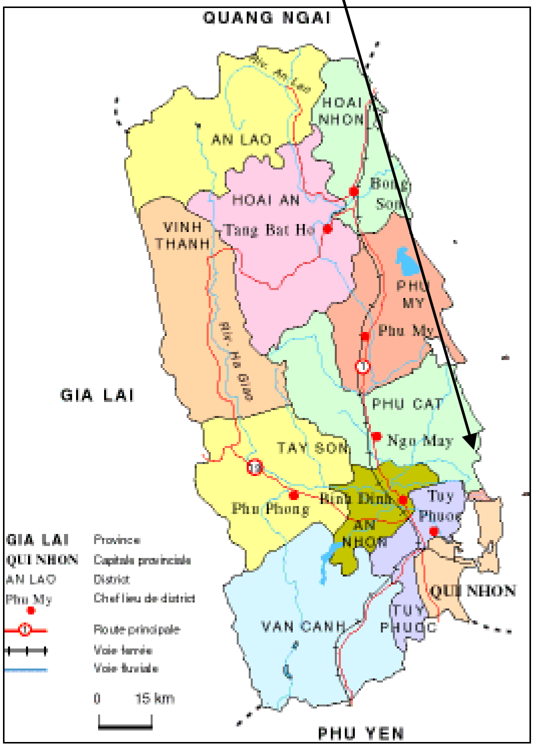
A.4.1.4. Details of physical location, including information allowing the unique identification of this project activity (maximum one page):

http://www.baomoi.com/Home/KinhTe/tuoitre.vn/Van-con-nhap-khau-dien-tu-Trung-Quoc/7622915.epi , last accessed on 07/03/2012).

The proposed project is situated in Phu Cat district, Binh Dinh province.The terrain of the project site is mainly low hill. The Figures A.1 and A.2 below show the location of the project. The coordinates of the site are 13.908222°N, 109.257556° E

Figure A.1: Project location on Viet Nam map

Figure A.2: Project location on Binh Dinh Map



A.4.2. Category(ies) of project activity:

Sectoral Scope 1: Energy industries (renewable/non renewable sources)
Methodology ACM0002.Ver.12.3.0.

A.4.3. Technology to be employed by the project activity:

The installed capacity of the project will be 21 MW with a total expected annual net generated electricity of 55,597 MWh . The main items of equipment are expected to be imported from abroad. This will contribute to the transfer of technology to Viet Nam. Alll the electricity generated by the project will be delivered to the Viet Nam national grid via a 110kV transmission line (see annex 4 for further detail of grid connection).
The technology of the project is detailed in the Table A.1. This technology is considered to be environmentally safe as the plant is a wind power plant and results in virtually zero emissions during operation. This is in addition to the fact that power is generated by a renewable resource resulting in near zero emissions.

Table A.1. The main technical specification of each wind turbine-generator unit used for the project

Items	Specification
Number of unit	14
Diameter of blades	77m
Number of blades	3
Rated speed of blades	9.2-17.3 rpm
Capacity of generator	1500kW
Voltage	690V
Current	1,255A
Cos ρ	0.9
Range of speed	1000-1800 rpm
Hub height	85m

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

The annual emission reductions of the proposed project are estimated to be 31,978 tCO_2e as shown in Table A.2. The project will employ a renewable crediting period and the total emission reductions are estimated to be 223,846 tCO_2e for the first seven year crediting period.

Table A. 2. The annual emission reductions of the proposed project for the first crediting period

Years	**Annual estimation of emission reductions in tonnes of CO_2e**
Year 1	31,978
Year 2	31,978
Year 3	31,978
Year 4	31,978
Year 5	31,978
Year 6	31,978
Year 7	31,978
Total estimated reductions (tonnes of CO_2 e)	223,846
Total number of initial crediting years	**7**
Annual average of the estimated reductions over the crediting period (tonnes of CO_2 e)	31,978

A.4.5. Public funding of the project activity:

There is no public funding from Annex 1 Parties for the proposed project.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity:

Methodology: ACM0002, Consolidated baseline methodology for grid connected electricity generation from renewable sources, Version 12.3.0 (henceforth referred to as 'the methodology').

As the project's total installed capacity will be 21 MW (above the 15MW CDM small / large scale project threshold) and employs a renewable source of energy (wind power) to be exported to a national grid system, the proposed project should be considered under the above methodology and the accompanying tools and Guidelines:

- Tool for the demonstration and assessment of additionality, version 6.0.0 (henceforth referred to as 'the Additionality Tool');
- Tool to calculate the emission factor of an electricity system, version 02.2..1 (henceforth referred to as 'the Emission Factor Tool'). This was the only version of the tool available at the time the Vietnamese DNA made the baseline emission calculation.
- Guidelines on the assessment of investment analysis, version 05.0, (henceforth referred to as 'the Investment Analysis Guidelines');
- Guidelines on Common Practice, version 01.0 (henceforth referred to as 'Guidelines on Common Practice').

B.2. Justification of the choice of the methodology and why it is applicable to the project activity:

	Applicability Criteria	Project Activity
1	This methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).	The project activity is a new (greenfield plant) grid connected renewable power generation project to be installed at a site where no renewable power plant was operated before. Hence the project activity complies with the option (a).

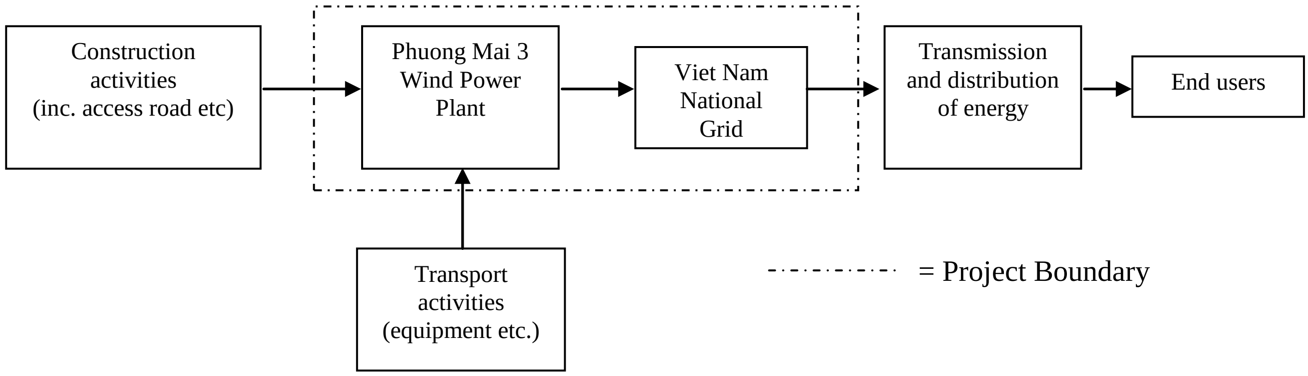
2	The project activity is the installation or modification/retrofit of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit.	The project activity involves the installation of a new wind power plant.
3	In the case of capacity additions, retrofits or replacements: the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity;	Not applicable, the project is a new one and does not involve a capacity addition, retrofit or replacement.
4	In case of hydro power plants, one of the following conditions must apply: a) The project activity is implemented in an existing reservoir, with no change in the volume of reservoir; or b) The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m^2; or c) The project activity results in new reservoirs and the power d density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m^2.	Not applicable, the project is a wind power plant.

B.3. Description of the sources and gases included in the project boundary:

In the proposed project activity, the generated electricity of the project will be delivered to the Viet Nam national grid system. As per the guidance set out in the methodology, the definition of project boundary is the following.

"*the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected*", the project boundary of the proposed project is the Viet Nam national grid system, which mainly

comprises of thermal, gas, diesel oil and hydropower plants (please see section B.4.). This is represented diagrammatically in Fig. B.1.
Figure B.1. The project boundary



As per the methodology, the following sources and gases are included the project boundary.

Table B.1. Source and gases in the project boundary

	Source	Gas	Included?	Justification/Explanation
Baseline	CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

As per the guidance of the methodology, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

"Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

The state-owned company Electricity of Viet Nam (EVN) dominates power production, transmission, and sale in Viet Nam. One of the key assumptions made in determining the baseline is to treat the whole grid system as one entity. The grid system is not divided into provincial sub-groups (as in China for example), the only distinction made by the EVN is categorising power stations by type (coal, gas, hydropower etc.), informally by geographical location (North, Central and South) and ownership (state, independent power producer, "build-operate-transfer").

The need for projects such as Phuong Mai 3 wind power plant is clearly illustrated by the fact that the contribution wind energy to the overall supply of electricity in Viet Nam is still minor. Currently, due to shortfalls in the amount of electricity available, Viet Nam imports electricity from China, where the grid emission factor is higher than that of Viet Nam (with the various Chinese regional grids having emission factors from 34 to 60% higher than that of Viet Nam)[3].

Data Used to Determine Baseline Emission

The baseline emission factor used in this project for the grid was based on the report published by the Vietnamese DNA - "Study, Definition of Viet Nam Grid Emission Factor prepared by the Department of Meteorology, Hydrology and Climate Change".
This data is:

- The latest source of data which is also publically available;
- Its results are published in a transparent manner; and
- The calculations are carried out in a conservative manner.

The Table B.2 shows the parameters for both the operational margin and the build margin required to calculate the emissions of the power plants that serve the national grid system.

Table B.2: Data used to determine baseline emissions

Parameters for the OPERATING margin	Detail	Source
$EF_{grid,OM,y}$	Operating margin CO2 emission factor for grid connected power generation in year y.	Study, Definition of Viet Nam Grid Emission Factor prepared by the Department of Meteorology, Hydrology and Climate Change
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)	Study, Definition of Viet Nam Grid Emission Factor prepared by the Department of Meteorology, Hydrology and Climate Change
$EF_{CO2,i,y}$	CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2/GJ)	Study, Definition of Viet Nam Grid Emission Factor prepared by the Department of Meteorology, Hydrology and Climate Change
m	All power units serving the grid in year *y* except low-cost / must-run power units	Study, Definition of Viet Nam Grid Emission Factor prepared by the Department of Meteorology, Hydrology and Climate Change
y	The three most recent years for which data is available at the time of	Study, Definition of Viet Nam Grid Emission Factor prepared by

[3] http://enviroscope.iges.or.jp/modules/envirolib/upload/2136/attach/iges_er_sheet_gridef.zip (last accessed on 07/03/2012)

	submission of the CDM-PDD to the DOE for validation (*ex ante* option)	the Department of Meteorology, Hydrology and Climate Change
$FC_{i,m,y}$	Amount of fossil fuel type *i* consumed by power unit *m* in year *y* (Mass or volume unit)	Study, Definition of Viet Nam Grid Emission Factor prepared by the Department of Meteorology, Hydrology and Climate Change
$NCV_{i,y}$	Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ / mass or volume unit)	Study, Definition of Viet Nam Grid Emission Factor prepared by the Department of Meteorology, Hydrology and Climate Change
$EF_{CO2,i,y}$	CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2/GJ)	Study, Definition of Viet Nam Grid Emission Factor prepared by the Department of Meteorology, Hydrology and Climate Change

Parameters for the BUILD margin	Detail	Source
$EF_{grid,BM,y}$	Build margin CO2 emission factor for grid connected power generation in year y.	Study, Definition of Viet Nam Grid Emission Factor prepared by the Department of Meteorology, Hydrology and Climate Change
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)	Study, Definition of Viet Nam Grid Emission Factor prepared by the Department of Meteorology, Hydrology and Climate Change
$EF_{EL,m,y}$	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)	Study, Definition of Viet Nam Grid Emission Factor prepared by the Department of Meteorology, Hydrology and Climate Change
m	Power units included in the build margin	Study, Definition of Viet Nam Grid Emission Factor prepared by the Department of Meteorology, Hydrology and Climate Change
y	Most recent historical year for which power generation data is available	Study, Definition of Viet Nam Grid Emission Factor prepared by the Department of Meteorology, Hydrology and Climate Change

In the report referenced, the operating margin is derived using the Simple OM methodology, as it is demonstrated that low cost / must run power stations contribute less than 50% of total power generation between 2006and 20010. For build margin, option 1 is employed whereby build margin is defined as the generation weighted average of the most recently built power plants which contribute 20% of total power generation. This is detailed in section B.6 and annex 3.

Following the end of the first crediting period, it is anticipated that a new ex-ante calculation of emission factor will be performed based on more recent data available published by the Vietnamese DNA.

Discussion of National and Sectorial Policies

The major policy document[5] identified which is relevant to renewable energy generation in Viet Nam is The Electricity Law which was approved by the National Assembly of Viet Nam in November 2004 and took effect in July 2005. It is the primary legislation that regulates the production of electricity in the country.

Under the Electricity Law, incentives such as preferential pricing and tax considerations are provided for new and renewable energy resources. These have been included in baseline financial analyses through tariffs within the range proposed for renewable energy projects and the application of preferential tax policies.

As per the guidelines from EB 22 Annex 3 regarding E- policies, *"National and/or sectorial policies or regulations under paragraph 6 (b) that have been implemented since the adoption of the COP of the CDM M&P (decision 17/CP.7, 11 November 2001) need not be taken into account in developing a baseline scenario".* Based on this, the above policies could be disregarded. However, in the interest of conservatism, it was decided to consider the policy in the development of the PDD.

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 CDM project activity (assessment and demonstration of additionality):

In this section the additionality assessment of the project is presented by following the steps provided in the Additionality Tool, which is the latest version of the tool available at the time writing this PDD. With the implementation of the project activity, the emissions of GHG would be reduced below those that would have occurred in the absence of the registered CDM project activity. The project activity is additional and would not have occurred due to the barriers identified below.

In compliance with the additionality tool, the investment analysis (step 2) has been selected as an appropriate method to demonstrate additionality.

Step 1. Identification of Alternatives to the Project Activity Consistent with Current Laws and Regulations

Sub-step 1a: Define Alternatives to the Project Activity

The following three scenarios are presented for consideration with respect to likelihood and credibility:

[5] Vietnam Country Report, USAID, 2007 (page 10)

a. The proposed project activity undertaken without being registered as a CDM project activity;
b. Construction of a fossil-fuel fired power plant or any other renewable energy power plants with equivalent amount of annual electricity generation;
c. Continuation of the current situation (no project activity or other alternatives undertaken).

An analysis of the three options identified above to identify the most realistic and credible alternative is presented below:

- Alternative (a) is, prior to conducting an investment analysis, a realistic and credible alternative.
- Alternative (b) is neither realistic nor credible because, with respect to energy. The project developer is an independent power producer investing in wind energy, and therefore a thermal power station is not an alternative as they have neither the technical expertise nor the access to finance to develop such a significant investment. On the other side, other renewable energy sources such as solar, geothermal and biomass are not considered since they are extremely rare in Viet Nam.
- Alternative (c), which is a continuation of the current situation (no project activity or other alternatives undertaken) with electricity provided from the Viet Nam national grid is a credible and realistic scenario (hence it is the baseline scenario).

Outcome of step 1a: Following are the identified realistic and credible alternatives to the project activity.

Alternative (a): The proposed project activity without being undertaken as a CDM project activity
Alternative (c): Continuation of the current situation (no project activity or other alternatives undertaken) with electricity provided from the Viet Nam national grid

Sub-step 1.b: Consistency with Mandatory Laws and Regulations

The only identified alternatives to the project are alternatives (a) and (c). Both of them are in compliance with all Viet Nam's legal and regulatory requirements.

Outcome of step 1b:

Identified realistic and credible alternative scenario(s) to the project activity that are consistent with mandatory laws and regulations are the following.
Alternative (a): The proposed project activity without being undertaken as a CDM project activity
Alternative (c): Continuation of the current situation (no project activity or other alternatives undertaken) with electricity provided from the Viet Nam national grid.

As per the latest version of the Additionality Tool, after step 1, PP has the option to choose Step 2 (investment analysis) or step 3 (barrier analysis). The investment analysis has been chosen to demonstrate additionality.

Step 2: Investment Analysis

Sub-step 2a: Determine Appropriate Analysis Method

The Additionality Tool provides the following two options to conduct the investment analysis.
To determine if the proposed project activity is not:

(a) The most economically or financially attractive
(b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs)

From the above, option (b) is chosen to demonstrate that the project activity is not "Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs)."[6]
The additionality tool provides three methods of analysis: simple cost analysis (option I), investment comparison analysis (option II) and benchmark analysis (option III).

The simple cost analysis (option I) cannot be employed because the proposed project produces economic benefits other than CDM related income (through the sale of electricity). Therefore, the project developer has the choice of using either Option II - "investment comparison analysis" or Option III - benchmark analysis. Of the alternatives, the project developer has chosen option III- benchmark analysis to demonstrate the additionality of the proposed project activity.

Sub-step 2b: Option III. Apply Benchmark Analysis

The Additionality Tool stipulates that the project developer should identify the financial / economic indicator, such as IRR, most suitable for the project type and decision context. As prescribed by the Additionality Tool itself, the project developer has chosen project IRR to demonstrate the additionality.

The project IRR needs to be compared with a benchmark to assess the financial attractiveness of the project. The paragraph 13 of the latest version Investment Analysis Guidelines requires that "*In the cases of projects which could be developed by an entity other than the project participant the benchmark should be based on parameters that are standard in the market".*

Paragraph 12 of the latest version of the Investment Analysis Guidelines states that "*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*".

Following the above Guidelines, local commercial lending rates were chosen as the appropriate benchmark for the project activity since the project activity can be developed by another entity than the project owner, in addition, commercial lending rates are not decided at the discretion of the project owner and are standard in the market. It is considered to be practical and realistic to factor in the estimated and projected interest rate in the calculation of the benchmark, since this

[6] Additionality Tool, Step 2

will capture the likely interest regime under which the project will borrow the money from banks to construct the project activity in future. Therefore, the benchmark is constructed by averaging three years commercial lending rates, namely of 2010, 2011 and 2012 as published in the published by Economist Intelligence Unit "Country Report on Viet Nam[7]" available at the time of decision to invest in the project activity . Of these three years the value for 2010 is actual, for 2011 is the estimated and for 2012 it is forecasted. The values and the estimation of the benchmark from these three years values are given below.

	2010	2011	2012
Lending Interest rate	13.1%	18.3%	17.5%
Average	16.3%		

The benchmark is *used* by the authority *to take a approval decision* in as much as a project which has returns lower than this does not merit consideration in view of economics. The benchmark chosen, therefore, meets the requirements of the Additionality Tool[8] and the Investment Analysis Guidelines and is considered conservative.

Sub-step 2c: Calculation and Comparison of Financial Indicators

The following input parameters (Table B3) were considered in making the projected income statement and IRR computation:

[7] The Economist Intelligence Unit,2011, Vietnam Economic and Political Outlook: Country Report Vietnam September 2011

[8] And also the *Investment Analysis Guidelines* , Section IV

Table B.3: Key input parameters

Parameters	Value	Basis
Installed capacity (MW)	21	Feasibility study
Plant load factor (%)	30.22	Calculated based on the FS
Annual power supplied to the grid (MWh)	55,597	Calculated based on the FS
Total Investment (million USD)	39.625	Feasibility study
Loan: equity ratio	80:20	Feasibility study
Power tariff (USD/ kWh)	0.0808	Feasibility study
O&M cost (USD/MWh)	10	Feasibility study
Interest rate on term loan (%): - Term loan	16.30%	Benchmark
Loan repayment period (years)	10	Feasibility study
Moratorium period (years)	1	Feasibility study
Depreciation – Equipment (%)	10.0	Circular No 203/2009/TT-BTC (20/10/2009)
-Civil works (%)	5.0	Circular No 203/2009/TT-BTC (20/10/2009)
Enterprise Income Tax (%)	0-25	Law No 14/2008/QH12 (03/6/2008) Decree No.124/2008/ND-CP (11/12/2008).
Technical life of project (years)	25	EB 50, tool to determine the remaining lifetime of equipment, version 01

Table B.4: Comparison of IRR with the benchmark rate of return

	Project IRR	Benchmark
Values	8.05 %	16.30 %

Sub-step 2d: Sensitivity Analysis

The robustness of the conclusion drawn above has been tested by subjecting critical assumptions to reasonable variations. The Investment Analysis Guidelines defines critical assumptions as those which constitute more than 20% of total project costs or total project revenue and reasonable variation has been defined as a range of +10% and - 10% (paragraphs number 20 and 21). Four factors have been identified as sensitive, viz., project cost, PLF and O&M cost and tariff. Though O&M cost does not account for 20% (total operating cost), it has been considered as interest on term loan and depreciation are not subject to variations as they are determined by project cost and loan documentation. Likewise, both civil works and equipment cost account for more than 20% of the total cost and are therefore included. Though non-tangible costs account for less than 20%, as they are eventually apportioned to tangible fixed assets, entire project cost has been subjected to reasonable variation. The impact of a 'reasonable variation' in these four parameters on the project IRR have been worked out and the results are as follows:

Table B5: Sensitivity Analysis

Project IRR	-10%	0	10%
PLF	6.60%	8.05%	9.44%
Project cost	9.41%	8.05%	6.90%
O&M cost	8.23%	8.05%	7.88%
Tariff	6.60%	8.05%	9.44%
Benchmark	16.30 %		

The PLF is based on monitoring the wind velocities in the location of the proposed wind power project activity. The same is prepared by an independent third party engineering consultant. Hence, an over or underestimation of the same is not a likely scenario.
In the recent past, Viet Nam has been facing very high rates of inflation. According to the recently published "Outlook 2011" by Asian Development Bank, in near future the inflation is expected to be higher than previously forecast.[9] In the above background of high inflation in Viet Nam, the possibility of any reduction in domestic construction cost is highly unlikely. The tariff showed in the feasibility study was defined as a fixed cost, typical of the kind of PPA offered at the time of decision making. O&M costs are not a very major assumption at all and the sensitivity analysis shows it has a very minor impact on the project IRR. The project IRR goes up by only 18 basis points when the O&M cost is brought down by 10%.

The project, therefore is not a business-as-usual scenario and hence additional.

Step 3: Barrier Analysis

As the additionality of this project is demonstrated through the investment analysis, this optional step is skipped.

Step 4: Common Practice Analysis

Sub-step 4a: Analyse other activities similar to the proposed project activity:

The PDD's common practice analysis is completed by employing the latest data available for the analysis. The new data comes in the form of a Grid Emission Factor study, recently made available by the Vietnamese DNA (2012). This contains data to calculate build margin, and the National Electricity Master Plan VII (2011) gives details with respect to all the power plants in operation nationally, and the plan of future electricity generation. Based on these data sources, it can be seen that there has been no similar project activity in operation in Viet Nam except for the project Wind Power Plant No.1 - Binh Thuan 30MW, which has already been registered as a CDM project, and thus it can be disregarded from the common practice analysis.

[9] http://beta.adb.org/publications/asian-development-outlook-2011-update-preparing-demographic-transition

Besides, the CDM EB also published the Guidelines on Common Practice. They provide for a stepwise approach that is shown below:

1. **Calculate applicable output range as +/-50% of the design output or capacity of the proposed project activity.**

   The proposed project is 21 MW so the applicable output range is 10.5 MW – 30.5 MW.

2. **In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project. Note their number N_{all}. Registered CDM project activities shall not be included in this step.**

   Data from the Master Plan VII that covers all power plants in Viet Nam published in 2011, in conjunction with the latest data received from the DNA for the grid emission factor, reveals that:

   $$N_{all} = 3$$

3. **Within plants identified in Step 2, identify those that apply technologies different that the technology applied in the proposed project activity. Note their number N_{diff}.**

   None of the plants identified are wind power plants. Therefore:

   $$N_{diff} = 3$$

4. **Calculate factor $F=1-N_{diff}/N_{all}$ representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity.**

   $$F = 1-(3 / 3) = 0$$

5. **Result**

According to the Guideline on Common Practice, *"The proposed project activity is a common practice within a sector in the applicable geographical area if the factor F is greater than 0.2 and N_{all}-N_{diff} is greater than 3."*

In the case of the proposed project, $F < 0.2$ and $N_{all}-N_{diff} = 0$ and therefore the proposed project is not an example of common practice.

Sub-step 4b: Discuss any similar Options that are occurring:

Following the analysis in sub-step 4a, there are no other activities that are operational and that are similar to the proposed project activity. Hence, the proposed project activity is not a common practice.

Prior Consideration of the CDM

The project activity has not yet been deemed to have started as the project proponent has not yet committed to any major expenditure related to the project activity. Thus prior consideration need not be addressed separately

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

In order to calculate the baseline, project and leakage emissions and hence emission reductions, the methodology is used in conjunction with the Emission Factor Tool including the following steps:

1. Calculation of baseline emissions;
2. Calculation of project emissions;
3. Calculating leakage emissions;
4. Calculating emission reductions.

1. Baseline Emissions

The following steps are as per the Study, Definition of the Grid Emission of Viet Nam prepared by the Department of Meteorology, Hydrology and Climate Change, referenced previously in Section B4 (source of baseline data). The calculation procedure followed is as per the Emission Factor Tool.

Step 1: Identify the Relevant Electric Power System

As per section B.4., the identified business as usual scenario is the continued generation of power by the Vietnamese national grid system, and baseline emissions are those produced as a result of this. Therefore, the Viet Nam national grid is identified as the relevant electric power system.

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

The calculation of the operating margin and build margin emission factor is based on the Vietnamese DNA study released in 2012. The calculations do not include the off-grid power plants and hence Option I is selected.

Step 3: Select an Operating Margin (OM) Method

In this case, the Simple Operating Margin has been calculated. In order to use the Operating Margin, assumption has been made with respect to “low cost” and “must run” resources. These are defined as “as power plants with low marginal generation costs or power plants that are dispatched independently of the daily or seasonal load of the grid. They typically include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation. If coal is obviously used as must-run, it should also be included in this list, i.e. excluded from the set of plants.”

As per the study, the contribution of “low cost” and “must run” sources to overall power generation in Viet Nam is well below 50% (please refer to the table B.6 below). Therefore the "Simple Operating Margin" (Option a) can be calculated for the purpose of deriving the grid emission factor as per Step 3 of the Emission Factor tool.

Table B.6. Contribution of low cost and “must run” sources to overall power generation in Viet Nam

Year	2006	2007	2008	2009	2010	Average
Percentage share of low cost and “must run” power stations (%)	34.13	33.74	34.72	35.68	26.57	32.66

The Ex ante option has been chosen for this project. The emission factor using the Simple Operating method has been calculated using a three year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period. The years used are therefore 2008-2010 inclusive.

Step 4: Calculate the Operating Margin Emission Factor According to the Selected Method

As per the study, the option A under Step 3 of the Emission Factor Tool is employed. Here the Simple OM emission factor is calculated based on the electricity generation of each power unit and an emission factor for each power unit, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_{i,m} FC_{i,m,y} \cdot NCV_{i,y} \cdot EF_{CO2,i,y}}{\sum_{m} EG_{m,y}} \quad (1)$$

Where:

$EF_{grid,OMsimple,y}$	=	Simple operating margin CO_2 emission factor of power unit m in year y (tCO_2/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 (energy content) of fossil fuel type *i* in year *y* (GJ / mass or volume unit)
$EF_{CO2,i,y}$	=	CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2/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 units
I	=	All fossil fuel types combusted in power unit *m* in year *y*
y	=	The three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation (*ex ante* option) or the applicable year during monitoring (*ex post* option), following the guidance on data vintage in step 3

Determination of $EG_{m,y}$

For grid power plants, $EG_{m,y}$ is determined as per the monitoring tables issued by the Vietnamese Ministry of Natural Resources and Environment.

Viet Nam currently imports electricity from China to make up for the shortfall in supply from its own generation system. Whilst the emission factor of China's grid is higher than that of Viet Nam's, as a conservative approach, this PDD has considered these imports as zero emissions whilst taking into account their contribution to the overall power generation of Viet Nam

Step 5. Calculate the build margin (BM) emission factor margin

For the first crediting period, the build margin emission factor will be calculated *ex-ante* based on the most recent information available on units already built for sample group *m* at the time of CDM-PDD submission to the DOE for validation (Option 1). Imports from China are not considered in the build margin calculation because as per the Emission Factor Tool, recent or likely future additions to transmission capacity are not planned so as to enable significant increases in imported electricity from China.

No capacity additions from retrofits of power plants are included in the calculation of the build margin emission factor.

Sample group of power units

(a) According to the study released by the Vietnamese Ministry of natural resources and environment, the Annual electricity generation ($AEG_{SET-5units}$) of the set of five power units that started to supply electricity to the grid most recently is:

$AEG_{SET\text{-}5units}$ = 18,244,920.65 MWh, where
$SET_{5\text{-}units}$: Srepok 3, Son La, Cua Dat, Hai Phong, Quang Ninh

(b) According to the study released by the Vietnamese Ministry of natural resources and environment, the annual electricity generation of the project electricity system, excluding power units registered as CDM project activities is
AEG_{total} = 91,224,603.26 MWh

The annual electricity generation of the set of power units (excluding power units registered as CDM project activities) that started to supply electricity to the grid most recently and that comprise 20% of AEG_{total} is:
$AEG_{SET\text{-}\geq 20\%}$ = 23,845,894.24 MWh

(c) The most recent set of power plants which generate 20% of the country's electricity generated more power (MWh) in 2010 than the five most recently built power stations. As such, the weighted carbon emissions from the $SET_{\text{-}\geq 20\%}$ were used to calculate the build margin.
Hence $SET_{\text{-}\geq 20\%}$ = SET_{sample}

The oldest COD of the power units included into SET_{sample} is 2008, which is less than 10 years back. Hence this sent can be used to calculate the build margin.

Calculation of the build margin factor:

The build margin emissions factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units *m* during the most recent year *y* for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_{m} EC_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}} \qquad (2)$$

Where:

$EF_{grid,BM,y}$	=	Build margin CO_2 emission factor in year *y* (tCO_2/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_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
m	=	Power units included in the build margin
y	=	Most recent historical year for which power generation data is available

The CO_2 emission factor of each power unit *m* ($EF_{EL,m,y}$) is determined as per the guidance in step 4 (a) for the simple OM, using options A1, A2 or A3,, using for *y* the most recent historical year for which power generation data is available, and using for *m* the power units included in the build margin.

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Step 6. Calculate the Combined Margin Emissions Factor

The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \quad (3)$$

Where:

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EF_{grid,OM,y}$ = Operating margin CO_2 emission factor in year y (tCO_2/MWh)
w_{OM} = Weighting of operating margin emissions factor (%)
w_{BM} = Weighting of build margin emissions factor (%)

The weightings used are as follows: $w_{OM} = 0.75$ and $w_{BM} = 0.25$ for the first crediting period, and for the subsequent crediting periods.

Calculate the Baseline Emission *(BE_y)*

The baseline emissions (*BE_y* in tCO_2e) are the product of the baseline emission factor (*$EF_{grid,CM,y}$* in tCO_2e/MWh) and the electricity supplied by the project activity to the grid *$EG_{PJ,y}$* in MWh).

The baseline emission is calculated by the following formula as per the latest version of the applicable methodology:

$$BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y} \quad (4)$$

Where:

BE_y = Baseline emissions in year *y*(tCO_2/yr)
$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as result of the implementation of the CDM project activity in year *y*(MWh/yr)
$EF_{grid,CM,y}$ = Combined margin CO2 emission factor for the grid connected power generation in year *y* calculated using the latest version of the “tool to calculate the emission factor for an electricity system” (tCO_2/MWh)

2. Project Emissions

As per methodology, the project emission of this project is zero.

$$PE_y = 0 \quad (5)$$

3. Leakage

As per methodology, the project owner does not need consider leakage.

Therefore:

$$LE_y = 0 \quad (6)$$

4. Emission Reductions

Emission reductions are calculated as follows

$$ER_y = BE_y - PE_y - LE_y \quad (7)$$

Where:

ER_y = Emission reductions in year *y* (t CO_2e/yr)
BE_y = Baseline emissions in year *y* (t CO_2e/yr)
PE_y = Project emissions in year *y* (t CO_2e/yr)
LE_y = Leakage emissions in year *y* (t CO_2e/yr)

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

Data / Parameter:	$EF_{grid,CM,y}$
Data unit:	tCO2/MWh
Description:	Combined margin CO2 emission factor for grid connected power generation per the BM and OM data made available by DNA issued "Study, Definition of Viet Nam Grid Emission Factor, "
Source of data used:	As per the Emission Factor Tool
Value applied:	0.5752 tCO_2/MWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per the Emission Factor Tool
Any comment:	-

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

Baseline emissions:

Baseline emissions are calculated as per the formula (4) as elaborated in section B.6.1. Based on the proposed project's feasibility study, the annual electricity generated and supplied to the grid is 55,597 MWh. The grid emission factor is 0.5752 tCO_2/MWh. Therefore the baseline emission is the following:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} \quad (4)$$
$$= 55,597 \times 0.5752$$
$$= 31,978 \ tCO_2 e$$

Project emissions:

As explained in section B.6.1, the project emission is zero.

Emission Reduction:

Emission reduction for the project activity is calculated as per the equation (7) described in section B.6.1. The same is presented below.

$$ER_y = BE_y - PE_y - LE_y \quad (7)$$

ER_y = (55,597 x 0.5752) – 0– 0 = 31,978 tCO_2e

Thus it can be derived that the estimated annual emission reductions attributable to the proposed project activity are 31,978 tCO_2e.

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

Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
Year 1	0	31,978	0	31,978
Year 2	0	31,978	0	31,978
Year 3	0	31,978	0	31,978
Year 4	0	31,978	0	31,978
Year 5	0	31,978	0	31,978
Year 6	0	31,978	0	31,978
Year 7	0	31,978	0	31,978
Total (tonnes of CO_2e)	0	223,846	0	223,846

B.7. Application of the monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Data / Parameter:	$EG_{facility,y}$ ($EG_{PJ,y}$)
Data unit:	MWh/yr
Description:	Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y*
Source of data to be used:	Project activity site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	55,597
Description of measurement methods and procedures to be applied:	Electricity meters
QA/QC procedures to be applied:	• Continuous measurement and monthly recording • Cross check measurement results with records for sold electricity • Data archived electronically and kept at least for 2 years after the end of the last crediting period • Uncertainty level: low • Calibration of meters as per relevant industry standard or at least once every three years
Any comment:	

B.7.2. Description of the monitoring plan:

A final monitoring plan will be prepared prior the start crediting date based on the as-built project activity. It will address the following aspects:

1. The CDM monitoring team and allocation of responsibility to ensure compliance with the monitoring requirement of the methodology is given here below:

Position	Responsibilities
Operational staff	• Ensure meter readings are captured in standard format
Site Supervisor	• Ensuring monitoring takes place

	• Initial check for anomalies (e.g. Significant changes against previous readings or expected values) • Site record management • Communication of meter readings to Project Director • Attendance at annual verification
Project Director	• Collation of metered data from the project site • Collation of confirmation records (see Annex 4) • Cross-check of confirmation records against metered data

	Tasks description	Operator	Supervisor	Project director	CDM Consultant
<u>Monitoring activity</u>					
1	Recording of monitored data	✓			
<u>Quality Assurance & Quality Control</u>					
2	Verification of data monitored (consistency and completeness)		✓		
3	Ensuring adequate training of staff		✓		
4	Ensuring adequate maintenance		✓		
	Ensuring calibration of monitoring instruments		✓		
5	Data archiving: ensuring adequate storage of data monitored (integrity and backup)			✓	
6.	Identification of non-conformance and corrective/preventive actions and monitoring plan improvement		✓		
7	Emergency procedures		✓		
8	External audit				✓
<u>Calculation of GHG emission reductions and reporting</u>					
9	Processing of data and calculation of emission reductions			✓	
10	Monitoring report: management review of monitoring report (internal audit)			✓	

2. Monitoring point

- Net electricity generation of the project will be measured and monitored through the use of on-site metering equipment at the outgoing feeder of the wind power plant or at the grid connection point which should be determined in the final agreement of EVN.

Additional information is available at Annex 4.

3. Emergency Procedures

- In case the primary system fails, data from a backup system may be used to calculate emission reductions until the primary system is once again available
- In case of errors in both systems, reconstruction of data may be undertaken on the basis of conservative assumptions. However, in case such reconstruction is not possible, emission reductions for the period under consideration may not be requested.

B.8. Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies):

Kyoto Energy Pte. Ltd. 80 Raffles Place UOB Plaza 1, Level 36-01 Singapore 048624		
Tel.: +65 6248 4728	Fax: +65 6248 4531	Email: info@kyotoenergy.net

Kyoto Energy Pte Ltd is not a project participant in Annex 1 of this document.

SECTION C. Duration of the project activity / crediting period

C.1. Duration of the project activity:

C.1.1. Starting date of the project activity:

Expected start date of the project activity is on 01/03/2013

C.1.2. Expected operational lifetime of the project activity:

25 years, 0 months

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:

01/03/2014 or registration date, 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. Documentation on the analysis of the environmental impacts, including transboundary impacts:

Under Vietnamese law, power plants need to have their environmental impacts assessed through an Environmental Impacts Assessment (EIA), or an Environmental Protection Commitment (EPC). The applicable form of assessment is on the basis of size of a project. Phuong Mai 3 Wind Power Project has undertaken the process to develop an Environmental Impacts Assessment (EIA). This EIA was approved by the relevant local authority, the People's committee of Binh Dinh province on 05/01/2009. The environmental impacts of both construction and operation period of the project are as follows.

Environmental Impacts during Construction and Operation period

<u>Impact to Air environment</u>

During the construction period, the emission of the dust, exhausted gases and noise from the construction activities causes the air pollution.

- *Dust:* The dust is released from transportation, unload and storage of materials such as soil, rock, sand, cement, brick and machines. The dust concentration is limited given the size of the project and can be reduced easily by the mitigation measures.
- *Exhaust gases:* Caused by the machinery vehicles such as bulldozers, excavators, lorries, etc… and transportation vehicles using gasoline, diesel oil.
- *Noise and vibration:* Generated by the operation of the transportation vehicles and construction machines on the site. The noise and vibration can impact significantly to the *environment and workers* and local people living near the site.

However, during the operation period, any air pollution will be reduced significantly – it is mainly seen in the construction stage.

<u>Impacts to water source</u>

- *Domestic wastewater:* The volume of domestic wastewater depends on the number of worker on the project site. Its component mainly includes organic materials and suspended solid. During the construction period, 35 workers on the project site will discharged the significant volume of domestic wastewater. It can have negative effects on the surface water and underground water unless there are the adequate wastewater treatment and collection systems.

- *Run-off water:* The run-off water flowing from the construction site, parking places and vehicle repair facilities can sweep rock, debris, oils and lubricants away, resulting in negative impacts to the aqueous environment.

Impact to the soil

- Domestic waste: the amount of domestic waste discharged daily from construction staff onsite can be significant since the number of workers on the project site during construction period is 35 persons. It consists of various components, ranging from organic substances such as vegetables and fruit, to paper, food, plastic, cans etc. These kinds of waste, unless managed correctly, will be the cause of bad odor and attract insects, flies, mosquitoes, having negative effects on environmental quality and human's heath.
- The construction solid wastes include excess material such as rock, soil, cement, steel, metal scraps…. Though the amount is not considerable, there should be measures to collect it will cause soil pollution.
- The hazardous wastes mainly include oil cloths and containers, broken equipment and potentially leaked fuel. Though the use of the hazardous substances and therefore production of waste is small (e.g. lubricants), they still has negative effects on the environment if not well managed.

Impact to ecological environment

- 15% of the area of the local forest will be lost because of the construction of the project. However, the project owner shall plant the same trees as removed at the bare land after replacing the houses of the local people.
- The project is located in an area with the poor biological resources. So impacts of the project construction are considered insignificant.
- There are no bird migration routes of birds in the area of the project site. So the installation of turbines hasn't negative effects on living and migration of birds.

Mitigation measure for the negative impacts to Environment

Mitigation to Air

- Choose the proper working regime to avoid impacts to people at rush hours.
- Regularly spray water on the roads at least twice per day.
- Use sheets to cover vehicles carrying materials.
- Maintain and repair the vehicles and machines periodically

.

Mitigation to water quality

Some following methods can be considered to use:

- To build digestion tanks at suitable positions.
- Cleaning water consisting of grease, oil etc must be collected to the tank in order to get rid of wastes.

Mitigation of effects from solid waste

- Domestic solid waste will be collected and buried in an adequate landfill.
- Some construction wastes will be collected and sold to the scrap buyer.
- Hazardous waste such as oil cloths, oils, lubricants will be collected, stored in a suitable place and then transported to a suitable treatment facility.

Mitigation to solid waste

- Plant trees in any cleared bare land.
- Prevent the workers and local people from destroying forest and hunting wind animals.

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:

The environmental impacts of the project are not considered significant by the Vietnamese authorities. Hence, the EIA report (a form of Environmental Impact Assessment) was approved by the People’s Committee of Binh Dinh province on 05/01/2009.

SECTION E. Stakeholders' comments

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

The stakeholder's meeting was held at the atministration office, Cat Chanh Commune, Phu Cat District, Binh Dinh Province, Viet Nam on 13/03/2012. Personal invitations were sent to community leaders, local People's Committee representatives and placed in the media. Public notices of the planned consultations were placed in *Labour Newspaper on 29/02/2012* which is widely published and read in the nation. Across the consultation, presentations were made by the project owner and consultant who outlined the planned project activity in a non-technical manner (including environmental, social and technological considerations), climate change, the role of the Clean Development Mechanism and annual emission reductions potential. In addition, questionnaires were circulated and filled in by the attendees. In all, there were 19 participants attending the meeting and 19 questionnaires were collected.

Figure E.1 Picture of the stakeholder's meeting at the atministration office, Cat Chanh Commune on 13/03/2012

E.2. Summary of the comments received:

During the consultation meeting, the stakeholders have not identified any major negative impact on the project. Local stakeholders appreciate that the project will have many positive aspects. However, some of them also showed that the project has some given impacts on the environment and their life. But they also clearly state that the scale of these impacts is very small or the sum of positive impacts is much bigger than that of negative impacts as follows:

- 37% respondents felt that the project would be highly affect the landscape.
- 26% of respondents expressed concern that noise and vibration from the construction activities would have a negative impact.
- 11% of respondents believe that the project would lead to higher employment.
- 5% of respondents expressed concern about the possibility of accidents occurring on the project site.
- 5% of respondents thought that the project could have effect on community facilities.
- 5% of respondents stated that the project implementation would affect to the domestic water supply for the local people who use stream water for living activity.

In general, the project has many positive responses from local communities. They are also expecting positive impacts on social, economic and environmental aspects of the project. Moreover, all concerns about environmental aspects have already been addressed by the project owner prior to the implementation of the project.

E.3. Report on how due account was taken of any comments received:

In response to the comments received during the stakeholder consultation, the project owner made the following responses:

- The project owner proposed that use of landscaping methods could be used to make the project less obvious to passersby.
- The project owner confirmed that modern techniques and well maintained equipment would be used to minimize the noise during construction. It was also confirmed that there would be no significant noise or vibration that could be observed in locality during operation.
- The project owner confirmed that the project would employ staff from local people during both construction and operation period.
- The project owner confirmed that all applicable safety standards and regulations (including training of employees) would be used to minimize the probability of accidents
- The project owner explained that the project would develop transport facilities for the region.
- The project owner confirmed to implement mitigation measure detailed in the EIA in order to minimize impacts to water source.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Neither public nor ODA funding from countries in Annex 1 was applied for by the project proponent for the project.

Annex 3

Table AN.1 Amount of consumption, emission and power generation in the most recent 3 years (2008, 2009, 2010)

Power plants	**Fuel consumption** Coal, oil: kton Gas: mm^3)	**Power generating to the grid** (MWh)	**Emission** (t CO_2)
2008			
Coal thermal power plants	6.483,99	10.055.394,03	13.378.811,40
Gas turbines	6.893,46	33.857.134,85	14.716.799,17
Gas turbine using gas	*6.839,11*	*22.396.231,24*	*14.535.266,34*
Gas turbine using oil	*54,35*	*183.087,52*	*181.532,83*
Add-on	-	*11.277.816,09*	-
Diesel thermal power plant	534,59	1.481.880,17	1.784.825,09
Diesel power plant using FO	22,48	90.465,01	71.384,99
Diesel power plant using DO	3,73	15.000,00	11.878,75
Imported power		3.220.000,00	
Total	**13.938,25**	**48.719.874,06**	**29.963.699,40**
2009			
Coal thermal power plants	6.927,29	9.841.578,80	14.380.035,80
Gas turbines	7.273,70	36.714.493,20	15.970.688,95
Gas turbine using gas	*7.251,87*	*25.471.686,34*	*15.897.778,22*
Gas turbine using oil	*21,83*	*71.303,56*	*72.910,73*
Add-on	-	*11.171.503,30*	-
Diesel thermal power plant	444,99	1.635.350,57	1.471.505,07
Diesel power plant using FO	0,18	-	604,88
Diesel power plant using DO	2,41	10.000,00	8.058,07
Imported power		4.102.080,00	

Total	**14.648,57**	**52.303.502,57**	**31.830.892,77**
2010			
Coal thermal power plants	9.075,79	14.624.274,14	18.824.109,53
Gas turbines	8.727,79	44.051.811,72	19.531.753,05
Gas turbine using gas	*8.664,36*	*31.073.369,39*	*19.320.632,28*
Gas turbine using oil	*63,43*	*209.306,21*	*211.120,77*
Add-on		*12.769.136,12*	-
Diesel thermal power plant	664,97	2.648.763,23	2.206.222,65
Diesel power plant using FO	0,99	-	3.268,82
Diesel power plant using DO	2,16	9.035,70	7.361,01
Imported power		5.599.230,00	
Total	**18.471,70**	**66.933.114,79**	**40.572.715,06**

Table AN.2 Total emission and power generation of the most recent 3 years

	2008	**2009**	**2010**	**Total**
Total power generation (MWh)	48.719.874,06	52.303.502,57	66.933.114,79	167.956.491,42
Total emission (tCO2)	29.963.699,40	31.830.892,77	40.572.715,06	102.367.307,23

Table AN.3 Result of OM emission factor in 2010

Year	**Total power generation (MWh)**	**Total emission(tCO_2)**	**OM $_{2010}$** (tCO_2/MWh)
	A	B	(∑B/∑A)
2008	48.719.874,06	29.963.699,40	

2009	52.303.502,57	31.830.892,77	
2010	66.933.114,79	40.572.715,06	
Total	**167.956.491,42**	**102.367.307,23**	**0.6095**

Table AN.4 Calculation of BM emission factor in 2010

Power plant	**COD year**	**Fuel consumption** (Coal, oil: kton Gas: mm^3)		**Electricity generated to the grid** (MWh)	**Annual Emissions** (t CO2)
The set of 5 power plants most recently constructed					
Seprok 3	2010	Hydropower		632.334,90	
son La	2010	Hydropower		113.951,84	
Cua Dat	2010	Hydropower		191.861,50	
Hai Phong	2010	Coal	813,42	1.825.288,00	1.713.136,92
Quang Ninh	2009	Coal	573,17	1.291.688,00	1.179.133,25
Total				**4.055.124,24**	**2.892.270,17**
The set of power plants most recently constructed contributes 20% of total power generation					
Srepok 3	2010	Hydropower	-	632.334,90	-
Son La	2010	Hydropower	-	113.951,84	-
Cua Dat	2010	Hydropower	-	191.861,50	-
Hai Phong	2010	Coal	813,42	1.825.288,00	1.713.136,92
Quang Ninh	2010	Coal	573,17	1.291.688,00	1.179.133,25
Pleikrong	2009	Hydropower	-	228.483,47	-
Buon Kuop	2009	Hydropower	-	1.028.732,36	-
Buon Tua Srah	2009	Hydropower	-	215.749,72	-
Hiep Phuoc	2009	Gas	115,52	422.000,02	253.151,16
Uong Bi expansion (7)	2009	Coal	856,14	1.896.937,00	1.765.022,67
Can Tho (S1)	2009	DO	226,56	991.768,00	723.401,16
	2008	DO	1,12	4.518,20	3.773,52
	2008	Gas	731,93	2.520.473,00	1.675.299,94

Nhon Trach	2009	Add-in	-	299.593,20	-
Tuyen Quang	2008	Hydropower	-	1.010.177,63	-
Dai Ninh	2008	Hydropower	-	1.102.793,00	-
A Vuong	2008	Hydropower	-	883.990,70	-
Ca Mau 1&2	2008	Add-in	-	3.251.096,50	-
		Gas	1.556,20	5.934.457,20	3.946.160,03
Total				**23.845.894,24**	**11.259.078,65**
Result of BM emission calculation (BM)					
Total emission			**11.259.078,65** (tCO_2)		
Total power generation			**23.845.894,24** (MWh)		
BM_{2010}			**0,4722** (tCO_2/MWh)		

Table AN.5 Calculation of Combined Margin

A	Estimated operating margin emission rate	tCO2/MWh	**0,6095**
B	Estimated build margin emission rate	tCO2/MWh	**0,4722**
C	Estimated baseline emission rate	tCO2/MWh	**0,5752**

Annex 4

MONITORING INFORMATION

Data Monitoring

The monitoring methodology involves the monitoring of the net generated electricity by using energy meter(s).

The purpose of the monitoring procedure will be to direct and support the monitoring of project performance indicators to determine project outcomes, greenhouse gas (GHG) emission reductions. The project employs latest state of art monitoring and control equipment that measure, control and record key parameters continuously.

Ensuring adequate maintenance and calibration of monitoring instruments

- Specific maintenance, repair or replacement of monitoring equipment will be recorded and will describe the time and action undertaken.
- The calibration will occur at intervals determined on the basis of instrument manufacturers' recommendations, stability, purpose, usage and history of repeatability.
- Energy meters are delivered with a certificate of conformity and are not calibrated after installation.
- Last calibration certificate date will be provided during periodic verification
- Defect, repair or change of monitoring equipment will be recorded.

Power purchasing company name: Electricity of Viet Nam (EVN)

Connection point details: The electricity generated from Phuong Mai 3 Wind Power Plant will be connected to the National Grid through a new transmission line to the transformer station of Phu Cat.

The grid connection plan of the project is:

- Starting point: output of Phuong Mai 3 substation (110kV)
- Structure: single current, type 3AC-240
- Transmission Voltage :110kV
- End point (national grid, built by EVN): Nhon Hoi 2 substation

The substation of Phuong Mai 3 power plant has follow characteristics:

- Capacity: 22/110kV+-2x2.5%-2x16MVA
- Voltage level: 115+-9x1.78%/22+-2x25.5%/11kV

Project Manager Name: Ms. Trinh Thi Hanh Phuc, Director-general of the company