



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

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

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**Project title:** Nam Lik 1-2 Hydropower Project**PDD Version:** 01.2**Completion Date:** 04/11/2011**A.2. Description of the project activity:**

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Nam Lik 1-2 Hydropower Project (hereafter referred to as the “the project”) is located on the Nam Lik River, about 50km upstream of the Nam Lik Bridge of Road No.13 at B.HinHeup, northwest of Vientiane city, developed by Nam Lik 1-2 Power Company Limited (the “project entity”).

The project is a diversion hydropower station, the construction of the project including dam, reservoir, diversion system, power house and transmission system. The installed capacity of the project is 100MW, with the annual gross power generation of 435,000 MWh.

Following the Lao PDR’s electrification policy, the electricity supply falls in short compared to the increased electricity demand. The project is expected to constantly contribute clean energy to the Lao Power Grid. For the Lao Power Grid is connected with the power grid in Thailand, the power supplied by the project will not only meet domestic electricity demand, but also increase the net power export to Thailand and decrease the net power import from Thailand, where the power grid is dominated by thermal power plants. The baseline scenario of the project is continuation of the present situation, i.e. electricity supplied from the power grid. By displacing part of the power generated by thermal power plants, the project is therefore expected to reduction of CO<sub>2</sub> emissions by an estimated 207,512 tCO<sub>2</sub>e per year during the first crediting period.

As a renewable energy project, the project will produce positive environmental and economic benefits and contribute to the local sustainable development in following aspects:

- During the construction period, plenty of job opportunities were provided to local residents, and the newcomers surged in the area will bring local people lots of employment opportunities thus bring more revenue for the local residents;
- The infrastructures were greatly improved. The implementation of water supply program, transportation and electricity system enhancement will bring substantial benefits to local villagers;
- Reduce the local use of firewood displacing by electricity, reduce the damage to the local vegetation;
- The project owner built a new school for the local community, which provides better education condition to the children, improved local education level.
- Power supplied to the regional grid consisting of Thailand Power Grid and the Lao Power Grid, will provide clean & cheap electricity power in this region, promote the sustainable development in this region and slowing down the increasing trend of GHG emissions

**A.3. Project participants:**



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The parties involved in the project are shown in Table A.1:

**Table A.1 Project participants**

Name of Party involved	Private and/or public entity(ies) project participants	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Lao PDR (host)	Nam Lik 1-2 Power Company Limited (Project owner)	No
Thailand (host)	Nam Lik 1-2 Power Company Limited (Project owner)	No

The project is located in Lao PDR and is connected to the regional grid which extends across Lao PDR and Thailand. Therefore both of the two countries are listed as host Parties.

For more detailed contact information on participants in the project activities, please refer to Annex 1.

**A.4. Technical description of the project activity:**

**A.4.1. Location of the project activity:**

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The location of the project is in Lao PDR. Therefore under A.4.1.1 only this host country is listed

**A.4.1.1. Host Party(ies):**

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Lao PDR

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

&gt;&gt;

Vientiane Province

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

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B.HinHeup City

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

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The project is located on the main stream of Nam Lik River, about 50km upstream of the Nam Lik Bridge of Road No.13 at B.HinHeup, Vientiane province, Lao PDR. The approximate coordinates of the project site is: 18.7897°N, 102.1233°E.

Figure A.1 Show the location of the project:

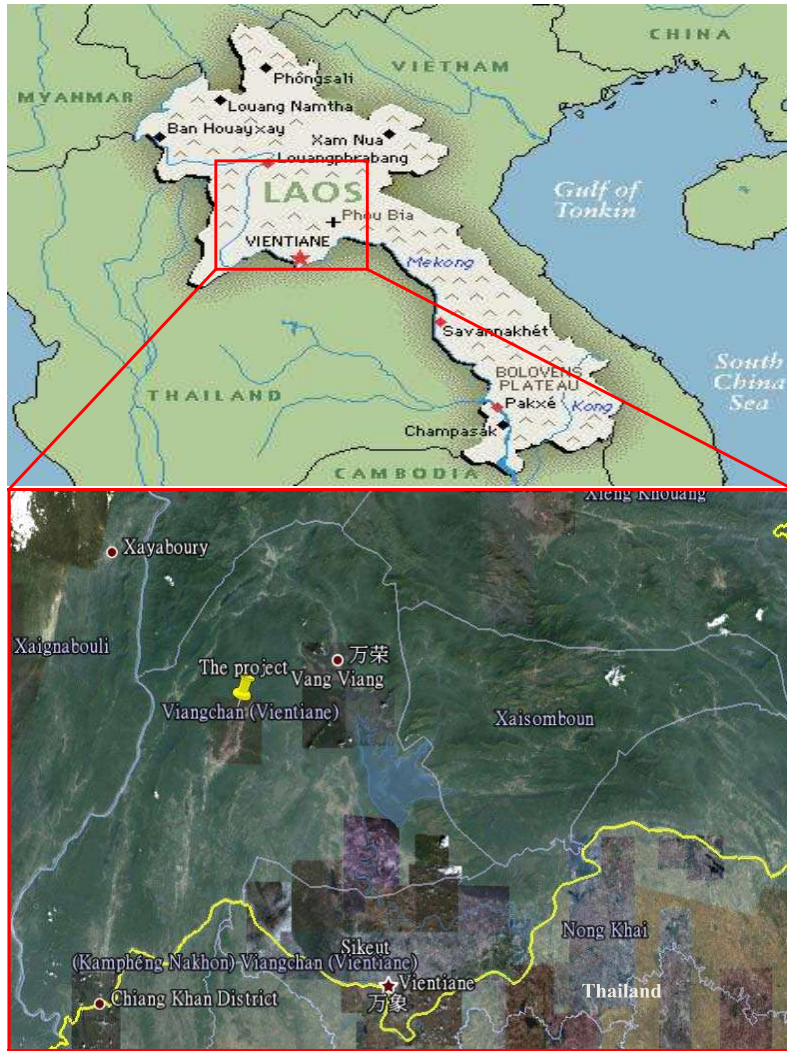


Figure A.1. Location of the project



The project activity is the installation of a new grid-connected renewable power plant/unit, and is not a modification/retrofit of an existing plant/unit, therefore, the baseline scenario is provision of the equivalent amount of electricity generated by the power plants connected with the regional grid consisting of Thailand Power Grid and the Lao Power Grid, and 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” (Version 02.2.1).

**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):**

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**Prior consideration of CDM**

After signing the concession agreement with government of Lao in October 2006, the project owner decided to seek CDM assistance in middle of 2007 when the project Feasibility Study Report has been completed by independent design institute to overcome financial weakness, and unfavourable conditions that the project encounters. After taking CDM into consideration seriously, the project owner signed the EPC contract in August 2007 which is the earliest date when implementation of the project activity began. The financial analysis shows that the additional support of the CDM makes a significant difference to the project financial status. If the project owner is able to sell CERs generated by the project activity, the additional carbon revenue will make the project financially viable.

The below table 3 shows that continue and real actions were taken to secure the CDM status in parallel with the project construction. In 2007, the project owner started to cooperate with a CDM consultant for the development work, while it is not clear whether the methodology and relevant tools are applicable to the project and there is no successful example for this kind of transnational power grid project. In Oct. 2007, a comparable project with similar situation started GSP while after nearly one year's time, it resubmitted a GSP PDD in Sep. 2008 which shows that there were many potential risk and difficulty for the development of this kind of project.

Furthermore, due to the lack of critical data for emission factor calculation for the regional power grid, the development work for the project was relatively slow. The uncertainty of methodology and lack of successful reference project prevented the project from being attractive for the buyers, especially when the carbon market was seriously affected by the financial crisis in the end of 2008. While the project entity continued to seek establishing cooperation with CER buyers and finally got letter of intent in the beginning of 2009 from one buyer. In May 2009, the term-sheet regarding to the purchase of CER between the project entity and the buyer was signed and the first Lao hydropower project started for GSP. While considering the risk, the buyer didn't sign the final CER purchase agreement with the project entity and withdraw from the project in the end of 2009.

In the beginning of 2010, the first transnational grid project, Dagachhu hydropower project finally got registered at EB which strengthen the confidence of the project entity and buyer to develop the project following the successful procedure under current methodology and tools, the project entity finally sign the emission reduction purchase agreement and submit the application for Lao PDR LoA in 2010.

According to the definition of the “starting date of a CDM project activity” provided in paragraph 67 of EB41 meeting report, the starting date of the Project is determined as 15/08/2007. Before the starting date of the project, the CDM consideration by the chairman of the board was made. During the



implementation period, as stated above, continue and real actions were taken to secure CDM status. So the CDM was seriously considered in the decision to implement the project activity.

The timeline of the CDM consideration and continue action of the project entity as follow:

**Table B.3. Timeline of the key events**

Time	Event
May. 2007	FSR finished by design institute, CER revenue has been taken into account
Jun. 2007	Received service proposal from the first CDM consultant
Jul. 5 <sup>th</sup> 2007	Investment decision was made by the chairman of the board and the incentive of CDM is acknowledged as a key element of the project's profitability
<b>Aug. 15<sup>th</sup> 2007</b>	<b>EPC contract has been signed (Starting date of CDM)</b>
Oct. 30 <sup>th</sup> 2008	Progress report by CDM consultant
Jan. 5 <sup>th</sup> 2009	Received LOI from the buyer
May. 19 <sup>th</sup> 2009	Signed term sheet with the buyer
Dec. 28 <sup>th</sup> 2009	Voluntary withdraw of the buyer
May. 18 <sup>th</sup> 2010	Second buyer contacted with the PO, provided LOI to the PO
Aug. 27 <sup>th</sup> 2010	Conclude an cooperation agreement with the second buyer
Dec. 2010	Submit application for host country approval
Mar. 2011	Update application documents for host country approval
Apr. 2011	Starts GSP

### Additionality

According to the "Tool for the demonstration and assessment of additionality" (Version 6.0.0) approved by EB, the additionality of the project is demonstrated and assessed through the following steps.

#### Step 1. Identification of alternatives to the project activity consistent with current laws and regulations

##### *Sub-step 1a. Define alternatives to the project activity:*

Plausible and credible alternatives available to the project that provide outputs or services comparable to the proposed CDM project activity include:

- Alternative a):** The project activity not undertaken as a CDM project activity;
- Alternative b):** Construction of a thermal power plant with equivalent installed capacity or annual electricity generation;
- Alternative c):** Construction of a power plant using other sources of renewable energy with equivalent amount of annual electricity generation;
- Alternative d):** Provision of an equivalent amount of annual power output by the grid into which the project is connected.

Alternative a) is in compliance with all applicable legal and regulatory requirements. But according to the investment analysis in step 2, this scenario is less attractive with low IRR and is not realistic without

**SECTION D. Environmental impacts**

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**D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:**

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The *Environmental Impact Assessment Report for Nam Lik 1-2 Hydropower Project* was compiled by the Laos National Consulting Company which is qualified for EIA consultancy services and is independent from the project owner. According to this EIA report, environmental impacts caused by the project and the corresponding measures adopted by the project owner for mitigation are as following:

**Water Quality**

Waste water mainly includes domestic wastewater and soil sediment in water. The domestic wastewater generated during the construction and operation period will be treated in the septic tank, and the sludge will be utilized as fertilizer for farming and forestry instead of being discharged directly into the water system. Excess in soil sediment load in water may occur at the early stage of construction for excavation works. The construction will occur during the dry season that the river flow is low and slow, we may expect that sediment will deposit rapidly and consequently reducing the impacts.

**Atmospheric /air impact Assessment**

The possible impact on the air quality include: dust and smoke from trucks and heavy equipment engines. The impacts will be temporary and of limited significance if consider the Project is located in a non populated area, several km from the nearest village. Water spraying will be the primary protection measure against dust. Smoke emission from engines can also be controlled by appropriate maintenance of engines.

**Noise**

Noise will be generated during the construction activity, due to transportation and excavation work. Measures to reduce noise impact will consist in adopting low noise construction equipments and reasonable arrange construction process. Any equipment which generates a high level of noise will be forbidden from operating at night. Moreover, the project owner will try as much as possible to keep workers far from noise sources.

**Solid waste**

The solid waste includes discarded soil and stone generated during the construction as well as residential garbage. Discarded soil and stone will be collected at special areas and then transported to a waste disposal site. Some discarded stone will be used for local residential housing constructions. Garbage bins present in the construction living area will be used to collect the residential garbage generated during the construction and operation periods. The residential garbage will be regularly sent to a garbage disposal station for landfill.

**Ecological impact**



According to the investigations implemented during the EIA period, there is rarely any endangered species at the project site. Nam Lik is a small river with low productive in term of aquatic fauna, it plays as habitat for limited species that mainly are small individuals such for Cyprinids. The numbers of species can be increased if spawning and feeding habitats remain keeping exist around the reservoir. The main impact is on the migratory fishes. To protect the migratory fishes, the measure to catch the fishes across the dam in the migratory season will be adopted. Besides, the Nam Lik River is a small secondary tributary of Mekong River (the Nam Lik River is the tributary of Nam Ngum River, and Nam Ngum River is the tributary of Mekong River). The annual average flow of the Mekong River is 16,000m<sup>3</sup>/s, while the Nam Lik River is only about 80m<sup>3</sup>/s, according to the EIA approved by the Lao government, the implementation applied by the project owner will minimize the impact to the regional biodiversity downstream, the influence of the project to the Mekong River is very limited.

#### **Impacts on land use and land acquisition**

According to the EIA and SIA report, there are no villages will be submerged by reservoir impoundment and no village located along the reservoir area. Therefore, no resident resettlement is needed. Although there is no resettlement, there is still farm land, garden paddy field will be occupied due to construction of permanent and temporary camps, quarries and access road. The compensation and benefit agreements are made base on the discussion and interview with the affected people and are in full compliance with relevant national/local laws and regulations.

#### **Erosion**

To prevent high sediment loads in water at beginning of rainy season when heavy storm washes out unstable slopes in construction sites, fast-growing trees and grass will be planted in the non-plant slopes. Drain system will be established in the quarry area and slag yard will be covered during rainy season.

#### **Fuel & chemical leakage**

The other possible impact on the water quality is accidental fuel leakage. The risk of accidental fuel leakage may be efficiently reduced by the implementation of preventive measures by the contractor: appropriate location of storage areas with drains and collection, collection and destruction of used oils, monitoring of all hazardous products with specific handing procedures and contingency plans.

#### **Impacts on vegetation and forestry**

The construction of the project will lead to the submerging of forest, which will lead to the loss of forest products. Before the reservoir submerging, clearing options will be adopted. Large and rare plants will be removed.

In conclusion, environmental impacts arising from the Project are considered insignificant.

**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:**

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Both the Host Party and the project participant regard that the proposed project will not bring significant negative impact to the environment. The project could be put into commencement only after the approval





of the EIA by local Environmental Protection Administration. The EIA was approved in Feb.18<sup>th</sup>, 2008.