

**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:**

Taebaek Wind Power Project  
(Version 6.1, 25/07/2008)

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

The Project activity involves construction and operation of 6.8 MW wind power generation project located in Mt. Maebong, Taebaek city, Korea. For this purpose, 8 wind turbines, with a capacity of 850kW each, have been installed at the project site. The project site is located in an area with favourable conditions in Korea for wind power generation, resulting in an expected capacity factor of 24.74 %. The capacity factor is the average mark of the records of five turbines which were real operated from Nov 2005 to Oct 2006. When this PDD(Project Design Document) is written(2007), there is no complete data of full operation of 8 wind turbines. So, the operation data of 5 turbines were used. The capacity factor is considered disabled rate and the average mark is calculated from real records. Nowadays, disabled rate is going down, because the project developer has operation experiences. With this condition, the Project will generate approximately 14,700 MWh of electricity annually. The electricity generated will be transmitted to the Korean grid and displace the electricity from the other power plants that would otherwise be generated using fossil fuels. By displacing fossil-fuel based generated electricity, the Project will contribute to GHG reduction of 9,198 tCO<sub>2</sub>e per year for the duration of the Project activity.

The Project activity has been implemented by three phases.

- Phase I: installation of two wind turbines. The construction started in November 2003 and commercial operation started in December 2004.
- Phase II: installation of three wind turbines and 13 km transmission line. The construction started in August 2004 and commercial operation started in June 2005.
- Phase III: installation of three wind turbines. The construction started in July 2005 and commercial operation started in November 2006.

| Year | Month | Capacity factor(%) | Number of application turbines | Year    | Month | Capacity factor(%) | Number of application turbines |
|------|-------|--------------------|--------------------------------|---------|-------|--------------------|--------------------------------|
| 2005 | 11    | 23.24              | 5                              | 2006    | 5     | 22.10              | 5                              |
|      | 12    | 35.73              | 5                              |         | 6     | 24.25              | 5                              |
| 2006 | 1     | 28.59              | 5                              |         | 7     | 20.30              | 5                              |
|      | 2     | 24.77              | 5                              |         | 8     | 15.80              | 5                              |
|      | 3     | 38.99              | 5                              |         | 9     | 12.20              | 5                              |
|      | 4     | 31.17              | 5                              |         | 10    | 19.71              | 5                              |
|      |       |                    |                                | average |       | 24.74%             |                                |

**Table A-1. A record of capacity factor for wind turbines from Nov. 2005 to Oct. 2006**

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The Project activity will contribute the sustainable development of Korea in several ways:

- Mitigation of GHGs as well as other pollutants

By displacing the electricity that would otherwise be generated in other fossil fuel-based power plants, the Project activity will reduce GHGs emission by 9,198 tCO<sub>2</sub> annually. Besides the GHGs emission reductions, the emissions of other pollutants, such as SO<sub>2</sub> and NO<sub>x</sub>, will be reduced.

- Contribution to the local economy development

One of the main industries in Taebaek city and Gangwon province is tourism. Taebaek wind park will be also used as tourist attractions and contribute to the development of the local economy.

- Dissemination of renewable energy generation

The Project activity is one of the first wind power generation projects, conducted by the local government, Gangwon-do Taebaek-si. The success of the Project activity will promote the other potential renewable energy activities in Korea.

**A.3. Project participants:**

| Name of Party involved(*)<br>((host) indicates a host Party) | Private and/ or Public entity(ies)<br>Project participants(*)<br>(as applicable)                 | Kindly indicate if the Party involved wishes to be considered as project participants (Yes/ No) |
|--|--|---|
| Republic of Korea<br>(host)                                  | Public entity : Taebaek City Hall<br>Public entity : Korea Energy Management Corporation (KEMCO) | 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):**

Republic of Korea

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

Gangwon Province

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

Mt.Maebong, Changjook-dong, Taebaek-si, Gangwon-do, Korea

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

The Project site is located on Mt. Maebong in Taebaek-si, Gangwon Province. (37°13' 6 " latitude and 128°58' 6" longitude) The project site is located in an area with favourable conditions for wind power generation. According to the Feasibility study, conducted by Korea Institute of Energy Research(2002. 07), the average velocity of the wind at the project site is approximately 8.4 m/sec.

| Height             | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | average |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|---------|
| 50m                | 9.95 | 9.97 | 10.9 | 10.0 | 6.56 | 6.78 | 8.28 | 5.63 | 6.86 | 6.80 | 9.67 | 10.1 | 8.4m/s  |
| 30m                | 9.90 | 9.82 | 10.8 | 9.87 | 6.31 | 6.57 | 8.07 | 5.37 | 6.62 | 6.56 | 9.51 | 9.95 | 8.3m/s  |
| Standard deviation | 7.18 | 4.79 | 5.75 | 5.55 | 3.13 | 4.50 | 4.19 | 2.30 | 2.89 | 3.40 | 5.15 | 5.28 | 5.00    |

**Table A-2. The monthly average wind speed in Mt.Maebong**



Figure 1. The location of Taebeak City

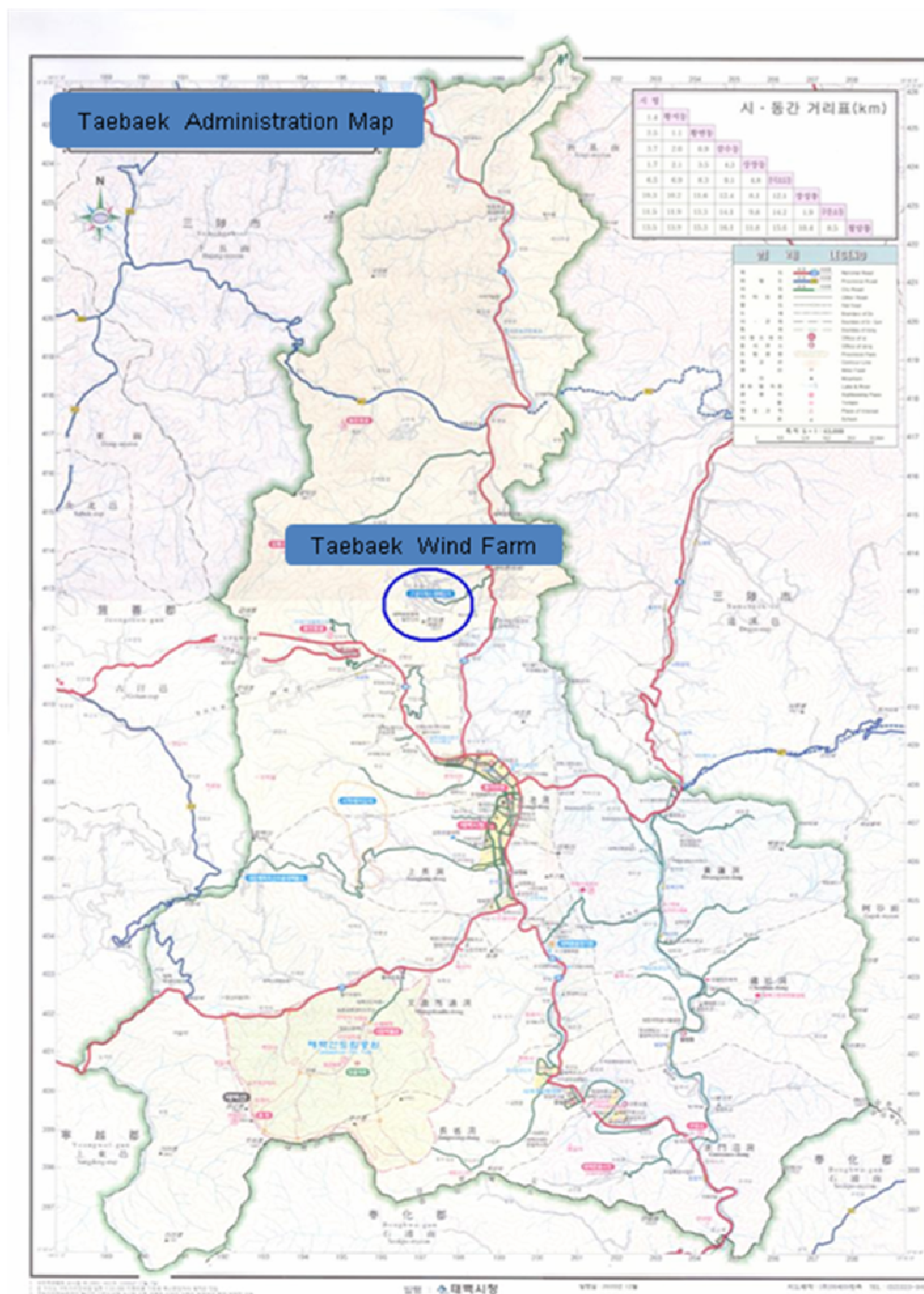


Figure 2. The location of Taebaek Wind Farm





**Figure 3. The site view of Taeback Wind Farm**



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

The Project activity falls under the following type and category.



Type I: Renewable Energy Projects

Category D: Grid connected renewable electricity generation

Sectoral Scope: 1 – Energy industries (renewable - / non-renewable sources)

The Project activity has installed total capacity of 6.8 MW of wind power generation system. Throughout the Project's phases, total 8 units of 850 kW wind turbine (2 units in phase I, 3 units in phase II and 3 units in phase III) have been installed. This technology is considered to be clean technology since it produces no gas emissions associated with the energy generation. Wind power is an environmental friendly alternative to conventional source such as fossil fuels for the production of electricity. Most of wind power facility in Korea has been imported from foreign company. Taebaek City Hall did not have the technology to construct and operate wind power facilities. The wind turbines were provided from Danish company VESTAS and Spanish company GAMESA, which are world's leading producers of the wind turbines. Those companies have lots of know-how and latest technique of wind power facility installation all over the world. Taebaek city Hall can increase capacity for experience with climate change mitigation through facilitating this wind power project. The project developer and technology provider contracted that technology provider give the training program to operators of the project developer. Also, Taebaek city Hall can gain experiences by installation, repair with wind power project and it will contribute to the improvement of the renewable energy project implementation in Korea with easy approach.

The specifications of each wind turbine installed are as follows:

|   |                    | VESTAS wind turbine  | GAMESA wind turbine   |
|---|--------------------|--|---|
| Structure of turbine                              |                    |  |  |
| Model   |                    | V52-850 kW   | G52-850 kW  |
| Rotor   | Diameter           | 52 m   | 52 m  |
|   | Swept area         | 2,124 m <sup>2</sup>   | 2,124 m <sup>2</sup>  |
|   | Rotational speed   | 14.0 ~ 31.4 rpm  | 14.6 ~ 30.8 rpm   |
|   | Number of blades   | 3  | 3   |
| Tower height                                      |                    | 50m  | 49m   |
| Generator   | Type               | Asynchronous with Opt speed  | Double-fed machine  |
|   | Rated power        | 850 kW   | 850 kW  |
|   | Operational data   | 50Hz/ 60Hz 690 V   | 50Hz/ 60Hz 690 V  |
| Operational Data                                  | Cut-in wind speed  | 4m/s   | 4m/s  |
|   | Normal wind speed  | 14~16m/s   | 14~16m/s  |
|   | Cut-off wind speed | 25m/s  | 25m/s   |
| Number of units installed in the Project activity |                    | 5<br>(2 in phase I and 3 in phase II)  | 3<br>(3 in phase III)   |
| URL   |                    | <a href="http://www.vestas.com">www.vestas.com</a>                                   | <a href="http://www.gamesa.es">www.gamesa.es</a>                                      |

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

| Years  | Annual estimation of emission reductions in tonnes of CO <sub>2</sub> e |
|--|---|
| Year1(2008.06.05~2009.05.04)   | 9,198   |
| Year2(2009.06.05~2010.05.04)   | 9,198   |
| Year3(2010.06.05~2011.05.04)   | 9,198   |
| Year4(2011.06.05~2012.05.04)   | 9,198   |
| Year5(2012.06.05~2013.05.04)   | 9,198   |
| Year6(2013.06.05~2014.05.04)   | 9,198   |
| Year7(2014.06.05~2015.05.04)   | 9,198   |
| Year8(2015.06.05~2016.05.04)   | 9,198   |
| Year9(2016.06.05~2017.05.04)   | 9,198   |
| Year10(2017.06.05~2018.05.04)  | 9,198   |
| <b>Total estimated reductions (tonnes of CO<sub>2</sub>e)</b>  | 91,980  |
| <b>Total number of crediting years</b>   | 10 years  |
| <b>Annual average over the crediting periods of estimated reductions (tonnes of CO<sub>2</sub>e)</b> | 9,198   |

TABLE A-3 ESTIMATED AMOUNT OF EMISSION REDUCTIONS

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

Project financing does not involve ODA or public funding from Annex I countries.

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

According to appendix C of simplified modalities and procedures for small-scale CDM project activities, ‘debundling’ is defined as the fragmentation of a large project activity into smaller parts. A small-scale project activity that is part of a large project activity is not eligible to use the simplified modalities and procedures for small-scale CDM project activities.

According to paragraph 2 of appendix C<sup>1</sup>, a proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

<sup>1</sup> Appendix C to the simplified M&P for the small-scale CDM project activities, <http://cdm.unfccc.int/projects/pac/sscismeth.pdf>

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- With the same project participants;
- In the same project category and technology/measure
- Registered within the previous 2 years; and
- Whose project boundary is within 1 km of the project boundary of proposed small-scale activity at the closest point

Since there is no small-scale activity registered and/or applied for registration in the name of project participants, which belongs to any of the categories of small-scale CDM project or meeting any of the debundling criteria stated above, this project activity therefore considered as a small scale CDM project activity.

**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:**

The approved baseline and monitoring methodology applied to the Project activity is:

AMS Type I. – Renewable Energy Projects

Category D. Grid connected renewable electricity generation (version 11)

The methodology referred to calculate grid emission factor is:

ACM0002 “Consolidated baseline methodology for grid-connected electricity from renewable sources” (version 6)

Reference : Appendix B of the simplified M&P for small scale CDM project activities

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

AMS I-D can be applied to the following project activities and the Project activity meets all the criteria as follows:

- This category comprises renewable energy generation units, such as photovoltaics, hydro, tidal/wave, wind, geothermal and renewable biomass, that supply electricity to and/or displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit.

The Project activity is a wind power generation project with an installed capacity of 6.8MW. The Project activity supplies the generated electricity to the Korean grid and displaces the electricity that would otherwise be generated using fossil fuel by the other plants connected to the Korean grid.

- If the unit added has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the

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renewable component. If the unit added co-fires fossil fuels, the capacity of the entire unit shall not exceed the limit of 15MW.

The Project activity does only have renewable components whose total capacity is less than 15 MW.

- Combined heat and power (co-generation) systems are not eligible under this category.

The Project activity is not co-generation system.

- In the case of the project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15MW and should be physically distinct from the existing units.

The Project activity does not involve the addition of renewable energy generation unit at an existing renewable power generation facility. The Project activity involves the construction of a new wind power generation system.

- Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category. To qualify as a small scale project, the total output of the modified or retrofit unit shall not exceed the limit of 15MW.

The Project activity does not seek to retrofit or modify an existing facility for renewable energy generation.

Therefore the Project activity qualifies as a small-scale project activity under AMS Type I, Category D.

|  |
|--|
| <b>B.3. Description of the project boundary:</b> |
|--|

As per the AMS I-D, “The project boundary encompasses the physical, geographical site of the renewable generation source”. In this project the project boundary would include TR(Transformer), the Korea National Grid.

|   |
|---|
| <b>B.4. Description of <u>baseline and its development</u>:</b> |
|---|

The Project activity supplies the generated electricity to the Korean grid. In the absence of the Project activity, the electricity would otherwise be produced by the other power plants connected to the Korean grid. The power plants connected to the Korean grid include thermal power plants, nuclear power plants and renewable energy power plants. Therefore, the baseline is the MWh produced by the renewable generating unit by the Project activity multiplied by an emission coefficient (measured in tCO<sub>2</sub>e/MWh) calculated in a transparent and conservative manner.

Among the options suggested in the AMS I.D for the calculation of an emission coefficient, option (a) – A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology ACM0002 – is chosen. Simple OM is chosen for the operating margin calculation. Following tables shows the data used for the determination of the baseline emissions.

| Variable/ Parameter   | Data Sources  |
|---|---|
| Electricity generated and supplied to the grid by the Project activity              | Project developer   |
| Combined Margin   | Calculated as a weighted average of operating margin and build margin |
| Operating Margin  | Calculated according to the guideline in the ACM0002                  |
| Build Margin  | Calculated according to the guideline in the ACM0002                  |
| Electricity generated by each power plants connected to the grid                    | Electric Power Statistics 2005, 2006, 2007(KEPCO)                     |
| Fuel consumption in each power plant connected to the grid                          | Electric Power Statistics 2005, 2006, 2007 (KEPCO)                    |
| Net Calorific Value of the fuels used in each power plants connected to the grid    | Electric Power Statistics 2005, 2006, 2007 (KEPCO)                    |
| Carbon emission factor of the fuels used in each power plants connected to the grid | IPCC 2006 Revised Guidelines  |
| Commissioning date of the power plants connected to the grid                        | State of Power Generation Facility 2007 (Korea Power Exchange)        |

**TABLE B-1 VARIABLE USED FOR BASELINE DETERMINATION**

\* The report of KEPCO, Electric Power Statistics contains the records of last year.

The details for the calculation of combined margin are described in the section B.6 and Annex 3. As per AMS I. D, any of the four procedures to calculate the operating margin can be chosen, but the restriction to use the Simple OM and the Average OM calculations must be considered. According to ACM0002 version 6, dispatch analysis should be the first choice for the current project. Dispatch data analysis cannot be used because of an availability of data. Therefore Simple OM method is chosen for the calculation of Operating Margin emission factor. The choice for Simple OM is justified since low-cost/must run resources constitute less than 50% of the total grid generation in average of the five most recent years.

|  |                 | 2002    | 2003    | 2004    | 2005    | 2006    |
|--|-----------------|---------|---------|---------|---------|---------|
| Low-cost/<br>must<br>run                         | Hydro           | 5,311   | 6,887   | 5,744   | 5,015   | 5,219   |
|  | Anthracite coal | 6,675   | 6,960   | 5,791   | 5,784   | 5,709   |
|  | Nuclear         | 119,103 | 129,672 | 130,715 | 146,779 | 148,749 |
|  | Renewable       | 0       | 0       | 463     | 583     | 511     |
| Others<br>(Bituminous coal, heavy oil, Gas, etc) |                 | 175,385 | 178,933 | 199,435 | 206,478 | 220,993 |
| Total  |                 | 306,474 | 322,452 | 342,148 | 364,639 | 381,181 |
| Percentage of low-cost/must run                  |                 | 42.8%   | 44.5%   | 41.7%   | 43.4%   | 42.0%   |

**TABLE B-2 Electricity Generation based on Energy Source (Unit: 10<sup>3</sup>MWh)**

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Simple OM is calculated *ex-ante* using the most recent 3 years data that are available at the time of PDD submission and used for the crediting period.

**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:**

In the absence of the CDM assistance, the Project activity could not be implemented due to the following insurmountable barrier:

**a) Investment barrier**

Due to high initial costs associated with planning, engineering and construction of the Project, and low revenue, the Project does not represent an attractive investment opportunity in the absence of additional revenue from CDM assistance.

As can be seen from the financial data displayed below, in the absence of revenue from CERs, the Net Present Value (NPV) of the Project activity is negative (- 3.39 billion KRW). This value is calculated from real operation data, so the level of reliability is high. Therefore, the Project activity is not economically attractive to be conducted on a commercial basis<sup>2</sup>.

|                        | Phase I                | Phase II               | Phase III              | Unit    |
|------------------------|------------------------|------------------------|------------------------|---------|
| Equipment costs        | 3,000,000,000          | 6,000,000,000          | 4,500,000,000          | KRW     |
| Installed capacity     | 1.70                   | 2.55                   | 2.55                   | MW      |
| Capacity factor        | 24.74                  | 24.74                  | 24.74                  | %       |
| Electricity generation | 3,684,281              | 5,526,421              | 5,526,421              | kWh/yr  |
| Parasitic consumption  | 1.7                    | 1.7                    | 1.7                    | %       |
| Electricity delivered  | 3,621,073              | 5,431,610              | 5,431,610              | kWh/yr  |
| Electricity tariff     | 76.17                  | 76.17                  | 76.17                  | KRW/kWh |
| Revenue                | 275,817,152            | 413,725,727            | 413,725,727            | KRW/yr  |
| O&M Cost               | 20,400,000             | 50,922,000             | 49,942,000             | KRW/yr  |
| Commissioning date     | 2004-12-18             | 2005-06-25             | 2006-11-06             |         |
| Discount rate          | 5.92                   |                        |                        | %       |
| NPV                    | -446,768,263           | -2,224,553,846         | -721,930,412           | KRW     |
| The exchange rate      | 1396.26<br>(Nov. 2003) | 1468.16<br>(Nov. 2004) | 1274.07<br>(Nov. 2005) | KRW/EUR |

**TABLE B-3 Analysis of economical attraction**

Due to this barrier, the incentive from CDM was considered at the early stage of project development. The development plan prepared by Taebaek City Hall before the implementation of the Project activity clearly states that the Project activity can be benefited by the expected carbon credits under the Clean Development Mechanism. Though the additional income is not enough to make the NPV of the Project positive, Taebaek City Hall decided to proceed into the further development of the Project activity considering non-monetary value of the Project activity.

<sup>2</sup> Details of NPV calculation are provided in the separate document, (NPV\_Taebaek\_Wind\_Power\_Project.xls)

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In order to prove out this project is not economically attractive, sensitivity analysis is performed as followed parameter variables. There are four item, they are able to have influence with economical additionality evaluation of this project. Basically, the degree of reversible change is  $\pm 10\%$ . There was no private investment in this project, so the discount rate is determined as government bonds, 5.92% in 2002. In the case of the domestic wind power project registered as CDM project in Korea, the utilization rate has been less than 30% of all registered project. This PDD sets up  $\pm 5\%$  the utilization rate in order to provide practical sensitivity analysis.

| No. | Case                            | Scenario      | NPV<br>(million won) | IRR<br>(%) | Note                              |
|-----|---------------------------------|---------------|----------------------|------------|-----------------------------------|
| 1   | Discount rate                   | 5.92%         | <b>-3,393</b>        | 2.5%       | government bonds<br>(5.92%, 2002) |
|     | Utilization rate                | 24.74%        |                      |            |                                   |
|     | Electricity price               | 76.17 won/kWh |                      |            |                                   |
| 2   | Discount rate                   | +5%           | <b>-8,832</b>        | 2.5%       |                                   |
| 3   | Utilization rate                | +5%           | <b>-819</b>          | 5.1%       |                                   |
| 4   |                                 | -5%           | <b>-11,559</b>       | -0.5%      |                                   |
| 5   | Price of purchasing electricity | +10%          | <b>-2,120</b>        | 3.9%       |                                   |
| 6   |                                 | -10%          | <b>-3,164</b>        | 1.1%       |                                   |
| 7   | O&M cost                        | +10%          | <b>-3,656</b>        | 2.2%       |                                   |
| 8   |                                 | -10%          | <b>-7,532</b>        | 2.8%       |                                   |

Table B-4 Result of Sensitivity Analysis

Additionally, the analysis of NPV and IRR is performed with CERs. Two cases are considered. First, the value of CERs is €5, the other value is €15. As a result of analysis, all NPV are lower than zero(0), and all the IRR is lower than government bonds, 5.92%. Therefore this project is not available for commercial purpose.

|  | Without CERs | With CERs |        |
|--|--------------|-----------|--------|
|  |              | € 5       | € 15   |
| IRR (%)  | 2.5          | 2.9       | 3.9    |
| NPV (million Won)  | -3,393       | -3,004    | -2,226 |
| 1. Purchased Electricity : 76.17 won<br>2. Operational lifetime : 20years<br>3. Further details presented to DOE |              |           |        |

TABLE B-5 Analysis of NPV and IRR with CERs



## b) Technological barrier

In Korea, wind power project constitutes only small portion of overall electricity market despite abundant domestic wind resources. In year 2006, generation of wind power plant reached 233,435 MWh, 0.064% of total generation 365,368,969 MWh in year 2006(KEPCO, 2007, statistics of Electric power in 2006). Most of wind power facility in Korea had been imported from foreign company. And a few wind power facilities are now facilitating in Korea. However there is a little experience of operating, managing, and repairing wind power facilities in Korea. Wind power project developers in Korea did not have an opportunity to improve their capacity because of lack of experiences. Also due to high cost from imported facilities and technologies, most of wind power projects are not economically viable. This made the market share of wind power in Korea had been very low. In such circumstances, Korea lacks technology or experience in wind power project.

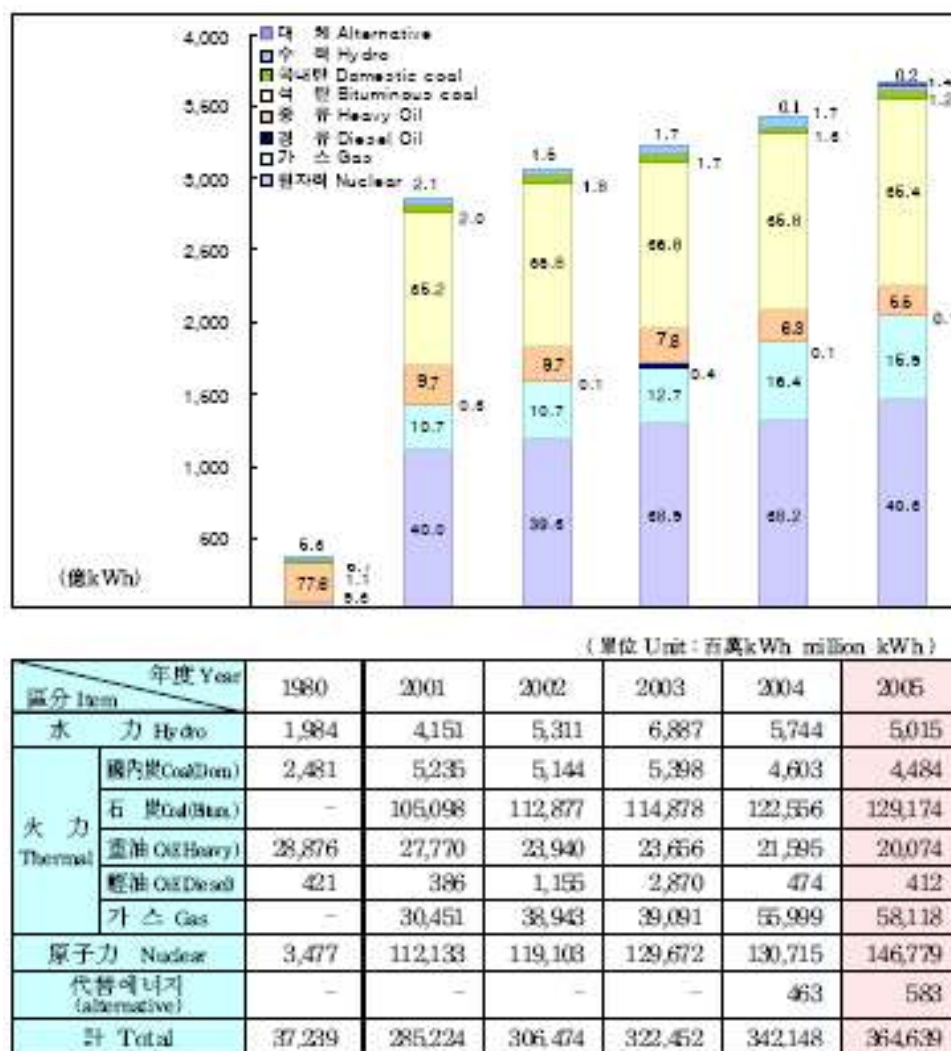


Figure B-1 Ratios of sub-total (Source: KEPCO in brief, 2006)

**c) prevailing barrier**

In 2002, Korean government strengthened the law to encourage using and developing renewable source. That law encourages investments in renewable energy projects by providing for high price within the feed-in-tariff policy. These special incentives help bridge the gap between WACC(Weighted Average Cost of Capital) and return on the project. This means that Korean government compensates for the difference between generation cost of renewable energy power and fossil fuel generation prices. In spite of these benefits (accounted for in the financial model), this projects are not very attractive due to performance uncertainty and low market share of the new technology.

Based on EB 22 meeting report, “Clarifications on the consideration of national and/or sectoral policies and circumstances in baseline scenarios”. Based on electricity law, SMP(System Marginal Price) is adopted from wind power unit cost prior to the notice of official price. Government subsidy for generation of electricity power difference ruled by ‘Renewable energy development and supply promotion law is excluded, it is also excluded from the unit cost of purchase. Thus the law will not be considered in this baseline calculation. Also there is an added risk of policy changes by the government. Government policies to support renewable energy project have been irregular. It has been seen in past that stats have curtailed a policy after declaring it. Irregular policy changes lead to uncertainties in revenue generation and thus more on the project risk. The renewable power plant owners in turn had no prior intimation of any change/extension/expiry in the renewable energy policy. That is why there are a few renewable energy facilities in Korea.

**d) serious consideration of the CDM**

This project was early considered as the Clean Development Mechanism (CDM). Taebaek City Hall established the ‘2003 local energy project plan’(2003.02.28) before construction starting date of this project. The president of Taebaek City Hall approved ‘Mt.Maebong Wind Park Development-Operational Plan’ as the local energy project(2003.05.15). This plan also has analysis of financial revenue which was considered as CERs with 0.52 tCO<sub>2</sub>/MWh and about 17 million KRW at the exchange rate of 1,350 KRW to the Euro. That numerical value is annually expected by especially the wind park in Mt. Maebong. That documentation is evidence that the intensive from CDM was seriously considered in the decision to proceed with the project activity was provided by Taebaek City Hall. That evidence documentation will be submitted to DOE(Designated Operating Entity). This is because the project activity qualifies as a CDM project because it would reduce the power consumption from the electricity grid thereby helping in significant reduction of GHG emissions. The evidences are as follows,

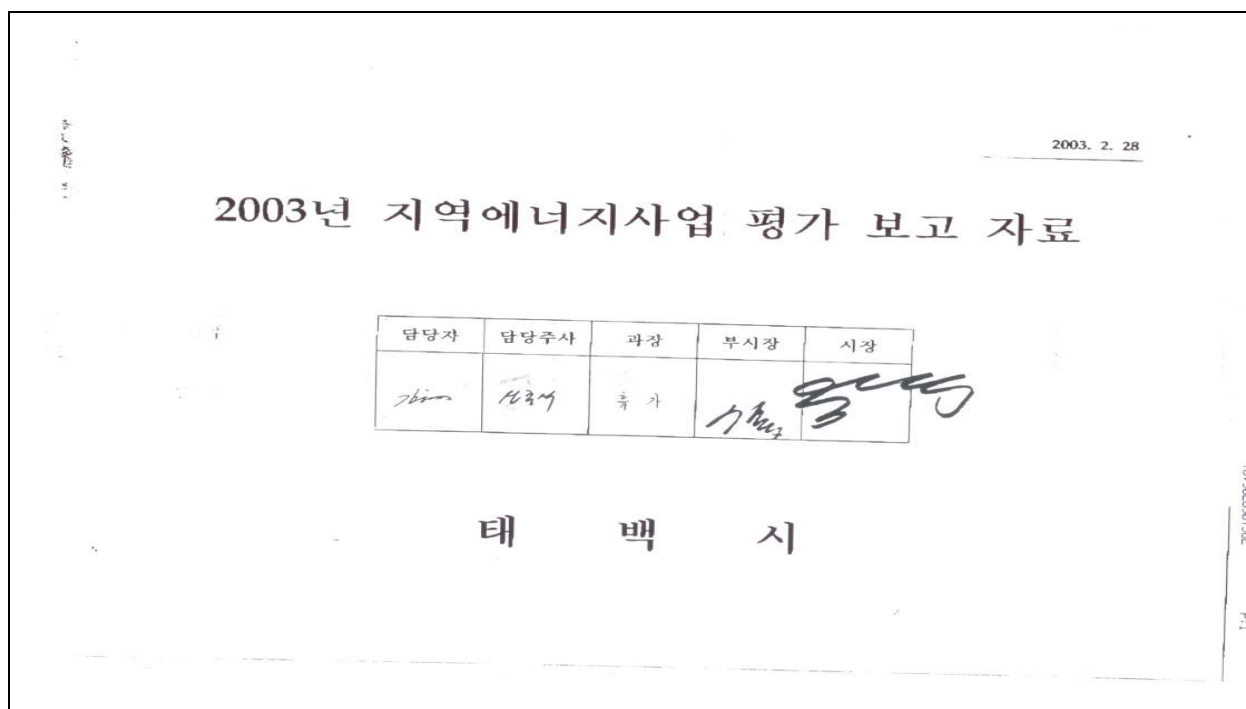


Figure B-2 The coverletter of 2003 local energy project plan (the original copy)

**A Documentation of  
2003 Local Energy Project Plan**

|           |                      |           |                    |           |
|-----------|----------------------|-----------|--------------------|-----------|
| Staff     | Assistant<br>Manager | Manager   | Vice-<br>President | President |
| signature | signature            | signature | signature          | signature |

**Taebaek City**

Figure B-3 The coverletter of 2003 local energy project plan (the translation)

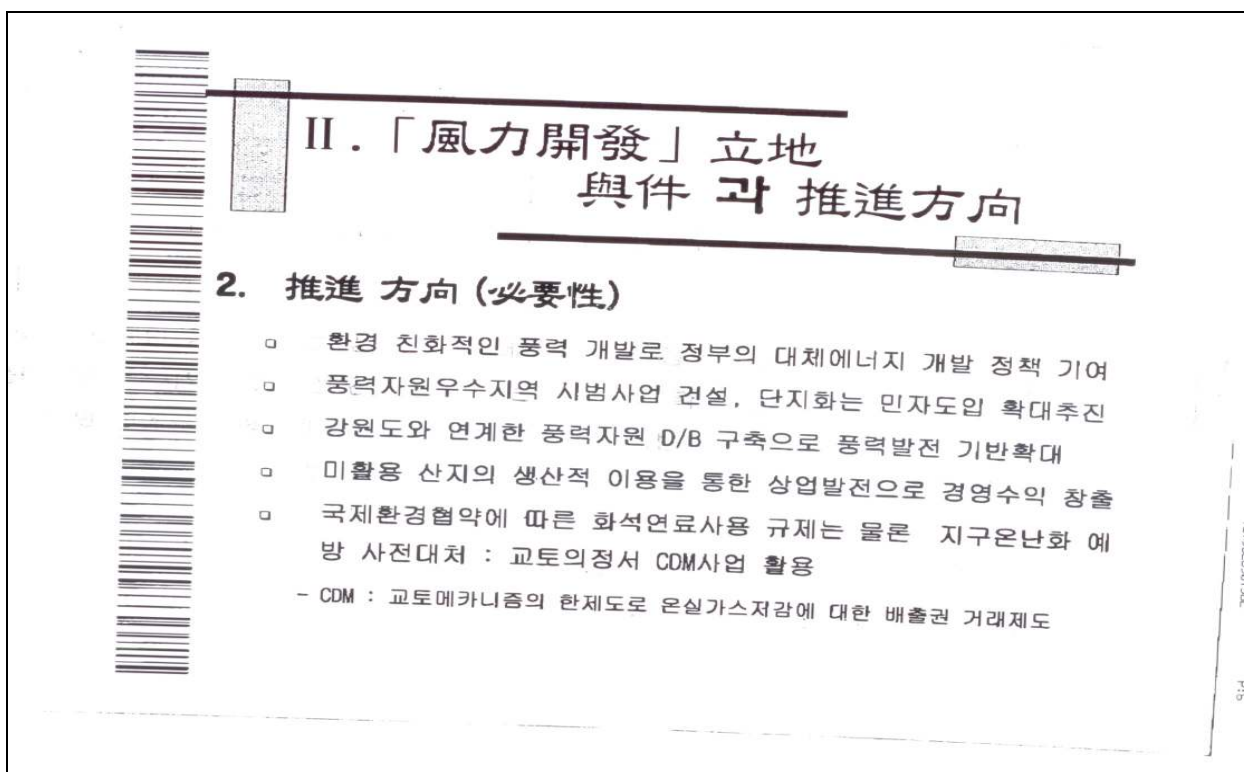


Figure B-4 The sixth page of 2003 local energy project plan (the original copy)

## II. Options of location and a direction of propulsion for Wind Power development

### 2. A direction of propulsion (necessity)

- Environmentall friendly
- Setting an example of Wind Power Farm
- Increasing of Wind Power Project in Kangwon-do, Korea
- Using a wasteland
- Dealing with the International Climate Change Convention through the CDM (CDM : Clean Development Mechanism)

Figure B-5 The sixth page of 2003 local energy project plan (the translation)

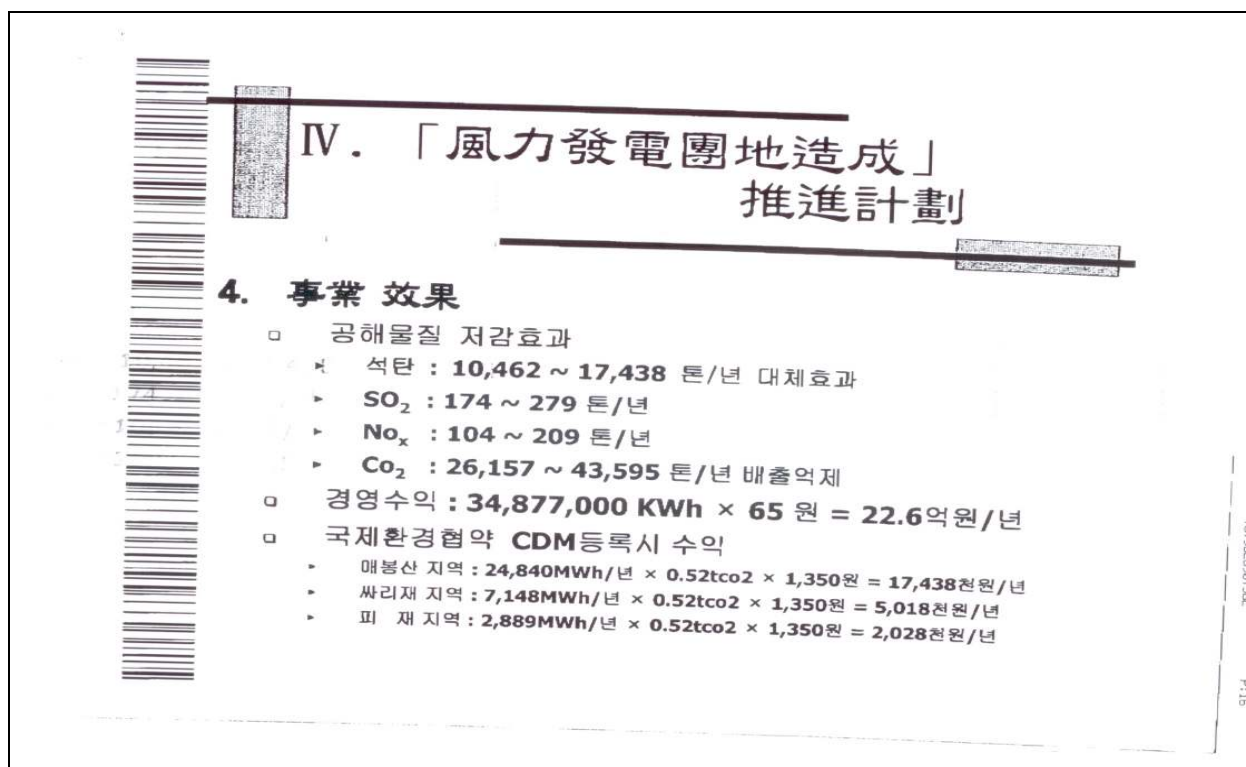


Figure B-6 The sixteenth page of 2003 local energy project plan (the original copy)

## IV. A Plan for composition of Wind Power Farm

### 4. Effectiveness of Wind Power Project

- Reduction of pollutions  
Replacement of coal : 10,462 ~ 17,438 ton/year  
SO<sub>2</sub> : 174 ~ 279 ton/year  
NO<sub>x</sub> : 104 ~ 209 ton/year  
CO<sub>2</sub> : 26,157 ~ 43,595 ton/year
- Revenue of electricity generations : 34,877,000 kWh × 65 won = 2.26 billion won/year
- Revenue of CERs  
Mt.Maebong : 24,840 MWh/year × 0.52 tCO<sub>2</sub> × 1,350 won = 17,438,000 won/year  
SSarijae : 7,148 MWh/year × 0.52 tCO<sub>2</sub> × 1,350 won = 5,018,000 won/year  
Pijae : 2,889 MWh/year × 0.52 tCO<sub>2</sub> × 1,350 won = 2,028,000 won/year

Figure B-7 The sixteenth page of 2003 local energy project plan (the translation)

CDM – Executive Board


|      |            |
|------|------------|
| 문서번호 | 경교57230    |
| 보존기간 | 5년         |
| 공개이부 | 공개         |
| 보고일자 | 2003.05.15 |

|     |        |        |        |
|-----|--------|--------|--------|
| 담당자 | 과장     | 부시장    | 시장     |
| 김영철 | 김영철    | 김영철    | 김영철    |
| 최소  | 기획예산실장 | 기획예산실장 | 기획예산실장 |
|     | 기획예산실장 | 기획예산실장 | 기획예산실장 |
|     | 회계과장   | 회계과장   | 회계과장   |

매봉산 風力發電示範團地造成  
實用化事業 施行計劃

太 白 市

Figure B-8 The coverletter of Mt.Maebong Wind Park Development-Operational Plan (the original copy)

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|                                      |            |
|--------------------------------------|------------|
| NO. document                         | KY57230    |
| A preservation period of document    | 5 years    |
| Whether or not opening to the public | Yes        |
| Reporting date                       | 2003.05.15 |

|           |           |                |           |
|-----------|-----------|----------------|-----------|
| Staff     | Manager   | Vice-President | President |
| signature | signature | signature      | signature |

**Mt.Maebong Wind Park**  
**Development-Operational Plan**

Tae Baek City

**Figure B-9 The coverletter of Mt.Maebong Wind Park Development-Operational Plan (the translation)**



매봉산 風力發電示範圈地 造成

## 實用化事業 施行計劃

○ 2003년도 국비지원 지역에너지사업으로 확정된 매봉산 풍력발전 시범단지 조성사업의 완벽한 추진을 위하여

○ 풍력발전시스템 기종선정, 실시설계, 진입로 정비, 부지확보등 사업 추진 준비단계에서 부터 체계적인 계획을 수립, 시행함으로써 지역 여건에 적합한 최적의 풍력발전단지 건설사업을 추진하고자함.

■ 實用化事業 概要

- 사업주체 : 강원도 태백시
- 사업규모
  - 설비규모 : 700~900kW급 풍력발전시스템2기 및 부대설비
  - 예산규모 : 30억원(국비21억원, 지방비9억원)
- 사업시행부지 : 태백시 창죽동 매봉산 일원
- 사업시행 근거 : 2003.지역에너지사업계획 확정(산업자원부)
  - 사업비 : 3,000백만원(국비보조2,100, 자부담900)

■ 細部推進計劃

□ 風力發電시스템 設置機種 選定

- 풍력발전시스템(기종) 제안서 접수
  - 기 간 : 2003. 6. 16 ~ 2003. 6. 20(5일간)
  - 대 상 : 국내 대행 또는 대리업체 및 자체개발사
  - 제안서 제출 자격요건 제한 : 관련법 적용
  - 방 법 : 제안서 접수 공고(인터넷 홈페이지, 공문발송)
  - 내 용 : 기종선정 및 건설사업에 필요한 전반적인내용
  - 공고(안) 및 제안서 기본형식(안) : 【붙임1】 , 【붙임2】
  - 제안접수 공고 : 2003. 5. 20(화)

Figure B-10 The first page of Mt.Maebong Wind Park Development-Operational Plan (the original copy)

## Mt.Maebong Wind Park

### Development-Operational Plan

- For Mt.Maebong a good practice of Wind Power Farm as 2003 local energy project,
- Selecting equipment, design of construction, maintenance of entrance road etc

#### ■ A summary of plan for practical use

- The main organization of the project : Taebaek-si
- The scale of the project
  - The scale of equipment : 700~900kW, wind turbine 2
  - The amount of an estimate : 3 billion won
- The location of the project : Mt.Maebong Changjook-dong Taebaek-si
- The evidence of the project : 2003 local energy project plan

#### ■ Detail plan

- ☐ Receiving proposals for Wind Power system from industry company
  - Receiving proposals for Wind Power system
    - Period of receiving : 2003.06.16 ~ 2003.06.20(5 days)
    - Targets : domestic industry company
    - How to receiving : a public announcement  
(Internet Homepage, sending official document)
    - Contents : selecting equipment and general things for construction wind power farm
    - A formation of public announcement and proposal : [attach 1], [attach 2]
    - A date of public announcement : 2003.05.20(Tue)

**Figure B-11 The first page of Mt.Maebong Wind Park Development-Operational Plan (the translation)**

**B.6. Emission reductions:****B.6.1. Explanation of methodological choices:****1. Baseline emissions (BE<sub>y</sub>)**

Applied methodology for the project is AMS I.D

Baseline emissions are calculated using the following equation.

$$BE_y = EG_y \times EF_y$$

where:

|                 |  |
|-----------------|--|
| BE <sub>y</sub> | Baseline emissions in the year y (tCO <sub>2</sub> )                         |
| EG <sub>y</sub> | Electricity supplied to the grid by the Project activity in the year y (MWh) |
| EF <sub>y</sub> | CO <sub>2</sub> emission factor of the Korean grid                           |

According to the methodology AMS I.D, baseline of the project activity is the kWh produced by the renewable generating unit multiplied by an emission coefficient(measured in kg CO<sub>2</sub>e/kWh) calculated in a transparent and conservative manner as:

- a) A combined margin(CM), consisting of the combination of operating margin(OM) and build margin(BM) according to the procedures prescribed in the approved methodology ACM0002. Any simple OM and the average OM calculation must be considered
- OR
- b) The weighted average emissions(in kgCO<sub>2</sub>e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used.

Among two choices above, a) has been chosen. A combined margin (CM) has been calculated by referring the methodology ACM0002 and the calculation method is as follows:

**STEP 1. Calculate the Operating Margin emission factor (EF<sub>OM,y</sub>)**

The equations used for Simple OM calculation are as follows:

$$EF_{OM,y} = \frac{\sum_{i,j} F_{i,j,y} \cdot COEF_{i,j}}{\sum_j GEN_{j,y}}$$

where:

|                    |  |
|--------------------|--|
| F <sub>i,j,y</sub> | Amount of fuel i (in a mass or volume unit) consumed by relevant power sources j in year(s) y  |
| j                  | Power sources delivering electricity to the grid, not including low-operating costs and must-run power plants, and including imports to the grid |

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$COEF_{i,j,y}$   $CO_2$  emission coefficient of fuel  $i$  ( $tCO_2$ /mass or volume unit of the fuel), taking into account the carbon content of the fuels used by relevant power sources  $j$  and the percent oxidation of the fuel in year(s)

$GEN_{j,y}$  Electricity (MWh) delivered to the grid by source  $j$

$$COEF_i = NCV_i \cdot EF_{CO_2,i} \cdot OXID_i$$

where:

$NCV_i$  Net calorific value (energy content) per mass or volume unit of a fuel  $i$

$OXID_i$  Oxidation factor of the fuel

$EF_{CO_2,i}$   $CO_2$  emission factor per unit of energy of the fuel  $i$

Simple OM of the Korean grid calculated by the equations above is 0.7197  $tCO_2$ /MWh. The information used in the calculation is described in Annex 3.

**STEP 2. Calculate the Build Margin emission factor ( $EF_{BM,y}$ )**

Build Margin emission factor is calculated as follows:

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \cdot COEF_{i,m}}{\sum_m GEN_{m,y}}$$

where  $F_{i,m,y}$ ,  $COEF_{i,m}$  and  $GEN_{m,y}$  are analogous to the variables described for the simple OM method above for plants  $m$ .

Between the options suggested in ACM0002 for the calculation of Build Margin emission factor, option 1 – Calculate the Build Margin emission factor *ex-ante* based on the most recent information available on plants already builds for sample group  $m$  at the time of PDD submission – is chosen. For sample group  $m$ , the power plant capacity additions in the electricity system that comprise 20 % of the system generation (in MWh) and that have been built most recently is selected since this group has larger annual generation than five power plants that have been built most recently as shown in the table below. (See Annex 3 for details.)

|                                    | Five power plant | 20% of the system generation |
|------------------------------------|------------------|------------------------------|
| Electricity generation in 2006     | 22,522 MWh       | 74,321,519 MWh               |
| Percentage to the total generation | 0.0062%          | 20.34 %                      |

**TABLE B-6 Sample Plant group for determining Build margin Emission factor**

\* Total Electricity generation in 2006 is 365,368,969 MWh according to the Electric Power Statistics 2007 (KEPCO)

Build Margin emission factor of the Korean grid calculated by the equation above is 0.3811 tCO<sub>2</sub>/MWh. The information used in the calculation is described in Annex 3.

### STEP 3. Calculate the baseline emission factor (EF<sub>y</sub>)

The baseline emission factor will be calculated as a weighted average of Operating Margin emission factor and Build Margin emission factor.

$$EF_y = w_{OM} \cdot EF_{OM,y} + w_{BM} \cdot EF_{BM,y}$$

where the weight  $w_{OM} = 0.75$  and  $w_{BM} = 0.25$ , which are the default values for wind power project.

The Combined Margin calculated for the Korean grid is 0.6350 tCO<sub>2</sub>/MWh. (The caloric value is not net caloric, so the project developer applied the correction factor, based on IPCC 2006 Revised Guidelines.)

| Fuel name | The correction factor |
|-----------|-----------------------|
| Coal      | 0.95                  |
| Oil       | 0.95                  |
| Gas       | 0.90                  |

**TABLE B-7 The correction factor of each fuel**

### 2. Project emissions (PE<sub>y</sub>)

Since the Project activity uses renewable energy for the electricity generation, there will be no GHGs emissions from the Project activity. Therefore the project emissions are zero (PE<sub>y</sub> = 0).

### 3. Leakage (L<sub>y</sub>)

As per AMS I. D, leakage is to be considered if the energy generating equipment is transferred from another activity or if the existing equipment is transferred to another activity. However the Project activity installs new energy generating equipment and no existing equipment is transferred to another activity. Therefore there is no leakage by the Project activity. (L<sub>y</sub> = 0)

### 4. Emission Reduction(ER<sub>y</sub>)

$$ER_y = BE_y - PE_y - L_y$$

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

|   |   |
|---|---|
| <b>Data / Parameter:</b>  | <b>EF<sub>y</sub></b>   |
| Data unit:  | tCO <sub>2</sub> /MWh   |
| Description:  | CO <sub>2</sub> emission factor of the Korean grid                                      |
| Source of data used:  | Calculated  |
| Value applied:  | 0.6350  |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | This value is calculated using the official data by the method described in the ACM0002 |
| Any comment:  |   |

|   |   |
|---|---|
| <b>Data / Parameter:</b>  | <b>EF<sub>OM,v</sub></b>  |
| Data unit:  | tCO <sub>2</sub> /MWh   |
| Description:  | CO <sub>2</sub> Operating Margin emission factor of the Korean grid                     |
| Source of data used:  | Calculated  |
| Value applied:  | 0.7197  |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | This value is calculated using the official data by the method described in the ACM0002 |
| Any comment:  | This value will be used for crediting periods continuously                              |

|   |   |
|---|---|
| <b>Data / Parameter:</b>  | <b>EF<sub>BM,v</sub></b>  |
| Data unit:  | tCO <sub>2</sub> /MWh   |
| Description:  | CO <sub>2</sub> Build Margin emission factor of the Korean grid                         |
| Source of data used:  | Calculated  |
| Value applied:  | 0.3811  |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | This value is calculated using the official data by the method described in the ACM0002 |
| Any comment:  |   |

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|   |  |
|---|--|
| <b>Data / Parameter:</b>  | <b>NCV<sub>i</sub></b>   |
| Data unit:  | TJ/ mass or volume unit  |
| Description:  | Net calorific value of fuel type i   |
| Source of data used:  | Electric Power Statistics 2005, 2006, 2007 (KEPCO)   |
| Value applied:  | See Annex 3  |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | These values are from the official source and used for Simple OM calculation and BM calculation. |
| 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 coefficient of each fuel type i  |
| Source of data used:  | IPCC  |
| Value applied:  | See Annex 3   |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Since reliable local data is not available, IPCC default values are used. These values are used for Simple OM calculation and BM calculation. |
| Any comment:  |   |

|   |  |
|---|--|
| <b>Data / Parameter:</b>  | <b>GEN<sub>j,m,v</sub></b>   |
| Data unit:  | MWh/yr   |
| Description:  | Electricity generation of each power source/ plant j, m  |
| Source of data used:  | Electric Power Statistics 2005, 2006, 2007 (KEPCO)   |
| Value applied:  | See Annex 3  |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | These values are from the official source and used for Simple OM calculation and BM calculation. |
| Any comment:  |  |



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| Data / Parameter:   | Plant specific data  |
|---|--|
| Data unit:  | -  |
| Description:  | Plant name, commissioning date   |
| Source of data used:  | Electric Power Statistics 2005, 2006, 2007 (KEPCO)/<br>State of Power Generation Facility 2007(Korea Power Exchange) |
| Value applied:  | See Annex 3  |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | These values are from the official source and used for Simple OM calculation and BM calculation.                     |
| Any comment:  |  |

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

#### Baseline Emissions

The Project activity is expected to deliver 14,484 MWh of electricity to the Korean grid annually. Therefore, the baseline emissions would be:

$$BE_y = 14,484 \text{ MWh/yr} \times 0.6350 \text{ tCO}_2/\text{MWh} = 9,198 \text{ tCO}_2/\text{yr}$$

#### Project emissions

There will be no project emissions ( $PE_y = 0$ )

#### Leakage

There will be no leakage ( $L_y = 0$ )

#### Emission Reductions

$$ER_y = BE_y - PE_y - L_y = 9,198 \text{ tCO}_2/\text{yr}$$

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

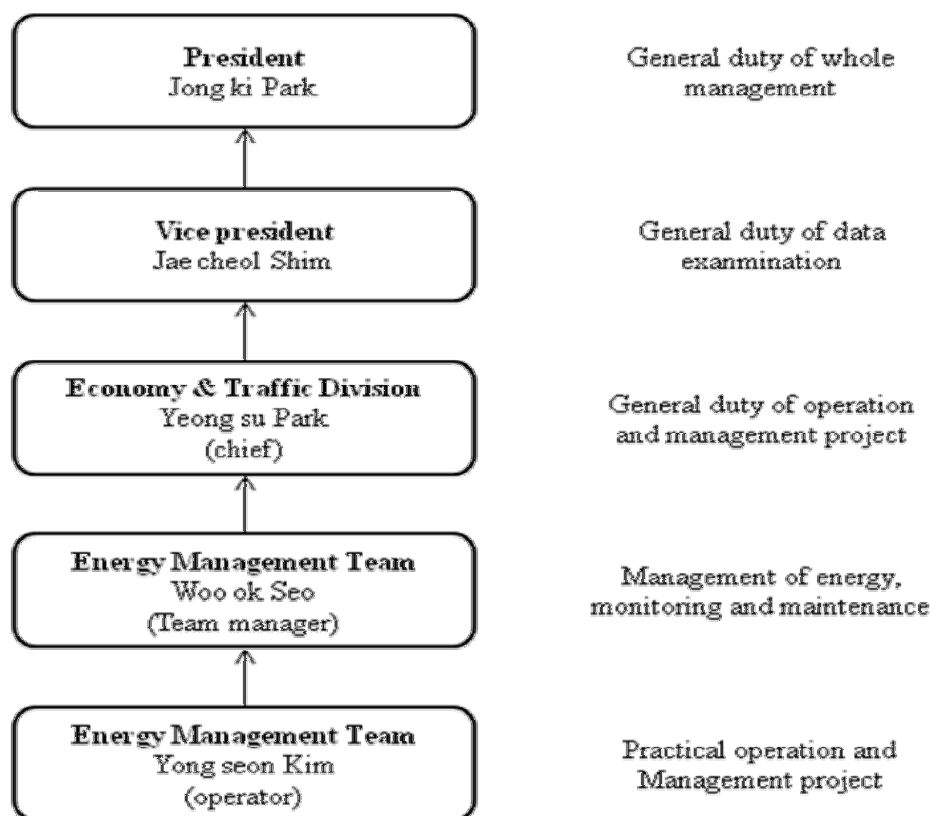
| Year  | Estimation of project activity emissions (tonnes of CO <sub>2</sub> e) | Estimation of baseline emissions (tonnes of CO <sub>2</sub> e) | Estimation of leakage (tonnes of CO <sub>2</sub> e) | Estimation of overall emission reductions (tonnes of CO <sub>2</sub> e) |
|-------|--|--|---|---|
| 2008  | 0  | 9,198  | 0   | 9,198   |
| 2009  | 0  | 9,198  | 0   | 9,198   |
| 2010  | 0  | 9,198  | 0   | 9,198   |
| 2011  | 0  | 9,198  | 0   | 9,198   |
| 2012  | 0  | 9,198  | 0   | 9,198   |
| 2013  | 0  | 9,198  | 0   | 9,198   |
| 2014  | 0  | 9,198  | 0   | 9,198   |
| 2015  | 0  | 9,198  | 0   | 9,198   |
| 2016  | 0  | 9,198  | 0   | 9,198   |
| 2017  | 0  | 9,198  | 0   | 9,198   |
| Total | 0  | 91,980   | 0   | 91,980  |

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

|  |   |
|--|---|
| <b>Data / Parameter:</b>   | EG <sub>y</sub>   |
| Data unit:   | MWh   |
| Description:   | Electricity supplied to the Korean grid by the Project activity   |
| Source of data to be used:                                       | Measured by project developer   |
| Value of data  | 14,484 MWh  |
| Description of measurement methods and procedures to be applied: | This value will be measured hourly and recorded monthly. There are two options in the operating and monitoring of the required data for CERs calculation data preservation methods. The project developer will chose an Option 2. (Option1 : 2 years after available period, Option2 : 2 years after verified CERs) |
| QA/QC procedures to be applied:                                  | The transmission electricity meters will be calibrated periodically in compliance with the relevant regulations/ standards. The electricity supplied to the Korean grid will be double-checked by receipt of sales.   |
| Any comment:   | The uncertainty about transmission of electricity measuring instrument is 0.5%(www.seoc.co.kr). The uncertainty about consumption of electricity measuring instrument is 2.0%(www.lsiz.biz). And the calibration period is 2 years. ( EG <sub>y</sub> = the electricity generation - the electricity consumption)   |

### B.7.2 Description of the monitoring plan:

The operational and management structure for monitoring emission reductions is as follows :



#### Role and Responsibilities:

**President** : In the project management structure, the president is responsible for whole project management. He has the right to make ultimate decision all the project.

**Vice president** : The vice president is responsible for data examination of the project. He will check the plan and allocate the annual budget for operation, estimation of the operating cost. He has also final responsibility for record keeping.

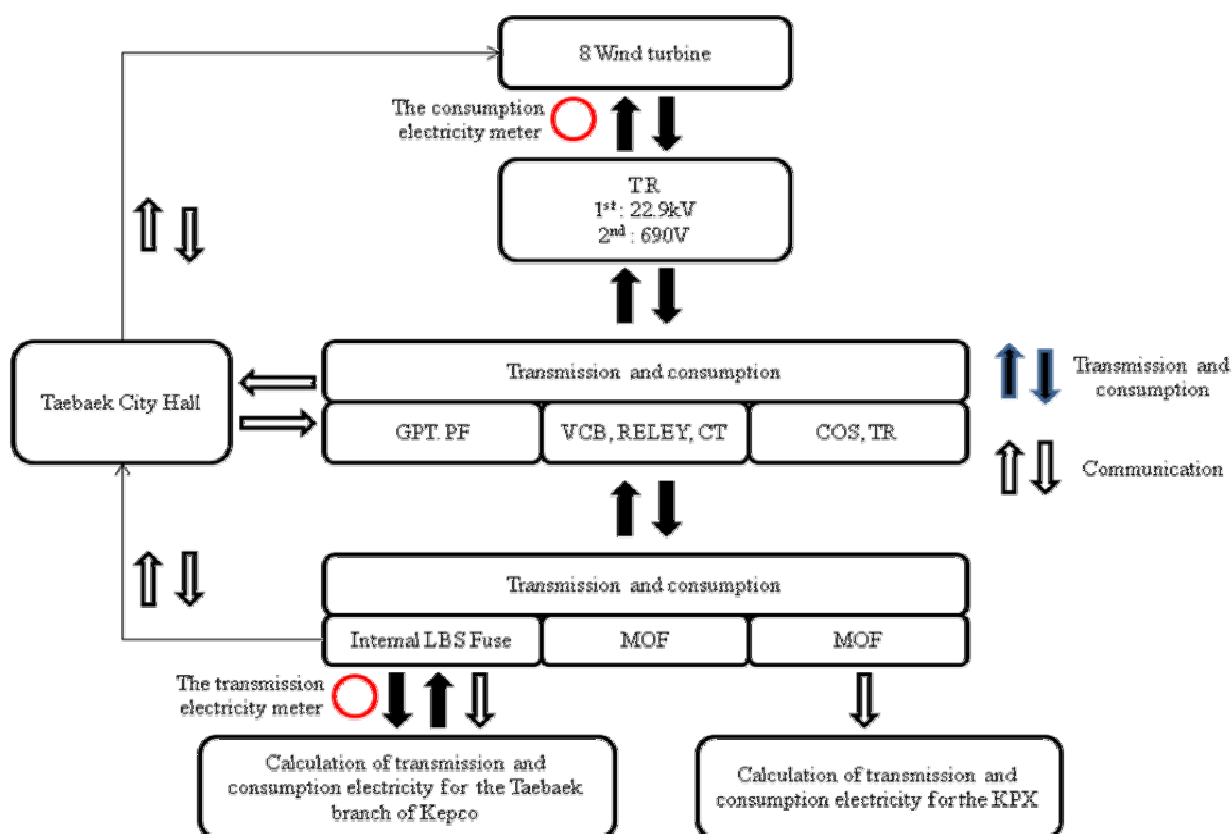
**Chief of Economy & Traffic division** : The chief of Economy & Traffic division is responsible for operation and management of the project. He will plan and allocate the annual budget for operation, estimation of the operating cost, revenue collection.

**Manager of Energy management team** : The manager of Energy management team is responsible for the monitoring and maintenance of the project. He will check the monthly electricity generated and annual emission reduction calculation. He is responsible for any leakage of emissions in the project boundary.

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**Operator of Energy management team** : The operator of Energy management team is responsible for the practical operation of the project. He is collecting daily report obtained from hourly monitoring with all the related parameters. He is also collecting and managing data for CDM. The data are related to calculating reduction emissions of CO<sub>2</sub>. All the records are given to president every month.

The monitoring distribution diagram is as follows :



- TR : Transformer
- GPT : Grounding Potential Transformer
- VCB : Vacuum Circuit Breaker
- MOF : Metering Out Fit
- PT : Potential Transformer
- CT : Current transformer
- COS : Cut Out Switch
- LBS : Load Breaker Switch
- PF : Power Fuse

### Quality control(QC) and Quality Assurance(QA) procedure

- 1) Monitoring equipment
  - Electricity measuring meter shall be set up transparently in accordance with “Law regarding affirmation of the KPX”(Korea Power Exchange)
  - The meter shall be authorized through the due formal certifying process.

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- The meter shall be calibrated when they are installed, and re-calibrated from every two years after installation.
- 2) Monitoring electricity generations
- The amount of electricity transmitted to the grid shall be measured automatically by established meter. The measured data are simultaneously transferred to wind power plant and KPX
- 3) Management of monitoring and electricity safety
- The person in charge of monitoring and electricity safety shall attend the training courses regularly.
- In case of absence of the responsible person, the second responsible person shall be selected.
- If the responsibility for monitoring and electricity safety is transferred to another person, that will be approved by the final decision-maker.

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

The baseline study was completed in 31/05/2007 by ECOSIAN. The contact details of ECOSIAN appear below:

ECOSIAN

Address : 613, Woolim E-BIZ Center 2-Cha, 184-1 Guro 3-dong, Guro-gu, Seoul, Korea

Tel: +82-2-890-7565

E-mail: swbb@ecosian.com

The ECOSIAN is the CDM Adviser to the Project and will be the contact for the CDM activity described in this PDD.

**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:**

15/05/2003

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

20 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:**

. Not applicable

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

Not applicable

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

05/06/2008 or registration date whatever is later

**C.2.2.2. Length:**

10 years 0 months

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

“Enforcement Decree of the Act on Assessment of Impacts of Works on Environment, Traffic, Disasters, etc.” describes projects that need Environment Impact Assessment (EIA). A wind power generation project whose capacity is greater than 100 MW is required to conduct an EIA. However, the installed capacity of the Project activity is 6.8 MW, which is less than the 100MW. Therefore under the current regulation, EIA is not required for the Project activity. Though EIA is not required under the current regulation and the expected environmental impact during the construction and operation of wind power plant was considered as a part of feasibility study. Impacts of the Project activity are limited to possible noise, visual pollution and change in land use. However, due to the following research(The research for availability of wind power resource in Taebaek city, Jul 2002), the impacts are considered negligible.

Noise pollution

Noise from the rotating blades may be a concern for wind power project. The Project site is in the cultivated land. Therefore, the noise may be important problem to residents. Project developer executed to measure the noise pollution at two sites, N-1 and N-2. All sites come under a general area “B”. And there are not any private houses in the 500m radius of the project area. There the noise from the wind turbines is not exceeded the noise limit under the current regulations.

| area | The daytime(dBA) |                 |                 |                 |         | The night time(dBA) |                 |         |
|------|------------------|-----------------|-----------------|-----------------|---------|---------------------|-----------------|---------|
|      | 1 <sup>st</sup>  | 2 <sup>nd</sup> | 3 <sup>rd</sup> | 4 <sup>th</sup> | Average | 1 <sup>st</sup>     | 2 <sup>nd</sup> | Average |
| N-1  | 49.4             | 48.1            | 45.9            | 44.3            | 46.9    | 42.8                | 41.4            | 42.1    |
| N-2  | 41.9             | 42.3            | 41.7            | 40.8            | 41.7    | 40.1                | 39.3            | 39.7    |

**TABLE D-1 Result of noise research, 11 November 2005**

\* N-1 : recovery space in Changjook-dong, Taebaek (general area)

\* N-2 : a stockfarm in Hwangji-dong, Taebaek (general area)

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| section      | Application area | Standard level(dBA) |                    |
|--------------|------------------|---------------------|--------------------|
|              |                  | Day(06:00~22:00)    | Night(22:00~06:00) |
| general area | “A” area         | 50                  | 40                 |
|              | “B” area         | 55                  | 45                 |
|              | “C” area         | 65                  | 55                 |
|              | “D” area         | 75                  | 70                 |

**TABLE D-2 Standard level of Noise, a fundamental law of environmental policy**Visual pollution

Due to its structures, the wind turbines can be considered as an eyesore. However, considering the Project site is relatively low populated area and the fact that Taebaek city Hall is planning to develop the Project site as a tourist spot, the visual pollution is not a significant concern.

Land use

As the project site is previously unused mountain area, there is little concern related to the change of land use.

**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:**

As described in the section D.1 above, environmental impacts by the Project activity are considered insignificant.

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

To incorporate local stakeholders' opinion, a local stakeholders' meeting was held by Taebaek City Hall at the Project site on 25 May 2003. Through the local network, residents nearby the Project sites were invited and 8 residents attended the meeting. During the meeting, the details about the Project activity were explained to the residents and their opinions were sought. And Kyunghyang Press, one of the major newspaper companies on Korea, announced the construction of Taebaek wind power plant through Kyunghyang internet news on 13 November 2003.<Figure E.1>



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**<Figure E.1> Kyunghyang internet news on construction of Taebaek wind power plant**

## E.2. Summary of the comments received:

Followings are the opinion raised during the local stakeholders' meeting.

- The farmland and crops nearby the wind turbines could be managed by the Project activity by the operation of wind turbines and heavy rain
- Uncovered road to the Project site needs to be covered. Also at the time of the road maintenance, the opinions from residents need to be reflected.
- A countermeasure should be prepared in case more tourists visit the Project site.
- Further consideration needs to be sought to develop the Project site and nearby area as a tourist spot.

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

As for the opinions raised by the local stakeholders, Taebaek city Hall gave the following answers with sufficient consideration and the residents were satisfied with them.

- Enough caution will be paid not to cause any damage to the nearby farmland and crops by the Project activity. Also, in case there is any damage by the Project activity, sufficiency compensation will be paid for the damaged property. As a part of this consideration, a plan for improvement of irrigation drainage system decided.
- Based on residents' requiry, some road maintenances projects were carried out reflecting their opinion and the rest of the projects are on their way.

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- Considering the expected increase of visitors, the main road will be broadened and parking lots will be prepared.
- To develop the area as a tourist spot, Taebaek city Hall are making progress such as program for ecology restoration.
- Taebaek city Hall prepared the window for the collection of public opinions. Taebaek city Hall is trying to improve the popular complaints continuously.

Stakeholder's comments, of the PDD while on the other hand PP has planned to take any of stakeholder comment received though UNFCCC website: <http://cdm.unfccc.int/projects/validation> during on 21 July 2007 until 19 August 2007. And there was no comment from public comments about this project activity.

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

|                  |  |
|------------------|--|
| Organization:    | Taebaek City Hall  |
| Street/P.O.Box:  | 244-3  |
| City:            | Taebaek  |
| State/Region:    | Hwangji-dong, Taebaek-si, Gangwon-do, Korea              |
| Postfix/ZIP:     | 235-701  |
| Country:         | The Republic of Korea                                    |
| Telephone:       | +82-33-550-1360  |
| FAX:             | +82-33-550-2925  |
| E-Mail:          | master@taebaek.go.kr                                     |
| URL:             | <a href="http://www.taebaek.go.kr">www.taebaek.go.kr</a> |
| Represented by:  |  |
| Title:           | Mayor  |
| Salutation:      |  |
| Last Name:       | Park   |
| First Name:      | Jong Ki  |
| Department:      |  |
| Mobile:          |  |
| Direct FAX:      | +82-33-550-2925  |
| Direct tel:      | +82-33-550-2001  |
| Personal E-Mail: | seon4529@taebaek.go.kr                                   |

|                  |  |
|------------------|--|
| Organization:    | KEMCO(Korea Energy Management Corporation)               |
| Street/P.O.Box:  | 1157   |
| City:            | Yongin   |
| State/Region:    | Pungdeokchon-2-dong                                      |
| Postfix/ZIP:     | 448-994  |
| Country:         | The Republic of Korea                                    |
| Telephone:       | +82-31-260-4453  |
| FAX:             | +82-31-260-4459  |
| E-Mail:          | <a href="mailto:jhwoo@kemco.or.kr">jhwoo@kemco.or.kr</a> |
| URL:             | <a href="http://www.kemco.or.kr">www.kemco.or.kr</a>     |
| Represented by:  |  |
| Title:           | President  |
| Salutation:      |  |
| Last Name:       | Lee  |
| First Name:      | Ki sub   |
| Department:      |  |
| Mobile:          |  |
| Direct FAX:      | +82-31-260-4831  |
| Direct tel:      | +82-31-260-4559  |
| Personal E-Mail: | <a href="mailto:jhwoo@kemco.or.kr">jhwoo@kemco.or.kr</a> |

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**Annex 2**

**INFORMATION REGARDING PUBLIC FUNDING**

Project financing does not involve ODA or public funding from Annex I countries.

**Annex 3****BASELINE INFORMATION****Table Annex 3.1 Information for OM 2004 calculation**

| Plant name | Unit number | Electricity delivered (MWh) | fuel consumption |                |                 |         | Calorific value |                    |                     |               |
|------------|-------------|-----------------------------|------------------|----------------|-----------------|---------|-----------------|--------------------|---------------------|---------------|
|            |             |                             | Coal (t)         | Heavy oil (kl) | Diesel oil (kl) | LNG (t) | Coal (kcal/kg)  | Heavy oil (kcal/l) | Diesel oil (kcal/l) | LNG (kcal/kg) |
| Honam      | #1          | 1,855,554                   | 885,758          | 606            | 300             | -       | 5,493           | 9,814              | 8,848               | -             |
|            | #2          | 1,625,399                   | 783,300          | 1,714          | 335             | -       | 5,430           | 9,817              | 8,850               | -             |
| Samchonpo  | #1          | 3,974,202                   | 1,624,500        | -              | 1,674           | -       | 5,527           | -                  | 9,012               | -             |
|            | #2          | 3,839,080                   | 1,564,986        | -              | 744             | -       | 6,275           | -                  | 9,010               | -             |
|            | #3          | 3,652,769                   | 1,467,177        | -              | 814             | -       | 6,530           | -                  | 9,006               | -             |
|            | #4          | 3,811,371                   | 1,538,768        | -              | 785             | -       | 6,507           | -                  | 9,004               | -             |
|            | #5          | 4,147,957                   | 1,707,777        | -              | 230             | -       | 4,829           | -                  | 9,000               | -             |
|            | #6          | 4,185,213                   | 1,734,977        | -              | 652             | -       | 4,773           | -                  | 9,000               | -             |
| Yonghung   | #1          | 2,986,382                   | 1,114,254        | -              | 27,916          | -       | 5,892           | -                  | 8,927               | -             |
|            | #2          | 1,172,450                   | 459,217          | -              | 18,314          | -       | 5,852           | -                  | 8,720               | -             |
| Boryeong   | #1          | 4,014,109                   | 1,599,557        | -              | 311             | -       | 5,924           | -                  | 8,770               | -             |
|            | #2          | 3,915,285                   | 1,555,055        | -              | 616             | -       | 5,922           | -                  | 8,910               | -             |
|            | #3          | 3,746,265                   | 1,427,263        | -              | 574             | -       | 5,943           | -                  | 8,749               | -             |
|            | #4          | 4,097,489                   | 1,560,014        | -              | 179             | -       | 5,945           | -                  | 8,749               | -             |
|            | #5          | 3,660,240                   | 1,397,343        | -              | 422             | -       | 5,931           | -                  | 8,749               | -             |
|            | #6          | 4,093,207                   | 1,559,785        | -              | 350             | -       | 5,937           | -                  | 8,749               | -             |
| Taean      | #1          | 3,780,097                   | 1,438,094        | -              | 999             | -       | 5,980           | -                  | 8,765               | -             |
|            | #2          | 3,975,123                   | 1,509,379        | -              | 310             | -       | 5,977           | -                  | 8,699               | -             |
|            | #3          | 3,732,363                   | 1,415,585        | -              | 390             | -       | 5,975           | -                  | 9,004               | -             |
|            | #4          | 4,048,258                   | 1,539,502        | -              | 254             | -       | 5,967           | -                  | 8,721               | -             |
|            | #5          | 4,091,406                   | 1,547,217        | -              | 329             | -       | 5,996           | -                  | 8,912               | -             |
|            | #6          | 4,056,835                   | 1,531,751        | -              | 230             | -       | 5,996           | -                  | 8,804               | -             |
| Hadong     | #1          | 3,688,313                   | 1,389,739        | -              | 533             | -       | 6,032           | -                  | 9,002               | -             |
|            | #2          | 4,028,529                   | 1,515,681        | -              | 145             | -       | 6,025           | -                  | 8,975               | -             |
|            | #3          | 3,997,064                   | 1,501,027        | -              | 670             | -       | 6,046           | -                  | 8,983               | -             |
|            | #4          | 3,724,757                   | 1,397,482        | -              | 737             | -       | 6,097           | -                  | 8,993               | -             |
|            | #5          | 4,013,845                   | 1,501,672        | -              | 318             | -       | 5,982           | -                  | 8,983               | -             |
|            | #6          | 3,685,698                   | 1,379,396        | -              | 689             | -       | 5,935           | -                  | 8,983               | -             |
| Dangjin    | #1          | 3,986,406                   | 1,502,885        | -              | 294             | -       | 6,011           | -                  | 8,880               | -             |
|            | #2          | 4,038,457                   | 1,523,605        | -              | 211             | -       | 6,000           | -                  | 8,889               | -             |
|            | #3          | 3,711,787                   | 1,404,465        | -              | 605             | -       | 5,976           | -                  | 8,897               | -             |
|            | #4          | 3,801,495                   | 1,434,844        | -              | 528             | -       | 5,966           | -                  | 8,898               | -             |
| Ulsan      | #1          | 271,544                     | -                | 73,408         | 114             | -       | -               | 9,893              | 9,010               | -             |
|            | #2          | 244,246                     | -                | 65,316         | 82              | -       | -               | 9,901              | 9,010               | -             |
|            | #3          | 268,231                     | -                | 71,305         | 554             | -       | -               | 9,896              | 9,010               | -             |
|            | #4          | 1,759,376                   | -                | 420,739        | 1,238           | -       | -               | 9,972              | 9,120               | -             |
|            | #5          | 2,141,162                   | -                | 513,497        | 931             | -       | -               | 9,963              | 9,120               | -             |
|            | #6          | 2,196,344                   | -                | 527,083        | 1,603           | -       | -               | 9,959              | 9,120               | -             |
| Youngnam   | #1          | 973,872                     | -                | 347,107        | 837             | -       | -               | 7,432              | 8,865               | -             |
|            | #2          | 665,973                     | -                | 248,049        | 274             | -       | -               | 7,679              | 8,876               | -             |

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|               |     |            |   |         |        |           |   |        |        |        |
|---------------|-----|------------|---|---------|--------|-----------|---|--------|--------|--------|
| Yosu          | #1  | 723,968    | - | 181,712 | 571    | -         | - | 10,011 | 8,924  | -      |
|               | #2  | 1,304,109  | - | 316,523 | 436    | -         | - | 10,009 | 8,956  | -      |
| Pyongtaek     | #1  | 850,533    | - | 204,664 | 247    | 2,095     | - | 9,877  | 8,917  | 12,920 |
|               | #2  | 880,646    | - | 209,664 | 232    | 2,515     | - | 9,879  | 8,941  | 12,907 |
|               | #3  | 751,633    | - | 179,921 | 240    | 3,791     | - | 9,902  | 8,907  | 12,910 |
|               | #4  | 800,854    | - | 192,294 | 225    | 3,217     | - | 9,903  | 8,915  | 12,956 |
| Namjeju       | #1  | 50,294     | - | 16,510  | 6      | -         | - | 9,900  | 9,333  | -      |
|               | #2  | 48,714     | - | 16,040  | 13     | -         | - | 9,901  | 8,846  | -      |
| Jeju          | #1  | 44,659     | - | 15,306  | 7      | -         | - | 9,897  | 8,961  | -      |
|               | #2  | 486,401    | - | 118,473 | 73     | -         | - | 9,912  | 8,936  | -      |
|               | #3  | 509,330    | - | 124,160 | 41     | -         | - | 9,919  | 8,928  | -      |
| Seoul         | #4  | 90,322     | - | -       | 1      | 22,409    | - | -      | 9,070  | 13,011 |
|               | #5  | 480,919    | - | -       | 3      | 117,908   | - | -      | 9,070  | 13,014 |
| Incheon       | #1  | 47,491     | - | -       | -      | 10,523    | - | -      | -      | 13,038 |
|               | #2  | 49,144     | - | -       | -      | 11,094    | - | -      | -      | 13,039 |
|               | #3  | 19,018     | - | -       | 149    | 4,235     | - | -      | 8,951  | 13,038 |
|               | #4  | 594        | - | -       | 171    | 526       | - | -      | 8,949  | 13,021 |
| Pyongtaek C/C |     | 596,001    | - | -       | 21     | 98,846    | - | -      | 8,758  | 13,033 |
| Ilsan         | C/C | 3,281,407  | - | -       | -      | 593,548   | - | -      | -      | 13,017 |
| Bundang       | C/C | 3,650,122  | - | -       | -      | 653,880   | - | -      | -      | 13,026 |
| Ulsan         | C/C | 2,329,524  | - | -       | -      | 347,076   | - | -      | -      | 12,920 |
| Seoincheon    | C/C | 8,353,619  | - | -       | 88     | 1,209,806 | - | -      | 9,211  | 13,010 |
| Shinincheon   | C/C | 11,596,955 | - | -       | -      | 1,587,638 | - | -      | -      | 13,017 |
| Boryeong      | C/C | 6,979,928  | - | -       | -      | 988,548   | - | -      | -      | 13,025 |
| Busan         | C/C | 9,884,075  | - | -       | 2,687  | 1,298,418 | - | -      | 9,250  | 13,004 |
| Hallim        | C/C | 96,435     | - | -       | 28,796 | -         | - | -      | 8,972  | -      |
| Anyang        | C/C | 1,506,070  | - | -       | -      | 270,559   | - | -      | -      | 13,025 |
| Bucheon       | C/C | 1,425,073  | - | -       | -      | 258,596   | - | -      | -      | 13,013 |
| K I E Co.     | C/C | 2,809,983  | - | -       | -      | 467,583   | - | -      | -      | 13,023 |
| L G Bugog     | C/C | 1,894,996  | - | -       | -      | 260,653   | - | -      | -      | 13,028 |
| Yulchon       | C/C | 36,366     | - | -       | 596    | 7,388     | - | -      | 11,731 | 13,014 |
| Namjeju       | D/P | 274,089    | - | 57,808  | 80     | -         | - | 9,901  | 8,867  | -      |
| Jeju          | D/P | 3,016      | - | -       | 2,232  | -         | - | -      | 8,948  | -      |

Source: Electric Power Statistics 2005 (KEPCO)

Table Annex 3.2 Information for OM 2005 calculation

| Plant name | Unit number | Electricity delivered (MWh) | fuel consumption |                |                 |         | Calorific value |                    |                     |               |
|------------|-------------|-----------------------------|------------------|----------------|-----------------|---------|-----------------|--------------------|---------------------|---------------|
|            |             |                             | Coal (t)         | Heavy oil (kl) | Diesel oil (kl) | LNG (t) | Coal (kcal/kg)  | Heavy oil (kcal/l) | Diesel oil (kcal/l) | LNG (kcal/kg) |
| Honam      | #1          | 1,787,715                   | 870,214          | 961            | 278             | -       | 5,392           | 9,835              | 8,809               | -             |
|            | #2          | 1,875,790                   | 912,497          | 338            | 185             | -       | 5,376           | 9,854              | 8,804               | -             |
| Samchonpo  | #1          | 3,810,079                   | 1,534,223        | -              | 1,220           | -       | 5,913           | -                  | 8,841               | -             |
|            | #2          | 4,323,618                   | 1,731,265        | -              | 626             | -       | 5,924           | -                  | 8,883               | -             |
|            | #3          | 4,343,666                   | 1,723,152        | -              | 377             | -       | 5,897           | -                  | 9,000               | -             |
|            | #4          | 4,112,297                   | 1,632,334        | -              | 1,029           | -       | 5,898           | -                  | 8,943               | -             |
|            | #5          | 3,542,728                   | 1,516,654        | -              | 1,415           | -       | 5,347           | -                  | 8,614               | -             |
|            | #6          | 3,643,969                   | 1,546,663        | -              | 1,001           | -       | 5,376           | -                  | 9,000               | -             |

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|           |    |           |           |         |       |         |       |        |        |        |
|-----------|----|-----------|-----------|---------|-------|---------|-------|--------|--------|--------|
| Yonghung  | #1 | 5,623,299 | 2,081,972 | -       | 4,541 | -       | 6,131 | -      | 8,935  | -      |
|           | #2 | 4,658,862 | 1,761,395 | -       | 2,903 | -       | 6,053 | -      | 8,947  | -      |
| Boryeong  | #1 | 3,547,140 | 1,440,343 | -       | 761   | -       | 5,830 | -      | 8,943  | -      |
|           | #2 | 3,433,608 | 1,388,532 | -       | 551   | -       | 5,816 | -      | 8,943  | -      |
|           | #3 | 4,124,745 | 1,589,150 | -       | 90    | -       | 5,882 | -      | 8,740  | -      |
|           | #4 | 3,698,705 | 1,421,343 | -       | 603   | -       | 5,890 | -      | 8,748  | -      |
|           | #5 | 4,121,314 | 1,587,999 | -       | 156   | -       | 5,882 | -      | 8,749  | -      |
|           | #6 | 3,283,477 | 1,260,305 | -       | 627   | -       | 5,901 | -      | 8,749  | -      |
| Taean     | #1 | 3,992,112 | 1,508,570 | -       | 621   | -       | 6,000 | -      | 8,692  | -      |
|           | #2 | 3,484,251 | 1,323,078 | -       | 395   | -       | 6,009 | -      | 8,684  | -      |
|           | #3 | 3,957,054 | 1,494,175 | -       | 650   | -       | 6,007 | -      | 8,676  | -      |
|           | #4 | 3,653,534 | 1,383,297 | -       | 365   | -       | 5,999 | -      | 8,705  | -      |
|           | #5 | 3,744,413 | 1,411,398 | -       | 742   | -       | 6,032 | -      | 8,676  | -      |
|           | #6 | 3,999,847 | 1,504,962 | -       | 417   | -       | 6,017 | -      | 8,691  | -      |
| Hadong    | #1 | 3,997,914 | 1,513,930 | -       | 284   | -       | 6,003 | -      | 8,940  | -      |
|           | #2 | 3,732,583 | 1,410,099 | -       | 792   | -       | 5,997 | -      | 8,928  | -      |
|           | #3 | 3,769,077 | 1,422,196 | -       | 472   | -       | 5,998 | -      | 8,982  | -      |
|           | #4 | 3,989,315 | 1,511,054 | -       | 567   | -       | 5,999 | -      | 8,938  | -      |
|           | #5 | 3,553,901 | 1,345,648 | -       | 614   | -       | 5,995 | -      | 8,975  | -      |
|           | #6 | 4,037,763 | 1,520,774 | -       | 331   | -       | 5,995 | -      | 8,928  | -      |
| Dangjin   | #1 | 3,797,307 | 1,438,702 | -       | 637   | -       | 5,962 | -      | 8,834  | -      |
|           | #2 | 3,798,078 | 1,437,473 | -       | 632   | -       | 5,962 | -      | 8,915  | -      |
|           | #3 | 4,081,017 | 1,549,041 | -       | 141   | -       | 5,935 | -      | 8,844  | -      |
|           | #4 | 4,079,557 | 1,544,010 | -       | 134   | -       | 5,941 | -      | 8,828  | -      |
|           | #5 | 1,318,670 | 499,714   | -       | 5,701 | -       | 6,115 | -      | 8,904  | -      |
|           | #6 | 96,365    | 38,671    | -       | 1,779 | -       | 6,221 | -      | 11,095 | -      |
| Ulsan     | #1 | 262,393   | -         | 70,183  | 750   | -       | -     | 9,900  | 9,116  | -      |
|           | #2 | 255,812   | -         | 67,296  | 585   | -       | -     | 9,903  | 9,113  | -      |
|           | #3 | 200,518   | -         | 53,085  | 662   | -       | -     | 9,908  | 9,119  | -      |
|           | #4 | 1,549,091 | -         | 375,417 | 1,971 | -       | -     | 10,001 | 9,122  | -      |
|           | #5 | 1,500,935 | -         | 363,992 | 1,676 | -       | -     | 9,993  | 9,122  | -      |
|           | #6 | 1,454,644 | -         | 352,776 | 1,708 | -       | -     | 9,979  | 9,118  | -      |
| Youngnam  | #1 | 1,022,470 | -         | 359,910 | 844   | -       | -     | 7,482  | 8,942  | -      |
|           | #2 | 531,006   | -         | 190,085 | 584   | -       | -     | 7,729  | 8,943  | -      |
| Yosu      | #1 | 430,310   | -         | 106,919 | 434   | -       | -     | 9,960  | 8,887  | -      |
|           | #2 | 904,597   | -         | 218,356 | 346   | -       | -     | 9,944  | 8,886  | -      |
| Pyongtack | #1 | 1,258,662 | -         | 293,214 | 118   | 3,553   | -     | 9,903  | 8,943  | 12,898 |
|           | #2 | 1,376,342 | -         | 321,188 | 140   | 2,641   | -     | 9,905  | 8,961  | 12,872 |
|           | #3 | 1,321,167 | -         | 308,042 | 132   | 1,784   | -     | 9,907  | 8,949  | 12,942 |
|           | #4 | 1,338,204 | -         | 311,245 | 138   | 2,047   | -     | 9,909  | 8,949  | 12,893 |
| Namjeju   | #1 | 44,602    | -         | 14,628  | 15    | -       | -     | 9,878  | 9,318  | -      |
|           | #2 | 44,654    | -         | 15,031  | 12    | -       | -     | 9,879  | 9,307  | -      |
| Jeju      | #1 | 36,266    | -         | 12,564  | 12    | -       | -     | 9,932  | 8,885  | -      |
|           | #2 | 532,700   | -         | 129,516 | -     | -       | -     | 9,929  | -      | -      |
|           | #3 | 502,189   | -         | 122,866 | 48    | -       | -     | 9,925  | 8,938  | -      |
| Seoul     | #4 | 207,498   | -         | -       | -     | 49,143  | -     | -      | -      | 13,002 |
|           | #5 | 444,324   | -         | -       | 1     | 108,761 | -     | -      | 9,070  | 13,008 |
| Incheon   | #1 | 16,450    | -         | -       | -     | 4,365   | -     | -      | -      | 13,032 |
|           | #2 | 37,727    | -         | -       | -     | 8,505   | -     | -      | -      | 13,025 |
|           | #3 | -         | -         | -       | 372   | 746     | -     | -      | 8,964  | 13,030 |

## CDM – Executive Board

|               |     |            |   |        |        |           |   |       |        |        |
|---------------|-----|------------|---|--------|--------|-----------|---|-------|--------|--------|
|               | #4  | 29,202     | - | -      | 400    | 6,620     | - | -     | 8,954  | 13,026 |
| Pyongtaek C/C | C/C | 659,932    | - | -      | 1      | 110,953   | - | -     | 8,950  | 13,030 |
| Ilsan         | C/C | 2,873,958  | - | -      | -      | 533,188   | - | -     | -      | 13,011 |
| Bundang       | C/C | 3,742,073  | - | -      | -      | 671,944   | - | -     | -      | 13,025 |
| Ulsan         | C/C | 3,131,075  | - | -      | -      | 470,131   | - | -     | -      | 12,750 |
| Seoincheon    | C/C | 7,001,031  | - | -      | 335    | 989,645   | - | -     | 9,200  | 13,009 |
| Shinincheon   | C/C | 10,543,280 | - | -      | -      | 1,458,763 | - | -     | -      | 13,013 |
| Boryeong      | C/C | 8,221,926  | - | -      | -      | 1,161,510 | - | -     | -      | 13,030 |
| Incheon       | C/C | 2,055,016  | - | -      | -      | 281,813   | - | -     | -      | 13,012 |
| Busan         | C/C | 9,076,327  | - | -      | -      | 1,211,144 | - | -     | -      | 13,000 |
| Hallim        | C/C | 100,346    | - | -      | 29,686 | -         | - | -     | 8,973  | -      |
| Anyang        | C/C | 1,433,978  | - | -      | -      | 261,202   | - | -     | -      | 13,025 |
| Bucheon       | C/C | 1,404,160  | - | -      | -      | 261,705   | - | -     | -      | 13,003 |
| POSCO POWER   | C/C | 2,571,095  | - | -      | -      | 445,253   | - | -     | -      | 13,024 |
| G S Bugog     | C/C | 2,189,808  | - | -      | -      | 297,976   | - | -     | -      | 13,756 |
| Yulchon       | C/C | 1,300,627  | - | -      | 159    | 194,534   | - | -     | 10,930 | 13,023 |
| Namjeju       | D/P | 268,073    | - | 56,727 | 37     | -         | - | 9,877 | 8,975  | -      |
| Jeju          | G/T | 5,069      | - | -      | 2,869  | -         | - | -     | 8,919  | -      |
| Jeju          | D/P | 151,759    | - | 31,808 | 72     | -         | - | 9,932 | 8,954  | -      |

Source: Electric Power Statistics 2006 (KEPCO)

Table Annex 3.3 Information for OM 2006 calculation

| Plant name | Unit number | Electricity delivered (MWh) | fuel consumption |                |                 |         | Calorific value |                    |                     |               |
|------------|-------------|-----------------------------|------------------|----------------|-----------------|---------|-----------------|--------------------|---------------------|---------------|
|            |             |                             | Coal (t)         | Heavy oil (kl) | Diesel oil (kl) | LNG (t) | Coal (kcal/kg)  | Heavy oil (kcal/l) | Diesel oil (kcal/l) | LNG (kcal/kg) |
| Honam      | #1          | 1,622,639                   | 781,139          | 1,113          | 279             | -       | 5,436           | 9,809              | 8,917               | -             |
|            | #2          | 1,782,016                   | 859,736          | 1,251          | 359             | -       | 5,407           | 9,823              | 8,870               | -             |
| Samchonpo  | #1          | 4,161,219                   | 1,696,271        | -              | 860             | -       | 5,937           | -                  | 8,814               | -             |
|            | #2          | 3,703,880                   | 1,508,082        | -              | 1,362           | -       | 5,942           | -                  | 8,814               | -             |
|            | #3          | 3,779,585                   | 1,519,385        | -              | 457             | -       | 5,858           | -                  | 8,814               | -             |
|            | #4          | 3,816,997                   | 1,521,263        | -              | 1,818           | -       | 5,861           | -                  | 8,803               | -             |
|            | #5          | 3,761,205                   | 1,665,339        | -              | 977             | -       | 5,236           | -                  | 9,000               | -             |
|            | #6          | 4,065,091                   | 1,770,348        | -              | 428             | -       | 5,255           | -                  | 9,000               | -             |
| Yonghung   | #1          | 5,337,432                   | 2,004,193        | -              | 2,548           | -       | 6,072           | -                  | 8,891               | -             |
|            | #2          | 5,727,937                   | 2,129,118        | -              | 2,545           | -       | 6,086           | -                  | 8,899               | -             |
| Boryeong   | #1          | 3,988,848                   | 1,638,140        | -              | 306             | -       | 5,768           | -                  | 8,855               | -             |
|            | #2          | 3,423,101                   | 1,389,425        | -              | 1,137           | -       | 5,766           | -                  | 8,943               | -             |
|            | #3          | 3,409,486                   | 1,323,779        | -              | 514             | -       | 5,845           | -                  | 8,943               | -             |
|            | #4          | 4,133,946                   | 1,610,928        | -              | 82              | -       | 5,824           | -                  | 8,943               | -             |
|            | #5          | 3,364,148                   | 1,296,455        | -              | 541             | -       | 5,845           | -                  | 8,749               | -             |
|            | #6          | 3,987,488                   | 1,553,273        | -              | 518             | -       | 5,834           | -                  | 8,749               | -             |
| Taeon      | #1          | 3,556,797                   | 1,354,832        | -              | 514             | -       | 5,982           | -                  | 8,749               | -             |
|            | #2          | 4,035,753                   | 1,532,209        | -              | 162             | -       | 5,978           | -                  | 8,371               | -             |
|            | #3          | 3,528,613                   | 1,338,967        | -              | 575             | -       | 5,983           | -                  | 8,649               | -             |
|            | #4          | 4,069,820                   | 1,548,909        | -              | 133             | -       | 5,979           | -                  | 8,665               | -             |
|            | #5          | 4,013,235                   | 1,542,775        | -              | 544             | -       | 5,934           | -                  | 8,665               | -             |



## CDM – Executive Board

|               |     |            |           |         |       |           |       |        |       |        |
|---------------|-----|------------|-----------|---------|-------|-----------|-------|--------|-------|--------|
|               | #6  | 3,381,867  | 1,294,577 | -       | 1,113 | -         | 5,960 | -      | 8,665 | -      |
|               | #7  | 159,677    | 61,910    | -       | 4,799 | -         | 5,965 | -      | 8,558 | -      |
| Hadong        | #1  | 3,607,063  | 1,373,049 | -       | 515   | -         | 5,969 | -      | 8,838 | -      |
|               | #2  | 4,068,036  | 1,543,074 | -       | 293   | -         | 5,959 | -      | 8,928 | -      |
|               | #3  | 4,079,158  | 1,549,094 | -       | 153   | -         | 5,958 | -      | 8,928 | -      |
|               | #4  | 3,631,374  | 1,376,612 | -       | 796   | -         | 5,969 | -      | 8,825 | -      |
|               | #5  | 4,092,625  | 1,554,524 | -       | 242   | -         | 5,963 | -      | 8,911 | -      |
|               | #6  | 3,610,222  | 1,371,801 | -       | 690   | -         | 5,967 | -      | 8,901 | -      |
| Dangjin       | #1  | 3,598,820  | 1,380,527 | -       | 966   | -         | 5,882 | -      | 8,975 | -      |
|               | #2  | 4,115,891  | 1,570,077 | -       | 161   | -         | 5,906 | -      | 8,978 | -      |
|               | #3  | 3,666,490  | 1,402,916 | -       | 433   | -         | 5,886 | -      | 9,007 | -      |
|               | #4  | 3,610,984  | 1,386,317 | -       | 1,549 | -         | 5,875 | -      | 9,015 | -      |
|               | #5  | 3,946,931  | 1,456,458 | -       | 745   | -         | 6,046 | -      | 8,955 | -      |
|               | #6  | 3,392,395  | 1,216,582 | -       | 3,051 | -         | 6,120 | -      | 8,895 | -      |
|               | #7  | 1,474      | 1,008     | -       | 505   | -         | 5,818 | -      | 8,984 | -      |
| Ulsan         | #1  | 275,016    | -         | 72,243  | 605   | -         | -     | 9,915  | 9,120 | -      |
|               | #2  | 306,668    | -         | 80,187  | 469   | -         | -     | 9,923  | 9,120 | -      |
|               | #3  | 376,132    | -         | 96,459  | 518   | -         | -     | 9,919  | 9,120 | -      |
|               | #4  | 1,511,557  | -         | 360,919 | 3,729 | -         | -     | 10,030 | 9,120 | -      |
|               | #5  | 1,583,846  | -         | 375,985 | 3,678 | -         | -     | 10,033 | 9,120 | -      |
|               | #6  | 1,589,838  | -         | 378,331 | 3,694 | -         | -     | 10,035 | 9,120 | -      |
| Youngnam      | #1  | 359,205    | -         | 107,090 | 1,016 | -         | -     | 10,138 | 8,845 | -      |
|               | #2  | 323,595    | -         | 95,127  | 1,494 | -         | -     | 10,110 | 8,862 | -      |
| Yosu          | #1  | 403,547    | -         | 99,129  | 281   | -         | -     | 9,963  | 8,798 | -      |
|               | #2  | 906,849    | -         | 215,957 | 291   | -         | -     | 9,954  | 8,796 | -      |
| Pyongtaek     | #1  | 1,123,948  | -         | 261,458 | 141   | 3,997     | -     | 9,707  | 8,943 | 12,941 |
|               | #2  | 1,198,620  | -         | 277,025 | 166   | 5,687     | -     | 9,719  | 8,943 | 12,941 |
|               | #3  | 1,304,568  | -         | 303,858 | 134   | 3,891     | -     | 9,747  | 8,949 | 12,859 |
|               | #4  | 1,052,228  | -         | 245,602 | 103   | 3,473     | -     | 9,693  | 8,949 | 12,963 |
| Namjeju       | #1  | 34,448     | -         | 11,406  | 17    | -         | -     | 9,908  | 8,974 | -      |
|               | #2  | 28,686     | -         | 9,772   | 14    | -         | -     | 9,908  | 8,952 | -      |
|               | #3  | 179,033    | -         | 46,504  | 2,509 | -         | -     | 9,898  | 8,938 | -      |
| Jeju          | #1  | 24,748     | -         | 8,603   | 23    | -         | -     | 9,870  | 8,873 | -      |
|               | #2  | 462,023    | -         | 113,679 | 64    | -         | -     | 9,952  | 8,973 | -      |
|               | #3  | 479,676    | -         | 117,464 | 67    | -         | -     | 9,953  | 8,973 | -      |
| Seoul         | #4  | 306,558    | -         | -       | 1     | 69,383    | -     | -      | 9,070 | 13,018 |
|               | #5  | 685,011    | -         | -       | 1     | 152,891   | -     | -      | 9,070 | 12,882 |
| Incheon       | #1  | 32,932     | -         | -       | -     | 6,945     | -     | -      | -     | 13,036 |
|               | #2  | 24,366     | -         | -       | -     | 5,223     | -     | -      | -     | 13,028 |
|               | #3  | 78,669     | -         | -       | 311   | 15,426    | -     | -      | 8,982 | 13,018 |
|               | #4  | 62,414     | -         | -       | 311   | 12,454    | -     | -      | 8,981 | 13,024 |
| Pyongtaek C/C | C/C | 497,441    | -         | -       | 45    | 84,054    | -     | -      | 8,950 | 13,030 |
| Ilsan         | C/C | 3,038,165  | -         | -       | 1,384 | 556,504   | -     | -      | 8,989 | 13,017 |
| Bundang       | C/C | 4,059,300  | -         | -       | -     | 720,381   | -     | -      | -     | 13,025 |
| Ulsan         | C/C | 3,608,435  | -         | -       | -     | 536,196   | -     | -      | -     | 12,646 |
| Seoincheon    | C/C | 8,726,521  | -         | -       | 1,066 | 1,199,196 | -     | -      | 9,200 | 13,025 |
| Shinincheon   | C/C | 11,797,500 | -         | -       | -     | 1,641,038 | -     | -      | -     | 13,025 |
| Boryeong      | C/C | 7,089,662  | -         | -       | -     | 998,683   | -     | -      | -     | 13,034 |
| Incheon       | C/C | 3,648,288  | -         | -       | -     | 484,606   | -     | -      | -     | 12,998 |

## CDM – Executive Board

|             |     |            |   |        |        |           |   |        |        |        |
|-------------|-----|------------|---|--------|--------|-----------|---|--------|--------|--------|
| Busan       | C/C | 10,455,401 | - | -      | -      | 1,396,417 | - | -      | -      | 13,017 |
| Hallim      | C/C | 175,356    | - | -      | 48,475 | -         | - | -      | 8,954  | -      |
| Anyang      | C/C | 1,286,480  | - | -      | -      | 230,969   | - | -      | -      | 13,028 |
| Bucheon     | C/C | 1,241,795  | - | -      | 215    | 225,713   | - | -      | 10,927 | 13,013 |
| POSCO POWER | C/C | 2,338,128  | - | -      | -      | 408,018   | - | -      | -      | 13,031 |
| G S Bugog   | C/C | 2,911,683  | - | -      | -      | 389,811   | - | -      | -      | 13,030 |
| Yulchon     | C/C | 2,276,276  | - | -      | -      | 315,132   | - | -      | -      | 13,376 |
| Namjeju     | D/P | 239,690    | - | 51,347 | 111    | -         | - | 10,246 | 8,907  | -      |
| Jeju        | G/T | 15,986     | - | -      | 8,264  | -         | - | -      | 8,792  | -      |
| Jeju        | D/P | 252,764    | - | 52,907 | -      | -         | - | 9,617  | -      | -      |

Source: Electric Power Statistics 2007 (KEPCO)

Table Annex 3.4 Information for BM calculation

| Plant name                  | Type    | Commissioning date | Net generation | fuel consumption |                |                 |         | Calorific value |                    |                     |               |
|-----------------------------|---------|--------------------|----------------|------------------|----------------|-----------------|---------|-----------------|--------------------|---------------------|---------------|
|                             |         |                    |                | Coal (t)         | Heavy oil (kl) | Diesel oil (kl) | LNG (t) | Coal (kcal/kg)  | Heavy oil (kcal/l) | Diesel oil (kcal/l) | LNG (kcal/kg) |
| Bundang fuel cell           | LNG     | Oct-06             | 290            | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Namhae solar                | Solar   | Oct-06             | 297            | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Hanrajeonggong solar        | Solar   | Oct-06             | 287            | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Top infra solar             | Solar   | Oct-06             | -              | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Solar park                  | Solar   | Oct-06             | 106            | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Enepark                     | Solar   | Sep-06             | 85             | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Nam Jeju #3                 | Thermal | Sep-06             | 179,033        | -                | 46,504         | 2,509           | -       | -               | 9,898              | 8,938               | -             |
| Yonheng solar               | Solar   | Sep-06             | 242            | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Hadongho                    | Hydro   | Jun-06             | 1,294          | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Mabongsan Wind power        | Wind    | May-06             | 8,998          | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Cheongsong pumping #2       | Hydro   | Dec-06             | 21,542         | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Cheongsong pumping #1       | Hydro   | Sep-06             | 39,965         | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Yangyang pumping #4         | Hydro   | Aug-06             | 62,801         | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Yangyang pumping #3         | Hydro   | Jun-06             | 93,471         | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Yangyang pumping wind power | Wind    | Jun-06             | 1,788          | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Goheung solar               | Solar   | Jun-06             | 619            | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Jangseong                   | Hydro   | May-06             | 514            | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Yangyang pumping #2         | Hydro   | Apr-06             | 97,896         | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Dangjin #6 Coal             | Coal    | Apr-06             | 3,392,395      | 1,216,582        | -              | 3,051           | -       | 6,120           | -                  | 8,895               | -             |
| Sinchang wind               | Wind    | Mar-06             | 2,969          | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Yangyang pumping #1         | Hydro   | Feb-06             | 129,063        | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Suncheon Solar              | Solar   | Dec-05             | 1,247          | -                | -              | -               | -       | -               | -                  | -                   | -             |
| Samcheonpo                  | Solar   | Dec-05             | 118            | -                | -              | -               | -       | -               | -                  | -                   | -             |

## CDM – Executive Board

|                        |         |        |            |           |        |       |           |       |       |       |        |
|------------------------|---------|--------|------------|-----------|--------|-------|-----------|-------|-------|-------|--------|
| Solar Energy           |         |        |            |           |        |       |           |       |       |       |        |
| Dangjin #5 Coal        | Coal    | Oct-05 | 3,946,931  | 1,456,458 | -      | 745   | -         | 6,046 | -     | 8,955 | -      |
| Taeon Solar Energy     | Solar   | Oct-05 | 127        | -         | -      | -     | -         | -     | -     | -     | -      |
| Wunjeong LFG           | LFG     | Oct-05 | 17,419     | -         | -      | -     | -         | -     | -     | -     | -      |
| Yangyang (small)       | Hydro   | Oct-05 | 5,143      | -         | -      | -     | -         | -     | -     | -     | -      |
| Yulchon C/C            | LNG     | Jul-05 | 2,276,276  | -         | -      | -     | 315,132   | -     | -     | -     | 13,376 |
| Incheon C/C            | LNG     | Jul-05 | 3,648,288  | -         | -      | -     | 484,606   | -     | -     | -     | 12,998 |
| Daegok                 | Hydro   | Jul-05 | 1,740      | -         | -      | -     | -         | -     | -     | -     | -      |
| Donghwa                | Hydro   | Jul-05 | 2,434      | -         | -      | -     | -         | -     | -     | -     | -      |
| Jeju D/P               |         | Jun-05 | 252,764    | -         | 52,907 | -     | -         | -     | 9,617 | -     | -      |
| Ulchin #6              | Nuclear | Apr-05 | 7,401,424  | -         | -      | -     | -         | -     | -     | -     | -      |
| Hanryo LFG             | LFG     | Apr-05 | 5,045      | -         | -      | -     | -         | -     | -     | -     | -      |
| Busan Bio-gas          | LFG     | Jan-05 | 7          | -         | -      | -     | -         | -     | -     | -     | -      |
| Gunsan Wind Power      | Wind    | Nov-04 | 6,069      | -         | -      | -     | -         | -     | -     | -     | -      |
| Yongheng #2            | Coal    | Nov-04 | 5,727,937  | 2,129,118 | -      | 2,545 | -         | 6,086 | -     | 8,899 | -      |
| New Solar Energy       | Solar   | Sep-04 | 216        | -         | -      | -     | -         | -     | -     | -     | -      |
| Daegwanryug Wind Power | Wind    | Aug-04 | 3,451      | -         | -      | -     | -         | -     | -     | -     | -      |
| Yongheng #1            | Coal    | Jul-04 | 5,337,432  | 2,004,193 | -      | 2,548 | -         | 6,072 | -     | 8,891 | -      |
| Ulchin #5              | Nuclear | Jul-04 | 7,879,757  | -         | -      | -     | -         | -     | -     | -     | -      |
| Busan C/C              | LNG     | Mar-04 | 10,455,401 | -         | -      | -     | 1,396,417 | -     | -     | -     | 13,017 |
| Chunsang               | Hydro   | Jan-04 | 183        | -         | -      | -     | -         | -     | -     | -     | -      |
| Cheongju LFG           | LFG     | Jan-04 | 6,906      | -         | -      | -     | -         | -     | -     | -     | -      |
| Daejeon Geumgodong     | LFG     | Jun-03 | 12,768     | -         | -      | -     | -         | -     | -     | -     | -      |
| Sangwon ENC            | LFG     | Jun-03 | 17,353     | -         | -      | -     | -         | -     | -     | -     | -      |
| Hoicheon ENC           | LFG     | May-03 | 4,501      | -         | -      | -     | -         | -     | -     | -     | -      |
| Muju                   | Hydro   | Apr-03 | 555        | -         | -      | -     | -         | -     | -     | -     | -      |
| Yonggwang #6           | Nuclear | Dec-02 | 7,969,957  | -         | -      | -     | -         | -     | -     | -     | -      |
| Boryeong C/C           | LNG     | Jun-02 | 7,089,662  | -         | -      | -     | 998,683   | -     | -     | -     | 13,034 |
| Taeon #6               | Coal    | May-02 | 3,381,867  | 1,294,577 | -      | 1,113 | -         | 5,960 | -     | 8,665 | -      |
| Yonggwang #5           | Nuclear | May-02 | 7,681,293  | -         | -      | -     | -         | -     | -     | -     | -      |
| Milyang                | Hydro   | Oct-01 | 5,820      | -         | -      | -     | -         | -     | -     | -     | -      |
|                        |         |        |            |           |        |       |           |       |       |       |        |
|                        |         |        |            |           |        |       |           |       |       |       |        |

Source: Electric Power Statistics 2007 (KEPCO)  
State of Power Generation Facility 2007 (Korea Power Exchange)

**Table Annex 3.5 CO<sub>2</sub> emission factor and oxidation factor**

|   | Coal | Heavy oil | Diesel oil | Natural gas |
|---|------|-----------|------------|-------------|
| CO <sub>2</sub> emission factor<br>(tCO <sub>2</sub> /TJ) | 94.6 | 77.4      | 74.1       | 56.1        |
| Oxidation factor  | 1    | 1         | 1          | 1           |

Source: 2006 IPCC Guidelines for National Greenhouse Gas Inventories

\* Since there is no available local value for CO<sub>2</sub> emission factor of each fuel, IPCC default values are used.

**Table Annex 3.6 Combined Margin**

|            |               |
|------------|---------------|
| OM2005     | 0.7220        |
| OM2006     | 0.7238        |
| OM2007     | 0.7133        |
| Average OM | 0.7197        |
| BM         | 0.3811        |
| CM         | <b>0.6350</b> |

**Annex 4**

**MONITORING INFORMATION**

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