

To: UNFCCC Secretariat  
Martin-Luther-King-Strasse 8  
D-53153 Bonn  
Germany

23 Jun. 2009

Dear Members of the CDM Executive Board,

Please find below our response to the issue raised by request for review of the “**Heilongjiang Yilan Hezuolinchang Phase II Wind Power Project**” (UNFCCC Ref. No. 2117).

*Question 1. The DOE is requested to further clarify the suitability of the input values to the investment analysis as per the requirements of EB 38 paragraph 54(c) guidance.*

Re: The input values used in the investment analysis in the PDD are all sourced from the FSR which is approved by Development and Reform Committee (DRC) of Heilongjiang Province. The FSR was recognized by Expert Appraisal Meeting organized by Project Consulting Audit Centre and of Heilongjiang Province. The investment decision was based on the FSR. The FSR and the approval by DRC of Heilongjiang Province have already been provided to DOE during validation. As per the guidance of EB 38 para. 54(c), the consistency between the input values in the PDD with the data from the FSR and the validity of the input values had been seriously checked by DOE before the final validation report finished.

Since total investment, O&M costs, electricity tariff and annual electricity generated are the major factors that could impact the financial IRR, the relevant important materials have been requested by the DOE for cross-checking.

#### **Total investment**

The total investment is 222.14 Million Yuan and the investment per kilowatt is 9,012 Yuan for the proposed project in the FSR approved by Heilongjiang DRC, which is reasonable according to the investment level of wind power project in China<sup>1</sup>. We have examined 4 similar projects to the proposed project (listed in Table 1) and calculated their investment per kW installed capacity. As Table 1 indicated, compared with the data reported for other similar registered CDM projects in the Heilongjiang province, the total investment is within the acceptable range. The average investment level is calculated as 9,157 Yuan/kWh, which is higher than that in the FSR of the proposed project. Therefore, the total investment in FSR is credible and appropriate to make investment decision.

Furthermore, we have checked the main project contracts including purchase of wind turbine, tower and transformer, equipments installation, and foundation and road construction, the budget value of which in the FSR is 85% of the total investment in the FSR but the factual

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<sup>1</sup> <http://www.stockstar.com/info/darticle.aspx?id=JY,20060324,00059242>

investment value of which has achieved 94.3% of the total investment in the FSR. There is 9% increase to the 85% of budget value and the other 15% of budget value in the FSR still needs to be invested. Therefore, it is impossible to lower the factual total investment of the project by 7.13% in order to make the Project IRR achieve benchmark 8%. Therefore, the total investment in FSR is credible and appropriate to make investment decision.

### **Tariff**

According to the PPA, the guiding tariff approved by regulating entities is executed during the operation period. The guiding tariff of the proposed project was approved finally by National Development and Reform Committee (NDRC) of China as 0.5622 Yuan/kWh (excl. VAT) within 30000 operation hours and using the average tariff of Heilongjiang Power Grid beyond 30000 operation hours on 23 July 2008<sup>2</sup>. Since Heilongjiang power grid is dominated by thermal power plants, where thermal power generation accounts for more than 97.5% of the total power generation<sup>3</sup>, the average tariff in the grid should also be approximately equal to thermal power tariff. The benchmark thermal power tariff in Heilongjiang grid is only 0.30 Yuan/kWh (excl. VAT)<sup>4</sup>. Therefore, after operating 30000 hours, the tariff of the proposed project tends to decrease. Furthermore, evidenced with the electricity sales invoice, the actual executive tariff in electric power transaction is the same as the guiding tariff issued by the government. Therefore, the tariff used for IRR calculation in the PDD is more conservative. The PPA, the tariff approval and the electricity sales invoice have been provided to DOE for cross-checking.

### **Annual output**

According to the feasibility study report of the proposed project, the annual output is estimated based on the long term weather statistic data provided by local meteorological station and wind resources measurement, first using professional software WAsP to select the rich wind source area, and then using software WindFarmer to optimize the location of each turbine for maximize power generation. This method and professional software have been used in many projects in China, so the calculated annual output is credible, accurate and appropriate to be used in the investment decision. Moreover, the annual output is validated and confirmed by the experts in wind power field. The Expert Panel Opinion on Heilongjiang Yilan Hezuolinchang Phase II Wind Power Project has been provided to DOE for cross-check.

Furthermore, compared with the projects in Table 1, the average annual operation hour is 2113, which is lower than the one in FSR of the proposed project. Therefore, the annual output in the FSR is credible and appropriate to make investment decision.

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<sup>2</sup> [http://jgs.ndrc.gov.cn/zcfg/t20080813\\_230722.htm](http://jgs.ndrc.gov.cn/zcfg/t20080813_230722.htm)

<sup>3</sup> China Electric Power Yearbook 2007

<sup>4</sup> Notice on adjustment of the tariff in NEPG issued by NDRC in 2006  
(<http://china.findlaw.cn/fagui/jj/26/104270.html>)

### O&M Costs

The O & M costs include several costs like maintenance fee, employees' salary and welfares, premium fee, material costs and other costs etc. The price of material and salaries of the employees are gradually increasing in China, which leads annual O&M costs gradually increasing<sup>5</sup>. And also, by comparing the percentage of average annual O&M costs<sup>6</sup> relative to total investment of the proposed project with other registered CDM wind projects in Heilongjiang province, the validity of the O&M costs can also be confirmed. Furthermore, compared with the projects in Table 1, the average ratio of average annual O & M costs against total investment is 3.64%, which is higher than the one in FSR of the proposed project. Therefore, the O & M cost in the FSR is credible and appropriate to make investment decision.

**Table 1 Similar projects to the proposed project**

No.	Project No.	Project	Ratio of average annual O & M costs against investment	Investment per kW installed capacity (Yuan/kW)	Predicted Annual operation hour in FSR (h)
1	2200	Heilongjiang Huanan Hengdaishan West Wind Power Project	3.93%	8,276	2070
2	2056	Heilongjiang Huanan Hengdaishan east Wind Power Project	4.3%	8,809	2081
3	0906	Heilongjiang Huafu Muling Wind Farm Project	2.75%	11,185	2232
4	2035	Heilongjiang Yilan Maanshan Wind Power Project	3.58%	8,361	2070
			Average 3.64%	Average 9,157	Average 2113
	2117	Heilongjiang Yilan Hezuolinchang Phase II Wind Power Project	3.14%	9,012	2273

Data source:

1. <http://cdm.unfccc.int/Projects/DB/DNV-CUK1218657862.08/view>

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<sup>5</sup> <http://www.china.com.cn/chinese/EC-c/1246238.htm>

[http://www.chinadaily.com.cn/hqgj/2007-09/03/content\\_6075777.htm](http://www.chinadaily.com.cn/hqgj/2007-09/03/content_6075777.htm)

<sup>6</sup> This is the average data of 20 operational years.

2. <http://cdm.unfccc.int/Projects/DB/DNV-CUK1218460144.88/view>
3. <http://cdm.unfccc.int/Projects/DB/DNV-CUK1169849299.65/view>
4. <http://cdm.unfccc.int/Projects/DB/DNV-CUK1218296845.76/view>

*Question 2. The DOE is requested to confirm the appropriateness of the electricity tariff assumed in the PDD, in comparison with previous tariff notifications for similar projects in the same region which commenced since 2002 and whether such information was available at the time the FSR was prepared.*

Re: Before 22 December 2006, the tariff of wind power projects is approved by the province price bureau and is not publicly available except a few demonstration projects. After 22 December 2006, the guidance tariff of wind power project is regulated by NDRC of China and is published accordingly.

Before 22 December 2006, there were a few wind power projects in the Heilongjiang province. Heilongjiang Mulan Wind Power Project and Heilongjiang Fujin Wind Power Project were both demonstration projects, benefited from more favorable tariff<sup>7</sup> and funded by international low interest loan<sup>8</sup> or national soft loan<sup>9</sup>. Yichun Daqingshan Wind Power Project, Yichun Shimaodingzi Wind Power Project, Heilongjiang Huaifu Muling Wind Farm and Yichun Erduoyan Wind Power Project were registered as CDM projects, and the tariff of them were from UNFCCC website.

According to Statistics on China Wind Farm Installed Capacity in 2007 (by Shi Pengfei, Deputy Director, Chinese Wind Energy Association), all the wind power projects commenced after 2002 and exporting electricity to the same grid (Heilongjiang province grid) are included in Table 2 below. As the Table 2 and Figure 1 indicated, the trend of tariff for these wind power projects is decreasing gradually. The proposed project is in line with the general decreasing trend.

As the Table 2 indicated, from 2002 to February 2008, there were a few wind power projects in the Heilongjiang province. Heilongjiang Mulan Wind Power Project and Heilongjiang Fujin Wind Power Project were both demonstration projects, benefited from more favorable tariff<sup>10</sup>. For the projects (No.3-6), the tariff of is 0.6636 Yuan/kWh (Excluding VAT). The guiding tariff of the project (No.13) is 0.5622 Yuan/kWh (Excluding VAT) from NDRC of China on 3 December 2007<sup>11</sup>. For the projects (No.7-12), the guiding tariff is 0.5622

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<sup>7</sup> <http://www.newenergy.org.cn/Html/00412/20041605.html>

<sup>8</sup> <http://www.newenergy.org.cn/Html/9991/19991799.html>

<sup>9</sup> <http://www.chinapower.com.cn/newsarticle/1005/new1005504.asp>

<sup>10</sup> <http://www.newenergy.org.cn/Html/00412/20041605.html>

<sup>11</sup> [http://jgs.ndrc.gov.cn/zcfg/t20080218\\_192021.htm](http://jgs.ndrc.gov.cn/zcfg/t20080218_192021.htm)

Yuan/kWh (Excluding VAT) from NDRC of China on 23 July 2008<sup>12</sup>. Eight projects (No.3-9 and No.12) were registered as CDM projects and three projects (No.10-11 and No.13) are applying for CDM.

**Table 2 Trends for the tariff of the projects commenced after 2002 in Heilongjiang province**

No	Item	Start time of the project	Tariff Yuan/kWh (Excluding VAT)
1	Heilongjiang Mulan Wind Power Project	12/2003	0.7834 (Source No.1)
2	Heilongjiang Fujin Wind Power Project	09/2004	0.7834 (inquired from the owner of the Huaifu Fujin project)
3	Yichun Daqingshan Wind Power Project	20/05/2005	0.6636 (Source No.2)
4	Heilongjiang Huaifu Muling Wind Farm	20/07/2005	0.6636 (Source No.3)
5	Yichun Shimaodingzi Wind Power Project	20/05/2006	0.6636 (Source No.4)
6	Yichun Erduoyan Wind Power Project	01/07/2006	0.6636 (Source No.5)
7	Yichun Xiaochengshan Wind Power Project	10/02/2007	0.5622 (Source No.6)
8	Heilongjiang Huanan Hengdaishan West Wind Power Project	28/02/2007	0.5622 (Source No.7)
9	Heilongjiang Yilan Maanshan Wind Power Project	28/03/2007	0.5622 (Source No.8)
10	Heilongjiang Fujin Phase II 18MW Wind Power Project	18/04/2007	0.5622 (Source No.9)
11	Heilongjiang Yilan Hezuolinchang Wind Power Project	10/06/2007	0.5622 (Source No.10)
12	Heilongjiang Huanan Hengdaishan East Wind Power Project	03/09/2007	0.5622 (Source No.11)
13	Heilongjiang Wuerguli Wind Power Project	28/02/2008	0.5622 (Source No.12)

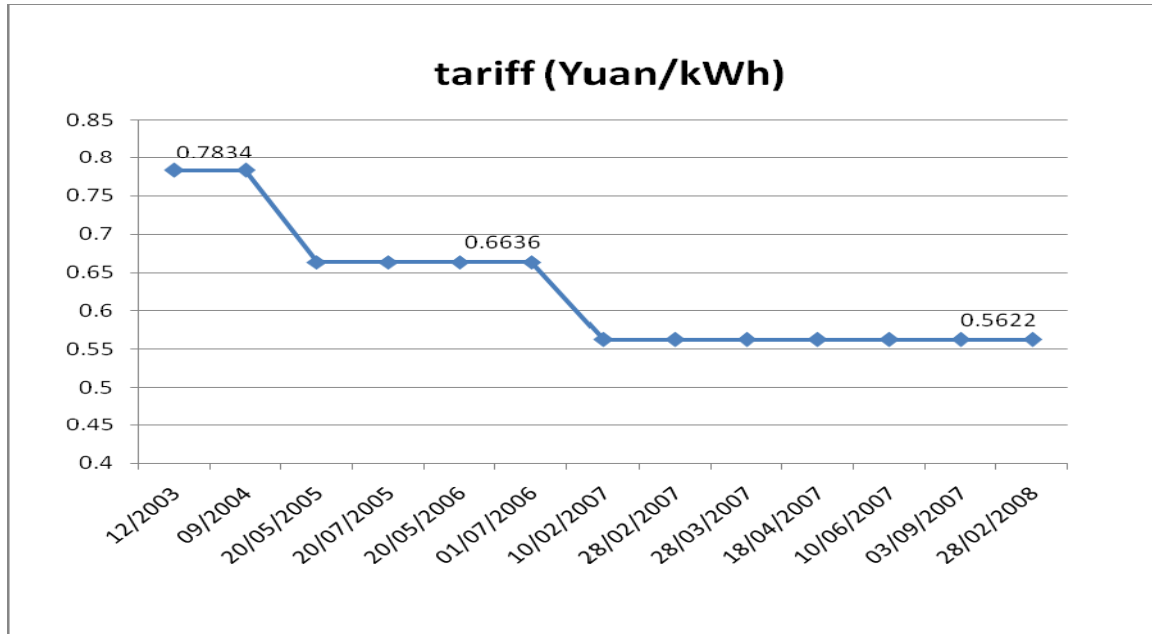
Data Source:

1. <http://www.newenergy.org.cn/Html/00412/20041605.html>
2. Yichun Daqingshan : <http://cdm.unfccc.int/Projects/DB/DNV-CUK1167140122.7/view.html>
3. Huaifu Muling : <http://cdm.unfccc.int/Projects/DB/DNV-CUK1169849299.65/view.html>
4. Yichun Shimaoding : <http://cdm.unfccc.int/Projects/DB/DNV-CUK1180509799.76/view.html>
5. Yichun Erduoyan : <http://cdm.unfccc.int/Projects/DB/DNV-CUK1172484180.34/view.html>
6. Yichun Xiaochengshan: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1227680375.56/view>
7. Hengdaishan West: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1218657862.08/view>
8. Yilan Maanshan: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1218296845.76/view>
9. Fujin Phase II: <http://cdm.unfccc.int/Projects/DB/BVQI1212750031.01/view>

<sup>12</sup> [http://jgs.ndrc.gov.cn/zcfg/t20080813\\_230722.htm](http://jgs.ndrc.gov.cn/zcfg/t20080813_230722.htm)

10. Yilan Hezuolinchang: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1218463806.5/view>
11. Hengdaishan Eest: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1218460144.88/view>
12. Wuerguli: <http://cdm.unfccc.int/Projects/DB/BVQI1218624268.71/view>

**Figure 1 Trends for the tariff of the projects commenced after 2002 in Heilongjiang province**



As the Figure 1 indicated, the tariff for the projects exporting electricity to the same grid, which commenced after 2002, has decreased from 0.7834 to 0.5622 Yuan/kWh (Excluding VAT). The proposed project is definitely in line with the general decreasing trend.

Generally, the government guiding tariff (the approved part e.g. 0.5622Yuan/kWh excluding VAT) should be applied within the 30,000 hour operation period and the tariff for the second period (i.e. after 30,000 hour operation) was guided to be the average tariff in region power grid. Since Heilongjiang power grid is dominated by thermal power plants, where thermal power generation accounts for more than 97.5% of the total power generation<sup>13</sup>, the average tariff in the grid should also be approximately equal to thermal power tariff. The benchmark thermal power tariff in Heilongjiang grid is only 0.30 Yuan/kWh (excl. VAT)<sup>14</sup>. Therefore, after operating 30000 hours, the tariff tends to decrease. At the decision-making process, based on the guidance tariff of the previous projects in the Heilongjiang province from the NDRC of China and using the conservative calculation (more higher tariff was used in the FSR, which has been proved to be reasonable in the response to *Question 1*), the Project IRR of the proposed project is still lower than the benchmark of 8% and the project owner decided to apply for CDM support. In view of the CDM support, the project owner started the project on 26 February 2008.

<sup>13</sup> China Electric Power Yearbook 2007

<sup>14</sup> Notice on adjustment of the tariff in NEPG issued by NDRC in 2006  
(<http://china.findlaw.cn/fagui/ji/26/104270.html>)

*Question 3. The DOE is requested to further clarify how it has validated the investment analysis, in particular, the 5% escalation applied to the operating cost at the same time other input values are fixed.*

Re: The Project IRR calculation is adopted. The financial benchmark Internal Return Rate (after tax) on total investment of Chinese power industry is 8% (the benchmark of Project IRR is 8%), which has been used widely for Feasibility Studies of the power project investments<sup>15</sup>.

IRR calculation of the proposed project is according to the *Economical Assessment Method and Parameters for Construction Project* and consistent with the *Guidance on the Assessment of Investment Analysis* provided by CDM EB. The detail calculation is in the Excel spreadsheet and consistent with the FSR.

As our above response analyzed (response to *Question 1*), the input values used in the investment analysis, including four major factors, i.e. the investment, the tariff, O &M costs and the generation output, had been seriously validated by DOE.

Particularly regarding the escalation for the O & M costs, further clarification are provided in the following:

(1) The O & M costs of the project are composed of five kinds of costs - maintenance costs, annual salaries for the employees, insurance premium of fixed assets, material fee and other costs. The increase in the maintenance costs results in an increase in the O & M costs, as the rest parameters are set basically fixed in the operation period, as shown in Table 3.

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<sup>15</sup> Interim Rules on Economic Assessment of Electric Engineering Retrofit Projects

**Table 3 The O & M costs of the proposed project (Unit: 10000 Yuan RMB)**

<b>Years</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>
Maintenance costs	22	22	311	327	343	360	378	397	417	438	459	482
Annual salaries	51	51	51	51	51	51	51	51	51	51	51	51
Insurance premium	22	22	90	90	90	90	90	90	90	90	90	90
Material fee	25	25	25	25	25	25	25	25	25	25	25	25
Other costs	99	99	99	99	99	99	99	99	99	99	99	99
<b>O &amp; M costs</b>	<b>218</b>	<b>218</b>	<b>575</b>	<b>591</b>	<b>607</b>	<b>624</b>	<b>642</b>	<b>661</b>	<b>681</b>	<b>702</b>	<b>723</b>	<b>746</b>

<b>Years</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>
Maintenance costs	507	532	559	586	616	647	679	713
Annual salaries	51	51	51	51	51	51	51	51
Insurance premium	90	90	90	90	90	90	90	90
Material fee	25	25	25	25	25	25	25	25
Other costs	99	99	99	99	99	99	99	99
<b>O &amp; M costs</b>	<b>771</b>	<b>796</b>	<b>822</b>	<b>850</b>	<b>880</b>	<b>911</b>	<b>943</b>	<b>977</b>



(2) Based on economic evaluation code (*Economical Assessment Method and Parameters for Construction Project*), it has been clearly stated in the economic evaluation code that the escalation could be applied to the maintenance costs and the maintenance costs could have an increase over the operation period<sup>16</sup>.

(3) By examining the latest five registered CDM wind power projects from China (listed in the Table 4 below), it is noted that 3 out of 5 projects have adopted an escalating operating cost method, which in China is also common.

**Table 4 latest five registered CDM wind power projects from China at EB<sup>17</sup>**

No.	Project No.	Project	Does the O & M cost escalate during the operation period?
1	2021	Shandong Haiyang Qiwershan Wind Power Project	No
2	2149	Diaobingshan New-built 49.5MW Wind Power Station Project	Yes
3	1992	Expansion Project of Huadian Inner Mongolia Huitengxile Wind Farm	No
4	2018	Baihubao 33.75MW Wind Power Generation Project in Shanxi Province	Yes
5	2200	Heilongjiang Huanan Hengdaishan West Wind Power Project	Yes
			3 out of 5 projects

(4) Due to the short history of wind power development in China (only about ten years) and the unavailability of a unified national standard on valuing the operating costs. The operating costs (or O&M costs), particularly the maintenance costs included, have been usually predicted by the experienced experts in the design institutes based on the project-specific situation: e.g. climate, traffic condition, geographic factor etc. As the design institute for wind power projects contains a number of experts covering wide field (e.g. wind resource evaluation, generation optimizing, electricity transmission, construction and economic evaluation, etc), its FSR, itself is on the basis of expertise. FSR has also to be validated by the sectoral experts before it could be approved. Therefore, the technology applied and the values set in the FSR could be trusted.

In the operation period, the equipment will certainly be aging, the failure rate will increase, and some parts will be replaced, consequently the maintenance costs will have an increase. So the maintenance rate in FSR was increased annually, the suitability of the increasing rate has been approved by the experts penal and the Heilongjiang DRC.

<sup>16</sup> Methodology and Parameters of Economic Evaluation on Construction Projects

<sup>17</sup> <http://cdm.unfccc.int/Projects/registered.html>

(5) Furthermore, it is conservative to apply escalating O&M costs than to use fixed O&M costs, which is achieved based on the condition that the total O&M costs in the whole operation period maintain unchanged. The response to *Question 1* has indicated that the total O & M cost in the FSR is credible and appropriate to make investment decision. (spreadsheet attached as annex 1)

As the attached spreadsheet indicated, when the cumulative total operating costs remain the same (as the red number in the spreadsheet shown, the total operating costs in Cash flow (fixed O&M cost) is 139.38 million Yuan and the total operation costs in Cash flow (escalating O&M cost) is also 139.38 million Yuan), using a fixed rather than an escalating operating cost in the whole operation period in investment analysis, the Project IRR of the proposed project will have a decrease from 6.94% to 6.62%.

*Question 4. The data used to recalculate the grid emission factor (12/2008) in the PDD submitted for registration was not available at the commencement of validation (10/2008). The PP and DOE are therefore requested to amend the grid emission factor using data, which was available at this date and provide the corresponding calculation of the emission reductions.*

Re: The ex-ante emission factor of 1.1438 tCO<sub>2</sub>/MWh complies with the requirements of the methodology regarding the use of the most up-to-date data at the time of validation. The data of 1999-2006 was used in the calculation of the ex-ante emission factor of 1.1438 tCO<sub>2</sub>/MWh, which was the most up-to-date data at the time of validation and from the *Notice on Confirming China Region Grid Baseline Emission Factor 2008* issued by the NDRC of China on 18 July 2008. The GSC of the PDD started on 30 October 2008. China Electric Power Yearbook 2007 was published in December 2007 and China Energy Statistical Yearbook 2007 was published in March 2008, therefore, the data of 2006 was acquirable before the GSC. The calculation of emission factor 1.1407 tCO<sub>2</sub>/MWh in the published PDD for the GSC was also based on the same data of 1999-2006 but the calculation of BM was different. Furthermore, the total capacity addition during 1999 to 2006 is 23.81% of 2006 installed capacity which is used in the calculation of emission factor 1.1438 tCO<sub>2</sub>/MWh, while the total capacity addition during 2000 to 2006 is 19.39% of 2006 installed capacity which is used in the calculation of emission factor 1.1407 tCO<sub>2</sub>/MWh.

According to the baseline methodology ACM0002 and the guidance from the CDM EB for a deviation of the baseline methodology AM0005 (it had combined into the baseline methodology ACM0002)<sup>18</sup>, the total capacity addition no less than 20% of 2006 installed capacity should be used for emission factor calculation and the BM calculation for the emission factor of 1.1438 tCO<sub>2</sub>/MWh is more consistent with the baseline methodology ACM0002 and the deviation. Therefore, the emission factor calculation has been revised in the validation. The problem of BM calculation has been also found by the NDRC of China,

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<sup>18</sup>[http://cdm.unfccc.int/UserManagement/FileStorage/AM\\_CLAR\\_QEJWJEF3CFBP1OZAK6V5YXPQKK7WYJ](http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZAK6V5YXPQKK7WYJ)

which has revised the emission factor calculation and issued it again on the 30 December 2008.

We sincerely hope that the information provided adequately addresses the concerns raised.

Best regards,

Hu Fang

Longyuan (Beijing) Carbon Asset Management Technology Co.,LTD.

Add: Floor 7, Tower C, International Investment

Building, No.6-9 Fuchengmen North Street,

Xicheng District, Beijing 100034, P. R. China

Tel: 86 10 66091380

Fax: 86 10 66091396

Mob: 86 15901189832

Email: [hufang32@163.com](mailto:hufang32@163.com)