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	IS-CMS-MUC/RZ Rachel Zhang	+49 89 5791-3038 rachel.zhang@tuev-sued.de	+49 89 5791-2756	2009-12-30	1 of 8

Dear Sirs or Madams,

Please find below the response to the review formulated for the CDM project “Jidong Cement Panshi Co., Ltd. 15 MW Cement Waste heat Recovery Project “ with the registration number 2780. In case you have any further inquiries please let us know as we kindly assist you.

Best regards

Rachel Zhang  
Carbon Management Service

Annexes:

1. Table listing all Chinese cement WHR projects supplying electricity to the grid that perform a benchmark analysis
2. TÜV SÜD information reference list (IRL)

Appendices:

- WACC calculation based on 2007

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## **Response to the CDM Executive Board**

### **Request 1:**

The DOE shall provide further clarification on the suitability of the WACC as an appropriate benchmark for the project activity in accordance with the Guidance on the Assessment of Investment Analysis version 2.1 (EB 41, Annex 45, paragraph 13), in particular: (a) the WACC of 2006 for an investment decision made in 2007 and further crosschecking the suitability of WACC by the DOE with the Bloomberg data of 2008; and (b) application of WACC for similar projects with similar risks, developed by the same company.

AND

### **Request 2:**

The DOE shall further substantiate the suitability of input values to the investment analysis in line with the paragraph 111 (c) of VVM, in particular: (a) different annual operating days considered for two cement lines; (b) turbine and generator efficiencies; and (c) O&M costs.

AND

### **Request 3:**

The DOE shall further substantiate how it considers the barriers specific to the project activity as the barrier referred are more appropriate for the cement sector as a whole than the project activity, which is an energy efficiency project in a cement plant.

## **Response by TÜV SÜD:**

### **Issue 1:**

**(a)** In 2006 the Jidong Cement Group made initial decision to start planning for WHR projects with CDM (IRL 62).

Besides the proposed project activity the Jidong Cement Group has implemented five other Waste Heat Recovery Projects in five other Cement plants under CDM (for more information please refer to part b of these answers). For a part of these projects the investment decision has been taken in 2006. Hence the benchmark (all are using the same WACC benchmark) has been calculated for 2006, which is considered suitable.

The Guidance on the Assessment of Investment Analysis, para 13 requires the following:

*„Internal company benchmarks/expected returns“ ... ”should be demonstrated to have been used for similar projects with similar risks, developed by the same company”*

It is the understanding of the audit team that a benchmark once applied by one company should be applied for all similar projects, independent of the investment decision date. Jidong Cement Group has decided on the implementation of a Waste Heat Recovery Project in 2006 and hence the same benchmark should be used in 2007. Following the argumentation above the audit team is of the opinion that the WACC calculation based on 2006 input values is also applicable for the proposed project activity, which had the investment decision in middle of 2007.

To demonstrate that the WACC of 2006 is even conservative, the project participant has calculated WACC of Jidong for 2007.

The WACC for 2007 is calculated in the same way as the 2006 WACC.

The formula can be considered as valid and applicable. The WACC is tax adjusted and it is appropriate to be used as a benchmark for after tax IRR.

The audit team has validated the following sources to check on the input values:

### **Total Debt:**

Audited financial statements as of December 31st 2006 (IRL 57)

### **Total Equity:**

Total equity is calculated by multiplying the share price by the number of shares:

- Source share price (August 2007): Shenzhen Stock Exchange website where the project entity is publicly listed. 1 (IRL 59)
- Source number of shares: Audited financial statements as of December 31st 2006 (IRL 57)

### **Cost of Debt:**

Total cost of debt is taken from official interest rates published by the People's Bank of China

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<sup>1</sup> This can be traced back inserting the project Entity's Share code 000401 and the date 2007/07/13 in the following website:  
<http://www.szse.cn/main/en/marketdata/Securitieshistory/>

- Source cost of debt: The loan's interest issued by the People's Bank of China in August 2006 (IRL 58)

### **Cost of Equity:**

The cost of equity is calculated according to the P/E model as explained above, based on:

- Source "P/E" (share Price/Earnings per Share): Share price as of August 2007 divided by the earnings per share as per the December 31st 2006 audited financial statements (IRL 59, 57).
- Source "g" (estimate of growth of future earnings): Historic and future forecast net earnings data are taken from analyst reports from four different security companies published in 2006 (IRL 41~44), complemented with last available annual audited financial statement (i.e. 31 December 2006) to replace estimates for 2006 used on original "2006 WACC" (IRL 57)
- Source "b" (dividend payout ratio): Historic Earnings per share and dividend payouts as reported in the project developer's audited annual financial statements from 2002, 2003, 2004, 2005 and 2006 (IRL 57, 45) .

All input values are consistent with their sources. Hence the audit team confirms that the WACC of 2007 is correctly calculated.

The WACC of 2007 is 18.16%, which is higher than the WACC of 2006 (15.58%).

Based on the information given above the audit team confirms that the WACC of 2006 is suitable and even conservative for the proposed project activity.

The WACC published by Bloomberg in 2008 was given as an additional independent and 3rd party source, and was not considered in confirmation of the applicability of the benchmark.

We hope that this explanation clarifies that the Bloomberg WACC value was not used as source for justification of the suitability of the benchmark, but only for plausibility check. If requested by the EB, the reference to the WACC calculation can be taken out.

**(b)** TÜV SÜD would like to apologize for the misleading formulation in the Validation report, which has lead to this request.

The project entity has invested in a Waste Heat recovery project in 2001 with a capacity of about 10 MW (IRL 25). The project had an IRR of 33.73% which clearly crossed the benchmark of 15.58 %. Due to steam constrains the project had to implement an additional coal based boiler one year after the implementation of the WHR project. This implementation caused the IRR to decrease to 24.88 % (IRL 54). Nevertheless the benchmark of 15.58% has still been crossed and hence Jidong invested in the project.

In 2002 the Chinese energy sector has been liberalized leading to a changing relation between investment, operational costs and revenues. The similar has been observed in Europe, when the energy sector has been liberalized in the 90s of the last century.

Based on our country expertise and as it is confirmed in the response from PP the frame conditions for investments in this sector significantly changed since 2001 and cannot be compared with the frame conditions at the moment of taking the decision for the later projects, which is the reason for the difference in the values of IRR.

Hence the requirement of paragraph 13 of the Guidance on the Assessment of Investment Analysis version 2.1, in particular, application of WACC for similar projects with similar risks, developed by the same company has been met by the proposed project activity.

TÜV SÜD further has checked on the investment portfolio of Jidong over the last years. Investments in the core business (e.g. clinker lines and grinding mills) have all crossed the internal benchmark (with an average IRR of 24.23%). This shows that the benchmark has consistently been applied within the company.

Furthermore Jidong invests in 5 other similar cement WHR projects. These projects would not be implemented without CDM revenues, which helped to increase the IRR to a level above the benchmark. These 5 projects are the following:

- Tangshan Jidong Cement Guye District 12MW Cement Waste Heat Recovery Project
- Tangshan Jidong Cement Matoushan Matishan 25MW Cement Waste Heat Recovery Project
- Tangshan Jidong Cement Guye District 8 MW Cement Waste Heat Recovery Project
- Tangshan Jidong Cement Fengrun District 12MW Cement Waste Heat Recovery Project
- Jidong Cement Jilin Co., Ltd 6 MW Cement Waste Heat Recovery Project

Four of them are in the process of being registered by the EB, and the fifth one has been registered by the EB already (UNFCCC reg. no. 2701).

In total there are 6 Waste Heat recovery projects which have been implemented by the project owner, one in 2001 and 5 additional ones in 2006 which have overcome the investment hurdle due to additional finance through CDM.

## **Issue 2:**

The DOE has checked the data applied in the PDD and IRR analysis with the Feasibility Study Jidong Cement Panshi Co., Ltd. 15 MW Cement Waste heat Recovery Project (IRL 6). All parameters listed in the FSR have been taken as input values.

The FSR has been completed by an independent and certified design institute (IRL 63) in July 2007, which is before the investment decision. The time between the FSR issuance and the starting date of the project activity are only 4 months.

The FSR has been approved by the government (IRL 7)

Hence the DOE confirms that the values have been valid and applicable at the time of the investment decision.

Furthermore the DOE cross checked the input values:

### **(a) Different annual operating days considered for two cement lines**

The project recovers waste heat from two clinker lines, with a capacity of 3200 t/d and 4000 t/d. The first cement production line (3200 t/d) was already operating at the time of FSR preparation and the second line (4000t/d) is a new one.

As the first line (3200 t/d) has already been operating historical data from the most recent three years have been available and have been used for the  $f_{cap}$  calculation (average production days of 352 days/year).

No historical values have been available for the second line at the time of uploading for registration. Hence the clinker production assumptions from the FSR have been used for the  $f_{cap}$  calculation.

In the FSR, the clinker production plant is assumed to be operating for 310 days/year. This is in line with "Code for Design of Cement Plant" (IRL 64, 65), where it is assumed that a cement production line is operating on a 85% basis (365 days/year \* 0,85 = 310 days/ year). The audit team confirms that these assumptions are appropriate.

The 4000 t/d clinker line has been put in operation since the project has been submitted for registration. The audit team has checked on the Panshi Cement Production in 2009 and can confirm that operational days of 310 days are realistic, since the 4000 t/d clinker line has been operating for 314 days.

The clinker production values are used for the  $f_{cap}$  calculation. The audit team would like to highlight that the assumption of 310 operation days is even conservative considering that  $f_{cap}$  would rise with an increased production.

### **(b) Turbine and Generator efficiencies**

The efficiency of the turbine and the generator has been crosschecked with the manufacturer's data (IRL 31).

According to "Anhui Hailuo (Conch) Kawasaki Engineering Co. Ltd.", the turbine has an efficiency between 80~82% and the generator 97~97.4%.

These parameters can furthermore be confirmed by the experts of China Cements (IRL 61).

Hence the audit team confirms that the values applied by the project participant are reasonable and applicable.

### **(c) O&M costs:**



The DOE has cross checked the parameter by comparing the assumed salaries and employees with the actual situation (Payrolls from Panshi, IRL 66).  
The assumed values in the FSR are slightly lower than the actual values.

Wages and benefits	Unit	FSR	Actual	Source actual
Wage	RMB/year	28,800	29,145	Project's official payroll
Staff members	Persons	33	35	

The audit team concludes that the assumptions taken in the FSR are reasonable and appropriate. Considering that they are lower than the actual one, they can also be seen conservative.

If the O&M costs are reduced by 28%, the benchmark of 15.58% will be crossed. A decrease of 28% is very unrealistic, as the material and welfare costs rose in the last years.

The audit team has further more cross checked the O&M cost with Perry's Chemical Engineers' Handbook, 8th edition. It can be confirmed that the assumed values in the FSR are reasonable.

**Issue 3:**

TÜV SÜD wants to clarify that the barriers mentioned in the PDD are referring to energy efficiency projects in general – and are not restricted to the Cement Sector.

**World Bank Report:**

- *The project development objective is to improve the energy efficiency of medium and large-sized industrial enterprises in China,...” (World Bank 2008, page 4)*
- *“Chinese banks have considered lending for energy conservation projects to be risky” (WB2008 report page 2)*
- *“...these characteristics lead to the perception that energy conservation projects are technically risky and financially unattractive, especially when compared with capacity expansion” (WB2008 page 2)*

These statements refer to energy efficiency projects in all industrial sectors in China.

**International Finance Cooperation:**

- *“The Program will organize and provide...to directly support implementation of energy efficiency (EE) projects.” (IFC 2006, page 1)*
- *“Commercial banks impose higher guarantee requirements on the financing of energy efficiency projects.” (IFC 2006 Page 38)*

These statements refer to energy efficiency projects in the Cement Sector.

The above statements show that the barriers are specific to energy efficiency projects, including those at cement plants, and not specific to only the cement sector as a whole.

TÜV SÜD would further like to highlight that the above statements are in line with The “Guidelines for the Objective Demonstration and Assessment of Barriers” as well as the “Tool for the Demonstration and Assessment of Additionality” and hence can be considered as credible evidences for the demonstration of barriers.

**Please find below the answers from the project participants.**

***1. The DOE shall provide further clarification on the suitability of the WACC as an appropriate benchmark for the project activity in accordance with the Guidance on the Assessment of Investment Analysis version 2.1 (EB 41, Annex 45, paragraph 13), in particular: (a) the WACC of 2006 for an investment decision made in 2007 and further crosschecking the suitability of WACC by the DOE with the Bloomberg data of 2008; and (b) application of WACC for similar projects with similar risks, developed by the same company.***

Although the Request for Review is directed to the DOE, the project participant is more than happy to contribute to the clarification of the issue raised by the EB.

We will clarify below that a) the timing of the WACC is appropriate and moreover conservative compared to a WACC calculated in 2007, and that b) similar project with similar risks, developed by the same company have also applied the same WACC.

**A) Timing of WACC and Reference to Bloomberg WACC**

Bloomberg does not keep historical WACC data for Jidong on its information terminal, and therefore a 2006 or 2007 Bloomberg WACC value is not available.<sup>1</sup> The WACC published by Bloomberg in 2008 was referred to by the Project Participant, as this Bloomberg WACC represents an additional independent and 3<sup>rd</sup> party source thereby giving it the credibility required to further support the WACC calculation by the Project Participant, based on reliable and verifiable data sources. We believe that although the timing of the 2008 Bloomberg WACC is slightly later, that the Bloomberg WACC confirms the reliability of the WACC calculation for as presented by the project participant, as the calculated WACC result is comparable to the one published by Bloomberg at a slightly later time. However, should the EB believe the reference to the Bloomberg WACC is not appropriate the Project Participant is happy to remove it, as the data sources use in the actual WACC calculation are in itself all reliable and from public sources as we will describe below.

Jidong made a general Group decision in August 2006 (see Table 7 in PDD requesting registration) to explore the development of a set of WHR projects with the support of CDM. This led to the initiation of the proposed project activity and 5 other WHR projects (listed below under our response to question 1.b). This is the reason the project participant presented a WACC based on 2006 data, as this is the time the initial planning of the proposed project activity and the other 5 WHR projects referred to above was initiated. The project participant therefore believe the 2006 WACC is the appropriate WACC.

However, since the actual and formal project specific investment decision for the proposed project activity was indeed taken in mid-2007 (see Table 7 in PDD requesting registration, indicating the final investment decision was made in August 2007, and the Start of the Project Activity was in October 2007), we will in our response to this Request for Review recalculate the WACC for 2007, which shows that the “2006 WACC” is a conservative interpretation of the additionality requirements (i.e. the “2007 WACC” is higher than the “2006 WACC”). For the calculation of the “2007 WACC”, the following data sources have been used and verified by the DOE:

Data	Source
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<sup>1</sup> Additionally, Bloomberg does not retain all of the input values, particularly the risk premiums, to enable us to recreate the calculation that they would have performed in 2006 or 2007.

Total Debt	<p>Total debt is taken from audited financial statements:</p> <ul style="list-style-type: none"> <li>Source total debt: Audited financial statements as of December 31<sup>st</sup> 2006.</li> </ul> <p><i>(this is the most recent available data at the time of the investment decision, i.e. the Board resolution on CDM in August 2007, as the audited annual financial statement for the year 2007 was not available in August 2007)</i></p>
Total Equity	<p>Total equity is calculated by multiplying the share price by the number of shares:</p> <ul style="list-style-type: none"> <li>Source share price (August 2007): Shenzhen Stock Exchange website where the project entity is publicly listed.<sup>2</sup></li> <li>Source number of shares: Audited financial statements as of December 31<sup>st</sup> 2006.</li> </ul> <p><i>(both data sources are the most recent available data at the time of the investment decision, as no audited annual financial statement for the year 2007 were available at the time of the investment decision)</i></p>
Cost of Debt	<p>Total cost of debt is taken from official interest rates published by the People's Bank of Chin.</p> <ul style="list-style-type: none"> <li>Source cost of debt: The loan's interest issued by the People's Bank of China in August 2006</li> </ul> <p><i>(this is the most accurate and available data at the moment of the investment decision, and corresponds to the "Total Debt" as listed above).</i></p>
Cost of Equity	<p>The cost of equity is calculated according to the P/E model as explained above, based on:</p> <ul style="list-style-type: none"> <li>Source "P/E" (share Price/Earnings per Share): Share price as of August 2007 divided by the earnings per share as per the December 31<sup>st</sup> 2006 audited financial statements.</li> <li>Source "g" (estimate of growth of future earnings): Analyst reports from 4 leading securities brokers complemented with last available annual audited financial statement (i.e. 31 December 2006) to replace estimates for 2006 used on original "2006 WACC".<sup>3</sup></li> <li>Source "b" (dividend payout ratio): Historic Earnings per share and dividend payouts as reported in the project developer's audited annual financial statements from 2002, 2003, 2004, 2005 and 2006.</li> </ul> <p><i>(All sources are applicable and most recent at the time of the investment decision in 2007; note that the 2007 audited annual financial statement was not available in August 2007)</i></p>
Corporate income tax rate	<p>Conservative Assumption 33% is the maximum tax in 2007 (note that the current tax rate of 25% is lower).</p>

All data has been taken from reliable and official sources that have been validated and confirmed to be accurate and applicable by the DOE. Additionally, for every specific parameter, the most recent available data at the time of the actual investment decision in 2007 have now been taken.

<sup>2</sup> This can be traced back inserting the project Entity's Share code 000401 and the date 2007/08/13 in the following website: <http://www.szse.cn/main/en/marketdata/Securitieshistory/>

<sup>3</sup> The average estimate of these 4 reports has been used. The securities brokers' reports are from: Guang Fa Securities (issued April 2006), United Securities (issued April 2006), Hai Tong Securities (issued August 2006), and Guotain Junan Securities (issued August 2006). These 4 are leading securities brokers are the only ones that publish an estimated growth of future earnings for the project entity in 2006: and rank Number 5, 16, 4, and 2 respectively out of 172 Chinese securities brokers based on total amount of stock trading. See: website of Securities Association China [http://www.sac.net.cn/newcn/home/info\\_detail.jsp?info\\_id=1236073459100&info\\_type=CMS.STD&ate\\_id=81183692051100](http://www.sac.net.cn/newcn/home/info_detail.jsp?info_id=1236073459100&info_type=CMS.STD&ate_id=81183692051100)

The resulting “2007 WACC”, based on the above mentioned reliable data sources, is calculated as 18.16%.

In conclusion, please note that 1) the project participant, as explained above, believes the “2006 WACC” as presented original PDD requesting registration remains the most applicable and appropriate WACC, 2) Also kindly note that the “2006 WACC” calculated in the original PDD requesting registration, the “2007 WACC” calculated above, and the “2008 WACC” as published by Bloomberg are not significantly different and all support the same conclusion, and 3) Finally please kindly note that in fact the “2007 WACC” is above the WACC in the PDD requesting registration, implying that the PDD requesting registration is conservative.

The results of each WACC calculation (2006, 2007, and 2008) are all comparable and all lead to the same conclusion, i.e. that the IRR of the proposed project activity without additional CER revenues is not sufficiently high to surpass the internal company benchmark. The project participant would be happy to include this explanation in the PDD.

### **B) Application of WACC for similar projects**

Paragraph 13 of the Guidance on the Assessment of Investment Analysis (version 2.1), requires a comparison of the IRR of similar projects with similar risks, developed by the same company to the Company Internal Benchmark (i.e. the WACC).

As a cement producer, projects implemented by the project entity include:

- Core activity projects (clinker lines and grinding mills): In the PDD requesting registration we have shown that all these projects are consistently implemented with an IRR above the Company Benchmark (and with an average IRR of 24.23%). This has been evidenced by means of all FSRs of these projects. Additionally, we argue based on documentation of the World Bank, International Finance Corporation, and Asian Development Banks (see references in our response below to question 3), that the project entity has a natural and strategic preference for these type of projects and that therefore it is conservative to compare the project activity to these “core activity” projects. However, we understand that the EB is of the opinion that this comparison is not correct and respect the opinion of the EB.
- One early WHR project in 2001: The project entity implemented in 2001 a low temperature WHR project with an installed capacity of slightly below 10MW. This project was in fact implemented at that time, as has been evidenced to the DOE. And the project IRR of this early WHR project was indeed 33.73% in its FSR (reason for this high IRR is the low cost at that time <sup>4</sup>). Evidences will be uploaded together with this response.<sup>5</sup> This indicates that one

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<sup>4</sup> Note that this project was implemented at a very early stage, when costs in China were considerably lower. The DOE has been provided with a cost comparison in China (inflation of relevant prices) indicating that this early project benefitted from significant lower cost compared to the proposed project activity (fixed asset and labor cost in Hebei Province increased by 17.2% and 127.9% respectively, already in the 5 years following implementation of this early project). The lower costs in 2001 imply that the unit investment cost was 5,047 RMB/kW for the 2001 WHR project, but 6,438 RMB/kW for the proposed project activity. At the same time the tariff did not significantly increase. This explains why this earlier WHR project could be implemented with a high IRR at that time.

<sup>5</sup> We will upload, together with this response, the FSR of the WHR project listing an IRR of 33.73%, together with the government approval (i.e. JiJiZiYuan [2001] No.375, issued by the Provincial

similar project was in fact implemented with an IRR above the company internal benchmark, confirming the Company Internal Benchmark.

One year later, in 2002, the project entity decided to retrofit some of its on-site coal fired heat boilers (inefficient boilers). Most of the heat from these boilers will be used for on-site heating purposes, and a minor share of the heat from these coal fired boilers is provided to the existing early WHR project to ensure a reliable and stable supply of heat and increase efficiency of the WHR project. As evidence, the FSR and approval of these coal fired boilers will be uploaded to UNFCCC together with this response.<sup>6</sup>

To conclude, the project entity did implement a similar WHR project with an IRR above the WACC, confirming the Company Internal benchmark. The fact that later some heat was added by a replaced coal fired heat boiler, to increase and ensure a stable heat supply to the WHR project, does not change that this project was originally implemented as a WHR project.

- Other current WHR projects: Besides the proposed project activity, the project entity has also implemented 5 other similar cement WHR projects. These projects were implemented based on the prospects of CDM revenues, which increased the IRR to a level above the benchmark. These 5 projects are almost identical to the proposed project activity and include:
  - Ø Tangshan Jidong Cement Guye District 12MW Cement Waste Heat Recovery Project<sup>7</sup>
  - Ø Tangshan Jidong Cement Guye District 8 MW Cement Waste Heat Recovery Project<sup>8</sup>
  - Ø Tangshan Jidong Cement Fengrun District 12MW Cement Waste Heat Recovery Project<sup>9</sup>
  - Ø Tangshan Jidong Cement Matoushan Matishan 25 MW Cement Waste Heat Recovery Project<sup>10</sup>
  - Ø Jidong Cement Jilin Co., Ltd 6 MW Cement Waste Heat Recovery Project<sup>11</sup>

These projects have been implemented based on the prospects of CDM. Four of them are in the process of being registered by the EB, and the fifth one has been registered by the EB already. With CER revenues, the IRR of these projects is above the company benchmark which is why the project entity could implement these projects. Without CDM revenues, the IRRs of these projects would be below the company internal benchmark and these projects would not have been implemented.

Analysis of the project entity's past behavior shows that all core activities have been implemented with a financial return above the company benchmark. It further shows that one early WHR project (in 2001), was implemented with a financial return above the company benchmark. Finally, there are 5 other WHR projects implemented by the project entity based on CDM

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Development and Planning Committee) of this early WHR project, both mentioning the project will be based purely on WHR.

- 6 We will upload, together with this response, the 2002 FSR of this coal fired boiler retrofit, together with the government approval (i.e. Shijingmaozizi (2002) No.50, issued by the Economic and Trade Committee of Tangshan City) of this project in 2002. These documents clearly show that this project was implemented as "coal fired boiler retrofit" after the above mentioned WHR was already implemented and existing, these documents clarify that "this project is implemented to increase overall efficiency onsite of the industrial facility, and partly to ensure a more stable heat supply to the existing WHR project".

Finally, please also note that replacement of the coal-fired heat boilers itself was done at an IRR of 24.88% according to its FSR (which is above the Company Internal Benchmark).

- <sup>7</sup> Project is registered by the EB, with UNFCCC reference number 2701

- <sup>8</sup> UNFCCC reference number 2731

- <sup>9</sup> UNFCCC reference number 2733

- <sup>10</sup> UNFCCC reference number 2587

- <sup>11</sup> UNFCCC reference number 2851

consideration which helped to increase the financial returns to a level above the company benchmark.

***2. The DOE shall further substantiate the suitability of input values to the investment analysis in line with the paragraph 111 (c) of VVM, in particular: (a) different annual operating days considered for two cement lines; (b) turbine and generator efficiencies; and (c) O&M costs.***

Although the Request for Review is directed to the DOE, the project participant is more than happy to contribute to the clarification of the issue raised by the EB.

### **The valid and applicable input values**

For ease of reference, let us copy paragraph 111(c) of the VVM:

***111.*** *The Board clarified that in cases where project participants rely on values from Feasibility Study Reports (FSR) that are approved by national authorities for proposed project activities, DOEs are required to ensure that:*

***(c)*** *On the basis of its specific local and sectoral expertise, confirmation is provided, by crosschecking or other appropriate manner, that the input values from the FSR are valid and applicable at the time of the investment decision.*

In line with the paragraph 111 (c) of VVM, for the investment analysis of the proposed project activity in the PDD uploaded requesting registration, the parameters listed in the Feasibility Study Report (FSR), without exemption, have been used as input values. The FSR has been approved by the appropriate government,<sup>12</sup> and was completed and issued by an independent and certified 3<sup>rd</sup> party design institute which is qualified to compile design reports for the cement industry.<sup>13</sup> The FSR (including the parameters listed therein which are used as input values in the investment analysis) can therefore be considered an independent assessment of the proposed project activity, which was subsequently approved by the government. The FSR (source for all input values) was completed and issued in July 2007, before the investment decision. Therefore, in accordance with paragraph 111(c) of the VVM, all input values were “*valid and applicable at the time of the investment decision*”.

Below we will provide several arguments as to why the input values estimated by the licensed and qualified design institute are reasonable and appropriate.

### **A) Annual operating days considered for two cement lines**

The FSR, approved by the appropriate government and issued by an independent and certified 3<sup>rd</sup> party design institute which is qualified to compile design reports for the cement industry,

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<sup>12</sup> The FSR has been implicitly approved when the General Project Approval was obtained (30 October 2007), issued by the “Provincial Economic Committee of Jilin Province”.

<sup>13</sup> The FSR was completed and issued by the “Hebei Province Building Material Industry Design & Research Institute”. This entity is It has obtained a “A grade of Engineering Consultation Certificate in cement industry, cement products, and inorganic - non metallic material”, issued by the “National Development and Reform Commission” of the Peoples Republic of China.

illustrates that the project is to utilize waste heat from the 3200t/d and 4000t/d cement production lines for generating electric power.

- Before the project activity, the 3200t/d cement production line has been operating by itself, although it needed to support the complete cement facility. We have used the historical data from the most three years of clinker production for the fcap calculation, as this is conservative. However, with the establishment of the 2<sup>nd</sup> clinker line, the initial clinker line will start a normal operation patterns in accordance with technical specifications, the design, and the common practice (as described below) as the initial operating days of this 1<sup>st</sup> clinker line (from before the 2<sup>nd</sup> clinker line (i.e. the 4000 t/d) was operational) was not technically sustainable.
- Regarding to the newly build 4000t/d cement production line, the FSR estimates the clinker production and assume the industrial operation by considering the normal operation and regular maintenance based on the industrial characteristics. This is a reasonable estimation:
  - Ø Estimated by independent expert 3<sup>rd</sup> party expert;
  - Ø We can confirm and crosscheck the operating days on the basis of the “*Code for Design of Cement Plant*” of the National Standards of China (GB 50295-2008; GB 50295-1999)<sup>14</sup>. According to the national standard for the industrial code, the annual operational rate of the cement production line is • 85%. The code implies the annual operating days as 310.25<sup>15</sup> days, which is quite same as the operating days (310 days) for the 4000t/d cement production line of Jidong and any clinker production (for example, 3200t/d clinker line) above 85% could be also considered reasonable.
  - Ø Finally, since time has passed since for uploading requesting registration, it is possible to look at the actual operating days of the 4000 t/d clinker line, as recorded during the last year (evidence has been provided to the DOE). This illustrates that the estimated 310 annual operating days is reasonable (in accordance with above mentioned guidance) as the actual operating days in 2009 was is 314 days.

Hence, we can conclude that our “crosscheck” in accordance paragraph 111(c) of the VVM the annual operating days for two cement lines is reasonable.<sup>16</sup>

### **B) Turbine and generator efficiencies**

When specifying the efficiency of the turbine and generator, based on the local and industrial expertise, the efficiency could be crosschecked and confirmed by the manufacturer’s specifications (which has been provided and confirmed by the DOE) issued by Anhui Hailuo Kawasaki (Chuanqi) Engineering Co., Ltd. who manufactured and supplied the main equipments including the turbine and generator to the project. According to the technical specifications, the

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<sup>14</sup> Data source: <http://www.csres.com/detail/193646.html>; <http://www.csres.com/detail/20537.html>

<sup>15</sup> The annual operating days would be calculated as  $365 \times 0.85 = 310.25$  days.

<sup>16</sup> Please kindly keep in mind, as described above, that the estimated operating days of both clinker lines is reasonable and similar. The only reason the 3200 t/d clinker line operated above its normal capacity initially was due to the fact it had to shoulder complete productions until the 2<sup>nd</sup> clinker line was installed (and this is not technically sustainable in the long run, however, this unreasonable high operating days is used for the fcap calculation to be conservative). The FSR of the WHR project, in accordance with reasonable crosschecks, estimates the available waste heat based on reasonable 310 operating days for both clinker lines.

efficiency of turbine is between 80%~82% and the efficiency of generator is between 97%~97.4%.

Furthermore, the efficiency of turbine and generator could be further crosschecked by local industrial expertise. In the “*Analysis on the pure low-temperature waste heat recovery utilization in the dry-method process cement production line*”, composed by two experts from CITIC Heavy Industries Co., Ltd. (CITIC HIC)<sup>1718</sup>, the efficiency of the turbine (•<sub>oi</sub>) is between 75%~85% in the normal condition, and the efficiency of the low-temperature steam turbine particularly in the cement industry can be specified as 80%; the efficiency of the generator (•<sub>d</sub>) is between 97%~98% and normally specified as 98%.

After the appropriate confirmation and crosscheck based on the manufacturing specifications and the industrial expertise, we conclude that the efficiency of the turbine and generator are both valid and applicable at the time of the investment decision in accordance with paragraph 111(c) of the VVM. Both the manufacturing specifications and industrial expertise have been provided to the DOE for review and confirmation.

### **C) Annual O&M Cost**

The annual O&M cost has been estimated by the independent and certified design institute based on their experience in estimating O&M cost for cement WHR projects. The project has not been operational for audited actual O&M cost to be available. However, to estimate the O&M cost, the design institute has used unit cost as input values in their model. It is possible to compare these unit costs to the actual current unit costs. Based on this we can conclude that unit costs of materials and labor have all increased significantly compared to the unit costs that the design institute used in their model to estimate the O&M cost. For example, the unit price of materials & chemicals used to estimate the O&M cost have increased on average by 27% since the design institute estimated the O&M cost.<sup>19</sup> Likewise, the average unit cost for labor used in the FSR (page 53), i.e. 28,800 RMB/year, has been compared to the current actual average wage level which is available and is 29,145 RMB/year. Additionally, from the employment list of the project developer, it is shown that instead of the planned 33 staff members (FSR, page 53), the project employed actually 35 staff members. We provide an overview of the increase in main costs in below table:

Wages and benefits	Unit	FSR, p 53	Actual	Source actual
Wage	RMB/year	28,800	29,145	Project's official payroll, provided by Human Resource Department of project developer
Staff members	Persons	33	35	

Based on the increase in material cost price, wage levels, and amount of employed staff, we can conclude that the estimated O&M cost in the FSR are a conservative estimation.

Additional to the above, we have in accordance with paragraph 111(c) of the VVM “*crosschecked that the input values are appropriate*”, by comparing the input value specifically mentioned by the EB, i.e. the annual O&M cost, to the value of Chinese Cement WHR projects

<sup>17</sup> CITIC HIC is one of the largest heavy machinery manufacturers in China. <http://www.citchmc.com/>

<sup>18</sup> The industrial expertise can be also found from the website: [http://www.chinacements.com/tech/detail/detail\\_673.html](http://www.chinacements.com/tech/detail/detail_673.html)

<sup>19</sup> The unit prices in the FSR (page 53) used to estimate the O&M cost, have been compared to the actual unit prices available at the following trading website: <http://b2b.hc360.com/supplyself/64233069.html>

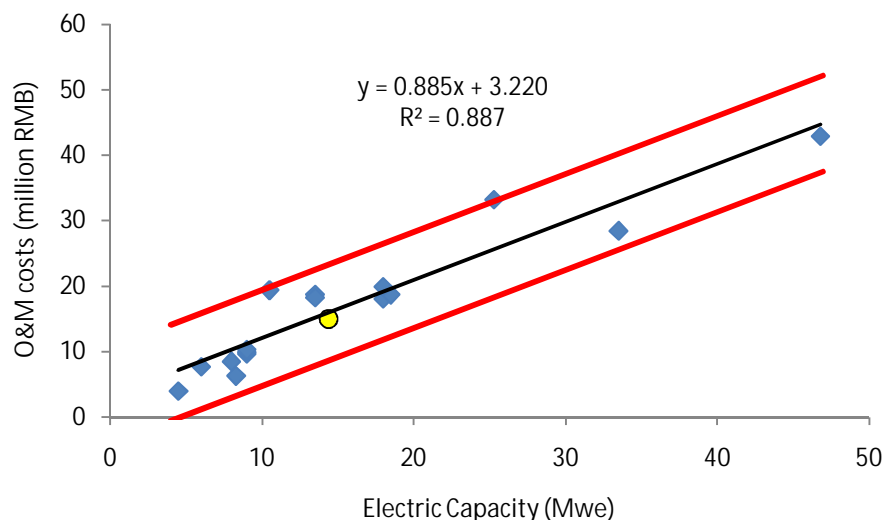
that are registered to date.<sup>20</sup> We have listed the parameters for all registered cement WHR projects in Annex 1 and based on this data we have performed a regression analysis (analysis has been provided to the DOE and has been summarized in Annex 1, and regression analysis described below) which demonstrates that for the input value mentioned by the EB, the input value of the proposed project activity is either within 2 Standard Errors from the trend, or that the input value assumed for the proposed project activity is conservative compared to the trend.

As mentioned above, we have compared the annual O&M cost of the proposed project activity in the FSR (i.e 14,955,900RMB) to similar registered projects listed in Annex 1. The projects were plotted in a scatter graph with their O&M costs in RMB on the (y)-axis and the Installed Capacity in MW on the (x)-axis. These projects are the basis of the regression analysis. The installed capacity was predicted based on the average mean of the O&M cost per installed capacity and the standard deviation. The regression formula has been defined as:

$$\text{O\&M (million RMB)} = 0.885 * \text{Cap (MW)} + 3.220$$

The correlation coefficient ( $R^2$ ) of 0.887 indicates there is a good correlation between the O&M costs and the electric capacity. The standard error (SE) of 3.675 has been calculated based on the difference between the predicted (theoretical) values and the O&M costs listed in the PDDs.

The figure below depicts a regression analysis assuming a linear relationship between the Installed Capacity in MW and the O&M costs in RMB for similar cement WHR projects. The proposed project activity (yellow dot) is within -2 standard errors (indicated in red line) below the black trend line, which means that the O&M costs of the project activity can be considered reasonable compared to all other similar projects. Hence, we can conclude our “crosscheck” in accordance paragraph 111(c) of the VVM, concludes that an IRR calculation based on the O&M costs listed in the FSR reasonable.



<sup>20</sup> Clarifications on other input values are also available, but we decided to stick to the input value specifically mentioned by the EB. If the EB should require additional clarification, the PP would be happy to provide this.

***3. The DOE shall further substantiate how it considers the barriers specific to the project activity as the barrier referred are more appropriate for the cement sector as a whole than the project activity, which is an energy efficiency project in a cement plant.***

We appreciate this opportunity to clarify that the barriers that are mentioned in the PDD apply to energy efficiency projects in general – and not specifically to projects in the cement sector. This fact is clearly brought forward in the relevant reports from the World Bank, IFC, and ADB – as is emphasized by the following quotes from these reports:

**World Bank <sup>21</sup>**

- “The project development objective is to improve the energy efficiency of medium and large-sized industrial enterprises in China,...” (World Bank 2008, p.4)
- “There are three key barriers which have impeded the development of the lending market for medium and large-sized industrial energy conservation investments, despite its large potential.” (World Bank 2008, p.2)

**International Finance Corporation <sup>22</sup>**

- “The Program will organize and provide...to directly support implementation of energy efficiency (EE) projects.” (IFC 2006, p.1)
- “Despite government policies in favor of EE, market barriers still limit the use of EE equipment.” (IFC 2006, p.1)

**Asian Development Bank <sup>23</sup>**

- “The lack of technical competence among commercial banks to make a technical assessment of energy efficiency projects is a key bottleneck.” (ADB 2007, p.5)
- “...the main reasons why financially viable energy efficiency projects fail to attract commercial bank loans in the PRC are summarized as follows:” (ADB 2007, p.3)

The above quotes illustrate that these documents are concerned with energy efficiency projects in general, as opposed to the cement sector specifically. Furthermore, the above documents are considered to be credible evidence by both the Guidelines for the Objective Demonstration and Assessment of Barriers as well as the Tool for the Demonstration and Assessment of Additionality – which both deem “*relevant (sectoral) studies or surveys (e.g. market surveys, technology studies, etc.) undertaken by universities, research institutions, industry associations, companies, bilateral/multilateral institutions, etc.*” to constitute credible evidence.

Therefore, the barriers are clearly specific to energy efficiency projects, including those at cement plants, and not specific to only the cement sector as a whole.

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<sup>21</sup> “Project Appraisal Document on a Proposed Loan in the Amount of US\$200 Million and a Proposed Grant from the Global Environment Facility Trust Fund in the Amount of US\$13.5 Million to the People’s Republic of China in Support of the Energy Efficiency Financing Project.” World Bank. 21 April 2008.

<sup>22</sup> “Project Executive Summary for the China Utility-Based Energy Efficiency Finance Program (CHUEE).” International Finance Corporation. 13 February 2006.

<sup>23</sup> “Proposed Credit Guarantee – People’s Republic of China: Energy Efficiency Multi-project Financing Program.” Asian Development Bank. November 2007.


Additionally, we would like to point out (as described in the PDD requesting registration) that the project activity received a Bank Loan with specific reference to and based on the consideration of additional CER revenues. The Bank specified that the WHR projects of Jidong developed as CDM projects and signed emission reductions purchases agreement is one of the key considerations of the bank loan commitment. Therefore, the project activity, with the help of CDM, managed to overcome the financing barriers for its energy efficiency projects as described by the Worldbank, IFC, and ADB.

However, should the EB believe there is no financing barrier, we are happy to delete this barrier from the PDD and argue additionality on the basis of the low profitability (i.e. below the WACC).


## Annex 1

The following table depicts all registered cement waste heat recovery CDM projects in China. Please note that the numbers are rounded. In order to crosscheck the O&M cost, we have compared to projects 1 to 16, as project number 17 is replacing a captive coal-fired power station registered based on a marginal cost comparison, and projects 18 to 27 perform a barrier analysis in the PDD and therefore input values for the IRR are not provided and have not been crosschecked by the DOE during validation and the EB during registration.


No.	UNFCCC Ref.	Project Title	MWe	O&M RMB million
1	1427	Low-temperature waste heat recovery for electricity generation project of Anhui Huaibei Mining (Group) Cement Co. Ltd.	5	3.97
2	1674	Waste Heat Recovery and Utilisation for Power Generation Project of Jiande Conch Cement Company Limited	8	6.3
3	1696	Power Generation by Waste Heat Recovery Project of Xinjiang Tianshan Cement Co. Ltd. in Urumqi City, Xinjiang Autonomous Region, P. R. China.	6	7.69
4	1450	8MW pure low temperature waste heat recovery (WHR) for power generation in SDIC Hainan Cement Co., Ltd	8	8.52
5	1622	Huanghe Tongli WHR Project	9	9.7
6	1624	Pingyuan Tongli WHR Project	9	9.97
7	1623	Yulong Tongli WHR Project	9	10.3
8	1673	Waste Heat Recovery and Utilisation for Power Generation Project of Huaining Conch Cement Company Limited	18	18.07
9	1659	13.5MW WHR1 Project in Hunan Niuli Cement Co.	14	18.72
10	1672	Waste Heat Recovery and Utilisation for Power Generation Project of Digang Conch Cement Company Limited	19	18.72
11	1402	BBMG Cement WHR for 10.5 MW power generation project in Beijing	11	19.40
12	1619	Yuhe Tongli WHR Project	18	19.9
13	1309	Jiangsu Qingshi Cement Plant's Low Temperature Waste Heat Power Generation Project	14	18.24
14	1676	Waste Heat Recovery and Utilisation for Power Generation Project of Zongyang Conch Cement Company Limited	34	28.47
15	1874	25.3MW WHR Project of Zhejiang Leomax Group	25	33.21
16	1675	Waste Heat Recovery and Utilisation for Power Generation Project of Tongling Conch Cement Company Limited	47	42.89
17	1730	Inner Mongolia Wulanchabu Volan Cement Waste Heat Recovery Project	17	n.a.
18	1225	30 MW WHR Project of Hongshi Group	30	n.a.
19	1878	Zhonglian Julong Cement Waste Heat Recovery as Power Project	17	n.a.
20	1643	Liaoyuan Jingang Cement Waste Heat Recovery as Power Project	13	n.a.
21	366	Taishan Cement Works Waste Heat Recovery and Utilisation (NM79)	13	n.a.
22	898	Ningguo Cement Plant 9100KW Waste Heat Recovery and Utilisation for Power Generation Project of Anhui Conch Cement Co. Ltd	9	n.a.
23	1038	6.5MW WHR Project in Huasheng Tianya Cement Co., Ltd	7	n.a.
24	1046	Gansu Qilianshan Cement 6000kW Waste Heat Recovery Project	6	n.a.
25	1353	Hebei Quzhai Cement 9000kW Waste Heat Recovery Project	9	n.a.
26	1714	Baofeng County Waste Heat Recovery for Power Generation	8	n.a.
27	1723	Henan Xichuan Waste Heat Recovery for Power Generation	9	n.a.
		Proposed project activity	14.4	14.95

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Ref. No.	Issuance and/or submission date(dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
1	18/01/2008	PDD "Jidong Cement Panshi Co., Ltd. 15 MW Cement Waste heat Recovery Project", Version 02	Chief Representative of CVDT consulting	PDD for GSP
2	06/07/2007	Consolidated baseline methodology for GHG emission reductions for waste gas or waste heat or waste pressure based on energy system ,ACM0012 ,Version 01.	UNFCCC	
3	19/10/2007	Tool to Calculate the Emission Factor for an Electricity System, Version 01	UNFCCC	
4	30/01/2008	Participant list of on-site interviews	TÜV SÜD	
5	30/01/2008	<p>On-site interviews conducted by TÜV SÜD. Validation team: Mr. Zhang Jiming                      TÜV SÜD China, Beijing Branch Mr. Li Ruifeng                         TÜV SÜD China, Beijing Branch Mr. Du Baohai                         TÜV SÜD China, Beijing Branch Interviewed persons:</p> <p>Ms. Liu Wei                      Hebei Tangshan Jidong Cement Co., Ltd.  Mr. Zhao Yonghong      Gansu tonghe consulting Co., Ltd. Mr. Meskes                      Chief Representative of CVDT consulting Mr. Liu Jianzhong              Jidong Cement Panshi Co., Ltd Mr. Zhang Hongzhi              Jidong Cement Panshi Co., Ltd</p>	TÜV SÜD	
6	Jul.2007	Feasibility Study Report for CDM project "Jidong Cement Panshi Co., Ltd. 15 MW Cement Waste heat Recovery Project".	Hebei construction and material industry design institute	IRR input data source
7	30/10/2007	Approval of Jidong Cement Panshi Co., Ltd. 15 MW Cement Waste heat Recovery Project	Provincial economic committee of jilin province	

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Ref. No.	Issuance and/or submission date(dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
8	Jul.2007	EIA Report for CDM project "Jidong Cement Panshi Co., Ltd. 15 MW Cement Waste heat Recovery Project"	State environmental Protection Bureau	
9	Oct.2007	Approval of EIA Report for CDM project "Jidong Cement Panshi Co., Ltd. 15 MW Cement Waste heat Recovery Project"	Environmental Protection Bureau of Jilin	
10	07/08/2007	The Bank loan promise (2007-08)	China Agriculture bank Tangshan branch bank, 219,750,000RMB	
11	16/02/2007	Tool for the demonstration and assessment of additionality version 03.	UNFCCC	
12	Sept.2006	Selling price table of Jilin Province electricity grid	Department of Commerce of Jilin Province	
13	29/10/2007	Equipment purchasing contract	Anhui Hailuo Chuanqi Engineering Co.,Ltd	Including AQC boiler, PH boiler, turbines and generators
14	13/11/2007	Questionnaire for stakeholders' comments with 17 persons signature	Jidong Cement Panshi Co., Ltd	
15	Dec.2006	CERs purchase agreement	Tangshan Jidong Cement Co., Ltd., and Climate Change Capital Carbon Managed Account Limited ,Climate Change Capital Carbon Fund II s.à.r.l.IXIS	
16	18/08/2006	CDM resolution board meeting minutes	Tangshan Jidong Cement Co., Ltd.	

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Ref. No.	Issuance and/or submission date(dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
17	15/08/2007	Resolution of the 21st Meeting of the 2nd Board of Directors of Jidong Cement Panshi Co., Ltd.	Jidong Cement Panshi Co., Ltd	
18	15/10/2007	Construction start contract	Jidong Cement Panshi Co., Ltd	
19		The business license of Jidong Cement Panshi Co., Ltd	Hebei Industry and Commerce Administration	
20		Internal Income Stat. Analysis of Tangshan Jidong Cement Group for Investment Construction Project, 10 projects has the IRR from 19.49% to 49.74%,	Tangshan JiDong Cement Group	
21	Jul.2008	Chinese LoA	China NDRC	
22	18/01/2008	Excel IRR calculation file	Chief Representative of CVDT consulting	
23	May 2006	Overview on Cement WHR Projects in China	Tianjing Cement Institute	
24	Aug.2007	Overview of waste-heat utilization projects at cement plants in northeast china grid as of August 2007	Tianjing Cement Institute	
25	April 2001	FSR of Boading Huadian Electric Power Design & Research Institute Co., Ltd	Huadian Electric Power Design & Research Institute Co., Ltd	Jidong Cement Co., Ltd. WHR Demonstration Project
26		Announcement of the State Council on Structural Adjustments in Industries with Production Overcapacities		
27	Aug.2007	Energy Efficiency Improvement Potential & Opportunities in China's Cement Industry, General Report	International Finance Corporation	
28	09/10/2008	Restriction on bank lending for over-growing industries	State Owned Assets Supervision and	

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			Administration Commission of Shanghai Municipal Government	
29	05/06/2007	CDM commission contract	Climate Change Capital and Casper van der Tack	
30	21/08/2007	Letter of Exclusivity	Climate Change Capital and Tangshan Jidong Cement Co., Limited	
31	24/10/2007	Demonstration of efficiency of main equipment in the WHR projects of Tangshan Jidong Cement Co., Ltd.,	Anhui (Hailuo) Conch Kawasaki Engineering Co., Ltd	
32	21/01/2009	Cement WHR power generation system	Luoyang Mining Machinery Engineering Design Institute	
33	30/12/2008	Education Added Expenses and Local Education Added Expenses	Jilin Local Taxation Bureau	
34	May.2007	Regulations on Collecting and Using Local Education Added Expenses in Jilin Province	Jilin Local Taxation Bureau	
35	30/12/2008	Notice of Jilin Provincial Office of the State Administration of Taxation on Printing and Issuing "the Rules on Collecting City Maintenance & Construction Tax in Jilin Province"	Jilin Local Taxation Bureau	
36	28/01/2007	the "Ninth Session of the Fifth Board meeting"	Tangshan Jidong Cement Co., Limited	
37		WACC calculation	Bloomberg	

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Ref. No.	Issuance and/or submission date(dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
38	01/07/2008	Consolidated baseline and monitoring methodology for GHG emission reductions from waste energy recovery projects (ACM0012 vers.3.1)	Unfccc	
39	26/08/2008	Tool for the demonstration and assessment of additionality version 5.2	Unfccc	
40		National major construction project Beijing Cement Plant		
41	12/04/2006	Extract from 2006 Broker Report for Jidong,	United Securities	
42	11/04/2006	Extract from 2006 Broker Report for Jidong,	GF Securities	
43	08/08/2006	Extract from 2006 Broker Report for Jidong,	Haitong	
44	10/08/2006	Extract from 2006 Broker Report for Jidong,	Guotai Junan Securities	
45	2002~2005	Financial Report for Jidong		
46		WACC calculation	Wharton Financing School	
47	30/06/2006	Jidong share price	Google Finance	Historical Prices
48	2006	Announcement of the State Council on Structural Adjustments in Industries with Production Overcapacity, Guo Fa [2006] Document No. 11	State Council (2006)	
49		Dividend paid by Jidong per share ( <a href="http://www.cninfo.com.cn/gszx/fhpg_fh000401.html">http://www.cninfo.com.cn/gszx/fhpg_fh000401.html</a> )		
50	09/06/2009	British LoA	Department for Environment Food and Rural Affairs) for Climate Change Capital Fund II S.a.r.l. („C4F2)	
51	09/06/2009	British LoA	Department for Environment Food and Rural Affairs) for	

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Ref. No.	Issuance and/or submission date(dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
			Cliamte Change capital Carbon Managed Account Limited (C4MA)	
52	04-06-2009	MoC	CCC and Jidong Cement Panshi Co., Ltd	
53		Reference Document on Best Available Techniques (BAT) in the Cement and Lime Manufacturing Industries"	Integrated Pollution Provention and Control	
54	January 2001	Feasibility Study Report: Tangshan Jidong Cement Co., Ltd. 92t/h Circulating Fluidized Bed Boilers Project	Baoding Huadian Electric Power Design & Research Institute Co., Ltd.	
55	22/02/2002	FSR approval of Tangshan Jidong Cement Co., Ltd. 92t/h Circulating Fluidized Bed Boilers Project Shijingmaozizi (2002) No.50	Economic and Trade Committee of Tangshan City	
56	09/05/2001	Approval by Hebei Development and Planning Committee on the Feasibility Study Report of Waste –Heat Power Generation Project of Tangshan Jidong Cement Co.,Ltd, JiJiZiYuan[2001]No.375	Document of The Development and Planning Committee of Hebei Province	
57	31/12/2006	Annual Report 2006 Tangshan Jidong Cement Company Limited		
58	22/08/2006	Notification of the people's Bank of China (PBOC raising the rates for deposits and loan	Central people's Government of the People's Republic of China	
59	15/08/2007	Share Price of Jidong	Shenzhen Stock Exchange	
60		WACC calculation based on 2007 values	Casper Van der Tack Consulting	

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61	29/12/2009 (accessed)	<a href="http://www.chinacement.com/tech/detail/detail_673.html">http://www.chinacement.com/tech/detail/detail_673.html</a>	CITIC Heavy Industries Co., Ltd.	Evidencing efficiency of turbine and generator
62	18/08/2006	Meeting minutes with respect to CDM projects	Jidong Cement Group	
63		Certificate of Hebei Province Building Material Industry Design & Research Institute		
64	01/07/1999	National Standards of the People's Republic of China, Code for design of Cement Plant GB 50295 - 1999	Ministry of Construction P.R.China	
65	24/09/2008	National Standards of the People's Republic of China, Code for design of Cement Plant GB 50295 - 2008	Ministry of Construction P.R.China	
66	06/2009	Panshi WHR plant Payroll for June of 2009		
67	29/12/2009	Panshi Cement Production Operational Log		