

30 June 2009

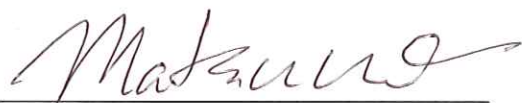
CDM Executive Board  
UNFCCC Secretariat  
Martine Luther King Strasse 8  
P.O. Box 260124, D-53153 Bonn Germany  
Attention: Mr. Daniele Violetti

**Initial Comments on Request for Review for  
"Controlled combustion of municipal solid waste (MSW)  
and energy generation in Linyi City, Shandong, China" (Ref. 2419)**

Dear Mr. Daniele Violetti,

To result in the faster registration of the proposed project activity by the decision of the next EB meeting, we wish our comments on "Controlled combustion of municipal solid waste (MSW) and energy generation in Linyi City, Shandong, China" could be supportive for the discussion.

Yours sincerely,



Tsutomu Matsuno  
Senior Executive  
Japan Quality Assurance Organization

**Initial comment for request for review for**  
**“Controlled combustion of municipal solid waste (MSW) and**  
**energy generation in Linyi City, Shandong, China” (Ref. 2419)**

1. The DOE is requested to substantiate:

***(a) the appropriateness of the electricity tariff assumed in the PDD in comparison with previous tariff notifications for similar projects since 2002 in the same region***

(Response from PP)

The FS (Feasibility Study) estimate, at 0.36 Yuan/kWh, was slightly higher than the tariff quoted in the notification received from the local DRC (Development and Reform Commission) in June 2006 (0.3549 Yuan/kWh) (Reference No. 01). A change to the electricity tariff was not included in the updates made to the FS during the same month.

(Response from DOE)

JQA surveyed the previous tariff notifications since 2002 to 2006 (Decision Making of the project activity) in Shandong Province, China, and found 2004, 2005 and 2006 information as follows:

Year	Notification No.	Tariff	Remarks
2004	[2004] No. 1036	0.325 Yuan/kWh	With desulfurization
2005	[2005] No. 668	0.344 Yuan/kWh	With desulfurization
2006	[2006] No. 1228	0.3549 Yuan/kWh	With desulfurization

The above notifications issued by NDRC (National Development and Reform Commission) have been followed by the Price Bureau of Shandong Province. As shown in the above table, the electricity tariff gradually increased, this is chiefly a result of inflationary pressures such as an increase of the fuel cost. The PDD applies the tariff of 0.36 Yuan/kWh as the tariff at the Decision Making

of the project activity, which is a little higher than the value of the 2006 notification.

JQA considers that the application of 0.36 Yuan/kWh as the tariff in the PDD was both reasonable and conservative at the time the decision to proceed with the plant was made.

***(b) suitability of thermal energy tariff as it is not clear how the average local price was determined***

(Response from PP)

The 90Yuan/ton figure used in the FS was the standard tariff in 2002. A revision of the thermal tariff was not included in the updates to the FS made in June 2006. In light of the more up-to-date tariffs quoted by the local DRC in response to queries from the DOE, an updated financial analysis has been provided based on the figure that was most recent at the time of the investment decision, namely, the 2005 tariff of 115 Yuan/ton.

As can be seen from the sensitivity analysis, the “+10% electricity tariff” scenario comes in at 8.04%. Slightly above the benchmark of 8%.

This is the only scenario in which the IRR is above the benchmark.

However, the probability of this scenario occurring is considered remote because of the tight control the national government places on the price of electricity, raising it strictly in line with inflation (see references quoted in the PDD).

Furthermore, it should be noted that if, along with the thermal energy tariff, the electricity tariff used in the IRR is also updated using the most up-to-date data available at the time the decision to proceed with the project was made (i.e. the 0.3549 Yuan/kWh tariff), the IRR does not pass the benchmark in any scenario.

(Response from DOE)

JQA directly confirmed the thermal energy tariff in 2006 through the telephone interviews with the person of the Price Bureau of Linyi City.

\* He gave JQA the following comments:

- The thermal energy tariffs in 2005 and 2006 were 115 and 120 Yuan/ton-steam respectively.
- A new tariff is applied from October of each year. Accordingly, the 2005 year tariff (115 Yuan/ton-steam) is considered to have been the most up-to-date figure available at the time the decision to proceed with the project activity was made.
- The tariff is strictly controlled by the local government.
- The Enthalpy of heat is not considered into the price determination.

As a result of the above information, the PP was required to alter the thermal energy tariff in the PDD is from 90 Yuan/ton-steam to 115 Yuan/ton-steam

***(c) suitability of revenue generated by avoiding waste disposal and selling ash***

(Response from PP)

For the disposal of MSW, the 2002 agreement (Reference No. 02) showing a tariff of 30 Yuan/kWh is provided as a reference. Further to this, the 2006 agreement which describes the name change of the project owner (Reference No. 03) shows that the 2002 agreement was still valid at the time the decision to proceed with the project activity was made.

In regard to the sale of waste from the boiler, the actual contract for the sale of boiler waste (Reference No. 04) is provided. The prices quoted are as follows:

Ash: 5 Yuan/ton

Boiler slag: 9 Yuan/ton

The Linyi MSW Incineration Plant produces approximately 20,000 tons of each per year. This equates to revenues of 280,000 Yuan/year.

Although this contract had not been issued prior to the start date of the project activity, it shows that in actuality the estimate in the FS of the revenue from raw

materials sales was quite high, thus in terms of additionality it can be considered conservative.

(Response from DOE)

- \* MSW disposal fee (30 Yuan /ton) is based on the approval document issued by Linyi City.
- \* The revenue generate by selling ash is based on the FSR. The figure has been validated as having been reasonable based on the actual contract for sales of the boiler waste.

The following table is the summary of revised IRR calculation. (Reference No. 05)

Variables	-10%	+/- 0%	+10%
Electricity tariff	-	6.64	8.04
Thermal energy tariff	-	6.64	7.23
Equipment and plant costs	7.77	6.64	-
Fuel costs	7.76	6.64	-
O & M costs	6.89	6.64	-

- \* In case the electricity tariff increases by 10%, the IRR reaches 8.04%. However, in China, the electricity tariff is strictly controlled by the government based on the Price law (Reference No. 06) and the Electricity law of people (Reference No. 07). Accordingly, the probability of this scenario occurring is considered highly unlikely and can be expected to require significant reform of the tariff regulations.
- \* Regarding the other variables, IRRs are lower than 8% of the benchmark in all scenarios

2. The DOE should further clarify:

***(a) how similar projects have been identified, in particular, what parameters have been considered,***

(Response from PP)

No comment provided.

(Response from DOE)

The PP collected data on MSW incineration projects with power generation in Shandong Province and presented the findings in the PDD.

In verifying this data, JQA performed a review of the relevant available information. Chiefly considering four parameters, namely MSW incineration with Power Generation, Capacity of MSW amount treated, Capacity of Power Generator and Weight Ratio of MSW and Coal, a summary of the findings are presented in the following table which shows similar projects in Shandong Province, the geographical scope of the common practice.

- \* There is no stoker-type MSW incineration project found in publicly available information in Shandong Province.
- \* The following list shows all data/information (Reference No. 08) obtained by JQA.

Location	Type of Technology	MSW (t/d)	Generator (MW)	MSW/Coal by wt.
Linyi	CFB	2 x 400	25	80/20
Heze	CFB	2 x 200	Data not available	Data not available
Zaohuang	CFB	150	Data not available	50/50
Jinan	CFB	1000 (?)	Data not available	Data not available
Zibo <sup>Note</sup>	CFB	3 x 400	15	80/20
Taian	CFB	2 x 500	18	Data not available
Weufang	CFB	600	Data not available	Data not available
Qingdao	CFB	No data	Data not available	Data not available

Note: CDM project activity

- \* As shown in the table, there are eight MSW/Coal-fired projects, which have been developed or are being developed in Shandong Province.
- All of them are categorized into Circular-type Fluidized Bed Incineration Boilers.
- The plant scale shown in daily MSW treatment amount is from 150 to 1,000 ton, and mainly about 400 -600 ton/day.
- Regarding the power generation capacity, the project activity is the largest in the list.
- The MSW/Coal ratio of the project activity is in the highest level in the list.

***(b) essential distinction between the proposed CDM project activity and other similar activities, and***

(Response from PP)

No comment provided.

(Response from DOE)

As mentioned above, there is very limited information available. However, there are several technical characteristics for the project activity distinct from other projects. Findings are as follows:

- \* The ratio of MSW/Coal for the project activity is 80/20 or more.
- \* The capacity of power generation is 25MW. According to Reference No. 08 of the PDD, the average capacity per 100 MSW tons of power generation is 2.6 MW, although it is 3.13 MW for the project activity.
- \* The annual operating hours (330days/year x 24 hours/day = 7,920 hours/year) for the project activity are longer than the others (6,000 hours/year) shown in Reference No. 08 of the PDD due to the application of "Heat exchanger outside the fluidized bed incinerator".

***(c) source of data used in identifying similar projects in compliance with paragraphs 118 and 119 of VVM.***

(Response from PP)

No comment provided.

(Response from DOE)

JQA found the following sources to determine to what extent similar and operational projects other than CDM project activities, have been undertaken in Shandong Province.

\* Source:

- Status and Development Prospect on Municipal Solid Waste Incineration Technology in Our Country (November, 2007)
- <http://www.eedu.org.cn/news/etech/home/200605/7935.html>
- [http://www2.sdnews.com.cn/vip/sjst/2006-7/12\\_249304.html](http://www2.sdnews.com.cn/vip/sjst/2006-7/12_249304.html)
- [http://www.newsenergy.org.cn/html/0077/200772\\_13963.html](http://www.newsenergy.org.cn/html/0077/200772_13963.html)

As a result, the project activity is not considered common practice in Shandong province, China.

3. The PP/DOE are requested to clarify:

- (a) whether MSW is stored in the waste stockyard more than 10 days during first and second years of project implementation, and***
- (b) how MSW is managed during first and second year of project implementation.***

(Response from PP)

MSW management over the first two years:

The waste is sourced from waste collection spots all over the city, not via a waste distribution centre or transfer station. Every collection spot is under the charge of



1-2 trained persons who make sure that only household waste can be collected, not construction waste or other types. Before the project, some MSW was transported via a transfer station to the landfill site because of the long distances from the collection spots to the landfill site. This practice has now stopped. Over the last two years, at about 3 am to 4 am everyday in Linyi, MSW has been transported directly from collection spots to the project site by trucks owned by the Sanitation Service Departments of Linyi City and the several Linyi districts. At present, there are 34 MSW transportation trucks, of which 29 trucks are from Lanshan district, 3 trucks from Hedong district, 1 truck from the new and high-tech development zone, and 1 truck from Luozhuang district. The carrying capacity of most trucks is 8 tons, except for three of them which have a carrying capacity of 5 tons.

At the site, after weighing on the weighbridge, the trucks drive to MSW unloading platform and unload the MSW into the MSW holding facility through the discharge outlet. Upon returning to the gate, the empty truck is weighed again, and the weighbridge automatically calculates the weight of MSW, generating a printout of the amount.

#### Operation of the boiler and storage of MSW (for the first two years):

There is an MSW platform and holding facility at the project site. The holding facility has a storage capacity of approximately 5,000 tonnes, MSW for about 3-5 days of operation.

500-1000 tons of MSW can be combusted per day in the plant, and the stock left in the holding facility is approximately 2000-3000 tons each day. The target amount of stored MSW is between 2000-4000 tons.

The discharge outlet is in south of the MSW holding facility. After unloading of the waste, workers operate the grab bucket to transport MSW to the north of the holding facility, and the space in the south end is emptied for next day's waste. The waste in the north end is then transported to a funnel that feeds into the boiler via a waste-feeding machine, again by grab bucket.

(Response from DOE)

JQA considered there might be two potential cases of the waste storage period more than 10 days during first and second years of project implementation.

Case 1: Shut-down of boilers for a long time

For this case, the PDD clearly describes “The waste will be stockpiled before combustion for no longer than 10 days. The capacity of the holding facility for the waste is 5000 tonnes; less than 10 days’ worth of MSW for the 800 tonnes/day plant. Therefore, MSW will not be held for a long enough period for anaerobic breakdown to occur to a significant degree. During the first year, when the plant will only be combusting 400 tonnes per day of MSW, the amount of waste delivered to the plant, and therefore held in the holding facility, will be reduced to meet the requirements of this applicability condition”. This implies MSW is well managed during first and second year of project implementation in order to avoid more 10 days for the storage period by the PP. Given that there are two boilers the likelihood of a prolonged period of non-operation of the plant (a result of a breakdown in both boilers at the same time) is very low. The DOE has confirmed that there is a clear plan in for the management of MSW such that the MSW will be stored for no more than five days under normal operating conditions. The conclusion of the DOE is that the applicability condition regarding storage of waste for no longer than 10 days has been met.

Case 2: Long retention time in the holding facility

For Case 2, as shown in the above, the PP manages the storage and discharge control as follows:

“The discharge outlet is in south of MSW holding facility. After unloading of the waste, workers operate the grab bucket to transport MSW to the north of the holding facility, and the space in the south end is emptied for next day’s waste.

The waste in the north end is then transported to a funnel that feeds into the boiler via a waste-feeding machine, again by grab bucket”.

There is no other area for the storage of MSW and it is trucked directly to the plant’s main holding facility. In the facility, the MSW is handled such that old waste is fed into the boiler from a different end to where the new waste is being added. Accordingly, the possibility of more than 10 days storage in the holding facility is quite low.

4. The DOE should substantiate the suitability of:

***(a) boiler efficiency applied in calculating the baseline emission from displaced thermal energy, in particular, how applied value represents efficiencies of over 100 coal fired boilers to be displaced by the project activity***

(Response from PP)

In preparation for the Project Activity, a survey of the size, fuel consumption and steam generation of more than 100 of the boilers to be displaced by the project activity was conducted. This found that the boilers were between 0.3 and 4 t/h, and were all coal-fired boilers.

This study did not record the manufacturer’s efficiency data of the boilers.

The manufacturer’s efficiency data was not provided when a request was made for it chiefly because negotiations on the implementation of this part of the project are still ongoing. Therefore, a second study was performed by a local design institute which surveyed local coal-fired boilers of a similar size range accordingly. The details of this study have been made available to the DOE for validation and the results of this study are accordingly quoted in the PDD.

(Response from DOE)

- \* The PP performed a survey of the majority of the boilers to be displaced under the project activity and established the size and type.
- \* A further survey performed by the local design institute established an average efficiency figure for local boilers of a similar size and type. This average was based on the manufacturer's efficiency data for these boilers.
- \* It is considered that the survey by the design institute provided an accurate estimate of the boilers to be displaced, and is a suitable reference in the absence of actual data from the factories themselves.
- \* The FSR (June 2006) describes the survey result of the installation situation of medium-small coal-fired boilers within 5 km radius of the project site.

No.	Name	Numbers of boilers	Capacity (t/h)	Supply Amount (t/month)
1	Guozhuang industrial park	6	1.5	57
2	Miaoshang industrial park	7	7.6	270
3	Manlov industrial park	31	47.5	1778
4	Longcun industrial park	8	7.5	316
5	Qianhoutongmen industrial park	7	9.1	292
6	Honggouuya industrial park	6	4.2	205
7	Yandongyanxi industrial park	25	19.55	985
8	Daizhuang industrial park	10	16	853
9	Gangshang industrial park	6	8.2	225
Total		106	121.15	4981

- \* The validation team confirmed the survey result at Site-visit (Validation Report: 3 Validation Findings 3) Project site).
- \* The PP obtained additional information on the boiler efficiency in the surrounding area. The survey report says the current boiler efficiencies are about 60%, which is much lower than 75% based on the design (Validation Report Reference No. 15: Explanation on Efficiency of Little Boilers in Linyi, 06/06/2008)

- \* The other document (Reference No. 09) clearly describes the boiler efficiency in China is 60 – 65% (Shandong Huayuan Boiler Company Limited, 2007-12-20). The point is as follows:
  - “Coal-fired industrial boilers in China the status quo and problems. Currently, the country’s industrial coal-fired boiler about 48 million units, about 1.6 million steamed tons/hour, the annual consumption of raw coal of about 400 million tons. China’s average coal-fired industrial boiler operating efficiency is only 60% - 65%.”
- \* In addition, the document regarding the boiler efficiency in China says as follows (Reference No. 10: Market Studies and Business Plans, UNDESA). The point is as follows:
  - “Medium and small cal-fired boilers in China consume over 300 million metric tons of coal per year, or about one third of China's annual coal consumption. .... Most are under sub-optimal conditions and use unsuitable coals due to management and technical problems, resulting in 10 to 20 percent energy efficiency losses.”
- \* In conclusion, based on the survey performed by the PP and the validator’s knowledge of this sector, the boiler efficiency of 75% can be seen as applicable to the boilers to be displaced by the project activity. Furthermore, this can be taken to be conservative since surveys of the actual operating efficiency of boilers in Linyi City show results of around 60%, consistent with the boiler efficiencies achieved throughout China which are in the region of 60 to 65%.

***(b) net calorific value of coal used in the project activity, in compliance with paragraphs 90, 91 and 92 of VVM***

(Response from PP)

The coal NCV used in the PDD is used in both grid calculations and project emissions calculations. The value used in the PDD is the national value from the

NDRC-published grid calculations. The applicability of the national values is supported by three reports (attached separately). These three test reports show the following figures:

Shandong Supervision & Inspection Laboratory of Coal Quality reports (Reference No. 11, 12, 13): 20.47MJ/kg and 19.55 MJ/kg (both on page 4 of respective reports)

Linyi Energy Monitor Centre report: 19,462 J/g (page 4)

These values are very close to the NCV from the NDRC grid publication (20,908 MJ/t).

(Response from DOE)

The measured data provided by PP support the use of the figure from the NDRC. The use of these lower figures would, in more conservative than the National data in the PDD (20.908 MJ/kg).

5. The DOE is requested to clarify how they confirmed that the monitoring plan contains all necessary parameters as required by applicable methodology, in particular, why monitoring of amount of organic waste type prevented from disposal in the landfill and density of fuel used in the project activity have not been included in the monitoring plan.

(Response from PP)

The PDD has been updated as follows:

$D_{\text{fuel}}$  and  $W_{j,x}$  parameters have been added to B.7.1

The word “fresh” has been changed to “organic”, in line with the tool.

The description of the monitoring of these parameters has been expanded in section B.7.2.

(Response from DOE)

The PDD (Version 4.1) was correctly revised in accordance with ACM0025 Version 10 and “Tool to determine methane emissions avoided from dumping of waste at a solid waste disposal site (Version 3)” as follows:

- \*  $D_{\text{fuel}}$  and  $W_{j,x}$  parameters have been added to B.7.1
- \* The word “fresh” has been changed to “organic” in all relevant parameters (e.g.  $W_x$ ,  $EG_d$ ,  $Q_y$ ).

In conclusion, with these updates, it is the validator’s opinion that the monitoring plan is now complete and fully in line with the methodological requirements.

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#### References:

- No. 01 01: Notification of Electricity tariff price adjustment
- No. 02 Approval on waste disposal fee to Linyi Hengyuan Cogeneration Co., Ltd.
- No. 03 Approval on the change of project owner of Controlled combustion of municipal solid waste (MSW) and energy generation in Linyi from Linyi Henguan Cogeneration Co., Ltd. to Linyi National Environmental New Energy Co., Ltd.
- No. 04 Ash Sales contract
- No. 05 CER Calculation Linyi
- No. 06 Price Law of the Peoples's Republic of China
- No. 07 Electricity Law of the Peoples's Republic of China
- No. 08 Status and Development Prospect on MSW Incineration Technology in Our Country
- No. 09 Enterprise news
- No. 10 Market Studies and Business Plans
- No. 11 Test Report (No: MZWT (2009) 030231)
- No. 12 Test Report (No: MZWT (2008) 050967)
- No. 13 Test Report (No: EMCL-JL-BG-HW200805004)