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Response to Request for review
Duerping Coal Mine Methane Utilization Project
Reference number 1900

In their request for review, the CDM EB has highlighted three issues as follows:

- Inconsistent application of some variables and the steps taken by the DOE to validate those variables
- Treatment of fixed electricity tariff and annual inflation
- Availability of tax concessions for certain types of investments

Responses from the Project Developer are presented below along with updated versions of the PDD and attached spreadsheets. Additional responses are provided by the DOE to explain the steps taken to validate data in a separate submission.

The revision of the financial analysis to address the above points where relevant, makes the analysis more consistent and robust. The revision improves the NPV of the project activity without CDM because it alters expenditure on refurbishment equipment and reduces the tax burden. However, it does not change the overall conclusion which is that investment in the project activity in the absence of the CDM is not an attractive proposition due to the low economic returns. Adding revenues from the sale of CERs alters that conclusion such that the project becomes attractive.

1) Inconsistent use and source of selected variables

Discount rate: In the spreadsheet uploaded along with the request for registration, the discount rate applied to the worksheet “IRR with CERs” was set to 8%. This has been corrected to 12%. This value was correctly applied in the worksheet “IRR without CERs” on which the financial analysis and sensitivity analyses were performed.
The discount rate for the IRR calculations was set at 12% which reflects the guidelines from the Ministry of Construction, as referenced in the PDD.

City maintenance and education tax rates: In the same worksheet the City maintenance tax and education tax were inverted. The former is 7% and the latter 3%. These have been corrected. This value was correctly applied in the worksheet “IRR without CERs” on which the financial analysis and sensitivity analyses were performed.
The levels of these taxes are defined in the Feasibility Study Report (FSR) prepared by The Shanxi Provincial Electricity Research and Design Institute which is a Class A Design Institute approved by the Chinese Authorities to prepare such studies. As such, it is considered that these values are a true reflection taxes that will be levied on the project activity.

Static Total Investment: In the same worksheet the static total investment was reported as 14571 *10^4 RMB whilst the correct value is 14771 * 10^4 RMB. This has been corrected. This value was correctly applied in the worksheet "IRR without CERs" on which the financial analysis and sensitivity analyses were performed.
This value is higher than the level quoted in the FSR and is supported by the actual receipts for the purchase of the first set of generating, flaring and control systems. These prices are fixed. As such it is considered to be a more complete, accurate and recent record of the investment costs associated with the project activity when compared to the estimate used in the FSR. Details of the receipts have been provided to the DOE. The date of signing of the EPC contract in which the costs were defined marks the start date of the project activity and therefore, these values were known in advance of financial commitment and hence can be justifiably included in the financial analysis.
Documentary evidence to support the increased total static investment is attached.

Receipt description	Cost for 3 engines (*10,000 RMB)	Cost for 1 engine (column 2/3) (*10,000 RMB)	Comment
3 Gensets	4436.34	1478.78	As shown on receipt
3 control units	73.31	24.44	As shown on receipt
1.5 waste heat units	90.00	60.00	Cost for 3 engines is 2 times the face value of the receipt
0.75 gas purification units	108.00	48.00	Cost for three engines 4/3 times the value
Sub-total		1611.22	Proportional cost of one genset and control systems
Sub total for 7 flares		11278.51	Purchased over 2 years
Sub total with non power gen equipment included		14240.54	The percentage of power generation related equipment in the static total investment (79%) – from FSR
One flare unit		330	As shown on receipt
Ducting for heat transfer		200	Estimate (less than 1.5% of total costs)
Total Static Investment		14770.54	

Operation and maintenance costs: In the same worksheet the Operating and Maintenance costs included a gas cost of 0.19 RMB/m3. The correct value is zero. This has been corrected. This value was

correctly applied in the worksheet “IRR without CERs” on which the financial analysis and sensitivity analyses were performed.

Hours of operation: Throughout the financial analysis, hours of operation have been set at 7000 hours per year, which is the value taken from the FSR. In the calculation of CERs, a higher value of 7360 was used. The PDD has been revised to reflect the lower value and the projected number of CERs has been restated.

2) Fixed tariff and treatment of inflation:

Annual inflation has not been addressed consistently in the analysis because it has not been applied to all costs and revenues. In the financial analysis an annual inflation rate of 2.5% was applied to coal costs (for the baseline consumption of coal to provide hot air for the mine air intakes during the winter months) and to the costs of equipment refurbishment after 64,000 hours of operation. However, power tariffs and operating and maintenance costs have remained static.

In response to this point, two alternative approaches are described here.

1) All inflation has been removed from the financial analysis and a foreign currency exchange rate mechanism has been used to address the likely escalation of costs of imported goods (see below). The impact of removing the inflation is not material.

In this approach, which is reported in the PDD, inflation has not been applied to the electricity tariffs or operating and maintenance costs for the following reasons:

- The tariff and operating and maintenance costs are drawn from the FSR. The FSR has been prepared in accordance with the Chinese Economic Evaluation Code, which specifies the adoption of fixed costs and prices. Fixing of both the operating and maintenance costs and the tariff (both of which are directly proportional to costs and revenues respectively) is consistent.
- In China, the electricity tariff is strictly controlled and will not be significantly changed without permission by the government. The power tariff is established based on regulations rather than on market mechanisms.
- In the absence of being able to accurately project price increases, assuming no cost or price increase is commonly applied to investment cases. The potential impacts of increases in costs or prices (or decrease) are then evaluated in sensitivity analyses and, as shown in the PDD, increases and decrease of up to 10% in either parameter do not alter the outcome.
- In the event that power tariffs were to increase, it is likely that such increases would be matched and exceeded by increases in operating and maintenance costs – so revenues would increase, but so would costs.

For these reasons, excluding any inflationary impacts on in-country costs and revenues is considered to be appropriate and realistic.

Annual inflation has also been removed from the purchase price of refurbishment parts for the generators. A long term forward exchange rate curve has been calculated using the Purchase Power Parity (PPP) concept which takes incorporates the differentiation in forecast Consumer Price Inflation (CPI) between China and the European Union. The PPP concept is commonly used in financial analysis. Data have been taken from Global Insight (Updated: January 12, 2008), a well established and widely used database of financial data. The 20 year average values used are 1.8% per annum for Western Europe and 3.3% for China. The starting point for the exchange rate is 8.75866 RMB to 1 Euro. Based on the differences in the long term inflation rates, the Euro will gradually strengthen against the RMB as shown below:

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
9.06	9.28	9.44	9.60	9.71	9.84	9.96	10.08	10.20	10.33	10.44	10.56	10.69	10.82	10.95	11.09	11.22	11.36

The adjusted rates have been applied in the conversion of Euro costs for imported refurbishment equipment to RMB in the appropriate years. This practice is consistent with good accounting practice.

2) As an alternative approach, the exchange rate between Euro and RMB has been kept constant throughout the analysis and inflation applied to the electricity tariff and operating and maintenance costs. In this analysis, the base case yields an NPV at 12% of -1,543.95 *10^4 RMB – however, this is not a realistic scenario because it includes no inflation whatsoever and no change in currency exchange rates over the 20 year lifetime of the project. Introducing variable long term average inflation rates in the electricity tariff and operating and maintenance (O&M) costs yields the following results:

	20 year average Inflation in power tariff					
20 year average inflation in O&M costs	0.00%	2.50%	3.30%	5.00%	7.50%	10.00%
0.00%	-1,543.95	2,220.13	3,643.16	7,094.20	13,458.80	21,831.02
2.50%	-3,677.24	-286.44	988.67	4,068.22	9,709.49	17,074.18
3.30%	-4,483.84	-1,240.96	-24.69	2,906.68	8,258.07	15,216.96
5.00%	-6,438.19	-3,566.79	-2,498.71	58.61	467.74	10,602.80
7.50%	-19,031.62	-7,883.55	-7,105.34	-5,282.28	-2,114.55	1,763.40
10.00%	-14,731.86	-13,591.33	-13,218.92	-12,427.70	-11,309.07	-10,346.91

The top right section above the diagonal highlighted line reflects a situation where the power tariff is inflating at a higher rate than O&M costs over a 20 year period. Whilst this yields a positive NPV, it is not a realistic outcome because energy costs contribute very significantly to the Consumer Price Index (CPI), which is very closely related to O&M costs. So if energy prices increase, CPI goes up and so do O&M costs. It is not likely that power prices can increase at an above inflation rate over a 20 year period.
The diagonal of highlighted cells represents the scenarios in which power and O&M costs increase at the same rate. Only when inflation is very close to 5% does this yield a positive NPV.
The bottom left section of the table reflects the impact of a situation where inflation in Operation and Maintenance Costs exceeds inflation in power tariffs, which is more likely to occur, not least because Chinese electricity prices are centrally controlled.

The Global Insights database predicts a long term inflation rate of 3.3% for China over the next years and at this rate, the NPV of the project activity is negative.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
	4.8	5.8	4.3	3.7	3.5	3.1	3.1	3.0	3.0	3.0	3.0	2.9	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Average		3.3																			

In conclusion, which ever method of treating electricity tariffs is selected, the results remain the same. Under either set of assumptions, investment in power generation is not an attractive option without additional revenues from the sale of carbon offsets. As option 1) above represents good accounting practice, and in the absence of any reliable and accepted means of estimating inflation in power tariffs and operating and maintenance costs required for option 2), option 1 has been retained in the financial analysis in the PDD.

3) Tax concessions:

Regulations exist which permit certain income tax concessions for projects which utilize waste streams for energy production. The 1996 regulations by the State Economic and Trade Commission, the Ministry of Finance, and the State Administration of Taxation, updated 2003 (http://fm.tfcoal.com/Article/ShowArticle.asp?ArticleID=108,
http://www.smelz.gov.cn/news/91298.htm) officially placed the items "coal mine gas recovered and its processed products" and "utilization of coalbed methane for power and heat generation" in the revised List of Comprehensive Utilization of Resources. These regulations entitle the

project to a five year income tax holiday. Shanxi Coking Coal, the host company, has confirmed that they are not claiming this tax benefit. No other CDM CMM projects list it in their PDDs and indeed, the officials in Shanxi Coking Coal were not very aware of the existence of such regulations. Having said that, in the absence of evidence to suggest that the regulations are not operational, the tax incentive has been incorporated into the financial analysis. The impact on the pre-tax returns is highly marginal because the benefits accrue post tax. The impact on post tax NPV (at an interest rate of 12%) is significant - without the tax benefit, NPV after tax is -4,386.13 * 10^4 RMB with the tax benefit the NPV is -3,385.81 * 10^4 RMB. As the NPV with the tax benefit is still negative, it does not alter the investment decision.

Conclusion:

The changes introduced as a result of altering parameters consistent with the above points have been implemented in the PDD, resulting in re-statement of the financial analysis tables and the sensitivity analysis. The re-statement of the investment analysis has had no impact upon the investment decision and the analysis of additionality.