TÜV SÜD Industrie Service GmbH · 80684 Munich · Germany

Industrie Service

Choose certainty.
Add value.

DAP-PL-2885.99
DAP-IS-2886.00
DAP-PL-3089.00
DAP-PL-2722
DAP-IS-3516.01
DPT-ZE-3510.02
ZLS-ZE-219/99
ZLS-ZE-246/99

Your reference/letter of	Our reference/name	Tel. extension/E-mail	Fax extension	Date/Document	Page
	IS-CMS-MUC/CF Sebasitan Randig	+49 89 5791-2943 Sebastian.Randig@tuev-sued.de	+49 89 5791-2756	2009-01-28	1 of 8

To EB of CDM

Please find below the response to the Request for Review for the CDM project “Gansu Datonghe Tiecheng Hydropower Station Project“ with UNFCCC project number 2108. In case you have any further inquiries please do not hesitate to contact us.

Best regards

Thomas Kleiser

Head of Certification Body “Climate and Energy”
Carbon Management Service

Enclosures:

Enclosure 1: IRR calculation spreadsheet
Enclosure 2: Emission Factor calculation spreadsheet

Industrie Service

Response to the CDM Executive Board

REQUEST No.1:

The PP/DOE are requested to clarify: a) the difference between the O&M costs, bank loan financing and interest and IRR results stated in the PDD and Validation Report and the ones used in the spreadsheet provided and; b) the appropriateness of the period of analysis applied in the investment analysis compared to the operational lifetime of the project.

Response from the Project Participant:

Point (a): To be clarified by TUV-sud
Point (b):

The Project Design Document (PDD) applies a 4 year construction period and a 26 year operation period which was consistently applied in the spreadsheet that was submitted to the DOE for UNFCCC submission. The specifications of the equipment installed as part of the proposed project activity (turbine / generator) do not state an expected operational technical lifetime, but generally feasibility studies in China apply a 20 to 30 year operational period for hydropower projects.

The project participants acknowledge that in the absence of a defined technical lifetime a conservative approach needs to be applied with regard to the selection of the operational lifetime. In general, renewable energy projects will yield a higher Internal Rate of Return (IRR) when a longer operational lifetime is applied as negative cash-flows are concentrated at the start of the project activity (capital investments) and the operation years generally have positive net-cash flow. Therefore a longer operational period can be considered conservative in the context of demonstrating additionality.

The Project Design Report (PDR) of the proposed project activity provides a basis for determining the appropriate operational period as it refers to the following guidance documents:

- The “Economic Assessment Method for Construction Projects” which states:
  ”*Generally the operation period is not more than 20 years. As for some hydraulic projects, transportation project, the calculation years of the operation period can be properly extended*”.
- The “Interim regulations of Financial Assessment of Hydropower Projects Construction” which states:
  ”The calculation period includes construction period and operation period. …..20 to 30 years is applied for the operation period.

The PDR applies a 30 year operational period which is taken here as a reasonable maximum period for evaluation purposes as suggested by relevant Chinese guidance documentation.

Another source for determining the appropriate operational period is provided by EB guidance as per “EB 41- Annex 45 - Guidance on the assessment of investment analysis (version 02)” which states:

"The period of assessment should not be limited to the proposed crediting period of the CDM project activity. Both project IRR and equity IRR calculations shall as a preference reflect the period of expected operation of the underlying project activity (technical lifetime), or - if a shorter period is chosen - include the fair value of the project activity assets at the end of the assessment period. In general a minimum period of 10 years and a maximum of 20 years will be appropriate."

EB guidance therefore suggests that in general a 10 to 20 year period can be considered appropriate which is taken here as a reasonable minimum period for evaluation purposes as it yields a lower IRR and is therefore considered less conservative than the approach applied in the PDD.

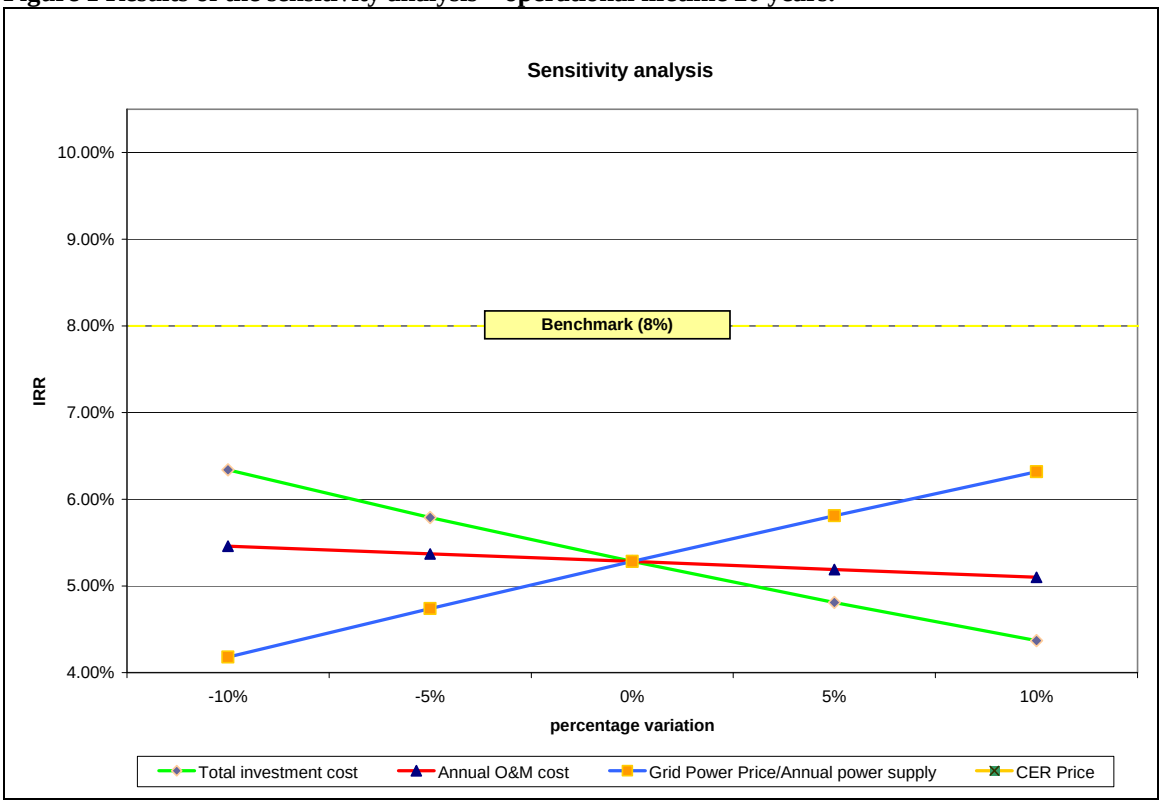
In order to demonstrate the robustness of the conclusions of the investment analysis we provide a calculation of the Internal Rate of Return for both a 20 year period and a 30 year period in addition to the 26 year period provided in the PDD.

The IRR for a construction period of 4 years and operational period of 20 years can be calculated as 5.28% without CER revenues and 8.78% with CER revenues. As the relevant benchmark for the proposed project activity has been identified as 8% the conclusions with regard to additionality remain unchanged. These results also hold in case +/-10% variations in the main input parameters are applied as indicated in Table 1 and graphically displayed in Figure 1.

Table 1 Results of the sensitivity analysis – operational lifetime 20 years.

Percentage Variation / Critical assumption	-10%	-5%	0%	+5%	+10%
Total investment	6.34%	5.79%	5.28%	4.81%	4.37%
Annual Power Supply	4.18%	4.74%	5.28%	5.81%	6.32%
Annual O&M Cost	5.46%	5.37%	5.28%	5.19%	5.10%
Grid price	4.18%	4.74%	5.28%	5.81%	6.32%

Figure 1 Results of the sensitivity analysis – operational lifetime 20 years.

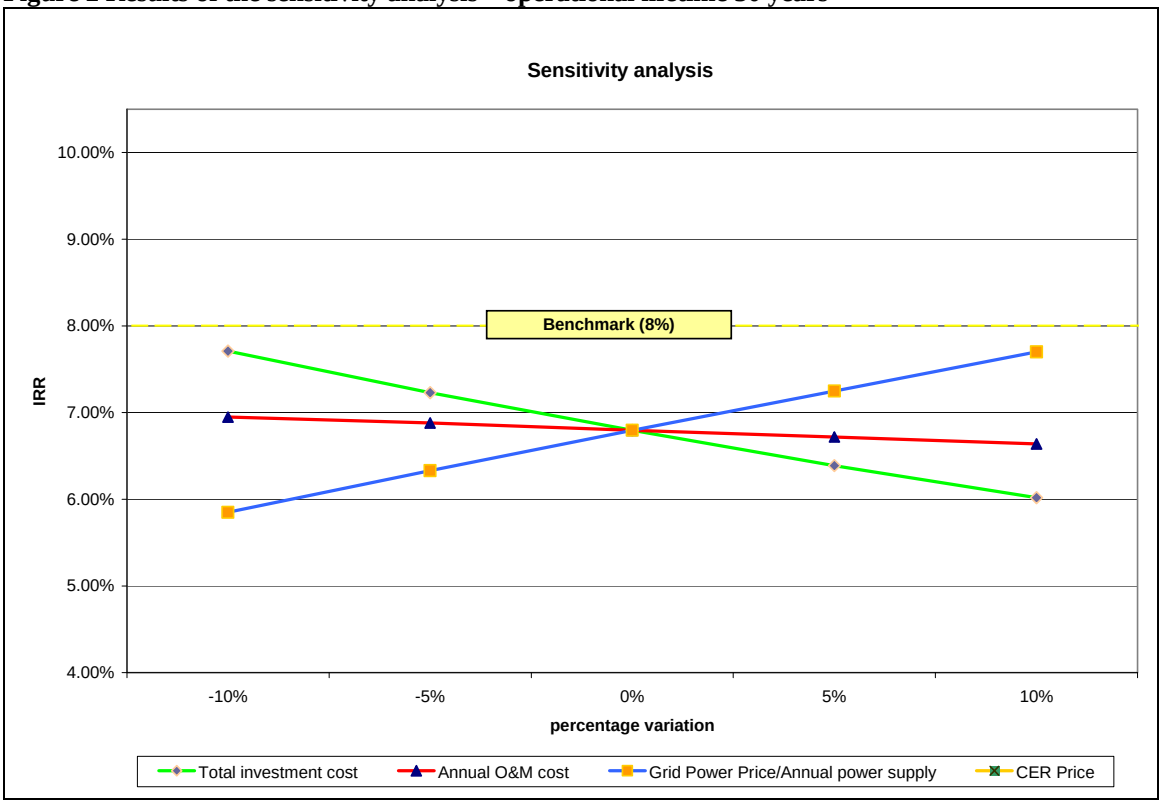


The IRR for a construction period of 4 years and operational period of 30 years can be calculated as 6.80% without CER revenues and 9.64% with CER revenues. Also in this case the IRR remains below the 8% benchmark without CER revenues and above with CER revenues. These results also hold in case +/-10% variations in the main input parameters are applied as indicated in Table 2 and graphically displayed in Figure 2.

Table 2 Results of the sensitivity analysis – operational lifetime 30 years.

Percentage Variation / Critical assumption	-10%	-5%	0%	+5%	+10%
Total investment	7.71%	7.23%	6.80%	6.39%	6.02%
Annual Power Supply	5.85%	6.33%	6.80%	7.25%	7.70%
Annual O&M Cost	6.95%	6.88%	6.80%	6.72%	6.64%
Grid price	5.85%	6.33%	6.80%	7.25%	7.70%

Figure 2 Results of the sensitivity analysis – operational lifetime 30 years



We conclude that the conclusions of the investment analysis remain unchanged when alternative operational periods are selected as the basis for the investment analysis.

Response by DOE:

Referring to issue a) we are regretful for providing the wrong version of the spreadsheet. The new spreadsheet has been checked carefully and it has been ensured that this is same as mentioned in the Validation Report and the PDD. As enclosure 1 the correct version of spreadsheet is uploaded.

Regarding issue b), as project participants mentioned in above discussion that for this specific project an extended operational lifetime is more conservative in the CDM context.

There are three references made with respect to the operational lifetime:

1) In the Chinese guideline, the “Economic Assessment Method for Construction Projects” it is mentioned that operation period should not exceed 20 years, however, for hydraulic projects, the operation period can be extended.
2) The “Interim regulations of Financial Assessment of Hydropower Projects Construction” which states ”The calculation period includes construction period and operation period”, which should last 20 to 30 years period (IRL11*).*
3) “EB 41- Annex 45 - Guidance on the assessment of investment analysis (version 02)” which states: *“The period of assessment should not be limited to the proposed crediting period of the CDM project activity. Both project IRR and equity IRR calculations shall as*

a preference reflect the period of expected operation of the underlying project activity (technical lifetime), or - if a shorter period is chosen - include the fair value of the project activity assets at the end of the assessment period. In general a minimum period of 10 years and a maximum of 20 years will be appropriate."

In the PDD as submitted for registration, the PPs had applied a conservative approach while calculating the IRR with an operational period of 26 years. They had arrived at this operational period while considering all three of the above mentioned guidelines, choosing the most conservative option.

To further strengthen the conservative approach the PPs have presented a revised IRR calculation, presenting the IRR results of three operational periods:

- the 20 years operational period as per the EB guidance,
- the 26 years which were derived from the "*Interim regulations of Financial Assessment of Hydropower Projects Construction*", considering maximum of 30 years for the construction period and operation period (4 years construction plus 26 years operational lifetime).
- the 30 years as used in the preliminary design report of the project

For better understanding of the investment analysis, calculation of the Internal Rate of Return for both 20 year period and 30 year period in addition to the 26 year period has been provided. It is clear that the Internal Rate of Return is lower than the applied benchmark 8% in all cases (IRR without CER revenues reaches in case of 20 years lifetime 5.25% and 6.80% when assuming 30 years lifetime). In all cases the additionality criterion is met. Further it is a more conservative approach to apply the longer lifetime of 30 years, as now presented in the revised IRR spreadsheet.

Industrie Service

REQUEST No.2:

The DOE is requested to clarify the opinion that the emission factor (0.861 tCO2/MWh) is more conservative than that published by NDRC in December 2006 (0.841 tCO2/MWh).

Response from the Project Participant:

The project participants believe that in the calculation of the baseline emission factor guidance provided by the methodology has been correctly applied. The Project Design Document (PDD) applies version 06 of ACM0002 which provides the following guidance with respect to data vintage selection:

Calculation of the Operating Margin:
ACM0002 (version 06) states (bold highlight applied by PP):
"The Simple OM, simple-adjusted OM, and average OM emission factors can be calculated using either of the two following data vintages for years(s) y:

- *(ex-ante) the full generation-weighted average for **the most recent 3 years for which data are available** at the time of PDD submission,*
- *the year in which project generation occurs, if EFOM,y is updated based on ex-post monitoring."*

The PP have applied the first option and therefore believe that the OM emission factor should be calculated on the basis of the most recent 3 years for which data is available.

Calculation of the Build Margin:
ACM0002 (version 06) provides the following two options for the determination of the BM emission factor (bold highlight applied by PP):

- *"Option 1. Calculate the Build Margin emission factor $EF_{BM,y}$ ex-ante **based on the most recent information available** on plants already built for sample group m at the time of PDD submission.*
- *Option 2. For the first crediting period, the Build Margin emission factor $EF_{BM,y}$ must be updated annually ex-post for the year in which actual project generation and associated emissions reductions occur."*

The project participants have applied Option 1 and therefore believe that the BM emission factor should be calculated on the basis of the most recent information at the time of PDD submission.

As the PDD of the proposed project activity was submitted for validation on 12 June 2007 it is understood that the OM and BM emission factors should be calculated on the basis of the most recent data available at that time.

The NDRC emission factor published in December 2006 referred to in the Request for Review calculates the OM and BM emission factors on the basis of mainly two data sources:

a) The China Energy Statistical Yearbook; and
b) The China Electric Power Yearbook

In December 2006 the *China Energy Statistical Yearbook 2006 edition* and the *China Electric Power Yearbook 2006 edition* were not yet available and only data up to and including 2005 has been used in the calculation of the NDRC emission factor.

At the time of submission of the PDD in June 2007, the 2006 editions of both data sources had become available and the project participants therefore incorporate this new data in the calculation of the baseline emission factor in accordance with the ACM0002 methodology in order to meet the requirements of the methodology (see also page 19 of the PDD).

The project participants believe that the calculation of the baseline emission factor is in accordance with methodological requirements and hope the above clarification sufficiently explains the choices applied. However, the project participants hereby state that they are willing to adjust the emission factor to either the earlier NDRC emission factor of December 2006 or the later NDRC emission factor of August 2007 following further guidance by the Executive Board.

Response by DOE:

The site inspection of validation was commenced in June 2007 and validation was then first completed with submission of the registration request in August 2008.

The data source (e.g. Statistical Yearbooks) which is used to calculate the emission factor (EF) is published annually.
The NDRC emission factor published in December 2006 (referred to in the Request for Review) rely for calculation of OM and BM emission factors on the basis of mainly two data sources:

- The China Energy Statistical Yearbook (up to 2005 volume); and
- The China Electric Power Yearbook (up to 2005 volume)

Both these Yearbooks new volume 2006 were available at that the time of submission of the PDD for GSP in June 2007[i]. The project participants integrated the updated data in the calculation of the baseline emission factor in accordance with the ACM0002 methodology in order to meet the requirements of the methodology where is stated "*Calculate the Build Margin emission factor $EF_{BM,y}$ ex-ante based on the most recent information available*". It is TÜV SÜDs interpretation that this guidance shall refer to the raw data utilized in the EF calculation, rather than the NDRC published EF value.

Calculation of OM and BM Emission Factors is done by using data published in the China Energy Statistical Yearbook and China Electric Power Yearbook volume 2006. The result is higher than the NDRC published EF which draws upon the same sources, but was published in August 2007, after the project commenced validation (OM 1.1257, BM 0.5739, resulting in CM of 0.8498). At the time when commencing the validation, the 2006 NDRC emission factor was available, which is lower than NDRC 2007 value and lower than the PPs EF (OM 1.0329 and BM 0.6491, resulting in CM of 0.841).

To apply a conservative approach TÜV SÜD requests guidance from the EB which of the two NDRC published emission factor values should be applied for this case, bearing in mind that NDRC 2007 value was not published when the PDD was submitted for GSP, while 2006 value is based on raw data which was outdated at the same time.

[i] The China Energy Statistical Yearbook, volume 2006 was published May 2007;
The China Electric Power Yearbook volume 2006 was published November 2006