

Validation Report

Report for:
Shenmu County Hengsheng Coal Chemical Co., Ltd.
Endesa Carbono S.L.

Validation of CDM project for
Shenmu County Hengsheng Coal Chemical Co., Ltd.
30MW Semi-coke Waste Gas Power Generation
Project

LRQA Reference : A20066-B Version 2.0
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1 Executive Summary

Lloyd's Register Quality Assurance Limited has been contracted by Endesa Carbono S.L. representing the project participants (PP), to undertake validation of the proposed project activity "Shenmu County Hengsheng Coal Chemical Co., Ltd. 30MW Semi-coke Waste Gas Power Generation Project". The validation has been performed through a process of document review based on the project design document, Version 01 dated 12/12/2009 initially submitted for validation and the subsequent revisions, follow-up interviews with the stakeholders, resolution of outstanding issues and issuance of the validation report.

The project intends to reduce greenhouse gas (GHG) emissions by using the waste gas generated from the existing 900,000 tonnes/annual of semi-coke production capability facilities of Shenmu County Hengsheng Coal Chemical Co., Ltd. through the construction and operation of a 30 MW waste gas utilization power plant located in Ningtiaota Industry Zone, Sunjiacha Town, Shenmu County, P. R. China. The project will supply electricity to Northwest China Power Grid and is expected to displace the predominantly fossil-fuel based electricity generation, thereby reducing the CO₂ emissions.

The fulfilment of the requirements as set forth in Article 12 of the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC), the modalities and procedures for a CDM (CDM M&P) and relevant decisions of the Conference of the Parties, serving as meeting of the Parties to the Kyoto Protocol (COP/MOP) and the Executive Board of the CDM (CDM-EB) have been evaluated and conformance to the validation requirements were confirmed based on the given information. A risk based approach was taken to conduct the validation and corrective action requests (CARs) and clarifications (CLs) were raised for relevant actions by the PP.

The validation team has found through the validation process 4 CARs and 5 CLs. The PP has taken actions and submitted to LRQA the revised project design document and supporting evidence. The validation team is of the opinion that the proposed project activity as described in the project design document Version 02 dated 21/10/2010 meets all the relevant UNFCCC requirements for the CDM, as well as the host country's national requirements and if implemented as designed, is likely to achieve the emission reductions and contribute to the sustainable development of the host country. LRQA therefore requests the registration of "Shenmu County Hengsheng Coal Chemical Co., Ltd. 30MW Semi-coke Waste Gas Power Generation Project" to the CDM Executive Board as a CDM project activity.

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Abbreviations

BE	Baseline emissions
BM	Build margin
CARs	Corrective action requests
CDM	Clean development mechanism
CDM-EB	Executive board of clean development mechanism
CDM M&P	Modalities and procedures for a clean development mechanism
CDM VVM	CDM Validation and Verification Manual
CERs	Certified emission reductions
CLs	Clarification requests
COG	Coke oven gas
COP/MOP	Conference of the Parties serving as meeting of the Parties to the Kyoto Protocol
DNA	Designated national authority
DOE	Designated operational entity
EF	Emission factor
EIA	Environmental impacts assessment
ERPA	Emissions reduction purchase agreement
FAR	Forward action requests
FSR	Feasibility study report
GHG	Greenhouse gas
GSP	Global stakeholders' consultation process
IPCC	Intergovernmental panel on climate change
IRR	Internal rate of return
KP	Kyoto Protocol of the United Nations Framework Convention on Climate Change
kW/kWh	Kilowatt / Kilowatt hour
LE	Leakage emissions
LoA	Letter of approval
LR	Lloyd's Register
LRQA	Lloyd's Register Quality Assurance Limited
MW/MWh	Mega watt / Mega watt hour
NCV	Net calorific value
NDRC	National Development and Reform Commission (China DNA)
NGO	Non governmental organization
NWPG	Northwestern China Power Grid
ODA	Official development aid
OM	Operating margin
PDD	Project design document
PE	Project emissions
PP	Project participant
tCO ₂ e	Tonnes of carbon dioxide equivalent
UNFCCC	United Nations Framework Convention on Climate Change

2 Introduction

The project participant (PP) represented by Endesa Carbono S.L. contracted with Lloyd's Register Quality Assurance Limited (LRQA) to undertake validation of the proposed project activity "Shenmu County Hengsheng Coal Chemical Co., Ltd. 30MW Semi-coke Waste Gas Power Generation Project". This report summarizes the findings of the validation process that has been conducted on the validation requirements of the CDM.

The validation has been undertaken by the team formed of the qualified personnel of LRQA as follows:

Xianxin Yan	LRQA China	Team leader, CDM lead validator
Dali Wang	External expert	Sector expert
Michiaki Chiba	LRQA Limited	Technical reviewer & Decision maker
Takahiro Iio	LRQA Japan	Sector expert for technical review

Personnel being engaged in a CDM project validation are qualified based on the established procedures of LRQA to assure the resource requirements satisfy all the requirements of competence criteria of CDM Accreditation Standard for Operational Entities. LRQA is designated as an operational entity and holds the full responsibility of decision-making regarding the validation, in accordance with the accreditation requirements of the CDM-EB. The certificate of appointment of the team personnel is attached to this report.

2.1 Objective

Validation is the process of an independent third party evaluation of a project activity on the basis of the PDD, against the requirements of the CDM as set out in Article 12 of the Kyoto Protocol, the CDM M&P, the present annex, subsequent decisions made by the COP/MOP and CDM-EB, and other rules applicable to the proposed project activity including the host country's legislation and its specific requirements for sustainable development. The validation follows the requirements of the current version of the CDM validation and verification manual (CDM VVM) to ensure the quality and consistency of the validation work and the report.

2.2 Scope

The scope of validation is an independent and objective review of the project design. Review of the PDD is conducted against the requirements of the Kyoto Protocol, the CDM M&P and relevant decisions of the COP/MOP and the CDM-EB. LRQA follows a risk-based approach in the validation focusing on the identification of significant risks for project implementation and generation of CERs. Validation is not meant to provide any consulting towards the PP, however, the corrective actions requests (CARs) and clarifications (CLs) might provide input for improvement of the project design. A validation conclusion shall become final subject to the decision maker's review by LRQA Ltd.

2.3 GHG Project Description

Shenmu County Hengsheng Coal Chemical Co., Ltd. operates a 900,000 tonnes/year semi-coke plant located in Ningtiaota Industry Zone, Sunjiacha Town, Shenmu County, P. R. China. The proposed project intends to reduce greenhouse gas (GHG) emissions by the introduction of 30 MW power generation facilities using the waste gas generated from the semi-coke production which would have been flared in to the atmosphere before the implementation of the project.

The Project activity will achieve greenhouse gas (GHG) emission reductions by avoiding CO₂ emissions from the business-as-usual scenario; electricity generated by those fossil fuel-fired power plants connected to Northwest China Power Grid.

The estimated GHG emission reduction are 127,594 tCO₂e per annum over the 10-year fixed crediting period.

3 Methodology

3.1 Review of documents

The validation is performed primarily based on the review of the project design document (PDD) and the other supporting documentation.

The PDD Version 01 dated 12/12/2009 was initially reviewed. LRQA requested the PP to present supporting information and documents relating to the project design and such additional information and documents were also reviewed by LRQA.

Through the process of the validation, the PDD and the supporting documents of the same were evaluated to confirm the actions taken by the PP to the CARs and CLs issued by LRQA. The documents reviewed by LRQA are listed in Appendix B. LRQA

reviewed the final version of the PDD Version 02 dated 21/10/2010 to confirm that all changes agreed had been incorporated.

3.2 Follow-up interviews

Follow-up interviews with the stakeholders and a field survey were conducted as detailed in the schedule as below:

24/05/2010	Shenmu County Hengsheng Coal Chemical Co., Ltd. Shenmu Jingyuan Clean Development Co., Ltd.
25/05/2010	Local stakeholders representatives of the project Shenmu County Environment Protection Bureau Shenmu County Development and Reform Committee Shenmu County Electricity Supply Company Shenmu Jingyuan Clean Development Co., Ltd.
26/05/2010	Shenmu County Hengsheng Coal Chemical Co., Ltd. Shenmu County Electricity Supply Company Shenmu Jingyuan Clean Development Co., Ltd.

A full list of persons interviewed is shown in Appendix C.

3.3 Resolution of clarification and corrective action requests

LRQA applies the risk based approach aimed at focusing on high risk issues to the validation results whilst not omitting any part of the mandatory processes.

Findings identified in the process are indicated under the titles corrective action requests (CARs) and clarification requests (CLs) and forward action requests (FARs). CARs and CLs require the PP to take relevant actions. Criteria for judging items as CAR or CL are as follows:

Corrective action request (CAR):

- the project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions
- the CDM requirements have not been met, or
- there is a risk that emission reductions cannot be monitored or calculated.

Clarification request (CL):

- information is insufficient or not sufficiently clear to determine whether the applicable CDM requirements have been met.

FARs are to be raised to highlight issues related to project implementation that require review during the first verification of the project activity. FARs do not relate to CDM requirements for registration.

CARs and CLs are to be resolved or closed out if the PP modifies the project design, rectifies the PDD or provides adequate additional explanations or evidence that satisfies the concerns. If this is not completed, the project activity cannot be recommended for registration to the CDM Executive Board.

3.4 Internal quality control

A technical review by a qualified person independent from the validation team and a review by an authorized decision maker were conducted prior to the submission of the validation report to the PP and prior to requesting the registration of the project activity.

4 Validation protocol and conclusions

This section provides an overview of the validation activities undertaken by LRQA in order to arrive at the final validation conclusions and opinion. It includes a general discussion of details captured by the validation protocol (which is based on the Clean Development Mechanism Validation and Verification Manual Version 01.2) and conclusions related to CDM requirements. Further details in relation to specific findings are provided in the Validation Findings Log.

The protocol is structured based on the main validation requirements as follows:

- participation requirements
- general description
- baseline methodology
- emission reductions
- monitoring methodology and monitoring plan
- duration of the project activity / crediting period
- environmental impacts
- stakeholders' comments.

4.1 Participation requirements

A CDM project shall be approved by the Parties involved.

The host Party of the proposed project is the People's Republic of China. China has ratified the Kyoto Protocol on 30/08/2002. The China Designated National Authority is the National Development and Reform Commission (NDRC).

The Annex I Party is the United Kingdom of Great Britain and Northern Ireland. The UK ratified the Kyoto Protocol on 31st May, 2002. The International Climate Change Division, Department of Energy and Climate Change is the Designated National authority for the CDM.

It was noted that in the PDD for GSP purpose the Annex I country was indicated as the Kingdom of Spain. Subsequently the PP presented the LoA of the United Kingdom of Great Britain and Northern Ireland dated 20 October 2010. The team confirmed that the PDD was revised accordingly.

The information of the DNAs has been confirmed by the validation team against the relevant information on the UNFCCC CDM website (<http://cdm.unfccc.int/DNA/index.html>).

A letter of Approval (LoA) from the host Party's DNA dated March 2010 (serial number 2357) and the LoA from the Annex-I Party's DNA dated 20 October, 2010 were made available by the PP.

The validation team reviewed the LoA presented by the PP against the requirements in 'Clarification on elements of a written approval' and confirmed that the LoA of host country contains the elements requested by the CDM-EB, including:

- confirmation of the Party's ratification to the Kyoto Protocol

- voluntary participation
- the project activity's contribution to sustainable development of the country (host Party), and
- the precise title of the CDM project activity of the final PDD referenced.

Shenmu County Hengsheng Coal Chemical Co., Ltd. is a private entity having its registered office in China.

Endesa Carbono S.L. is a private entity having its registered office in UK.

The contact details of the PPs are correctly provided in Annex 1 of the PDD.

The Modalities of Communication (MoC) was submitted to LRQA using the form F-CDM-MOC. The validation team confirmed the completeness of the information following the Procedures for modalities of communication between project participants and the executive board. Endesa Carbono S.L. and Shenmu County Hengsheng Coal Chemical Co., Ltd. are the joint focal points for communication. The authorized signatory of the participating entities were confirmed as that of authorized representatives of the respective entities and completeness of information was confirmed by the validation team.

CAR 01 was issued because the LoA from the Annex I country was not presented at the initial stage of the validation. This was subsequently addressed as above and the finding was therefore closed accordingly.

4.2 General description

Project design document

The PDD was checked and confirmed as complete against the Guidelines for completing the project design document (CDM-PDD) and proposed new baseline and monitoring methodologies (CDM-NM) Version 07. A valid form of the CDM-PDD Version 03 is used as it is available in the CDM website.

Project description

Shenmu County Hengsheng Coal Chemical Co., Ltd. operates a semi-coke production plant in Ningtiaota Industry Zone, Sunjiacha Town, Shenmu County, P. R. China. The semi-coke plant is consisted of 18 similar semi-coke facilities with a total annual production capacity of 900,000 tones of semi-coke.

Shenmu County Hengsheng Coal Chemical Co., Ltd. planned to establish a 30 MW waste gas utilization power plant that involves installation of two 75t/h gas-fired boilers, two 15MW condensing steam turbines and generators. The waste gas from the semi-coke plant is transformed into steam in two gas-fired boilers and generates power by two condensing steam turbines & generators. The electricity generated is supplied to the Yulin power grid, which is connected to the Northwest China Power Grid through Shaanxi power grid. The implementation of the project activity will supply 153.0 GWh electricity to the Northwest China Power Grid per year resulting in estimated emission reductions of 127,594 tCO₂e/a over the 10-year fixed crediting period.

The accuracy and completeness of the project description was validated by document review including the PDD and references, interview, and field survey.

Semi-coke is a product made of the special kind of coal produced in the area where the proposed project locates (mainly in Shaanxi Province of China). The production is a kind of low temperature carbonization process with the temperature around 600 to 750 °C which is lower than that of coke production as 1,000 to 1,100 °C. A special kind of low ash coal is only the raw material. The manufacturing process and equipment as well as the purpose are also different from the coke production.

The equipment of the proposed power generation project is manufactured in China.

CL 02

In the PDD, it was described that the project is to be connected with the 35kV substation but during the interview with the PP and the grid company, it was told that the power produced by the project will be sent to Ningtiaota 110kV substation. The monitoring plan should be clarified according to the actual grid connecting arrangement with the grid company.

The PP revised the PDD according the actual agreement with the grid company. The CL was closed.

Sustainable development

The host Party's DNA confirmed the contribution of the project activity to the sustainable development of the host Party. The use of waste gas from semi-coke production for power generation is a waste energy utilization and pollution prevention technology, and is expected to contribute towards the sustainable development of the host country.

Public funding

The project activity uses no public fund. By checking the formal investment documentation and registration of the company, it was validated that the project activity is funded by the project owner's equity. No public funding from Annex I countries is considered to be utilized for the project activity.

4.3 Baseline methodology

Application of baseline and monitoring methodology

The project activity applied the approved baseline and monitoring methodologies: ACM0012 "Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects" (Version 03.2) and refers to "Tool to calculate the emission factor for an electricity system" (Version 02) and "Tool for the demonstration and assessment of additionality" (Version 05.2).

The project is one of the activities defined in Type-1 project. In the absence of the project activity, waste gas from the current production process of semi-coke was flared without utilization. The situation was confirmed through on-site review and document review.

The project applicability was confirmed against each condition in the approved methodology selected by the following methods.

No.	Applicability conditions in ACM0012 Ver. 03.2	Justification in PDD	Comments of validation team
1	If the project activity is based on the use of waste pressure to generate electricity, electricity generated using waste pressure should be measurable.	The Project does not use waste pressure.	The project uses waste gas from the production process of semi-coke to generate electricity. The condition is met.
2	Energy generated in the project activity may be used within the industrial facility or exported from the industrial facility.	The electricity is supplied to the Northwest China Power Grid.	According to the Grid Connecting Approval signed with Yulin Electricity Supply Company (Local Grid Company), the electricity generated by the proposed project will be supplied to the public power grid. The conditions are met.
3	The electricity generated in the project activity may be exported to the grid or used for captive purposes.	The electricity is exported to the Northwest China Power Grid.	
4	Energy in the project activity can be generated by the owner of the industrial facility producing the waste energy or by a third party (e.g. ESCO) within the industrial facility.	Energy in the project activity is generated by the owner of the industrial facility i.e. the project proponent Hengsheng Company itself.	Shenmu County Hengsheng Coal Chemical Co., Ltd. is the owner of the semi-coke production facilities and the proposed project. This condition is met.
5	Regulations do not constrain the industrial facility that generates waste energy from using fossil fuels prior to the implementation of the project activity.	There are no such regulations on Hengsheng Company which restrict the generation of the waste gas from using the fossil fuels before implementation of the project activity.	Coal and other fossil fuels are used commonly in semi-coke production. There is no regulation constrains the industrial facility that generates waste energy from using

			fossil fuels prior to the implementation of the project activity. The condition is met.
6	The methodology covers both new and existing facilities. For existing facilities, the methodology applies to existing capacity. If capacity expansion is planned, the added capacity must be treated as a new facility.	For the case of the project activity under consideration, the semi-coke plant was consolidated a number of smaller semi-coke facilities, and it is an existing facility, so the methodology is applicable.	By checking the FSR and field survey, It was confirmed that the project activity is implemented in the existing semi-coke production plant. The condition is met.
7	The emission reductions are claimed by the generator of energy using waste energy.	Shenmu Hengsheng Coal Chemicals Co., Ltd. will claim the emission reductions for electricity generation through waste gases.	The electricity is generated by the Project owner who claims the emission reductions. The condition is met.
8	In cases where the energy is exported to other facilities, an official agreement exists between the owners of the project energy generation plant (henceforth referred to as generator, unless specified otherwise) with the recipient plant(s) that the emission reductions would not be claimed by recipient plant(s) for using a zero-emission energy source.	The electricity generated by the proposed project activity will mainly supply to the local grid and the credits are only claimed by the generator of the electricity.	By checking the project documentation, interview with the PP and the local grid company and by field survey, it was confirmed that the power generated by the proposed plant will be transferred to the public grid without exported to other facilities. The condition is met.
9	For those facilities and recipients, included in the project boundary, which prior to implementation of the project activity (current situation) generated energy on-site (sources of energy in the baseline), the credits can be claimed for minimum of the following time periods: ✓ The remaining lifetime of equipments currently being used; and ✓ Credit period	There is no any energy generated plant on-site, prior to implementation of the project activity (current situation). Hence, the fixed crediting period of 10 years is selected.	The proposed project is a newly established power generation plant. According to the FSR of the semi-coke plant and the proposed power plant and the equipment purchasing contracts, the remaining lifetime of all of the facilities are longer than the selected fixed credit period of 10 years.
10	Waste energy that is released under abnormal operation (for example, emergencies, shut down) of the plant shall not be accounted for.	As emission reductions are only claimed by actual net output electricity and no electricity can be generated under abnormal conditions, any waste gas flared under abnormal operation (emergencies, shut down) of the plant will not be accounted for.	The power generating plant is only using the waste energy and the ERs are counted by electricity generated as the proposed project activity. Therefore in no case waste energy released under abnormal operation is accounted for ERs and the case passes the condition.
11	This methodology is not applicable to projects where the waste gas/heat recovery project is implemented in a single-cycle power plant (e.g. gas turbine or	The proposed project is not implemented in a single-cycle power plant to generate power.	By checking the FSR and field survey, the team confirmed that the project is not a case of waste heat recovery from

	diesel generator) to generate power.		combustion turbine or engine as applicable with ACM0007 that is excluded from the applicability condition.
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Demonstration of use of waste energy in absence of CDM project activity

The team confirmed that project is Type I activities that the waste energy (waste gas) utilized in the project activity was in the absence of the project activity by means of on site checks as follows.

- 1) By checking the FSR of semi coke production facilities, the waste gas would be flared without any other utilization method.
- 2) By field survey on the existing semi coke production facilities and confirmed that there is no other waste gas utilization facilities installed connecting with the waste gas collection system and there is no pipeline led the waste gas to any other facilities. The waste gas generated from the semi coke production is led to a set of torches.

It was also noted by the team that *Shaanxi Province Development and Status of Semi-coke Industry* published by Shaanxi Energy Conservation Association on 20 May 2009 declared that to flare the waste gas generated from the semi coke production in Shaanxi province is a common practice and the proposed project activity is considered as one of the pilot projects under the help of CDM to utilize the waste gas for power generation.

Project boundary

The project boundary has been validated through review of the PDD and the referenced documents, interview and field survey that included the cokery (waste gas sources), power generating equipment and the power plants connected physically to the electricity grid that the proposed project activity will affect. The electricity generated by the project will be exported to NWPG, which include Shaanxi Power Grid, Gansu Power Grid, Qinghai Power Grid, Ningxia Power Grid and Xinjiang Power Grid. This information was substantiated via cross check with official publication of the host country government, physical site survey and interviews with the PP and other stakeholders. Through the processes taken, the validation team confirmed that the identified project boundary, selected sources and gases were justified for the project activity and meet the requirements of the approved methodology.

Baseline scenario

The validation team assessed the requirement taking the steps below.

Step 1 Define the most plausible baseline scenario for the generation of electricity using the following baseline options and combinations:

For the use of waste energy, the PP analysed the plausible baseline scenarios from the options as below:

Baseline options	Description of ACM0012	Justification in PDD	Validation comments
W1	Waste Energy Carrying Medium (WECM) is directly vented to atmosphere without incineration or waste heat is released to	According to Safety Code for Gas of Industrial Enterprises (GB6222-2005), the bleeding device for waste gas should install	This option is not consistent with mandatory laws and regulations and was excluded.

	the atmosphere or waste pressure is not utilized	incineration equipment, and the waste gas must be incinerated.	
W2	WECM is released to the atmosphere (for example after incineration) or waste heat is released to the atmosphere or waste pressure energy is not utilized	The baseline scenario option is in compliance with Chinese relevant laws and regulations, and it is a possible option in baseline scenario prior to the implementation of the proposed project.	The option remains for further step.
W3	Waste energy is sold as an energy source	Waste Gas has a very low calorific value (7524 KJ/m ³) & it is 19.3% of the calorific value of the Natural Gas (38931KJ/Nm ³). So waste gas cannot be sold for residential use. Besides, presence of about 59.4% non-combustible components in the waste gas leaves no price for this gas. In addition, continuous supply of the waste gas cannot be ensured, as it is a by-product of the semi-coke manufacturing process. Furthermore, the project located on the edge of Chawusu desert and there is not any other big industrial energy (waste gas) consumer in the area, so the waste gas is impossible to be sold as an energy source. Therefore, this option is excluded.	This judgment is based on the concentration data in the FSR and confirmed with the monitoring result conducted by the Environment Monitoring Station, an independent third party, about the waste gas components in the plant of the area which use the similar technology and raw coal. The project located on the edge of Chawusu desert and there is not any other big industrial energy (waste gas) consumers in the area as confirmed during the interview with the local authorities. The waste gas is impossible to be sold as an energy source and this option is not realistic and credible.
W4	Waste energy is used for meeting energy demand	As there is no potential use of waste gas for thermal energy around the project site, in addition there is no thermal energy demand either within the industrial facility (semi-coke plants) as it uses coal only as its fuel source, therefore this W4 is excluded.	Semi coke production uses coal as the raw material and the energy source and no thermal energy is needed. This option can be excluded.

W5	A portion of the waste gas produced at the facility is captured and used for captive electricity generation, while the rest of the waste gas produced at the facility is vented/flared	Considering the fact that there is no semi-coke oven gas to electricity generation project in the region due to low financial viability of utilizing semi-coke oven gas ¹ and all the projects currently under planning are seeking for CDM revenue to overcome investment barrier ² , so W5 is not deemed to be a plausible baseline scenario to the project activity.	By checking the electricity consumption record of semi-coke plant, the power consumption in 2009 was 1520MWh, it will only occupy approximately 1% of the electricity generation assumption of the proposed project as 153GWh annually. It shows that the captive power generation was far less attractive to the PP. The team further checked the third party document Shaanxi Province Development and Status of Semi-coke Industry issued by Shaanxi Energy Conservation Association and other public available information listed in the PDD, the team confirmed that this scenario is not plausible.
W6	All the waste gas produced at the industrial facility is captured and used for export electricity generation	This option is interpreted as the proposed project activity not undertaken as a CDM project activity, which is similar to the W4 in the proposed project.	This alternative is the plausible baseline scenario and will be evaluated later.

Based on barriers and the legal requirements on each alternative analysed the PP identified option W2, W6 as technically feasible and compliant with relevant laws/regulations.

For power generation, the PP analysed the plausible baseline scenarios from the options as below:

Baseline options	Description of ACM0012	Justification in PDD	Validation comments
P1	Proposed project activity not	This alternative is in	This is plausible and

1 Shaanxi Energy Conservation Association Document: Shaanxi semi-coke industry development and current status (reporting to Environment & Resource Department of Shaanxi Provincial Development & Reform Commission) (Document Number Shaan Jie Xie (2009)12)

2 <http://cdm.unfccc.int/Projects/Validation/DB/SVI2SVEX47K6230B5XJ2UAKP4BEXJ3/view.html>
<http://cdm.unfccc.int/Projects/Validation/DB/O2RD17OF3OV7V4KPHZO15GAS03RWEU/view.html>
<http://cdm.unfccc.int/Projects/Validation/DB/UIKFZOAMLCYMTUX77JZPTD0WUD5OEG/view.html>
<http://cdm.unfccc.int/Projects/Validation/DB/1UDFVTAJAPU5YJ18VLN0AH2674HH45/view.html>
<http://cdm.unfccc.int/Projects/Validation/DB/7FGDZ7WNO7S9F6C7MHD2U9SB779VNC/view.html>

	undertaken as a CDM project activity	compliance with all applicable legal and regulatory requirements.	requires further consideration.
P2	On-site or off-site existing/new fossil fuel fired cogeneration plant	There is no on-site or off-site existing fossil fuel based cogeneration plant, and it could not be foreseen to build a new cogeneration plant with equivalent amount of electricity output as there is no thermal energy demand either around the project site or within the industrial facility (semi-coke plants), where is near to the Ordos desert. P2 is therefore excluded.	This option has been discarded as there is no need for heat energy and the Project only generating electricity.
P3	On-site or off-site existing/new renewable energy based cogeneration plant	There is no on-site or off-site existing renewable energy based cogeneration plant, and it could not be foreseen to build a new cogeneration plant with equivalent amount of electricity output since there is no available renewable resource on-site or off-site. In addition, there is no thermal energy demand either around the project site or within the industrial facility (semi-coke plants), where is near to the Ordos desert. P3 is therefore excluded.	This option has been discarded as there is no need for heat energy and the Project only generating electricity.
P4	On-site or off-site existing/new fossil fuel based existing captive or identified plant	According to Chinese regulations issued in 2002, fossil-fired power plants of less than 135MW are prohibited for construction in the areas covered by the large grids such as provincial grids, and the fossil fuel power units with less than	This option has been discarded because it is not in compliance with Notice on Strictly Prohibiting the Installation of thermal Generators with the Capacity of 135MW or Below issued by the Government. Construction of coal-fired power plants

		100MW is strictly regulated for installation. So the possible alternative baseline scenario of building a 30 MW coal-fired power plant conflicts with China's current regulations. Therefore, There is no on-site or off-site existing fossil fuel based captive plant. P4 is excluded.	with capacity of less than 135 MW are prohibited in the areas which can be covered by large grids such as provincial grids, and the coal-fired power units with capacity of less than 100 MW is strictly limited for installation. The semi coke production facility is constructed in 2008 after the enforcement of the above policy, so both of the on-site or off-site existing fossil fuel based captive plant do not meet the requirement.
P5	On-site or off-site existing/new renewable energy (or other waste energy) based existing captive or identified plant	There is no on-site or off-site existing renewable energy based existing captive plant which could provide the equivalent annual power supplied since the project region is in Ordos desert, where there are no significant hydropower resources ³ in the project area. It also can be proved that, in China, solar PV ⁴ , biomass ⁵ and geothermal ⁶ generation technology is still in the demonstration stage and it has little economic attraction to investor, Without policies& financial support, it would be difficult to operate	The project activity is located in an area where renewable resources are not available according to public available information. It was also validated and confirmed that it is not economic and resourceful for the renewable energy based power plant for the equivalent capacity power plant in the area and it is not reasonable for the PP not use waste gas instead of other energy to get electricity. Through the site visit and interview with the local authorities, it was confirmed that there was no on-site or off-site renewable

³ <http://yl.hsw.cn/system/2009/08/10/050268757.shtml>

⁴ <http://www.ceh.com.cn/ceh/cjxx/2009/6/27/49087.shtml>

⁵ <http://www.gold9999.cn/chinese/share/shownews.asp?id=180201&classid=1&level=41>

⁶ <http://www.wanye68.com/news/content/2009/5/195653.html>

		such kinds of renewable energy. Also, there is no other semi-coke waste gas energy based power plant on site ⁷ . Thus, renewable energy based or other waste energy based power plant may not be a part of the baseline.	energy (or other waste energy) based existing captive or identified plant. This is not a plausible baseline scenario.
P6	Sourced grid-connected power plants	This option is in compliance with Chinese relevant laws and regulations.	The option remains for further evaluation. See Step 3 below.
P7	Captive electricity generation using waste energy (if project activity is captive generation using waste energy, this scenario represents captive generation with lower efficiency than the project activity.)	There is no captive plant using waste gas that already built in the plant site. Furthermore, the amount of the electricity consumed by the industrial facilities is very small ⁸ , the captive electricity generation plant with the equivalent electricity output with the proposed project activity is not needed. Hence the scenario P7 is not feasible as baseline scenario.	The amount of the electricity consumed by the industrial facilities is very small compared with the capacity of the power generation using the waste heat produced from the semi-coke production process. (which was noted in the validation of P2). The captive electricity generation plant with the equivalent electricity output with the proposed project activity is not needed. According to the Electricity Supplying Intent Agreement, the electricity generation by the project will be completely supplied to the grid and no captive use is allowed. This project is not a captive electricity generation project and this option is excluded.
P8	Cogeneration using waste energy gas (if project activity is cogeneration using waste energy, this scenario represents cogeneration with lower efficiency	There is no cogeneration plant using waste gas with equivalent amount of electricity output as	There is no need for heat energy (refer the validation in W3). Cogeneration is not a credible option. This

⁷ Shaanxi Energy Conservation Association Document: Shaanxi semi-coke industry development and current status (reporting to Environment & Resource Department of Shaanxi Provincial Development & Reform Commission) (Document Number Shaan Jie Xie (2009)12)

⁸ Clarification of the semi-coke plant, the rate of the annual electricity consumption of the semi-coke plant occupies the annual electricity generated of the power plant is less than 10%.

	than the project activity)	there is no thermal energy demand either around the project site or within the industrial facility (semi-coke plants), where is near to the Ordos desert. Thus P8 is excluded.	option is excluded.
P9	Existing power generating equipment (used previous to implementation of project activity for captive electricity generation from a captured portion of waste gas) is either decommissioned to build new more efficient and larger capacity plant or modified or expanded (by installing new equipment), and resulting in higher efficiency, to produce and only export electricity generated from waste gas. The electricity generated by existing equipment for captive consumption is now imported from the grid	There is no existing power generating equipment before the proposed project. Therefore, this option is not applicable to the proposed project activity.	Before the project activity, there is no electricity generation facility in the company using waste gas. This option is not applicable to the project activity.
P10	Existing power generating equipment (used previous to implementation of project activity for captive electricity generation from a captured portion of waste gas) is either decommissioned to build new more efficient and larger capacity plant or modified or expanded (by installing new equipment), and resulting in higher efficiency, to produce electricity from waste gas (already utilized portion plus the portion flared/vented) for own consumption and for export		
P11	Existing power generating equipment is maintained and additional electricity generated by grid connected power plants		

The PP made analysis on each of the above alternatives and found P1 and P6 remain from the options. The PP made investment analysis in B.5 of the PDD on P1 and found that the proposed project activity without the benefits of CDM is not economically feasible. Please refer to the below section for Additionality.

The most plausible scenarios matrix obtained from the combinations of the alternatives are presented in the following table B.3.

Table B.3: Possible combinations of baseline scenarios matrix

Scenario	Baseline options		Description
	Waste gas use	Power generation	

1.	W2	P6	Waste gas is released directly to the atmosphere after incineration, and NWPG provides the equivalent electricity
2.	W6	P1	All the waste gas produced at the industrial facility is captured and used for export electricity generation and the proposed activity not undertaken as a CDM project activity

Step 2. Identify the fuel for the baseline choice of energy source taking into account the national and/or sectoral policies as applicable

Both of the above two scenarios don't involve additional fuel consumption which face no compelling law.

Step 3: step 2 and/or step 3 of the latest approved version of the “Tool for the demonstration and assessment of additionality” shall be used to identify the most credible baseline scenarios by eliminating non-feasible options.

Step 2 and Step 3 of Tool for demonstration and assessment of additionality (Additionality tool) Version 05.2 are applied as detailed below. PDD concluded that the project activity if not implemented as a CDM project activity (scenario W6 & P1) is not financially viable and was excluded. While this is further discussed below, scenario W2 and P6 only remain as plausible baseline scenarios.

Step 4: If more than one credible and plausible scenario remain, the alternative with the lowest baseline emissions shall be considered as the most likely scenario.

This step is not applied as there is one baseline scenario left.

The statements in the PDD were cross-checked with referenced legal and sector requirements. The team confirmed that: the PDD indicates the assumptions and data used; applicable national / sectoral policies and circumstances in a complete manner that are appropriately justified, supported by evidence and deemed reasonable to the context of the project activity; references to the information sources are correctly made; the information sources are reliable, correctly quoted and interpreted; and the baseline scenario is identified in accordance with the requirements of the approved methodology.

CL 01

The PP was required to further clarify the reason of the baseline scenario demonstration, e.g.

- The reason of elimination of W3 should be given relating to both residential and Industrial users.
- For P5, the description in the PDD was noted as It can be observed on-site that there was no significant hydropower resource in the project area which need to be clarified by using evidence.
- For P7, it was declared in the PDD as captive power use would not be allowed by the grid company and the electricity has to be supplied to the grid first; hence it should be excluded. Please clarify the reason by using evidence.

As the clarification, the PP revised the description of the baseline selection as described in above tables and the CL was closed.

Additionality

The project additionality was demonstrated by the PP using the Tool for the demonstration and assessment of additionality Version 05.2.

Step1. Identification of alternatives to the project activity consistent with current laws and Regulations.

Referring to the result of the baseline selection, the most possible alternatives to the project activity are:

Scenario 1 (W2, P6): Waste gas is released directly to the atmosphere after incineration, and NWPG provides the equivalent electricity

Scenario 2 (W6, P1): All the waste gas produced at the industrial facility is captured and used for export electricity generation. And the project activity is undertaken not as a CDM project activity

Both scenarios above are in compliance with all applicable legal and regulatory requirements. Scenario 2 is analyzed through Step 2 and the PDD concludes Scenario 1 is the baseline scenario as Scenario 2 is not financially viable.

Step 2 - Investment analysis

Investment analysis is used for demonstration of the additionality.

Benchmark analysis is selected out of the options for the analysis method as the project activity will produce economic return by electricity sales other than the CDM related revenue and the project owner has no other investment option to compare with.

Identified benchmark is 8% (total investment after income tax) that is indicated in *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects* (Guodianfa [2002] No.623), issued by State Power Corporation of China on 10/09/2002 that is relevant for total investment's IRR (after tax). This benchmark is widely used in the investment analysis of project activities in China. The validation team confirmed that the *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects* issued on 10/09/2002 and available at the time of feasibility study and investment decision making of the project activity.

In paragraph 54. of the 38th meeting, the CDM-EB clarified that in cases where PPs rely on values from Feasibility Study Reports (FSR) that are approved by national authorities for proposed project activities, DOEs are required to ensure that:

- (a) The FSR has been the basis of the decision to proceed with the investment in the project, i.e. that the period of time between the finalization of the FSR and the investment decision is sufficiently short for the DOE to confirm that it is unlikely in the context of the underlying project activity that the input values would have materially changed.
- (b) The values used in the PDD and associated annexes are fully consistent with the FSR, and where inconsistencies occur the DOE should validate the appropriateness of the values.
- (c) On the basis of its specific local and sectoral expertise, confirmation is provided, by cross-checking or other appropriate manner, that the input values from the FSR are valid and applicable at the time of the investment decision.

For implementation of the project activity in China, completion of feasibility study report (FSR) to demonstrate project's viability and its approval by the Government are pre-

requisite. The main parameters used in the investment analysis in the PDD are derived from the FSR.

The FSR was completed in August 2008 and it was approved by Shaanxi Province Development and Reform Committee on 31/12/2008. The investment decision for the project activity followed the FSR and the real action for implementation of the project activity started from 30/04/2009, only 8 months after completion of the FSR. The validation team confirmed that there was no significant change that affects implementation of the project activity during the short time period. Information as available at the time of the investment decision making is considered in the investment analysis.

Parameters		Value	Source	Validation comments
Installed capacity(MW)		30	Feasibility Study Report	Confirmed with FSR and other project documents.
Annual power supplied (MWh)		153,000	Feasibility Study Report	Confirmed with FSR. Technical evaluation was conducted and noted below.
Total Static investment (10,000 Yuan RMB)		18,516.28	Feasibility Study Report	No bank loan is used in this project, so there is no interest need to be paid and the construction investment equals to the static investment. Confirmed with FSR and official documents. Crosscheck was conducted and noted below.
Annual running cost	Raw material fee (10,000 Yuan RMB)	407.22	Feasibility Study Report	Confirmed with FSR and official documents. Crosscheck was conducted and noted below.
	Water fee (10,000 Yuan RMB)	335.28		
	Salary (10,000 Yuan RMB)	430.92		
	Repair (10,000 Yuan RMB)	645.60		
	Management (10,000 Yuan RMB)	391.59		
	Total (10,000 Yuan RMB)	2,210.61		
Floating capital (10,000Yuan RMB)		624.52	Feasibility Study Report	Confirmed with FSR and official documents. Floating capital was counted back at the end of analysis period following Guidance on the assessment of Investment Analysis.
Grid price (with VAT, Yuan RMB/ kWh)		0.315	Feasibility Study Report	Confirmed with FSR and official policy tariff. This tariff is confirmed in the agreement between the PP and the Grid company. Evaluation in details was noted below.

VAT	17%	Feasibility Study Report	Confirmed with FSR and local tax regulations. (http://www.gov.cn/banshi/2005-08/19/content_24733.htm)
Urban Maintenance and Construction Tax	5%	Feasibility Study Report	Confirmed with FSR and local tax regulations (http://www.53tax.gov.cn/showNews.jsp?info_id=1985)
Education Supplementary Tax	3%	Feasibility Study Report	Confirmed with FSR and local tax regulations (http://www.53tax.gov.cn/showNews.jsp?info_id=767)
Income Tax	25%	Feasibility Study Report	Confirmed with FSR and meet the National Income Tax Law (http://www.gov.cn/flfg/2007-03/19/content_554243.htm)
Depreciation fee (10000 Yuan RMB)	976.98	Feasibility Study Report	Confirmed with FSR. Depreciation fee rate was estimated following the local regulations and the residual value was counted at the end of analysis period following Guidance on the assessment of Investment Analysis
Operating period (years)	15	Feasibility Study Report	Operation period as 15 years is inline with the national standards "Industrial entity financial policy".
CER price (EUR)	8.5	Expected	

The project IRR after tax of the project was calculated and the results are as shown below.

IRR with and without CDM support

	IRR (%)
IRR without CERs	5.34%
IRR with CERs	11.42%

The validation team assessed the calculation and the supporting evidences. The calculation results show that the project IRR is 5.34% without CDM revenue and lower than the 8% benchmark. And the IRR is improved and reaches 11.42% with the CDM revenue. Therefore, the proposed project is considered financially feasible to the investors if it is implemented as a CDM project activity. Further details and the calculation process are provided in the calculation spreadsheet in a transparent manner and relevant evidences were presented to the validation team.

The team selected the registered COG projects in China for project comparison. It is because the proposed project is one of the first pilot semi-coke waste gas based projects for which the sufficient and detailed information for all semi-coke gas recovery based power generation projects in Shaanxi province are not publicly available for investment analysis comparison. COG provides higher heating value than semi-coke gas and technology to recover and utilize COG for power generation has been better demonstrated. Hence the comparison is considered as more conservative if being

applied to the semi-coke gas based project. Therefore, similar registered COG recovery based power generation projects in China are taken for this comparison. There are total of 4 COG projects in China have been registered (including 3 projects registered by investment analysis and 1 project registered by barrier analysis). By checking the CDM pipeline (<http://www.cd4cdm.org>) and UNFCCC website, following three projects are compared.

Project name	Ref. Number	Installed capacity (MW)	Total investment (RMB)	Unit Investment (RMB/kW)	O&M cost (RMB)	O&M of total investment (%)	O&M/ Capacity (RMB/KW)
Power Generation (20MW) by utilizing Coke Oven Gas of China Coal and Coke Jiuxin Limited in Lingshi, Shanxi (investment comparison analysis method)	1390	20.00	88,287,700	4,414.39	11,326,000	12.83%	566.3
2*6MW Coke Oven Gas Power Generation Project in Xiangcheng County	1721	12.00	64,710,000	5,392.50	12,380,000	19.13%	1031.67
Pingdingshan Coal (Group) Company Chaochuan Mine 6*2MW Coke Oven Gas Cogeneration Project	2818	12.00	65,030,000	5,419.17	10,995,000	16.91%	916.25
Proposed project	N.A.	30.00	185,162,800	6,172.09	22,106,100	11.94%	736.87

LRQA evaluated the major input value of the financial investment and the sensitivity analysis of the project activity and conducted crosscheck by using other information resource.

Total static investment

Construction investment was confirmed as consistent in comparison of the FSR which was the information source of the decision of the project construction.

- As a project under construction, LRQA crosschecked the total investment by checking the actual value of the contracts, including the purchasing of the boilers, turbines, generators, transformers, gas storage and transporting system, cooling system, control system, and the construction and installation contracts and found the total static investment as of the time of the validation was 203,245,000 RMB (109.76% of total static investment estimation of 185,162,800 RMB).
- The team compared the proposed project with similar registered waste gas utilization projects in China on unit investment cost per power generation capacity using the information described in above table. Unit investment cost per power generation capacity of the project activity is 6,354.30 RMB/kW which is higher than the projects reported in the above table. The reason was summarized as following:
 - The NCV of the semi-coke gas is in the order of 7524 kJ/m³ while for the coke oven gas it is about 16 726-117981 kJ/m³.⁹ This has a direct consequence on the dimension of the equipment and piping: to convey the same amount of waste energy (in MJ/second) from the source in the semi

⁹ China Energy Statistical Yearbook 2006, P287

coke production facility to the point of use, pipe diameters and the boiler size have to be more than 50% bigger than in the case of coke gas projects. Larger pipe diameters and boiler size mean also more expensive equipment such as valves, instruments, supporting beams, etc and also excavation and other civil works;

- The existence of additional equipment in the project activity with respect to the comparison coke projects such as a start-up boiler and a 30,000 m³ equalization tank in the project activity;
- The investment costs in 2008 were higher than in the previous years when the financial analysis of the coke projects were conducted.

Thus the assumption of the total investment as 185,162,800 RMB can be considered as reasonable and conservative.

Electricity Tariff

In the PDD and the financial analysis, the tariff as 0.315 RMB/kWh (with VAT) is cited from the approved FSR (approved on 31/12/2008). The electricity tariff was known by the project owner in the official document prior to the investment decision making on 05/01/2009 and was therefore used for the investment analysis. The validation cross checked the tariff information resource before the decision making step by the following means:

By checking the official document Announcement of the Adjustment of the Electricity Price issued by Yulin City Price Bureau, dated 31/07/2008 and the Announcement of the Adjustment of Feed-in Tariff of Thermal Power issued by Shaanxi Province Price Bureau dated 20/08/2008, the tariff (with tax) for thermal power generation plants is 0.315 RMB/kWh
http://www.spic.gov.cn/admin/pub_journalshow.asp?id=103895&chid=100068).

The Feed-in tariff of 0.315 (including tax) was fixed in the Electricity Purchase & Sale Contract and Supplemental Contract between the project owner and Yulin City Power Supply Bureau signed on 09/10/2009 for the project life time.

Annual O&M cost

Annual O&M cost was confirmed as consistent with the FSR that is based on the Economic Assessment Method and Parameters for Capital Construction Project, published by the NDRC and Construction Ministry which was the information source of the decision of the project construction. The annual O&M costs for the project activity represent 11.94% of the total investment and 736.87RMB/kW installation capacity. These data were compared with the similar value of the other projects analysed in the above table and are also considered as being estimated in a reasonable range. Furthermore the team evaluated the details of the assumption of the O&M cost as below.

	item	value	Date source	evaluation
1	Raw material fee (10,000 Yuan RMB)	407.22	Page 99 of the FSR	This value is assumed according to general material price level in the area. The team compared the O&M cost with other projects to demonstrate the reasonableness of this assumption.

2	Water fee (10,000 Yuan RMB)	335.28	Page 99 of the FSR	The assumption is in line with the announcement of Shaanxi Price Bureau <2006>247. (http://www.spic.gov.cn/admin/pub_journalshow.asp?id=103228&chid=100068)
3	Salary (10,000 Yuan RMB)	430.92	FSR	The salary: 105 staff X 3,000 RMB/month /staff. Welfare rate: 14%. Thus: 105 staff *3,000 RMB/month/staff *12*1.14 = 4,309,200 RMB <ul style="list-style-type: none"> • 105 staff number is in line with Standard Quota of Staff for Thermal Power issued by State Power Company in 1998. • Average salary of technical staff in the area as 30,000 RMB/yr is assumed reasonable. (http://www.jobyun.com/gongzi_%BC%BC%CA%F5%D4%B1_area_%D3%DC%C1%D6) • Welfare rate is assumed conservative as there are some other mandatory insurance such as jobless insurance, house funding, etc.
4	Repair (10,000 Yuan RMB)	645.60	FSR	4% of the static investment is in line with the common accountant practice.
5	Management (10,000 Yuan RMB)	391.59	Table 11-1 of FSR	The assumption is in line with the Economic Evaluation Method and Parameters issued by NDRC. The details are listed in the FSR and was found the major items including company management fee, travel expense, land taxation etc.
	Total (10,000 Yuan RMB)	2,210.61		

The fixed input values are used for the investment analysis over the analysis period following the guidance of the Economic Evaluation Method and Parameters for Project Construction. This is also noted as more conservative approach for projects in China as more fluctuation is expected with operational expenses while electricity price that constitutes project's revenue is regulated by the local government and not expected to increase with rate greater than the increase of the operational expenses.

Tax rates

These were taken from the approved FSR and they are in line with the current Chinese regulations. Tax rates account to 17% for VAT, 25% for income tax, 3% educational supplementary tax and 5% for urban maintenance and construction tax. The reference policy documents are crosschecked and listed in the Appendix B of this report.

The team had confirmed that no bank loan was used in the project activity, so there was no interest payment need to be considered.

Electricity supplied to the grid

Cited from the FSR, the annual waste gas production is $4.35 \times 10^8 \text{ Nm}^3$ with the calorific value of $7,524 \text{ kJ/Nm}^3$, which was flared to the atmosphere through gas pipe in the pre-project situation, will be recovered and transmitted to the waste gas power plant for generating power with the operating time of 6,000 hours under the proposed project activity.

The operation hour of the power plant is assumed as 6,000 hours that is cited from the FSR which was found in accordance with the design operation hour of the semi coke plant. In comparison with the average level, the team compared with 5 semi coke projects published in the UNFCCC website for CDM validation and found the operation hour of the project is similar with the other published projects. Furthermore, according to China Power Year book from 2004 to 2008, the average annual operation hours of fossil fired power plant in China is 5,767 hours, 5,991 hours, 5,865 hours, 5,612 hours and 5,344 hours respectively from 2003 to 2007 which were all within 6,000 hours.

By checking the details of the technical specification, the gross capacity of the auxiliary equipments was confirmed as 4,502 kW, which occupies about 15% of the total capacity of the project activity. Thus the auxiliary power consumption rate as 15% referenced from the FSR is reasonable and suitable. Thus the estimated PLF of the proposed project was confirmed as reasonable.

Sensitive analysis

The PP conducted the sensitivity analysis based on the four main factors to affect the result of the IRR analysis that are total investment, annual running cost, electricity price supplied to the grid, electricity quantity supplied with analysis range of +/- 10 %. The above identified variables cover those investment costs, revenue and operational costs that constitute more than 20% of the project's cost or revenues. The variation range is +/- 10%, following the recommended variations as stated in engineering guidance documentation in China. The choice of variables and range of variations meet the Guidance on the Assessment of Investment Analysis.

The actual total static investment as of the time of the validation was already happened as 203,245,000 RMB (109.76% of total static investment estimation of 185,162,800 RMB). Thus the reduction of the investment will not happen.

Annual O&M costs are also unlikely to decrease 23.2% which the IRR of the project will reach the benchmark. This depends on material, energy and labour costs in China that have increased and are expected to increase further following development of the economy.

Electricity tariff checked comply with policy tariff published by the government and had been fixed in the Electricity Purchase & Sale Contract and Supplemental Contract between the project owner and Yulin City Power Supply Bureau signed on 09/10/2009 for the project life time and there is no possibility to be decreased. The tariff was also checked comply with policy tariff published by the government.

An increase of annual electricity supply by 11.8%, the IRR of the project will reach the benchmark but it is unlikely to happen. The estimated annual electricity generation is based on a reasonable estimate in the FSR. The increased on 11.8% of the annual power supply will lead to the equivalent annual operation hour as 6,700 hours. But the operation hour of the project activity is limited by the operation of the semi coke production hour which had been compared with the average level semi coke production projects as 6,000 hours (published as CDM under validation projects in UNFCCC). Also, the operation hour assumption of the project is already found higher than average annual operation hours of fossil fired power plant in China.

The auxiliary power consumption rate of the project was confirmed as 15% and is not possible to be reduced as the auxiliary equipment need to be operated whenever the power generation activity is happened.

The validation team confirmed that the sensitivity analysis consistently supports the result of the investment analysis and the project passes Step 2 of the Additionality tool.

CL 04

The PP was requested to clarify the input values in the investment analysis, e.g.

- The demonstration of the total investment cost by presenting relevant evidence
- The information for crosscheck the assumption of the annual running cost, e.g. the raw material fee, water fee, salary fee, repair fee and management fee.

In response to the CL, the PP presented the signed contract of the project activity and the total investment of the project actually happened that had reached 203,245,000 RMB which is 109.76% of the estimated total static investment cost of 185,162,800 RMB in the FSR and the PDD. The O&M cost of the proposed project was analysed by detailed items and was compared with other similar projects and found that the O&M cost per kWh of electricity generation of the proposed project is within or below the range of the relative data. Thus the CL was closed.

CL 05

The PP was requested to clarify the base of the estimated operation hours of 6,000 hours.

In responding to this CL, the PP explained that the project owner's core business is semi-coke production and in the project activity, the PP will recover waste gas from the semi-coke production line for power generation. Unlike traditional fossil fuel fired power plants, the amount of power generated by the project activity is not based simply on power demand or designed operability of the power plant equipment but it is based on the ability to maintain levels of production in the underlying semi-coke production facility. The waste gas is therefore only available when the semi-coke production facility is operating and consequently it determines the availability of power which can be sold to the grid.

According to the FSR of the semi-coke production plant, the annual operation hour of the semi-coke production facility is estimated as 6,000 hours. Therefore, the operation hours as 6,000 hours for the semi-coke gas based power plant is considered reasonable.

Furthermore, the average annual operation hours of fossil fuel fired power plants in China is 5,767 hours, 5,991 hours, 5,865 hours, 5,612 hours and 5,344 hours respectively from 2003 to 2007, which were all within 6,000 hours.

Thus it can be concluded that the operation hours as 6,000 hours of the project activity is reasonable and feasible, and the CL was closed.

Barrier analysis

Additionality has been demonstrated through investment analysis, and barrier analysis has not been used.

Common practice analysis

The validation team reviewed the common practice analysis of the project by checking the description in the PDD, related documented evidence and publicly available information. The circumstance surrounding the project activity largely depends on legislation of local government in China, and the scope of common practice is reasonably determined as semi coke waste gas recovery projects providing electricity to the grid. Shaanxi province is selected by the PP as the region scope for common practice analysis considering that the key economic factors vary among different provinces in China.

The semi-coke is the unique production of Shenmu County and Fugu County in Shaanxi Province (http://www.coke.gov.cn/static/lanc_introduction/556624178.htm), which shows obvious regional characteristic. LRQA evaluated the declaration on the essential difference between the project activity and other coke plants by checking the public available information source and evaluated by independent sector expert and confirmed that the description of the differences of semi-coke and coke production described in Table B.6 and B.7 of the revised PDD Version 02 (dated 21/10/2010) was obviously. And the common practice focusing in semi-coke projects was accepted.

The PP selected 8 projects (including the proposed project) according to the Development and Current Status of Semi-coke Industry in Shaanxi Province issued by Shaanxi Province Energy Conservation Association in May 2009. 6 of the projects (including the proposed project) had been approved by the host country DNA which had been listed in the official website of the DNA of China (<http://cdm.ccchina.gov.cn>). The validation team interviewed the officers of local government and confirmed that there is no similar project that has been implemented without the support of CDM. The other two projects are in the process of the CDM application.

Based on the available information to the validation team, it was confirmed that similar activity is not widely observed and the project activity is not considered as a common practice.

Prior serious consideration of CDM

The project activity's start date was after 2nd August 2008 and the PP has notified Host Country DNA and CDM-EB for the CDM consideration.

The PP listed the mile stone of the project implementation process in Table 5 of the PDD. The validation team assessed the evidence that includes internal documents of the project owner as well as the documents made with third parties including the government offices, CER buyer, consulting companies, technology providers and the other stakeholders and confirmed that the evidence is credible and consistent. Specific interviews with persons concerned also confirmed that the demonstration was credible. The validation team therefore concluded, based on the evidence assessed by the team, that the incentive of CDM was seriously considered prior to the investment decision as a decisive factor to the requirement of clause 5 (a) of Guidance on the demonstration and assessment of prior consideration of the CDM.

The milestone of the Project

Date	Events and evaluation
08/2008	FSR was prepared and finished in August of 2008 by Xi'an Datang Electricity Design Institute Co., Ltd which is independent third party authorized by National Development Reform Committee (NDRC) and Construction Department of P. R. China.
31/12/2008	FSR was approved and the registered by Shaanxi Province Development and Reform Commission
05/01/2009	The Board Meeting was held and with seriously taking into account CDM support, Hengsheng company decided to implement the proposed project activity with application for CDM.
02/03/2009	EIA was approved by the Shaanxi Province Environmental Protection Bureau
30/04/2009	Contract for two gas-fuelled boilers was signed. This was demonstrated as the earliest real action of the project which was considered as start date of the project activity complying with Glossary of the CDM Term.

09/08/2009	Notification was made to NDRC about the CDM consideration. The notification letter was checked.
14/10/2009	Notification was made to the CDM-EB about the CDM consideration. It was confirmed by checking the UNFCCC CDM website: http://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html
December 2010	Excepted to be fully operated

4.4 Emission reductions

Project emissions

According to ACM0012, the project emission should be calculated as,

$$PE_y = PE_{AF,y} + PE_{EL,y} + PE_{EL,Import,y}$$

The project will not use supplementary fossil fuels and thus $PE_{AF,y}$ is not considered.

By checking the technical specification of the waste gas boilers and field survey, it was confirmed that the boiler can only use gas fuel and no other fuel such as coal can be mixed as a fuel.

The project is a Type-1 activity and there is no captive electricity generated in the baseline thus $PE_{EL,Import,y}$ is not considered.

The gas cleaning process is tar capture (electro tar filter), during the process only electricity is consumed and was considered in the auxiliary power consumption of the project. Net electricity supply of the project is used to calculate emission reductions. Thus, $PE_{EL,y}$ is not considered.

Leakage

The main source of potential leakage emissions is the construction work. Construction work related emissions are not considered following the guidance of the applied methodology ACM0012 Version 03.2. The project boundary covers the project site, industrial process and connected electricity grid, and the emissions attributable to the project activity are considered as PE as above. Therefore $L_y = 0$.

Baseline emissions

According to ACM0012, the baseline emission is to be calculated as,

$$BE_y = BE_{En,y} + BE_{flst,y}$$

As the baseline of the project does not use any other fuel and steam to flare the waste gas, $BE_{flst,y}$ is not applicable.

$$BE_y = BE_{En,y}$$

The baseline is identified as the Scenario 1 and the following equation is applied.

$$BE_{En,y} = BE_{Elec,y} + BE_{Ther,y}$$

The project activity generates electricity only and $BE_{Ther,y}$ is not applicable.

The project activity falls in Case-1 of Type-1 activity and equation (1a-1) of ACM0012 is used to determine $BE_{Elec,y}$.

$$BE_y = BE_{En,y} = BE_{Elec,y} = f_{cap} * f_{wcm} * \sum_j \sum_i (EG_{i,j,y} * EF_{Elec,i,j,y})$$

f_{wcm} is 1 as the electricity generation of the project activity is purely from use of waste energy.

f_{cap} is determined using Method-2 because the semi-coke production line of Hengsheng Company was operated in 01/01/2009, the three year data on production of each semi-coke production line is unavailable, and the waste gas generated by the semi-coke production line can be direct monitored by the flow meter without technical limitations.

$$f_{cap} = \frac{Q_{WCM, BL}}{Q_{WCM, y}}$$

$$Q_{WCM, BL} = Q_{BL, product} \times q_{wcm, product}$$

According to the FSR of the project, the total amount of waste gas generated by the production process of the semi-coke facilities per year is $4.35 \times 10^8 \text{ Nm}^3/\text{y}$, and the waste gas consumed by the proposed activity is designed to be $4.16 \times 10^8 \text{ Nm}^3/\text{y}$. According to ACM0012, when using Method-2 in calculating f_{cap} , the manufacturer's data for the industrial facilities should be used. CAR 02 was raised to this concern as detailed below.

CAR 02

The PP selected Method-2 in determination of the f_{cap} . No evidence to show the estimation of f_{cap} met the requirement of ACM0012 was presented at the initial stage of validation.

ACM0012 requires that the manufacturer's data for the industrial facility shall be used to estimate the amount of waste energy the industrial facility generates per unit of product generated by the process that generates waste energy. In case any modification is carried out by the project proponent or in case the manufacturer's data is not available for an assessment, this should be carried out by independent qualified/certified external process experts such as a chartered engineer on a conservative quantity of waste energy generated by plant per unit of product manufactured by the process generating waste energy.

In estimating the production associated with the relevant waste energy generation as it occurs in the baseline scenario, the minimum of the following two figures should be used: (1) average annual historical production data from start-up, if the plant's operational history is less than three years, of the plant or (2) the most relevant manufacturer's data for normal operating conditions.

In responding this CAR, the PP presented following records and LRQA evaluated the contents in details:

- The Waste Gas Balance Analysis of Hengsheng 900,000 tones of Semi-coke Production Facilities conducted by four independent qualified processed experts and was issued by Shanxi FangYuan Construction Design Institute in which the detail waste gas balance calculation including the waste gas component analysis and the parameters of the semi-coke production facility was presented. Waste gas generated by the production process of the semi-coke facilities per year of $4.35 \times 10^8 \text{ Nm}^3$ was demonstrated. The four experts are, He Jun qualified by Shaanxi Province Talents Qualification Leadership Group on thermal power sector engineer (qualification licence number as <2009>09), Zhang Honggang qualified by Northwest Institute of the Ministry of Electric Industry on 1993 (qualification number is 0001614) as senior engineer, Luo Yong qualified by Shaanxi Province Construction Material Institute as engineer on 2000 and Cui Xiuyun qualified by Shaanxi Province Talents Qualification Leadership Group on financial analysis economist (qualification

licence number as <2004>555). This institute holds B-level coke chemical design accreditation issued by the Ministry of Construction dated 16/12/2004. Considering that the manufacturing facilities of the semi-coke production is not the standardized product of the manufacturer and it is commonly manufactured and installed according to the design of the facilities, LRQA accepted that the data from the design institute as characterizing the actual facilities.

- The Energy Balance Analysis of Hengsheng 30 MW Waste Gas Utilization Project compiled by Xi'an Datang Electricity Design Institute, the design institute of the proposed project. The waste gas consumption level as 4.16×10^8 Nm³/yr was elaborated by using the parameters including the operation hour, waste gas composition and NCV, equipment efficiency and power factors. This institute holds B-level thermal power design accreditation issued by the Ministry of Construction dated 09/02/2009.
- The semi-coke production record for the year 2009 demonstrated that the actual production of semi-coke was 909,219 tones which was a little greater than the assumption in the FSR as 900,000 tones.
- By using the figure demonstrated in above analysis, the rated production capacity of semi-coke production is 900,000 tons per year and the waste gas consumed by the proposed activity is estimated at 4.35×10^8 Nm³/a, and $q_{wcm,product}$ is about 483.3 Nm³/t.

Thus the f_{cap} can be calculated as $4.35 \times 10^8 / 4.16 \times 10^8$ and 1 should be adopted.

Furthermore the value of f_{cap} will be updated ex-post when the $Q_{WCM,y}$ is monitored

and its value is available for calculating f_{cap} as per the equation above. Thus the CAR was closed.

$EF_{Elec,ij,y}$ is CO₂ emission factor of the grid as determined in the baseline and Tool to calculate the emission factor for an electricity system is followed.

The PP has chosen ex-ante determination of the emission factor calculated as a combined margin (CM), consisting of the operating margin (OM) and build margin (BM) as the emission coefficient based on data of full generation-weighted average for the most recent 3 years in accordance with the guidance provided by the latest version of Tool to calculate the emission factor for an electricity system. The PP has chosen Option 1 defined in the Tool that includes only those power plants connected to the grid system which is acceptable.

The project is located in Shaanxi province and the delineation of the project electricity system and connected electricity systems have been identified as the NWPG following the Notification on Determining Baseline emission factor of China Grid issued by China's DNA which includes Shaanxi Power Grid, Gansu Power Grid, Qinghai Power, Ningxia Power Grid and Xinjiang Power Grid.

Following the methodological tool, the simple OM is selected for ex-ante determination of OM emission factor. According to the China Electric Power Yearbook 2004-2008 (for data of years 2003 to 2007), the thermal power generation sources constitute more than 60% of the total electricity generation of the NWPG throughout the five most recent years and the simple OM method can be used.

In China, sufficient data for the simple adjusted OM and dispatch data analysis methods is not publicly available, and the average OM method can not be applied because the low cost/must run source is less than 50% of total grid generation in the NWPG. Thus it was confirmed that the use of simple OM method is relevant for the project activity.

The OM emission factor is calculated following the guidance of the Chinese DNA using the publicly available data from official sources for year 2005, 2006 and 2007 that are the most recent 3 years for which data was available at the time of the PDD submission and the IPCC default values as appropriate. The validation team reviewed the calculation and the supporting documents and validated the OM emission factor;

$$EF_{OM,y} = 1.0246 \text{ tCO}_2\text{e/MWh}$$

The PP has chosen ex-ante option for the BM emission factor. In China, plant or unit specific fuel consumption and electricity generation data as required in the equation for BM emission factor of the methodological tool are not publicly available. The CDM-EB has accepted the alternative method to determine BM emission factor in a conservative manner for Chinese projects and the PP also followed the method. The determination method is detailed in the Notification on Determining 2009 Baseline Emission Factors of Regional Power Grids in China (<http://cdm.ccchina.gov.cn/web/index.asp>)

The sample group m is identified as capacity addition during the last 3 years time for different power generation technologies and the CO₂ emissions by using of the best available technology efficiency for the conservative estimation of the emission factor following the guidance issued by the Chinese DNA. The validation team reviewed the calculation and the supporting documents and validated the BM emission factor;

$$EF_{BM,y} = 0.6433 \text{ tCO}_2\text{e/MWh}.$$

The baseline emission factor is calculated as the weighted average of the OM emission factor and BM emission factor as;

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM}$$

As per Tool to calculate the emission factor for an electricity system Version, the default weights are W_{OM} and W_{BM} are 50% (i.e., $W_{OM} = W_{BM} = 0.5$) and hence the baseline grid emission factor is determined as;

$$EF_{grid,CM,y} = 0.83395 \text{ tCO}_2\text{e/MWh}$$

$$\begin{aligned} BE_y &= BE_{Elec,y} = f_{cap} * f_{wcm} * \sum_j \sum_i ((EG_{i,j,y} * EF_{Elec,i,j,y})) \\ &= 1 * 1 * 153,000 * 0.83395 \\ &= 127,594 \text{ tCO}_2\text{e}. \end{aligned}$$

Emission reductions

The emission reductions by the project activity are estimated following the applied methodology. Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y = 127,594 - 0 = 127,594 \text{ tCO}_2\text{e}$$

CAR 04

Some of the formulas and the results in the annex 3 of the PDD could not be traced. For example for the CO₂ emission formula in OM calculation and the result of CO₂ emission for specific kind of fuel in 2007. The information in Annex 3 of the PDD cannot meet each other with what in the presented spreadsheet of the EF and ER calculation.

The PP revised the description in the Annex 3 of the PDD and the CAR was closed.

4.5 Monitoring methodology and monitoring plan

The approved consolidated monitoring methodology ACM0012 Version 03.2 is applied to the project.

The monitoring plan is composed of monitoring of four parameters, $Q_{WCM,y}$, $EG_{GEN,y}$, $EG_{i,j,y}$, $EC_{PJ,y}$.

The monitoring parameters listed in the monitoring methodology but not related to the project activity, are not considered.

The monitoring and reporting plan contains;

1. Monitoring Targets
2. Monitoring Procedures
3. Quality Assurance and Quality Control
4. Operational and Management Structure

The general manager took the charge of managing CDM activity. A CDM manager was nominated in charge of managing CDM activity directly. The validation team interviewed the management and technical in charge of the power plant and confirmed that the procedure for CDM monitoring and data management has been established.

All electronic and hard copy records of the metering devices, relevant documentation and the results of calibration will be collected in a central location by the project entity. Data records will be archived for a period of 2 years after the crediting period to which the records pertain.

The CDM manager will coordinate with the plant manager to ensure and verify adequate metering and recording of data, including power generation and net power supply to the grid by the project activity. The validation team evaluated the relevant monitoring procedures provided in the PDD and checked the monitoring manual and confirmed their appropriateness. The QA/QC and emergency response requirements are found defined in the documents.

The training plan for the project has been established and will be conducted by project technology supplier.

CL 03

In B.7.2 of the PDD, it was described that meter for monitoring parameter EG_{GEN} is installed at the exit of the power generation plant for monitoring the electricity generation, meter for monitoring parameter $EC_{PJ,y}$ is installed in the power generation plant for monitoring the electricity consumption by the proposed project activity, and meter for monitoring parameter $EG_{i,j,y}$ is installed at the 35KV substation to measure the net quantity of power supplied to the grid by the project activity, which is the main electricity meter for emission reduction calculation.

- In B.7.1, for parameter $EG_{GEN,y}$, it was described as the meter(s) are installed at the outlet of the power generator. The PP was requested to clarify the position of the meters and confirm if the transformer locates before or after the meters.
- In B.7.1 for parameter $EG_{i,j,y}$ (net electricity supply), it was explained that the net power supply $EG_{i,j,y}$ equals to the value of EG_{GEN} minus the auxiliary electricity consumption. The PP was requested to clarify if this formula is for calculation or for double check.
- The PP was requested to explain the approach of the monitoring of the net electricity supply by using the main meter. E.g. if bi-directional meter is used and if the power upload and power download are to be monitored and recorded separately.

The PP presented further clarification and revised the PDD.

- The position of the meters for monitoring parameter EG_{GEN} is at the exit of the power generator, and the transformer is to be installed after the meters. EG_{GEN} is the quantity of electricity generation by the project activity during the year y . The value of EG_{GEN} minus the $EC_{PJ,y}$ (auxiliary electricity consumption) is used in case the meter for monitoring parameter $EG_{i,j,y}$ is out of work,
- The main electricity meter will be installed at the 110kV substation, where is the recipient end of the grid, and it is the main meter for purchase receipts.
- If bi-directional meter will be used to monitor the net electricity supply, the electricity upload and electricity download will be monitored and recorded separately, the net electricity supply will be the difference of the quantity of the electricity upload and the electricity download.

The CL was closed.

4.6 Duration of the project activity / crediting period

The starting date of the project activity is defined according to the signing date of the equipment purchase contract of gas-fuelled boiler. The validation team checked the construction contracts and equipments purchasing contracts and confirmed that the date is the earliest real action date of the project activities.

The operation life time of the project is estimated as 15 years consistently with the formal FSR. This is considered as a reasonable operational lifetime for the type of the project activity.

The PP selected the 10-year fixed crediting period starting on 01/01/2011 as per PDD Version 02. If the registration of the project activity happens after 01/01/2011, then the start date of the crediting period will be the actual date of the registration of the project activity.

4.7 Environmental impacts

The EIA report of Shenmu County Hengsheng Coal Chemical Co., Ltd. 30MW Semi-coke Waste Gas Power Generation Project was completed in February 2009 and approved by the Shaanxi Provincial Environmental Protection Bureau on 02/03/2009. The validation team interviewed local EPB officer and checked the relevant EIA regulation.

According to the EIA report, air, noise, waste water and solid waste pollution were major focus points of the analysis of the project activity during the construction and operation phases. Relevant project design and management requirements have been requested in the report.

In the approval letter of EIA, air pollution, noise, waste water and solid waste pollution were defined as key indicators of the project. The quantitative targets for control of the main pollutant are also identified. The planned actions and the environment management practice of project were reviewed by the team during the field visit.

The validation team checked the environment management procedures and the implementation in Shenmu County Hengsheng Coal Chemical Co., Ltd. 30MW Semi-coke Waste Gas Power Generation Project. Relevant environmental protection facilities had been planned and installed. The person involved in environmental protection had been trained and demonstrated relevant knowledge of environmental protection activities. The team interviewed the delegate of local EPB and confirmed that the application and construction process of the project activity comply with the legal requirements and the environment clearance inspection will be arranged after the project is implemented with full load.

4.8 Stakeholders' comments

The comments by local stakeholders are to be invited in an open and transparent manner. A summary of the comments received is to be provided to the DOE together with a report indicating how due account was taken to the comments received.

Chinese regulations do not require a formal stakeholder consultation for the proposed project activity as the environmental impacts of the project activity is considered to be minimal.

The PP took measures for inviting comments from local stakeholders as below.

- 1) The project owner publicly pasted a notification of inviting comments on the project site and the downtown of Shenmu County on 09/01/2009.
- 2) From 10th January to 11th January of 2009, the project owner Hengsheng Coal Chemicals Co., Ltd. conducted interviews and received comments from local stakeholders around.
- 3) The questionnaire distributed and collected.

The project brief was introduced in both the questionnaire and the interview with the stakeholders. The validation team reviewed the project outline and the activity, and confirmed that the relevant stakeholders and the local authorities were included to the extent of the project activity. By checking the record of the consultation including the questionnaire and the analysis summary, it was found that the feedback to the construction of the project is positive. The majority of the participants stated that the project will positively affect the local environment, economy and society. Stakeholders including local government, residents and staff in the PP agree with the development of the project. No negative opinion was received. An overview of the main comments & suggestions expressed during the consultation is provided in PDD section E.2

The stakeholder consultation process, targeted stakeholders and due actions for concerned issues have been clarified in the PDD.

CAR 03

The PP was requested to demonstrate that the relevant process for inviting local stakeholders' comments has been taken in open and transparent manners.

In resolution of this CAR, the PP presented the evidences of the invitation and the consulting process. The validation team interviewed with certain villagers and confirmed the consulting process. The CAR was then closed.

The stakeholder consultation process, targeted stakeholders and due actions for concerned issues have been clarified in the PDD.

5 Comments by parties, stakeholders and NGOs

In accordance with the requirement of the Procedures for Processing and Reporting on Validation of CDM project activities, the PDD is to be made publicly available for 30 days subject to confidentiality provisions agreed with the PP, to enable comments to be received from Parties, stakeholders and UNFCCC accredited NGOs on the validation and registration requirements.

The PDD was made publicly available in accordance with the requirements of the procedure for the period of 16 Apr 10 - 15 May 10 as per <http://cdm.unfccc.int/Projects/Validation/DB/3SVAPDJ9VHB7HN5L6NKXBNPQESDMVY/view.html>

No comment was received during this period.

Through the validation process, adjustments have been made to the PDD according to the actual situation of the project and validation findings. The validation team evaluated the revisions to the PDD and confirmed the changes from the original PDD are appropriate.

It was noted that in the PDD for GSP purpose the Annex I country was indicated as the Kingdom of Spain. The PP present the LoA of the United Kingdom of Great Britain and Northern Ireland dated 20 October 2010. The team confirmed that the PDD was revised accordingly.

6 Validation Opinion

LRQA has undertaken the validation of the proposed project activity “Shenmu County Hengsheng Coal Chemical Co., Ltd. 30MW Semi-coke Waste Gas Power Generation Project” based on the requirements of CDM as set out in Article 12 of the Kyoto Protocol, the CDM M&P, the present annex, subsequent decisions made by the COP/MOP and CDM-EB, and the other rules applicable to the proposed project activity including the host country’s legislation and its specific requirements for sustainable development.

The project intends to reduce greenhouse gas (GHG) emissions by using the waste gas generated from the existing 900,000 tonnes/annual of semi-coke production facilities of Shenmu County Hengsheng Coal Chemical Co., Ltd. through the construction and operation of a 30 MW waste gas utilization power plant located in Ningtiaota Industry Zone, Sunjiacha Town, Shenmu County, P. R. China. The project will supply electricity to Northwest China Power Grid and is expected to displace the predominantly fossil-fuel based electricity generation, thereby reducing the CO₂ emissions.

In order to arrive at the final validation conclusions and opinion, LRQA carried out document review, review of compliance with and application of the approved methodology and methodological tools in determination of baseline, additionality, monitoring and the calculation of emission reductions, field survey and interviews, and reference to similar CDM project activities. There was no project component or issues excluded from the validation.

Through the validation process, the validation team identified 4 CARs and 5 CLs. The PP has taken actions and submitted to LRQA the revised PDD Version 02 and the other supporting evidence. These were reviewed and the findings were closed.

The validation team is of the opinion that the proposed project activity conforms with all the relevant UNFCCC requirements for the CDM as well as the host country’s national requirements, and if implemented as designed, is likely to achieve the emission reductions and contribute to the sustainable development of the host country. Therefore LRQA requests the registration of “Shenmu County Hengsheng Coal Chemical Co., Ltd. 30MW Semi-coke Waste Gas Power Generation Project” to the CDM Executive Board as a CDM project activity.

Decision Maker



Michiaki Chiba

Climate Change Manager – Asia & Pacific

7 Appendices

7.1 Appendix A: Letter of approval for the project by the host and investing country DNA

Letter of Approval from The National Development and Reform Commission of the People's Republic of China for host country approval to the project activity dated March 2010 (serial number 2357).

Letter of Approval from the International Climate Change Division, Department of Energy and Climate Change of United Kingdom of Great Britain and Northern Ireland dated 20 October 2010.

7.2 Appendix B: List of documents reviewed

Category A documents (documents prepared by the PP)

- 1) The CDM-PDD for Shenmu County Hengsheng Coal Chemical Co., Ltd. 30MW Semi-coke Waste Gas Power Generation Project Version 01 dated 12/12/2009
- 2) The CDM-PDD for Shenmu County Hengsheng Coal Chemical Co., Ltd. 30MW Semi-coke Waste Gas Power Generation Project Version 02 dated 21/10/2010
- 3) Feasibility Study Report of Shenmu County Hengsheng Coal Chemical Co., Ltd. 30MW Semi-coke Waste Gas Power Generation Project
- 4) EIA report of Shenmu County Hengsheng Coal Chemical Co., Ltd. 30MW Semi-coke Waste Gas Power Generation Project
- 5) Approval on EIA of the power plant on from Shaanxi Province Environmental Bureau on 02/03/2009
- 6) Approval on EIA of 600000 tone semi coke production project from Shaanxi Province Environmental Bureau on 30/11/2008
- 7) Company Constitution of Shenmu County Hengsheng Coal Chemical Co., Ltd
- 8) Contracts as evidence of investment analysis
- 9) Copy of questionnaires of stakeholder consultation
- 10) Technical specification of the main equipment
- 11) Accreditation documents of Xi'an Datang Electricity Design Institute Co., Ltd, the providers of FSR and Waste Gas Balance
- 12) Accreditation documents of Shanxi FangYuan Construction Design Institute, the provider of Waste Gas Balance Analysis
- 13) Adjustment of the Electricity Price issued by Yulin City Price Bureau, dated 31/07/2008
- 14) Adjustment of Feed-in Tariff of Thermal Power issued by Shaanxi Province Price Bureau dated 20/08/2008
- 15) Approval of the project as CDM by province DRC 2010.04.28
- 16) CDM consultation agreement
- 17) Brief introduction of the manufacturer of the equipment of the project
- 18) Construction approval signed by Shenmu County Economic Bureau on 18/05/2009
- 19) Construction schedule of Shenmu County Hengsheng Coal Chemical Co., Ltd. 30MW Semi-coke Waste Gas Power Generation Project
- 20) Development and Current Status of Semi-coke Industry in Shaanxi Province issued by Shaanxi Province Energy Conservation Association in May 2009
- 21) Electrical Connecting Diagram of the project
- 22) ERPA
- 23) Layout of the project

- 24) Electricity Purchase & Sale Contract and Supplemental Contract signed between the project owner and Yulin City Power Supply Bureau signed on 09/10/2009
- 25) Notification about CDM to DNA on 19/08/2009
- 26) Notification to the CDM-EB notification of the stakeholder opinion investigation
- 27) Energy Balance Analysis of Shenmu County Hengsheng Coal Chemical Co., Ltd. 30MW Semi-coke Waste Gas Power Generation Project
- 28) Resolution of the Board meeting of Shenmu County Hengsheng Coal Chemical Co., Ltd. On 05/01/2009, No.1
- 29) Semi-coke production statistics of Shenmu County Hengsheng Coal Chemical Co., Ltd.
- 30) Waste gas composition and NCV analysis report conducted by Test Centre of Baotou Steel Company.
- 31) Waste gas tube diagram
- 32) Qualification of the independent process experts.
- 33) Qualification of Shanxi FangYuan Construction Design Institute
- 34) Qualification of Xian Datang Electricity Design Institute
- 35) Electricity consumption record of the semi-coke plant in 2009.

Category B documents (other documents referenced)

- 1) Approved consolidated baseline methodology ACM0012 Version 03.2 for GHG emission reductions for waste gas or waste heat or waste pressure based energy system
- 2) Tool to calculate the emission factor for an electricity system Version 02
- 3) Tool for the Demonstration and Assessment of Additionality Version 05.2
- 4) Decision by the CDM-EB on request for clarification on use of approved methodology AM0005 for several projects in China
- 5) Clean development mechanism validation and verification manual Version 01.2
- 6) Regulation of CDM in China
- 7) China Energy Statistical Yearbook 2006, 2007 and 2008
- 8) China Electric Power Yearbook 2006, 2007 and 2008
- 9) Cleaner Production Promotion Law of PRC
- 10) The Law on Energy Conservation of the People's Republic of China
- 11) Policies Outline of Energy Conservation Technologies (enacted in 1984 and revised in 1996)
- 12) Act of purchasing electricity generated by renewable resources
- 13) Notice of the State Economic and Trade Commission concerning the stopping and shutting down of small-scale thermal power units [1999] No.44, General Office of the State Council
- 14) Notice of the General Office of the State Council concerning the strict prohibition of the construction of thermal power units with a capacity of 135MW or below [2002] No.6, General Office of the State Council
- 15) The China Medium and Long Term Energy Conservation Plan, LV Wenbin, Department of Environment and Resources Conservation, National Development and Reform Commission, Feb. 2005, Beijing
- 16) 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy
- 17) The Operating Margin (OM) Emission Factor and the Build Margin (BM) Emission Factor published by the Chinese DNA on 02 July 2009
- 18) Interim rules of on Economic Assessment of Electric Engineering Retrofit Projects published by the Operation Department of Power Generation and Power Transmission of the State Power Corporation of China on 10 September 2002
- 19) EB guidance on estimating the build margin for AM0005, consolidated in ACM0002 which refers to the Tool to calculate the emission factor for an electricity

- system
<http://cdm.unfccc.int/UserManagement/FileStorage/6POIAMGYOEDOTKW25TA20EHEKPR4DM> and
http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZAK6V5YXPQKK7WYJ
- 20) EIA law of P.R. China, (effective September 1, 2003)
 - 21) Document for Registered Engineering Consultants in China
 - 22) Comparison to other similar technology project in CDM pipeline.

7.3 Appendix C: List of persons interviewed

Representatives from Local Communities

Mr. He Guangzeng — Deputy Village Head of Liushuihao Village
Mr. Yang Aiyong — Villager of Liushuihao Village

Local Government Authorities

Mr. Gao Haixiong — Deputy Director of Shenmu Country Economic and Development Bureau
Mr. Li SHuming — Delegate of Shenmu Country EPB

Yulin City Electricity Supply Company

Mr. Liu Jianjun — Deputy Director

Shenmu County Hengsheng Coal Chemical Co., Ltd.

Mr. Wang Jihu — Board Director and General Manager
Mr. Zhang Xinglin — Vice General Manager
Mr. Ma ZHiping — Vice General Manager
Mr. Li Guangliang — Vice General Manager

Shenmu Jingyuan Clean Development Co., Ltd

Mr. Liu Zhogqiang — Manager
Mr. Liu Xinlei — Project Manager

7.4 Appendix D: How due account has been taken to the public input made to the validation requirements

The PDD was made publicly available in accordance with the requirements of the Procedures for processing and reporting on validation of a CDM project activity for the period of 16 Apr 10 - 15 May 10 as per
<http://cdm.unfccc.int/Projects/Validation/DB/3SVAPDJ9VHB7HN5L6NKXBNPQESDMVY/view.html>

No comment was received during this period.

7.5 Appendix E: Certificate of Appointment

Validation of “Shenmu County Hengsheng Coal Chemical Co., Ltd. 30MW Semi-coke Waste Gas Power Generation Project”

We hereby certify that the following personnel have engaged in the validation process that has fully satisfied the competence requirements of the validation of the CDM project activity.

Name of Person	Assigned Roles
Xianxin Yan	Team leader
Dali Wang	Sector expert
Michiaki Chiba	Technical reviewer & Decision maker
Takahiro Iio	Sector expert for technical review

Signed by



Decision Maker
Michiaki Chiba
Climate Change Manager – Asia & Pacific

7.6 Appendix F: Validation findings log

1. Ref No:	CAR01	2. Grade:	CAR	3. Date:	26/05/2010
4. Requirement	CDM M&P Para 37 a, 40 a			5. Status:	Closed
6. Finding: The LoA of the Annex I country has not been presented to LRQA.					
7. Conclusion: The LoA of UK dated 20 October 2010 was presented by the PP on 25/10/2010. The team found, 1- The Annex I country indicated in the PDD for GSP was Spain. The PDD was revised accordingly. 2- The name of the Annex I participant in the LoA-UK is 'Endesa Carbono, S.L.', but in the PDD for GSP, the MoC and the LoA of China it was indicated as 'Endesa Carbono S.L.'. The name of the Annex I country indicated in the PDD was revised according to the actual approval. The team compared with project reference 2566 wherein the NDRC mentioned the Netherlands as the Annex I Party, but, the PP presented LoA of UK at the time of requesting registration. LRQA also referenced the Part II of the Permission Requirements of the Measures for Operation and Management of Clean Development Mechanism Projects in China and confirmed that there is no requirement that the Annex I country should be predefined prior to seeking registration. There is also currently no requirement from the EB that the LoA from the host Party DNA should have the Annex I Party defined. It is therefore the team's opinion that the difference of the Party authorizing the Annex I PP while the Annex I PP remains unchanged does not affect the project's compliance status with the registration requirements. This CAR was closed.					

1. Ref No:	CAR02	2. Grade:	CAR	3. Date:	26/05/2010
4. Requirement	CDM M&P Para 37 e			5. Status:	Closed
6. Finding: The PP selected Method-2 in determine the fcap. No evidence to show the estimation of fcap meets the requirement of ACM0012. ACM0012 requires that the manufacturer's data for the industrial facility shall be used to estimate the amount of waste energy the industrial facility generates per unit of product generated by the process that generates waste energy. In case any modification is carried out by the project proponent or in case the manufacturer's data is not available for an assessment, this should be carried out by independent qualified/certified external process experts such as a chartered engineer on a conservative quantity of waste energy generated by plant per unit of product manufactured by the process generating waste energy. In estimating the Production associated with the relevant waste energy generation as it occurs in the baseline scenario. The minimum of the following two figures should be used: (1) average annual historical production data from start-up, if the plant's operational history is less than three years, of the plant or (2) the most relevant manufacture's data for normal operating conditions.					
7. Conclusion: In responding this CAR, the PP presented following records and LRQA evaluate the contents in details:					

- The Waste Gas Balance Analysis of Hengsheng 900,000 tones of Semi-coke Production Facilities conducted by Shanxi FangYuan Construction Design Institute, the design party of the semi-coke production facilities in which the detail waste gas balance calculation including the waste gas component analysis and the parameters of the semi-coke production facility was presented. Waste gas that generated by the production process of the semi-coke facilities per year is 4.35×10^8 Nm³ was demonstrated. This institute holds B-level coke chemical design accreditation issued by the Ministry of construction on 16/12/2004. Considering that the manufacturing facilities of the semi-coke production is not the standardized product of the manufacture and it is commonly manufactured and installed according to the design of the facilities, LRQA accept that the data form the design institute is more close to the actual character of the facilities.
- The Energy Balance Analysis of Hengsheng 30 MW Waste Gas Utilization Project compiled by Xian Datang Electricity Design Institute, the design Institute of the proposed project. The waste gas consumption level as 4.16×10^8 Nm³/yr was elaborated by using the parameters including the operation hour, waste gas component and NCV, equipment efficiency and power factors. This institute holds B-level thermal power design accreditation issued by the Ministry of Construction on 09/02/2009.
- The semi coke production record for the year 2009 and demonstrated the actual production of semi-coke was 909,219 tones which was a little bit larger that the assumption in the FSR as 900,000 tones.
- By using the figure demonstrated in above analysis, the rated production capacity of semi-coke production is 900,000 tons per year and the waste gas consumed by the proposed activity is estimated about 4.35×10^8 Nm³/a, and $q_{wcm,product}$ is about 483.3 Nm³/t.

Thus the f_{cap} can be calculated as $4.35 \times 10^8 / 4.16 \times 10^8$ and 1 should be adopted. Furthermore the value of f_{cap} will be updated ex-post when the $Q_{wcm,y}$ is monitored and its value is available for calculating f_{cap} as per the equation above. Thus the CAR was closed.

1. Ref No:	CAR03	2. Grade:	CAR	3. Date:	26/05/2010
4. Requirement	CDM M&P Para 37b			5. Status:	Closed
6. Finding: The PP is requested to demonstrate that the relevant process for inviting local stakeholders' comments has been taken in open and transparent manners.					
7. Conclusion: In closing this CAR, the PP presented the evidences of the invitation and consulting process of the process. The validation team interviewed with certain villagers and confirmed the consulting process. The CAR was then closed.					

1. Ref No:	CAR04	2. Grade:	CAR	3. Date:	26/05/2010
4. Requirement	CDM M&P Para 37e			5. Status:	Closed
6. Finding: Some of the formulas and the results in the Annex 3 of the PDD cannot be traced. For example, for the CO2 emission formula in OM calculation and the result of CO2 emission for specific kind of fuel in 2007. The information in Annex 3 of the PDD cannot meet each other with what in the presented spreadsheet of the EF&ER calculation.					

7. Conclusion:

The PP revised the description in the Annex 3 of the PDD and the CAR was closed.

1. Ref No:	CL01	2. Grade:	Clarification	3. Date:	26/05/2010
4. Requirement	CDM M&P Para 37e			5. Status:	Closed
6. Finding: The PP is required to further clarify the reason of the baseline scenario demonstration, e.g. <ul style="list-style-type: none">• The reason of elimination of W3 relating both residential and Industrial users.• For P5, the description in the PDD is noted as: It can be observed on-site that there are no significant hydropower resources in the project area which need to be clarified by using evidence.• For P7, it was declared in the PDD as Captive power use would not be allowed by the grid company and the electricity has to be supplied to the grid first; hence it should be excluded. Please clarify the reason by using evidences.					
7. Conclusion: As the clarification, the PP revised the description of the baseline selection as described in above table in this report and the CL was closed.					

1. Ref No:	CL02	2. Grade:	Clarification	3. Date:	26/05/2010
4. Requirement	CDM M&P Para 53			5. Status:	Closed
6. Finding: In the PDD, it was described as the 35kV substation is to be connected with but during the interview with the PP and the grid company, it was told the power of the project will be sent to Ningtiaota 110kV substation. The monitoring plan should be clarified according to the actual grid connecting arrangement with the grid company.					
7. Conclusion: The PP revised the PDD according the actual Agreement with the grid company. The CL was closed.					

1. Ref No:	CL03	2. Grade:	Clarification	3. Date:	26/05/2010
4. Requirement	CDM M&P Para 54			5. Status:	Closed
6. Finding:					
<p>In B.7.2 of the PDD, it was described that Meter for monitoring parameter EGGEN is installed at the exit of the power generation plant for monitoring the electricity generation, and meter for monitoring parameter ECP,J,y is installed in the power generation plant for monitoring the electricity consumption by the proposed project activity, meter for monitoring parameter EGj,y is installed at the 35KV substation to measure the net quantity of power supplied to the grid by the project activity, which is the main electricity meter for emission reduction calculation.</p> <ul style="list-style-type: none">• In B.7.1, for parameter EGGEN,y, it was described as the meter(s) are installed at the outlet of the power generator. Please clarify the position of the meters and confirm if the transformer is to be installed before or after the meters.• In B.7.1 for parameter EGij,y, (net electricity supply), it is explained that the net power supply EGij,y equals to the value of EGGEN minus the auxiliary electricity consumption. Please clarify if this formula is for calculation or for double check.					

- Please explain the approach of the monitoring of the net electricity supply by using the main meter. E.g. if bi-directional meter is used and if the power upload and power download are to be monitored and record separately.

7. Conclusion:

The PP presented further clarification and revised the PDD.

- The position of the meters for monitoring parameter EG_{GEN} is at the exit of the power generator, and the transformer is to be installed after the meters. EG_{GEN} is the quantity of electricity generation by the project activity during the year y . The value of EG_{GEN} minus the $EC_{PJ,y}$ (auxiliary electricity consumption) is used in case the meter for monitoring parameter $EG_{i,j,y}$ is out of work.
- The main electricity meter will be installed at the 110KV substation, where is the recipient end of the grid, and it is the main meter for purchase receipts.
- If bi-directional meter will be used to monitor the net electricity supply, the electricity upload and electricity download will be monitored and recorded separately, the net electricity supply will be the difference of the quantity of the electricity upload and the electricity download.

The CL was closed.

1. Ref No:	CL04	2. Grade:	Clarification	3. Date:	26/05/2010
4. Requirement	CDM M&P Para 54			5. Status:	Closed
6. Finding:					
Please clarify the input value in the financial analysis, e.g. <ul style="list-style-type: none">• The demonstration of the total investment by presenting relevant evidences• The information for crosscheck the assumption of the annual running cost, e.g. the raw material fee, water fee, salary fee, repair fee and management fee.					
7. Conclusion:					
The PP presented the signed contract of the project activity and the total happened investment of the project reached 203,245,000 RMB which is109.76% of total static investment estimation of 185,162,800 RMB in the FSR and the PDD. The O&M cost of the proposed project was analysed by details items and was compared with other similar project and found the O&M per kW of the proposed project is within or below the range of the relative data. Thus the CL was closed.					

1. Ref No:	CL05	2. Grade:	Clarification	3. Date:	26/05/2010
4. Requirement	CDM M&P Para 43			5. Status:	Closed
6. Finding: The PP shall clarify the reason on the justification of the operation hours as 6000 hours.					
7. Conclusion: In responding to this CL, the PP explained that the PP's core business is in semi-coke production and in the project activity the PP will recover waste gas from the semi-coke production line for power generation. Unlike traditional fossil fired power plants the amount of power generated by the project activity is not based simply on power demand but based on the ability to maintain levels of production in the underlying semi-coke production facility. The waste gas is therefore only available when the semi-coke production facility is operating and consequently determines the availability of power which can be sold to the grid. While according to the FSR of the semi-coke production plant, the annual operation hour of the					

semi-coke production facility is 6000 hours. Therefore, the operation hours as 6000 hours of the semi-coke gas based power plant is reasonable.

Furthermore, the average annual operation hours of fossil fired power plant in China is 5767 hours, 5991 hours, 5865 hours, 5612 hours and 5344 hours respectively from 2003 to 2007, which were all within 6000 hours.

Thus it can be concluded that the operation hours as 6000 hours of the project activity is reasonable and feasible and the CL was closed.