Response to the request for review for the CDM project activity

Mr. Peer Stiansen
Chair, CDM Executive Board
UNFCCC

Response to the request for review for the CDM project activity

"Use of biomass as an alternative fuel for the production of Calcium Oxide"

(Ref. no.: *10016*)

2015-12-12

Dear Mr. Peer Stiansen,

,

The DOE TÜV Rheinland(China) Ltd. was informed on 17 November 2015that the CDM project " Use of biomass as an alternative fuel for the production of Calcium Oxide " (Ref. no. *10016.*), is under “Request for Review” because *two* requests for review have been received from members of the board.

All of these requests for review contain *two* issues. We would like to provide our response to the issue raised on the following pages.

In summary, we understand the issue raised in the “Request for Review” and regret if the previous Validation Report did not reflect and describe the validation results in sufficient detail. However, we hope that the input by the project participants and DOE in this explanation will find acceptance among the members of the Executive Board.

Yours sincerely

Mr. Henri Phan
DOE Manager
TÜV Rheinland(China)Ltd.

Issue 1 raised:

1) The DOE shall further substantiate how it has validated the suitability of the investment costs of the project activity, since:
(a) It is not clear whether the investment costs applied in the investment analysis are the incremental investment costs compared with baseline scenario, considering that: (i) for the new 600 tpd kiln, both baseline scenario and project scenario would involve installation of a new kiln;

Project Participant response:

The investment analysis was based considering the incremental investment costs compared with the baseline scenario:

- Regarding to the new 600 tpd kiln, the project investment considers only the costs related to build the biomass properties of the kiln. There is a quotation made by a third party (P115_VAL_364) that considers only this *related-biomass costs*, which are the following:
    - Collection center (engineering, chipping complex, civil work, electric work of force and control).
    - Unload, drying, grinding, pneumatic transport and Maerz system (engineering, discharge hopper system, reception hopper, cover and winch, converyor belt, magnet, drying system, screw conveyor, refiner mill, blower, pneumatic piping, cyclone, dust collector, silo, aerzen blower, spears biomass injection system, piping for biomass injection through spears, civil work, structural work in grinding and biomass conduction, electric work of force and control, electric work of biomass grinding system, engine control room, general installation, grinding and biomass conduction starting, automation system).
    - Internal infrastructure (substation, safety equipments, administrative expenses, provisional expenses, another office expenses).

The DOE confirms by a third party evaluation that this cost will be added to the baseline scenario in order to operate a kiln with biomass. No other cost was included due to the fact that those cost remains the same in the baseline scenario.

- Regarding to the already built 400 tpd kiln, the project investment considers only the costs related to the retrofit of the kiln to use biomass as fuel. This costs are supported also by the quotation P115_VAL_364 but only two elements are required for the retrofit:
    - Spears biomass injection system.
    - Silo

The values of all the costs previously described are disclosed on the document P115_VAL_381. It is important to mention that the costs regarding to the building of the new kiln is not considered part of the project investment because it will be built anyway. The initiative of the project is to build it with biomass properties so it can use alternative fuels and reduce GHG emissions.

Therefore, the value of the total project investment is $7,022,585.49 USD, as can be seen on Image 01.

New to be built 600 tpd kiln related-biomass costs:			
Equipment Description		**Price**	**Units**
Collection center	**$**	**4,536,889.00**	MXN
Engineering	$	23,900.00	MXN
Chipping complex	$	1,332,541.00	MXN
Civil work	$	2,224,542.00	MXN
Electric work of force and control	$	955,907.00	MXN
Unload, drying, grinding, pneumatic transport and Maerz system	**$**	**62,597,747.00**	MXN
Engineering	$	945,549.00	MXN
Discharge hopper system	$	2,196,078.00	MXN
Reception hopper	$	1,504,451.00	MXN
Cover and winch	$	425,190.00	MXN
Converyor belt	$	306,596.00	MXN
Magnet	$	486,245.00	MXN
Drying system	$	13,910,427.00	MXN
Screw conveyor	$	550,380.00	MXN
Refiner mill	$	3,075,423.00	MXN
Blower	$	197,080.00	MXN
Pneumatic piping	$	2,242,795.00	MXN
Cyclon	$	395,535.00	MXN
Dust collector	$	997,685.00	MXN
Silo	$	2,127,587.00	MXN
Aerzen blower	$	743,486.00	MXN
Spears biomass injection system	$	14,963,088.00	MXN
Piping for biomass injection through spears	$	3,267,123.00	MXN
Civil work	$	4,569,484.00	MXN
Structural work in grinding and biomass conduction	$	2,834,796.00	MXN
Electric work of force and control	$	1,456,539.00	MXN
Electric work of biomass grinding system	$	2,906,615.00	MXN
Engine control room	$	428,749.00	MXN
General installation	$	625,993.00	MXN
Grinding and biomass conduction starting	$	1,070,651.00	MXN
Automation system	$	370,202.00	MXN
Internal infrastructure	**$**	**3,837,911.00**	MXN
Substation	$	660,000.00	MXN
Safety equipments	$	105,000.00	MXN
Administrative expenses	$	2,668,390.00	MXN
Provisional expenses	$	114,333.00	MXN
Another office expenses	$	290,188.00	MXN

Already built 400 tpd kiln retrofit-biomass costs:			
Silo	**$**	**2,127,587.00**	MXN
Spears biomass injection system	**$**	**14,963,088.00**	MXN

TOTAL PROJECT INVESTMENT COST	$	88,063,222.00	MXN
	$	7,022,585.49	USD

Table 01. Description of Project Investment (Related-biomass costs for new kiln and retrofit-biomass costs for already existing kiln).

The DOE confirms that the investment costs are related to facilities necessary to prepare the biomass to be feed to the kiln. Detailed costs are included as part of PP response in this file and are based on the quotation prepared by the third party company "Asistencia industrial de la Laguna" /69/, Information included in this response is explained as well in the latest version of the FVR (Attached join with this report).

Therefore, the DOE confirms that the investment costs are suitable to the investment analysis.

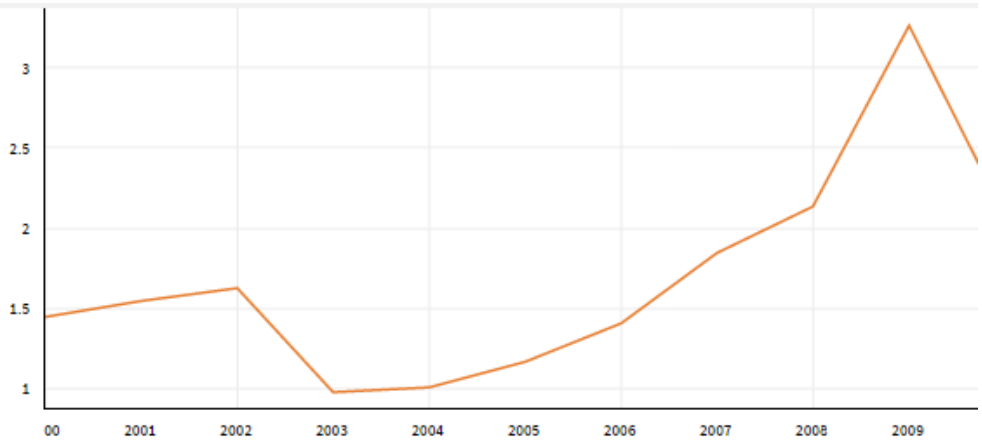
(ii) the investment analysis has been conducted based on the marginal effect of the project activity (for example, revenue comes from the savings of fuel costs due to the fuel switch from baseline scenario to project scenario). In doing so, a breakdown of the investment costs shall also be provided, in which each component of the investment costs can be illustrated, in particular the investment costs due to the installation of the new 600 tpd kiln.

The investment analysis has been conducted based on the marginal effect of the project activity. The revenue comes from the savings of fuel costs due to the fuel switch from baseline scenario to project scenario has been included to the analysis, but it is explained below section of table 7. The PDD and the economic model also contain this consideration, where there is a new breakdown and sensitivity analysis.

Sensitivity Analysis Results					
Parameter/Variation	**-10%**	**-5%**	**0%**	**5%**	**10%**
Investment	7.95%	7.15%	6.37%	5.70%	5.09%
Fossil fuels price	-3.46%	2.15%	6.37%	10.24%	13.77%
Forestry and Agroindustrial residues price	12.39%	9.53%	6.37%	3.01%	-0.75%
Project activity costs	8.21%	7.33%	6.37%	5.45%	4.50%

Table 02. New results of the sensitivity analysis.

As can be seen, the IRR benchmark (12.2%) is exceeded when the price of biomass decreases 10% (which is not likely to happen because this price is the most regular, is supported by a third party supplier whose quotation and description of the price is explained below on c). On the other hand, the benchmark is also exceeded when the price of pet coke increases 10% since its value on 2009 was decreasing according to Quandl on Graph 01.



Graph 01. Historic price of petcoke (decreasing by 2009)[1]

[1]Quandl.Historic Price of petcoke. 2000 – 2009.

Break-even analysis results		
Parameter	% of variation	IRR
Investment	-219.87%	#¡NUM!
Petcoke Price	7.76%	12.20%
Forestry and Agroindustrial residues price	-9.69%	12.22%
Project activity costs	-33.87%	12.17%

Table 03. New break-even analysis results

TÜVRheinland's response:

A breakdown analysis was provided joint with this response; information (and references) have been included in the latest version of the FVR.

(b) The references used for cross-checking appears to be either same or internal document, which is not in line with paragraph 129(b) of VVS version 9 which requires using third-party or public available sources for cross-checking. Please refer to paragraph 129 (a) & (b) of VVS version 9.

PP Participants Response:

The following third-party references or public available information has been used to support this document in order to cross-check the project results (among others included in PDD):

- Related-biomass costs quotation or project investment (P115_VAL_364).
- Historic price of petcoke (https://www.quandl.com/home-v3).
- Biomass quotation for the project scenario (P115_VAL_407).
- FAO study of the optimal biomass substitution in a kiln (P115_VAL_345).
- Study of net calorific value of agave bagasse (P115_VAL_088).
- Study of net calorific value of forestry residues (P115_VAL_057).
- Minimum salary in Mexico (P115_VAL_388).

The internal references to support project data (among other reports included in the PDD) are:

- Internal report of the agave bagasse net calorific value (P115_VAL_045).
- Internal report of the forestry residues net calorific value (P115_VAL_046).
- Internal report of electricity consumption of the biomass silo (P115_VAL_216).
- Internal report of electricity consumption of the grinding system (P115_VAL_217).
- Internal report of electricity consumption due to fossil fuel preparation (P115_VAL_086).
- Annual expected production of CaO (P115_VAL_085).

TÜVRheinland's response:

The DOE clarifies that the source used to justification of the inputs used in the investment is not an internal document, but proposals provided by a third party not involved with the CDM process. Investment analysis is provided by the company "Asistencia Industrial de la Laguna" which is a third party not related with the project developer.

Due the specific characteristics of the project, it is not possible to identify a project with similar characteristics to the proposed one i.e the investment used to retrofitted kiln of 400 tpd kiln and investment used to build the facilities for the 600 tpd kiln; that is the reason of include the legend "*Due to the nature of the project activity, it was not possible to verify costs with other projects in the region."*

The research done by the DOE to compare the costs of the project activity included registered CDM projects using the same methodology as the used by the project activity (i.e. AM0036 version 04.0.0 shows:

Currently, there are 10 CDM projects with the same methodology, 7 registered and 3 rejected:

Project	Status	Host Party
Mondi Richards Bay Biomass Project	Registered on 20/05/2007	South Africa
Fuel switch at BSM sugar mills	Rejected	México

Cargill Uberlândia Biomass Residues Fuel Switch Project	Rejected	Brazil
Biomass thermal energy plant – HartalegaSdn.Bhd, Malaysia	Registered on 21/12/2007	Malaysia
Incauca S. A. Fuel Switch from Coal to Green Harvest Residues CDM Project	Registered on 16/10/2008	Colombia
Fuel switch from fossil fuel to biomass residues for cogeneration in integrated pulp and paper unit of ITC PSPD at Bhadrachalam	Registered on 07/06/2011	India
MNI Renewable Energy Plant	Registered on 07/06/2011	Malaysia
Fuxin Fuel Switch from Coal to Biomass Residues Project in Jilin City, Jilin Province, P.R.China	Registered on 29/09/2011	China
Liuyang Project of Fossil Fuel Switch to Biomass Residues in Boilers for Heat Generation	Registered on 14/10/2011	China
Coal to Biomass Residues Fuel Switch Project in Qing'an Cogeneration Plant	Registered 28/12/2012	China

Comparison shall be done against projects located in the same country of the proposed project activity, otherwise it is meaningless. The project located in México was rejected and the one located in Colombia, however, this project does not contain a financial analysis attachment and description of cost are just lightly described; therefore, it is not possible to identify an suitable investment comparison.

(c) Moreover, the investment analysis considers a price for the Agroindustrial Residues of USD 43.84 /ton, which is 40% of the price considered for Petcoke. The PDD states on its page 5 that these residues are otherwise sent to the landfill. Therefore, it has to be further substantiated how realistic is that these residues reach such a high market price (the IRR value when considering a price of cero is 30%). According to the validation report, the reference provided for justifying this price was cited as "quotation of forestry residues". The DOE is therefore requested to further justified how the price of agroindustrial residues has been validated, considering that the mentioned validation source refers to the price for forestry products and not to agroindustrial residues. Furthermore, the DOE is requested to validate this input value according to paragraph 129(b) of VVS version 9, which requires the use of third party or public available sources.

PP Participants Response:

There must be a slight misunderstanding on the Validation Report when was specified the description of the biomass considered for the project activity, since **it is composed mainly by agroindustrial residues and not by forestry products.**

As you can see in the attached document P115_VAL_407 (translated on P115_VAL_408) issued by a third party, the biomass considered to supply the project activity consists practically of agave bagasse bales but with some traces of forestry and other organic residues. This means the biomass can be considered as an agroindustrial and not a forestry residue. This organic matter typically would have been uncontrolled burned or aerobically left to decay by the farmer because he would not have taken any economic advantage from the residue. Nevertheless, if this residue is sold to a third party specialized in the management of biomass (like happens in this case), the farmer demands a payment in exchange for the agroindustrial residues.

Besides, as explained in the document P115_VAL_407 (translated on P115_VAL_408), the third party established as a biomass supplier carries out a management process before selling it as a fuel. This process includes the following steps:

- Collection
- Processing (compression)
- Storage
- Transport

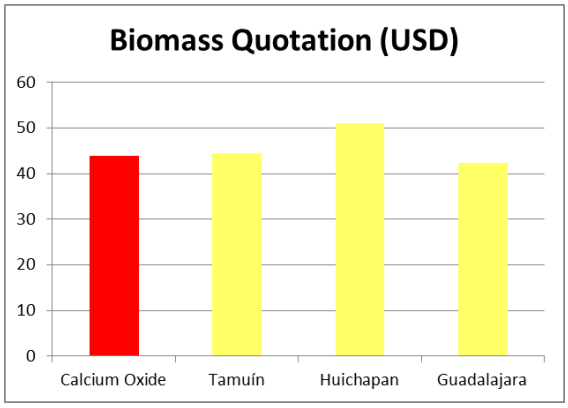
The steps previously mentioned imply costs that have to be covered (plus the cost of the agroindustrial residues paid to the farmer) in order to grant a profit to the third party supplier. That's the reason why the biomass considered for the project has a value of 43.84 USD.

Besides, public available sources were considered in a benchmark analysis which considers biomass substitution projects in Mexico already registered as Clean Development Mechanisms (CDM's). There were identified 3 projects disclosed in the following table, together with the indicators of our project (10016 Use of biomass as an alternative fuel for the production of Calcium Oxide):

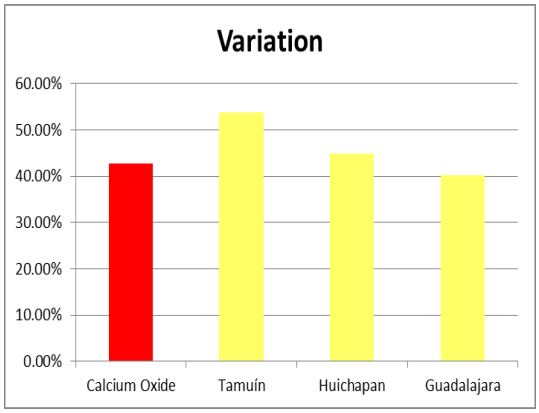
		Year	Biomass description	Biomass Quotation (USD)	Price of petcoke (USD)	Variation	What would have happened with the biomass on the baseline scenario?
10016	**Use of biomass as an alternative fuel for the production of Calcium Oxide**	2010	Agave bagasse bales	43.84	102.75	42.67%	Sent to landfills where it decays aerobically
https://cdm.unfccc.int/filestorage/I/8/O/I8O5KXNG2Q3LBMPTSZ79YH1VF6R0WU/PDD_Calcium%20Oxide.pdf?t=a2h8bnlkMW5jfDANoRv0IZk70Rf0a5P6_9v0							
7155	**CEMEX Mexico: Biomass project at Tamuín cement plant**	2012	Sugar cane bagasse, paper, cardboard…	44.39	82.61	53.73%	Sent to confinement, landiflled, left to decay or uncontrolled burned
https://cdm.unfccc.int/filestorage/c/d/5N91Q7RVGJ0B4A2XPZIKCL6USHYTD8.pdf/P110_VAL_249.pdf?t=Y0N8bnljemRjfDDjjmPgy6hT9hUjLIHWJ9KU							
8035	**CEMEX Mexico: Biomass project at Huichapan cement plant**	2012	Sugar cane bagasse, paper, cardboard…	51.05	113.98	44.79%	Sent to confinement, landiflled, left to decay or uncontrolled burned
https://cdm.unfccc.int/filestorage/y/d/MVL4F8R3HZWIN5D61BSO0TUGAYJPQE.pdf/P111_VAL_250.pdf?t=NTl8bnlkMDBkfDA4LhjJTga0ddDBueLpdUkN							
7846	**CEMEX Mexico: Biomass project at Guadalajara cement plant**	2012	Sugar cane bagasse, paper, cardboard…	42.26	105.07	40.22%	Sent to confinement, landiflled, left to decay or uncontrolled burned
https://cdm.unfccc.int/filestorage/o/f/1FTABU7P0OMX9SI258RC4WLVGQKYED.pdf/P104_VAL_295.pdf?t=SzF8bnlkMWI3fDAtoGPaMc6yRCU_2HDB_SsB							
			Average	**45.39**	**101.10**	**45.35%**	

Table 04. Fuel information of biomass substitution projects in Mexico already registered as CDM's.

As can be concluded from Table 04, the price of the agroindustrial residues considered for the project are pretty similar compared to other biomass substitution projects in Mexico already registered as CDM's. In the following years, the registered projects have a similar variation of the price of biomass regarding to the price of petcoke (about 40%). These results can be better appreciated in the following graphs:



Graph 02. Biomass price (USD) of the Project 10016 "Calcium Oxide" compared to CDM's already registered in Mexico



Graph 03. Percentage of variation of Biomass price regarding to Petcoke price of the Project 10016 "Calcium Oxide" compared to CDM's previously registered in Mexico

Besides, all those projects establish that their residues would also have been left to aerobic decay without any income. Nevertheless, when the farmer sells those residues to the third party supplier, a management process is carried out in order to prepare it as a fuel.

Therefore, it is concluded that the price of the biomass has been validated by third party and public available sources. It has been demonstrated that the price of 43.84 USD is realistic in the market according to the cost of the management process required to use it as a fuel and it is within the price range of similar projects in Mexico previously registered as CDM's.

TÜVRheinland's response:

The DOE apologize regarding the translation of the source /70/ "PREAGRO-supplier of biomass and forestry residues, "quotation of forestry residues" dated on 01/10/2010". A more accurate translation shall be "agroindustrial supply proposal" (files P115_VAL_407 and P115_VAL_408), provided by Preagro (a third party supplier). Original file (and translation to English) is attached joint with this response.

As stated in page 5 of the PDD, "*the forestry and agroindustrial residues used in this project activity have not a current use, being burned in an uncontrolled manner or left to decay in landfills in aerobic fashion without using its energy contain*", however, it does not mean that any cost shall be included as part of the project activity, due to the biomass shall be prepared to be feed to the kiln; it is not anymore an "uncontrolled burner" or "anaerobic decay".

The file provided clarifies the cost included in the investment analysis:

AGROFORESTAL RESIDUES PROCESOR
BIOMASS FABRICATION COSTS

Imports per metric ton produces

Salaries	$20.91
Maintenance	$6.67
Depreciation	$10.78
TOTAL FIXED COSTS (Mexican pesos)	$38.28
Variable Costs	
Reception costs	$459.00
Diesel	$0.32
Electric Energy	$49.87
Several Supplies	$2.00
TOTAL VARIABLE COSTS (Mexican pesos)	$511.19
TOTAL FABRICATION COSTS (Mexican pesos)	$550.00

Fabrication costs is $550 MXP, taking the exchange rate of 12.54, included in the financial analysis (the one available at the investment decision date) gives USD 43.84/ ton.

Consider that the variable costs (included in the proposal) are not included into the costs.

Issue 2raised:

The DOE shall further substantiate how it has validated the suitability of the operational costs (project activity costs) in the investment analysis, as it is not clear whether/how the savings of operational costs in the baseline scenario have been considered in the investment analysis, considering that the investment analysis has been conducted based on the marginal effect of the project activity (for example, revenue comes from the savings of fuel costs due to the fuel switch from baseline scenario to project scenario). In particular, the savings of electricity costs due to fossil fuel preparation in the baseline scenario (e.g. grinding of pet coke) and the savings of transportation costs of baseline fossil fuels. Furthermore the amount of Calcium Oxide considered for the yearly production as stated in the PDD: 340,000 tons, is not consistent with the amount considered for the investment analysis in the excel table submitted: 345,000 tons.Please refer to paragraph 129 (a) of VVS version 9.

PP response:

The following adjustments have been made on the economic model:

Project activity

The percentage of biomass substitution was based on the document P115_VAL_407, which is the scope of fuel switch with the biomass availability of the quotation made by the third party supplier. The energy balance was added to the model and can be seen in the following image

Energy balance of biomass substitution		
Agave bagasse supply (wet basis)	270	tons/day
Forestry residues supply (wet basis)	30	tons/day
Moisture content	40%	
Percentage of biomass storage	5%	
Agave bagasse storage	8.68	tons/day
Forestry residues storage	1.16	tons/day
Percentage of biomass sent to heater	20%	
Agave sent to feed the heater	32	tons/day
Forestry sent to feed the heater	6	tons/day
Agave (dry basis)	120	tons/day
Agave energy supply	697	TJ/yr
Forestry (dry basis)	9	tons/day
Forestry energy supply	64	TJ/yr
Biomass energy supplied	761	TJ/yr
Energy requirement	1,260	TJ/yr
% of agave substitution	55%	
% of forestry substitution	5%	
% of biomass substitution	60%	

Table 05. Energy balance of biomass substitution

Besides, the percentage of biomass substitution was supported by the document P115_VAL_345, which is a study made by Marland and Marland (1992) where a fossil fuel substitution model was

explored and found that biomass would be converted to useful energy at 60%[2].

On the other hand, the net calorific values of the biomass components are supported by internal reports and third party studies, using the most conservative value:

	Internal report (cal/g)	Third party study (cal/g)
Agave bagasse	**3805**	5937
	Source: P115_VAL_045	Source: P115_VAL_088
Forestry residue	**4471**	4800
	Source: P115_VAL_046	Source: P115_VAL_057

Table 06. The most conservative values are from the internal report results for both the agave bagasse and the forestry residue.

Additionally, the project activity costs are supported by the following sources:

- Electricity cost due to alternative fuels consumption: P115_VAL_216 and P115_VAL_217 (Internal reports of electricity consumption for the biomass silo and the grinding system).
- Transportation cost due to alternative fuels consumption: was removed from the economic analysis because this cost is provided by the biomass supplier.
- Operator's salaries due to alternative fuels consumption: P115_VAL_388 (Minimum salary in Mexico).

Baseline scenario

Regarding to the baseline scenario, additional considerations due to the fuel switch were included on the economic model as part of the operational costs:

- Savings of electricity costs due to fossil fuel preparation*.
- Savings of transportation due to fossil fuel preparation*.

* According to the document P115_VAL_086, which is a description of the monthly fossil fuel preparation costs Regarding to the transportation on-site of the pet coke, it is done by electrical conveyor belts, therefore, all this savings corresponds to electricity consumption. The cost of fossil fuel preparation per tonne of Calcium Oxide produced was calculated from the average of the sum of the costs divided by the tonnes produced every month. To calculate the annual savings, the cost of fossil fuel preparation per tonne of Calcium Oxide produced was multiplied by the annual forecast of production (established on the document P115_VAL_085) and by the percentage of the fossil fuel substitution established on the PDD (60%). This annual savings were included on the new version of the economic model as a reduction of the baseline operational costs.

[2]FAO (1994).*Bioenergy for development – Technical and environmental dimensions.*Recovered from: http://www.fao.org/docrep/t1804e/t1804e00.htm#Contents.

Savings due to preparation of fossil fuel not consumed on the Project Scenario							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Units
Cost of internal management of petcoke	$ 3.40	$ 3.40	$ 3.40	$ 3.40	$ 3.40	$ 3.40	$ 3.40	USD/ton of CaO
Energy required for petcoke management	$ 1,172,403.46	$ 1,172,403.46	$ 1,172,403.46	$ 1,172,403.46	$ 1,172,403.46	$ 1,172,403.46	$ 1,172,403.46	USD
Cost of internal management of petcoke	$ 703,442.07	$ 703,442.07	$ 703,442.07	$ 703,442.07	$ 703,442.07	$ 703,442.07	$ 703,442.07	USD/yr

Table 07. Yearly savings of electric consumption due to preparation of fossil fuel not consumed on the Project Scenario.

Economic scenarios comparison

After comparing both scenarios including all the previous adjustments, it is clear that the baseline remains as the most economically feasible scenario (the Project's IRR without CERs equals 6.37%). The results can be seen in the following image:

	Year	Year 0	Year 1	Year 2	Year 3
		Investment	1	2	3
Baseline Fuel Costs		$ -	$ 4,064,274.65	$ 4,064,274.65	$ 4,064,274.65
Project Fuel Costs		$ -	$ 3,560,676.29	$ 3,560,676.29	$ 3,560,676.29
CERs income		$ -	$ -	$ -	$ -
Incomes		$ -	$ 503,598.36	$ 503,598.36	$ 503,598.36
Project activity costs		$ -	-$ 120,573.20	-$ 120,573.20	-$ 120,573.20
EBITDA		$ -	$ 624,171.55	$ 624,171.55	$ 624,171.55
Depreciation		$ -	$ 1,069,389.84	$ 1,069,389.84	$ 1,069,389.84
Amortization		$ -	$ 175,564.64	$ 175,564.64	$ 175,564.64
EBIT		$ -	-$ 620,782.93	-$ 620,782.93	-$ 620,782.93
Interests		$ -	$ 158,008.17	$ 150,107.76	$ 142,207.36
Taxes		$ -	$ -	$ -	$ -
Net income		$ -	-$ 778,791.10	-$ 770,890.70	-$ 762,990.29
Project Cash Flow (USD)		-$ 3,511,292.74	$ 290,598.74	$ 298,499.15	$ 306,399.56
Project IRR	6.37%				

Table 08. Economic model without CERs for the project use of biomass as an alternative fuel for the production of Calcium Oxide

	Year	Year 0	Year 1	Year 2	Year 3
		Investment	1	2	3
Baseline Fuel Costs		$ -	$ 4,064,274.65	$ 4,064,274.65	$ 4,064,274.65
Project Fuel Costs		$ -	$ 3,560,676.29	$ 3,560,676.29	$ 3,560,676.29
CERs income		$ -	$ 967,811.94	$ 967,811.94	$ 967,811.94
Incomes		$ -	$ 1,471,410.29	$ 1,471,410.29	$ 1,471,410.29
Project activity costs		$ -	-$ 120,573.20	-$ 120,573.20	-$ 120,573.20
EBITDA		$ -	$ 1,591,983.49	$ 1,591,983.49	$ 1,591,983.49
Depreciation		$ -	$ 1,069,389.84	$ 1,069,389.84	$ 1,069,389.84
Amortization		$ -	$ 175,564.64	$ 175,564.64	$ 175,564.64
EBIT		$ -	$ 347,029.01	$ 347,029.01	$ 347,029.01
Interests		$ -	$ 158,008.17	$ 150,107.76	$ 142,207.36
Initial balance		$ 3,511,292.74	$ 3,511,292.74	$ 3,335,728.11	$ 3,160,163.47
Final Balance		$ 3,511,292.74	$ 3,335,728.11	$ 3,160,163.47	$ 2,984,598.83
Taxes		$ -	$ 52,925.83	$ 55,137.95	$ 57,350.06
Tax lost		$ -	$ -	$ -	$ -
Tax base		$ -	$ 189,020.83	$ 196,921.24	$ 204,821.65
Net income		$ -	$ 136,095.00	$ 141,783.29	$ 147,471.59
Project Cash Flow (USD)		-$ 3,511,292.74	$ 1,205,484.84	$ 1,211,173.14	$ 1,216,861.43
Project IRR	32.21%				

Table 09. Economic model with CERs for the project use of biomass as an alternative fuel for the production of Calcium Oxide. It is important to mention that the price considered of the CER is the one applicable by September 2010, which is 13.75 EUR. Nevertheless, actually the price of the CER has decreased to about 0.60 EUR, far below that time.

TÜV Rheinland's response:

Project activity costs included as part of the project activity included:

Concept	$USD /year	Explanation
Electricity costs	$550,460.35	The cost is obtained by multiplying the electricity consumed by the power units used by the Biomass silo (854 MWh) and Biomass grinding system (4,529 MWh), electrical consumption is obtained from technical data of the equipment provided by PP /84/. Amount of electricity is multiplied by the operational time of the plant (365 days x 24 hrs) /87/, and then multiply by the electrical tariff (1,2819 MXP/kWh) /53/
Onsite transportation costs	$ 14,784.99	The cost is calculated by multiplying the operational time of the plant (365 days x 24 hrs) /85/, and the cost of moving the biomass on site the facilities (considering one truck of 2.5 tones of capacity) moving 54.4 runs/day, considering a price os 0.71 USD/lt /79/
Operator salaries	$17,623.54	This cost is considering 5 employees with a salary of 4.83 USD /day /86/ operating 365 days/ year.
TOTAL	**$528,868.88**	

On the other hand, cost of management of fossil fuel in the baseline scenario is as follows:

Cost of internal management of petcoke = $703,442.07.

The cost of management of fossil fuel is related to electrical consumption of transport the fuel. Investment analysis As described in the file "Cost of management of the PetCoke", consumed electricity during 2010 is divided by the amount of produced Calcium Oxide, this assumption is correct, as the consumption of electricity is related to amount of production, in order to run the model an average cost is used as input:

	January	February	March	April	May	June	July	August
Cost of electrical consumption	66,053	86,742	134,863	95,239	126,741	125,099	126,174	53,843
Produced tones	2,291	2,224	2,321	2,005	2,701	2,631	2,566	761
Cost of electricity/produced tones	29	39	58	48	47	48	49	71

Average cost $42.63 MXP/ton = $3.40 USD/ton

Finally, this input is multiplied by the expected amount of CaO produced (by the project activity):

Cost required for petcoke management: $3.40 USD/ton * 345,000 tones= 1,172,403.46 USD /year.

Using this input, IRR without CERs is 6.73 %, therefore the project is still additional.

Furthermore the amount of Calcium Oxide considered for the yearly production as stated in the PDD: 340,000 tons, is not consistent with the amount considered for the investment analysis in the excel table submitted: 345,000 tons. Please refer to paragraph 129 (a) of VVS version 9.

The right amount of Calcium Oxide considered for the yearly production in the investment analysis is 345,000 tonnes according to the document P115_VAL_085, which is a letter from the manager of the project facility establishing the number of days per year they are expecting to operate the kilns. Therefore, there must be a misunderstanding on the PDD, which has been edited in order to be consistent.

Project CaO production projection								
Parameter	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Units
CaO production (only for retroffited and new kilns)	3450,000	3450,000	3450,000	3450,000	3450,000	3450,000	3450,000	tons

Biomass residues properties				
Fuel Type	Net Calorific Value (J/g)	Net Calorific Value (MJ/kg)	Net Calorific Value (kcal/kg)	Emission factor (ton CO2/TJ)
Forestry residues	18,707	18.71	4,471	0.0
Agroindustrial residues	15,920	15.92	3,805	0.0

Electricity Data								
Parameter	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Units
Electricity cost	102.25	102.25	102.25	102.25	102.25	102.25	102.25	USD/MWh
Grid Emission Factor	0.513	0.513	0.513	0.513	0.513	0.513	0.513	tCO2e/MWh
Grid Transmission and Distribution Loss	20	20	20	20	20	20	20	%

Transportation Data								
Parameter	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Units
Average return-trip distance	150	150	150	150	150	150	150	km
EF_CO2,f	129	129	129	129	129	129	129	g CO2/t km

Table 09. Project CaO production projection adjustment on PDD

TÜV Rheinland's response:

The DOE confirms that the correct value is 345,000 tonnes, this value is considering an installed capacity of 400 ton/day (for the kiln 1 –retrofitted-) and 600 ton/day of the new kiln. The letter released by the project developer (with code P115_VAL_085) describes that operatives days per year are 345 days, the rest days of the year are used for maintenance. This information is included as well in the latest version of the verification report.

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Reference Documentation in Validation Report Section 2.1

/53/	Electric Energy bill (from October of 2009to September of 2010), provided by CFE Federal Electricity Commission.
/69/	Investment evidence "Turnkey project quotation", dated on 20/10/2010, issued by Asistencia Industrial de la Laguna.
/70/	PREAGRO-supplier of biomass and forestry residues, "quotation of biomass residues" dated on 01/10/2010 P115_VAL_407 and P115_VAL_408
/71/	Investment Breakdown for the Project Use of biomass as an alternative fuel for the production of Calcium Detail of costs of the project activity.
/79/	Newspaper, "El Universal" that provides the price of Diesel it is dated on 08/10/2010
/84/	iemmsa, "General line Diagram of the project activity"
/85/	Grupocalidra, " Operative days of the plant" Dated on 05/09/2010
/86/	Government of Mexico, "Salaries in 2010" http://www.conasami.gob.mx/pdf/tabla_salarios_minimos/2010/01_01_2010.pdf
/87/	Calidra de Occidente, "Cost of management of the PetCoke" Dated on September 2010