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Response to Registration Incomplete regarding the Request for Registration of the project "UNOSUGEN Natural gas based grid connected Combined cycle power generation project" (UNFCCC Ref. no. 8048), notification received via email dated "26th December 2012"

Dear CDM team,

Please find below the response of the TÜV NORD JI/CDM Certification Program to the request for registration/issuance incomplete for the above mentioned project.

With regard to this response, we would kindly request you to continue with the request for registration process. If that cannot be done, please specify the request for registration incomplete in more detail to prevent any misinterpretation. If you have any questions do not hesitate to contact us.

Yours sincerely,

TÜV NORD JI/CDM Certification Program



Rainer Winter

Request for Registration/Issuance Incomplete Reason (1)	
Issue raised by the UNFCCC Secretariat:	<p>The DOE is requested to describe whether the assumptions and data used for the baseline identification are justified appropriately, supported by evidence and can be deemed reasonable as per VVM v1.2 paragraph 87 (c).</p> <p>(a) For alternative imported coal with conventional technology, the Validation Report page 213 states that the coal cost (0.68 INR/1000 kcal) is higher than the cost mentioned in the project activity 4629 (0.35 INR/1000 kcal), and that the consideration of 0.35 INR/1000 kcal does not change the selected baseline. However, the validation report has not provided any justification on why the cost is higher. Furthermore, the DOE is requested to further justify that with the application of the lower value the baseline would not change;</p> <p>(b) For alternative imported coal with conventional technology, the Validation Report page 214 states that the heat rate of the alternative is found higher (2315.31 kcal/kWh) than it is of the project activity 4629 (2226 kcal/kWh), and that the application of the lower value would not change the baseline. However, the validation report has not provided any justification on why the heat rate is higher.</p>
Response by DOE:	<p><i>As per VVM v 1.2 paragraph 87 (c) which states the reporting requirement for the validating DOE that the DOE shall clearly describe in the validation report the steps taken to assess the requirement given in paragraphs 81 and 82 above and shall provide an opinion as to whether:</i></p> <p><i>(c) Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable;</i></p> <p><u>In line with the reporting requirement as mandated by said paragraph of the VVM, validation team would like to justify the incompleteness comment no.1 (a) in following paragraphs.</u></p> <p>(a) The cost of imported coal has considered from the reply of Ministry of Coal of Government of India in the Parliament. The Ministry was replying to the question about the cost of imported coal vis-à-vis domestic coal. Further, the question was answered on 14th December 2009 (i.e. prior to the investment decision date of 28th January 2010 for the project activity).</p>

As is evident from above, the price has been sourced from most authentic source that was available at the time of investment decision. Hence, the same is appropriate.

As far as the higher coal price is concerned, we would like to submit that the source of price considered by PP is dated 14th December 2009 whereas the source of price considered by the project activity 4629 is the CERC approved Tariff order for Nagarjuna Power dated 25th October 2005. Hence, there is a difference in the period for which the price has been considered by the PP and the project activity 4629.

Price considered by PP				Cross Check by DOE		
	Value	Unit	Source	Value	Unit	Source
Coal Price	85.74	USD/tonne	GOVERNMENT OF INDIA MINISTRY OF COAL RAJYA SABHA UNSTARRED QUESTION NO 2628 TO BE ANSWERED ON 14.12.2009 COAL PRICES. http://164.100.47.5:8080/members/website/quest.asp?gref=149034	2148	INR/MT	Page 7 of CERC approved Tariff order, Nagarjuna Power Limited, 2005 http://www.cercind.gov.in/261005/40-2005.pdf
	0.68	INR/1000 Kcal		0.35	INR/1000 Kcal	
GCV of coal	5900	Kcal/kg		6200	Kcal/kg	

The validation team has also referred to CERC report titled “Analysis of the Comments Received from Stakeholders on the Proposed Methodology for Calculating Escalation Rates for Use in Tariff Based Competitive Bidding by the Staff of the Commission” (Table 1 – Page 4) (source: http://cercind.gov.in/2010/ORDER/mis/Escalation_New_Method_Information_web.pdf). As per the report, the average increase in price of imported coal for the period 1999-2010 is 13.99%. Thus, if such increase in price of imported coal is considered for the period 2005 to 2009 also, the rate considered by project activity 4629 in 2005 (i.e. USD 49.21 per MT¹) comes to USD 83 per MT for 2009 (i.e. applying 13.99% rise for four years on USD 49.21 per MT price of 2005) which is comparable to the price considered by the PP (i.e. USD 85.74 per MT).

¹The imported coal price of INR 2148 per MT was converted into USD 49.21 per MT considering the average exchange rate of INR 43.65 per USD for the first half of 2005 sourced from Reserve Bank of India web-site (<http://www.rbi.org.in/scripts/ReferenceRateArchive.aspx>) which is verified with the price of imported coal in 2005 (i.e. USD 49.59 per MT) as mentioned in the above-mentioned CERC Report (page 20)).

Further, it has been mentioned in the report (page 19-20) that Coal prices of internationally traded coal have undergone huge volatility in the last 4 to 5 years (2005 to 2010). The year 2008 saw traded coal prices reaching in the range of USD 180 per MT. The annual average prices were close to USD 130 per MT in 2008. This is nearly increased of 100% over the average prices for 2007. Historically for a long period, the coal price has remained in the range of USD 30-50 per MT till 2005. The three years moving average rate for 2009 has been mentioned as USD 88.81 per MT which is comparable to the price considered by the PP (i.e. USD 85.74 per MT).

However, even if the lower price of imported coal (i.e. as considered by the project activity 4629) is considered, the levelised tariff of imported coal conventional comes to INR 2.30¹ vis-à-vis INR 2.29 of the selected baseline alternative. Hence, the application of the lower value of imported coal heat rate (i.e. as considered by the project activity 4629) does not change the selected baseline.

Table A-3: Assessment of Financial Parameters has been revised by validation team to include the proper justification for the input parameter "Cost of Coal" for baseline alternative imported fired port based power plant using conventional technology. Revised Validation report is submitted to board along with the incompleteness response.

In line with the reporting requirement as mandated by said paragraph of the VVM, validation team would like to justify the incompleteness comment no.1 (b) in following paragraphs.

(b) The heat rate for the alternative has been sourced from Terms and Conditions of Tariff Regulations, 2009 of Central Electricity Regulatory Commission (CERC). CERC is the central regulatory body for regulating the power sector (including tariff of power plants). Hence, the source is most authenticated. Further, the Terms and Conditions of Tariff Regulations, 2009 of CERC was available at the time of decision making for the project activity. Based on the same, the value considered by the project activity is appropriate.

It may be noted that the PP has considered the station heat rate of 2174 kCal/kWh which is lower than that considered by the project activity 4629 (i.e. 2226 kCal/kWh sourced from Central Electricity Authority (CEA) report dated September 2008) (Please refer Annex-3 of the FVR page no 224). Further, it may also be noted that such station heat rate (i.e. as considered by the PP) is provided by CERC considering the recommendation of Central Electricity Authority (CEA) only (refer to Statement of Objects and Reasons of CERC (Terms and Conditions of Tariff) Regulations, 2009 (<http://www.cercind.gov.in/2009/February09/SOR-regulations-on-T&C-of-tariff-05022009.pdf>) page 119-120). However, in respect of coal/lignite based thermal generating units, the CERC has taken a view that the station heat rate norms could not be set based on the actual performance of high performing units leaving them no scope for operational flexibility. CERC has provided a margin of 6.5% above the CEA recommended station heat rate as the station heat rate norm for

	<p>coal/lignite based stations. This additional margin is applicable for all coal /lignite based plants from 01 April 2009 onwards. Considering such additional margin, the heat rate considered by the PP (i.e.2315.31 kCal/kWh) is higher than the heat rate considered by the project activity 4629 (i.e. 2226 kCal/kWh).</p> <p>However, even if the heat rate of 2226 kCal/kWh of the project activity 4629 is considered, the levelised tariff of imported coal conventional comes to ~ INR 3.10 vis-à-vis INR 2.29 of the selected baseline alternative. Hence, the application of the lower value of heat rate (i.e. as considered by the project activity 4629) does not change the selected baseline.</p> <p><i>Table A-3: Assessment of Financial Parameters has been revised by validation team to include the proper justification for the input parameter “Gross Heat Rate” for baseline alternative imported fired port based power plant using conventional technology. Revised Validation report is submitted to board along with the incompleteness response.</i></p>
Request for Registration/Issuance Incomplete Reason (2)	
Issue raised by the UNFCCC Secretariat:	<p>The DOE is requested to describe the steps taken to assess the equations applied to calculate the baseline/ project emissions, leakage and emission reductions as per the chosen methodology as per VVM v1.2 paragraph 92. The Validation Report page 81 states that parameter EF_{NG,upstream,CH4} is correctly calculated as per applied methodology and references of CO2 Baseline Database for Indian Power Sector, Report on Gujarat Lignite Resources and Scope for Joint Sector Thermal Power and SSI Project (Annexure IV).</p> <p>However, it is not clear if the absolute emissions shown in the calculation have considered the secondary fuel of each power plant in the sample BM plants considering that the absolute emissions values are given values, rather than calculated values.</p>
Response by DOE:	<p><u>In line with the reporting requirement as mandated by paragraph 92 of the VVM, validation team would like to justify the incompleteness comment no.2 in following paragraphs.</u></p> <p>As per methodology AM0029 version 03, EF_{BL,upstream,CH4} is determined based on the build margin or the combined margin, however the calculation should be consistent with the calculation of CO₂ emissions in the build margin and the combined margin i.e. the same cohort of plants and data on fuel combustion and electricity generation should be used, and the values for Fossil Fuel and Electricity Generation should be those already determined through the application of “Tool to calculate emission factor for an electricity system”.</p> <p>In the current project activity, the PP has used the build margin approach in order to calculate the baseline grid emission factor (conservatively selected in line with the AM0029, version 03). The build margin emission factor has been directly</p>

sourced from CEA CO₂ baseline database version 07, January, 2012 (the database has been prepared based on the latest "Tool to calculate emission factor for an electricity system").

Based on the above, the PP has calculated the parameter $EF_{BL,upstream,CH_4}$ in line with Build margin emission factor. The applied approved methodology AM0029, version 03 has provided the default emission factor for fugitive upstream Methane emission for various fuel types under table 2 of the methodology. Based on these factors the fugitive Methane emissions from the use of each type of fuel can be directly calculated. However, this calculation requires the amount of each type of fossil fuel used in the baseline plants. Since there is no publically available data for the total fuel consumption in the identified baseline grid power plants, the PP has calculated the amount of fuel consumption through use of absolute emission factor as provided in the CEA data base.

As per user guide of CO₂ baseline database version 07, January, 2012 for the Indian power sector published by CEA, the following equation has been used for calculation of absolute emission of power plants (page 11 http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm)

CO₂ emissions of thermal stations were calculated using the formula below:

$$AbsCO_2(station)_y = \sum_{i=1}^2 FuelCon_{i,y} \times GCV_{i,y} \times EF_i \times Oxid_i \quad (1)$$

Where:

$AbsCO_{2,y}$ Absolute CO₂ emission of the station in the given fiscal year 'y'

$FuelCon_{i,y}$ Amount of fuel of type i consumed in the fiscal year 'y'

$GCV_{i,y}$ Gross calorific value of the fuel i in the fiscal year 'y'

EF_i CO₂ emission factor of the fuel i based on GCV

$Oxid_i$ Oxidation factor of the fuel i

Based on the above it is evident that the absolute CO₂ emission of station is summation of CO₂ emission of fuel type i, where i assumes the value 1 (For primary fuel) & 2 (for secondary fuel).

As mentioned above, the absolute emissions in the database have been calculated by consideration of both primary and secondary fuels and directly provided in the CEA database. The PP has sourced the same from the CEA database and thus the calculated value is not provided or shown in the CER calculation sheet. From the absolute emissions, the PP has calculated the amount of fuel consumed with consideration of GCV and emission factor of the each type of fuel.

In the revised PDD and emission reduction sheet following changes has been done for calculation of $EF_{BL,upstream,CH4}$ by the PP in response to the CAR B17.

- Coal & Lignite based plants:** As per the database, it is evident that the secondary fuel used in coal and lignite based plants is Oil. The absolute emissions from the use of secondary fuel have been calculated based on CEA database assumptions i.e. 2 ml per KWh oil consumption for coal based plants & 3 ml per KWh oil consumption (Appendix B - CO2 Baseline Database for Indian Power Sector, published by Central Electricity Authority, Ministry of Power, Government of India, version 7, January 2012) for lignite based plants. Thus, calculated emissions from the secondary fuel are subtracted from the total absolute emissions as provided in the CEA data base and emission due to only primary fuel are considered in calculation of the parameter. The same is conservative approach and thus accepted by the validation team.
- Naphtha based plants:** The secondary fuel mentioned for Naphtha based plants is natural gas. As the Fugitive Methane emission Factor of gas (160 tCH₄/PJ) is higher than that of Naphtha (4.1 tCH₄/PJ), to be conservative the entire fuel consumption (including secondary fuel) has been considered as Naphtha only by the PP for the calculation of absolute emission of the Naphtha based plants (i.e. lower value of $EF_{BL,upstream,CH4}$ will result in lower baseline leakage emission and higher leakage emissions by the project activity. Thus there will be lower emission reduction by the project activity).
- Gas based plants:** It has been checked and confirmed from the database that gas base plants used in the build margin calculation do not involve secondary fuel.

Nevertheless, CAR B17 is raised by validation team in this aspect and in response to the correction action PP has clarified that the absolute emission as given in the CEA database has considered the secondary fuel of each power plant in the sample BM plants and subsequently, the calculation of the parameter " $EF_{BL,upstream,CH4}$ " in line with Build margin emission factor has been revised conservatively in the PDD Version 05 dated 27/12/2012 . DOE has verified the revised PDD and emission reduction which correctly and conservatively calculates the emission factor for leakage calculation in line with the applied methodology. Detailed assessment on the same is now included in section 5 of the revised Final validation report (FVR) by validation team.

Request for Registration/Issuance Incomplete Reason (3)	
Issue raised by the UNFCCC Secretariat:	The DOE is requested to include information on how it has validated the input values to the financial calculations as per VVM v 1.2 paragraph 114 (a) . While the determination of the tariff has been in accordance with the CERC Tariff Regulations 2009 (taking into account fuel cost, PLF, O&M cost and heat rate), the DOE is required to further substantiate the change of the fuel cost, O&M cost, PLF or heat rate resulting in the tariff change in the actual situation during the project operation. Furthermore, how the sensitivity analysis considering the change of fuel cost, O&M cost, PLF or heat rate is appropriate as the tariff also changes with the change of aforementioned parameters.
Response by DOE:	<p>As per VVM v 1.2 paragraph 114 which states the reporting requirement for the validating DOE that the validation report shall:</p> <p>(a) Describe in detail how the parameters used in any financial calculations have been validated;</p> <p><u>In line with the reporting requirement as mandated by paragraph 114 (a) of the VVM, validation team would like to justify the incompleteness comment no.3 in following paragraphs.</u></p> <p>The tariff of a thermal power station is determined by CERC as per CERC Terms and Conditions of Tariff Regulations 2009. As per Regulation 13 (1) of the said Regulations, the tariff for supply of electricity from a thermal generating station shall comprise two parts, namely, capacity charge (for recovery of fixed cost) and energy charge (for recovery of fuel cost).</p> <p>PP has calculated the tariff of the project activity based on the CERC Terms and Conditions of Tariff Regulations 2009. Thereafter the levelized tariff has been calculated based on the annual tariff so calculated and used for calculations of revenue generated over the useful life of the plant. The annual costs to be incurred are also calculated on same parameters. The fixed cost of a plant is dependent on the project cost, O&M cost, interest on working capital, and PLF achieved by the plant. The energy charges are based on the fuel cost which in turn is based on fuel price, heat rate and the PLF of the plant.</p> <p>Thus, the tariff of a thermal plant is a derived value based on primarily Project cost, Fuel cost, O&M cost, PLF etc. The Tariff will change with a variation in any of the factors. Further as the tariff is based on cost plus basis, the sensitivity analysis does not make any major difference (except to the extent of impact on tax due to marginal modification in working capital loans). This is mostly attributable to the following reasons:</p> <ul style="list-style-type: none"> • Tariff for IRR computation has been derived from the annual levelised cost of generation. • Cost elements as considered for computing the project IRR have been estimated following the fixed and variable cost

as determined to compute levelised cost of generation

However to further substantiate the change of the fuel cost, O&M cost, PLF or heat rate resulting in the tariff change and its impact on project IRR, the PP has presented the following analysis in the PDD version 05 dated 27/12/2012 in response to the CL B19 raised by the validation team.

The global trend of natural gas prices for last ten year has been analyzed and the trend has been observed as upward only (<http://www.oilenergy.com/1gnymex.htm#since30>) as there is growing demand for natural gas as fuel among various sector. Based on the same, any decrease in the fuel price is unlikely. However, the sensitivity analysis with 10% decrease in fuel price adequately covers any likely decrease in fuel price. As far as the increase in the fuel price is concerned. It has been observed that the global price has shown a maximum rise from USD 3 / MCF to USD 8 / MCF in the last ten years (<http://www.oilenergy.com/1gnymex.htm#since30>), a rise of ~167%. Based on the same, the sensitivity analysis for 200% increase of the fuel price has also been done and it has been found that the IRR still does not cross the benchmark.

The PLF of 85% has been considered. If such PLF is reduced by 50% (i.e. PLF of 42.5% only), the IRR is still not crossing the benchmark. However such low PLF of less than 50% in a power deficient market is not possible. Further an increase by 50 % (i.e. PLF of 127.5%) in PLF is not considered technically feasible. Based on the same, the sensitivity analysis for 10% increase and decrease adequately covers any increase or decrease in PLF.

An escalation factor of 5.72% in the O&M cost as provided under the CERC Terms and Condition of Tariff, 2009 has already been considered. It may also be noted that CERC has not prescribed any decrease in the O&M cost as such cost increases only with the operation of the plant. Based on the above, the sensitivity analysis of 10% increase or decrease in O&M cost vis-à-vis 5.72% escalation prescribed by CERC adequately covers any increase or decrease in O&M cost.

The project cost of the project activity has been taken based on the EPC contract executed. Hence, there is no possibility of any major change in the project cost. Based on the same, the sensitivity analysis for 10% increase and decrease done by PP adequately covers any increase or decrease in project cost.

The heat rate considered for the project activity is based on the design heat rate as guaranteed by the OEM (EPC contractor). Further, the same is also in line with the heat rate of existing power plant being operated by TPL. Hence, there is no possibility of any major change in the heat rate. Based on the same, the sensitivity analysis for 10% increase and decrease adequately covers any increase or decrease in Heat Rate. Additionally, in order to ascertain the suitability of the heat rate considered in the financial evaluation validation team has extended the sensitivity analysis of the project to +/- 50% and results of which still support the additionality of the project activity.

However, the validation team also independently carried out sensitivity analysis with 50% increase or decrease for the above-mentioned parameters in order to cover any unlikely situation and observed that the IRR does not cross the benchmark and the project remains additional.

From the above it can be seen that the likely variations do not impact project IRR to a great extent and the project remains additional.

Further, as mentioned above, the levelised cost of generation for power projects to be derived as per the CERC guideline (i.e. based upon total fixed (capacity charges) and variable cost (energy charges) as incurred by the project activity). As it is based on the CERC guideline which is a central regulatory body of power sector in India, the same is considered appropriate and acceptable. The same is also applied during actual operations scenario which is evident from various tariffs approved by CERC for currently running plants (NTPC Kawas Power Plant - <http://www.cercind.gov.in/2009/February09/Signed-Order-in-Pet-No-79-2005.pdf> and Ratnagiri Power Plant - http://www.cercind.gov.in/2010/ORDER/August10/Signed_order_in_Pet_No_283-2009_18.8.2010.pdf). In addition to the above, the validation team has also reviewed that the tariff of PP's other existing power plant whose tariff has also been approved by CERC as per CERC Terms and Conditions of Tariff Regulations 2009 and the validation team has also verified the actual invoices raised by such existing power plant of the PP on its beneficiaries for the months of August 2009, September 2009, November 2009 and January 2010 and March 2010, wherein it is evident that there is change in tariff being charged with change in cost. Thus, the change in the fuel cost, O&M cost, PLF or heat rate will result in tariff change in the actual situation of the plant operation.

However, the validation team would like to emphasize that the sensitivity analysis has been carried out as per the guidance 20 & 21 of EB 62 Annex 5 even though the change in fuel cost O&M cost, PLF or heat rate will result in tariff change leading to very marginal variation in the project IRR as it is based on the levelised cost of generation. Further, the validation team has also reviewed recently registered project (4419) & (5554). It has observed that similar approach was followed in those projects and the similar result of sensitivity analysis on the project IRR is obtained.

CL B19 is raised by validation team in this aspect and in response to the clarification PP has included information in section B.5 of the revised PDD substantiating the change of the fuel cost, O&M cost, PLF or heat rate resulting in the tariff change in the actual situation during the project operation in the revised PDD. Validation team has verified the section B.5 of the revised PDD which appropriately substantiates the change of the fuel cost, O&M cost, PLF or heat rate resulting in the tariff in the actual situation of the project operation. In addition to this a detailed assessment on the same is now included in section 5 of the revised Final validation report (FVR) by validation team.