

**MONITORING REPORT FORM (F-CDM-MR)**
Version 02.0**MONITORING REPORT**

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| Title of the project activity | Natural Gas based grid connected power project at Peddapuram, A.P. by Gautami Power Limited |
| Reference number of the project activity | 4828 |
| Version number of the monitoring report | 01 |
| Completion date of the monitoring report | 20/04/2012 |
| Registration date of the project activity | 09/09/2011 |
| Monitoring period number and duration of this monitoring period | 01 and dates (09/09/2011 to 10/03/2012) |
| Project participant(s) | GVK Gautami Power Limited, Hyderabad (Private entity) |
| Host Party(ies) | India |
| Sectoral scope(s) and applied methodology(ies) | Sectoral scope : 01- Energy Industries (renewable - / non-renewable) Applied methodology: AM0029- Baseline Methodology for Grid Connected electricity Generation Plants using Natural Gas |
| Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD | 648,483 tCO ₂ e |
| Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period | 378,168 tCO ₂ e |

SECTION A. Description of project activity**A.1. Purpose and general description of project activity**

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Project title

Natural Gas based grid connected power project at Peddapuram, A.P. by Gautami Power Limited

Project activity:

The project activity is commissioning and operation of a new, green field 469 MW Natural Gas fired, gas turbine based combined cycle power plant. The project activity is installed by GVK Gautami Power Limited (GPL)¹ at Industrial Development Area, Peddapuram, near Samalkot in East Godavari district, Andhra Pradesh, India. The project activity uses relatively cleaner fuel, natural gas instead of most common fuel in the grid i.e. coal for power generation. Thus, the project activity avoids significant GHG emission compared to the usual practice in coal dominated Indian power sector.

Purpose of the project activity:

The purpose of the project activity is commissioning and operation of 469 MW natural gas fired power plant. The project activity is less emission intensive compared with the common coal based power and average fuel mix in the grid. Thus, the project activity aims at reducing the GHG emission reduction by use of a relatively lesser GHG intensive fuel i.e. natural gas.

Description of the technology applied in the project activity:

The power generation components of the project activity comprise of two gas turbine generators (GTG), two heat recovery steam generators (HRSG) and one steam turbine generator (STG). The turbine unit has annular type combustors. The combustion of air fuel mixture takes place in the combustors. The major components located in the auxiliary block are lubricating oil system with lube oil reservoirs and lube oil coolers.

The generators (210 MVA) are coupled to gas turbines and steam turbine. They deliver the power at 15.75 kV with 0.8 PF; 3 phase; 50 Hz at site ambient conditions of 29°C and a relative humidity of 70%. The power generated at 15.75 kV is stepped-up to 400kV through step-up transformers. The step-up transformers are connected to project switchyard by overhead transmission lines. The 400kV project switchyard is connected to APTRANSCO's 400kV sub-station.

The details of the equipments are summarized in the table below.

| S.N. | Equipments | Specification |
|------|---------------------------------------|--|
| 1 | Gas turbine (GT) | Two (2) nos. Alstom Power make (Type - GT13E2) heavy duty industrial gas turbines equipped with the lean premix dry low NOx EV burners; holds 21-stages compressor and 5-stage turbine blades; Capacity- 2 x 152.438 MW at site conditions of 29 deg C, 70% RH and 50Hz frequency. |
| 2 | Heat recovery steam generators (HRSG) | Make -ALSTOM Power, Triple Pressure Capacity: High Pressure (HP)/ Intermediate Pressure (IP)/light Pressure (LP) Flow: 56.95/ 11.1/ 9.7 kg/s Temp: 508.3/ 506/ 151.2 deg C Pressure: 96.35/ 24.6/ 4.8 bar |
| 3 | Steam turbine generator (STG) | ALSTOM Power, Triple Pressure Capacity- 164.235MW at site conditions of 29 deg C, 70% Relative Humidity (RH) and 50Hz frequency. |

¹ GVK Gautami Power Limited is the new name of PP as per order dt. 08/09/2009 (letter from 'Registrar of Companies, Andhra Pradesh' submitted to DOE)

Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.)

| Project Step | Execution | Date |
|------------------|-----------|--|
| Commissioning | | 05/06/2009 (as per COD approval from Andhra Pradesh Power Coordination Committee) |
| Operation period | | Project plant operated continuously without major shut down with routine maintenance in this monitoring period |

Total GHG emission reduction:

The total GHG emission reduction achieved by the project activity in the current monitoring period is 378,168 tCO₂e.

A.2. Location of project activity

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Host Party: India

State: Andhra Pradesh

Town: Industrial Development Area, Samalkot, East Godavari District

The 469 MW combined cycle power plant is located at Industrial Development Area, Samalkot, near the port town Kakinada, Andhra Pradesh. The site is 15 km from the sea port at Kakinada and 3 km from the Samalkot railway station. The geographical coordinates of the Samalkot are 17°03'03" N and 82°07'04" E.



**A.3. Parties and project participant(s)**

| Party involved (host) indicates a host Party) | Private and/or public entity(ies) project participants (as applicable) | Indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|--|--|--|
| India (host country) | GVK Gautami Power Limited Hyderabad (Private entity) | No |

A.4. Reference of applied methodology

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Type : I- Renewable energy projects
Category : AM0029
 (“Baseline Methodology for Grid Connected electricity Generation Plants using Natural Gas”)
Version No : 03, EB 39
Sectoral Scope : 01 Energy Industries (renewable/non-renewable)

Reference: <http://cdm.unfccc.int/methodologies/PAmethodologies/approved>

Title: “Tool to calculate emission factor for an electricity system”

Version 02.2

EB 61

A.5. Crediting period of project activity

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Fixed crediting period of 10 years is chosen

Crediting Period: 09/09/2011 – 08/09/2021

The registered PDD had chosen crediting period from 01/08/2011, however project activity was registered on 09/09/2011. Thus, the crediting period is started from this date.

SECTION B. Implementation of project activity**B.1. Description of implemented registered project activity**

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The implementation and operational status of the project as of this monitoring period:

1. The starting date of operation of the project activity – 05/06/2009
2. There have not been any events and situations during this monitoring period which may impact the applicability of the methodology.

B.2. Post registration changes**B.2.1. Temporary deviations from registered monitoring plan or applied methodology**

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Not applicable

Any deviation was not applied to this monitoring plan or applied methodology.

B.2.2. Corrections

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Not applicable

Any correction was not applied to this monitoring plan.

**B.2.3. Permanent changes from registered monitoring plan or applied methodology**

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Not applicable

No changes from registered monitoring plan or applied methodology.

B.2.4. Changes to project design of registered project activity

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Not applicable

No changes to project design of registered project activity.

B.2.5. Changes to start date of crediting period

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Not applicable

No changes to start date of crediting period.

There was no change requested to the starting date of crediting period. Though this date is different from the date proposed in the registered PDD, the CDM project activity registration date is taken as the starting date of crediting period.

B.2.6. Types of changes specific to afforestation or reforestation project activity

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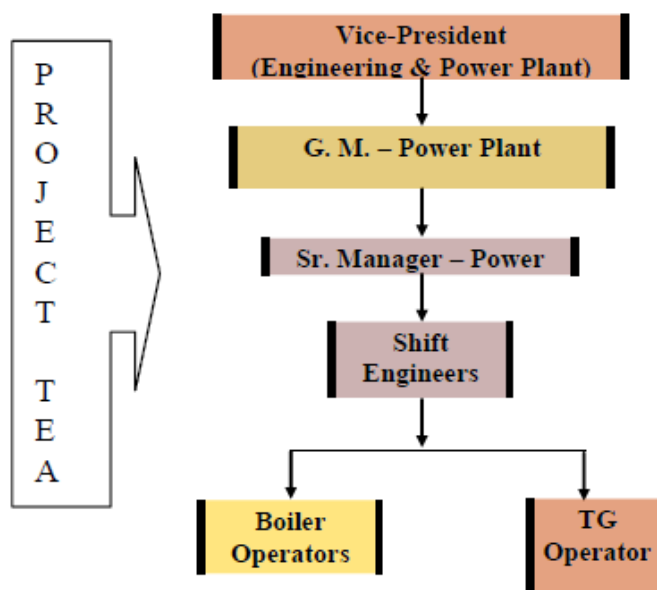
Not applicable

The project activity is not an afforestation or reforestation activity

SECTION C. Description of monitoring system

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The project activity is operated and managed by the PP. The natural gas based power project abides by all regulatory and statutory requirements as prescribed under the state and central laws and regulations. A monitoring team has been established at the plant site. The project team is entrusted with the responsibility of storing, recording the data related to the project activity. The project team is also responsible for calculation of actual creditable emission reduction in the most transparent and relevant manner. Installed meters are calibrated according to the maintenance schedule programmed at the start of the operation and recalibrated according to the plant's performance requirement. All the monitoring data is stored, recorded and will be kept under safe custody of the Project Executor and Head (Power Plant and Utilities) at the plant site for the full crediting period + 2 years. Also any change within the project boundary, such as change in spare and or equipment is recorded and any change in the emission reduction due to such alteration is studied and recorded.



| Designation | Responsibilities |
|--|--|
| Vice-President (Engineering & Power Plant) | Registration |
| | Project Execution |
| G. M. – Power Plant | Operation Verification of data Inspection of data whenever necessary to independently check the authenticity of data and take corrective actions wherever required. Storage of data |
| Sr. Manager – Power Plant | Operation, Monitoring and Verification of Data Data Recording Storage of data |
| Shift Engineers and Operators (Operation and Maintenance) | Operation and Maintenance Storage of data Data Recording Data Collection Archiving of data Observation, Monitoring |

The net electricity export for this period will be monitored from the check meter/ DCS readings from the PP's monitoring system.

DATA BACK UP

The natural gas meter is tested for accuracy at least once in six months against an accepted laboratory standard meter in accordance with prescribed standards. The meters are deemed to be working satisfactory as long as the errors are within specifications for meters. The consumption registered by the main meter holds well as long as the error in the meters is within the permissible limits. In any case, the gas supplier data in the gas bills/ invoices is used for the emission reduction calculation.

QA & QC PROCEDURES

During the monitoring period, the Electronic Meters are calibrated by Electronic test at accredited calibration centre. Both the energy meter SI.no 07615227 and 09451715 are calibrated on 04/08/2011 and



it has validity till 03/08/2012. The natural gas flow measuring GAIL flow meters had 1st calibration on 18/07/2011, 2nd calibration on 21/10/2011, 3rd calibration on 17/01/2012. These flow meters calibration are done by GAIL.

The NCV measurement of natural gas, the gas chromatograph installed by GAIL had 1st calibration on 26/08/2011, 2nd calibration on 21/11/2011 and 3rd calibration on 23/12/2011 which is done by GAIL joint calibration.

INTERNAL AUDIT AND PERFORMANCE REVIEWS

The audit team verified and audited the calibration plan and calibration record of the instruments with respect to the CDM monitoring plan. The audit team meets once in three months (quarterly) to verify and audit the data collected, the process followed and the quality control and assurance measures.

The internal audit team also certified the data for the verification of CER. The team also certified the calculations for arriving at actual CER.

Verification: The quantitative details indicating the net exported electrical energy, natural gas consumed and the net calorific value audited by the internal audit team constituted for the purpose is used, for verification of the CERs. Further, the joint energy meter reading jointly signed by PP and APTransco and the invoices raised by PP on APTransco is the base audit document for verification protocol.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Parameter 1

| | |
|---------------------------|--|
| Data/Parameter | EF _{NG,upstream,CH4} |
| Unit | tCH ₄ /PJ |
| Description | Emission factor for upstream fugitive methane emissions of natural gas from production, transportation, distribution and in the case of LNG, liquefaction, transportation, re-gasification and compression into a transmission or distribution system, in tCH ₄ per GJ fuel supplied to final consumers |
| Source of data | Table- 2 of AM 0029 Version 03 |
| Value(s) applied | 296 |
| Purpose of data | Leakage emission calculations |
| Additional comment | Nil |

Parameter 2

| | |
|---------------------------|---|
| Data/Parameter | OXID _{NG} |
| Unit | Unit less factor |
| Description | Oxidation Factor of NG |
| Source of data | Table 1.4, Chapter 1, Volume 2, 2006 IPCC Guidelines for National Greenhouse Gas Inventories |
| Value(s) applied | 1 |
| Purpose of data | Project emission calculations |
| Additional comment | As IPCC emission factors are not updated from the value used at the time of project activity registration, same value is used |

Parameter 3

| | |
|-----------------------|-----------------------|
| Data/Parameter | EF _{CO2,f,y} |
|-----------------------|-----------------------|



| | |
|---------------------------|--|
| Unit | tCO ₂ /GJ |
| Description | Emission factor for fuel “f” in tonnes of carbon dioxide per Giga Joule. |
| Source of data | Table 1.4, Chapter 1, Volume 2, 2006 IPCC Guidelines for National Greenhouse Gas Inventories |
| Value(s) applied | 0.0561 |
| Purpose of data | Project emission calculation |
| Additional comment | As IPCC emission factors are not updated, from the value used at the time of project activity registration, same value is used |

D.2. Data and parameters monitored

Parameter 1



| | | | | | | |
|--|---|-----------|-----------------------------|--|-------------------|--|
| Data/Parameter | EG _{PJ} | | | | | |
| Unit | kWh | | | | | |
| Description | Net electricity exported by the project plant to the grid in present monitoring period | | | | | |
| Measured/Calculated /Default | Measured | | | | | |
| Source of data | The readings taken from the export meter present in the tariff metering room present in the switch yard. The readings are stored in power plant log book. | | | | | |
| Value(s) of monitored parameter | <table><tr><td>From 9th September to 10th March</td><td colspan="2">1,268,084,440 kWh</td></tr></table> | | | From 9 th September to 10 th March | 1,268,084,440 kWh | |
| From 9 th September to 10 th March | 1,268,084,440 kWh | | | | | |
| Monitoring equipment | The data represents the electricity measured by the Cumulative Energy Meter. The meter is a 3 phase 4 wire meter and of an accuracy of 0.2s class. This represents the summation of the readings measured by the energy meter line-1 and energy meter line-2. This energy meter is present in the Switch Yard, Tariff metering room. The readings are taken manually every day at 00 hrs. The readings are stored in the power plant electricity generation log book. The readings are taken by the shift engineers and are cross checked by the site main controller and are recorded in the log book. | | | | | |
| | Details | | | | | |
| | Meter | Frequency | 1 st calibration | | | |
| | Line 1 electricity meter Sr. No. 07615227 | Yearly | 04/08/2011 | | | |
| | Line 2 electricity meter Sr. No. 09451715 | Yearly | 04/08/2011 | | | |
| Measuring/Reading/ Recording frequency | Daily | | | | | |
| Calculation method (if applicable) | Not Applicable | | | | | |
| QA/QC procedures | The data measured by the cumulative meter is cross checked with the summation of the electricity measured by the energy meter line-1 and energy meter line-2. The monthly summation of daily export readings can be cross checked with the JMR. | | | | | |
| Purpose of data | Baseline and Leakage Emission calculations | | | | | |
| Additional comment | -- | | | | | |

Parameter 2

| | |
|-------------------------------------|--|
| Data/Parameter | Q_{NG} |
| Unit | SCM |
| Description | Quantity of NG consumed in the project activity |
| Measured/Calculated /Default | Measured |
| Source of data | The readings are recorded manually at 00 hrs and are stored in the power plant log book. |



| | | | | | | | | | | |
|---------------------------------------|---|-----------|-----------------------------|-----------------------------|-----------------------------|-----------------|--|--|--|--|
| Value(s) of monitored parameter | From 9 th September to 10 th March | | | | | 250,740,017 SCM | | | | |
| | | | | | | | | | | |
| Monitoring equipment | The quantity of Natural Gas is measured by the gas flow meter which is installed by GAIL at their terminal | | | | | | | | | |
| | Meter | Frequency | 1 st Calibration | 2 nd Calibration | 3 rd Calibration | | | | | |
| | Gas flow meter - at GAIL- Line-A | Yearly | 18/07/2011 | 21/10/2011 | 17/01/2012 | | | | | |
| | Gas flow meter at GAIL - Line-B | Yearly | 18/07/2011 | 21/10/2011 | 17/01/2012 | | | | | |
| | | | | | | | | | | |
| Measuring/Reading/Recording frequency | Daily | | | | | | | | | |
| Calculation method (if applicable) | Not Applicable | | | | | | | | | |
| QA/QC procedures | The quantity of natural gas is cross checked with the invoices that are obtained from the GAIL and it is also tallied with the quantity of Natural Gas measured by the gas flow meter that is installed by the project proponent for internal purposes. The meter installed by GAIL will be calibrated jointly. | | | | | | | | | |
| Purpose of data | Project and Leakage Emission calculations | | | | | | | | | |
| Additional comment | -- | | | | | | | | | |

Parameter 3

| | | | | | | | | | | | | | | | |
|---|--|-----------------------------|-----------------------------|-----------------------------|--|---|------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------------|--------|------------|------------|------------|
| Data/Parameter | NCV_{NG} | | | | | | | | | | | | | | |
| Unit | kcal/SCM | | | | | | | | | | | | | | |
| Description | Net Calorific Value of Natural Gas | | | | | | | | | | | | | | |
| Measured/Calculated /Default | Measured | | | | | | | | | | | | | | |
| Source of data | Invoice from the supplier | | | | | | | | | | | | | | |
| Value(s) of monitored parameter | <table><tr><td>Weighted Average from 9th September to 10th March</td><td colspan="4">8836.84 kcal/SCM</td></tr></table> | | | | | Weighted Average from 9th September to 10 th March | 8836.84 kcal/SCM | | | | | | | | |
| Weighted Average from 9th September to 10 th March | 8836.84 kcal/SCM | | | | | | | | | | | | | | |
| Monitoring equipment | <p>The Supplier provided the value of the NCV in the invoice that is being given to the project proponent. The NCV is measured by the Gas calorimeter that would be installed by GAIL at their terminal.</p> <table><tr><td>Meter</td><td>Frequency</td><td>1st Calibration</td><td>2nd Calibration</td><td>3rd Calibration</td></tr><tr><td>Gas Chromatogram at GAIL-9007289</td><td>Yearly</td><td>26/08/2011</td><td>21/11/2011</td><td>23/12/2011</td></tr></table> | | | | | Meter | Frequency | 1 st Calibration | 2 nd Calibration | 3 rd Calibration | Gas Chromatogram at GAIL-9007289 | Yearly | 26/08/2011 | 21/11/2011 | 23/12/2011 |
| Meter | Frequency | 1 st Calibration | 2 nd Calibration | 3 rd Calibration | | | | | | | | | | | |
| Gas Chromatogram at GAIL-9007289 | Yearly | 26/08/2011 | 21/11/2011 | 23/12/2011 | | | | | | | | | | | |
| Measuring/Reading/Recording frequency | Daily | | | | | | | | | | | | | | |



| | |
|---|---|
| Calculation method (if applicable) | Not Applicable |
| QA/QC procedures | The NCV of natural gas is cross checked with the invoices that are obtained from the GAIL. The meter installed by GAIL was calibrated according to the standard joint calibration procedures. |
| Purpose of data | Project and Leakage Emission calculations |
| Additional comment | -- |

Parameter 4

| | | |
|---|---|------------------------------|
| Data/Parameter | COEF _{f,y} | |
| Unit | tCO ₂ / m ³ | |
| Description | Calculation of CO ₂ Emission Co-efficient of natural gas | |
| Measured/Calculated /Default | Calculated | |
| Source of data | Not Applicable | |
| Value(s) of monitored parameter | From 9th September to 10 th March | 0.0020 tCO ₂ /SCM |
| Monitoring equipment | Not Applicable (as it is a calculated value from one monitored and two default parameters) | |
| Measuring/Reading/ Recording frequency | Not Applicable | |
| Calculation method (if applicable) | COEF _{f,y} = NCV _{f, y} * EFCO _{2, f,y} * OXID _f Where, NCV _{f,y} is as per parameter 3 under section D.2 “Data and Parameters monitored”. EFCO _{2,f,y} is as per parameter 3 under section D.1 “Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors”. OXID _{NG} is as per parameter 2 under section D.1 “Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors” | |
| QA/QC procedures | None as accepted under applicable methodology AM0029 | |
| Purpose of data | Project emission calculations | |
| Additional comment | -- | |

Parameter 5

| | |
|--|--|
| Data/Parameter | EF _{BM, y} |
| Unit | tCO ₂ /MWh |
| Description | The Build Margin emission factor of Southern grid |
| Measured/Calculated /Default | Default |
| Source of data | CEA CO ₂ Baseline Database, version 07; January 2012 |
| Value(s) of monitored parameter | 0.7339 (For calculation purpose, the value is later converted from tCO ₂ /MWh to tCO ₂ /GWh i.e. 733.9 tCO ₂ /GWh) |
| Monitoring equipment | Not Applicable |



| | |
|--|--|
| Measuring/Reading/Recording frequency | Annually |
| Calculation method (if applicable) | Not Applicable |
| QA/QC procedures | As per methodology requirement, this is monitored ex-post for ER calculation in the monitoring period (latest available database, most recent year BM is used) |
| Purpose of data | Baseline emission calculations |
| Additional comment | -- |

Parameter 6

| | |
|--|---|
| Data/Parameter | EF _{BL,upstream,CH4} |
| Unit | tCO ₂ /MU |
| Description | Emission factor for upstream fugitive methane emissions occurring in the absence of the project activity |
| Measured/Calculated/Default | Calculated |
| Source of data | Not applicable |
| Value(s) of monitored parameter | 15.94 |
| Monitoring equipment | Not Applicable |
| Measuring/Reading/Recording frequency | Annually |
| Calculation method (if applicable) | <p>Calculated as;</p> $\frac{\sum_j FF_{j,k} * EF_{k, upstream, CH4}}{\sum_j EG_j}$ <p>Source:</p> <p>Where:</p> <p>$\sum FF_{j,k}$: Quantity of fuel type combusted in power plant included in j build margin</p> <p>$EF_{k, upstream, CH4}$: Taken from Table 2 of AM 0029, version 03</p> <p>$\sum EG_j$: Electricity generation in the plant included in the build j margin</p> <p>EF_{BL,upstream,CH4} is calculated for power plants included in the Build Margin, in line with the baseline emission factor selection. This data will be computed consistent with the Build Margin emission factor based on latest available information from (a) Central Electricity Authority, Ministry of Power, Government of India, Version 7, January 2012. (b) AM 0029, version 03</p> |
| QA/QC procedures | The uncertainty level of this data is low. This is collected from official data sources. No additional QA/QC procedures are required. |
| Purpose of data | Leakage emission calculations |

**Additional comment**

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D.3. Implementation of sampling plan

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Not applicable

Sampling plan is not required for monitoring of this project activity

SECTION E. Calculation of emission reductions or GHG removals by sinks**E.1. Calculation of baseline emissions or baseline net GHG removals by sinks**

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| Parameter | Description | Source | 9 th Sept, 2011 to 10 th March 2012 |
|------------------------|---|---|---|
| EG _{PJ,y} | Electricity exported by the project plant | Refer to Parameter 6 detailed under sec. D.2 “Data and Parameters monitored” | 1,268.08 GWh |
| EF _{BL,CO2,y} | The Build Margin emission factor of Southern grid | Refer to Parameter 4 detailed under sec. D.2 “Data And Parameters monitored” | 733.9 tCO ₂ /GWh |
| BE _y | Emissions in the Baseline Scenario | Calculated as per equation number 2 of the methodology AM0029 version 03 as described in part 4.1 of section 4 of the registered PDD. $BE_y = EG_{PJ,y} * EF_{BL,CO2,y}$ | 930,647 tCO ₂ e |

Based on the above the BE_y (Emissions in the Baseline Scenario) for the monitoring period is: 930,647 tCO₂e.

E.2. Calculation of project emissions or actual net GHG removals by sinks

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| Parameter | Description | Source | 9 th Sept, 2011 to 10 th March, 2012 |
|-----------------------|--|--|--|
| Q _{NG} | Quantity of NG consumed in the project activity | Refer to Parameter 1 detailed under section D.2 “Data and Parameters Monitored”. | 250,740,017 SCM |
| NCV _{f,y} | Net Calorific Value of Natural Gas | Refer to Parameter 2 detailed under section D.2 “Data and Parameters Monitored”. | 0.03680 GJ/SCM |
| EF _{CO2,f,y} | Emission Factor of Natural Gas | Refer to Parameter 4 detailed under section D.1 | 0.0561 tCO ₂ /GJ |
| OXID _f | Oxidation factor of natural gas | Refer to Parameter 3 detailed under section D.1. | 1 |
| COEF _{f,y} | CO ₂ Emission co-efficient of natural gas | Calculated as per equation no. 1a of AM 0029-version 3.0. Refer to Parameter 5 detailed under section D.2 “Data and Parameters Monitored”. | 0.00206436 tCO ₂ /SCM |
| PE _y | Emissions in the Project Scenario | Calculated as per equation no. 1 of AM 0029-version 3.0. Refer to Parameter 8 detailed under section D.2 “Data and Parameters Monitored”. | 517,617 tCO ₂ e |



Based on the above the PE_y (Emissions in the Project Scenario) for the monitoring period is: 517,617 tCO₂e.

E.3. Calculation of leakage

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Calculated as: Calculated as per equation number-4 of AM 0029- version 3.0 as contained in part C of section 4 of the registered PD

$$LE_y = LE_{CH_4,y} + LE_{LNG,CO_2,y}$$

| Parameter | Description | Source | 9 th Sept, 2011 to 10 th March, 2012 |
|---------------------------|--|---|--|
| Q_{NG} | Quantity of NG consumed in the project activity | Refer to Parameter 1 detailed under section D.2 “Data and Parameters Monitored”. | 250,740,017 SCM |
| $NCV_{f,y}$ | Net Calorific Value of Natural Gas | Refer to Parameter 2 detailed under section D.2 “Data and Parameters Monitored”. | 0.03680 GJ/SCM |
| $EF_{NG, upstream, CH_4}$ | Emission factor for upstream fugitive methane emissions of natural gas from production, transportation, distribution, and in the case of LNG, liquefaction, transportation, regasification and compression into a transmission or distribution system, in tCH ₄ per GJ fuel supplied to final consumers | Refer to Parameter 1 detailed under section D.1 | 0.000296 tCH ₄ /GJ |
| $EG_{PJ,y}$ | Electricity exported by the project plant | Refer to Parameter 6 detailed under sec. D.2 “Data and Parameters monitored” | 1,268.08 GWh |
| $EF_{BL, upstream, CH_4}$ | CO ₂ Emission Co-efficient of natural gas | Emission factor for upstream fugitive methane emissions occurring in the absence of the project activity in tCO ₂ /MU electricity generation in the project plant | 27.49 tCO ₂ /MU |
| GWP_{CH_4} | Global warming potential of methane valid for the relevant commitment period | | 21 |
| $LE_{CH_4,y}$ | Leakage emissions due to fugitive upstream CH ₄ emissions | Calculated as per equation number-5 of AM 0029, version 3.0 as contained in section 4 of the registered PDD. Leakage emissions due to fugitive upstream CH ₄ emissions ($LE_{CH_4,y}$) | 34,863 tCO ₂ e |
| $LE_{LNG,CO_2,y}$ | Leakage emissions due to fossil fuel combustion /electricity consumption associated with the | Calculated as per the methodology, AM0029 version 3.0 as contained in of section 4 of the registered PDD | 0.0 tCO ₂ e |

| | | | |
|--------|---|--|---------------------------|
| | liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system ($LE_{LNG,CO_2,y}$) | Leakage emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system ($LE_{LNG,CO_2,y}$) $LE_{LNG,CO_2,y} = FC_{LNG,y} * EF_{CO_2,upstream,LNG}$ | |
| LE_y | Total Leakages | Calculated as per equation number-4 of AM 0029- version 3.0 as contained in Section 4 of registered PDD $LE_y = LE_{CH_4,y} + LE_{LNG,CO_2,y}$ | 34,863 tCO ₂ e |

Based on above the LE_y (Total Leakages) for the monitoring period is: 13,711 tCO₂e.

E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

| Time Period | Baseline emissions or baseline net GHG removals by sinks (tCO ₂ e) | Project emissions or actual net GHG removals by sinks (tCO ₂ e) | Leakage (tCO ₂ e) | Emission reductions or net anthropogenic GHG removals by sinks (tCO ₂ e) |
|--------------|---|--|------------------------------|---|
| Total | 930,647 | 517,617 | 34,863 | 378,168 |

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

| Item | Values estimated in ex-ante calculation of registered PDD | Actual values achieved during this monitoring period |
|--|---|--|
| Emission reductions or GHG removals by sinks (tCO₂e) | 648,483 | 378,168 |

E.6. Remarks on difference from estimated value in registered PDD

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Projected emission reductions as per CDM-PDD for the first monitoring period was estimated at 648,483 tCO₂. The actual emission reductions measured is 378,168 tCO₂. This resulted in 41.68% deviation on lower side.

The reduction in emission is due to following reason:

- 1) The build margin of southern grid decreased from 817.9 tCO₂/GWh to 763.4 tCO₂/GWh.
- 2) The PLF used in ex-ante calculation is 85% while the actual PLF for the monitoring period was 61.5%. This resulted in lower output of electricity and thus lower emission reduction.



History of the document

| Version | Date | Nature of revision |
|---|--------------------------------|--|
| 02.0 | EB 66 13 March 2012 | Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20). |
| 01 | EB 54, Annex 34 28 May 2010 | Initial adoption. |
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