**CLEAN DEVELOPMENT MECHANISM**
**SIMPLIFIED PROJECT DESIGN DOCUMENT**
**FOR SMALL-SCALE PROJECT ACTIVITIES (SSC-CDM-PDD)**
**Version 02**

**CONTENTS**

**Revision history of this document**

| Version Number | Date | Description and reason of revision |
|---|---|---|
| 01 | 21 January 2003 | Initial adoption |
| 02 | 8 July 2005 | • The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document.<br>• As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>. |

## SECTION A. General description of the small-scale project activity

### A.1. Title of the small-scale project activity:

>>
10 MW biomass based Renewable energy generation for the grid in Parbhani District of Maharashtra, India

### A.2. Description of the small-scale project activity:

>>
The proposed small scale project activity will utilise surplus biomass residues i.e. crop residues available locally to generate electricity for a grid system owned by the state owned power utility, Maharashtra State Electricity Board (MSEB), looking after electricity generation, transmission and distribution.

The location of the project was selected after due consideration of availability of biomass, availability of water, power evacuation facilities etc. Parbhani District has abundance availability of biomass (crop residues) resources, which were not being properly managed due to poor understanding of their energy value and importance for development of the rural economy. Hence, the project proponents, decided to tap the potential for power generation and contribute to the rural development as well as climate change mitigation.

The proposed project activity will generate power through sustainable means without causing any negative impact on the environment and export the generated electricity to the 33/11 kV Pangari substation owned by MSEB, which is at a distance of 5 km from the project site. The whole process supports in climate change mitigation as it leads to emission reduction of 425,247 tonnes of $CO_2$ eq. over the crediting period of 10 years.

The implementation of the project activity would bring in the following local benefits:

- Economic utilization of surplus biomass
- Generation of additional income to the rural farmers due to purchase of surplus crop residues from them
- Climate change mitigation, through renewable energy generation and reducing the demand for fossil fuel based power
- Contributing to the national electricity capacity through additional power generation
- Creation of indirect employment for rural youth for collection and transportation of biomass for the project
- Contribution to the availability of stable power in the local area

***View of project participant about the project activity's contribution to Sustainable Development***

Ministry of Environment and Forests (MoEF), Government of India, has stipulated the following indicators for sustainable development in the interim approval guidelines for CDM projects.

1. Social well-being
2. Economic-well being
3. Environmental well being and
4. Technological-well being

The project activity contributes to the above indicators in the following manner.

*Social well being*

The proposed 10 MW biomass based power project caters jobs for number of persons in the rural area in various sectors like construction of the plant, biomass collection, processing biomass, transportation of biomass as well as in the operation of the power plant. Apart from the direct employment generation, proposed project also encourages indirect employment by setting up other agro industries due to sufficient power supply from the proposed project.

Commercial value to agricultural residues will encourage the farmers to collect biomass from fields and effectively utilize the barren and uncultivable lands for energy plantations, which will improve the income levels of the farmers.

The proposed project will engage both genders in construction of the project, biomass collection, biomass processing etc during operation lifetime of the project and this will lead to increase in Gender Equity and prevents social disparities.

*Economic well being*

The proposed project will bring in additional capital investment and indirectly supports creation of local infrastructure like roads, schools and other basic civic amenities.

The project acts as a nucleus for other economic activities such as setting up of cottage industries, shops, hotels etc around the area contributing to the economic development around the project area.

The proposed biomass plant will help local farmers in earning extra money by selling crop residues there by helping them to improve their economic standards.

The proposed biomass based power generating plant facilitates the availability of continuous and sustained power to the local industries and agricultural farmers located in remote areas, there by avoiding the load shedding and low frequency of power.

*Environmental well being*

The proposed project activity utilises biomass potential available for power generation, which otherwise is dominated by fossil fuels such as coal, lignite and gas, the project will not result in increase of GHG emissions and cause no negative impact on the environment. The project generates real, measurable and long-term emissions reductions.

The project utilizes surplus biomass residues and thereby reduces fossil fuels.

The project conserves local resources, reduce pressure on the local environment to a great extent, provide improved health and other environmental benefits.

*Technological well being*

The CDM project activity should leads to increase in utilization of biomass resources for power generation and contributes to the energy security in the country.

The above benefits due to the project activity ensure that the project would contribute to the sustainable development of the region.

**A.3. Project participants:**

>>

| Name of the party involved ((Host) indicates a host party) | Private and/or public entity (ies) project participants | Whether party involved wishes to be considered as project participant |
|---|---|---|
| India (Host) | **Private Entity:** M.S.M. Energy Limited, Hyderabad | No |

**A.4. Technical description of the small-scale project activity:**

>>

**A.4.1. Location of the small-scale project activity:**

>>

**A.4.1.1. Host Party(ies):**

>>

India

**A.4.1.2. Region/State/Province etc.:**

>>

Maharashtra

**A.4.1.3. City/Town/Community etc:**

>>

District: Parbhani
Taluk: Parbhani
Village: Borawand

**A.4.1.4. Detail of physical location, including information allowing the unique identification of this small-scale project activity(ies):**

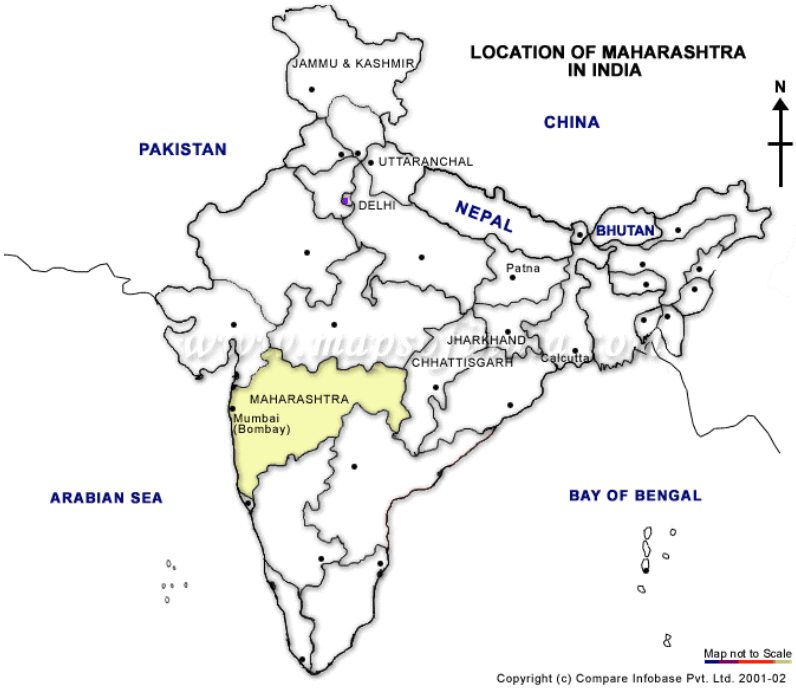
>>

The proposed project is located in Borawand Village, Parbhani Taluk & District of Maharashtra. The site premise, which is accessible only by road, is located at a distance of 15 kms from Parbhani, the district head quarters. The nearest railway station is at Parbhani and the nearest seaport is at Mumbai.

The location address of the project is furnished below

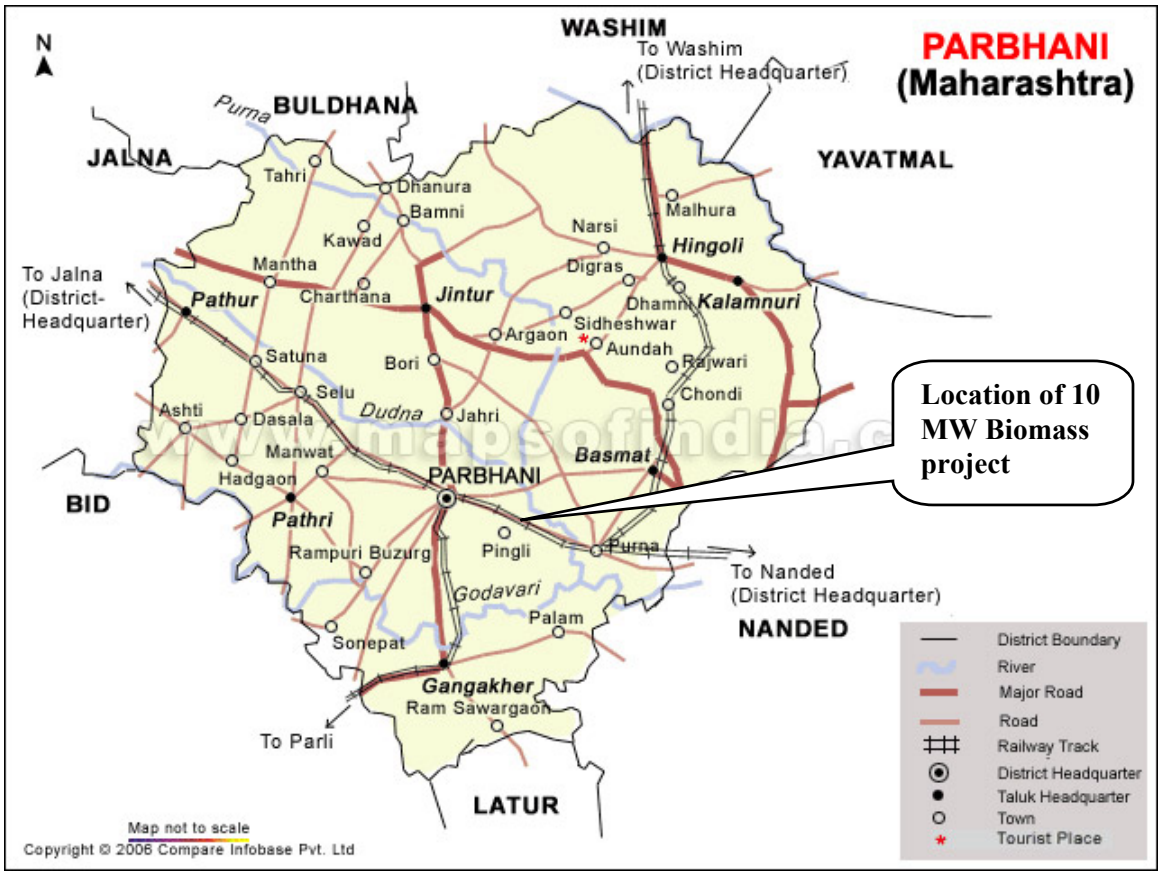
M/s. M.S.M. Energy Limited
10 MW Biomass based Power Project (Parbhani)
Gut No. 128, 129
Borawand Village, Parbhani Tehsil, Parbhani District,
Maharashtra State, India.

Physical location of the project is marked in the maps below.




Map: Location of Maharashtra state (Marked in yellow) in India


Map: Location of Parbhani district in Maharashtra state




Map: location of 10 MW Biomass project in Parbhani district

**A.4.2. Type and category(ies) and technology of the small-scale project activity:**

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According to the Appendix B to the simplified modalities and procedures for small-scale CDM project activities the proposed project activity fall under the following type and category.

**Project type: Type I - Renewable Energy project**
**Category: I.D - Renewable Electricity Generation for a grid. (version 9 dated 28 July 06)**

Since, the capacity of the proposed CDM project is only 10 MW, which is well below the qualifying capacity of 15 MW, the project activity can be regarded as a small scale CDM project activity and UNFCCC indicative simplified modalities and procedures can be applied. Since, the maximum electricity generating capacity is limited by its design and construction, there is no possibility of exceeding the limits of small-scale CDM project activities during the crediting period and the project activity will remain as a small scale project activity.

**Technology**

The project is designed to generate electricity for grid system using multi-fuels. The basic technology is Rankine cycle route where direct combustion of biomass materials takes place through the multi-fuel fired boiler to generate high pressure and high temperature steam, which drives an impulse turbine generator set.

The plant and machinery of the project consists of one number traveling grate boiler, one number steam turbine generator set, power evacuation system and fuel handling system etc. Other plant equipment include fuel conveyors, ash handling system, water treatment plant, compressed air plant etc.

The capacity of the turbo generator is 10 MW, which generates electricity at 33/11 kV level. It is anticipated that the plant can operate at about 70 % in the first year and 80% plant load factor (PLF) from second year onwards. Average annual estimate of power export to the grid system is 55.19 GWh for first year and 63.07 GWh for the subsequent years.

**Table 1: Technical details of Biomass power plant**

| | |
|---|---|
| **Boiler** | |
| Type | Travelling Grate, Bi-drum, |
| Boiler capacity (100 % load) / Steam Flow rate | 50 tons / hour |
| Steam pressure at super heater outlet | 66 ata |
| Steam temperature at super heater outlet | 490$^{o}$C |
| Water requirement | 67 $m^3$ / hour |
| **Turbo Generator** | |
| Type | Double bleed cum condensing |
| Steam pressure at the TG inlet | 64 ata |
| Steam temperature at the TG inlet | 480$^{o}$C |
| Generator Voltage | 11 kV |
| Frequency | 50 Hz |
| Power factor | 0.8 |
| RPM | 1500 |
| Condenser type | Surface condenser / Water cooled |
| **Power evacuation** | |
| Grid Voltage | 33 kV |
| MSEB Sub station | Pangari 33/11 kV |
| **Energy production** | |
| Gross power | 10 MW |
| Auxiliary consumption (10%) | 1.0 MW |
| Net power for export | 9.0 MW |
| **Auxiliaries** | |
| Fuel handling | Series of belt conveyors |
| Demineralization plant capacity | 2.5 $m^3$ / hour |
| Bottom ash handling | Belt conveyors |
| Fly ash handling | Pneumatic conveying system |
| Cooling tower | RCC counter flow, 2750 $m^3$ / hour |

No technology transfer is envisaged for the proposed CDM project activity.

**A.4.3. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed small-scale project activity, including why the emission reductions would not occur in the absence of the proposed small-scale project activity, taking into account national and/or sectoral policies and circumstances:**

>>

Project activity and baseline scenario

The project activity is setting up a 10 MW biomass based power plant. The project activity will supply its power to the western grid of India, leading to the displacement of Carbon intensive electricity by generation of electricity from a renewable energy source. Implementation of the project activity is scheduled for completion by December, 2007. The project activity will start generating emission reductions from January, 2008.

The baseline scenario in the absence of project activity continues to be highly carbon intensive and emission reductions generated by the project activity are additional. The associated emission reductions are calculated based on the net amount of electricity fed into the grid and the weighted average emission factor for the grid.

Additionality

The project activity is not the baseline scenario and the emission reductions would therefore not occur in the absence of the project activity. The project activity is not required by law, and the national and state policies in place are not sufficient to make the project commercially viable on its own.

The project faces barriers, which in the absence of CDM would be prohibitive. These barriers include:

- Prevailing practice: In the State of Maharashtra against an estimated potential of 781 MW only one biomass plant of 8 MW is established based on biomass resources.
- Price fluctuations of biomass leading to uncertainty of profitability.
- Difficulties in collection and handling of biomass.
- Lack of policy support.

**Table 2:Potential for Non-Conventional Energy Sources in Maharashtra and in All India** [1]

| S. No | Source | Potential in Country (MW) | Potential in Maharashtra (MW) | Achievement (MW) |
|---|---|---|---|---|
| 1. | Wind | 45000 | 3650 | 456.775 |
| 2. | Small Hydro | 15000 | 600 | 207.080 |
| 3. | Biomass | 16000 | 781 | 8 |
| 4. | Bagasse Co-generation | 3500 | 1250 | 73.5 |
| 5. | Urban and Industrial waste | 1700 | 450 | 6.126 |
| Total | | 81200 | 6731 | 749.481 |

As observed from the table above though the potential for power generation from biomass in the state of Maharashtra is 781 MW only one plant has been established so far. Whereas the proposed CDM project activity generates electricity using surplus biomass, which otherwise would have been left for decay or it would have burnt causing environmental nuisance, consumption of renewable biomass for generating

[1] *Future Energy, Maharashtra Energy Development Agency (MEDA), Vol.3, No.1, Jan-Mar 2005*

electricity does not give rise to release of GHGs and, in fact, it is referred to as carbon neutral. Hence, electricity generation by the proposed project activity is less GHG intensive than the current grid electricity mix and results in reduced anthropogenic GHG emissions.

CDM will help to make the proposed project activity viable. The CDM revenues will help to deal with various risks associated with the project as described above.

For details on baseline, additionality and national and Sectoral policies, please refer to Section B2 and B3.

**A.4.3.1 Estimated amount of emission reductions over the chosen crediting period:**

>>

Emission reductions due to the project activity depend on the energy fed to the Western regional grid and the content of fossil fuel based generation in the Western grid system. Hence, power fed to the regional grid and the generation mix in the baseline region becomes the basis for estimating emissions reductions.

The chosen crediting period for the project activity is 10 years. It is estimated that the project activity would generate 425,247 certified emission reductions (CER) during the crediting period of 10 years. Annual estimates of emission reductions by the project activity during the above crediting period are furnished below.

| S. No | Year | Annual estimation of emission reductions in tonnes of $CO_2$ eq. |
|---|---|---|
| 1. | 2008 | 37,680 |
| 2. | 2009 | 43,063 |
| 3. | 2010 | 43,063 |
| 4. | 2011 | 43,063 |
| 5. | 2012 | 43,063 |
| 6. | 2013 | 43,063 |
| 7. | 2014 | 43,063 |
| 8. | 2015 | 43,063 |
| 9. | 2016 | 43,063 |
| 10. | 2017 | 43,063 |
| **Total emission reductions (tonnes of $CO_2$ eq.)** | | **425,247** |
| **Total number of crediting years** | | **10** |
| **Annual average over the crediting period of estimated reductions (tonnes of $CO_2$ eq.)** | | **42,524** |

In the above table the year 2008 corresponds to 01.01.08 to 31.12.08. Similar interpretation shall be applied for the remaining years.

**A.4.4. Public funding of the small-scale project activity:**

>>

No public funding from Annex I Party is involved in this project activity.

**A.4.5. Confirmation that the small-scale project activity is not a debundled component of a larger project activity:**

>>

The project proponents hereby confirm that the proposed project activity is not a debundled component of another larger project activity.

The project proponents further confirm that they have not registered any small scale CDM activity or applied to register another small scale CDM project activity within 1 km of the proposed project boundary, in the same project category and technology/measure in the previous 2 years.

## SECTION B. Application of a baseline methodology:

### B.1. Title and reference of the approved baseline methodology applied to the small-scale project activity:

>>
Project Category Title: Type I, Renewable Energy project.
Reference: I.D- Renewable Electricity Generation for grid. Version 09 (28 July 2006)

### B.2 Project category applicable to the small-scale project activity:

>>
**With a proposed installed capacity of 10 MW the project activity qualifies as small scale and therefore is eligible to use approved methodology AMS I.D. The application of the methodology is described below:**

**a) Selection and justification of calculation approach.**

**The baseline emissions are calculated based on net energy exported to the grid (in GWh / year) and an emission factor for the displaced grid electricity (in tCO2/GWh)**

**As per paragraph 9 of AMS I.D, it requires that baseline emission factor will be calculated in a transparent and conservative manner based on either:**

**a) Combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology ACM 0002.**

**OR**

**b) The weighted average emissions (in kg $CO_2$equ/kWh) of the current generation mix.**

**The project proponent has opted for approach 'b', as the proposed project is a small scale project activity and the resultant emission factor will be lower and hence more conservative than the combined margin emission factor for the following reasons:**

**Table 3: Data sources for Baseline calculations**

| Key Parameter | Value | Data Source | Website |
|---|---|---|---|
| Power generation | Power generated by all sources including hydro, nuclear and RES | All related authentic sources like CEA. Ex-post détermination. | www.cea.nic.in www.mnes.nic.in |
| CEF for fuel | Carbon Emission factor for each fuel type | India's Initial National Communication to UNFCCC and IPCC default values. Ex-ante determination. | www.ipcc.ch www.unfccc.int |
| Fuel Type | Type of Fuel used for individual plant | MNES and CEA Ex post determination. | www.mnes.nic.in |
| Oxidation factor | Oxidation factor for each fuel type | IPCC default values. Ex-ante determination. | www.ipcc.ch/ |
| Net Heat Rate | Net heat rate of individual power plants | CEA and MNES. Ex-post determination. | www.cea.nic.in www.mnes.nic.in |

| | | | |
|---|---|---|---|
| EFy | Baseline emission factor for the project grid | Calculated for power plants in the Western regional grid. Ex-post determination | ----- |
| EGy | Power export to the grid per annum | From Plant and MSEB Records. Ex-post determination. | ------ |

The total energy demand in Maharashtra state and also in the whole western region is increasing rapidly. To meet the growing energy demand, various private and public sector utilities have envisaged many new projects that are expected to become operational in near future.

**Table 4:Fuel wise breakup of Installed Capacity in the Western Regional grid**[2]

2. INSTALLED CAPACITY AS ON 30-04-2006 (FIGURES IN MW)

| Sector | Hydro | Thermal | | | | Nuclear | Wind/ RES $ | Total |
|---|---|---|---|---|---|---|---|---|
| | | Coal | Gas | Diesel | Total | | | |
| STATE | 5234.3 | 14291.5 | 1390.8 | 17.3 | 15699.6 | 0.0 | 195.1 | 21129.0 |
| PRIVATE | 447.0 | 2290.0 | 2398.0 | 0.2 | 4688.2 | 0.0 | 903.8 | 6039.0 |
| CENTRAL | 1000.0 | 4360.0 | 1292.0 | 0.0 | 5652.0 | 1300.0 | 0.0 | 7952.0 |
| TOTAL | 6681.3 | 20941.5 | 5080.8 | 17.5 | 26039.8 | 1300.0 | 1098.8 | 35119.9 |

As per the latest records of power generating capacity of western region as on 30st April 2006[3] furnished in the above table, the share of thermal power is around 74%, whereas the non-conventional sources like hydro (19%), renewable energy sources (3.1%) are minimal.

**Table 5: Actual power supply position, Western Regional Grid during April 2005 – March 2006** [4]

| S. No | States in Western Region | Requirement (MU) | Availability (MU) | Surplus (+) / Deficit (-) | |
|---|---|---|---|---|---|
| | | | | MU | (%) |
| 1. | Chhattisgarh | 12999 | 12528 | -471 | -3.6 |
| 2. | Gujarat | 57129 | 52428 | -4701 | -8.2 |
| 3. | Madhya Pradesh | 36851 | 31623 | -5228 | -14.2 |
| 4. | Maharashtra | 102780 | 84132 | -18648 | -18.1 |
| 5. | Daman & Diu | 1346 | 1323 | -23 | -1.7 |
| 6. | Dadar Nagar Haveli | 2540 | 2532 | -8 | -0.3 |
| 7. | Goa | 2338 | 2338 | 0 | 0 |
| | Western Region | 215983 | 186904 | -28079 | -13.5 |

[2] Page no.27, Power Scenario at a Glance - 2006, Central Electricity Authority,

[3] Page no. 27, power scenario at a Glance - 2006, Central Electricity Authority,

[4] Page no. 27-42, Power Scenario at a Glance - 2006, Central Electricity Authority,

**Table 6: Peak Demand / Peak Met, Western Regional Grid during April 2005 – March 2006**[5]

| S. No | States in Western Region | Peak Demand (MW) | Peak Met (MW) | Surplus (+) / Deficit (-) | |
|---|---|---|---|---|---|
| | | | | MW | (%) |
| 1. | Chhattisgarh | 2133 | 1857 | -276 | -12.9 |
| 2. | Gujarat | 9783 | 7610 | -2173 | -22.2 |
| 3. | Madhya Pradesh | 6558 | 5136 | -1422 | -21.7 |
| 4. | Maharashtra | 16069 | 12360 | -3709 | -23.1 |
| 5. | Daman & Diu | 324 | 324 | 0 | 0 |
| 6. | Dadar Nagar Haveli | 387 | 387 | 0 | 0 |
| 7. | Goa | 368 | 368 | 0 | 0 |
| | Western Region | 31772 | 25257 | -6515 | -20.5 |

As seen from the above tables the Energy requirement of Western region during 2005-06 is deficit by 28079 MU or13.5%. The peak energy demand is deficit by 6515 MW or 20.5% during the year 2005-06. Further, as per the 16th Electric Power Survey by Central Electricity Authority, the growth in the energy requirement is around 6.2% until 2017. Based on the information available on western regional grid capacity additions during 11th plan, it is observed that grid system in future will be carbon intensive due to major share of power coming from coal, gas and diesel based thermal power plants.

**Table 7 : Installed Capacity in Maharashtra**[6]

2. INSTALLED CAPACITY AS ON 30-04-2006 (FIGURES IN MW)

| Sector | Hydro | Thermal | | | | Nuclear | Wind/ RES.$ | Total |
|---|---|---|---|---|---|---|---|---|
| | | Coal | Gas | Diesel | Total | | | |
| STATE | 2777.7 | 6425.0 | 912.0 | 0.0 | 7337.0 | 0.0 | 74.8 | 10189.5 |
| PRIVATE | 447.0 | 1650.0 | 920.0 | 0.0 | 2570.0 | 0.0 | 631.9 | 3648.9 |
| CENTRAL | 0.0 | 1339.0 | 391.9 | 0.0 | 1730.9 | 493.5 | 0.0 | 2224.4 |
| TOTAL | 3224.7 | 9414.0 | 2223.9 | 0.0 | 11637.9 | 493.5 | 706.7 | 16062.8 |

- Renewable Energy Sources (RES) includes Small Hydro Project (SHP), Biomass Gas (BG), Biomass Power (BP), Urban & Industrial Waste (U & I), Wind Energy

As seen in the table above the power generating capacity of Maharashtra as on 30 April 2006, share of thermal power is around 72%, whereas the non-conventional sources like hydro and renewable energy sources contributes only 24%.

As per the data published in CEA website[6], the Energy requirement in the state of Maharashtra during

[5] Page no. 27-42, Power Scenario at a Glance - 2006, Central Electricity Authority,

[6] Page no 35-36, Power Scenario at a Glance - 2006, Central Electricity Authority,

2005-06 is 102780 MU and the energy availability is 84132 MU with energy deficit of 18.1%. The peak demand for Maharashtra for the same period is 16069 MW and peak met is only 12360 MW, with a peak deficit of 23.1%.

To meet the present energy demand and growth in the energy requirement in the state of Maharashtra, it would be required to add additional capacities for power generation. Based on the proposed conventional power projects in the state of Maharashtra, it appears that the dependence will be more on conventional power projects.

**Table 8: Proposed conventional power projects in Maharashtra**

| S. No | Project Name | Proposed Fuel | Capacity | Year of Commissioning |
|---|---|---|---|---|
| 1. | New Parli TPS Unit -1 | Coal | 250 MW | July 2006 |
| 2. | New Parli TPS Unit -2 | Coal | 250 MW | 2007-08 |
| 3. | Paras TPS | Coal | 250 MW | November 2006 |
| 4. | Paras TPS Extn. Unit-2 | Coal | 250 MW | 2007-08 |
| 5. | Khaperkheda TPS Extn | Coal | 500 MW | 2009-10 |
| 6. | Bhusawal TPS Extn. | Coal | 2 X 500 MW | 2008-09 |
| 7. | Koradi TPS Extn. | Coal | 2 X 500 MW | During 11th Plan period (2007 – 2012) |
| 8. | Chandrapur TPS Extn. | Coal | 500 MW | During 11th Plan period (2007 – 2012) |
| 9. | Coal based Coastal project | Coal | 2 X 800 MW | During 11th Plan period (2007 – 2012) |
| 10. | Wani TPS | Coal | 1000 MW | 2008-09 |
| 11. | Umred TPS | Coal | 500 MW | 2008-09 |
| 12. | Dabhol – II | Coal | 1444 MW | During 11th Plan period (2007 – 2012) |
| 12. | Uran Gas Turbine Extn. | Gas | 1040 MW | During 11th Plan period (2007 – 2012) |
| 13. | Talegaon Combined Cycle Project | Gas | 1400 MW | During 11th Plan period (2007 – 2012) |
| 14. | Ghatghar PSS | Hydro | 250 MW | During 11th Plan period (2007 – 2012) |

(Source:
1. Future Projects, Maharashtra Generation Company (MAHAGENCO), www.mahagenco.in
2. Projects under implementation, Maharashtra Generation Company (MAHAGENCO), www.mahagenco.in
3. 10th Plan under Execution, Ministry of Power, Govt. of India, www.powermin.nic.in
4. Capacity Addition Programme in Western Region during 11th plan period, www.powermin.nic.in )

**As could be seen from the above and the same situation prevailing in other states of the region, western region grid will become more carbon intensive in future. Hence, the resultant Emission factor (combined margin) will be higher than the weighted average emission factor.**

**Hence, the above scenario justifies the conservative estimation of Emission factor based on weighted average of current generation mix.**

The details of the weighted average emission factor calculations are provided in Annex 3. The project is located in the state of Maharashtra, which falls under the Western part of India. Hence, The baseline emission factor is calculated for the western grid of India.

The baseline emission factor for projection of Emission reductions is based on the latest available data for the fiscal year 2005/06. Actual emission reductions will be calculated *ex post*.

**b) Calculation of the baseline emission factor**

As explained earlier, the baseline for the project activity is kWh exported to the grid by the biomass project multiplied by an emission coefficient calculated in a transparent and conservative manner as the weighted average emissions (in $kgCO_2/kWh$) of the current generation mix of the western region. For this purpose, the generation data published by Central Electricity Authority (CEA) for the western region was used. Baseline emissions were estimated as explained below.

**i : Estimation of emissions from each power generating unit in the baseline**

Emissions from each fossil fuel source are estimated using the following formula.

| Baseline Emissions $tCO_2$ | = | Net Generation GWh | x | Carbon Emission Factor tC/TJ | x | Net Station Heat Rate TJ/GWh | x | Conversion Factor (44/12) | x | Oxidation Factor |
|---|---|---|---|---|---|---|---|---|---|---|

For estimation of emissions from each power generating unit in the grid, actual generation data and station heat rates monitored and published by CEA is used. IPCC default emission factors as well as local values (India's Initial National communication) for carbon emission factor (CEF) and IPCC oxidation factors of each fuel type are used. The CEA published data on Net heat rates of Thermal power plants (Performance Review of Thermal power stations) and CEA norms on station heat rates published in MNES Baselines report is considered to calculate the baseline emission factor.

Using the above formula, emissions from each power generating source are estimated. For non-fossil fuel sources such as hydro, nuclear and renewable energy sources GHG emissions are not applicable.

**ii: Total grid emissions**

**Total emissions from all stations in the grid are estimated by summation of emissions from all baseline power generating units.**

**iii: Estimation of baseline emission coefficient**

The baseline emission coefficient for the grid is estimated as the weighted average of all existing generation sources using the following formula.

| Baseline Emission Factor | = | Baseline Emissions | / | Total Net Generation |
|---|---|---|---|---|

$tCO_2/GWh$ $tCO_2$ GWh

Using the above formula and data for the year 2005-2006, the baseline emission coefficient is estimated as 870 t $CO_2$ /GWh. The detailed data underlying this calculation is furnished in Annex 3. For the purpose of projecting Emission reductions Emission Factor of the year 2005-06 is considered. However, the Baseline Emission factor will be updated ex-post every year during the crediting period.

**B.3. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:**

>>

a) Justification for application of simplified methodology to the project activity

The capacity of the proposed project is 10MW and the project activity is generation of electricity for a grid system using renewable biomass potential. Hence, the type and category of the project activity meets the criteria specified under AMS.I.D. in Appendix B of the indicative simplified baseline and monitoring methodologies for small scale CDM project activities as well as those related to demonstration of additionality for small-scale activities (Attachment A to Appendix B).

b) National Policies and Circumstances

*National policy on Coal, Lignite, Oil and Natural Gas*

The Ministry of Power (MoP), Government of India, has set an agenda of providing power for all by the year 2012. To meet the present national deficit of 16.3%[7] and to achieve the above target, about 100,000 MW of new capacity needs to be added by the end of 2012 to the existing installed capacity of 124,302[8] MW. In line with the Five Year Plan system being followed by the Planning Commission of India, the MoP decided to add about 46,000 MW during the period 2002-2007 and about 61,000 MW during the period 2008-2012. Emphasis has been laid on setting up large pithead stations to avoid high costs associated with transporting high ash bearing Indian coal and over-straining the already stretched rail network.

To push forward the power sector reforms further, the Government of India has opened up the coal sector for private participation. Captive coal mining is allowed by the Ministry of Coal to facilitate coal mining by power generating units for their fuel needs. In addition, coal imports are allowed for power projects. This has significantly strengthened the preference of the private sector for coal-based mega power projects over other energy sources.

The Government of India has also opened oil and natural gas exploration for private sector participation. In the oil and natural gas sector, both central and private sector organisations are involved and already exploring the potential available in India. The discovery of new reserves is not significant enough to meet the increasing demand for natural gas. As yet the natural gas consumption is limited to a small extent and significant investments are required for natural gas infrastructure.

*Biomass power policy in India and Maharashtra*

[7] www.cea.nic.in

[8] Page no. 3, power scenario at a Glance – 2006, www.cea.nic.in

The grid electricity in India today is clearly dominated by thermal generation, predominantly coal. The overall nationwide mix of thermal to hydro-electric power stands currently at around 83:17 (Source www.cea.nic.in as on March 2006).

The Ministry of Non-Conventional Energy Sources (MNES) is engaged in development of renewable energy sources in India including biomass. MNES has estimated the potential for biomass projects in India to an extent of 16,000 MW. Against this, the country has so far achieved establishment of biomass projects to an extent of only 867[9] MW indicating exploitation of only about 5.4 % of the potential. In spite of Ministry's resolve to encourage setting up of these projects by providing incentives such as interest subsidy, tax holiday etc., these projects could not be established in a large scale due to various barriers prevailing in the sector. In spite of all the propagation by MNES, the focus of power generation is on thermal projects primarily based on coal. As indicated earlier the share of installed thermal power generation capacity in Maharashtra is over 74% and the same is expected to continue based on the planned projects in Maharashtra.

UNFCCC simplified modalities seek to establish additionality of the project activity as per Attachment A to Appendix B, which listed various barriers, out of which, at least one barrier shall be identified due to which the project would not have occurred any way.

c) Additionality

Project participants have undertaken the following barrier analysis in support of additionality.

***Prevailing practice:***

In the Indian power sector, the common practice is investing in only medium or large scale fossil fuel fired power projects, which is evident from a host of planned projects that comprises mostly large-scale fossil fuel based power generation projects. This is mainly due to the assured return on investment, economies of scale and easy availability of finances. The same applicable to the western region as well as Maharashtra state. The various projects under planning in the state of Maharashtra (refer Table 8) and Western region during 11$^{th}$ plan are furnished in the following table.

[9] Annual report 2005-06, Ministry of Non-conventional Energy sources (MNES)

**Table 9:Capacity additions during 11th plan period**

LIST OF PROJECTS FOR LIKELY BENEFITS DURING 11TH PLAN (TENTATIVE)

| Sl.No. | PLANT NAME | STATE | AGENCY | SECTOR | ULTIMATE CAPACITY (MW) | TYPE | BENEFITS 11TH PLAN (2007-12) | LIKELY YEAR OF BENEFIT |
|---|---|---|---|---|---|---|---|---|
| WESTERN REGION | | | | | | | | |
| CENTRAL SECTOR | | | | | | | | |
| 1 | OMKARESHWAR * | MP | NHDC | C | 520 | ROR | 260 | 2007-08 |
| | SUB-TOTAL(HYDRO CENTRE) | | | | 520 | | 260 | |
| 2 | SIPAT I | CHG | NTPC | C | 1980 | PH | 1980 | 2008-10 |
| 3 | BHILAI JV | CHG | NTPC | C | 500 | PH | 500 | 2007-08 |
| 4 | INTEGRATED PROJECT LARA(4000 MW) | CHG | NTPC | C | 4000 | PH | 800 | 2011-12 |
| 5 | KAWAS II | GUJ | NTPC | C | 1300 | GAS | 1300 | SUBJECT TO GAS AVAILABILI |
| 6 | GANDHAR II | GUJ | NTPC | C | 1300 | GAS | 1300 | |
| | SUB-TOTAL(THERMAL CENTRE) | | | | 9080 | | 5880 | |
| | TOTAL CENTRAL SECTOR WESTERN | | | | 9600 | | 6140 | |
| STATE SECTOR | | | | | | | | |
| 1 | MATNAR | CHG | CSEB | S | 60 | ROR | 60 | 2011-12 |
| | SUB-TOTAL(HYDRO STATE) | | | | 60 | | 60 | |
| 2 | KORBA WEST EXT | CHG | CSEB | S | 600 | PH | 600 | 2008-09 |
| 3 | IGTPP BHAIYATHAN | CHG | CSEB | S | 1320 | PH | 660 | 2010-11 |
| 4 | IFFCO SARGUJA | CHG | CSEB JV | S | 1000 | PH | 500 | 2011-12 |
| 5 | SIKKA EXT | GUJ | GSECL | S | 500 | COASTAL | 500 | 2009-10 |
| 6 | MALWA | MP | MPGENCO | S | 1000 | LC | 500 | 2011-12 |
| 7 | KHAPER KHEDA EX | MAH | MAHA GEN | S | 500 | LC | 500 | 2009-10 |
| 8 | PARLI EXT U-2 | MAH | MAHA GEN | S | 250 | LC | 250 | 2008-09 |
| 9 | PARAS EXT U-2 | MAH | MAHA GEN | S | 250 | LC | 250 | 2008-09 |
| 10 | CHANDRAPUR | MAH | MAHA GEN | S | 500 | PH | 500 | 2011-12 |
| 11 | KORADI | MAH | MAHA GEN | S | 1000 | LC | 500 | 2009-10 |
| 12 | SURAT LIGNITE EXT | GUJ | GIPCL | S | 250 | PH | 250 | 2008-09 |
| 13 | UTRAN | GUJ | GSECL | S | 350 | GAS | 350 | 2008-09 |
| | SUB-TOTAL(THERMAL STATE) | | | | 7520 | | 5360 | |
| | TOTAL STATE SECTOR WESTERN | | | | 7580 | | 5420 | |
| PRIVATE SECTOR | | | | | | | | |
| 1 | MAHESHWAR | MP | IPP | P | 400 | STO | 400 | 2010-11 |
| | SUB-TOTAL(HYDRO PRIVATE) | | | | 400 | | 400 | |
| 2 | ULTRA MEGA PROJECT MUNDRA (4000 MW) | GUJ | IPP | P | 4000 | COASTAL | 800 | 2011-12 |
| 3 | ULTRA MEGA PROJECT SINDHUDURG (4000 MW) | MAH | IPP | P | 4000 | COASTAL | 800 | 2011-12 |
| 4 | ULTRA MEGA PROJECT SASAN (4000 MW) | MP | IPP | P | 4000 | PH | 800 | 2011-12 |
| 6 | RAIGARH PH II* | CHG | JIN. POWER | P | 750 | PH | 750 | 2007-08 |
| 7 | PATHDI (LANCO) U1 | CHG | LANCO-IPP | P | 300 | PH | 300 | 2008-09 |
| 8 | PATHDI (LANCO) U2 | CHG | LANCO-IPP | P | 300 | PH | 300 | 2008-09 |
| 9 | PATHDI (LANCO) U3 | CHG | LANCO-IPP | P | 600 | PH | 600 | 2009-10 |
| 10 | VILE TATA | MAH | TATAPOWER | P | 1000 | LC | 1000 | 2009-11 |
| 11 | SURAT TORRENT* | GUJ | IPP | P | 1068 | GAS | 752 | |
| | SUB-TOTAL(THERMAL PRIVATE) | | | | 16018 | | 6102 | |
| | TOTAL PRIVATE SECTOR WESTERN | | | | 16418 | | 6502 | |
| | TOTAL WESTERN REGION | | | | 33598 | | 18062 | |
| | TOTAL ALL INDIA | | | | 88720 | | 62475 | |

(source: Power sector profiles – Western region, Ministry of powerhttp://www.powermin.nic.in/JSP_SERVLETS/internal.jsp )

As could be seen from the above, the total likely capacity additions in western region during the 11th plan is 18,602 MW. Out of which the share of thermal power is 17,342 MW, which is about 93% of the total capacity addition planned in western Region. In the private sector participation of western region capacity addition during 11th plan is entirely dominated by thermal power plants. The total private sector participation in western region during 11th plan is 6502 MW, out of which the thermal power plants contributes to 6102MW (94%). This is obvious from the above that the investors in both public and private sector are interested to invest in thermal energy projects only. Hence, investing for a biomass based power plant is not a common practice in the region.

The share of electricity from small biomass electric projects in India's total installed capacity is negligibly small. According to the latest statistics published by the Ministry of Non-Conventional Energy Sources (MNES)[10], the total installed capacity of small biomass projects is only 867 MW, where as the India's total installed capacity is around 124,287 MW[11] which accounts for less than 1%.

In the state of Maharashtra, against an estimated potential of 781 MW, only one biomass based power plant with capacity of 8 MW is established The existing Maharashtra state grid mix comprises of 72.46 % Thermal, 20.07 % hydro, 4.39 % renewable energy, 3.07 % Nuclear (Calculated from Table 7 above). This clearly illustrates that establishing a biomass based power plant is not a common practice in the state of Maharashtra.

**Financial barrier:**

The following barriers prevent investment in a biomass-based power plant with out additional revenue from CDM.

***Fluctuations in price of biomass:***

The success of biomass based power plant depends on the price of biomass material required for power generation. Price of biomass depends on the following, on which the project proponent has no control.

- Biomass prices unlike fossil fuel are not regulated by any agency. The farmers at times sell the residues, by taking their own decision on fixing price. At present the average cost of biomass is around Rs.1000-1100 per tonne as against Rs. 760 per tonne at the time project was envisaged. The price of biomass fluctuating continuously due to creation of commercial value for the product which has no market value early to establishment of Power plant, making the cost of generation unstable.

- It has been experienced in other states, where the biomass plants are established that price variation is substantial, ranging from 25% and even up to 50%. Evidence is also found from some of the registered biomass projects under CDM, the fluctuation in price of biomass after the plants commence operations.

Due to this lack of price stability, the cost of power generation is unpredictable.

[10] Ministry of Non Conventional Energy Sources (MNES), Govt. of India, Annual Report 2005-06

[11] All India Total Installed Capacity (as on 3rd April 2006), Ministry of Power, Govt. of India, www.powermin.nic.in

***Lack of policy related support***

Ministry of Non-conventional Energy Sources, Govt. of India has announced a policy for development of renewable energy projects in India in 1993 and closely on the lines of MNES policy, Government of Maharashtra came with its policy for the renewable energy projects including biomass in May 1998. The salient features of both MNES and the Maharashtra Govt. policy for renewable energy are as follows.

**Table 10:Salient features of MNES Policy and Govt. of Maharashtra Policy**

| S. No | Subject | | MNES, Govt. of India policy | Govt. of Maharashtra (GoM) policy |
|---|---|---|---|---|
| 1. | Year announced | | 1993 | 1998 |
| 2. | Power purchase rate | | Rs.2.25 / kWh | Rs.2.25 / kWh |
| 3. | Base year | | 1994-95 | 1994-95 |
| 4. | Escalation every year | | 5 % | 5 % |
| 5. | Wheeling Charges | | 2 % | 2 % |
| 6. | Banking Charges | | 2 % | 2 % |
| 7. | Period for banking | | 1 year | 1 year |
| 8. | Transmission line losses | | 0 % | 0 % |
| 9. | Power evacuation facility | From project to SEB substation | To be borne by developer | To be borne by developer |
| | | EHV / HV substation including augmentation, strengthening of evacuation system | To be borne by utility | To be borne by utility |
| 10. | Power purchase by | | ---------- | MSEB |
| 11. | Third party sale | | ---------- | Allowed |
| 12. | Capital subsidy | | ---------- | 30 % subject to a max. of Rs.20 lakhs. |
| 13. | Others | | 1. Income Tax holiday<br>2. Accelerated depreciation<br>3. Concessional custom duty / duty free import<br>4. Interest subsidy | 1. Pass through of conventional fuel cost<br>2. Protection to foreign exchange fluctuation risk<br>3. Sales tax benefits up to 50%<br>4.Refund of entry tax/ octroi. |

*(Source:*
*1. Ministry of Non-Conventional Energy Sources (MNES), Govt. of India,* www.mnes.nic.in/guide.htm
*2. Maharashtra state tariff policy adopted,*
http://www.mnes.nic.in/annualreport/2001_2002_English/ch5_pg13.htm *)*

Attracted by the above policy of GoM number of developers proposed biomass based power plants in the state of Maharashtra and obtained a clearance to set up the power projects. Subsequently GoM scrapped its policy in the year 2001. By that time the promoters have taken several steps for implementation of the project and have to stop all their efforts.

Due to delay in formulation of the policy the developers have formed an association under the name Maharashtra Biomass Energy Developers Association (MBEDA) and filed a petition before the

Maharashtra Electricity Regulatory Commission (MERC) for a tariff policy. MBEDA has also worked out fair tariff for their projects with supporting arguments.

After prolonged process, MERC came out with its tariff order dated 8th August 2005 on setting up of biomass-based power plants.

Copy of the tariff order made by MERC will be made available to the validator during the course of validation.

Thus the entire process took almost five years and then only a final policy was formulated for these biomass power plants. This is one of the reasons, why only one plant is established in Maharashtra based on biomass.. This is against an estimated potential of 781 MW (Refer Table 2 above) projected by Maharashtra Energy Development Agency.

MERC has come out with its ruling on tariff payable to the biomass based power plants and the salient features of the same are produced below.

**Table 11: MERC's tariff structure**

| **Subject** | **MERC's Ruling** |
|---|---|
| Tariff | Rs.3.18 / kwh |
| Annual Escalation upto 13 years from base year | 5 % |
| Base year | 2004-2005 |
| Third party sale | Permitted |
| Energy purchase agreement between MSEB and Biomass project developer | Approved |
| Wheeling Charges, in case of third party sale, irrespective of the distance | 2 % |
| Charge for transmission line losses | 5 % |
| Use of fossil fuels when there is no sufficient biomass available. | Upto 25 % of annual fuel requirement |
| Penalty for shortfall in supply of energy | Rs.0.25 / RkVAh (reactive power) |
| Review of tariff rate and structure | After 5 Years |
| Capital cost | Rs. 4 crore / MW |
| Capacity | MEDA has to ensure that there is no overlap, MEDA has to give opinion on fuel availability for each project before entering into EPA. |
| Plant Load Factor (PLF) | 70 % (1st year)<br>80 % (From 2nd year onwards) |
| Auxiliary consumption | 10 % |
| Station heat rate | 1.14 kg/kwh |
| O and M charges | 4 % of capital cost |
| Stocking of biomass | 2 months |
| Return on equity | 16 % |
| Depreciation | 5.28 % |
| Means of Finance | 70:30 |
| Rate of Interest on Loan | 10.75 % per annum |

| | |
|---|---|
| Repayment of debt | 8.5 years with 1 year moratorium |

An IRR analysis has been prepared for the project activity based on tariff order issued by MERC. However adjustments have been made with respect to capital cost as per the norms of lending institutions. The IRR has worked out to 12.09 % without GHG income. While working out the base line profitability the incentives available for this type of project activity such as Interest subsidy, Excise concession, Tax holiday etc have been considered as furnished in the below table.

**Table 12*:IRR assumptions***

| Parameter | Value |
|---|---|
| Cost of Project | 449 millions |
| Means of finance<br>⇒ Share capital<br>⇒ Term loan | <br>149.7 millions<br>299.2 millions |
| Plant capacity | 10 MW |
| Working days per annum | 365 |
| Plant Load factor (optimum year) | 80% |
| Gross energy | 70.08 (optimum) |
| Auxiliary consumption @ 10% | 7.08 |
| Net saleable energy | 63.07 (optimum) |
| Sale price of energy (per kWh) | Rs.3.18 |
| Escalation considered on price of biomass | 5% |
| Operation & maintenance charges with 5% yearly escalation | 4% |
| Rate of interest on term loan | 10.75% |
| Depreciation | 5.28% |
| Tax holiday | 10 years |
| Minimum alternative Tax | 11.22% |
| No. of CERs | 425,247 (10 years) |
| Rate per CER | 6 Euros |

A sensitivity analysis has also been made for the project activity considering the below mentioned scenarios including the positive probabilities (though chances of accurance of these are remote) and the resultant IRR is as under:

**Table 13*:Sensitivity Analysis***

| Sensitivity parameters | IRR<br>With out GHG (%) |
|---|---|
| Normal | 12.09 |
| 10% increase in project cost | 9.41 |
| 10% decrease in project cost | 15.24 |
| 10% decrease in PLF | 9.14 |
| 10% increase in PLF | 14.95 |
| 10% increase in Fuel cost | 9.38 |
| 10% decrease in Fuel cost | 14.66 |

As could be seen from the above, the IRR is quite low and only after considering income from sale of emission reductions the IRR is improves to 15.64 % which is found to be reasonable and almost reaches the bench mark return of 15.15%. This indicates that, the CDM revenue is very significant for the project activity.

***Technological Barriers***

The most important equipment that has bearing on the smooth operation of the power plant is the boiler. The boiler is a travelling grate type capable of using various fuels unlike the more efficient fluidized bed boiler. A travelling grate boiler normally is subject to mechanical troubles due to usage of varieties of fuels. The performance of the boiler depends on the uniform material used as fuel. In respect of a biomass plant the fuel used depends on type of biomass available whose characteristics are not uniform.

As the project is located in a rural area where power is supplied to agricultural purposes generally by rotation, the plant may face frequent fluctuations in grid voltage due to which the power evacuation equipment would be affected and some times leading to tripping of the plant.

***Other barriers***

*Handling and storage of biomass:*

The problems and difficulties associated with procurement, handling and storage of biomass in respect of project activity are as follows:

1. The biomass is available in small quantities over a large area. As the material has low bulk density collection and transportation of the same to the project site is a constraint.

2. The cost of collection and transportation also tend to increase due to the increasing cost of labour and cost of diesel used for transportation of biomass.

3. Biomass cannot be Stored for longer period . The characteristics of biomass change quickly with in short period. Calorific value of biomass decreases due to loss of volatiles and deterioration of biomass and this may also affect the performance of the plant.

4. The collection of biomass is a manual job and number of people has to be engaged continuously for storage of biomass. Any problem on availability of labour particularly during harvesting operations may hinder collection of the biomass fuel.

In the view of above, the proposed project is additional and not the same as the baseline scenario and would not occur without the CDM benefits.

**B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the small-scale project activity:**

>>

As per the guidelines mentioned in Type I.D of Annex B of the simplified modalities and procedures for small-scale CDM project activities, project boundary encompasses the physical and geographical site of the renewable generation source. Hence, the project boundary covers the point of fuel supply to the point of power export to the grid where the project proponent has a full control. Hence, project boundary is

considered within these terminal points. Thus, boundary covers fuel storage and processing, boiler, Steam Turbine generator and all other power generating equipments, and auxiliary consumption units.

**B.5. Details of the baseline and its development:**

>>

The baseline for the project activity is constructed according to the 9.b. i.e. weighted average emissions of the current generation mix (in kg $CO_2$eq./kwh), applicable for Type I.D CDM project activities, as contained in the Appendix B of the simplified modalities and procedures for small scale CDM project activities.

Date of completion of the baseline: 30/09/06
Name of the person / entity determining the baseline: Zenith Energy Services (P) Limited, Hyderabad.

Contact information of the above entity furnished below:

| | |
|---|---|
| Organization: | Zenith Energy Services (P) Limited |
| Street/P.O. Box, Building: | 10-5-6/B, My Home Plaza, Masabtank, |
| City: | Hyderabad |
| State/Region: | Andhra Pradesh |
| Postfix/ZIP: | 500028 |
| Country: | India |
| Telephone: | +91- 40- 2337 6630, 2337 6631 |
| FAX: | +91- 40- 2332 2517 |
| E-Mail: | zenith@zenithenergy.com |
| URL: | www.zenithenergy.com |
| Represented by: | |
| Title: | Director |
| Salutation: | Mr. |
| Last Name: | Reddy |
| Middle Name: | Mohan |
| First Name: | Attipalli |
| Mobile | +91- 9849408485 |
| Direct Fax | +91- 40- 2332 2517 |
| Direct Telephone | +91- 40- 23325803 |
| Personal E.mail | mohan@zenithenergy.com |

The above entity is not a project participant.

**SECTION C. Duration of the project activity / Crediting period:**

**C.1. Duration of the small-scale project activity:**

>>

**C.1.1. Starting date of the small-scale project activity:**

>>

01/09/05

**C.1.2. Expected operational lifetime of the small-scale project activity:**

>>
30 years

**C.2. Choice of crediting period and related information:**

>>
Fixed crediting period

**C.2.1. Renewable crediting period:**

>>
Not chosen

**C.2.1.1. Starting date of the first crediting period:**

>>
Not applicable

**C.2.1.2. Length of the first crediting period:**

>> Not applicable

**C.2.2. Fixed crediting period:**

>>

**C.2.2.1. Starting date:**

>>01/01/08

**C.2.2.2. Length:**

>>10 years

**SECTION D. Application of a monitoring methodology and plan:**

>>

**D.1. Name and reference of approved monitoring methodology applied to the small-scale project activity:**

>>
The name of the methodology applied for the project activity is ***"Metering the Electricity Generated".*** This is in accordance with Appendix B of simplified modalities and procedures for small-scale CDM project activities. The reference to the proposed monitoring methodology is para 13 of AMS I.D of Appendix B of simplified modalities and procedures for small-scale CDM project activities.

**D.2. Justification of the choice of the methodology and why it is applicable to the small-scale project activity:**

>>
The project activity meets the eligibility criteria to use simplified modalities and procedure for small-scale CDM project activities as set out in paragraph 6 (c) of decision 17/CP.7. As the power plant is of 10 MW capacity, reference has been taken from indicative simplified baseline and monitoring methodologies for selected small scale (CDM projects less than 15 MW) project activity categories.

The project activity is generation of electricity using biomass potential and exporting the same to the grid system, which is also fed by other fuel sources such as fossil and non-fossil types. Emission reductions due to the project activity are considered to be equivalent to the emissions avoided in the baseline

scenario by displacing the grid electricity. Emission reductions are related to the electricity exported by the project and the actual generation mix in the grid system. Ex-post approach is selected for the baseline calculation as the capacity of the biomass project is 10 MW. The baseline emission factor is estimated based on the weighted average emissions of the current generation mix, and will be updated during the crediting period. The data to be monitored to ascertain emission reductions out of the project activity is to measure the amount of electricity generated through energy meters. With this information, a reliable estimate of the amount of emission reduction can be made.

## D.3. Data to be monitored:

>>

| ID number | Data type | Data variable | Data unit | Measured (m), calculated (c) or estimated (e) | Recording Frequency | Proportion of data to be monitored | How will the data be archived? (electronic/ paper) | For how long is archived data to be kept? | Comment |
|---|---|---|---|---|---|---|---|---|---|
| D.3.1 | Power | Gross Generation | kWh | m | Continuous | 100% | Electronic and Paper | Crediting period plus 2 years | Meter is Calibrated and Regularly inspected by MSEB |
| D.3.2 | Power | Auxiliary Consumption | kWh | m | Continuous | 100% | Electronic and Paper | Crediting period plus 2 years | Meter is Calibrated and Regularly inspected by MSEB |
| D.3.3 | Power | Power Import | kWh | m | Continuous | 100% | Electronic and Paper | Crediting period plus 2 years | The import is when project is under maintenance or temporary shutdown and Meter is Calibrated and Regularly inspected by MSEB |
| D.3.4 | Power | Power Export | kWh | m | Continuous | 100% | Electronic and Paper | Crediting period plus 2 years | Meter is Calibrated and Regularly inspected by MSEB |
| D.3.5 | Fuel | Biomass used ( For each type of biomass separately) | MT | m | Daily | 100% | Electronic and Paper | Crediting period plus 2 years | Biomass deliveries are weighted using calibrated weigh bridges and build upon receipt at the plants, Recorded per type of biomass. |
| D.3.6. | Fuel | Fossil fuels (coal) used | MT | m | Daily | 100% | Electronic and Paper | Crediting period plus 2 years | Fossil fuel deliveries are weighted and build upon receipt at the plants |
| D.3.7. | Calorific Values | NCV of coal used in the plant | kcal/kg | m | batch-wise for coal | 100% | Electronic and Paper | Crediting period plus 2 years | The coal will be sampled and taken for analysis of calorific value at reputed laboratories. |
| D.3.8. | Calorific Values | NCV of biomass used in the plant (for each type) | kcal/kg | m | batch-wise | 100% | Electronic and Paper | Crediting period plus 2 years | The biomass fuels will be sampled and taken for analysis of calorific value at reputed laboratories. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| D.3.9 | Fuel (renewable biomass) | Surplus biomass availability (for estimation of leakage) | MT | E | Yearly | 100% | Electronic and Paper | Crediting period plus 2 years | The data item is used to estimate the leakage affect due to the implementation of the project activity in the project region. The data item is a calculated value derived from either any public survey documentation or the biomass assessment study carried out for project by an independent party during each year of the crediting period. |
| D.3.10. | Emission factor | Emission factor of the most carbon intensive fuel used | $tCO_2TJ$ | m | yearly | 100% | Electronic and Paper | Crediting period plus 2 years | The emission factor values will be taken from the officially published data for Indian system. |
| D.3.11. | Emission Factor | Grid Emission Factor (EF) Weighted average | $tCO_2/GWh$ | c | Yearly | 100% | Electronic and Paper | Crediting period plus 2 years | This data item is required for estimating the baseline emissions and emission reductions. Data sourced from official CEA web site. |

**D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures are undertaken:**

>>

| Data | Uncertainty level of data (High/Medium/Low) | Explain QA/QC procedures planned for these data, or why such procedures are not necessary |
|---|---|---|
| D.3.1 & D.3.2 | Low | This data item will be recorded at the project site which is under the control of project proponent. The energy generated and consumed is measured using calibrated meters and recorded by project proponent. Records of measurements will be used for calculating net export to grid. |
| D.3.3 | Low | This data will be recorded at the project site and the energy imported is measured using MSEB calibrated meter. Records of measurements will be used for calculating net export to grid. Sales bills/receipts may be compared as an alternative proof of the power imported from MSEB grid. |
| D.3.4 | Low | This data item will be recorded at the grid substation, which is under the control of MSEB. The energy measured using calibrated meters and recorded at MSEB substation will be monitored. Records of measurements will be used for verification of emissions reductions. Sales bills / receipts may be compared as an alternative proof of the power exported to the grid |
| D.3.5 and D.3.6 | Low | This data item will be recorded at the inlet of the plant premises. Fuel purchase records can be used for verification of fuel purchases in each category of biomass and fossil fuels. Payments made to fuel suppliers can be used to cross check the fuel purchase records. |
| D.3.7 & D.3.8 | Low | Fuel samples will be analysed at reputed laboratories / if available, for coal, will be obtained from the suppliers. No QA/QC procedures are applicable, since, the parameter is not under the control of project proponent. |
| D.3.9 | Low | Either publicly available survey data is used or in the absence of publicly available data, biomass assessment study will be carried out by an independent agency, based on the official statistics, scientific approaches and standard practices. Hence, it can be ensured that the compliance with QA/QC and quality of data will be high. Since, the data item is not under the control of project proponent, no QA/QC procedures are applicable here. |
| D.3.10 | Low | The parameter will be taken from the officially published documentations of the India's DNA such as, India's initial national communication to UNFCCC and/or IPCC 2006 default values, which ever is applicable. Since, the data item is not under the control of project proponent, no QA/QC procedures are provided here. |
| D.3.11 | Low | Based on official data from CEA. Project participants has no influence on quality control procedures. |

**D.5. Please describe briefly the operational and management structure that the project participant(s) will implement in order to monitor emission reductions and any leakage effects generated by the project activity:**

>>

The management structure proposed for monitoring of emission reductions due to the project activity mainly comprises a GHG audit team / committee which will be established immediately after commissioning of the plant. The committee performs various functions such as measuring, recording, storage of measured data and reporting to the project participants. The outcome of the committee, in the form of GHG audit reports, are being monitored monthly and annually. The committee comprised representatives of the project participant and other experts as decided from time to time. It was proposed that whenever required external independent GHG auditors would be deputed for the monitoring activities.

*Project Management*

The authority and responsibility for registration, monitoring, measurement, reporting and reviewing of the data rests with the Board of Directors. The Board may delegate the same to a competent person identified for the purpose. The identified person will be the in charge of GHG monitoring activities and necessary reports will be submitted to the management or its Committee for review.

*Monitoring Requirements*

The monitoring plan includes monitoring of parameters i.e. the energy fed to the MSEB grid system, Biomass and fossil fuel consumption, auxiliary consumptions and Imports. Emission reductions resulted from the project activity will be calculated using the energy fed in accordance with the calculations illustrated in Section E of the PDD. Emission reductions generated by the project shall be monitored at regular intervals. The crediting period chosen for the project activity is 10 years.

Monitoring equipment comprises of energy meters and weigh bridge meter at Project entrance, The export meters will monitor the energy fed by the plant to MSEB grid system by the project. In accordance with the procedures laid down in EPA, project proponents have to install two energy meters one is main meter and the other is check meter. Project proponent will have to calibrate both the meters according to the procedures of EPA. The meters will be tested once in a year generally. In case, the variation in meter reading between main and check meters is more than 0.5%, both meters will be tested and calibrated immediately by MSEDCL (Maharashtra State Electricity Distribution Company Limited) as corrective action. The import meter will record the energy taken by the project activity from Grid system. This meter will be checked, calibrated and may be replaced with a new one by MSEB based on meter condition. This will be under the control of MSEB, project proponent have no authorization to deal with import energy meter. The gross, auxiliary energy meters and weigh bridge meter will be periodically checked and calibrated by project proponent as per Indian standards for calibration of equipment.

Methodology adopted for determining base line emission factor is the weighted average emissions of the generating mix in the Western grid system, which will represent the intensity of carbon emissions of the grid system. The baseline emission factor is calculated ex-post for all the years of the crediting period using the official data published by the Central Electricity Authority for the Western grid and therefore included in the monitoring procedures.

*Leakage Monitoring*

The 10 MW Parbani project is renewable energy type and it utilizes Biomass fuel for power generation. Since no energy generating equipment is transferred from another activity nor existing equipment is transferred to another activity, leakage needs not to be monitored or considered. However, parameter to asses the leakage due to competing uses of biomass (surplus biomass in the region) has been included in the monitoring (section D3), which will be assessed during each year of the crediting period.

*Data Recording and Storage*

The net energy fed to the grid system, by the project activity will be recorded by project proponents using either of the two meters (main meter and check meter) in the presence of the representative of MSEB. Representatives of both the project proponent and MSEB will sign the document which will contain all details such as the equipment data, calibration status, previous reading, current reading, export, import, net billable units, date and time of recording etc. This document will be used as a basic document for monitoring and verification of the net energy exported to the grid. MSEB will pay to project proponents based on this document.

Biomass and coal (if any) consumption are recorded on daily as well as monthly basis and the same can be verified from invoice data. This document will be used as a basic document for monitoring and verification of the fuel consumption for power generation.

The above document will be preserved for verification of emission reductions from the project, in safe storage. Supporting documents such as receipts of payments released by MSEB will also be preserved in safe storage for later verification by an independent third party. The period of storage will be 2 years after the end of crediting period.

**D.6. Name of person/entity determining the monitoring methodology:**

>>

The contact information for the entity that has determined the monitoring methodology is given below. The entity is a project participant.

| | |
|---|---|
| Organization: | Zenith Energy Services (P) Limited |
| Street/P.O. Box, Building: | 10-5-6/B, My Home Plaza, Masabtank, |
| City: | Hyderabad |
| State/Region: | Andhra Pradesh |
| Postfix/ZIP: | 500028 |
| Country: | India |
| Telephone: | +91- 40- 2337 6630, 2337 6631 |
| FAX: | +91- 40- 2332 2517 |
| E-Mail: | zenith@zenithenergy.com |
| URL: | www.zenithenergy.com |
| Represented by: | |
| Title: | Director |
| Salutation: | Mr. |
| Last Name: | Reddy |
| Middle Name: | Mohan |
| First Name: | Attipalli |
| Mobile | +91- 9849408485 |
| Direct Fax | +91- 40- 2332 2517 |
| Direct Telephone | +91- 40- 2337 6630, 2337 6631 |
| Personal E.mail | **mohan@zenithenergy.com** |

**SECTION E.: Estimation of GHG emissions by sources:**

**E.1. Formulae used:**

>>

**E.1.1 Selected formulae as provided in appendix B:**

>>

Appendix B of the simplified modalities and procedures for small-scale CDM project activities does not provide specific formulae for the baseline for project Category I.D.

Calculation of the project GHG emissions reductions applies a weighted average emissions factor for all thermal plants that are operational on the Western grid of India as of March 2006.

**E.1.2 Description of formulae when not provided in appendix B:**

>>

**E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary:**

>>

The proposed project activity generates power using renewable biomass which is considered $CO_2$ neutral However, since use of fossil fuels is permitted in exigencies to a maximum of 25% of the total annual fuel requirement for biomass based power projects, the project may use fossil fuels such as coal in future in case of exigencies.

GHG emissions occurring within the project boundary will be calculated using the following formula:

$$PE_y = \sum FF_{i,y} \cdot NCV_i \cdot EF_{CO2,i} \cdot OXID_i$$

Where:

| | |
|---|---|
| $PE_y$ | are the emissions from the project activity during the year *y* in tonnes of $CO_2$ |
| $FF_{i,y}$ | is the quantity of fossil fuel type *i* combusted to supplement the biomass residues in the project activity during the year *y* in energy or mass units |
| $NCV_i$ | is the net calorific value of the fossil fuel type *i* in TJ per mass unit, obtained from local fuel supplier or from the country specific IPCC default factors |
| $EF_{CO2i}$ | is the $CO_2$ emission factor per unit of energy or mass of the fuel type *i* in tons of $CO_2$ obtained from the country specific IPCC default factors |
| $OXID_i$ | is the oxidation factor of the fuel (as per table 1.29 in the 1996 revised IPCC guidelines for default values) |

For the purpose of estimating the anticipated project emissions due to the project activity, it has been assumed that coal to an extent of 10% of the annual fuel requirement may be used as supplementary fuel. Accordingly, the estimate of project emissions is provided below. These emissions will be updated ex post depending on the actual quantity of coal consumed.

**Project Emissions (tCO2)**

| No. | Year | Biomass consumed | Coal Consumption | Total fuel consumption | % of coal consumption | NCV of Coal | Emission factor coal ($EF_{CO2,y}$) | Oxidation factor ($OXID_i$) | Project emissions |
|---|---|---|---|---|---|---|---|---|---|
| | | tons | tons | tons | % | kcal/kWh | $tCO_2/TJ$ | | $tCO_2$ |
| Reference | | | | | | | India's Initial National communication | 1996 revised IPCC guidelines | |
| 1 | 2008 | 62,363 | 6,929 | 69,292 | 10 | 3800 | 95.81 | 0.98 | 10334 |
| 2 | 2009 | 71,271 | 7,919 | 79,190 | 10 | 3800 | 95.81 | 0.98 | 11810 |
| 3 | 2010 | 71,271 | 7,919 | 79,190 | 10 | 3800 | 95.81 | 0.98 | 11810 |
| 4 | 2011 | 71,271 | 7,919 | 79,190 | 10 | 3800 | 95.81 | 0.98 | 11810 |
| 5 | 2012 | 71,271 | 7,919 | 79,190 | 10 | 3800 | 95.81 | 0.98 | 11810 |
| 6 | 2013 | 71,271 | 7,919 | 79,190 | 10 | 3800 | 95.81 | 0.98 | 11810 |
| 7 | 2014 | 71,271 | 7,919 | 79,190 | 10 | 3800 | 95.81 | 0.98 | 11810 |
| 8 | 2015 | 71,271 | 7,919 | 79,190 | 10 | 3800 | 95.81 | 0.98 | 11810 |
| 9 | 2016 | 71,271 | 7,919 | 79,190 | 10 | 3800 | 95.81 | 0.98 | 11810 |
| 10 | 2017 | 71,271 | 7,919 | 79,190 | 10 | 3800 | 95.81 | 0.98 | 11810 |
| **Total Project Emissions** | | | | | | | | | **116,628** |

**E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities**

>>

No leakage is anticipated due to the project activity as the generating equipment is not transferred from another activity.

Although a small amount of emissions occur outside the project boundary due to transportation of biomass, the same are not considered as being negligible and occur in the baseline scenario.

| | Parameter | Unit | Value |
|---|---|---|---|
| a | Total biomass required for the project | tonnes | 80000 |
| b | Average Return trip Distance (AVD) from collection centres* | km | 100 |
| c | Total Ash Generation** (anticipated) | tonnes | 8000 |
| d | Average Return trip distrance for Ash utilization or disposal | km | 30 |
| e | Average load per truck | tonnes | 10 |
| f | Total Distance travelled | km | 824000 |
| g | Consumption of Diesel by truck | km/Litre | 5 |
| h | Total Diesel consumption for transportation | Litres | 164800 |
| i | Density of Diesel | kg/Litre | 0.82 |
| j | Total Diesel consumption | kg | 135136 |
| k | Energy value of Diesel (IPCC) | $TJ/10^3$ tonnes | 43.33 |
| l | Total Energy from Diesel | TJ | 5.86 |
| m | Emission factor of Diesel | t $CO_2$/TJ | 74.1 |
| n | Total Transport Emissions | t $CO_2$ | **434** |
| * AVD considered is the maximum possible distance from plant site (Radious 50, 50+50 = 100 km) | | | |
| ** Ash Generation is considered at 10% of total biomass consumption per year for projection | | | |

The project activity is generating electricity using Biomass residues, hence, according to the Attachment C to Appendix B of simplified modalities and procedures, the leakage source applicable is 'Competing use of biomass'. The project proponents conducted a Biomass Assessment Survey in the project region to ensure that the biomass available in the region is surplus, which is not utilized so far. According to the Biomass Assessment Report, the total generation of biomass residues with in the 50 km radius from plant location is 1.11 million tonnes (mt), where as the consumption of the region is 0.77 mt. The surplus biomass available is 0.34 mt. The leakage calculation is demonstrated in the below table:

**Leakage - competing use of biomass**

| | Parameter | Unit | Value |
|---|---|---|---|
| a | Total biomass available in the region | tonnes | 1,115,023 |
| b | Total conumption of the reigon | tonnes | 770,169 |
| c | Biomass consumption of the 10 MW project activity | tonnes | 80,000 |
| d | Total biomass consumption of the region including project activity (b+c) | tonnes | 850,169 |
| e | Total surplus in the region after accounting for all types of consumption (a-d) | tonnes | 264,854 |
| f | Percentage of surplus available biomass in the reigon (e/d%) | % | **31%** |

The total quantity of surplus biomass in the region is 31% larger than the total biomass consumption in the region. Hence, the leakage emissions due to competing use of biomass is neglected.

The main biomass residues i.e. crop residues used for this project, which can be regarded to be renewable since their use does not lead to a decrease of carbon pools as defined in Annex 18 of the report of EB 23 meeting. The quantity of available biomass in the region is 25% larger than the quantity of biomass that is utilized including the project activity. Hence, according to Attachment C to Appendix B Indicative simplified modalities and procedures Leakage due to competing uses for the biomass is neglected. However, as required by Attachment C to Appendix B, leakage effect will be monitored (section D3) during each year of the crediting period to ensure that the implementation of project activity does not lead to any increase in GHG emission from fossil fuel combustion or other sources due to the diversion of biomass residues from the other uses to the project as a result of the project activity. If, the quantity of surplus biomass in the region found below the 25% of the total consumption of the project region during any year of the crediting period, the corresponding percentage of biomass quantity would be considered to estimate the leakage emissions due to the competing uses of biomass, as described below.

**Leakage emissions – Competing uses for the biomass**

A fuel availability survey will be carried out during each year of the crediting period to assess the surplus availability of biomass in the project region. If it is found that the surplus in the region is less than 25% of the total region consumption, the emissions due to leakage will be estimated and deducted from the emission reductions by applying the following equation.

$$L_y = BF_{d,y} \cdot EF_{CO2.L} \cdot NCV_{avg,y}$$

$L_y$ = Leakage emissions during the year *y* ($tCO_2/y$)

$BF_{d,y}$ = The quantity of biomass i.e. in deficit during the year *y* (tonnes)
(In the above parameter, the quantity of biomass in deficit refers to the corresponding quantity of biomass in deficit from 25% surplus of the total consumption of the biomass in the project region, including the project activity)

$EF_{CO2,L}$ = $CO_2$ emission factor of the most carbon intensive fuel used in the country (t $CO_2$/TJ)

$NCV_{avg,y}$ = Average net calorific value of the biomass residues combusted in the project activity during the year *y* (TJ/tonne)

**E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the small-scale project activity emissions:**

>>

The sum of emissions estimated in E.1.2.1 and E.1.2.2 is provided in the below table

| Year (FY) | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|
| Project emissions, **E.1.2.1** $tCO_2$ | 10,334 | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 |
| Leakage, **E.1.2.2** $tCO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total, **E.1.2.1 + E.1.2.2** $tCO_2$ | 10,334 | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 |

**E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHGs in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities:**

>>

As per AMS I.D.

**iv. Estimation of baseline emissions**

Baseline emissions or emissions avoided by the project activity are estimated using the following formula.

| Baseline Emissions $tCO_2$ | = | Grid Emission Factor $tCO_2/GWh$ | x | Net Power Generation GWh |
|---|---|---|---|---|

The power export from the project for the optimum year is anticipated at 63.07 GWh per year, based on which the baseline emissions are estimated and tabulated.

**Baseline Emissions (tCO2)**

| S.no | year | Gross energy | Net enrgy export (GWh) | Emission Factor (t CO2/Gwh) | Baseline Emissions (t CO2) |
|---|---|---|---|---|---|
| 1 | 2008 | 61.32 | 55.19 | 870 | 48014 |
| 2 | 2009 | 70.08 | 63.07 | 870 | 54873 |
| 3 | 2010 | 70.08 | 63.07 | 870 | 54873 |
| 4 | 2011 | 70.08 | 63.07 | 870 | 54873 |
| 5 | 2012 | 70.08 | 63.07 | 870 | 54873 |
| 6 | 2013 | 70.08 | 63.07 | 870 | 54873 |
| 7 | 2014 | 70.08 | 63.07 | 870 | 54873 |
| 8 | 2015 | 70.08 | 63.07 | 870 | 54873 |
| 9 | 2016 | 70.08 | 63.07 | 870 | 54873 |
| 10 | 2017 | 70.08 | 63.07 | 870 | 54873 |
| **Total Baseline Emissions** | | | | | **541871** |

**E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:**

>>

| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|
| Baseline emissions, **E.1.2.4**, $tCO_2$ | 48,014 | 54,873 | 54,873 | 54,873 | 54,873 | 54,873 | 54,873 | 54,873 | 54,873 | 54,873 |
| Project emissions, **E.1.2.3**, $tCO_2$ | 10,334 | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 | 11,810 |
| Emissions Reductions, **E.1.2.4 – E.1.2.3,** $tCO_2$ | 37,680 | 43,063 | 43,063 | 43,063 | 43,063 | 43,063 | 43,063 | 43,063 | 43,063 | 43,063 |

**E.2 Table providing values obtained when applying formulae above:**

>>

| S. No | Year | Annual estimation of emission reductions in tonnes of $CO_2$ eq. |
|---|---|---|
| 1 | 2008 | 37,680 |
| 2 | 2009 | 43,063 |
| 3 | 2010 | 43,063 |
| 4 | 2011 | 43,063 |
| 5 | 2012 | 43,063 |
| 6 | 2013 | 43,063 |
| 7 | 2014 | 43,063 |
| 8 | 2015 | 43,063 |
| 9 | 2016 | 43,063 |
| 10 | 2017 | 43,063 |
| **Total emission reductions (tonnes of $CO_2$ eq.)** | | **425,247** |
| **Total number of crediting years** | | **10** |
| **Annual average over the crediting period of estimated reductions (tonnes of $CO_2$ eq.)** | | **42,524** |

## SECTION F.: Environmental impacts:

**F.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:**

>>

As per the prevailing regulations of the Host Party i.e. India (represented by the Ministry of Environment and Forests (MoEF), Govt. of India and also the line ministry for environmental issues in India), Environmental Impact Assessment (EIA) studies need not to be done for the projects less than Rs.1000 millions. Since the total cost of the proposed project is only Rs.449 millions and also comes under the small scale category of CDM projects as per UNFCCC guidelines, doesn't call for EIA study. However prior to implementation, the project shall notify to the Maharashtra State Pollution Control Board (MSPCB) for necessary evaluation and approval. As required for implementation of the project activity, project participants had studied the possibility of environmental impacts and concluded that no negative impacts are possible due to the project activity. Hence, no documentation or summary is provided here.

The project does not fall under the purview of the Environmental Impact Assessment (EIA) notification of the Ministry of Environment and Forest, Government of India. However the design philosophy of this biomass based project activity is driven by the concept of providing the renewable energy with negligible impact on the environment hence the environment and safety aspects of the project activity are discussed here.

The possible type of pollutants emanating from a normal biomass plant are Air Pollution, Water Pollution, Thermal pollution, Noise Pollution etc. which are also common to the proposed plant, but it is negligible. The project proponent has planned various preventive and precautionary steps to control all forms of pollutants so as to safeguard the environment.

**Air Pollution Control**

The main air pollutants in the biomass based plant are Dust and particulate matter in the Flue gas, Fly ash from the hoppers, Furnace bottom ash etc. and the steps to be taken are

*Electrostatic Precipitator*

The proposed biomass plant will have an Electrostatic Precipitator (ESP), which will separate the dust from the flue gas and has an efficiency of 99.2 %. The dust concentration in the flue gas leaving the ESP will be within the permissible limit of statutory norms.

*Waste as Wealth*

The ash from the silo will be disposed off to the farmers, who can use the ash as manure for the crops and to local industries, who will utilize the ash for manufacture of bricks and for road building materials.

**Water Pollution Control**

The main forms of water pollutants in the plant are effluents from water treatment plant, Boiler blow down, Sewage from the power plant buildings.

*Water Treatment Plant*

The water utilized for the operation of the plant is treated before letting off so as to maintain it in neutral pH.

*Sewage through trenches*

The Sewage from the various power plant buildings will be taken to a common septic tank through trenches. The sewage from the septic tank will be disposed off through concrete trenches so as to prevent the soil from getting contaminated.

**Thermal Pollution**

*Cooling Tower*

The water used in the surface condenser to condense the steam, will be cooled in a cooling tower of either induced or forced draft type. The water let out from the cooling tower will have a temperature very close to the ambient.

*Cooling Pond*

The boiler blow down water which will be at temperature of 100$^{o}$C is taken to effluent pond so as to get cooled naturally

**Noise Pollution Control**

The major source of noise pollution in the biomass power plant is from rotating equipments like ID, FD, SA fans, Feed pumps, Boiler and super heater safety valves, Start up vent, Steam turbine, DG sets etc. and steps to be taken to control all these are

*Silencers*
The start up vent, safety valve outlets and the DG sets will be provided with silencers to reduce the noise level to the acceptable limits.

*Equipment Design*
The rotating equipments are designed in such a way, so that the sound level will be between 85 to 90 dBA as per the OSHA standards.

*Land Environment*
Selected tree species will be planted in the area after considering attenuation factors for air and noise pollution.

**Green Belt Development**
The project proposed to develop Green Belt with in the project premises , which is the one of the major component of Environmental Management Plan (EMP). Green Belt will enhance environmental quality through mitigation of fugitive emissions, attenuation of noise levels, balancing eco-environment, consumption of treated effluents, prevention of soil erosion, creation of aesthetic environment.

**Socio Economic Environment**
The project will provides an opportunity for local people to get employed directly or indirectly in upliftment of socioeconomic status of the area. It is also proposed to do awareness and welfare programmes, upliftment of social, health, basic needs of drinking water supply and provision of educational facilities.

Hence the project is not likely to have any significant adverse negative socio-economic environmental effects during execution or after commissioning during or during the operational lifetime.

## SECTION G. Stakeholders' comments:

### G.1. Brief description of how comments by local stakeholders have been invited and compiled:

>>

**Requirement of Stakeholder comments**

**No specific public consultation / participation requirements are specified in Indian statutes for setting up of small-scale industries. However, there are certain procedural requirements, which every project investor needs to follow before implementing any project.**

**Before implementing any project, project investors / developers need to identify the stakeholders, prepare necessary documents, approach the identified stakeholders directly and obtain required clearances / approvals. The stakeholders after review of documents and investment profile, will accord approvals / licences or send comments in writing to project investors for further clarifications / corrections. In case they are not satisfied with the project design or they feel that the project impacts any of the local environment / social / economical environments, they will not issue clearances / approvals and stop the implementation of the project.**

**Identification of Stakeholders**

**The project participants, as required for setting up the project, have identified the following stakeholders.**

***Local populace.***
**Local populace, represented by the Borawand (BK) Gram Panchayat, the elected administrative body of the village Borawand, where the project is getting implemented, will issue No-Objection Certificate (NOC) for setting up of the project under the jurisdiction of the village.**

*Maharashtra Energy Development Agency (MEDA)*
**Maharashtra Energy Development Agency (MEDA), the state nodal agency under the umbrella of the Ministry of Non Conventional Energy Sources (MNES), Govt. of India to undertake development, techno-economic viability of renewable energy and facilitates energy conservation in the state of Maharashtra.**
**(www.mahaurja.com)**

*Maharashtra Sate Electricity Board (MSEB)*
Maharashtra State Electricity Board (MSEB), a state utility company looks after power generation, transmission, and distribution through out the state of Maharashtra.
**(www.msebindia.com)**

***Maharashtra Electricity Regulatory Commission (MERC)***
**Maharashtra Electricity Regulatory Commission (MERC) has the role of tariff fixation, licensing, grievance redressing, regulating power purchase and procurement processes of the transmission and distribution utilities throughout the state of Maharashtra.**
**(www.mercindia.org.in)**

*Maharashtra Pollution Control Board (MPCB)*
Maharashtra Pollution Control Board (MPCB), a regulatory body to monitor environmental impacts and environmental management of industries, accords clearances for setting up of industries in the state after ensuring adherence to the statutory regulations. Also gives Consent for Establishment (CFE) and Consent for Operation (CFO) for the project if it satisfies with the environmental management and pollution control measures.
**(www.mpcb.mah.nic.in)**

***Ministry of Non-conventional Energy Sources, Govt. of India (MNES)***
**The Ministry of Non-Conventional Energy Sources (MNES), Govt. of India, a nodal ministry for all matters relating to new and renewable energy like Bio-energy, Wind, hydro, Solar, Geothermal, Tidal etc.**
***(www.mnes.nic.in)***

**Apart from the above, there are other stakeholders such as Inspector of Factories, Inspector of Boilers, Chief Electrical Inspectorate General etc., but the role of these stakeholders is limited to examination of certain issues such as plant layout, equipment designs, etc. These stakeholders are to be approached during the project implementation stage, however, will in no way obstruct the implementation of the project as long as the d.esigns are according to the stipulated regulations.**

**The project participants prepared necessary documentation before implementation of the project activity and approached the above stakeholders individually. No negative comments have been received by the project participants, which is evident from the following clearances and approvals.**

***Village Panchayat***
**Local populace, represented by the Borawand (BK) Gram Panchayat, the elected administrative body of the village Borawand where the project is getting implemented, issued NOC (No-Objection Certificate) for the project on 16th July 2005.**

***Maharashtra Energy Development Agency (MEDA)***
**Maharashtra Energy Development Agency (MEDA) has issued 'In Principle Clearance' for setting up of project vide BPP-061/04-05/2321 dated 26th May 2004**

***Maharashtra State Electricity Regulatory Commission (MERC)***
**MERC has framed tariff policy for the project through out the state of Maharashtra, which is applicable to the proposed project activity also.**

***Ministry of Non-Conventional Energy Sources (MNES)***
**MNES has recognised the project activity under Non-Conventional Energy sources**

***Maharashtra State Pollution Control Board (MPCB)***
**Maharashtra State Pollution Control Board (MPCB) issued Consent for Establishment (CFE) with vide letter no. BO./PCI-II/ROAD/EIC No.AD-0314-05/E/CC-36 and Consent for Operation (CFO) will be obtained after completion of the construction of the project and before commissioning of the project.**

**G.2. Summary of the comments received:**

>>
No negative comments are received on the project activity, which is evident from the licences / approvals / clearances accorded to the project activity by the stakeholders

**G.3. Report on how due account was taken of any comments received:**

>>
No comments received; hence no report is applicable

**Annex 1**

## CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

| | |
|---|---|
| Organization: | M/s M. S. M. Energy Limited |
| Street/P.O. Box, Building: | Plot No: 1115, Road No: 54, Jubilee Hills |
| City: | Hyderabad |
| State/Region: | Andhra Pradesh |
| Postfix/ZIP: | 500 033 |
| Country: | India |
| Telephone: | +91- 40- 2355 0597, 2355 0598 |
| FAX: | +91- 40- 2354 1339 |
| E-Mail: | msmenergy@rediffmail.com |
| URL: | |
| Represented by: | |
| Title: | Managing Director |
| Salutation: | Dr. |
| Last Name: | S. M. |
| Middle Name: | |
| First Name: | Manepalli |
| Mobile | |
| Direct Fax | +91- 40- 2354 1339 |
| Direct Telephone | +91- 40- 2355 0597, 2355 0598 |
| Personal E.mail | |

## Annex 2

## INFORMATION REGARDING PUBLIC FUNDING

No public funding from the parties included in Annex – I is involved in the project activity

- - - -

# Annex 3
# Baseline Information

**Baseline Information for Western Region**

| Power Stations | Owner | Installed capacity MW | Fuel | Net Generation GWh 2006 | Station heat rate kcal/kWh | IPCC / Local emission factor tC/TJ | Oxidation factor (IPCC) | Emission factor tCO2/GWh | Emissions tCO2 2006 |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 1 | 2 | 1 | 2 | 3 | 3 | | |
| **GUJARAT** | | | | | | | | | |
| Dhuvaran | GEB | 534 | Coal 4F | **1459.63** | 2717 | 26.13 | 0.98 | 1066 | **1556487** |
| Ukai | GEB | 850 | Coal 4F | **5363.09** | 2746 | 26.13 | 0.98 | 1078 | **5780013** |
| Gandhi Nagar | GEB | 660 | Coal 4F | **3703.6** | 2568 | 26.13 | 0.98 | 1008 | **3732779** |
| Wanakbori | GEB | 1260 | Coal 4F | **8472.06** | 2561 | 26.13 | 0.98 | 1005 | **8515532** |
| Sikka REP | GEB | 240 | Coal 4F | **1404.7** | 2926 | 26.13 | 0.98 | 1148 | **1613136** |
| Torr Pow Sab. | AECO | 330 | Coal | **2703.14** | 2717 | 26.13 | 0.98 | 1066 | **2882514** |
| Torr Power AEC | AECO | 60 | Coal | **485** | 2717 | 26.13 | 0.98 | 1066 | **517183** |
| GSECL (G.5) | GSECL | 210 | Coal 4F | **1743.46** | 2717 | 26.13 | 0.98 | 1066 | **1859152** |
| GSECL (W.7) | GSECL | 210 | Coal 4F | **1709.31** | 2717 | 26.13 | 0.98 | 1066 | **1822736** |
| Utran GT | GSECL | 144 | Gas HBJ | **1077.44** | 2061 | 15.3 | 0.995 | 481 | **518124** |
| Dhuvaran CCPP | GSECL | 106.6 | Gas HBJ | **707.33** | 2061 | 15.3 | 0.995 | 481 | **340144** |
| Hazira CCCP | GSEGL | 156.1 | Gas HBJ | **1182.21** | 2061 | 15.3 | 0.995 | 481 | **568506** |
| G.T.E CORP | GTE | 655 | Gas HBJ | **4755.99** | 2061 | 15.3 | 0.995 | 481 | **2287079** |
| Kawas GT | NTPC | 644 | Gas HBJ | **2884.2** | 2061 | 15.3 | 0.995 | 481 | **1386965** |
| Gandhar GT | NTPC | 648 | Gas HBJ | **4478.2** | 2061 | 15.3 | 0.995 | 481 | **2153494** |
| Torr Pow.Vat.GT | AECO | 100 | Gas HBJ | **718.17** | 2061 | 15.3 | 0.995 | 481 | **345356** |
| Essar GT IMP | Essar | 515 | Gas HBJ | **1800.94** | 2061 | 15.3 | 0.995 | 481 | **866043** |
| GIPCL GT | GIPCL | 154 | Gas HBJ | **2321.14** | 2061 | 15.3 | 0.995 | 481 | **1116199** |
| Surat LIG | GIPCL | 250 | Lignite | **1874.15** | 2742 | 28.95 | 0.98 | 1192 | **2234571** |
| Akrimota | GMDCL | 250 | Lignite | **168.29** | 2717 | 28.95 | 0.98 | 1181 | **198825** |
| Kutch LIG | GEB | 215 | Lignite | **669.62** | 3368 | 28.95 | 0.98 | 1465 | **980670** |
| UKai | GEB | 305 | Hydro | **580.49** | | | | 0 | **0** |
| Kadana | GEB | 240 | Hydro | **209.17** | | | | 0 | **0** |
| S.Sarovar RBPH | SSVNL | 1000 | Hydro | **1752.86** | | | | 0 | **0** |
| S.Sarovar CHPH | SSVNL | 250 | Hydro | **208.65** | | | | 0 | **0** |
| Kakrapara | NPC | 440 | Nuclear | **2366.94** | | | | 0 | **0** |
| | | | | | | | | | |
| **MADHYA PRADESH** | | | | | | | | | |
| Satpura | MPGPCL | 1142.5 | Coal 4F | **7581.25** | 3288 | 26.13 | 0.98 | 1290 | **9783310** |
| Amar Kantak | MPGPCL | 60 | Coal 4F | **150.26** | 2717 | 26.13 | 0.98 | 1066 | **160231** |
| Amar_Kantak Ext | MPGPCL | 240 | Coal 4F | **952.57** | 3918 | 26.13 | 0.98 | 1538 | **1464787** |
| Sanjay Gandhi | MPGPCL | 840 | Coal 4F | **4856.34** | 2829 | 26.13 | 0.98 | 1110 | **5392066** |
| Vindh_Chal STPS | NTPC | 2260 | Coal 3E | **18304.6** | 2717 | 26.13 | 0.98 | 1066 | **19519248** |
| Gandhi Sagar | MPGPCL | 115 | Hydro | **148.01** | | | | 0 | **0** |
| Bargi | MPGPCL | 90 | Hydro | **565.35** | | | | 0 | **0** |
| Pench | MPGPCL | 160 | Hydro | **422.13** | | | | 0 | **0** |
| Madhikhera | MPGPCL | 0 | Hydro | **0** | | | | 0 | **0** |
| Rajghat (MP) | MPGPCL | 45 | Hydro | **135.68** | | | | 0 | **0** |
| Bansagar (I) | MPGPCL | 315 | Hydro | **996.57** | | | | 0 | **0** |
| Bansagar (II) | MPGPCL | 30 | Hydro | **156.12** | | | | 0 | **0** |
| Bansagar (III) | MPGPCL | 60 | Hydro | **89.19** | | | | 0 | **0** |
| Bansagar(IV) | MPGPCL | 0 | Hydro | **0** | | | | 0 | **0** |
| Binsinghpur | MPGPCL | 20 | Hydro | **55.69** | | | | 0 | **0** |
| Tawa | HEGL | 13.5 | Hydro | **23.88** | | | | 0 | **0** |
| Indira Sagar | NHDC | 1000 | Hydro | **2572.97** | | | | 0 | **0** |
| | | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **CHATTISGARH** | | | | | | | | | |
| Korba-II | CSEB | 200 | Coal 4F | **1610.63** | 2946 | 26.13 | 0.98 | 1156 | **1862266** |
| Korba-III | CSEB | 240 | Coal 4F | **1587.1** | 2946 | 26.13 | 0.98 | 1156 | **1835060** |
| Korba-West | CSEB | 840 | Coal 4F | **5746.38** | 2653 | 26.13 | 0.98 | 1041 | **5983355** |
| Korba-STPS | NTPC | 2100 | Coal 4F | **16001.3** | 2717 | 26.13 | 0.98 | 1066 | **17063107** |
| Hasdeobango | CSEB | 120 | Hydro | **358.28** | | | | 0 | **0** |
| Gangrel | CSEB | 5 | Hydro | **8.72** | | | | 0 | **0** |
| | | | | | | | | | |
| **MAHARASTRA** | | | | | | | | | |
| Nasik | MSEB | 910 | Coal 4F | **5753.17** | 2651 | 26.13 | 0.98 | 1040 | **5985909** |
| Koradi | MSEB | 1100 | Coal 4F | **6460.34** | 2981 | 26.13 | 0.98 | 1170 | **7558412** |
| K_Kheda II | MSEB | 840 | Coal 4F | **5703.99** | 2600 | 26.13 | 0.98 | 1020 | **5820567** |
| Paras | MSEB | 62.5 | Coal 4F | **479.72** | 3198 | 26.13 | 0.98 | 1255 | **602115** |
| Bhusawal | MSEB | 482.5 | Coal 4F | **3381.68** | 2635 | 26.13 | 0.98 | 1034 | **3497247** |
| Parli | MSEB | 690 | Coal 4F | **5161.2** | 2665 | 26.13 | 0.98 | 1046 | **5398351** |
| Chandrapur | MSEB | 2340 | Coal 4F | **13987.27** | 2611 | 26.13 | 0.98 | 1025 | **14333526** |
| Dhanu | BSES | 500 | Coal 2W | **4323.11** | 2298 | 26.13 | 0.98 | 902 | **3899056** |
| Trombay | TATA MAH | 1150 | Coal 3E | **7854.36** | 2717 | 26.13 | 0.98 | 1066 | **8375556** |
| Uran GT | MSEB | 672 | Gas HBJ | **2430.23** | 2061 | 15.3 | 0.995 | 481 | **1168658** |
| Uran WHP | MSEB | 240 | Gas HBJ | **1318.35** | 2061 | 15.3 | 0.995 | 481 | **633973** |
| Trombay GT | TATA MAH | 180 | Gas HBJ | **1330.75** | 2061 | 15.3 | 0.995 | 481 | **639936** |
| Dhaboi GT | ENRON | 740 | Gas HBJ | **0** | 2061 | 15.3 | 0.995 | 481 | **0** |
| Koyna | MSEB | 1960 | Hydro | **4463.06** | | | | 0 | **0** |
| Vaitarna | MSEB | 61.5 | Hydro | **170.87** | | | | 0 | **0** |
| Tillari | MSEB | 60 | Hydro | **182.95** | | | | 0 | **0** |
| Bhira Tail Race | MSEB | 80 | Hydro | **98.76** | | | | 0 | **0** |
| Eldari | MSEB | 22.5 | Hydro | **16.3** | | | | 0 | **0** |
| Veer | MSEB | 9 | Hydro | **46.36** | | | | 0 | **0** |
| Bhatgarh | MSEB | 16 | Hydro | **57.76** | | | | 0 | **0** |
| Paithon | MSEB | 12 | Hydro | **24.92** | | | | 0 | **0** |
| Bhandardhara | MSEB | 44 | Hydro | **44.89** | | | | 0 | **0** |
| Pawana | MSEB | 10 | Hydro | **13.51** | | | | 0 | **0** |
| Radhanagri | MSEB | 4.8 | Hydro | **8.97** | | | | 0 | **0** |
| Kvasla (Panshet) | MSEB | 8 | Hydro | **58.24** | | | | 0 | **0** |
| K_Vasla (Varsa) | MSEB | 8 | Hydro | **21.5** | | | | 0 | **0** |
| Bhatsa | MSEB | 15 | Hydro | **85.14** | | | | 0 | **0** |
| Kanher | MSEB | 4 | Hydro | **14.7** | | | | 0 | **0** |
| Ujjaini | MSEB | 12 | Hydro | **44.04** | | | | 0 | **0** |
| Surya | MSEB | 6 | Hydro | **22.62** | | | | 0 | **0** |
| Manikhod | MSEB | 6 | Hydro | **8.05** | | | | 0 | **0** |
| Dhom | MSEB | 2 | Hydro | **10.5** | | | | 0 | **0** |
| Dimbe | MSEB | 5 | Hydro | **10.58** | | | | 0 | **0** |
| Warna | MSEB | 16 | Hydro | **60.9** | | | | 0 | **0** |
| Dudh Ganga | MSEB | 24 | Hydro | **59.02** | | | | 0 | **0** |
| Bhira | TATA MAH | 150 | Hydro | **479.79** | | | | 0 | **0** |
| Bhira PSS | TATA MAH | 150 | Hydro | **701.46** | | | | 0 | **0** |
| Bhivpuri | TATA MAH | 72 | Hydro | **427.83** | | | | 0 | **0** |
| Khopoli | TATA MAH | 72 | Hydro | **414.47** | | | | 0 | **0** |
| Tarapur | NPC | 860 | Nuclear | **3714.63** | | | | 0 | **0** |
| | | | | | | | | | |
| **GOA** | | | | | | | | | |
| Reliance Energy | REL | 48 | Coal | **302.75** | 2717 | 26.13 | 0.98 | 1066 | **322840** |
| Total | | | | **186871.54** | | | | | **162575084** |

**Summary**

| Year - 2005/06 | | | |
|---|---|---|---|
| | GWh | Emissions | % |
| Hydro | 15831 | 0 | 8 |
| Coal | 137242 | 147136542 | 73 |
| Gas | 25005 | 12024477 | 13 |
| Lignite | 2712 | 3414066 | 1 |
| Nuclear | 6082 | 0 | 3 |
| **Total** | **186872** | **162575084** | **100** |
| | | | |
| **Avg $\sum EF_{Baseline}$** | | **870** | |

**References:**

**BASE LINE DATA**

The methodology adopted for the calculation of the baseline is 'Simple weighted average of the current generation mix". Year 2005-06 is considered as the base year for prediction of future capacity additions during the crediting period. Western Grid generation data as tabulated in Enclosure-II is used for consideration of installed Western grid capacity and energy availability during the period 2005-06.

In order to arrive at the detailed break up of power generation mix in Western Region, various documents and various web sites were refereed. The websites refereed for estimating the generation mix in Western regional grid are:

1. http://.mnes.nic.in
2. http://cea.nic.in
3. Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual
4. India's Initial National communication to United Nations Framework convention on climate change (UNFCCC)

As per the availability, actual generation figures as against the sector wise installed capacity were used. Wherever the break up of generation was not available, proportionate calculated figures were used so as to match the total energy availability.

***References for completing PDD.***

1. **Website of United Nations Framework Convention on Climate Change (UNFCCC), http://unfccc.int**
2. **UNFCCC document: Clean Development Mechanism, Simplified Project Design Document For Small Scale Project Activities (SSC-PDD), Version 02**
3. **UNFCCC document: Simplified modalities and procedures for small–scale clean development mechanism project activities**
4. **UNFCCC document: Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories, Version 09, 28th July 2006**
5. **Detailed project reports of project**

## Annex – 4

## Abbreviations

| | |
|---|---|
| CEA | Central Electricity Authority |
| $CO_2$ | Carbon dioxide |
| EIA | Environment Impact Assessment |
| GHG | Greenhouse gas |
| GWh | Giga watt hour |
| IPCC | Inter Governmental Panel On Climate Change |
| kWh | Kilo watt hour |
| MEDA | Maharashtra Energy Development Agency |
| MERC | Maharashtra Electricity Regulatory Commission |
| MPCB | Maharashtra Pollution Control Board |
| MSEB | Maharashtra State Electricity Board |
| MW | Mega watt |
| MNES | Ministry of Non Conventional Energy Sources |
| PDD | Project design document |
| UNFCCC | United Nations Framework Convention on Climate Change |

## Annex-5

**MINUTES OF THE STAKEHODLERS MEETING WITH RESPECT TO 10MW BIOMASS BASED POWER PROJECT OF MSM ENERGY LTD. HELD AT BORDWAND VILLAGE, PARBHANI TAHSIL, PARBHANI DISTRICT MAHARASHTRA STATE.**

MSM Energy Ltd., the project proponent of 10 MW Biomass based power project have conducted a public meeting with the farmers and the village Panchayat members of Bordwand village on 29th June, 2006 at IST 11:30 AM to ascertain the views of the stakeholders with respect to setting up of the biomass based power project. In response to the notice from the project proponent, panchayath members and number of farmers have participated in the public meeting and expressed their views on the project. Proceedings of the meeting are summarized below.

The following members have attended the meeting.

**Panchayat Members**

1. Gopal Kulkurni – Gram Panchayat Sarpanch
2. Subhash Hingane – Up-sarpanch.
3. Gangadhar Bigde
4. Sheshrao Gangade
5. Namdev Kavle
6. Ganpath Kamble
7. Raghunath Raut
8. Baghwan Kavle

**Farmers**

1. Balasaheb Kavle
2. Basel Kavle
3. Ramkishan Kavle
4. Saheb Kavle
5. Baghwan Hingane
6. Datta Gangode
7. Balu Gore
8. Dashrath Binde
9. Vidul Kavle
10. Bansidhar Kavle
11. Namdev Kavle
12. Nilkanth Kulkurni
13. Dashrath Levde
14. Atul Kulkurni
15. S.Ismail
16. Ashok Kamble
17. Munjabhalu Kamble
18. Anantha Thambre
19. Kachruba Binde
20. Suresh Binde
21. Maghid Binde
22. Ganesh Ramjhau Larne
23. Ramkishan Hingane
24. Rambhalu Harkal
25. Pandit Rusthumrao Hingane
26. Baburao Vamrao Langde
27. Baghwan Narhari

28. Rojkau Panduraganpath raut
29. Namdev Shesrao Langde
30. Shek Shaeed
31. Shyam Kavle
32. Farukh S. Ismail

**Representatives of Project proponent**

Mr. Ravi Venkat and Mr. Nitin Pandit Rao Wagh

**Consultants**

K. Ram Babu

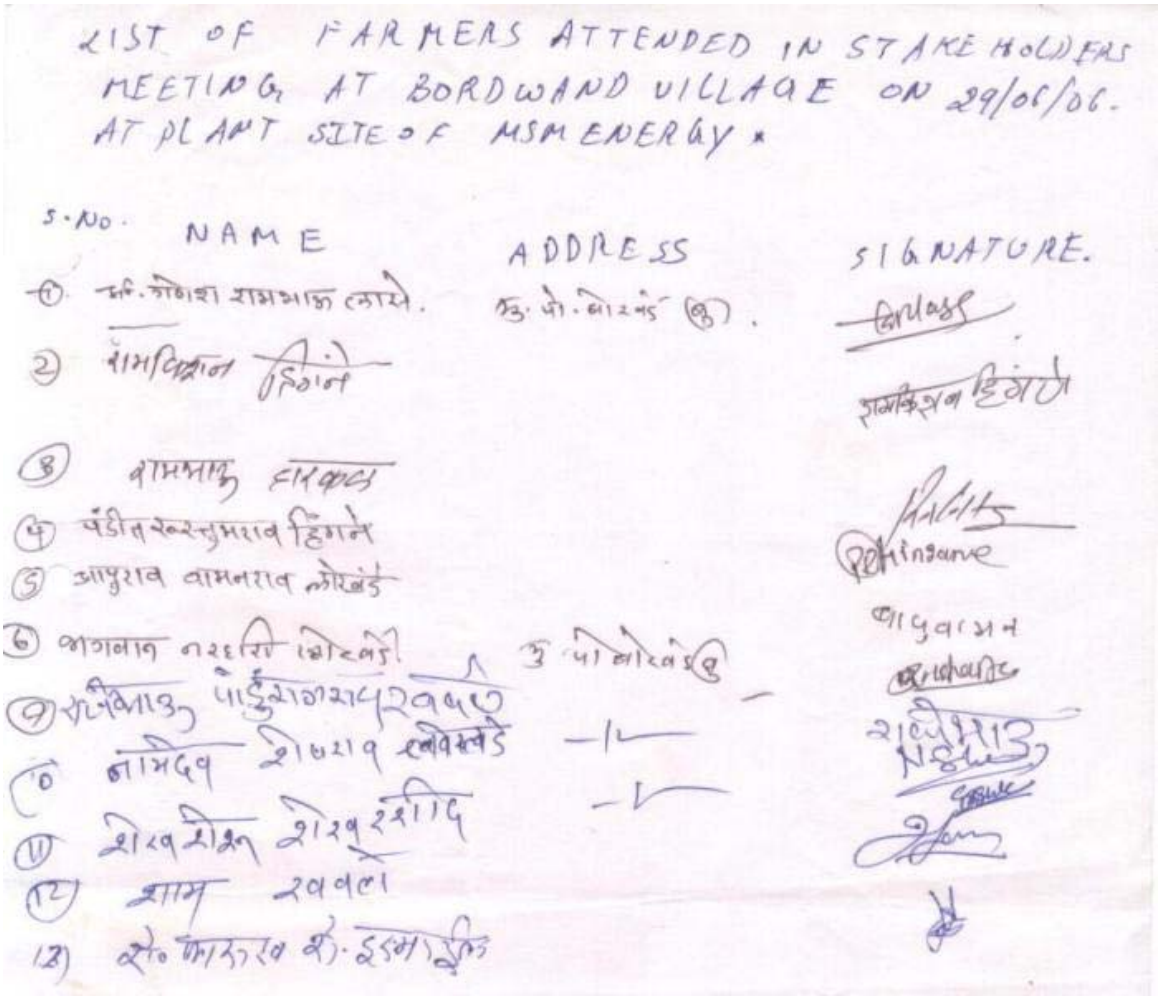
Sarpanch of Bordwand gram panchyath Sri.Gopal Kulkurni initiated the meeting, expressing his deep regret for arranging the meeting at plant site in open space, as the panchayath office is under renovation. Sarpanch also gave thanks to Mr. Ravi Venkat for conducting the meeting, which will clear off doubts of the villagers. Mr. Ravi Venkat addressed himself and the consultant to the villagers and explained briefly about the power generating unit and employment opportunities. The members expressed happiness after hearing from Mr. Ravi Venkat about employment opportunities and requested the company to recruit the local people. Mr. Ravi Venkat assured the members that priority would be given to local people for employment. One of the member inquired about total cost of the project and is it feasible for the company to establish one textile unit, which will benefit local farmers to sell their agriculture produce. Mr. Ravi Venkat explained the members that total investment for setting up the power generating unit has been estimated around Rupees 45 crores and also assured the members that he will put forward the proposal for setting up a textile unit before the management. On inquiring about source of water for operation of the plant, Mr. Ravi Venkat explained to the members that water will drawn from the canal which is at a distance of 1.5 Kms from the plant site and also through bore wells. The members expressed dissatisfaction on meeting water requirement by means of bore wells as this may lead to water problem in the local area. Mr. Ravi Venkat explained that bore wells will be utilized as emergency source and substantial quantity of water will be drawn from the canal and mentioned the progress of the official proceedings for drawing of water from the canal. All the members were satisfied and requested the company to use water judiciously. The members also requested Mr. Ravi Venkat to put the matter in front of the management and suggested to construct a reservoir for captive purpose, if possible, near the plant site. The members inquired about the landed cost of crop residues and whether sugar cane trash & tops can be used as raw material. Mr. Ravi Venkat felt sorry for not having information about using sugar cane residues as raw material but assured the members to inquire about the same from the corporate office. Regarding landed cost of residues Mr.Ravi Venkat mentioned that cost of raw materials would be around Rs. 350 to 450 per tonne. The members expressed their willingness to supply raw materials and requested the company management to increase the cost of raw materials. The members also assured that the company can procure substantial quantity of raw materials provided the cost of raw material is increased. The members also informed Mr. Ravi Venkat that Parbhani and adjoining districts such as Hingoli are one of important cotton producing districts in the state of Maharashtra and presently 60% of the cotton stalks is being burnt in the fields, hence the company can procure sufficient quantity of raw material for operation of the plant. On questioning about the project commissioning period, Mr. Ravi Venkat informed the members that construction of the unit will start within a period of two months and the unit will be commissioned by June 2008.

The meeting was terminated at 1:30 PM (IST) with Gram Panchayath giving vote of thanks on behalf of the Sarpanch

members to all the participants of the meeting and wished the company to commission the project at the earliest. The Sarpanch requested the company management to contribute some monetary help for the renovation of the village temple. Mr. Ravi Venkat, assured the sarpanch that he will discuss the issue with the Managing Director personally.

LIST OF STAKEHOLDERS ATTENDED IN THE STAKHOLDERS MEETING HELD ON 29/06/06 AT 11:30 A.M AT BORDWADI VILLAGE. PARBANI TAHSIL.

| SL No. | NAME | ADDRESS | Signature. |
|---|---|---|---|
| ① | गोपाळ कुलकर्णी (सरपंच) | ग्रा.पं. बोरवाडी (बु) | |
| ② | | उपसरपंच | |



LIST OF FARMERS ATTENDED IN STAKE HOLDERS MEETING AT BORDWAND VILLAGE ON 29/05/06. AT PLANT SITE OF MSM ENERGY.

| S.No. | NAME | ADDRESS | SIGNATURE. |
|---|---|---|---|
| 1 | [illegible] | [illegible] | |
| 2 | रामविज्ञान हिंगणे | | |
| 3 | रामभाऊ [illegible] | | |
| 4 | पंडीतरूस्तुमराव हिंगणे | | |
| 5 | आपुराव वामनराव लोखंडे | | |
| 6 | भागनाथ नरहरि लोखंडे | | |
| 7 | रामेश्वराव पांडुरंगराव रवळे | | |
| 8 | नामदेव शेषराव खोबरखेडे | | |
| 9 | शेषराव रोशन शेषराव शेख | | |
| 10 | शाम रवळे | | |
| 11 | [illegible] | | |