

# **MONITORING REPORT**

VERSION-1 DATED 06<sup>th</sup> July 2009

FOR THE PERIOD  
1<sup>st</sup> APRIL 2007 to 31<sup>st</sup> MARCH 2009

## **0390: Perpetual 7.5 MW Non-Conventional Renewable Sources Biomass Power Project**

### **PERPETUAL ENERGY SYSTEMS LTD.**

| <b><u>Plant Address</u></b>                                                                                                                                                                                                                               | <b><u>Registered Office</u></b>                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PERPETUAL ENERGY SYSTEMS LTD</b><br>Appayyapeta Village,<br>Seethanagaram mandal,<br>Vizianagaram Dist.<br>Andhra Pradesh – 535 546<br>Ph : 08944 – 250997<br>Fax : 08944 - 250985<br>e-mail: <a href="mailto:nslpesl@gmail.com">nslpesl@gmail.com</a> | <b>PERPETUAL ENERGY SYSTEMS LTD</b><br>#8-2-684/2/A, Flat No.1 to 4,<br>NSL Icon 4 <sup>th</sup> Floor, Road No. 12,<br>Banjara Hills, Hyderabad – 500 034<br>Andhra Pradesh.<br>Ph : 040 – 23327949<br>Fax : 040 - 23327919<br>e-mail: <a href="mailto:nslpesl@yahoo.com">nslpesl@yahoo.com</a> |

**CURRENT STATUS OF THE PROJECT**

Perpetual 7.5 MW Non-Conventional Renewable Sources Biomass Power Project is located at Appayyapeta (Village), Seethanagaram Mandal, Vizianagaram (Dist) of Andhra Pradesh, India. Project is commissioned on 23rd March 2003, since then the plant is in Operation.

The project is registered with UNFCCC in 2006 and received two issuances of CERs in 2007 and 2008 as shown below.

|                                                                                         |                                                            |
|-----------------------------------------------------------------------------------------|------------------------------------------------------------|
| Registration of the project with UNFCCC                                                 | <b>16<sup>th</sup> June 2006</b>                           |
| <b>Monitoring period:</b> 16 <sup>th</sup> February 2003 to 31 <sup>st</sup> March 2006 | <b>93053 CERs</b> issued on 8 <sup>th</sup> January 2007   |
| <b>Monitoring period:</b> 1 <sup>st</sup> April 2006 to 31 <sup>st</sup> March 2007     | <b>35203 CERs</b> issued on 28 <sup>th</sup> February 2008 |

UNFCCC through its communication on 6th May 2008 directed Perpetual Energy Systems Limited and concerned DOE (DNV) to revise the monitoring plan by including diesel consumption at the project site of the project activity In accordance with the direction, Perpetual Energy Systems Limited submitted revised PDD by including revised monitoring plan to UNFCCC through DOE (DNV) on 16th February 2009. Further to the directions of the Secretariat after completeness check of the document, revised monitoring plan alone has been submitted to UNFCCC through DOE (DNV) and the acknowledgement of the same has been received through email from Secretariat on 3rd March 2009. UNFCCC approved the request for revision of the monitoring plan on 28<sup>th</sup> April 2009 and this monitoring plan is prepared in accordance with the approved Revised Monitoring Plan.

During the period from 1st April 2007 to 31<sup>st</sup> March 2009 for commercial operations, plant exported 70638.90 MWh of electricity to APTRANSCO grid and consumed 133, 597.63 MT of renewable biomass fuels and 653 Liters of Diesel.

**Statement showing the outages, forced and planned shutdown periods**

Plant is in operation continuously (with outages, forced & planned shutdowns) from

1<sup>st</sup> April 2007 to 31<sup>st</sup> March 2009 and year wise details of outages, forced and planned shutdown periods are as mentioned below.

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|                                                                                        | <b>1<sup>st</sup> April 2007 to 31<sup>st</sup> March 2008</b> | <b>1<sup>st</sup> April 2008 to 31<sup>st</sup> March 2009</b> |
|----------------------------------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|
| Total Number of available working days                                                 | 366 days 00 hours 00 minutes                                   | 365 days 00 hours 00 minutes                                   |
| Number of planned shutdowns including Shutdown days after completion of monthly target | 29 days 07 hours 46 minutes                                    | 56 days 09 hours 24 minutes                                    |
| Number of forced shutdowns                                                             | 10 days 08 hours 56 minutes                                    | 38 days 17 hours 23 minutes                                    |
| Total shutdown days                                                                    | 39 days 16 hours 42 minutes                                    | 95 days 2 hours 47 minutes                                     |
| Total Shut down days for the monitoring period                                         | 134 days 19 hours 29 minutes                                   |                                                                |

| <b>Planned and Forced Shutdown days for the period 1<sup>st</sup> April 2007 to 31<sup>st</sup> March 2008</b> |           |                      |              |                |               |              |                |              |              |                |
|----------------------------------------------------------------------------------------------------------------|-----------|----------------------|--------------|----------------|---------------|--------------|----------------|--------------|--------------|----------------|
| <b>PERIOD</b>                                                                                                  |           | <b>SHUTDOWN DAYS</b> |              |                |               |              |                |              |              |                |
| <b>From</b>                                                                                                    | <b>To</b> | <b>Planned</b>       |              |                | <b>Forced</b> |              |                | <b>Total</b> |              |                |
|                                                                                                                |           | <b>Days</b>          | <b>Hours</b> | <b>Minutes</b> | <b>Days</b>   | <b>Hours</b> | <b>Minutes</b> | <b>Days</b>  | <b>Hours</b> | <b>Minutes</b> |
| 01-Apr-07                                                                                                      | 23-Apr-07 | 01                   | 07           | 59             | 00            | 02           | 18             | 01           | 10           | 17             |
| 23-Apr-07                                                                                                      | 23-May-07 | 02                   | 18           | 55             | 01            | 05           | 57             | 04           | 02           | 52             |
| 23-May-07                                                                                                      | 23-Jun-07 | 03                   | 08           | 06             | 01            | 02           | 00             | 04           | 10           | 06             |
| 23-Jun-07                                                                                                      | 23-Jul-07 | 00                   | 00           | 00             | 00            | 06           | 20             | 00           | 06           | 20             |
| 23-Jul-07                                                                                                      | 23-Aug-07 | 04                   | 11           | 27             | 00            | 15           | 26             | 05           | 02           | 53             |
| 23-Aug-07                                                                                                      | 23-Sep-07 | 04                   | 01           | 04             | 00            | 09           | 56             | 04           | 11           | 00             |
| 23-Sep-07                                                                                                      | 23-Oct-07 | 05                   | 08           | 23             | 02            | 15           | 05             | 07           | 23           | 27             |
| 23-Oct-07                                                                                                      | 23-Nov-07 | 02                   | 03           | 55             | 00            | 04           | 47             | 02           | 08           | 42             |
| 23-Nov-07                                                                                                      | 23-Dec-07 | 00                   | 00           | 00             | 00            | 14           | 35             | 00           | 14           | 35             |
| 23-Dec-07                                                                                                      | 23-Jan-08 | 00                   | 00           | 00             | 02            | 10           | 06             | 02           | 10           | 06             |
| 23-Jan-08                                                                                                      | 23-Feb-08 | 01                   | 02           | 47             | 00            | 10           | 21             | 01           | 13           | 08             |
| 23-Feb-08                                                                                                      | 23-Mar-08 | 04                   | 00           | 09             | 00            | 05           | 31             | 04           | 05           | 40             |
| 23-Mar-08                                                                                                      | 31-Mar-08 | 00                   | 17           | 01             | 00            | 02           | 34             | 00           | 19           | 35             |
| <b>Total</b>                                                                                                   |           | <b>29</b>            | <b>07</b>    | <b>46</b>      | <b>10</b>     | <b>08</b>    | <b>56</b>      | <b>39</b>    | <b>16</b>    | <b>42</b>      |

| <b>Planned and Forced Shutdown days for the period 1<sup>st</sup> April 2008 to 31<sup>st</sup> March 2009</b> |           |                      |              |                |               |              |                |              |              |                |
|----------------------------------------------------------------------------------------------------------------|-----------|----------------------|--------------|----------------|---------------|--------------|----------------|--------------|--------------|----------------|
| <b>PERIOD</b>                                                                                                  |           | <b>SHUTDOWN DAYS</b> |              |                |               |              |                |              |              |                |
| <b>From</b>                                                                                                    | <b>To</b> | <b>Planned</b>       |              |                | <b>Forced</b> |              |                | <b>Total</b> |              |                |
|                                                                                                                |           | <b>Days</b>          | <b>Hours</b> | <b>Minutes</b> | <b>Days</b>   | <b>Hours</b> | <b>Minutes</b> | <b>Days</b>  | <b>Hours</b> | <b>Minutes</b> |
| 01-Apr-08                                                                                                      | 23-Apr-08 | 00                   | 00           | 00             | 02            | 20           | 04             | 02           | 20           | 04             |
| 23-Apr-08                                                                                                      | 23-May-08 | 00                   | 00           | 00             | 01            | 22           | 02             | 01           | 22           | 02             |

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|              |           |           |           |           |           |           |           |           |           |           |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 23-May-08    | 23-Jun-08 | 00        | 00        | 00        | 03        | 5         | 44        | 03        | 5         | 44        |
| 23-Jun-08    | 23-Jul-08 | 00        | 00        | 00        | 02        | 5         | 35        | 02        | 5         | 35        |
| 23-Jul-08    | 23-Aug-08 | 09        | 01        | 30        | 07        | 17        | 10        | 16        | 18        | 40        |
| 23-Aug-08    | 23-Sep-08 | 20        | 23        | 49        | 00        | 12        | 15        | 21        | 15        | 04        |
| 23-Sep-08    | 23-Oct-08 | 02        | 07        | 46        | 01        | 19        | 39        | 04        | 03        | 25        |
| 23-Oct-08    | 23-Nov-08 | 02        | 22        | 58        | 13        | 19        | 40        | 16        | 18        | 38        |
| 23-Nov-08    | 23-Dec-08 | 04        | 07        | 09        | 00        | 15        | 54        | 04        | 23        | 03        |
| 23-Dec-08    | 23-Jan-09 | 13        | 22        | 25        | 01        | 13        | 59        | 15        | 12        | 24        |
| 23-Jan-09    | 23-Feb-09 | 00        | 10        | 07        | 01        | 15        | 08        | 02        | 01        | 15        |
| 23-Feb-09    | 23-Mar-09 | 02        | 09        | 40        | 00        | 05        | 52        | 02        | 15        | 32        |
| 23-Mar-09    | 31-Mar-09 | 00        | 00        | 00        | 00        | 12        | 59        | 00        | 12        | 59        |
| <b>Total</b> |           | <b>56</b> | <b>09</b> | <b>24</b> | <b>38</b> | <b>18</b> | <b>01</b> | <b>95</b> | <b>03</b> | <b>25</b> |

**Monitoring Period**

The Monitoring period is from **01<sup>st</sup> April 2007 to 31<sup>st</sup> March 2009**, both days inclusive.

**Parameters monitored in accordance with the approved Revised Monitoring Plan**

As requested by the board, PESL has revised monitoring plan to incorporate one additional parameter as a part of the monitoring plan, namely, Diesel Consumption at the project facility. Though this parameter did not form a part of the monitoring plan in the registered PDD, PESL had already incorporated the same in the previous two monitoring reports submitted for the project activity against which CERs have already been issued. The links to the same have been given below:

1. Monitoring report: 24 March 2003 - 31 Mar 2006<sup>1</sup>
2. Monitoring report: 01 Apr 2006 - 31 Mar 2007<sup>2</sup>

In the first monitoring report (24 March 2003 - 31 Mar 2006) the DOE issued a Forward Action Request (FAR) which has been given below:

*“Southern grid emission factor is calculated based on data from CEA annual reports and fixed for total crediting period. The power exported to the grid is monitored on daily basis by project team and on monthly basis by APTRANSCO officials in presence of plant management. The fuel consumption is done based on daily log books and stores records on*

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<sup>1</sup> <http://cdm.unfccc.int/UserManagement/FileStorage/PGWCMKP4FDZUCXC5JVR10CTZK6Z0JF>

<sup>2</sup> <http://cdm.unfccc.int/UserManagement/FileStorage/JQ7OAC8PF26WE7ACGIUG9HYXFPWC2O>

daily basis. Monitoring of data pertaining to emissions due to consumption of diesel for DG set operations in case of emergency need to be made part of monitoring plan”.

Against the same, PESL’s response which was duly accepted is stated below:

*“Though the consumption of diesel in plant during the emergency conditions like black out is being monitored since beginning the same as not included in the monitoring protocol considering consumption in very small quantities. However, the same, will be included in the monitoring plan and separate records for the same will be maintained and the same will be made available during all future verifications as it was done during present verification.”*

Since then PESL is maintaining up to date records pertaining to Diesel consumption and same have been made available during subsequent verifications.

Thus with the incorporation of this monitoring parameter, there would be no impact on the baseline and negligible impact on the emission reductions from the project activity.

In accordance with the revised monitoring plan, following parameters are being monitored for the project activity:

| Sl. No | Parameter                                | Procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | <b>Electricity Generation (in kWh)</b>   | Power generated in the plant is measured using the energy meter installed in the plant on continuous basis. The total generated power is also used to compare the auxiliary consumption of the plant after deducting the power exported to the grid from total generation.                                                                                                                                                                                                               |
| 2      | <b>Auxiliary consumption (in kWh)</b>    | Power consumed by auxiliaries at the plant is measured as the difference between total electricity generated and electricity exported to the grid.                                                                                                                                                                                                                                                                                                                                       |
| 3      | <b>Power Export (in kWh)</b>             | Power exported to the grid is monitored from energy meters installed at APTRANSCO sub-station on <b>23rd day</b> of every month. Representatives of APTRANSCO and IGPPL are recording meter readings jointly for the energy exported to the Grid. Both the parties will jointly sign the recorded readings as a proof of export of Power to the grid from IGPPL plant. These meter readings are the basis for the invoices raised by <b>Perpetual Energy Systems Limited</b>             |
| 4      | <b>Power Import in kWh</b>               | Power imported from the grid is monitored from energy meters installed at APTRANSCO sub-station on <b>23rd day</b> of every month. Representatives of APTRANSCO and IGPPL are recording meter readings jointly for the energy imported to the Grid. Both the parties will jointly sign the recorded readings as a proof of import of Power from APTRANSCO grid by the power plant. These meter readings are the basis for the invoices raised by <b>Perpetual Energy Systems Limited</b> |
| 5      | <b>Biomass Fuel (of all kinds) in MT</b> | On receipt of Biomass fuel to the Plant, the vehicles are weighed on 40T Electronic Weigh Bridge installed at the entrance of the Plant and these will be unloaded in the fuel storage yards. The biomass fuel after necessary preparation is fed to the Boiler through Belt Conveyor as per the requirement and consumption will be recorded on daily basis.                                                                                                                            |

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|   |                                                                             |                                                                                                                                                                                                                                     |
|---|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   |                                                                             | During the monitoring period, Plant used Rice Husk, Red gram Stalk and other Agricultural Waste Residues (like Bengal gram, Black gram and Trashes of Soya been, Ground Nut Shell etc.,) for the purpose of electricity generation. |
| 6 | <b><i>Calorific value of the Biomass fuel (of all kinds) in kCal/Kg</i></b> | The calorific value of the Biomass fuel being used is measured in the in-house laboratory on daily basis as per the arrivals and average value will be considered on monthly basis.                                                 |
| 7 | <b><i>Diesel in Liters</i></b>                                              | Diesel consumption will be monitored on regular basis using dip stick method                                                                                                                                                        |
| 8 | <b><i>Coal in MT</i></b>                                                    | Coal will be fed to the boiler as and when required and consumption will be recorded accordingly. As of now, no coal is being used in the plant for the purpose of electricity generation.                                          |

**Power Generation, Export, Import & Fuel Consumption**

Month-wise data on Power Generation, export, import, fuel consumption and diesel consumption during the monitoring period is given below:

| Period                                                    |            | Electricity<br>Generated,<br>kWh | Electricity<br>Exported,<br>kWh | Electricity<br>Imported,<br>kWh | Total Biomass<br>used, MT | Coal Used, MT | Diesel<br>consumption, lit |
|-----------------------------------------------------------|------------|----------------------------------|---------------------------------|---------------------------------|---------------------------|---------------|----------------------------|
| From                                                      | To         |                                  |                                 |                                 |                           |               |                            |
| 1 <sup>st</sup> April 2007 to 31 <sup>st</sup> March 2008 |            |                                  |                                 |                                 |                           |               |                            |
| 01-Apr-07                                                 | 23-Apr-07  | 2794000                          | 2446300                         | 9900                            | 4785                      | 0             | 41                         |
| 23-Apr-07                                                 | 23-May-07  | 3555900                          | 3075500                         | 9700                            | 5690                      | 0             | 20                         |
| 23-May-07                                                 | 23-Jun-07  | 3616800                          | 3030800                         | 20000                           | 5700                      | 0             | 37                         |
| 23-Jun-07                                                 | 23-Jul- 07 | 3965300                          | 3419500                         | 900                             | 6415                      | 0             | 3                          |
| 23-Jul- 07                                                | 23-Aug-07  | 3739800                          | 3261200                         | 9600                            | 6135                      | 0             | 38                         |
| 23-Aug-07                                                 | 23-Sep-07  | 3146700                          | 2657400                         | 15100                           | 5230                      | 0             | 7                          |
| 23-Sep-07                                                 | 23-Oct-07  | 2897600                          | 2494000                         | 25900                           | 5050                      | 0             | 5                          |
| 23-Oct-07                                                 | 23-Nov-07  | 4125300                          | 3611100                         | 5600                            | 6945                      | 0             | 14                         |
| 23-Nov-07                                                 | 23-Dec-07  | 3975700                          | 3461800                         | 3000                            | 7255                      | 0             | 2                          |
| 23-Dec-07                                                 | 23-Jan-08  | 4032700                          | 3538500                         | 12600                           | 7525                      | 0             | 2                          |
| 23-Jan-08                                                 | 23-Feb-08  | 4459900                          | 3921700                         | 7400                            | 8305                      | 0             | 3                          |
| 23-Feb-08                                                 | 23-Mar-08  | 3968800                          | 3513200                         | 9100                            | 6225                      | 0             | 6                          |
| 23-Mar-08                                                 | 31-Mar-08  | 1149300                          | 1011800                         | 4500                            | 2117.7                    | 0             | 1                          |
| Total for 2007-2008                                       |            | 45427800                         | 39442800                        | 133300                          | 77377.7                   | 0             | 179                        |
| 1 <sup>st</sup> April 2008 to 23rd January 2009           |            |                                  |                                 |                                 |                           |               |                            |

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|                            |           |                 |                 |               |                 |          |            |
|----------------------------|-----------|-----------------|-----------------|---------------|-----------------|----------|------------|
| 01-Apr-08                  | 23-Apr-08 | 2747100         | 2393800         | 12600         | 3687            | 0        | 4          |
| 23-Apr-08                  | 23-May-08 | 4031500         | 3518900         | 11000         | 6005            | 0        | 95         |
| 23-May-08                  | 23-Jun-08 | 4333200         | 3782800         | 15800         | 7170            | 0        | 32         |
| 23-Jun-08                  | 23-Jul-08 | 4051700         | 3524600         | 8400          | 6346.1          | 0        | 13         |
| 23-Jul-08                  | 23-Aug-08 | 1645300         | 1401100         | 24300         | 2670.01         | 0        | 294        |
| 23-Aug-08                  | 23-Sep-08 | 1157200         | 987100          | 28100         | 2010            | 0        | 3          |
| 23-Sep-08                  | 23-Oct-08 | 2781100         | 2330600         | 13700         | 4910            | 0        | 4          |
| 23-Oct-08                  | 23-Nov-08 | 1357300         | 1106700         | 28200         | 2694.95         | 0        | 4          |
| 23-Nov-08                  | 23-Dec-08 | 2980100         | 2542600         | 8800          | 4596.21         | 0        | 2          |
| 23-Dec-08                  | 23-Jan-09 | 2451900         | 2068200         | 24200         | 3715.63         | 0        | 3          |
| 23-Jan-09                  | 23-Feb-09 | 4162200         | 3647300         | 8800          | 6470            | 0        | 8          |
| 23-Feb-09                  | 23-Mar-09 | 3498700         | 3067500         | 7800          | 4640            | 0        | 11         |
| 23-Mar-09                  | 31-Mar-09 | 953900          | 824900          | 3500          | 1305            | 0        | 1          |
| <b>Total for 2008-2009</b> |           | <b>36151200</b> | <b>31196100</b> | <b>195200</b> | <b>56219.9</b>  | <b>0</b> | <b>474</b> |
| <b>TOTAL for 2007-2009</b> |           | <b>81579000</b> | <b>70638900</b> | <b>328500</b> | <b>133597.6</b> | <b>0</b> | <b>653</b> |

**Note:** 1) The above values are taken from 23rd to 23rd of Every Month (Billing Month Basis).

### **Emission Reductions**

Emission reductions are calculated based on the power exported to the grid, power imported from the grid during shut down and start up, and diesel consumed in the plant from 01<sup>st</sup> April 2007 to 31<sup>st</sup> March2009.

Baseline and project emissions are calculated as per the formulas and default values as mentioned in approved Revised Monitoring Plan. The same is given below:

| <b>Emissions</b>                 | <b>Formula used</b>                                                                                                                                 |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Baseline emissions</b>        | = Electricity exported to the grid (kWh) x grid emission factor (tCO <sub>2</sub> /kWh)                                                             |
| <b>Project emissions</b>         |                                                                                                                                                     |
| Due to coal consumption          | = Actual Coal consumed in MT x % carbon in coal x (44/12)                                                                                           |
| Due to diesel consumption        | = [(Diesel consumed in liters x calorific value (TJ/kg) x density of fuel (kg/l))] x IPCC emission factor (tCO <sub>2</sub> /TJ) x oxidation factor |
| Due to import of power from Grid | = Electricity imported from grid (kWh) x grid emission factor (tCO <sub>2</sub> /kWh)                                                               |

|                                                                              |   |                                  |
|------------------------------------------------------------------------------|---|----------------------------------|
| Grid Emission Factor (Ex ante value as per registered PDD)                   | = | <b>0.830 tCO<sub>2</sub>/MWh</b> |
| Net Calorific Value of Diesel (Default Value as per revised Monitoring Plan) | = | <b>43.0 TJ/Gg</b>                |

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|                                                                  |   |                                |
|------------------------------------------------------------------|---|--------------------------------|
| Density of Diesel (Default Value as per Revised monitoring plan) | = | <b>0.83 t/1000 Lit</b>         |
| IPCC Emission factor                                             | = | <b>74.1 tCO<sub>2</sub>/TJ</b> |
| Oxidation Factor of Diesel                                       | = | <b>1.0</b>                     |

| Period                                                    |            | Electricity<br>Generated,<br>kWh | Electricity<br>Exported,<br>kWh | Electricity<br>Imported,<br>kWh | Total Biomass used,<br>MT | Coal Used, MT | Diesel consumption ,<br>lit | Emission<br>Reductions/CERS |
|-----------------------------------------------------------|------------|----------------------------------|---------------------------------|---------------------------------|---------------------------|---------------|-----------------------------|-----------------------------|
| From                                                      | To         |                                  |                                 |                                 |                           |               |                             |                             |
| 1 <sup>st</sup> April 2007 to 31 <sup>st</sup> March 2008 |            |                                  |                                 |                                 |                           |               |                             |                             |
| 01-Apr-07                                                 | 23-Apr-07  | 2794000                          | 2446300                         | 9900                            | 4785                      | 0             | 41                          | 2,022                       |
| 23-Apr-07                                                 | 23-May-07  | 3555900                          | 3075500                         | 9700                            | 5690                      | 0             | 20                          | 2,545                       |
| 23-May-07                                                 | 23-Jun-07  | 3616800                          | 3030800                         | 20000                           | 5700                      | 0             | 37                          | 2,499                       |
| 23-Jun-07                                                 | 23-Jul-07  | 3965300                          | 3419500                         | 900                             | 6415                      | 0             | 3                           | 2,837                       |
| 23-Jul-07                                                 | 23-Aug-07  | 3739800                          | 3261200                         | 9600                            | 6135                      | 0             | 38                          | 2,699                       |
| 23-Aug-07                                                 | 23-Sep-07  | 3146700                          | 2657400                         | 15100                           | 5230                      | 0             | 7                           | 2,193                       |
| 23-Sep-07                                                 | 23-Oct-07  | 2897600                          | 2494000                         | 25900                           | 5050                      | 0             | 5                           | 2,049                       |
| 23-Oct-07                                                 | 23-Nov-07  | 4125300                          | 3611100                         | 5600                            | 6945                      | 0             | 14                          | 2,993                       |
| 23-Nov-07                                                 | 23-Dec-07  | 3975700                          | 3461800                         | 3000                            | 7255                      | 0             | 2                           | 2,871                       |
| 23-Dec-07                                                 | 23-Jan-08  | 4032700                          | 3538500                         | 12600                           | 7525                      | 0             | 2                           | 2,926                       |
| 23-Jan-08                                                 | 23-Feb-08  | 4459900                          | 3921700                         | 7400                            | 8305                      | 0             | 3                           | 3,249                       |
| 23-Feb-08                                                 | 23-Mar-08  | 3968800                          | 3513200                         | 9100                            | 6225                      | 0             | 6                           | 2,908                       |
| 23-Mar-08                                                 | 31-Mar-08  | 1149300                          | 1011800                         | 4500                            | 2117.7                    | 0             | 1                           | 836                         |
| Total for the period<br>2007-2008                         |            | 45427800                         | 39442800                        | 133300                          | 77377.7                   | 0             | 179                         | 32,627                      |
| 1 <sup>st</sup> April 2008 to 23rd January 2009           |            |                                  |                                 |                                 |                           |               |                             |                             |
| 01-Apr-08                                                 | 23-Apr-08  | 2747100                          | 2393800                         | 12600                           | 3687                      | 0             | 4                           | 1,976                       |
| 23-Apr-08                                                 | 23-May-08  | 4031500                          | 3518900                         | 11000                           | 6005                      | 0             | 95                          | 2,911                       |
| 23-May-08                                                 | 23-Jun-08  | 4333200                          | 3782800                         | 15800                           | 7170                      | 0             | 32                          | 3,127                       |
| 23-Jun-08                                                 | 23-Jul- 08 | 4051700                          | 3524600                         | 8400                            | 6346.1                    | 0             | 13                          | 2,918                       |
| 23-Jul- 08                                                | 23-Aug-08  | 1645300                          | 1401100                         | 24300                           | 2670.01                   | 0             | 294                         | 1,142                       |
| 23-Aug-08                                                 | 23-Sep-08  | 1157200                          | 987100                          | 28100                           | 2010                      | 0             | 3                           | 796                         |



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|                                           |           |                 |                 |               |                 |          |            |              |
|-------------------------------------------|-----------|-----------------|-----------------|---------------|-----------------|----------|------------|--------------|
| 23-Sep-08                                 | 23-Oct-08 | 2781100         | 2330600         | 13700         | 4910            | 0        | 4          | 1,923        |
| 23-Oct-08                                 | 23-Nov-08 | 1357300         | 1106700         | 28200         | 2694.95         | 0        | 4          | 895          |
| 23-Nov-08                                 | 23-Dec-08 | 2980100         | 2542600         | 8800          | 4596.21         | 0        | 2          | 2,103        |
| 23-Dec-08                                 | 23-Jan-09 | 2451900         | 2068200         | 24200         | 3715.63         | 0        | 3          | 1,697        |
| 23-Jan-09                                 | 23-Feb-09 | 4162200         | 3647300         | 8800          | 6470            | 0        | 8          | 3,020        |
| 23-Feb-09                                 | 23-Mar-09 | 3498700         | 3067500         | 7800          | 4640            | 0        | 11         | 2,540        |
| 23-Mar-09                                 | 31-Mar-09 | 953900          | 824900          | 3500          | 1305            | 0        | 1          | 682          |
| <b>Total for the period<br/>2008-2009</b> |           | <b>36151200</b> | <b>31196100</b> | <b>195200</b> | <b>56219.9</b>  | <b>0</b> | <b>474</b> | <b>25730</b> |
| <b>Total</b>                              |           | <b>81579000</b> | <b>70638900</b> | <b>328500</b> | <b>133597.6</b> | <b>0</b> | <b>653</b> | <b>58357</b> |

The detailed calculation sheet for the same is given in **Annexure – I** of the monitoring report.

**Availability of biomass in the region:**

The total biomass availability in the region was assessed based on the data available from the Central Planning Office, District Administration of Vizianagaram District, Andhra Pradesh. The total biomass available in the region was estimated for the year 2006-07 at 2,351,000MT. Accordingly the total biomass utilization in the region is estimated at 1,566,790 MT per annum which includes biomass power plants and other users. The total surplus biomass in the region after usage is 133, 597.63 MT, which is about 50% of the quantity of biomass that is utilized including the project activity. In accordance with the baseline and monitoring methodology AMS-I.D applied to the project activity, if the quantity of available biomass in the region is at least 25% higher than the quantity of biomass that is utilized including the project activity, then the source of leakage can be neglected. Otherwise this leakage shall be estimated and deducted from the emission reductions. Since the quantity of biomass is greater than 25%, there is no leakage attributed to the project activity.

**Measures to Ensure the Results / Uncertainty Analysis**

As per the Power Purchase Agreement (PPA), the energy exported to the AP Grid is recorded from two independent meters viz., Main Meter and Check Meter and reading of main meter is used for billing. In the event of main meter not in operation / fails, the reading of the check meter shall be used for Billing. The calibration of monitoring equipment is being maintained as per the requirement of APTRANSCO and the same is being done regularly. Power Generation,

Export & Auxiliary Consumption, fuel consumption are being recorded daily and the same is being verified by General Manager and it will be approved by Plant Manager.

Internal audits are carried out by CDM team members in order to ensure that monitoring of the parameters is done as per the PDD and revised monitoring plan. Experts and consultants of Perpetual Energy Systems Limited also assist CDM team in monitoring of the parameters as per monitoring plan.

### **Roles & Responsibilities**

A CDM team has been formed in Perpetual Energy Systems Limited for monitoring and verification of all the monitoring parameters as per the guidelines formulated by the management of Perpetual Energy Systems Limited. Qualified and trained people monitor the parameters and emission reduction calculations. In the complete implementation and monitoring Plan, Perpetual Energy Systems Limited is the sole agency responsible for implementation and monitoring.

### **Members of CDM Team**

- a) Rambabu, Plant Manger (till 31st March 2009)
- b) V Manohar, Plant Manager (From 1<sup>st</sup> April 2009)
- c) Pavan Kumar Lasya, Manager ( Finance & Accounts)
- d) K Madhava Rao (O&M).
- e) K. S. Koteswara Rao (Accountant)

**Annexure – I: CER Calculations**

| Period From                                                              | Period To | Electricity Generated, kWh | Electricity Exported, kWh | Electricity Imported, kWh | Auxiliary Consumption, kWh (including T&D losses) | Total Biomass – MT | Coal Used, MT | Raw Material Total, MT | % Carbon in Coal | Emission Factor, kgCO2/ kWh | Baseline Emissions, tCo2e | Diesel consumption , lit | Project Emissions, tCO2e     |                        |                            |         | EMISSION REDUCTIONS, tCo2e |
|--------------------------------------------------------------------------|-----------|----------------------------|---------------------------|---------------------------|---------------------------------------------------|--------------------|---------------|------------------------|------------------|-----------------------------|---------------------------|--------------------------|------------------------------|------------------------|----------------------------|---------|----------------------------|
|                                                                          |           |                            |                           |                           |                                                   |                    |               |                        |                  |                             |                           |                          | Due to consumption of Diesel | Due to import of Power | Due to consumption of coal | Total   |                            |
|                                                                          |           |                            |                           |                           |                                                   |                    |               |                        |                  |                             |                           |                          |                              |                        |                            |         |                            |
| For the period 1 <sup>st</sup> April 2007 to 31 <sup>st</sup> March 2008 |           |                            |                           |                           |                                                   |                    |               |                        |                  |                             |                           |                          |                              |                        |                            |         |                            |
| 1-Apr-07                                                                 | 23-Apr-07 | 2794000                    | 2446300                   | 9900                      | 347700                                            | 4785               | 0             | 4,785                  | 0                | 0.83                        | 2,030                     | 41                       | 0.108                        | 8.217                  | 0.00                       | 8.22    | 2,022                      |
| 24-Apr-07                                                                | 23-May-07 | 3555900                    | 3075500                   | 9700                      | 480400                                            | 5690               | 0             | 5,690                  | 0                | 0.83                        | 2,553                     | 20                       | 0.053                        | 8.051                  | 0.00                       | 8.05    | 2,545                      |
| 23-May-07                                                                | 23-Jun-07 | 3616800                    | 3030800                   | 20000                     | 586000                                            | 5700               | 0             | 5,700                  | 0                | 0.83                        | 2,516                     | 37                       | 0.098                        | 16.600                 | 0.00                       | 16.60   | 2,499                      |
| 23-Jun-07                                                                | 23-Jul-07 | 3965300                    | 3419500                   | 900                       | 545800                                            | 6415               | 0             | 6,415                  | 0                | 0.83                        | 2,838                     | 3                        | 0.008                        | 0.747                  | 0.00                       | 0.75    | 2,837                      |
| 23-Jul-07                                                                | 23-Aug-07 | 3739800                    | 3261200                   | 9600                      | 478600                                            | 6135               | 0             | 6,135                  | 0                | 0.83                        | 2,707                     | 38                       | 0.100                        | 7.968                  | 0.00                       | 7.97    | 2,699                      |
| 23-Aug-07                                                                | 23-Sep-07 | 3146700                    | 2657400                   | 15100                     | 489300                                            | 5230               | 0             | 5,230                  | 0                | 0.83                        | 2,206                     | 7                        | 0.019                        | 12.533                 | 0.00                       | 12.53   | 2,193                      |
| 23-Sep-07                                                                | 23-Oct-07 | 2897600                    | 2494000                   | 25900                     | 403600                                            | 5050               | 0             | 5,050                  | 0                | 0.83                        | 2,070                     | 5                        | 0.013                        | 21.497                 | 0.00                       | 21.50   | 2,049                      |
| 23-Oct-07                                                                | 23-Nov-07 | 4125300                    | 3611100                   | 5600                      | 514200                                            | 6945               | 0             | 6,945                  | 0                | 0.83                        | 2,997                     | 14                       | 0.037                        | 4.648                  | 0.00                       | 4.65    | 2,993                      |
| 23-Nov-07                                                                | 23-Dec-07 | 3975700                    | 3461800                   | 3000                      | 513900                                            | 7255               | 0             | 7,255                  | 0                | 0.83                        | 2,873                     | 2                        | 0.005                        | 2.490                  | 0.00                       | 2.49    | 2,871                      |
| 23-Dec-07                                                                | 23-Jan-08 | 4032700                    | 3538500                   | 12600                     | 494200                                            | 7525               | 0             | 7,525                  | 0                | 0.83                        | 2,937                     | 2                        | 0.005                        | 10.458                 | 0.00                       | 10.46   | 2,926                      |
| 23-Jan-08                                                                | 23-Feb-08 | 4459900                    | 3921700                   | 7400                      | 538200                                            | 8305               | 0             | 8,305                  | 0                | 0.83                        | 3,255                     | 3                        | 0.008                        | 6.142                  | 0.00                       | 6.14    | 3,249                      |
| 23-Feb-08                                                                | 23-Mar-08 | 3968800                    | 3513200                   | 9100                      | 455600                                            | 6225               | 0             | 6,225                  | 0                | 0.83                        | 2,916                     | 6                        | 0.016                        | 7.553                  | 0.00                       | 7.55    | 2,908                      |
| 23-Mar-08                                                                | 31-Mar-08 | 1149300                    | 1011800                   | 4500                      | 137500                                            | 2117.73            | 0             | 2,117.73               | 0                | 0.83                        | 840                       | 1                        | 0.003                        | 3.735                  | 0.00                       | 3.74    | 836                        |
| Total for the Period 2007-2008                                           |           | 45427800                   | 39442800                  | 133300                    | 5985000                                           | 77377.73           | 0             | 77377.73               | 0                | 0.83                        | 32738                     | 179                      | 0.47                         | 110.64                 | 0.00                       | 111.112 | 32627                      |
| For the period 1 <sup>st</sup> April 2008 to 23rd January 2009           |           |                            |                           |                           |                                                   |                    |               |                        |                  |                             |                           |                          |                              |                        |                            |         |                            |
| 1-Apr-08                                                                 | 23-Apr-08 | 2747100                    | 2393800                   | 12600                     | 353300                                            | 3687               | 0             | 3,687                  | 0                | 0.83                        | 1,987                     | 4                        | 0.011                        | 10.458                 | 0.00                       | 10.46   | 1,976                      |
| 23-Apr-08                                                                | 23-May-08 | 4031500                    | 3518900                   | 11000                     | 512600                                            | 6005               | 0             | 6,005                  | 0                | 0.83                        | 2,921                     | 95                       | 0.251                        | 9.130                  | 0.00                       | 9.13    | 2,911                      |
| 23-May-08                                                                | 23-Jun-08 | 4333200                    | 3782800                   | 15800                     | 550400                                            | 7170               | 0             | 7,170                  | 0                | 0.83                        | 3,140                     | 32                       | 0.085                        | 13.114                 | 0.00                       | 13.11   | 3,127                      |
| 23-Jun-08                                                                | 23-Jul-08 | 4051700                    | 3524600                   | 8400                      | 527100                                            | 6346.1             | 0             | 6,346.1                | 0                | 0.83                        | 2,925                     | 13                       | 0.034                        | 6.972                  | 0.00                       | 6.97    | 2,918                      |
| 23-Jul-08                                                                | 23-Aug-08 | 1645300                    | 1401100                   | 24300                     | 244200                                            | 2670.01            | 0             | 2,670.01               | 0                | 0.83                        | 1,163                     | 294                      | 0.778                        | 20.169                 | 0.00                       | 20.17   | 1,142                      |
| 23-Aug-08                                                                | 23-Sep-08 | 1157200                    | 987100                    | 28100                     | 170100                                            | 2010               | 0             | 2,010                  | 0                | 0.83                        | 819                       | 3                        | 0.008                        | 23.323                 | 0.00                       | 23.32   | 796                        |

*Perpetual Energy Systems Limited*

|                                       |           |                   |                   |                |                   |                |          |                |          |             |               |            |              |                |              |                |               |
|---------------------------------------|-----------|-------------------|-------------------|----------------|-------------------|----------------|----------|----------------|----------|-------------|---------------|------------|--------------|----------------|--------------|----------------|---------------|
| 23-Sep-08                             | 23-Oct-08 | 2781100           | 2330600           | 13700          | 450500            | 4910           | 0        | 4,910          | 0        | 0.83        | 1,934         | 4          | 0.011        | 11.371         | 0.00         | 11.37          | 1,923         |
| 23-Oct-08                             | 23-Nov-08 | 1357300           | 1106700           | 28200          | 250600            | 2694.95        | 0        | 2,694.95       | 0        | 0.83        | 919           | 4          | 0.011        | 23.406         | 0.00         | 23.41          | 895           |
| 23-Nov-08                             | 23-Dec-08 | 2980100           | 2542600           | 8800           | 437500            | 4596.21        | 0        | 4,596.21       | 0        | 0.83        | 2,110         | 2          | 0.005        | 7.304          | 0.00         | 7.30           | 2,103         |
| 23-Dec-08                             | 23-Jan-09 | 2451900           | 2068200           | 24200          | 383700            | 3715.63        | 0        | 3715.63        | 0        | 0.83        | 1,717         | 3          | 0.008        | 20.086         | 0.00         | 20.09          | 1,697         |
| 23-Jan-09                             | 23-Feb-09 | 4,162,200         | 3,647,300         | 8,800          | 514,900           | 6,470          | 0        | 6,470          | 0        | 0.83        | 3,027         | 8          | 0.020        | 7.300          | 0.00         | 7.300          | 7.300         |
| 23-Feb-09                             | 23-Mar-09 | 3,498,700         | 3,067,500         | 7,800          | 431,200           | 4,640          | 0        | 4,640          | 0        | 0.83        | 2,546         | 11         | 0.030        | 6.470          | 0.00         | 6.470          | 6.500         |
| 23-Mar-09                             | 31-Mar-09 | 953,900           | 824,900           | 3,500          | 129,000           | 1,305          | 0        | 1,305          | 0        | 0.83        | 685           | 1          | 0.000        | 2.910          | 0.00         | 2.910          | 2.900         |
| <b>Total for the period 2008-2009</b> |           | <b>36,151,200</b> | <b>31,196,100</b> | <b>195,200</b> | <b>4,955,100</b>  | <b>56,220</b>  | <b>0</b> | <b>56,220</b>  | <b>0</b> | <b>0.83</b> | <b>25,893</b> | <b>474</b> | <b>1.251</b> | <b>162.013</b> | <b>0.000</b> | <b>163.234</b> | <b>25730</b>  |
| <b>Total for the period 2007-2009</b> |           | <b>81,579,000</b> | <b>70,638,900</b> | <b>328,500</b> | <b>10,940,100</b> | <b>133,598</b> | <b>0</b> | <b>133,598</b> | <b>0</b> | <b>.83</b>  | <b>58,630</b> | <b>653</b> | <b>1.72</b>  | <b>272.652</b> | <b>0.000</b> | <b>274.346</b> | <b>58,357</b> |