Monitoring report form (Version 03.1)

Monitoring report

Title of the project activity	Orb Energy Solar Project, India
Reference number of the project activity	GS 696
Version number of the monitoring report	Version ~~3.1~~4
Completion date of the monitoring report	~~01~~17/~~11~~12/2013
Registration date of the project activity	12/09/2012
Monitoring period number and duration of this monitoring period	1st Monitoring Period, from 12/09/10 to 31/12/12
Project participant(s)	Orb Energy Private Limited and JP Morgan Ventures Energy Corporation
Host Party(ies)	Orb Energy Private Limited
Sectoral scope(s) and applied methodology(ies)	Sectoral Scope 1:Energy industries (renewable - / non-renewable sources) AMS – I.A. Electricity generation by the user, version 14 AMS – I.C. Thermal energy production with or without electricity, version 19
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	26,004
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	18,573

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

(a) Purpose of the project activity and the measures taken for GHG emission reductions or net anthropogenic GHG removals by sinks;

The purpose of Gold Standard project activity is dissemination of solar thermal and lighting systems in rural and semi-urban areas in Karnataka. The proposed project through dissemination of solar thermal heater and photovoltaic will utilize the energy from the sun and convert it into thermal and electrical energy respectively to replace the fossil fuel that would have been used otherwise to meet equivalent energy demands. Thus, replacement of fossil fuel usage shall contribute towards reducing equivalent GHG emissions.

(b) Brief description of the installed technology and equipment;

The project involves two technologies

1. Solar Water Heating System (SWH): These systems use the thermo-siphoning principle whereby water circulates from the hot water storage tank to the glass tubes by gravity. Since hot water is lighter than cold water, the lighter hot water in the glass tubes rises into the hot water storage tank while thecold water flows in to fill the space left by hot water in the glass tubes. The rate of water movement is determined by how bright and strong the sunshine is.The thermal glass tube or flat plate is placed facing south position for maximum sunlight. Once the system is fully configured, the user can achieve a water temperature of up to 65^0C. There are two main categories of the SWH systems i.e. the flat plate and the glass tube systems. These are available in various sizes and capacities according to the varying customer needs. The specifications of the same are mentioned below:

    a. Flat Plate type system specifications

System	Sunstream 100C	Sunstream 200C	Sunstream 500C	Sunstream 100CPR	Sunstream 200CPR	Sunstream 300CPR	Sunstream 500CPR
Litres per day	100	200	500	100	200	300	500
Shadow free floor area required	2.5mtrs x 1.2mtrs	2.5mtrs x 2.4mtrs	2.5mtrs x 4.8mtrs	2.5mtrs x 1.2mtrs	2.5mtrs x 2.4mtrs	2.5mtrs x 3.6mtrs	2.5mtrs x 4.8mtrs
Number of collectors	1	2	4	1	2	3	4
Tank operating pressure (max)	1 kgf/cm^2 (atmospheric) pressure			2.5 kgf/cm^2 pressure			
Water hardness - maximum	200 PPM						
Collector type	Copper tube with fins, coated with selective-black chrome (9 fins in each collector)						
Collector frame	Aluminum with anodised finish / pure polyester powder coating						
Glass	4 mm toughened, low iron, high transmission of energy > 85%						
Inner tank material and type	Stainless steel 304						
Thermal insulation material	PUF, 50mm thickness						
Specifications are subject to change without notice.							

    b. Glass tube type system specifications

Models	Inner Tank Material	Outer Tank Material	Water Hardness	Water Capacity
Sunstream GV	SS-304 / 0.8mm	SS-430	Less than 200 PPM	100LPD, 150LPD, 200LPD
Sunstream GH	SS-304 / 1mm	SS-430	Less than 800 PPM	100LPD, 150LPD, 200LPD
Sunstream GM	MS / 1.5mm	Coated steel / 0.4mm	Less than 800 PPM	100LPD, 150LPD, 200LPD

Specifications are subject to change without notice.

System	Sunstream 1000	Sunstream 2500	Sunstream 5000	Sunstream 10000	Sunstream 15000
Litres per day	1000	2500	5000	10000	15000
Water temperature	60°C - 65°C on normal sunny conditions				
Tube size	47mm outer dia, 37mm inner dia, 1500mm length				
Number of tubes	128	320	640	1280	1920
Tubes made of	Borosilicade glass				
Impact resistance / hail resistant	<25mm dia				
Collector frame	MS - Powder Coated				
Glass sealing	Silicon rubber ring				
Tilt angle	Fixed				
Hot water tank material	Stainless steel SS-304 / 316				
Thermal insulation	Rockwool insulation at site				
Tank insulation thickness	100mm				
Tank cladding	Aluminum				
Overnight heat loss	5°C - 7°C				
Tank design	Suitable to with stand 1kg / cm2 atmospheric pressure				
Electrical heater	3 nos of 2kW heater with thermostat	3 nos of 3kW heater with thermostat	Boiler Backup		
Hard water tolerance	< 300 PPM for SS304 and < 800 PPM for SS316				

Specifications are subject to change without notice. Performance conditional on following company's recommended installation procedure.

2. Solar Photovoltaic System (SPV): Solar PV systems include direct current (DC) units or alternating current (AC) units. For DC units, the solar unit come with the photovoltaic module, battery and charge controller while the AC units, come with a solar photovoltaic module, console battery and inverter. All these units come in different sizes based on user needs. There are two main categories of the PV systems i.e. solectric (inside lighting) and solite (Street lighting). These are available in various sizes and capacities according to the varying customer needs. The specifications of the same are mentioned below:

   a. Solectric DC

Specifications **	Solectric 60	Solectric 90	Solectric 120	Solectric 150	Solectric 180
Example of application and use	1 x 7w and 1 x 11w for 3.5 hours	2 x 7w and 1 x 11w for 3.5 hours	1 x 7w, 1 x 11w and 1 x 18w DC fan for 3.5 hours	1 x 7w, 2 x 11w and 1 x 18W DC fan for 3 hours	2 x 7w, 2 x 11w and 1 x 18w DC Fan for 3 hours
Energy per day (Whrs)	60	90	120	150	180
System voltage (Volts)	12	12	12	12	12
PV module capacity (Wp)	20	30	40	50	60
Charge controller (A)	3	5	5	10	10
Maximum load (Watts)	20	35	55	70	80

*** Specifications are subject to change without notice.*

   b. Solectric AC

Solectric AC Systems	225	330	440	440U	660	1000	1300	1800	2200	3000
Energy per Day (Watt-hours)	225	330	440	440	660	1000	1300	1800	2200	3000
PV Module Capacity (Wp)	80	120	160	160	240	360	480	640	800	1080
Inverter Capacity (VA)	350	350	350	1300	1300	1300	1300	1300	1300	2200
Maximum Load (Watts)	140	150	150	250	400	450	600	700	900	1000

c. Solectric higher capacity systems

System	Solectric 1000	Solectric 3000	Solectric 4000	Solectric 6000
Energy per Day (Whrs)	1000	3000	4000	6000
System Voltage (Volts)	24	24	24	24
PV Module Capacity (Wp)	360	1120	1440	2160
Charge Controller (A)	20	40	40	40
Inverter Capacity (VA)	1300	1300	2200	2200
Max Load (Watts)	550	1000	1600	1600

System	Solectric 8000	Solectric 10000	Solectric 12000	Solectric 14000
Energy per Day (Whrs)	8000	10000	12000	14000
System Voltage (Volts)	48	48	48	48
PV Module Capacity (Wp)	2880	3840	4320	5120
Charge Controller (A)	80	80	80	80
Inverter Capacity (VA)	4000	4000	6000	6000
Max Load (Watts)	2300	3500	5000	5000

*Specifications are subject to change without notice

d. Solite lighting systems

Specifications *	Solite 75L	Solite 120	Solite 120L	Solite 150L	Solite 180	Solite 240
Available energy per day (Whrs)	75	120	120	150	180	240
System voltage (Volts)	12	12	12	12	12	12
PV module capacity (Wp)	25	40	40	50	60	80
Dusk to dawn charge controller (A)	5	5	5	5	5	10
Battery capacity (Ah)	12V, 40Ah	12V, 40Ah	12V, 40Ah	12V, 60Ah	12V, 60Ah	12V, 100Ah
Light (Watts)	6	9	9	11	11	18 (9 x 2)
Light type	LED	CFL	LED	LED	CFL	CFL
Light output (Lumens)	480	600	720	950	850	1200
Light colour	Cool white	Cool white	Cool white	Cool white	Cool white	Cool white
Luminaires						

* Specifications are subject to change without notice

As part of project, the number of units distributed are as follows:

Type	Number of units	Total Installed capacity
Solar Water Heating Systems	19303	12.85 MW
Solar Photovoltaic Systems	13667	0.68 MW
Total Installed capacity		**13.53 MW**

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

Date of Installation of first unit installed under the project – 28 Nov 2007.

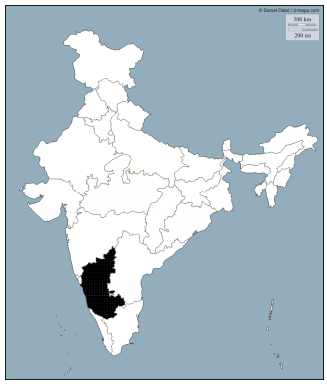
From the date of installation, respective units are in continued operation.

(d) Total GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period.

18573

A.2. Location of project activity

The project boundary is the geographical area where the SWH and SPV systems are installed and in use. The units included in the project activity are spread across various districts of Karnataka as mentioned in the SWH and SPV installation records. All the units are confined within the project boundary i.e. geographical boundary of Karnataka. Each unit installed under the project activity is uniquely identifiable through a unique serial number.



Location of the project activity

A.3. Parties and project participant(s)

Party involved((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (Host)	Orb Energy Private Limited	No
United Kingdom of Great Britain and Northern Ireland	JP Morgan Ventures Energy Corporation	No

A.4. Reference of applied methodology

The project falls under Type I: Renewable Energy category and applies the following approved small scale methodologies:

AMS – I.A. Electricity generation by the user, version 14 and,

AMS – I.C. Thermal energy production with or without electricity, version 19

A.5. Crediting period of project activity

Renewable Crediting Period (7*3 years)

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

The project start date is 28th November 2007 when the first solar unit under the project activity was installed for use. The detail of units installed from the start date to 31 December 2012 is as follows:

Year	Solar Water Heating Systems	Solar Photovoltaic Systems
2007	120	64
2008	1834	1125
2009	2991	2306
2010	3497	3950
2011	4934	3871
2012	5927	2351
Total	**19303**	**13667**

The Solar based thermal/PV systems have been in continued operation since installation. Ex-post sampling survey was conducted to determine the fraction of installed units that were not operational during the monitoring period. The results of same have been discussed in Annex 1 below and have been used accordingly to determined emission reductions achieved in this monitoring period.

B.2. Post registration changes

N/A

B.2.1. Temporary deviations from registered monitoring plan or applied methodology

N/A

B.2.2. Corrections

N/A

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

N/A

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

N/A

B.2.5. Changes to start date of crediting period

N/A

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

N/A

SECTION C. Description of monitoring system

The Project involves two stage monitoring system

Stage 1: Installation records –at the time of installation, used for determination of number of units sold under the project activity

Data Generation /Aggregation and recording: Orb and its technicians are responsible for sales and installation of SWH and SPVs. Local sales team members book the order and hand over the order copy to local Operations Executive. The operations executive feeds the order information into Orb Energy's in-house CRM software (BITS) at branch. As a control measure this information is checked and processed by the Operations Head at Head Office. After approval, the sales data is fed into Orb Energy SAP. Thereafter, the Accounts Department checks the stocks and generate invoice based on the SAP. The invoice number is re-updated in BITS against respective sale. Subsequently, the Logistics department dispatches the installation kits based on invoice to the concerned branch. Branch receives the installation kits and the branch technicians install the system.

Each unit is assigned a unique serial number for easy identification and avoidance of double counting. Orb ensures successful installation of solar units by having the technician doing the installation to complete Installation Form (IF). The IF form has all the information of the household. The form is signed by both the technician and the customers as proof of successful installation of the unit. Data captured in the IF isfed into BITS by the branch teamwhich also sends the hard copy of the invoice, installation report to Head office. At the Head Office, the customer care team checks the received documents (hard-copies) from branch and compares with the updated record in BITS and acknowledges it to ensure that the recorded information is correct. The updated documents afterverification by the customer care team arearchived in the head office.The centralized databasecontains the following information, besides others:

- Name of customer
- Solar unit type and size
- Date of installation
- Location of the user and Orb Energy branch where the unit was bought from

This aforesaid data management process started from 1st Sep 2011 onwards. Prior to that the only exception to the above was that the recording of data into soft format was completely managed at the head office. The documents like invoice, installation report etc., were sent directly to the head office customer care team. The customer care executive use to feed all the information available in the hard copies and save the record in the in-house MS access based software. As a best practice, this process was changed in September 2011 to provide access to the branches to update the BITS at local level and adequate data quality controls have been introduced at head office level where each sales record is crosschecked against original hard-copies as explained in paragraph above.

Data Calculation and reporting: The centralize database is transferred to the JPMVEC representative for quality check. The database records are screened by JPMVEC to eliminate any double counted and/or incomplete, invalid entries.

Stage 2: Sampling Surveys – During SWH/SPV operation, used for determination of number of units not operating

Data Generation and Aggregation: On-site, ex-post surveys have been conducted by Orb to determine Unit Operating fraction (UOF) on a sampling basis. Simple random sample of SWH and SPV from the centralized database were picked in accordance with the monitoring frequency

(biennial) and confidence/margin of error (95/5). A questionnaire survey to determine UOF were carried out on the selected samples. In practice, 180 customers (90 solar thermal and 90 solar PV) were selected through automated random sampling software (raosoft sample size calculator[1] and stattrek random number generator[2]). Subsequently, a survey was administered by Orb Energy's technical staff. For details of the sampling refer Annex 1.

Data Recording: The results from the sampling survey were recorded (annex 1) by surveyors and submitted to Orb. The same were converted to electronic format by Orb and forwarded to JPMVEC for assessment and statistical compliance. The hardcopy reports are archived at Orb head-office.

Data Calculation and reporting: JPMVEC has checked the compliance of the sampling results for 95% confidence and 5% precision (margin of error) as required in case of biennial monitoring. The margin of error obtained on monitored samples is less than 5% and hence the sampling results are acceptable with desired confidence. For calculations refer ER calculator.

[1] http://www.raosoft.com/samplesize.html, using 95% response distribution

[2] http://stattrek.com/statistics/random-number-generator.aspx

SECTION D. Data and parameters

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

Data / Parameter:	Sunshine days in a year
Data unit:	Days
Description:	Annual sunshine days for the area where the solar units will be in operation
Source of data to be used:	Registered PDD
Value(s) applied	300[3]
Purpose of data	Baseline calculations
Additional comment	Although the number of sunshine days is more than 300, this figure is used to be conservative.

Data / Parameter:	Daily bulb usage
Data unit:	Hours/day
Description:	Daily bulb usage
Source of data to be used:	Registered PDD
Value(s) applied	3.5
Purpose of data	Baseline calculations
Additional comment	-

Data / Parameter:	$EF_{C,MGrid,y}$
Data unit:	tCO_2/MWh
Description:	Emission factor for the Southern Grid
Source of data to be used:	Registered PDD
Value(s) applied	0.852
Purpose of data	Baseline calculations
Additional comment	This value will be fixed ex ante for the current crediting period and will be revised at the renewal of crediting period.

Data / Parameter:	Specific heat capacity of water
Data unit:	$KJ/(Kg\ ^0C)$
Description:	Specific heat capacity of water
Source of data to be used:	Registered PDD
Value(s) applied	4.187
Purpose of data	Baseline calculations
Additional comment	This value is fixed ex ante for the current crediting period and will be revised at the renewal of crediting period.

Data / Parameter:	ΔT
Data unit:	^0C
Description:	Temperature increase for solar thermal heating
Source of data to be used:	Registered PDD
Value(s) applied	40
Purpose of data	Baseline calculations
Additional comment	-

Data / Parameter:	$NCV_{fossil\ fuel}$

[3] http://mnre.gov.in/pdf/Solar%20(Lantern%20&%20heater)%20Eng.pdf, and http://mnre.gov.in/spv-intro.htm

Data unit:	TJ/t
Description:	Net calorific value of baseline fossil fuels
Source of data to be used:	PDD
Value(s) applied	Kerosene: 0.0438 Diesel: 0.043 LPG: 0.0473
Purpose of data	Baseline calculations
Additional comment	This value is fixed ex ante for the current crediting period and will be revised at the renewal of crediting period..

Data / **Parameter:**	$EF_{fossil\ fuel}$
Data unit:	tCO_2/TJ
Description:	Carbon dioxide emission factor for the baseline fossil fuels
Source of data to be used:	Registered PDD
Value(s) applied	Kerosene: 71.9 Diesel: 74.1 LPG: 63.1
Purpose of data	Baseline calculations
Additional comment	This value is fixed ex ante for the current crediting period and will be revised at the renewal of crediting period.

Data / **Parameter:**	Average number of bulbs per household
Data unit:	Number
Description:	Average number of bulbs per household
Source of data to be used:	Registered PDD
Value(s) applied	5
Purpose of data	Baseline calculations
Additional comment	-

Data / **Parameter:**	Average mass of fossil fuel for water heating
Data unit:	Kg/day
Description:	Average mass of fossil fuel used to heat water per day (for households with fossil fuel baseline)
Source of data to be used:	Registered PDD
Value(s) applied	Kerosene: 0.15 LPG: 0.28
Purpose of data	Baseline calculations
Additional comment	-

Data / **Parameter:**	Average mass of fossil fuel for lighting
Data unit:	Kg/day
Description:	Average mass of fossil fuel used to lighting per day (for households with fossil fuel baseline)
Source of data to be used:	Registered PDD
Value(s) applied	Kerosene: 0.153, LPG: 0.20 and Diesel: 0.617
Purpose of data	Baseline calculations
Additional comment	-

Data / **Parameter:**	Volume of water heated
Data unit:	Litres per day
Description:	Volume of water heated per day per unit (for households with grid electricity baseline)
Source of data to be used:	Registered PDD

Value(s) applied	50% of thermal capacity
Purpose of data	Baseline calculations
Additional comment	-

D.2. Data and parameters monitored

Data / Parameter:	Thermal units Sales
Unit:	Number of units
Description:	Number of Thermal units by size
Measured/ Calculated / Default:	Monitored
Source of data:	SWH Installation Records
Value(s) of monitored parameter:	19303
Monitoring equipment:	NA
Measuring/ Reading/ Recording frequency:	Continuous
Calculation method (if applicable):	NA
QA/QC procedures:	The installation records are checked by JPMVEC for elimination of double counting and incomplete / incorrect entries.
Purpose of data:	Baseline calculations
Additional comment:	The revised MR now states that the data archiving is done both manually and electronically as per the stipulated period after end of crediting period. The data is collected as a part of business operations of the PP. No separate monitoring process is required.

Data / Parameter:	Photo voltaic units sales
Unit:	Number of units
Description:	Number of Photo voltaic units by size
Measured/ Calculated / Default:	Monitored
Source of data:	SWH Installation Records
Value(s) of monitored parameter:	13667
Monitoring equipment:	NA
Measuring/ Reading/ Recording frequency:	Continuous
Calculation method (if applicable):	NA

QA/QC procedures:	The installation records are checked by JPMVEC for elimination of double counting and incomplete / incorrect entries. The installation records may be cross-checked against IF on a sampling basis
Purpose of data:	Baseline calculations
Additional comment:	The revised MR now states that the data archiving is done both manually and electronically as per the stipulated period after end of crediting period. The data is collected as a part of business operations of the PP. No separate monitoring process is required.

Data / Parameter:	Number of units not operating
Unit:	% fraction
Description:	% fraction Solar PV and Thermal systems not operating
Measured/ Calculated / Default:	Calculated
Source of data:	Field survey
Value(s) of monitored parameter:	SWH – 0.022 SPV – 0.045
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	Biennial with 95% confidence, 5% margin of error
Calculation method (if applicable):	Number of units not operating is determined based on percentage fraction of units found not operating on a sampling basis through field survey.
QA/QC procedures:	
Purpose of data:	Baseline Calculations
Additional comment:	The revised MR now states that the data archiving is done both manually and electronically as per the stipulated period after end of crediting period. The data is collected as a part of business operations of the PP. No separate monitoring process is required.

SD parameters:

Data / Parameter:	Quality of employment
Unit:	number
Description:	Type of jobs created (permanent or temporary)
Measured/ Calculated / Default:	measured
Source of data:	Orb employment database

Value(s) of monitored parameter:	

Number of jobs created as per type			
Category	year of Joining	year of leaving	Total
Management & Administration	2010	2010	0
		2011	2
		still working	11
	2011	2011	0
		still working	15
	2012	still working	5
Management & Administration Total			33
Operations	2010	2010	0
		2011	7
		2012	5
		still working	5
	2011	2011	6
		2012	13
		still working	33
	2012	2012	5
		still working	19
Operations Total			93
Production	2010	2011	3
		2012	2
		still working	3
	2011	2011	1
		still working	10
	2012	2012	1
		still working	6
Production Total			26
Sales & Marketing	2010	2010	2
		2011	21
		2012	10
		still working	21
	2011	2011	35
		2012	60
		still working	78
	2012	2012	7
		still working	64
Sales & Marketing Total			298
technical2	2010	2011	8
		2012	1
		still working	15
	2011	2011	4
		2012	5
		still working	23
	2012	2012	3
		still working	31
technical2 Total			90
Grand Total			540

The aforesaid table provides the number of permanent jobs created by Orb Energy during the monitoring period. As a conservative measure, employees leaving before three months of their joining date have not been included in the above compilation.

Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	annually
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data:	SD Monitoring
Additional comment:	The revised MR now states that the data archiving is done both manually and electronically as per the stipulated period after end of crediting period. The data is collected as a part of business operations of the PP. No separate monitoring process is required.

Data / Parameter:	Quantitative employment and income generation
Unit:	number
Description:	Number of jobs created mainly jobs for local people and income level
Measured/ Calculated / Default:	measured
Source of data:	Orb employment database
Value(s) of monitored parameter:	Number of jobs created year of Joining / year of leaving / Total 2010 / 2010 / 2 2011 / 41 2012 / 18 still working / 55 2011 / 2011 / 46 2012 / 78 still working / 159 2012 / 2012 / 16 still working / 125 Grand Total / 540 As a conservative measure, employees leaving before three months of their joining date have not been included in the above compilation.
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	annually
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data:	SD Monitoring
Additional comment:	The revised MR now states that the data archiving is done both manually and electronically as per the stipulated period after end of crediting period. The data is collected as a part of business operations of the PP. No separate monitoring process is required.

Data / Parameter:	Access to affordable clean energy services
Unit:	number
Description:	Number of units installed by type
Measured/ Calculated / Default:	measured
Source of data:	Orb Installation records

Value(s) of monitored parameter:	

Number of PV installed	
Year of Installation	Total
2007	64
2008	1125
2009	2306
2010	3950
2011	3871
2012	2351
(blank)	
Grand Total	13667

Number of SWH Installed	
Year of Installation	Total
2007	120
2008	1834
2009	2991
2010	3497
2011	4934
2012	5927
(blank)	
Grand Total	19303

Access to affordable Clean Energy Services - Number of Branches		
Year	New Branches opened	Total number of branches
2007	14	14
2008	26	40
2009	5	45
2010	8	53
2011	16	69
2012	13	82
Grand Total	82	82

Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	annually
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data:	SD Monitoring
Additional comment:	The revised MR now states that the data archiving is done both manually and electronically as per the stipulated period after end of crediting period. The data is collected as a part of business operations of the PP. No separate monitoring process is required.

Data / Parameter:	Disposal mechanism of the used batteries
Unit:	Number
Description:	Number of old batteries recycled
Measured/ Calculated / Default:	measured
Source of data:	Orb Maintenance records

Value(s) of monitored parameter:	Statistics for battery disposal are as below Category | Till 2011 | 2012 Batteries scrapped | 26 | 18
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	annually
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data:	SD Monitoring
Additional comment:	The system to ensure proper disposal of batteries is as follows: Customer logs the complaint in Orb Energy Customer Care Department for battery non performance. Defective batteries under warrantyare pulled back from the field and sent to supplier for repair and/or replacement. Post the free repair the batteries are sent back to customer to close the complaint. In case of battery failure after warranty period, the batteries are pulled back from field and sent to supplier to see the possibility of repair on a chargeable basis. If the battery is repairable, then the cost of repair is communicated to customer his consent for repair is sought. In case the battery is beyond repairable condition, then customer is informed accordingly and advised to buy new battery. For buying new battery, a special discount is given for returning the old battery to Orb Energy. This communication goes with every system sold to the customer in local language. Refer annex 2 The revised MR now states that the data archiving is done both manually and electronically as per the stipulated period after end of crediting period. The data is collected as a part of business operations of the PP. No separate monitoring process is required.

Data / Parameter:	Preventative maintenance service
Unit:	Number
Description:	No of services being done on each unit
Measured/ Calculated / Default:	measured
Source of data:	Orb Maintenance records
Value(s) of monitored parameter:	Three preventative maintenance service visitsin the first year are carried out for each unit installed.
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	annually
Calculation method (if applicable):	-
QA/QC procedures:	-

Purpose of data:	SD Monitoring
Additional comment:	The revised MR now states that the data archiving is done both manually and electronically as per the stipulated period after end of crediting period. The data is collected as a part of business operations of the PP. No separate monitoring process is required.

D.3. Implementation of sampling plan

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The following parameters have been determined using sampling approach

1. UOF – fraction of units that are in use

The samples have been picked through simple random sampling approach from SWH and SPV population separately. The details of the sampling results are as below:

Details

Description	SWH	SPV
Number of units (sampling population size)	18731	12940
Type of Sampling	Simple Random sampling without replacement	Random sampling without replacement
Monitoring Frequency	Biennial	Biennial
Confidence required	95%	95%
Precision required	5%	5%
Sample size	90	90
QA/QC	In cases where survey results indicate that desired precision is not achieved, the lower bound of a 90% confidence interval of the parameter value shall be used against repeating the survey efforts to achieve the desired precision.	

Results

Description	UOF	
	SWH	SPV
Number of units sampled initially	90	90
Samples rejected	0	2
Final number of samples	90	88
Minimum sample size required as per raosoft sample size calculator	73	73
Estimated proportion of operation	0.95	0.95
Units found not operating	2	4
UOF	88/90 = 0.978	84/88 = 0.955
Precision (margin of error) Achieved (%)	3.03%	4.33%
Acceptability (error less than 5%)	Ok	Ok

$$\text{Precision achieved} = \frac{Z_{\text{value}} \times s.e.}{\sqrt{n}}$$

$$\text{Relative precision achieved } (\%) = \frac{Z_{\text{value}} \times s.e.}{\sqrt{n}} / \bar{x}$$, Z-value is used for proportional parameters of interest and t-value in case of mean parameters of interest.

Where n is the sample size
$\bar{x}$ is the sample mean
$s.e.$ is the standard error of mean

For more information on sampled units is available in ER calculator.

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

>>

Parameter			Value		
Symbol	Description	unit	2010	2011	2012
BEy	Baseline emissions per year	tCO2e/year	1482	6827	10264

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

>>

N/A

E.3. Calculation of leakage>>

N/A

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

Item	Baseline emissionsor baseline net GHG removals by sinks (t CO_2e)	Project emissions or actual net GHG removals by sinks (t CO_2e)	Leakage (t CO_2e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO_2e)
2010	1482	0	0	**1482**
2011	6827	0	0	**6827**
2012	10264	0	0	**10264**
Total	**18573**	**0**	**0**	**18573**

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

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO_2e)	26004	18573

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

>>

The actual average emission reductions during this monitoring period are lower than the estimation in the registered PDD as demonstrated above. Therefore, there was no increase in the actual emission reductions achieved during the monitoring period compared to that mentioned in the registered PDD.

E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO_2e)	18573	0

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Document information

Version	*Date*	*Description*
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net anthropogenic GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.

Decision Class: Regulatory
Document Type: Form
Business Function: issuance
Keywords: monitoring report, performance monitoring

Annex1

Sl.No.	Project	CustCode	CustName	System	InvDt	Qty	InsdDate	Operational Status
45	Thermal	ORB/KUM/SWH/1107/0124	Daya Nilaya Convent	Sunstream100C	30-Nov-07	1	30/11/2007	operating
95	Thermal	ORB/KUM/SWH/1207/0131	Raviraj Kadle	Sunstream200G	15-Dec-07	1	15/01/2008	operating
288	Thermal	ORB/KRK/SWH/1207/0007	Sulaimaan AR	Sunstream200G	31-Jan-08	1	09/02/2008	operating
531	Thermal	02-08-1964MLT	RA Dastikoppa	Sunstream200G	26-Mar-08	1	27/03/2008	operating
580	Thermal	SUG 0200-PO279	BV Suresh	Sunstream200G	31-Mar-08	1	05/04/2008	operating
766	Thermal	SUG 0100-PO025	M Basavaraj	Sunstream100G	12-May-08	1	07/06/2008	operating
773	Thermal	SUG B0200 0002	N Vijay Kumar	Sunstream200GV	12-May-08	1	03/05/2008	operating
851	Thermal	SUG B0100 0020	M Subbanna	Sunstream100GV	30-May-08	1	05/07/2008	operating
1016	Thermal	SUG B0150 0028	Shahin	Sunstream150GV	30-Jun-08	1	02/07/2008	operating
1066	Thermal	660307102344	Padmanabha	Sunstream100GV	15-Jul-08	1	15/07/2008	operating
1107	Thermal	SUG B0200 0074	Shivanna	Sunstream200GV	25-Jul-08	1	28/07/2008	operating
1259	Thermal	SUG B0150 0069	Payappa S Shirahatti	Sunstream150GV	28-Aug-08	1	05/09/2008	Not Operating -
1501	Thermal	SUG B0150 0149	Shobha Naik	Sunstream150GV	30-Sep-08	1	13/10/2008	operating
1551	Thermal	SUG B0200 0184	Khursheeda Khatoon	Sunstream200GV	15-Oct-08	1	18/10/2008	operating
1737	Thermal	SUG B0100 0094	Rathanakar Shetty	Sunstream100G	31-Oct-08	1	28/11/2008	operating
1744	Thermal	07082441MLT	Nilamma	Sunstream200G	6-Nov-08	1	08/11/2008	Not Operating -
1987	Thermal	SUG B0200 0257	Rajendra Kumar	Sunstream200GV	18-Dec-08	1	29/12/2008	operating
2229	Thermal	SUGB01500375	Mahajabeen	Sunstream150GV	20-Jan-09	1	23/01/2009	operating
2707	Thermal	SUGC01500211	L.G.Vaidya	Sunstream150G	23-Mar-09	1	02/04/2009	operating
4236	Thermal	SUGB1000177	Robert Futardo	Sunstream100GV	30-Sep-09	1	03/10/2009	operating
4506	Thermal	SUGB1000258	Amar	Sunstream100GV	31-Oct-09	1	17/11/2009	operating
4721	Thermal	SUC1500066	Prakash R	Sunstream150GP	17-Nov-09	1	19/11/2009	operating
5157	Thermal	SUG(L)A2000091	Keshavareddy N	Sunstream200G	30-Dec-09	1	08/01/2010	operating
5206	Thermal	SUG(L)A1000036	Ramakrishna S A	Sunstream100G	31-Dec-09	1	27/03/2010	operating
5392	Thermal	SUGC1500229	Gulfam N Paratanalli	Sunstream150GP	22-Jan-10	1	28/01/2010	operating
5399	Thermal	SUGB1500556	Madappa B N	Sunstream150GV	22-Jan-10	1	01/02/2010	operating
5642	Thermal	SUGB1500573	Maruthi V Naik	Sunstream150GV	6-Feb-10	1	16/02/2010	operating
5692	Thermal	SUG(L)A2000068	Rajesh Bhoja Sanil	Sunstream200G	11-Feb-10	1	11/02/2010	operating
5885	Thermal	SUGB(L)1500144	Usman B	Sunstream150GV	27-Feb-10	1	02/03/2010	operating
6127	Thermal	SUGB(L)1000138	Prashantha Holla T	Sunstream100GV	30-Mar-10	1	31/05/2010	operating
6177	Thermal	SUGB(L)2000175	Prema Teacher	Sunstream200GV	31-Mar-10	1	15/04/2010	operating
6363	Thermal	SUGB(L)2000199	Vijaya Bhaskar Reddy	Sunstream200GV	29-Apr-10	1	12/06/2010	operating
6370	Thermal	SUGB(L)1500233	Subhadramma	Sunstream150GV	29-Apr-10	1	28/05/2010	operating
6447	Thermal	SUGA0150 0161	Kumaresh Sadashiva	Sunstream150G	5-May-10	1	14/10/2010	operating
6613	Thermal	SUGB(L)10000143	Jayashri Shriyan	Sunstream100GV	26-May-10	1	26/05/2010	operating
6662	Thermal	SUGB(S)1000029	Venkatachalapathy	Sunstream100GH	31-May-10	1	19/06/2010	operating
6855	Thermal	SUGB(S)1000024	Chandrappa M B	Sunstream100GH	28-Jun-10	1	02/07/2010	operating
6929	Thermal	SUGB(L)2000225	Raju R K Shet	Sunstream200GV	30-Jun-10	1	18/07/2010	operating
7098	Thermal	SUGA(L)1000139	Santosh Suresh Kamath	Sunstream100G	31-Jul-10	1	16/08/2010	operating
7147	Thermal	SUGB(L)2000317	Vinayak Gulab Kalal	Sunstream200GV	6-Aug-10	1	20/08/2010	operating
7333	Thermal	SUGB1500207	Shantharama Shetty	Sunstream150GV	30-Aug-10	1	08/09/2010	operating
7341	Thermal	SUGB1500271	Prakash R Muchandikar	Sunstream150GV	31-Aug-10	1	12/10/2010	operating
7583	Thermal	SUGB(S)1500114	Thotesh Babu	Sunstream150GH	29-Sep-10	1	06/10/2010	operating
7633	Thermal	SUCD1000066	Venkataramane Gowda R	Sunstream100C	30-Sep-10	1	06/10/2010	operating
7826	Thermal	SUGB(F)1000003	Shekarappa G Hubballi	Sunstream100GH	25-Oct-10	1	28/10/2010	operating
8068	Thermal	SUCD1000086	Bhujanga Shetty	Sunstream100C	9-Nov-10	1	12/11/2010	operating
8304	Thermal	SUGB1500440	Shakil Ahmed A Bhadkali	Sunstream150GV	30-Nov-10	1	28/02/2011	operating
8311	Thermal	SUG(L)A1000196	Mahabaleshwar Gajanan	Sunstream100G	30-Nov-10	1	15/12/2010	operating
8645	Thermal	SUGB(F)1000111	Chinnivar P S	Sunstream100GH	29-Dec-10	1	31/12/2010	operating
9274	Thermal	SUGB2000190	Ramanna Naik	Sunstream200GV	8-Feb-11	1	10/02/2011	operating
9408	Thermal	SUGB1000126	Gururaj Y S	Sunstream100GV	17-Feb-11	1	21/02/2011	operating
10803	Thermal	SUGB2000111	Hedderi V S	Sunstream200GV	27-May-11	1	03/06/2011	operating
11288	Thermal	SUGB(F)02000827	Basangouda Golappagouda	Sunstream200GH	30-Jun-11	1	12/07/2011	operating
11481	Thermal	SUGB(F)2000156	Balachandra Manjaiah Naik	Sunstream200GH	26-Jul-11	1	12/03/2011	operating
11724	Thermal	SUCD(F)02000020	Vijay M S	Sunstream200C	11-Aug-11	1	13/08/2011	operating
11774	Thermal	SUGB(F)01500139	Nonayya Naik N	Sunstream150GV	17-Aug-11	1	07/07/2011	operating
11959	Thermal	SUGB(F)02001050	Babu B Galgali	Sunstream200GH	31-Aug-11	1	29/09/2011	operating
11967	Thermal	SUGB5000050	Shri Rama Vidya Kendra	Sunstream500GV	31-Aug-11	1	28/10/2011	operating
12044	Thermal	SUCD(F)01000044	JMC Projects India Ltd	Sunstream100C	31-Aug-11	1	02/11/2011	operating
12209	Thermal	SUG B (F) 0200 0193	RAJALAKSHMI B	Sunstream 200 GV	19-Sep-11	1	25/07/2011	operating
12259	Thermal	SUC D (F) 0200 0043	KANTESH K	Sunstream 200 C	22-Sep-11	1	12/10/2011	operating
12300	Thermal	SUG B (F) 0150 0924	Sharadha	Sunstream 150 GH	27-Sep-11	1	03/10/2011	operating
12452	Thermal	SUG B (F) 0200 1190	Chandra Kumar	Sunstream 200 GH	30-Sep-11	1	29/10/2011	operating
12695	Thermal	SUG B(F)0150 0966	KRISHNE GOWDA	Sunstream 150 GH	24-Oct-11	1	31/10/2011	operating
12744	Thermal	SUG B (F) 0150 0954	ASHA KUNDAR	Sunstream 150 GH	27-Oct-11	1	09/11/2011	operating
12930	Thermal	SUGB (F) 0100 0758	Mohan Appani Shetty	Sunstream 100 GH	8-Nov-11	1	14/11/2011	operating
12937	Thermal	SUG B (F) 0200 0009	Razeena	Sunstream 200 GV	8-Nov-11	1	17/07/2011	operating
13180	Thermal	SUG B (F) 0200 0404	AMBIKA N	Sunstream 200 GV	28-Nov-11	1	19/12/2011	operating
13229	Thermal	SUGB (F) 0200 00049	Ganesh Manjunath Harikant	Sunstream 200 GH	30-Nov-11	1	17/12/2011	operating
13422	Thermal	SUGB(B)1500012	Uma U.S w/o H.S Umesh	Sunstream 150 GH	16-Dec-11	1	31/01/2012	operating
13665	Thermal	SUG B(F) 0200 0146	Puttamma	Sunstream 200 GH	31-Dec-11	1	23/01/2012	operating
13715	Thermal	SUGB (F) 0100 0009	U NAYANA SHERIGAR	Sunstream 100 GV	30-Dec-11	1	31/12/2011	operating
13900	Thermal	SUG B(F) 0100 0082	Shaila M Malage	Sunstream 100 GH	19-Jan-12	1	15/02/2012	operating
13908	Thermal	SUG B (F) 0200 00196	Halappanavaramath.	Sunstream 200 GH	19-Jan-12	1	24/01/2012	operating
13985	Thermal	SUG E(F)0150 0081	ABDULSAB J BUDIHAL	Sunstream 150 GM	25-Jan-12	1	31/03/2012	operating
14150	Thermal	SUG E(F) 0150 0104	Vasanthiah	Sunstream 150 GM	31-Jan-12	1	07/02/2012	operating
14200	Thermal	SUCD(F)02000157	Maruri N. Naik	Sunstream 200 C	31-Jan-12	1	28/02/2012	operating
14393	Thermal	SUGBF01500304	ROBERT CORRAIA	Sunstream 150 GV	16-Feb-12	1	14/03/2012	operating
14636	Thermal	SUGB(F)01500906	Shrikanta Murthy	Sunstream 150 GH	29-Feb-12	1	28/05/2012	operating
14871	Thermal	SUG B (F) 0150 0135	U.S.SUBRAYA BHAT	Sunstream 150 GH	22-Mar-12	1	28/03/2012	operating
16885	Thermal	SUG E (F) 150 0465	Basava Raju	Sunstream 150 GM	27-Aug-12	1	04/09/2012	operating
17370	Thermal	SUG E (F) 200 0970	Vaijnath M Muchandikar	Sunstream 200 GM	30-Sep-12	1	10/10/2012	operating
17641	Thermal	SUG E(F) 0150 0683	Mr.Divakar.K.G	Sunstream 150 GM	22-Oct-12	1	29/10/2012	operating
17806	Thermal	SUGD (F) 200 0967	Ibrahim Ruknuddin Sepai	Sunstream 200 GH	31-Oct-12	1	10/11/2012	operating
17855	Thermal	SUGB(F)0200 0685	M G LEELAVATHI	Sunstream 200 GV	31-Oct-12	1	05/11/2012	operating
18049	Thermal	SUG E(F)02001332	Rudrappa	Sunstream 200 GM	16-Nov-12	1	20/11/2012	operating
18291	Thermal	SUGE(F)02001527	Vasant S Naik	Sunstream 200 GM	29-Nov-12	1	09/12/2012	operating
18341	Thermal	SUG E(F) 0100 0467	RAMESH. SAKHARAM.	Sunstream 100GM	30-Nov-12	1	06/12/2012	operating
18526	Thermal	SUG E (F) 01000453	NAGARAJ NAIK K	Sunstream 100 GM - R3	13-Dec-12	1	17/12/2012	operating
18534	Thermal	SUGD(F) 0200 1027	Maruti Annappayya Acharya	Sunstream 200 GH	14-Dec-12	1	24/12/2012	operating

Sl.No.	Branch	Project	CustCode	CustName	System	InvDt	Qty	InsdDate	Operational
132	Kumta	PV	ORB/KUM/PVS/0108/0172	Suresh Hosabanna Nayak	Solectric180	24-Jan-08	1	11/02/2008	operating
206	Kolar	PV	3602070015/080A25211	SR Edith	Solectric90	4-Feb-08	1	05/02/2008	operating
266	Kumta	PV	403612071178/08A25209	Deepak Ganapathi Naik	Solectric120	29-Feb-08	1	01/03/2008	No response
300	Thirthahalli	PV	ORB/TTH/SPV/0308	Vikram KS	Solectric330	15-Mar-08	1	13/03/2008	operating
467	HO	PV	3603080419/08D10023	Surendra	Solectric90	19-May-08	1	20/05/2008	operating
602	Kumta	PV	SLD 0120 0007	Shanta Kostans Lopies	Solectric120	19-Jul-08	1	21/07/2008	operating
635	Bhatkal	PV	SLD 0120 0093	Shivananda Narayan Bhat	Solectric120	31-Jul-08	1	04/08/2008	operating
802	Kolar	PV	SLD 0120 0187	Narayanaswamy SM	Solectric120	22-Sep-08	1	30/09/2008	operating
937	Ranibennur	PV	SLD 0120 227/4005082148	Balachandra Sadkehsappa	Solectric120	31-Oct-08	1	12/10/2008	operating
970	Sullia	PV	4010082409/08I15124	Ismail A	Solectric120	13-Nov-08	1	13/11/2008	operating
1138	Ranibennur	PV	STD02400005	Lakshmi Ranganath Temple Seva	Solite 240	30-Nov-08	1	09/12/2008	Not Operating -
1272	Kolar	PV	SLD0600111	J.N.Hanumanthu	Solectric60	30-Dec-08	1	08/01/2009	operating
1305	Kumta	PV	SLD01800083	Ananth Naryan Bhat	Solectric180	31-Dec-08	1	02/01/2009	operating
1473	Hubli	PV	SLD01200515	Mruthyunjaya	Solectric120	31-Jan-09	1	27/04/2009	operating
1547	Chikodi	PV	SLD01200573	Ravasab.S.Benurkar	Solectric120	16-Feb-09	1	26/02/2009	operating
1607	Honnali	PV	SLD01200447	Maheshwarappa	Solectric120	26-Feb-09	1	02/04/2009	operating
1640	Davangere	PV	SLD01200639	Shivanna O G	Solectric120	28-Feb-09	1	10/03/2009	operating
1808	Bellary	PV	SLD01200693	Gori Mohammed P	Solectric120	31-Mar-09	1	01/06/2009	operating
1943	Davangere	PV	SLD00900140	Murugi Gowda	Solectric90	29-Apr-09	1	14/05/2009	operating
1976	Jamkhandi	PV	SLD1200746	Mahalingappa I Bilagi	Solectric120	30-Apr-09	1	06/05/2009	operating
2143	Thirthahalli	PV	SLA03300080	Krishnamurthy T	Solectric330	30-May-09	1	02/06/2009	operating
2272	Hubli	PV	SLD01200899	Gangamma V Kambar	Solectric120	30-Jun-09	1	07/07/2009	operating
2278	Jamkhandi	PV	SLD01200939	Somaling Vajappa Asangi	Solectric120	30-Jun-09	1	22/07/2009	operating
2684	Ranibennur	PV	SLD0012001074	Dr Mahantesh G H	Solectric120	31-Aug-09	1	06/09/2009	operating
2942	Bhatkal	PV	STD01800131	Superior Karipalaya Health Centre	Solite 180	14-Oct-09	1	22/10/2009	operating
3613	Ranibennur	PV	SLD00900424	Chandragouda Parameshappa	Solectric90	30-Dec-09	1	31/12/2009	operating
4073	Honnali	PV	STD00750173	Executive Officer,Taluk	Solite 75	12-Feb-10	1	13/02/2010	operating
4133	Honnali	PV	STD00750184	Executive Officer,Taluk	Solite 75	19-Feb-10	1	18/02/2010	Not Operating -
4283	Jamkhandi	PV	SLD00750306	Somappa Kareppa Madakari	Solectric75	26-Feb-10	1	05/03/2010	operating
4333	Ranibennur	PV	SLD00900632	S B Yadachi	Solectric90	27-Feb-10	1	20/03/2010	operating
4468	Honnali	PV	STD0750245	Assistant Engineer(Panchayath Raj	Solite 75	12-Mar-10	1	14/03/2010	Not Operating -
4501	Dharwad	PV	SLD0012001197	Krishna A Jahagirdar	Solectric120	15-Mar-10	1	19/03/2010	operating
4669	Chikodi	PV	SLD00900557	Balappa N Hanagandi	Solectric90	26-Mar-10	1	02/04/2010	operating
4803	Sullia	PV	SLD01201860	Jagadeesha K V	Solectric120	31-Mar-10	1	10/04/2010	operating
4836	Dharwad	PV	SLD00900759	Patil P S	Solectric90	8-Apr-10	1	21/04/2010	operating
5004	Bijapur	PV	SLD00600760	Shekappa Ramoji	Solectric60	28-Apr-10	1	06/05/2010	operating
5139	Haliyal	PV	SLD00900777	Ashok B Kottan	Solectric90	5-May-10	1	15/05/2010	operating
5172	Jamkhandi	PV	SLD00900821	Krishnabaye Venkappa Patil	Solectric90	12-May-10	1	14/05/2010	operating
5339	Honnali	PV	STD00750271	Executive Officer,Taluk	Solite 75	29-May-10	1	03/06/2010	Not Operating -
5414	Athani	PV	SLD01202120	Shankar Balwad	Solectric120	4-Jun-10	1	04/06/2010	operating
5474	Sullia	PV	SLD012001300	Laxmi	Solectric120	12-Jun-10	1	12/06/2010	operating
5507	Bellary	PV	STD00750300	Hemadri KV	Solite 75	17-Jun-10	1	21/06/2010	operating
5674	Ranibennur	PV	SLD00900958	Maheshappa C Sirigiri	Solectric90	30-Jun-10	1	15/07/2010	operating
5809	Kundapur	PV	STD01500049	Dr.Pushpa Gandhini	Solite 150	20-Jul-10	1	23/07/2010	operating
5842	Davangere	PV	SLD00901024	Rekha B K	Solectric90	22-Jul-10	1	29/07/2010	operating
6010	Rabkavi	PV	SLD00901079	Holabasappa M Talavar	Solectric90	6-Aug-10	1	11/08/2010	operating
6144	Jamkhandi	PV	SLD00901101	Hanumanth Mahadev Konegal	Solectric90	18-Aug-10	1	22/08/2010	operating
6177	Holalkere	PV	SLD01202522	Narendra	Solectric120	19-Aug-10	1	04/10/2010	operating
6285	Kundapur	PV	SLD01200275	Sri Nagachala Ayappa Swamy	Solite 120	30-Aug-10	1	18/09/2010	operating
6345	Koppal	PV	SLD01202493	Nagayya	Solectric120	31-Aug-10	1	07/09/2010	operating
6480	Jamkhandi	PV	SLD00601051	Ningappa Kenchappa Horatti	Solectric60	15-Sep-10	1	17/09/2010	operating
6809	Shiggaon	PV	SLD01202658	Gadigayya A Kolasigermath	Solectric120	21-Oct-10	1	22/10/2010	operating
6815	Tumkur	PV	SLD00901500	Krishna Murthy K C	Solectric90	21-Oct-10	1	23/10/2010	operating
7479	Gulbarga	PV	STD01200174	Subash M Timmanagol	Solite 150	24-Dec-10	1	28/12/2010	operating
7891	Koppal	PV	SLD01203121	Veerabhadraiah	Solectric120	31-Jan-11	1	10/02/2011	operating
8150	Channarayapatna	PV	SLD00901914	Prasanna Kumbar	Solectric90	28-Feb-11	1	21/04/2011	operating
8535	Bilagi	PV	SLD00601557	Mallu Lamani	Solectric60	31-Mar-11	1	02/04/2011	operating
8625	Gokak	PV	KADA PROJECT	Sadanand Amrutappa Harijan	Solectric60	31-Mar-11	1	31/03/2011	operating
8670	Gokak	PV	SLD00601602	Parasuram Yallappa Godi	Solectric60	31-Mar-11	1	07/04/2011	operating
8703	Hubli	PV	SLD00901982	Shivanagowda T	Solectric90	31-Mar-11	1	15/04/2011	operating
8820	Raibag	PV	SLD00601769	Madhukar Ganapathi Sannakki	Solectric60	31-Mar-11	1	31/03/2011	operating
8870	RON	PV	SLD00601882	Swanappa Ramappa Asooti	Solectric60	31-Mar-11	1	31/03/2011	operating
9005	Channagere	PV	SLD01203428	Devendrappa G K	Solectric120	11-Apr-11	1	19/04/2011	operating
9038	Sullia	PV	SLD01203466	Kushalappa Gowda	Solectric120	16-Apr-11	1	04/05/2011	operating
9206	Raichur	PV	SLD01203520	Hanumanna Yadav Y	Solectric120	29-Apr-11	1	07/05/2011	operating
9280	Hassan	PV	STD012000490	Pereira J	Solite 120	24-May-11	1	01/06/2011	operating
9340	Hassan	PV	SLD01500227	Sarojamma	Solectric150	31-May-11	1	08/07/2011	No response
9373	Mudhol	PV	SLD0902096	Krishnappa Laxmappa Jambagi	Solectric90	31-May-11	1	17/06/2011	operating
9541	Haveri	PV	SLD01203602	Murugeppa	Solectric120	30-Jun-11	1	07/07/2011	operating
9675	Virajpet	PV	SLD0902208	Rajarraham	Solectric90	15-Jul-11	1	19/07/2011	operating
9708	Sullia	PV	SLD01203527	Sathish S	Solectric120	22-Jul-11	1	12/08/2011	operating
9876	Raichur	PV	STD00750457	Chandrashekhar	Solite 75	30-Jul-11	1	27/08/2011	operating
10011	Mudhol	PV	SLD00902332	Hanamappa Padappa Mulur	Solectric90	23-Aug-11	1	29/08/2011	operating
10044	Ranibennur	PV	SLD00902234	Nagaraj Shekharappa Yaralli	Solectric90	27-Aug-11	1	05/09/2011	operating
10211	HAVERI	PV	SLD00902343	PRABULINGA. NINGAPPA.	Solectric 90 with 3 lights	20-Sep-11	1	21/09/2011	operating
10346	SORABA	PV	SLD 0090 2454	Mr.M.K.Maheshwarappa	Solectric 90 with 3 lights	29-Sep-11	1	10/10/2011	operating
10379	DHARWAD	PV	SLD 0060 2314	D.K. Chavhan	Solectric 60 with 2 lights without console	30-Sep-11	1	17/10/2011	operating
10416	MUDHOL	PV	SLD01203716	Rangangouda Gireppagouda Patil	Solectric 120 with 4 lights	30-Sep-11	1	10/10/2011	operating
10547	HASSAN	PV	SLD 0090 2137	Saganaiah	Solectric 90 with 3 lights without console	18-Oct-11	1	01/11/2011	operating
10621	SORABA	PV	SLD 0120 4061	Mr.Hanchi Mardan Sab	Solectric 120 with 4 lights without console	21-Oct-11	1	24/10/2011	operating
10675	HUBLI	PV	SLD00902590	SHANKAPPA NAGAPPA	Solectric 90 with 3 lights (2 x 9W and 11W)	27-Oct-11	1	08/11/2012	operating
10681	TUMKUR	PV	SLD 0090 2626	Shobha T K	Solectric 90 with 3 lights	27-Oct-11	1	02/11/2011	operating
10714	BYLAHONGAL	PV	SLD:00902486	Ningappa B Talavar	Solectric 90 with 3 lights	29-Oct-11	1	02/11/2011	operating
11016	ATHANI	PV	SLD 00902666	Ningappa D wagmade	Solectric 90 with 3 lights	24-Nov-11	1	30/11/2011	operating
11150	GADAG	PV	SLD00902839	Manjunath D Patil	Solectric 90-3L with console and 5W LED	30-Nov-11	1	09/12/2011	operating
11345	BYLAHONGAL	PV	SLD00602499	Nagappa.V.Bagalkot	Solectric 60 with 2 lights (9W and 11W)	29-Dec-11	1	16/01/2012	operating
12016	MANGALORE	PV	SLD0120 4499	CBOO (CORPORATION BANK	Solectric 120 with 6 lights	24-May-12	1	01/06/2012	operating
12686	KARKALA	PV	SLA 0330 0333	Sathish Naik	Solectric 330 without console and prioritizer	29-Oct-12	1	24/11/2012	operating
12871	SHIGGAON	PV	SLD01205075	Gousmuddin Thasheda	Solectric 120 - 4 Lights (40ah, no console)	7-Dec-12	1	18/12/2012	operating
12904	HALIYAL	PV	SLD01500347	Rajesh Chandrakant Vernekar	Solectric 150	17-Dec-12	1	21/12/2012	operating

Annex 2

Battery Recycling Instruction Sheet

Recycle Your Battery

NO

Do not throw away your battery

YES

Return your old battery to an Orb Energy branch for a discount on a new battery. We will recyle it.

Recycle Your Battery

- **Do not throw away your battery. It will pollute the environment and potentially damage the health of your family and neighbours. Instead return it to us for a discount on a new battery, and we will ensure it is properly recycled. Thank you.**
- ನಿಮ್ಮ ಹಳೆಯ ಬ್ಯಾಟರಿಯನ್ನು ಹಾಗೆಯೇ ಬಿಸಾಡಬೇಡಿ. ಇದು ಪ್ರಕೃತಿಯನ್ನು ಹಾಳು ಮಾಡಬಹುದು ಹಾಗು ನಿಮ್ಮ, ನಿಮ್ಮ ಕುಟುಂಬದ, ಹಾಗು ನೆರೆ ಹೊರೆಯವರ ಆರೋಗ್ಯವನ್ನು ಹಾಳು ಮಾಡಬಲ್ಲದು. ಆದರ ಬದಲಾಗಿ, ಈ ಬ್ಯಾಟರಿಯನ್ನು ನಮ್ಮ ಹತ್ತಿರ ರಿಯಾಯತಿ ದರದಲ್ಲಿ ಹೊಸ ಬ್ಯಾಟರಿಯೊಂದಿಗೆ ಬದಲಾಯಿಸಿ. ನಾವು ಈ ಬ್ಯಾಟರಿಗಳನ್ನು ಸರಿಯಾದ ರೀತಿಯಲ್ಲಿ ಪುನರ್ಬಳಕೆ ಮಾಡುತ್ತೆವೆ.
- നിങ്ങളുടെ ബാറ്ററികൾ വലിച്ചെറിയരുത്. അത് പരിസ്ഥിതിയെ മലിനമാക്കുമെന്ന് മാത്രമല്ല നിങ്ങളുടെ കുടുംബത്തിന്റെയും അയൽക്കാരുടെയും ആരോഗ്യത്തെ ദോഷകരമായി ബാധിക്കുകയും ചെയ്യും. ഇതിനു പകരം അവ ഞങ്ങൾക്ക് തിരികെ തന്നാൽ പുതിയ ബാറ്ററിക്ക് ഞങ്ങൾ ഡിസ്കൗ നൽകും. ഉപ യോഗശൂന്യമായ ബാറ്ററികൾ ഉചിതമായ രീതിയിൽ പുനരുൽപാദനപ്രക്രിയക്ക് വിധേയമാക്കുമെന്നും ഞങ്ങൾ ഉറപ്പു നൽകുന്നു. നന്ദി.
- **మీ బ్యాటరీని పారవెయ్యవద్దు. ఇది పర్యావరణాన్ని కలుషితం చేస్తుంది మరియు మీ కుటుంబ సభ్యులు మరియు పొరుగువారి ఆరోగ్యాన్నికూడా పాడువెయ్యగలదు. బదులుగా క్రొత్త బ్యాటరీపై డిస్కౌంట్ పొందడానికి దానిని మాకు తిరిగి ఇవ్వండి, మరియు అది సక్రమంగా రీసైకిల్ అయ్యేలా మేము చూస్తాము. ధన్యవాదాలు.**
- आपली बॅटरी फेकून देऊ नका. त्यामुळे पर्यावरण दुषित होते आणि आपले कुटुंबिय आणि शेजारी यांच्या प्रकृतीस धोका होऊ शकतो. त्याऐवजी नवीन बॅटरीवर डिस्काउंटसाठी ती आम्हास परत करा, आणि आम्ही ती योग्य रित्या पुनर्निर्मित होते याची खात्री करू. आभारी आहोत.

Annex 3

Baseline information

The following baseline information, as mentioned in the registered PDD, has been used to calculate emission reductions:

Baseline distribution - Lighting		
Location type	Urban	Rural
Distribution	6%	94%
Electricity	70%	59.494%
Diesel	20%	5.696%
Kerosene	0%	32.278%
Gas	10%	2.532%
Baseline distribution - thermal		
Location type	Urban	Rural
Distribution	78.31%	21.69%
Electricity (Grid EF for India)	54.73%	21.951%
Kerosene	0%	4.878%
Gas	20.95%	12.195%

Fuel parameters/yr/household - Thermal	
Yearly Wood Consumption (TJ/yr)	0.019
Yearly Gas Consumption (TJ/yr)	0.004
Yearly Kerosene Consumption (TJ/yr)	0.00163
Wood EF per household (tCO_2/yr)	2.182
Gas EF per household (tCO_2/yr)	0.251
Kerosene EF per household (tCO_2/yr)	0.11700
Volume of water heated per day / capacity(%)	50
Temperature of Intake water (^{0}C)	25
Temperature of outlet water (^{0}C)	65
Number of Sunshine days per year	300

Fuel parameters/yr/household - Lighting	
Yearly Kerosene Consumption (TJ/yr)	0.002
Yearly Diesel Consumption (TJ/yr)	0.008
Yearly Gas Consumption (TJ/yr)	0.003
Yearly Electricity Consumption (MWh/yr)	0.386
Kerosene EF per household (tCO_2/yr)	0.142
Diesel EF per household (tCO_2/yr)	0.610
Gas EF per household (tCO_2/yr)	0.218
Electricity EF per household (tCO_2/yr)	0.329
Average wattage per bulb (W)	60
Average number of bulbs per household	5.0
Average lighting hours per day per household (h)	3.5

Annex 4

Monitoring Information

1. Onsite monitoring survey team

Name of Surveyor	Samples covered PV Lighting	Samples covered Thermal	Total
Anand Shendagi	1	3	4
Harish K	3	7	10
Harish Sriyan	6	26	32
Keshav Murthy	1	6	7
Prakash Mathad	15	3	18
Praveen Benal	5	7	12
Shivayya Hiremat	9	5	14
Suresh A	10	11	21
Suresh Biradhar	16	10	26
Tulsi Ramu	3	3	6
Veeraswamy	19	9	28
Total	**88***	**90**	**178**

2. Schedule of on-site monitoring surveys

Date of Survey	Samples covered PV Lighting	Samples covered Thermal	Total
02/05/2013	1	--	1
20/05/2013	4	6	10
21/05/2013	10	5	15
22/05/2013	3	13	16
23/05/2013	8	9	17
24/05/2013	17	10	27
25/05/2013	14	10	24
26/05/2013	6	2	8
27/05/2013	12	13	25
28/05/2013	11	16	**37**
29/05/2013	2	5	**7**
30/05/2013	--	1	**1**
Grand Total	**88***	**90**	**178**

* 88 Samples were covered for PV Lighting as 2 potential respondents could not be reached at the time of survey visit. For details refer the emission reduction calculator.