**PROJECT DESIGN DOCUMENT FORM
FOR SMALL-SCALE CDM PROJECT ACTIVITIES (F-CDM-SSC-PDD)
Version 04.1**

PROJECT DESIGN DOCUMENT (PDD)

Title of the project activity	Implementation of energy saving project for Coimbatore municipal corporation street lighting on ESCO Basis
Version number of the PDD	01
Completion date of the PDD	30/07/2012
Project participant(s)	Salzer Electronics Limited
Host Party(ies)	India
Sectoral scope(s) and selected methodology(ies)	Sectoral scope, 03 – Energy demand Selected Methodology: AMS II.L - Demand-side activities for efficient outdoor and street lighting technologies , Version 01
Estimated amount of annual average GHG emission reductions	7,202 tCO_2e per year*

*Rounded up to zero decimal

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

>>

Purpose of the project activity:

The project activity involves installation of energy saving devices to reduce annual consumption of electricity of the street lights in the total distribution network of Coimbatore Municipal Corporation. The installation aims to reduce annual power consumption in municipal street lights.

The project activity is implemented by **Salzer Electronics Limited** *(project participant)*. Salzer Electronics Limited have been awarded contract for implementation of energy efficiency measures in Coimbatore Municipal Corporation on an ESCO based performance contracting model. Salzer Electronics Limited[1] will be installing in-house built GSM enabled wireless energy saver units, called **Salzer Energy Savers**[2] (SES) in the distribution network of Coimbatore Municipal Corporation. Salzer Energy Savers gives a guaranteed energy saving of 32%[3]. The implementation of SES is expected to result in annual energy saving of 8,595 MWh which would have been generated in the regional grid. Thereby, project is expected to help reduce GHG emissions by an average of 7,202 tCO_2e per year over the project crediting period.

Pre-project scenario:

Prior to the project there is no SES in operation at the project site. The installation of SES will lead to reduction in annual electricity consumption, which is at present supplied by fossil fuel dominated Tamil Nadu State Electricity grid, which is part of southern regional grid in India. The electricity generated by the southern regional grid is relatively carbon intensive. Therefore, this project is expected to reduce the emissions of greenhouse gases.

Description of the project activity:

The project activity is installation of SES and will be implemented in all four zones (North, South, East and West) of Coimbatore Municipal Corporation. The project will be undertaken in three phases:

Phase 1: Conduct of baseline energy consumption study for all the four zones
Phase 2: Installation of Salzer Energy Savers
Phase 3: Operation and maintenance work

Phase 1: Baseline Energy Consumption

The result of baseline energy study conducted in all the four zones of Coimbatore Municipal Corporation are as follows:

Zone	Consumption per day (kWh)
East Zone	22311.9
North Zone	21801.3
South Zone	14828.2
West Zone	14647.8
Total Consumption per day (kWh)	73589.2
Total Consumption per annum (kWh)	26860058
Source: Coimbatore consolidated energy auditor report	

[1] http://www.salzergroup.net
[2] http://www.salzergroup.net/EnergySaver.htm
[3] Agreement between Salzer and Coimbatore City Municipal Corporation, Ref No: K440653.

Phase 2: Implementation

Salzer Electronics Limited will be installing in-house built GSM enabled wireless energy saver units, called **Salzer Energy Savers** (SES) in the total distribution network of Coimbatore Municipal Corporation. The function of energy saver units will include power conditioning (by maintaining optimum power) and reduction in lux level (by using dimming technology-by the use of toroidal transformers) but at all time adhering to the lux requirements as per IS Code (IS 1944 part 1 and 2-1970 reaffirmed in 2003 clause 5.1 and 5.7) and monitoring and controlling the energy saver equipment through suitable wireless technology from a central monitoring station. Salzer Energy Savers gives a guaranteed energy saving of 32%.

Phase 3: Operation and maintenance work
Salzer Electronics Limited will be responsible for complete operation and maintenance of the energy saving devices.

The project is developed on an ESCO based performance contracting model between Salzer and Coimbatore City Municipal Corporation. Hence, all the investment related to implementation and operation of the energy efficiency measures will be borne by Salzer Electronics Limited only. The revenue from the project will be from % saving achieved by Energy savers, which will be shared between the two parties as per the agreement between them.

Considering the above, Salzer management anticipated various risk/barriers associated with such projects and its low economic viability. However, Salzer Electronics Limited management believed the CDM revenue from the project will substantially help in mitigating all the adverse effect of the uncertainties related to the project

The project has also been accorded Host country approval from the National Clean Development Authority, Ministry of Environment and Forests (MoEF), Government of India (HCA Letter No: 4/10/2010-CCC, Dated 12 Aug 2010).

Contribution of project activity to sustainable development:
The project contributes to the general well being of the region and is in line with the sustainable development policies of the host country

Social well-being

- The project activity creates employment opportunities for the local people which provides boost to the local economy
- Increases energy services in a country which faces considerable power outages.
- Has a high explicability potential and can therefore promote technological self reliance in India.

Economic well-being

- The project activity will result in direct and indirect employment opportunities for local persons towards installation, operation and maintenance of the proposed project activity.
- The proposed project activity will result in increased business opportunities for local contractors and suppliers during the various phases.

Environmental well-being

- The project activity will result in CO2 emission reduction.
- In addition to the reduction in carbon dioxide (CO2) emissions the project implementation will result in reduction of other harmful gases (NOx and SOx) that arise from the combustion of coal used in power generation.

Technological well-being:

- Has a high explicability potential and can therefore promote technological self reliance in India.
- The reduction in demand shall reduce the overall loadings on upstream network and result in reduced technical losses.

A.2. Location of project activity

A.2.1. Host Party(ies)

>>

India

A.2.2. Region/State/Province etc.

>>

Coimbatore, Tamil Nadu State

A.2.3. City/Town/Community etc.

>>

Coimbatore

A.2.4. Physical/ Geographical location

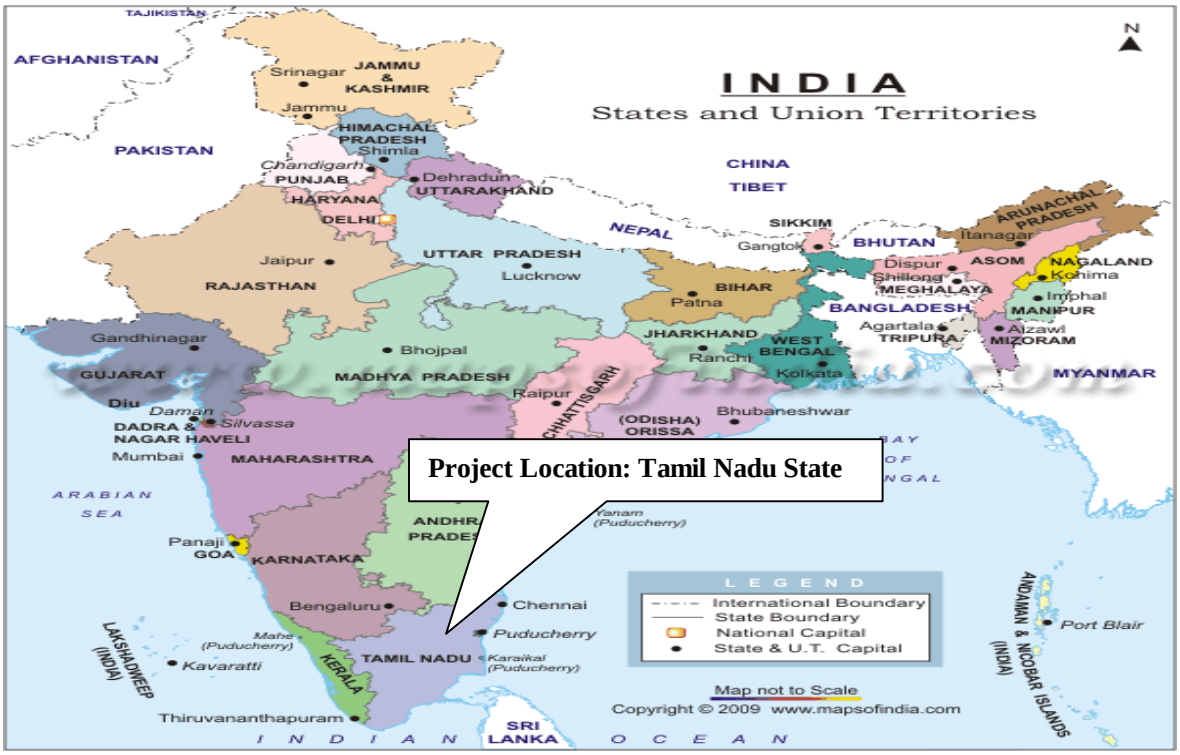
>>

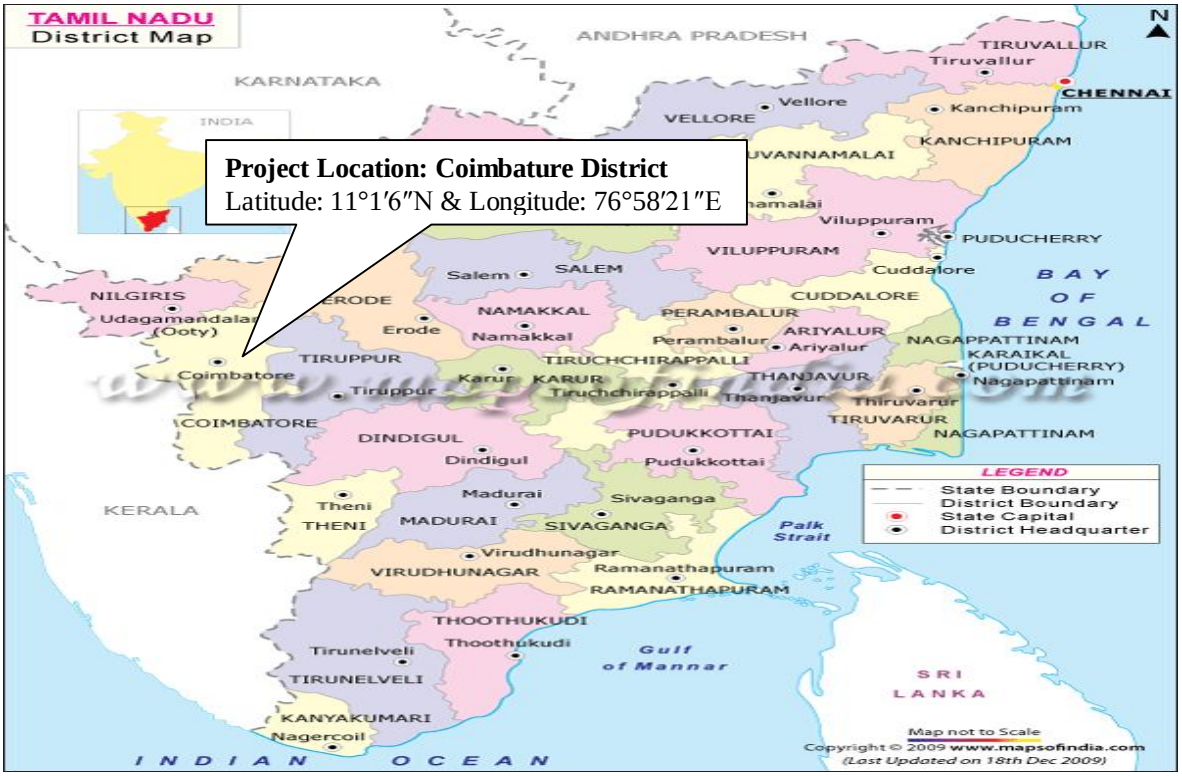
The proposed site is located at Coimbatore district in Tamil Nadu. Coimbatore district is well connected by road and rail. Airport facility is available at Coimbatore. The Coordinates of Coimbatore districts are as follows:
Latitude: 11°1′6″N
Longitude: 76°58′21″E

How to reach Coimbatore: ***By Air*** Coimbatore Airport, known as Peelamedu Airport, is at a distance of 10 km from the city.

By Bus: State road transport corporations of Tamil Nadu and Kerala operate many bus services from Coimbatore connecting various cities in the state. Many Super deluxe buses connecting Coimbatore to Trivandrum, Cochin, Chennai, Kozhikode, Hyderabad and Bangalore are available.

By Train: Coimbatore junction is a major railway station in Southern railway. It is well connected to all the rail heads in India.


INDIA
States and Union Territories
Project Location: Tamil Nadu State
LEGEND
International Boundary
State Boundary
National Capital
State & U.T. Capital
Map not to Scale
Copyright © 2009 www.mapsofindia.com
AFGHANISTAN
PAKISTAN
CHINA
TIBET
NEPAL
BHUTAN
BANGLADESH
MYANMAR
SRI LANKA
INDIAN OCEAN
ARABIAN SEA
BAY OF BENGAL
Srinagar
Jammu
Shimla
Chandigarh
Dehradun
Jaipur
Lucknow
Patna
Gangtok
Itanagar
Dispur
Shillong
Kohima
Imphal
Aizawl
Agartala
Ranchi
Kolkata
Gandhinagar
Bhopal
Raipur
Bhubaneshwar
Diu
Daman
Silvassa
Mumbai
Panaji
Bengaluru
Chennai
Puducherry
Karaikal
Mahe
Kavaratti
Thiruvananthapuram
Port Blair

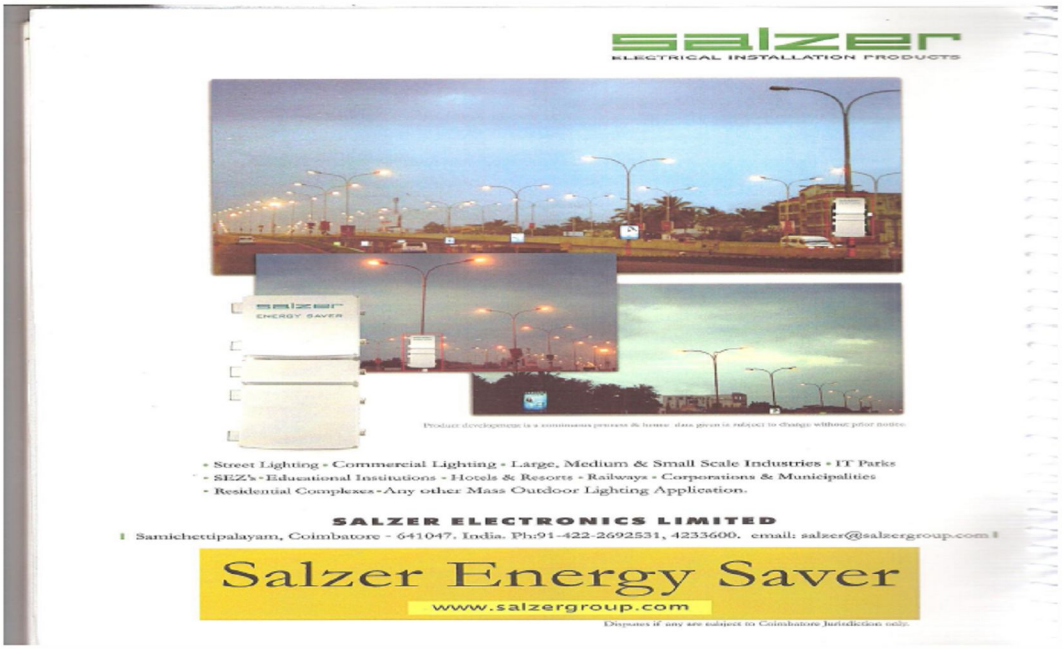

TAMIL NADU
District Map
Project Location: Coimbature District
Latitude: 11°1′6″N & Longitude: 76°58′21″E
LEGEND
State Boundary
District Boundary
State Capital
District Headquarter
Map not to Scale
Copyright © 2009 www.mapsofindia.com
(Last Updated on 18th Dec 2009)
ANDHRA PRADESH
KARNATAKA
KERALA
INDIA
TIRUVALLUR
Tiruvallur
CHENNAI
Kanchipuram
KANCHIPURAM
VELLORE
Vellore
TIRUVANNAMALAI
VILUPPURAM
Viluppuram
PUDUCHERRY
Cuddalore
CUDDALORE
SALEM
Salem
ERODE
NAMAKKAL
Namakkal
PERAMBALUR
Perambalur
ARIYALUR
Ariyalur
NAGAPPATTINAM
KARAIKAL (PUDUCHERRY)
Nagapattinam
TIRUPPUR
Tiruppur
Coimbatore
COIMBATORE
TIRUCHCHIRAPPALLI
Tiruchchirappalli
KARUR
Karur
THANJAVUR
Thanjavur
Thiruvarur
TIRUVARUR
NAGAPATTINAM
DINDIGUL
Dindigul
PUDUKKOTTAI
Pudukkottai
NILGIRIS
Udagamandalam (Ooty)
Erode
Theni
THENI
MADURAI
Madurai
SIVAGANGA
Sivaganga
Palk Strait
Virudhunagar
VIRUDHUNAGAR
Ramanathapuram
RAMANATHAPURAM
THOOTHUKUDI
Thoothukudi
Tirunelveli
TIRUNELVELI
KANYAKUMARI
Nagercoil
Gulf of Mannar
SRI LANKA
INDIAN OCEAN

A.3. Technologies and/or measures

>>

Technology of the project activity

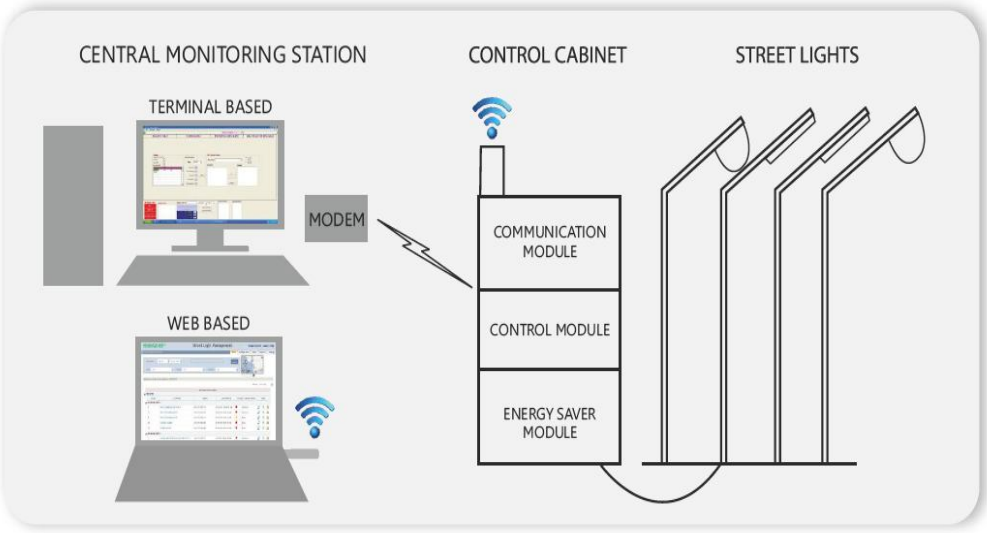
Salzer Energy Saver (SES) is an integrated Remote controlled Energy Saving and Monitoring solution for street /outdoor lighting. SES reduces the power consumption by reducing the voltage to the lamps, taking care to maintain the lux levels as per regulatory standards. SES also gives the option of programmable time intervals in which Energy Saving periods can be pre-set. The entire system can be controlled and monitored from a Central Monitoring Station which is wirelessly connected. SES has a guaranteed operating life time of 15 years[4]. The Salzer Energy Saver (SES) consists of a Control Cabinet and a Central Monitoring System (CMS). Each service connection has one control
cabinet.



Control Cabinet

This unit consists of transformers and switching circuits. This unit saves energy by maintaining optimum voltage across the lamp at all times.

[4] Letter from Salzer Electronics Limited



Micro Controller Unit
Micro controller performs the following functions:

- Total system controls Switching ON, Switching OFF & reduction of voltage according to the programmed time schedule, monitoring and recording of the load parameters voltage, current,
- energy, power factor etc.,
- Energy Saving calculation.
- Energy data backup for one month.
- Energy Meter.
- This unit measures the energy consumed by the lamps.

GSM Unit
This unit transmits the energy data to the CMS and also receives data from CMS.

Central Monitoring Station:
The Central Monitoring Station has a computer with a modem to receive the reports given by the Controller unit for every service connection provided with energy saver unit. It sends commands and executes the same in the controller. It communicates with the Controller to perform the tasks like, automatic on/off, change the on/off time, dimming time slots, voltage control, Shows online status of any service connection connected with energy saver. It generates tamper-proof daily, week, monthly energy saving reports and lamp failure reports. It registers the instantaneous alert messages given by the Controller unit. It generates on-line condition of any/many energy saver/s unit at any point of time.

It monitors:

- Daily consumption of energy, energy saved and reports the possible outcomes.
- Load parameters such as Voltage, Current, Energy and PF.
- Total failure of load and group failure of load.
- Low Power Factor, Low & High supply voltage.
- Abnormal increase in load current instantaneously.
- Phase-wise failure of load.
- Setting of Lamp Voltage levels, Setting of ON/OFF timings
- Switching ON/OFF of the lamps directly overriding the Controller Unit.
- The number of glowing hours in each Service Connection.

- Common changes to be effected into the Control Cabinet (Energy Saver unit).

A.4. Parties and project participants

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)	**Private entity:** Salzer Electronics Limited	No

A.5. Public funding of project activity

>>

The project doesn't involve public funding from parties included in Annex-I.

A.6. Debundling for project activity

>>

In accordance with Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM project activities "Determining the occurrence of debundling", a proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

- With the same project participants
- In the same project category and technology/measure; and
- Registered within the previous 2 years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.

There is no other CDM activity undertaken by the project participant, which is in the same project category and whose boundary is within 1 km of the project boundary of this project activity at the closest point.The participant of the proposed project has not applied to register another small scale CDM project activity within 1 KM of the proposed project boundary. Thus, it is confirmed that the project is not a debundled component of another large scale project activity.

SECTION B. Application of selected approved baseline and monitoring methodology

B.1. Reference of methodology

>>

Methodology: AMS II.L – Demand side activities for efficient outdoor and street lighting technologies (Version 01, approved in EB 60)

Reference:
http://cdm.unfccc.int/filestorage/C/D/M/CDM_AMSVWHGGYBKA6MQWUJW9BQ4VMXDU0VUMT/EB60_repan18_SSC-II.L_ver01.pdf?t=azh8bTVsbXhvfDAnBHvT_pgdL67Sfw61iexI

Tool: Tool to calculate the emission factor for an electricity system – version 02.2.1, EB 63, annex 19

B.2. Project activity eligibility

>>

The project activity is a Type (ii) project activity ("Energy efficiency improvement projects") because it

increases the efficiency of electric lighting in communities.

The project activity belongs to the Category L ("Demand-side activities for efficient outdoor and street lighting technologies") because it increases the efficiency of lighting use in communities (demand-side) and the project activity consists of a installation of energy savers (specific technology) to be placed over a period of time.

Methodology applicability criteria	Project activity in accordance with the applicability criteria
This category comprises activities that lead to efficient use of electricity through the adoption of energy efficient lamps and/or fixture combinations to replace less efficient lamps and/or fixture combinations in public- or utility-owned street lighting systems. Project and baseline lamps and/or fixture combinations are referred to here as luminaires, which encompasses all of the components in an individual assembly of street lighting equipment, including lamp, lens and reflector, fixture housing, wiring, and driver or ballast and individual and centralized controls components/system(s). This methodology covers projects involving multiple luminaires used to illuminate roadways. This methodology is applicable for one-for-one replacements of baseline luminaires with project luminaires or for replacing multiple baseline luminaires with multiple project luminaires. This methodology is also applicable to projects that involve the implementation of lighting controls that reduce total operating hours or average wattage of the lighting system as well as for new construction installations. This methodology is only applicable if failed project equipment will continuously be replaced based on local maintenance practices, during the crediting period, by equipment of equivalent or better lighting and energy performance specification. The luminaires selected to replace existing equipment must be new equipment and not transferred from another activity.	The project activity is installation of energy savers due to which there is reduction in electricity consumption of street lights in the distribution network of Coimbatore Municipal Corporation. The project involves implementation of lighting controls that reduce the wattage of the lighting system. In case of any failure of the installed energy savers during the crediting period, the defected equipments will be replaced with new energy savers. Hence applicable.
Controls covered by this methodology may include simple photocells and/or astronomical time clocks that provide basic streetlight scheduling control. Controls may also include advanced systems that allow for more sophisticated strategies, such as dynamically altering street lighting power (dimming or multiple levels of operation such as bi-level lighting) based on vehicle and/or pedestrian traffic sensors or schedules, time of night, ambient conditions, etc;	The project activity is based on the dimming of street lights with pattern of pedestrian traffic schedules. The project activity employed advanced systems which allows dynamically altering street lighting power based on pedestrian traffic schedules and time of night.Typically, Streetlights are switched ON by 6 PM during which the

a practice known as adaptive lighting.	vehicle pedestrian traffic is usually high. After 9 PM the traffic level reduces and further reduces after 11PM. However, the input voltage increases due to reduction in residential and commercial electrical power consumption. In that time the street lights will glow very bright and consumes more electrical power. Salzer Energy Saver regulates the voltage to reduce the extra brightness of street lights as per the requirement at various time frames (As per ISI Code). Hence applicable.
This methodology applies to street lighting projects that provide lighting performance quality either: (a) Equivalent to or better than the baseline lighting performance; or (b) Equivalent to or better than the applicable street lighting standard. If adaptive controls will be used to vary light output for project luminaires, lighting performance must be proven to meet or exceed baseline performance or the applicable standard for all light output settings. The preferred standard would be the local standard if there is one, in the absence of a local standard the national standard if there is one, or the CIE standards detailed in Annex III if there is no local or national standard.	The quality of the lighting performance after installation of energy savers is equivalent to applicable street lighting standard. Hence applicable.
For retrofit projects, lighting performance quality of project luminaires shall be shown to comply with this methodology through the use of one of the following methods: (a) Equivalence to existing baseline luminaires: The project participant shall prove that project luminaires provide equivalent or improved total useful illumination (lx), compared to the baseline luminaires being replaced, at each representative location. Either by: (i) Measurements and calculations; or (ii) Computer modeling of average illuminance from baseline and project luminaires at representative locations that shall be determined in accordance with CIE standard 140:2000 (b) Compliance with applicable street lighting standard: (i) If a national or local lighting standard is available that prescribes lighting levels for roadway lighting classes, such shall be used to evaluate project luminaire compliance at each representative location. A standard field of calculation shall be defined to field measure or computer model illuminance per Annex II of this methodology. Project luminaires must meet or exceed the illuminance levels prescribed in the standard, as well as uniformity and glare criteria as applicable; (ii) If no national or local standard exists, the project participant shall use an approved international standard such as CIE ís Lighting of Roads for Motor and Pedestrian	The project activity is installation of new energy savers in the existing street lighting system of Coimbatore Municipal Corporation. Hence not applicable.

Traffic (CIE 115:2010), which provides a structured model for selection of the appropriate roadway lighting class and gives recommended maintained lighting levels. Alternately, if appropriate, project participant may use the illuminance standards given in CIE ís Technical Report: Road Transport Lighting for Developing Countries (CIE 180:2007). The illuminance, uniformity and glare requirements of both of these standards are provided in Annex III of this methodology. Illuminance evaluations for comparison of project and baseline luminaires or for compliance with an applicable standard shall either be made on the basis of the photopic response curve, or using the mesopic system of photometry developed by the CIE and relying on photopic and scotopic response curve measurements. Determining lighting performance quality is a one-time activity and thus continuous monitoring and verification of lighting system performance compliance with baseline performance or applicable street lighting standards are not required during the crediting period.	
In the case of a Greenfield (new construction) project, the existing baseline technology is assumed to be the prevailing street lighting technology used in the region for equivalent roadway types and lighting classes. If it is not common practice in the project's region to illuminate roadways with electric lighting and it cannot be shown that a less efficient street lighting system would be installed in lieu of project activities, this methodology is not applicable.	The project activity is installation of new energy savers in the existing street lighting system of Coimbatore Municipal Corporation. Hence applicable.
For Greenfield baseline determination, project participant must be able to document representative locations, as described in paragraph 3, where baseline luminaires are already installed in the same region as the project. The same region is defined as either: (a) Within 200 km of the project's boundary; or (b) Within the same city or town jurisdiction. The project participant must document the type, wattage, and operating schedule of the baseline luminaires at the comparable location and assume this as the baseline for the project representative location. In selecting the baseline technologies to consider, the project participant shall follow the "General guidelines to SSC CDM methodologies under the section "Type II and III Greenfield projects (new facilities)"	The baseline as well as the project location of the project activity includes east, west, north and south zones of Coimbatore municipality which falls within the same city. Hence applicable.
The aggregate electricity savings by a single project activity may not exceed the equivalent of 60 GWh per year.	The estimated aggregate energy savings from the project is 8, 595MWh (i.e. 8.595 GWh) which is very much lower than threshold limit of 60 GWh per year and the energy savings from the project will below 60 GWh

	during any year of the project crediting period. Hence applicable.

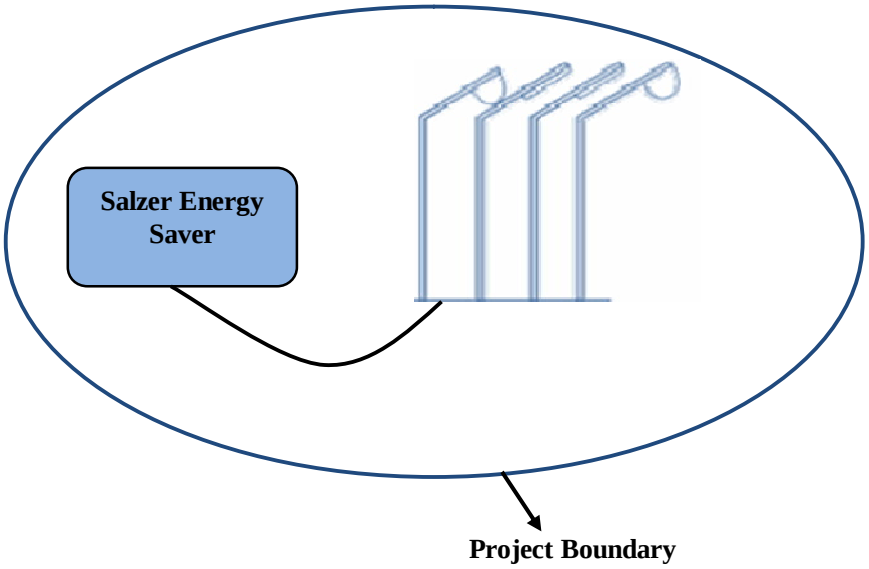
On the basis of above discussion, it can be concluded that the applicability conditions for the use of baseline methodology category AMS II.L have been satisfied.

B.3. Project boundary

>>

As per AMS II.L (Version 01), *the project boundary is the physical, geographical location of all project luminaries installed.* Hence, the project boundary encompasses the physical and geographical area of all the salzer energy savers installed covering all the four zones (north, east, west and south) and all the street light networks connected physically in the Coimbatore municipality distribution area

.



B.4. Establishment and description of baseline scenario

>>

The alternatives considered for determination of the baseline scenario in the context of the project activity includes all possible options available for the project proponent before the implementation of the project activity within applicable laws and regulations.

The possible alternative baseline scenarios are the following:

Alternative 1: Proposed project activity undertaken without CDM; and
Alternative 2: Continuation of the present practice (Proposed project activity not implemented)

Alternative 1: Proposed project activity undertaken without CDM

This alternative is in compliance with all applicable legal and regulatory requirements. The proposed CDM project activity requires huge capital investment by the project proponent and would not have come up in the absence of CDM benefits. Hence *this alternative does not become eligible as most plausible baseline scenario.*

Alternative 2: Continuation of the present practice (Proposed project activity not implemented)

This implies continuing operation of street lighting without installing the new energy saver units which is also the common practice in the region. It does not involve any further capital expenditure. *Therefore this is a credible alternative to the project activity.*

All the alternatives discussed above are within applicable laws and regulations.

Considering all the points mentioned above, **"Alternative 2: Continuation of the present practice (Proposed project activity not implemented)"** was found to be the most plausible and realistic option available to the Salzer management.

The baseline for this project activity is defined as the electricity consumption of the street lights in the municipality network of Coimbatore and the related GHG emissions that would have occurred in case the project would not be implemented and the installation of energy savers would not take place.

An ex ante baseline energy audit study was conducted by BEE certified energy auditor to provide key information about existing street lights such as type of lamps, the total load managed by each zone, average lighting usage, and energy consumption of the street lights.

As per AMS II.L (Version 01), paragraph 14 "*the emissions reduction is the net electricity savings (NES) times an Emission Factor (EF) calculated in accordance with provisions under AMS I.D.".*
The Emission factor for Southern region is taken from the "CO_2 Baseline Database (Version 07)[5]" published by CEA for Indian grid systems, which are made publicly available on CEA website. The Emission factors are calculated according to "Tool to calculate the emission factor for an electricity system", version 02.2.1" CDM UNFCCC website.

Data source for the key parameters used to calculate emission reductions is furnished below:

Key Parameter	**Value**	**Data Source**
$EF_{CO2,Elec,y}$	Baseline emission factor for the Southern region grid	CEA published baseline emission factor for Southern region grid
NES_y	Net electricity savings by the project activity	From Electricity Board (EB) statements and Baseline energy consumption values. Ex post determination.

Actual emission reductions will be calculated *ex post* based on the actual monitored data during each year of the crediting period.

B.5. Demonstration of additionality

>>

The project activity is implementing energy efficiency measures in the street lighting network of Coimbatore Municipal Corporation and the energy savings resulting from the project activity is 8,595 MWh per year. The project activity will result in minimum of 32% energy savings as compared to the baseline energy consumption. The additionality of the project activity is demonstrated using "**GUIDELINES FOR DEMONSTRATING ADDITIONALITY OF MICROSCALE PROJECT ACTIVITIES"** version 04

As per point no.3 of *"GUIDELINES FOR DEMONSTRATING ADDITIONALITY OF MICROSCALE PROJECT ACTIVITIES"* energy efficiency project activities that aim to achieve energy savings at a scale of no more than 20 gigawatt hours per year are additional if any one of the conditions below is satisfied:

[5] http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

(a) The geographic location of the project activity is in an LDC/SIDS or special underdeveloped zone of the host country identified by the government in accordance with the paragraph 2 (a) (i) above;

(b) The project activity is an energy efficiency activity with both conditions (i) and (ii) below satisfied:

(i) Each of the independent subsystems/measures in the project activity achieves an estimated annual energy savings equal to or smaller than 600 megawatt hours;

(ii) End users of the subsystems or measures are households/communities/SMEs.

The various types of energy savers installed as part of the project activity and the resulting energy savings from each type of energy saver is detailed below

Energy Saver Type	kVA Rating	Baseline Burning Hours	Total Baseline Consumption per Year (in kWh)	Actual Burning Hours	Consumption after ES Installed per Year (in kWh)	Energy Savings per year (in kWh)	Energy Savings per year (in MWh)
1 Phase	1 kVA	12.00	3525.9	12.00	2173.72	1339.84	1.34
1 Phase	2 kVA	12.00	7051.8	12.00	4347.43	2679.68	2.68
1 Phase	3 kVA	12.00	10577.7	12.00	6521.15	4019.53	4.02
1 Phase	4 kVA	12.00	14103.6	12.00	8694.87	5359.37	5.36
1 Phase	5 kVA	12.00	17629.5	12.00	10868.59	6699.21	6.70
1 Phase	6 kVA	12.00	21155.4	12.00	13042.30	8039.05	8.04
1 Phase	7 kVA	12.00	24681.3	12.00	15216.02	9378.89	9.38
1 Phase	8 kVA	12.00	28207.2	12.00	17389.74	10718.74	10.72
1 Phase	9 kVA	12.00	31733.1	12.00	19563.46	12058.58	12.06
1 Phase	10 kVA	12.00	35259.0	12.00	21737.17	13398.42	13.40
3 Phase	1 kVA	12.00	10577.7	12.00	6521.15	4019.53	4.02
3 Phase	2 kVA	12.00	21155.4	12.00	13042.30	8039.05	8.04
3 Phase	3 kVA	12.00	31733.1	12.00	19563.46	12058.58	12.06
3 Phase	4 kVA	12.00	42310.8	12.00	26084.61	16078.10	16.08
3 Phase	5 kVA	12.00	52888.5	12.00	32605.76	20097.63	20.10
3 Phase	6 kVA	12.00	63466.2	12.00	39126.91	24117.16	24.12
3 Phase	7 kVA	12.00	74043.9	12.00	45648.06	28136.68	28.14

From the above table it is clear that the estimated energy savings from each independent measure in the project activity is well below 600 megawatt hour per year and the energy savings resulting from the project activity is less than 20 GWh per year. The end users of the implemented measures are communities.

Hence the project activity is additional as per point no 3 (b) of the guidelines for demonstrating the additionality of the micro scale project activities.

Description on CDM consideration:

The project activity start date is 27th September 2010 (Completion of baseline study). Hence in accordance with the Annex22 EB49, the present project activity will be categorized as **new project activities**. Accordingly, the project proponents have sent intimation letter to UNFCCC As per UNFCCC, the date of intimation letter received by them is 25/09/2009[6].

B.6. Emission reductions

B.6.1. Explanation of methodological choices

>>

[6] http://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html?s=20

Baseline emissions
The estimation of baseline emissions has been done in accordance with paragraph 14 of AMS II.L (Version 01). As per that the emissions reduction is the net electricity savings (*NES*) times an Emission Factor (*EF*) calculated in accordance with provisions under AMS-I.D.

$ER_y = NES_y * EF_{CO2, ELEC,y}$

Where

$EF_{CO2, ELEC,y}$ = Emission factor in year *y* calculated in accordance with the provisions in AMS-I.D (tCO_2/MWh)

ER_y = Emission Reductions in year *y* (tCO_2e)

The net electricity savings (*NES*) is arrived at by comparing the EB reading and the baseline energy consumption.

Savings will be calculated by finding the difference between the EB reading and the baseline consumption data. The units (kWh) for the non-burning of lamps and the less on-time will be reduced from the savings obtained to get the net savings.

Where Base line consumption is derived through energy auditing and the same is taken for calculation after being verified by the BEE certified energy auditor

Grid Emission Factor ($EF_{CO2,ELEC,y}$)
The emission factor for the displacement of electricity corresponds to grid emission factor. The grid emission factor for southern regional grid for the year 2010-11 was **0.8379 tCO_2/MWh** , which is taken from the Central Electricity Authority, India.

B.6.2. Data and parameters fixed ex ante
(Copy this table for each piece of data and parameter.)

Data / Parameter	$EF_{CO2,ELEC,y}$
Unit	tCO_2/MWh
Description	CO_2 Emission factor for the Southern regional grid
Source of data	CEA published data. Version 7.0, Jan 2012
Value(s) applied	0.8379 (ex-ante approach)
Choice of data or Measurement methods and procedures	The CEA is the prime authority of Indian power sector for determining the guidelines and norms. The authority publishes all the data relevant to the Indian power sector. The CO_2 data base for Indian power sector published by CEA is available publicly. Hence, the application of data published by CEA is transparent and conservative.
Purpose of data	To calculate the baseline emissions
Additional comment	CO_2 Emission factor for the Southern regional grid will be constant as ex-ante based and fixed for entire crediting period

Data / Parameter	$E_{BL,y}$
Unit	kWh
Description	Energy consumption in the baseline
Source of data	Baseline Energy Audit Report
Value(s) applied	26860058
Choice of data or Measurement methods and procedures	
Purpose of data	To calculate the baseline emissions
Additional comment	Energy consumption in the baseline will be constant as ex-ante based and fixed for entire crediting period

B.6.3. Ex-ante calculation of emission reductions

>>

The product of the net electricity savings of the energy savers and the emission factor for the electricity displaced

	Values Applied	**Source**
$E_{BL,y}$	26860058 kWh	Calculated based on Energy Audit report
NES	8595 MWh	Calculated
$EF_{CO2,ELEC,y}$	0.8379 tCO2/MWh	CEA published data. Version 7.0, Jan 2012
BEy	**7,202 tCO_2e**	Calculated

Project Emissions: Considered zero

Leakage Emissions: Considered zero, since there is no transfer of the energy savers from any other project.

Emission Reductions: 7,202 tCO2e

B.6.4. Summary of ex-ante estimates of emission reductions

Year	Baseline emissions (tCO_2 e)	Project emissions (tCO_2 e)	Leakage (tCO_2 e)	Emission reductions (tCO_2 e)
Year 1	7,202	0	0	7,202
Year 2	7,202	0	0	7,202
Year 3	7,202	0	0	7,202
Year 4	7,202	0	0	7,202
Year 5	7,202	0	0	7,202
Year 6	7,202	0	0	7,202
Year 7	7,202	0	0	7,202
Year 8	7,202	0	0	7,202
Year 9	7,202	0	0	7,202
Year 10	7,202	0	0	7,202
Total	**7,2020**	**0**	**0**	**7,2020**
Total number of crediting years	**10**			
Annual average over the crediting period	**7,202**	**0**	**0**	**7,202**

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

(Copy this table for each data and parameter.)

Data / Parameter	**$Q_{P,i}$**
Unit	Number
Description	Number of SES installed
Source of data	Project Proponent Records and System data
Value(s) applied	2341
Measurement methods and procedures	Records by project proponent
Monitoring frequency	NA
QA/QC procedures	NA
Purpose of data	For calculating the emission reductions
Additional comment	Data shall be archived for the entire crediting period + 2 years

Data / Parameter	$OF_{,i}$
Unit	Hours
Description	Number of Hours elapsed between failure of energy saver and the replacement
Source of data	Project Proponent Records and System data
Value(s) applied	_
Measurement methods and procedures	Standard reports are generated by the implementing departments. These documents are maintained at central location.
Monitoring frequency	Continuous
QA/QC procedures	-
Purpose of data	For calculating the emission reductions
Additional comment	Data shall be archived for the entire crediting period + 2 years

Data / Parameter	P_i
Unit	Watts
Description	Power output of the SES.
Source of data	Technical specification of SES
Value(s) applied	-
Measurement methods and procedures	Standard reports are generated by the implementing departments. These documents are maintained at central location.
Monitoring frequency	Continuous
QA/QC procedures	-
Purpose of data	For calculating the emission reductions
Additional comment	Data shall be archived for the entire crediting period + 2 years

Data / Parameter	O_i
Unit	Hours
Description	Average annual hours of operation of SES
Source of data	Technical specification of SES
Value(s) applied	-
Measurement methods and procedures	Standard reports are generated by the implementing departments. These documents are maintained at central location.
Monitoring frequency	Continuous
QA/QC procedures	
Purpose of data	For calculating the emission reductions
Additional comment	Data shall be archived for the entire crediting period + 2 years

Data / Parameter	**AFR_i**
Unit	%
Description	Annual Failure rate of the SES
Source of data	Technical specification of SES
Value(s) applied	-
Measurement methods and procedures	Standard reports are generated by the implementing departments. These documents are maintained at central location.
Monitoring frequency	Continuous
QA/QC procedures	-
Purpose of data	For calculating the emission reductions
Additional comment	Data shall be archived for the entire crediting period + 2 years

B.7.2. Sampling plan

>>

There are no parameters in section B.7.1 that are to be determined by sampling approach.

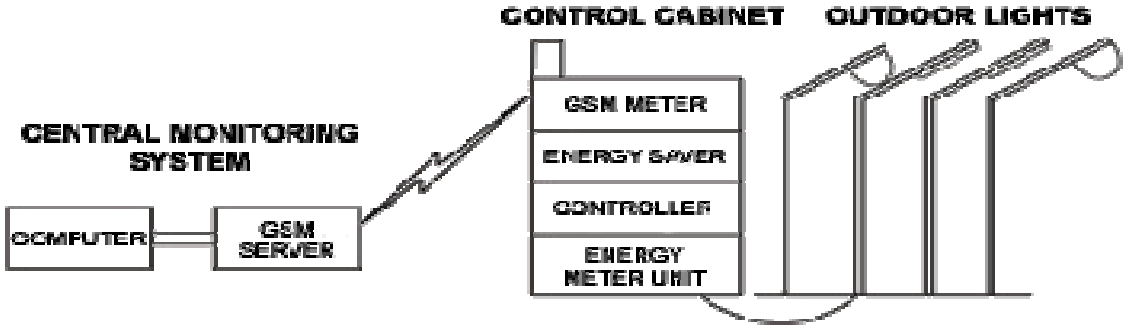
B.7.3. Other elements of monitoring plan

>>

Monitoring requirement & measures

The Central monitoring station, shortly called as CMS, controls and monitors the street lights situated in field at a remote location, through wireless GSM/GPRS technology. The electrical parameters such as voltage, current, power factor, power, etc. will be continuously monitored through an Automatic Meter Reading system (AMR), which is in-built within the energy saver device. It consists of ISI certified digital energy meter enabled with an interface (RS-232 for single phase, RS-485 for three phase) for the collection of data.

The data received will be communicated to the central Monitoring Station through a GSM/GPRS based modem, provided with a suitable network (SIM card) for communication.The entire system can be controlled and monitored from a Central Monitoring Station which is wirelessly connected. Each service connection has one control cabinet.



Control Cabinet

This unit consists of transformers and switching circuits. This unit saves energy by maintaining optimum voltage across the lamp at all times.

Micro Controller Unit
Micro controller performs the following functions:

- Total system controls Switching ON, Switching OFF & reduction of voltage according to the programmed time schedule, monitoring and recording of the load parameters voltage, current, energy, power factor etc.,
- Energy Saving calculation.
- Energy data backup for one month.
- Energy Meter.
- This unit measures the energy consumed by the lamps.

GSM Unit
This unit transmits the energy data to the CMS and also receives data from CMS.

Central Monitoring Station:
The Central Monitoring Station has a computer with a modem to receive the reports given by the Controller unit for every service connection provided with energy saver unit. It sends commands and executes the same in the controller. It communicates with the Controller to perform the tasks like, automatic on/off, change the on/off time, dimming time slots, voltage control, Shows online status of any service connection connected with energy saver. It generates tamper-proof daily, week, monthly energy saving reports and lamp failure reports. It registers the instantaneous alert messages given by the Controller unit. It generates on-line condition of any/many energy saver/s unit at any point of time. It monitors:

- Daily consumption of energy, energy saved and reports the possible outcomes.
- Load parameters such as Voltage, Current, Energy and PF.
- Total failure of load and group failure of load.
- Low Power Factor, Low & High supply voltage.
- Abnormal increase in load current instantaneously.
- Phase-wise failure of load.
- Setting of Lamp Voltage levels, Setting of ON/OFF timings
- Switching ON/OFF of the lamps directly overriding the Controller Unit.
- The number of glowing hours in each Service Connection.

Meter Calibration:
Respective meters will be calibrated once a year to ensure the accuracy of the readings; the error margin should not exceed 0.5%. The calibration frequency too is a part of the monitoring system. This data is monitored using meters and standard testing equipment, which is regularly, calibrated following standard industry practices.

Monitoring Team & Responsibility:

- **Technical Director:** Overall responsibility of compliance with the CDM monitoring plan.
- **Project Manager:** Quality assurance of the data/report generated by Shift Engineer
- **Shift Engineer:**
  - Responsible for monthly and annual report generation.
  - Responsible for completeness of data and check for reliability of data, along with identification of any discrepancies in the data.
  - Responsible for daily report generation, log preparation, data recording.

Management system and quality assurance
The quality assurance and quality control procedures involve the process of data monitoring, recording, maintaining and archiving, and monitoring equipment calibration. The data should be cross-checked against relevant electricity sales receipts and/or records from the grid for quality control. Calibration of Meters &

Metering should be implemented according to national standards and rules annually at least. And all the records should be documented and maintained by the project owner for verification.

Internal audit procedures:
A Quality Assurance procedure will be undertaken every six months or atleast once in a year. An internal Audit shall be done in order to ensure the quality of the recorded data and also to ensure that all established steps have been properly followed.

SECTION C. Duration and crediting period
C.1. Duration of project activity
C.1.1. Start date of project activity
>>
27/09/2010 (Date of completion of energy audit study)

C.1.2. Expected operational lifetime of project activity
>>
15 Years 00 Months[7]

C.2. Crediting period of project activity
C.2.1. Type of crediting period
>>
Fixed Crediting period

C.2.2. Start date of crediting period
>>
01/10/2012 or date of request for registration to UNFCCC whichever is later

C.2.3. Length of crediting period
>>
10 years 00 Months

SECTION D. Environmental impacts
D.1. Analysis of environmental impacts
>>
As per the Schedule 1 of Ministry of Environment and Forests (MoEF - Government of India) notification dated September 14, 2006[8], - 39 activities are required to undertake environmental impact assessment studies. The proposed project does not fall under the list of activities requiring EIA as it will not involve any negative environmental impacts. Thus no EIA study was conducted.

The project objective is to reduce the street light energy consumption. Such project has a positive global impact on the environment by reducing the emissions of green house gases.

[7] Technical life of Salzer Electrics Saver
[8] http://envfor.nic.in/legis/eia/so1533.pdf

SECTION E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

>>

For the purpose of seeking comments and local stakeholder views on the project activity, stakeholder meeting had been organized by Salzer Electronics Management on 21/12/2009, inviting representatives from local community. Approximately 25-30 people attended the meeting. The meeting was called upon through a notice in the local newspaper (The New Indian Express, Dated 11/12/2009), informing stakeholders that the project will be undertaken and inviting comments. Comments have been compiled and the signatures of all present were taken.

The minutes of meeting and evidence of stakeholder notice will be submitted to DOE during validation.

E.2. Summary of comments received

>>

No negative comments (formal or informal) have been received by the authority

E.3. Report on consideration of comments received

>>

The stakeholders were provided clarifications on the issues raised as above to their satisfaction. None of the concerns expressed by the stakeholders required an action to be taken.

SECTION F. Approval and authorization

>>

The project activity has received Host Country Approval (HCA) from NCDMA (National CDM Authority) at the time of submission of PDD to DOE for validation.

Appendix 1: Contact information of project participants

Organization	**Salzer Electronics Limited**
Street/P.O. Box	Samichettipalayam,
Building	-
City	Coimbatore
State/Region	Tamil Nadu
Postcode	641047
Country	India
Telephone	+91 422 4233600
Fax	+91 422 2692170
E-mail	salzer@salzergroup.com, sales@salzergroup.com
Website	www.salzergroup.com
Contact person	-
Title	-
Salutation	Mr
Last name	Jaganathan
Middle name	-
First name	Nithin
Department	Vice President - Projects
Mobile	+91 9894778777
Direct fax	+91 422 2692170
Direct tel.	+91 422 4233600/2692531
Personal e-mail	nithinjaganathan@gmail.com

Appendix 2: Affirmation regarding public funding

No Public funding is envisaged for the project

Appendix 3: Applicability of selected methodology

Please refer section B.2 of the PDD for the detailed information on selected methodology

Appendix 4: Further background information on ex ante calculation of emission reductions

Exe-ante calculation of emission reduction is provided in section B.6.3. The baseline information has been provided below

Simple Operating Margin (tCO_2/MWh) (incl. Imports)				
	2007-08	2008-09	2009-10	2010-11
NEWNE	1.00	1.01	0.98	0.97
South	0.99	0.97	0.94	0.94
India	1.00	1.00	0.97	0.96
Build Margin (tCO_2/MWh) (not adjusted for imports)				
	2007-08	2008-09	2009-10	2010-11
NEWNE	0.60	0.68	0.81	0.86
South	0.71	0.82	0.76	0.73
India	0.63	0.71	0.80	0.83
Combined Margin in tCO_2/MWh (incl. Imports)				
	2007-08	2008-09	2009-10	2010-11
NEWNE	0.80	0.84	0.90	0.91
South	0.85	0.90	0.85	0.84
India	0.81	0.85	0.88	0.90

Source: CEA published data. Version 7.0, Jan 2012

Appendix 5: Further background information on monitoring plan

Refer section B.7.3

Appendix 6: Summary of post registration changes

Not Applicable

- - - - -

History of the document

Version	Date	Nature of revision
04.1	11 April 2012	Editorial revision to change history box by adding EB meeting and annex numbers in the Date column.
04.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the project design document form for small-scale CDM project activities" (EB 66, Annex 9).
03	EB 28, Annex 34 15 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.
02	EB 20, Annex 14 08 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
01	EB 07, Annex 05 21 January 2003	Initial adoption.
Decision Class: Regulatory **Document Type:** Form **Business Function:** Registration		