CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • 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>.
03	22 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.

SECTION A. General description of small-scale project activity

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

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>>***"Bundled Municipal Street lighting efficiency improvement projects in 14 cities of Madhya Pradesh, India"***

Version No: 4

Date: 19.03.2009

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

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The proposed project activity is located in the state of Madhya Pradesh, India. The objective of the proposed project activity is to reduce the GHG emission by reducing energy consumption in street lighting by integrating various energy efficiency measures into street lighting system. The project activities proposes replacement of existing street lighting comprising sodium vapour & mercury vapour lamps and fluorescent tube light across 14 Municipal Corporations of Madhya Pradesh by a combination of energy efficient devices such as T-5 (28 watt) tube lights, electronic ballasts, programmable timer switches, and power saver units along with other design considerations. The project is being implemented in 14 Municipal Corporation of Madhya Pradesh, India. At the time of the replacement of the existing fixtures, the substituted old fixtures and bulbs will be collected and later destroyed under supervision of an independent body to make sure that they will not be reused.

APPLIANCES (Existing)	Watts	New Wattage (Appliances)
Incandescent Bulbs	40W	28W, (T-5FTL)/15W, (CFL)
Incandescent Bulbs	60W	28W, (T-5FTL))/15W, (CFL)
Incandescent Bulbs	100W	28W, (T-5FTL))/15W, (CFL)
Tube Lights	40W	28W, (T-5FTL))/15W, (CFL)

Despite a significant potential for energy savings, energy efficiency improvement projects are not being implemented in this sector[1]. The municipalities are unable to implement projects because of lack of funds, and other agencies are not implementing them because of associated systemic risk and uncertainties.

Under the proposed CDM Project, Environmental Planning & Coordination Organisation (EPCO) will work as a bundling agent (received supporting letters from all 14 Municipal Corporations) and the project participant's will replace around 68946 fittings of conventional tube lights (40W) and bulbs (40W,

[1] ICLEI SA study

Alliances to save energy (Energy Efficiency Project Manual)

60W & 100W) and also install power saver and timer in street lighting, in the 14 participating cities of Madhya Pradesh (MP) by Municipal Corporation / EPCO / Urban Administration and Development Department, Govt of MP.

The project will lead to considerable electricity consumption savings in street lighting. The project will therefore lead to reduced consumption of fossil fuel-based generated electricity in the Northern Grid and thus reduce GHG emissions.

Current Scenario of Street lighting: Street lighting comes under the control of the Municipal Corporations and is driven by the demand placed by expansion of urban limits. About 20-30%[2] of the electricity consumption by any Municipal Corporation is for street lighting, paying huge amounts of money towards electricity bills for the services.

City-wise Energy Consumption and Annual Energy Costs on Street Lighting for the year 2006-07

S. No	Name of the city	Energy Consumption (in KWh)	Annual Costs (in Rs.)
1	Sagar City	1,050,820	4,155,604
2	Gwalior	5,196,414	16,108,883
3	Burhanpur	1,394,000	5,060,000
4	Jabalpur	10952750	43,811,000
5	Ujjain	6,043,824	21,008,129
6	Indore	16068714	49753686
7	Ratlam	3710139	15819539
8	Singrauli	725000	2096211
9	Satna	2710074	11111304
10	Rewa	1310100	4061304
11	Dewas	2211546	7632538
12	Khandwa	1668357	6623377.29
13	Bhopal	9696356	31028339
14	Katni	2596942.15	7790826.45
15	**Total**	**65,335,036**	**226,060,741**

Source- City Municipal Corporations

[2] Source:www.iclei.org/sa

Contribution of project activity to sustainable development:

The contribution of project activities towards sustainable development has been addressed under the following pillars of sustainable development as per the criteria prescribed by the Designated National Authority (DNA), Government of India:

Social & Economical well-being:

By using the energy efficiency measures in street lighting, a large amount of energy savings can be achieved from the project[3]. Any energy savings or release of grid capacity can be used by the power utility to improve electricity supply for other power dependent activities in the area. This can also help to lower marginal cost per unit of electricity, of particular importance to low income consumers, who pay a disproportionate share of income towards payment for their power consumption. Energy saved can also be diverted by the power utilities to improve supply in the area thereby enhancing the social well being of people.

Environmental Well-Being: The energy efficiency measures will reduce the energy consumption in street lighting, which directly reduces the coal consumption in the thermal power plants which otherwise would have been consumed more. By reducing the coal consumption, the project activity will avoid release of carbon dioxide and particulate matter from coal combustion and proportionate amount of GHG emissions resulting from the transportation & mining of coal. The project activities will contribute towards saving of coal (a finite reserve) that is a primary resource for power generation and other metallurgical applications, which cater to the growth of economy.

Thus,

- The project will provide for efficient use of electricity, which will reduce the coal and other fuel consumption and thereby reducing emission of carbon dioxide, carbon monoxide, SO_2, NOx, mercury and particulate matter.
- The project will also encourage other municipalities, to improve energy efficiency in street lighting system. Despite the obvious attractions and benefits of improving the energy efficiency of the street lighting, most Municipal Corporations world wide do not take advantage of the existing potential. In India, competing demands for investment further discourage implementation of such projects.
- The Municipal Corporations supported by this project can serve as models for other Corporations in similar circumstances by showcasing the project activities and results.

[3] http://www.indiaprwire.com/pdf/pressrelease/200803057836.pdf

Manual for the Development of Municipal Energy Efficiency Projects in India

Technological Well-being: The project includes continuous training and education of the municipal employees, which will raise the awareness levels on efficient use of electricity. The technical skill and knowledge level of the employees of the organization will also improve.

A.3. Project participants:

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Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) Project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
India	• Environmental Planning & Coordination Organisation (EPCO) • 14 Municipal corporation of Madhya Pradesh	Yes Yes

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

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

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A.4.1.1. Host Party(ies):

>> India

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

>> Madhya Pradesh

A.4.1.3. City/Town/Community etc:

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The Project will be implemented in 14 Municipal Corporation namely, Municipal Corporation of Indore, Bhopal, Jabalpur, Gwalior, Ujjain, Sagar, Dewas, Satna, Ratlam, Burhanpur (East Nimar), Murwara (Katni), Singrauli (West Nimar), Rewa, Khandwa (East Nimar) in Madhya Pradesh. The locations of cities are shown in the below map. The latitude and longitude of the ULB are mentioned below[4]. -

[4] http://www.mapsofindia.com/lat_long/madhyapradesh/madhyapradesh.htm

http://travel.bixee.com/railway-stations/Singrauli/SGRL/

http://travel.bixee.com/railway-stations/Singrauli/SGRL/

CITY Name	Latitude	Longitude
Indore	22° 44' N	75° 50' E
Bhopal	23° 16' N	77° 36' E
Jabalpur	23° 10' N	79° 59' E
Gwalior	26° 14' N	78° 10' E
Ujjain	23° 09' N	75° 43' E
Sagar	23° 5' N	78° 5' E
Dewas	22° 58' N	78° 06' E
Satna	24° 34' N	80° 55' E
Ratlam	23° 31' N	75° 07' E
Burhanpur(East Nimar),	21° 17' N	76° 17' E
Murwara (Katni)	23° 51' N	80° 02' E
Singrauli (West Nimar)	24°2'N	82°66'E
Rewa	24° 32' -1" N	81° 18' 0" E
Khandwa (East Nimar)	22°17'N	76°28'E

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

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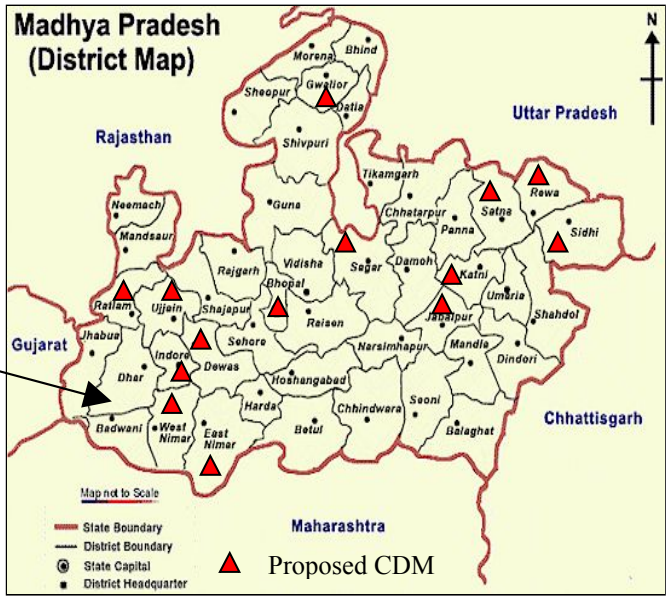

A.4.2. Type and category (ies) and technology/measure of the small-scale project activity:

>>This project applies to the category:
Type (ii): Energy efficiency improvement projects
Category: C. Demand-side energy efficiency programmes for specific technologies

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

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Year	Annual estimation of emission reductions in tonnes of CO_2 e
2010	26506.70
2011	26506.70
2012	26506.70
2013	26506.70
2014	26506.70
2015	26506.70
2016	26506.70
2017	26506.70
2018	26506.70
2019	26506.70

Total estimated reductions (tonnes of CO_2 e)	265067
Total number of crediting years	10 Years
Annual average over the crediting period of estimated reductions (tonnes of CO_2 e)	26506.70

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

>> No recourse to public funding.

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

The project activity is not a debundled component of a large project activity as there is no 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.

SECTION B. Application of a baseline and monitoring methodology

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

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The Project activity follows approved baseline methodology:

AMS-II.C – "Demand side energy efficiency improvements for specific technologies"
Version-12

B.2 Justification of the choice of the project category:

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The project activity is a Type (ii) project activity ("Energy efficiency improvement projects") because it increases the efficiency of electric lighting in street lighting of 14 Municipal Corporations of Madhya Pradesh. The project activity belongs to the Category C ("Demand-side energy efficiency programmes for specific technologies") because it increases the efficiency of lighting use in street lighting (demand-side) and the project activity consists of a large quantity of efficient technologies such as T-5 tube light (specific technology) to be replaced over a long period of time (programme) and also install power saver

with programmable timer. The approved methodology chosen for this project is, "AMS-II.C (small scale)". The AMS-IIC methodology comprises activities that encourage the adoption of energy efficient equipment, lamps, ballasts, etc at many sites. These technologies may replaces existing equipment or be installed at new sites. In the case of new facilities, the determination is applicable to project activities that enhance energy-efficiency in lighting systems. Further, the aggregate savings may not exceed the equivalent of 60 GWh per year for electrical use energy efficient technologies. For each replaced efficient equipment /appliances the capacity or output or level of services (e.g. light output, room temperature and comfort, etc) is not significantly larger or smaller than the baseline.

B.3. Description of the project boundary:

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The cluster of all 14 Municipal Corporations of Madhya Pradesh acts as the boundary for the bundled project. The project boundary includes municipal electricity supply network, cluster of municipalities and electricity grid system to which the CDM project activity is connected. The Indian power grid system is split into two regions. The regional grids facilitate the transfer of electricity between states, which is supplied by state-owned and central sector power generating stations. Madhya Pradesh state falls within the NEWNE[5] Region, hence grid based plants supplying electricity to the NEWNE Grid are chosen as the sample for the analysis of the grid emission coefficient. Only CO_2 emissions from fossil fuel fired power plants connected to the electricity system are included for baseline and project emissions.

The table below summarizes the gases included in the project boundary for the purpose of calculating

	Source	**Gas**	**Included**	**Justification/ Explanation**
Baseline	Emissions from electricity from the grid	CO_2	Yes	CO_2 is formed from combustion of fuels
		CH_4	No	Minor source.
		N_2O	No	Minor source.
Project Activity	Emissions from electricity from the	CO_2	Yes	CO_2 is formed from combustion of fuels
		CH_4	No	Minor source.

[5] http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

	grid	N_2O	No	Minor source.

B.4. Description of baseline and its development:

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A separate baseline study conducted inside the project boundary is applied.The data required to prepare the baseline for the project activity of the 14 cities of Madhya Pradesh in Street Lighting, has already been collected. This data includes city wise energy consumption by streetlights during the last two/three years, types of lamps & fixtures with their ratings (power wattage), operating hours of the lamps and burning status of the streetlights. A team of project participants have done the field visit of all the Municipal Corporations and crosschecked all the given data from the Municipal Corporations. The Municipal Corporations have given the letter of authencity of the provided data (data enclosed with the PDD).

With all conventional tube light and bulbs taking part in the baseline study (wattage per tube light, bulb) and the daily operating hours during the baseline period, the overall power consumption of those fixtures during the baseline period has been calculated (Baseline energy consumption). Parameters to be monitored for calculation of baseline emissions:

	Data variable
Date $_{START,BL}$	Start date of the baseline study. The data when all baseline meters r are Installed.
Date END,BL	End date of the baseline study
o_i	Operating hours per day of the fixtures i as measured by the meter r in the baseline area/streetlights during the baseline period BL.
pi	Power rating of the fixtures i used before replacement
nr,d	Number of meters *r* that provide a valid value for day *d* during the Baseline study.
$EFCO_2,ELEC$	CO_2 grid emission factor of the project electricity system.

The emission baseline is determined as the product of the baseline energy consumption of equipment/appliances and the emission factor for the electricity displaced:

$BE_y = E_{BL,Y} * EF_{CO2, ELEC, Y}$

Where,

BE_y Baseline emissions in year y (tCO_2e)

$E_{BL,Y}$ Energy consumption in the baseline in year y (kWh)

$EF_{CO2, ELEC, Y}$ Emission factor in year Y

Determination of baseline electricity consumption for street lighting

For the purpose of determining the baseline emissions, electricity consumption will be estimated by the following equation:

$$\mathbf{E_{BL,Y} = \sum (n_i * p_i * o_i)}$$

Where,

$E_{BL,Y}$ Energy consumption in the baseline in year y (kWh)

Σ_i Sum over the group of "i" devices (e.g. 40W incandescent bulb) replaced, for which the project energy efficient equipment is operating during the year, implemented as part of the project activity

n_i Number of devices of the group of "i" devices (e.g. 40W incandescent bulb) replaced, for which the project energy efficient equipment is operating during the year

p_i Power of the devices of the group of "i" baseline devices (e.g. 40W incandescent bulb). In the case of a retrofit activity, "power" is the weighted average of the devices replaced. In the case of new installations, "power" is the weighted average of devices on the market

o_i Average annual operating hours of the devices of the group of "i" baseline devices

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

As per the decision 17/CP.7 para 43, a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.

The "additionality tool" (http://cdm.unfccc.int/methodologies/PAmethodologies/AdditionalityTools/Additionality_tool.pdf) shall be applied in conjunction with the proposed baseline methodology to describe how the anthropogenic emissions of GHG are reduced below those that would have occurred in the absence of the Energy efficient CDM Project.

STEP 1: Identification of alternative scenarios

This step serves to identify all alternative scenarios to the proposed CDM project activity(s) that can be the baseline scenario through the following sub-steps:

Sub-step 1a. Define alternative scenarios to the proposed CDM activity

The realistic and credible alternatives(s) available with Municipal corporations are:

Alternative 1: Continuation of current operation

In the present setup the municipalities adopt the practice of replacement or installation of lamps with the most commonly used lamps in the geographical region where the project activity is implemented. This system perpetuates continuation with existing inefficient system[6] (inefficient 40watt conventional tube lights/fluorescent tubes, etc). Such system does require investment but this alternative does not lead to reduction of GHG emission.

Alternative 2: The project activity without CDM

The implementation of the project activity not proposed as a CDM.

Sub-step 1b. Consistency with mandatory applicable laws and regulations:

Both the alternatives presented above are plausible, credible and realistic. The alternative, which is to continue with the common situation before the decision of implementing this CDM project activity is consistent with the applicable laws and regulations.

Step 2: Barrier analysis

Sub-step 2a. Identify barriers that would prevent the implementation of alternative scenarios:

[6] http://www.energymanagertraining.com/equipment_all/lighting_system/pdf/Energy%20Efficiency%20in%20Muncipal%20system%20Lighting.pdf

The project activity faces a number of risks and barriers, which the CDM helps to overcome

I) Inadequate information: In most of the municipal corporation in India, there are tremendous inefficiencies throughout the system. Municipalities of cities lack information about energy-saving[7] investments, especially on financial aspects and the implementation experiences of others.

II) Lack of Finance: The other major barrier for energy efficiency is lack of finance. Most Municipal Corporations in India are extremely strapped for cash and therefore none have the resources to implement significant energy efficiency projects in the street lighting systems. Even if that were case, most banks and other lending institutions in India are hesitant to lend for project that reduces operating cost alone. Financial institutions in India are generally not familiar or adept at analyzing the financial aspects of these investments, and hence even less willing to extend credit for energy conservation projects.
Many of the municipalities approached for the energy efficiency projects claimed that they had conducted[8] some sort of energy audits done in the past, but were enable to fund implementation project. The poor financial performance of the municipalities in India does not generate enough funds internally to support financing of such
projects. The municipalities have also not developed the credit worthiness among the financial institutions for sourcing of the funds.

III) Technology transfer barriers[9]: The energy efficiency equipment penetration in Municipal Corporation in India is still very low[10]. Since there are a set of technologies to be adopted in the project activity, technological barrier should be considered for each type of improvement measures.

T-5 tube light[11]: It has not been widely distributed in the municipal sector. The average technological level of most equipment is still quite low or old. Their efficiency is quiet low in comparison to other new technologies available such as T-5 tubelight in the market. Most of the cities are still using old conventional 40 watt tube light in the street lighting. Further, there is lack of infrastructure for implementation and logistics for maintenance of the technology.

[7] http://www.energymanagertraining.com/DSM/DSMPresentation-SaurabhBEE.pdf

[8] Source: ICLEI South Asia report

[9] http://www.energymanagertraining.com/DSM/DSMPresentation-SaurabhBEE.pdf

[10] http://www.energymanagertraining.com/equipment_all/lighting_system/pdf/Energy%20Efficiency%20in%20Muncipal%20system%20Lighting.pdf

[11] http://instat5.com/about-us.html

Power saver & Timer: It has not been widely distributed in the municipal sector. At present most of the municipal corporation using manual switching of street lighting without any energy efficiency devices such as power saver, which leads to unnecessary wastage of electricity. Automatic control for switching off lights can lead to good energy savings. Simple timers or programmable timers can be used for this purpose. Use of timers with the power saver technology is a very reliable method of control. But, the penetration of these technologies in Municipal Corporation is very low[12].

IV) Institutional risks and barrier

These energy efficiency projects can be implemented through the energy savings project i.e. ESCO Project. Internationally some cities have already implemented through ESCO project, but still in India ESCO market is not yet mature enough particularly with regards to the municipal sector due to the number of market barriers which includes lack of finance, lack of experience in ESCOs/performance contracting and weak contract law, etc. Another barrier is lack of familiarity and experience with the concept, and the degree of difficulty and perceived high risks in establishing and enforcing this project activity. Lack of sufficient payment security from the host, is also a barrier for this project.

Sub-step 2b. Eliminate alternative scenarios which are prevented by the identified barriers:

The barriers as described in section 2a will not affect the alternative of continuing the operation of the present street lighting. But, these barriers will act as hurdle against implementation of the project activity not proposed as a CDM.

Hence, there is only one alternative that is not prevented by the barriers mentioned above. This alternative becomes the baseline scenario for the proposed CDM project activity.

Step 3. Investment Analysis

Not applicable.

Step 4. Common practice.

Sub-step 4a. Analyze other activities similar to the proposed project activity.

In the present the municipalities adopt the practice of replacement or installation of lamps with the most commonly used lamps in the geographical region where the project activity is implemented by using

[12] http://www.energymanagertraining.com/equipment_all/lighting_system/pdf/Energy%20Efficiency%20in%20Muncipal%20system%20Lighting.pdf

www.iclei.org/sa

conventional methods without considering Photometric & Installation terms. The present common practice is based on like to like replacement through procurement tender, which does not factor in energy performance. There is no activity similar to the proposed project activity in India where EE measures are adopted. The project activity is first-of-its-kind in the Madhya Pradesh and India.

Sub-step 4b. Discuss any similar options that are occurring.

No similar activity is observed and commonly carried out.

CDM will move energy efficiency up the priority ladder for resources in large part because it will bring in additional resources. It is unlikely these projects would be implemented without this visibility. CDM would act as a catalyst for implementing energy efficiency projects in the municipal sector and development of ESCOs. CDM registration and the resulting revenue from CER sales will help the Project to overcome the qualitative barriers outlined above.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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The proposed project activity mainly aims to reduce the energy consumption directly by using retrofitting and other energy efficiency measures. The proposed project improves the efficiency in the street lighting system by the introduction of retrofitting and other new improved technologies or new system. This leads to decrease of energy consumption. The methodology AMS-II.C only provides a very generic formula and very generic guidelines for calculation of emission reductions of retrofitting of old inefficient fixtures. In the following we explain in detail how we apply and substantiate the procedures in AMS-II.C in order to arrive at a transparent estimate for emission reductions to be expected by the project activity. The project activity reduces electricity consumption in street lighting. In this case (energy displaced is electricity), AMS-II.C requires that baseline emissions are calculated by multiplying the energy baseline (EB) with an emission coefficient (measured in kg CO_2e/kWh) in accordance with provisions under category I.D. The projects proposed under this PDD meets all the requirements mentioned under the category AMS-II C "Demand side energy efficiency improvements for specific technologies"

- The project proposes a **"street lighting energy efficiency improvement"** activity that includes replacement of inefficient incandescent bulb with other efficient lamps (for e.g. CFL, 28 W T-5) and up gradation of fluorescent tubes, sodium and mercury vapours lamps, with more efficient types of lamps, etc.

CDM – Executive Board

- Proposed project area comes under NEWNE grid (as per Central Electricity Authority, India). All the 14 cities draw electricity for street lighting from Madhya Pradesh State Electricity Board (MPSEB). MPSEB connected to NEWNE grid.
- Till date there is no other CDM project registered with UNFCCC that may affect the energy efficiency of the street lighting located in Madhya Pradesh.
- Further, we can measure the historical total energy consumption for 3 months before the CDM schedule begins, to determine the business as usual baseline GHGs emissions for street lighting systems. Then we would find the emission reductions from project implementation by monitoring the energy consumption after implementation measures.

As the project is an energy efficient project, it is being fit into the **approved methodologies AMS-II C**. The above-mentioned methodologies are applicable because we can measure the historical total energy consumption before the project, to determine the business as usual baseline GHGs emission for street lighting systems. Then we would find the Emission reductions from project implementation by monitoring.

Emission reduction:

$ER_Y = BE_Y - PE_Y - Ly$

Where

ERy are the emission reductions of the project activity during the year y in tons of CO_2

PEy are the emission reductions of the project activity during the year y in tons of CO_2

BEy are the baseline emissions during the year y in tons of CO_2

Ly are the Leakage during the Year y in tons of CO_2

A. Baseline Emission:

The emission baseline is determined as the product of the baseline energy consumption of equipment/appliances and the emission factor for the electricity displaced:

$BE_y = E_{BL,Y} * EF_{CO2, ELEC, Y}$

Where,

BE_y Baseline emissions in year y (tCO_2e)

$E_{BL,Y}$ Energy consumption in the baseline in year y (kWh)

$EF_{CO2, ELEC, Y}$ Emission factor in year Y

Determination of baseline electricity consumption for street lighting

AMS-II.C requires the application of the following formula for calculation of the energy baseline ($E_{BL,Y}$) if the energy displaced is electricity:

$$E_{BL,Y} = \sum (n_i * p_i * o_i)$$

Where,

$E_{BL,Y}$ Energy consumption in the baseline in year y (kWh)

Σ_i Sum over the group of "i" devices (e.g. 40W incandescent bulb) replaced, for which the project energy efficient equipment is operating during the year, implemented as part of the project activity

n_i Number of devices of the group of "i" devices (e.g. 40W incandescent bulb) replaced, for which the project energy efficient equipment is operating during the year

p_i Power of the devices of the group of "i" baseline devices (e.g. 40W incandescent bulb). In the case of a retrofit activity, "power" is the weighted average of the devices replaced. In the case of new installations, "power" is the weighted average of devices on the market

o_i Average annual operating hours of the devices of the group of "i" baseline devices

B. Project emissions

As per the methodology project emissions for street lighting are calculated by this equation:

$$PE_y = E_{BL,Y} * EF_{CO2, ELEC, Y}$$

Where,

PE_y Project emissions in year y (tCO_2e)

$E_{BL,Y}$ Energy consumption in the in year y (kWh)

$EF_{CO2, ELEC, Y}$ Emission factor in year Y

The electricity consumption in the project case for the municipal lighting systems will be done in the same manner as done for determining the baseline electricity consumption.

Estimation of project energy use for a municipal street lighting system:

For the purpose of determining the project emissions, electricity consumption at particular feeder level will be estimated by the product of number of lamps, lamp-specific electricity consumption and the hours of operation. The following equation is used:

$$E_{BL,Y} = \sum (n_i * p_i * o_i)$$

Where,

$E_{BL,Y}$ Energy consumption in the project case in year y (kWh)

Σ_i Sum over the group of "i" devices (e.g. 40W incandescent bulb) replaced, with the efficient one.

n_i Number of devices of the group of "i" devices (e.g. 40W incandescent bulb) replaced with the efficient one

p_i Power of the devices of the group of "i" (e.g. 28W T-5 tube light). In the case of a retrofit activity, "power" is the weighted average of the devices replaced. In the case of new installations, "power" is the weighted average of devices on the market

o_i Average annual operating hours of the devices of the group of "i" project case devices

B. Leakages

No leakage is envisaged for this type of project activity.

B.6.2. Data and parameters that are available at validation:

(Copy this table for each data and parameter)

B.6.2. Data and parameters that are available at validation:

(Copy this table for each data and parameter)

Data / Parameter:	EFGrid,y
Data unit:	tCO_2/kWh
Description:	CO_2 emission factor for grid electricity system
Source of data used:	CO_2 baseline database for the Indian Power Sector - CEA version 4.0 Sep 2008
Value applied:	0. 81

Justification of the choice of data or description of measurement methods and procedures actually applied:	Published data is used from reliable sources Application of standardized data forms and compliance protocols; data review through project coordinator; data storage paper and electronic
Any comment:	- The project activity will use an ex-ante grid emission factor. Hence the grid emission factor is fixed over the crediting period.

Data / Parameter:	***NFi (Number of*** fluorescent lamps in the Municipality)
Data unit:	Number
Description:	Total number of fluorescent lamps in municipality
Source of data used:	The signed document by municipal Corporation
Value applied:	Large amount of data. Data used in the calculations are presented in the spreadsheets appended to the PDD.
Justification of the choice of data or description of measurement methods and procedures actually applied:	This data is determined by field measurement and was cross checked with municipality records.
Any comment:	

Data / Parameter:	***NSi (Number of*** Sodium vapour lamps in the Municipality)
Data unit:	Number
Description:	Total number of Sodium vapour lamps in municipality
Source of data used:	The signed document by municipal Corporation
Value applied:	Large amount of data. Data used in the calculations are presented in the spreadsheets appended to the PDD.
Justification of the choice of data or description of	This data is determined by field measurement and was cross checked with municipality records.

measurement methods and procedures actually applied:	
Any comment:	

Data / Parameter:	Total energy consumption in street lighting
Data unit:	kWh
Description:	Amount of energy consumption in street lighting
Source of data used:	The data is provided by Municipal corporation and signed by Municipal Commissioner
Value applied:	Large amount of data. Data used in the calculations are presented in the spreadsheets appended to the PDD.
Justification of the choice of data or description of measurement methods and procedures actually applied:	
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

>>

Applying the formulae given in PDD section B 6.1 (formula No. 15), the ex-ante calculation of emission reductions is shown.

$ER_Y = BE_Y - PE_Y - Ly$

Illustration of Emission Reduction Calculation- Gwalior Municipal Corporation

Baseline Calculation: (For 40 Watt Conventional Tube light) by using above-mentioned formula:

The table below summarizes the data collected from one of the Municipal Corporations to illustrate the use of this methodology. The data is collected from the Gwalior Municipal Corporation.

Details of street lighting-Gwalior

Year	SVL (Sodium Vapour	Tube	Incandesce	Metal	High Mast

	Lamp)			Light (FTL)	nt Lamps	halide	
	70 W	150 W	250 W	40 W	40 W	400 W	400 W
2002-03	0	35	2594	9972	1725	15	45
2003-04	0	69	3124	9720	1972	15	45
2004-05	70	149	5136	9250	2000	15	80
2005-06	70	149	5161	8250	2000	15	86
2006-07	1303	1378	5165	7250	2000	15	86

* *Gwalior Municipal Corporation Data*

Baseline Emission Calculation:

Specification	FTL	Bulb
Watt	40	40
Choke	15W	
Operating Hour/Day	11	11
Lamp specific Power Consumption	220.825	160.6
MWh	0.220825	0.1606
No of Fixture	7250	2000
Total Consumption	1600.981	321.2
EF	0.81	0.81
Baseline Emission	1296.79	260.17

	FTL	Bulb	Total Emission
Total Baseline Emission	1296.79	260.17	1556.96

Project Emission:

Specification	T-5 tube Light	15 Watt CFL
Watt	28	15
Choke		
Operating Hour/Day	11	11
Lamp specific Power Consumption	112.42	60.225
MWh	0.11242	0.060225
No of FTL	7250	2000
Total Consumption	815.045	120.45
EF	0.81	0.81
Project Emissions	660.18	97.56

	T-5	CFL 15 Watt	Total Project Emission
Project Emission	660.18	97.56	757.74
Emission Reduction			**799.22**

Baseline Calculation: (For Power Saver with the Timer) by using above-mentioned formula:

Total Street light Consumption (Data Collected)*	5196413.87
Total Street light Consumption (MWh)	5196.41387
Ef	0.81
Baseline Emission	4209.09

Note: Data has been collected from the Municipal Corporation

Project Emission:

Total Street light Consumption after replacement	4209727.62
Installation of Power Saver with timer*	25
Savings	1052431.905
consumption (kWh)	3157295.71
Consumption (MWh)	3157.295
EF	0.81
Total Project Emission	2557.40

- **Technical specification with monitored saving results has been enclosed with the PDD**

Emission reduction (Power Saver with Timer)	1651.68
Emission reduction (T-5 and bulb)	799.21
Total	**2450.90**

Summary of Emission Reduction

Emission Reduction						
			Baseline Emission	Project Emission	Leakage	Total Emission Reduction
1	Sagar	T-5 & Bulb	969.36	453.75	0	515.61
		Power Saver & Timer	851.16	251.66	0	599.5
2	Gwalior	T-5 & Bulb	1556.96	757.75	0	799.21
		Power Saver & Timer	4202.09	2557.40	0	1651.68
3	Burhanpur	T-5 & Bulb	455.57	230.97	0	224.60
		Power Saver & Timer	1129.14	678.40	0	450.73
4	Indore	T-5 & Bulb	584.54	297.58	0	286.95
		Power Saver & Timer	13015.65	8817.20	0	4198.45
5	Jabalpur	T-5 & Bulb	2209.20	1124.68	0	1084.51
		Power Saver & Timer	8871.72	6329.58	0	2542.14
6	Ratlam	T-5 & Bulb	689.53	351.03	0	338.50
		Power Saver & Timer	3005.21	1349.46	0	1655.76
7	Singrauli	T-5 & Bulb	128.94	60.94	0	68
		Power Saver & Timer	587.25	389.43	0	197.81
8	Ujjain	T-5 & Bulb	1061.58	540.44	0	521.14
		Power Saver & Timer	4895.49	2909.22	0	1986.26
9	Satna	T-5 & Bulb	1286.17	550.19	0	735.97
		Power Saver & Timer	2195.15	891.29	0	1303.86
10	Rewa	T-5 & Bulb	482.76	245.77	0	236.99
		Power Saver & Timer	1061.18	618.14	0	443.04
11	Dewas	T-5 & Bulb	1393.18	683.17	0	710.01
		Power Saver & Timer	1791.35	811.00	0	980.34
12	Khandawa	T-5 & Bulb	395.83	201.51	0	194.31
		Power Saver & Timer	1108.36	685.53	0	422.83
13	Bhopal	T-5 & Bulb	2447.63	1246.06	0	1201.56
		Power Saver & Timer	7854.04	5657.36	0	2196.68
14	Katni	T-5 & Bulb	427.67	217.72	0	209.94
		Power Saver & Timer	2371.01	1620.79	0	750.21
	Total		67034.86	40528.15		26506.70

B.6.4 Summary of the ex-ante estimation of emission reductions:

>>

Year	Estimation of	Estimation of	Estimation of	Estimation of

	Project activity emission (tonnes of CO_2e)	Baseline emission (tonnes of CO_2e)	Leakage (tonnes of CO_2e)	Overall emission reduction (tonnes of CO_2e)
2010	40528.15	67034.86	0	26506.70
2011	40528.15	67034.86	0	26506.70
2012	40528.15	67034.86	0	26506.70
2013	40528.15	67034.86	0	26506.70
2014	40528.15	67034.86	0	26506.70
2015	40528.15	67034.86	0	26506.70
2016	40528.15	67034.86	0	26506.70
2017	40528.15	67034.86	0	26506.70
2018	40528.15	67034.86	0	26506.70
2019	40528.15	67034.86	0	26506.70
Total	**405281.5**	**670348.6**	**0**	**26506.70**

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

(Copy this table for each data and parameter)	
Data / Parameter:	*DateSTART,v*
Data unit:	Date (day/month/year)
Description:	Date of the start of the monitoring interval *v*
Source of data to be used:	Project coordinator sets the date
Value of data	Format dd.mm.yyyy
Description of measurement methods and procedures to be applied:	The date of the start will be fixed by the project coordinator
QA/QC procedures to be applied:	Date will be fixed and stored in the project database
Any comment:	Start date of the monitoring interval will be recorded for each monitoring interval Separately

(Copy this table for each data and parameter)	
Data / Parameter:	*DateEND,v*
Data unit:	Date
Description:	Date of the end of the monitoring interval *v*
Source of data to be used:	Project coordinator sets the date
Value of data	Format dd.mm.yyyy
Description of	The date of the start will be fixed by the project coordinator

measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	The date of the start will be fixed by the project coordinator
Any comment:	End date of the monitoring interval will be recorded for each monitoring interval Separately

(Copy this table for each data and parameter)	
Data / Parameter:	*DateSTART,BL*
Data unit:	Date
Description:	Date of the start of the baseline study *BL* interval
Source of data to be used:	Project coordinator sets the date
Value of data	Format dd.mm.yyyy
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	Date will be fixed and stored in the project database
Any comment:	Once at start date of the baseline study interval

(Copy this table for each data and parameter)	
Data / Parameter:	*DateEND,BL*
Data unit:	Date
Description:	Date of the end of the baseline study *BL* interval
Source of data to be used:	Project coordinator sets the date
Value of data	Format dd.mm.yyyy
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	Date will be fixed and stored in the project database
Any comment:	Date will be fixed and stored in the project database

(Copy this table for each data and parameter)	
Data / Parameter:	o_i
Data unit:	Hours
Description:	Operating hours of Conventional tube lights/GLS bulb *i* on day *d* as given by valid meter *r* in month *q* during the baseline study in the baseline street
Source of data to be used:	Readings of meters

Value of data	Daily operating hours
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	Automatic and continuously applied plausibility check of the data. Data review through project coordinator and automatic recognition of wrong data formats by the database; data storage electronic. Validity of meters evaluated according to procedure described for parameter nr,d
Any comment:	

(Copy this table for each data and parameter)	
Data / Parameter:	n*r,d*
Data unit:	No.
Description:	Number of meters *r* that provide a valid value for day *d* during the baseline study
Source of data to be used:	Server/Project Database
Value of data	
Description of measurement methods and procedures to be applied:	All installed meters for the baseline study are registered in the project database. Only meters delivering valid daily data records or daily operating hours are counted. The data will have a daily monitoring frequency.
QA/QC procedures to be applied:	Data will be checked either manually and/or by automated procedures in the Database
Any comment:	

(Copy this table for each data and parameter)	
Data / Parameter:	*Datei,k*
Data unit:	Date
Description:	Date of the replacement of GLS bulb *i* by T-5/CFL *k*
Source of data to be used:	
Value of data	Format dd.mm.yyyy
Description of measurement methods and procedures to be applied:	The date of replacement will be recorded
QA/QC procedures to be applied:	Application of standardized data forms and compliance protocols; data review through project coordinator; data storage paper (until first verification) and electronic
Any comment:	

(Copy this table for each data and parameter)	
Data / Parameter:	P*i*
Data unit:	W
Description:	pi is the power of the conventional tube light/GLS bulb *i* used before

	replacement.
Source of data to be used:	Lamp marking data of GLS
Value of data	40W,60 W or 100 W
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	Application of standardized data forms and compliance protocols; data review through project coordinator; data storage paper (until first verification) and electronic
Any comment:	Data for power rating will be recorded for each replacement separately

(Copy this table for each data and parameter)	
Data / Parameter:	P*k*
Data unit:	W
Description:	Power rating of the T-5/CFL *k* used to replace GLS bulb *i*
Source of data to be used:	Lamp marking data of CFL
Value of data	28W,15 W or 20 W
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	Application of standardized data forms and compliance protocols; data review through project coordinator; data storage paper (until first verification) and electronic
Any comment:	Data for power rating will be recorded for each replacement separately

(Copy this table for each data and parameter)	
Data / Parameter:	o_i
Data unit:	Hours
Description:	Operating hours of the distributed T-5/CFL *k* on day *d* as given by valid meter *m* at the spot-check
Source of data to be used:	Readings of measuring instruments
Value of data	Daily operating hours
Description of measurement methods and procedures to be applied:	.
QA/QC procedures to be applied:	
Any comment:	

(Copy this table for each data and parameter)	
Data / Parameter:	Date*c,v*
Data unit:	Date
Description:	Date of cross-check in cross-check area/street *c* for monitoring period *v*
Source of data to be used:	Cross-check team/Cross-Check form
Value of data	Format dd.mm.yyyy
Description of measurement methods and procedures to be applied:	The date of the cross-check will be recorded on the cross-check form while the Cross-check (checking whether the project Luminaries/CFL is still functioning) is physically taking place. Date of the cross-check will be recorded for each cross-check area/street separately. The information from the cross-check form is afterwards entered into the project database.
QA/QC procedures to be applied:	Application of standardized data forms and compliance protocols; data review through project coordinator; data storage paper and electronic
Any comment:	Cross-check has to be done per each monitoring interval separately

(Copy this table for each data and parameter)	
Data / Parameter:	n*sample,CC,v*
Data unit:	No.
Description:	Number of checked T-5/CFLs during cross check *CC* in monitoring interval *v*
Source of data to be used:	Cross-check team/Cross-Check form
Value of data	
Description of measurement methods and procedures to be applied:	The data of each checked T-5/CFL will be recorded on the cross-check form while the cross-check (checking whether the project CFL is still functioning) is physically taking place. This is done by the cross-check team. The data of the cross-check will be recorded for each cross-check area/streetlight separately. The information from the cross-check form is afterwards entered into the project database. The project database sums up all CFL that were checked during the cross-check in monitoring interval *v*.
QA/QC procedures to be applied:	Application of standardized data forms and compliance protocols; data review through project coordinator; data storage paper and electronic
Any comment:	Cross-check has to be done per each monitoring interval separately

(Copy this table for each data and parameter)	
Data / Parameter:	n*ok,v*
Data unit:	No.
Description:	Number of replaced T-5/ CFLs to cross-check points which are functional during cross-check of monitoring interval *v*
Source of data to be used:	Cross-check team/Cross-Check form
Value of data	n*sample,CC,v* minus CFL found not functioning in monitoring interval *v*
Description of measurement methods and procedures to be applied:	The data of each checked T-5/CFL will be recorded on the cross-check form while the cross-check (checking whether the project CFL is still functioning) is physically taking place. This is done by the cross-check team. The data of the cross-check will be recorded for each cross-check area/streetlight separately. The

	information from the cross-check form is afterwards fed into the project database.
QA/QC procedures to be applied:	Application of standardized data forms and compliance protocols; data review through project coordinator; data storage paper and electronic
Any comment:	Cross-check has to be done per each monitoring interval separately

(Copy this table for each data and parameter)	
Data / Parameter:	$EFCO_2,ELEC$
Data unit:	$kgCO_2/kWh$
Description:	CO_2 grid emission factor of the project electricity system
Source of data to be used:	Central Electricity Authority of India (CEA): CO_2 baseline data
Value of data	The project coordinator will download the latest grid emission factor from the CEA website
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	Application of standardized data forms and compliance protocols; data review through project coordinator; data storage paper and electronic
Any comment:	The project activity will use ex-ante grid emission factor. Hence the grid emission factor is fixed over the crediting period.

B.7.2 Description of the monitoring plan:

>>

Monitoring Plan:

The Monitoring and Verification (M&V) procedures define a project-specific standard against which the project's performance (i.e. GHG reductions) and conformance with all relevant criteria will be monitored and verified. The M&V Protocol provides a range of data measurement, estimation and collection options/techniques in each case indicating preferred options consistent with good practices to allow project managers and operational staff, auditors, and verifiers to apply the most practical and cost-effective measurement approaches to the project. The aim is to enable this project to have a clear, credible, and accurate set of monitoring, evaluation and verification procedures. The purpose of these procedures would be to direct and support continuous monitoring of project performance/key project indicators to determine project outcomes, greenhouse gas (GHG) emission reductions.

Since the project is an energy efficiency project, emission reduction quantity totally depends on the electrical energy used. The methodology covers the monitoring of power and operating hours of the

fixtures in the boundary. A project database is established. All data collected is entered into the database. All required calculations specified in this MP will be performed in the project database. The project is designed in such a way that the first monitoring period starts with the start of retrofitting.

1) Project Co-ordinator: The management of municipalities/EPCO will assign an agency and designate one person from the agency to be responsible for the collation of data required to design and implement the monitoring plan that will report to the implementing agency. The management of the municipalities will put in place monthly reporting of net electricity consumption for street lighting in the municipalities. This data will be part of the management information systems for the municipalities and will also be provided to the implementing agency responsible for implementation of project to calculate the emission reductions generated. The emission reductions will be calculated monthly, reported back to the plant authorities, and incorporated into existing management information systems.

The management will appoint an audit team, comprising of personnel from the management of municipalities, which will review the daily reports, monthly reports, procedure for data recording and maintenance reports of the meters. This team will check whether all records are being maintained as per the details provided in the PDD. The audit team will compare the reported results and data will be compared with the previous results and data and will be thoroughly checked for any inconsistency.

2. Baseline-Study : For the baseline study all fixtures are eligible to be metered that will later be suitable for replacement with project CFL. For the baseline study all selected feeder will be visited and meter equipment will be installed. The baseline operating hours will be monitored for 90 days.

3: Execution: The retrofitting and installation of energy efficiency devices will be done by technical team. The teams will physical visit each street and check the current lighting installation and will replace old conventional tube light with the efficient T-5. This team will make sure of the following:

- the T-5/CFL lamps will be installed immediately at the date of distribution and there is no risk that CFL lamps will be kept in storage or not being used at all
- the T-5/CFL lamps will replace only the eligible GLS bulbs (60W & 100W) and 40 watt conventional tube light
- the 40 watt tube light/GLS bulbs replaced will be collected immediately and will not be used anymore from date of exchange
- each single distributed T-5/CFL and the corresponding wattage will be documented

The date of replacement, the power rating of the replaced inefficient 40 watt tube light/light bulb (GLS) and the power rating of the efficient T-5/CFL as well as the batch number[13] of the CFL has to be recorded during retrofitting. The power rating of the replaced 40 watt tube light/GLS is derived from the lamp marking. The power rating of the efficient distributed T-5/CFL is derived from the lamp marking and manufacturer's information.

The replaced light fixture will be taken back to the municipal office/ project office by the project team. Each team will record the total number of replaced fixture on a separate protocol.

All replaced fixture will be collected, counted & destroyed. To assure that these replaced fixtures will not be reused, the lamps will be destroyed in presence and under supervision of an independent body. The destruction will be done as specified by the appropriate local authority. It will be assured that the destruction will be done in an appropriate manner with due care and safety. The waste of the destroyed GLS will be handled in an appropriate and environmental friendly way with due care and safety and without causing any damage.

Metering Equipments: The metering equipment for both the baseline and spot-check will be installed by Project participant. The meter ID together with the name, address will be recorded. After the installation, a functionality check will be done to assure the correct operation of the meter.

Cross-check: After the retrofitting and installation, the City municipalities and the project participants will do the Third party/Individual Cross-check to validate the implementation.

Spot-Check :will be done to keep a track of the appliances supplied in each city and the replacements done .The replaced appliances would be kept tracked of and its disposal and scrapping monitored according to the best scientific and technical measures available. All the data would be maintained electronically and immediately updated as per actions implemented.

Project Database: The project database would be maintained electronically and would be available for 3 years post project implementation by the project participants.

[13] The batch number is a production number that enables one to check when and where this lamp was produced. To avoid re-sale of the CFL, the label on the project CFL will be clearly marked accordingly.

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

>>

Baseline information for the project activity in the form of data has been gathered from all the 14 municipal corporation's records and emission factor for coal has been assumed at the CEA's default value.

Date of completing the final draft of this baseline section: July 2007

Name of person/entity determining the baseline:

EPCO

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>> April 2010

C.1.2. Expected operational lifetime of the project activity:

>> 10 years 0 Months

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

C.2.1. Renewable crediting period

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

>> This section has been left blank for purpose (EPCO Will provide)

C.2.1.2. Length of the first crediting period:

>>Not Applicable

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>> EPCO will decide

C.2.2.2. Length:

>>10 Years

SECTION D. Environmental impacts

>>

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

>> The Government of India does not require any documentation of the environmental impacts of the project activity. The project type/category is not included in the "List of projects or activities

requiring prior environmental clearance" included in the Environmental Impact Assessment (EIA) notification of the Ministry of Environment and Forest (MOEF), Government of India, 200623.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

SECTION E. Stakeholders' comments

>>

E.1. Brief description how comments by local stakeholders have been invited and compiled:

>>

In order to get stakeholders inputs, four local workshops (Gwalior, Indore, Ujjain and Jabalpur) and one state level workshop (Bhopal, State Capital) was organized. The Stakeholders involved were District Administration, Municipal Corporations, Technical Institutions, Universities, State Govt Departments (Pollution Control Board, Town and Country Planning organizations, Development Authorities, Forest Department, Urban Development Department, Mining Department), Local NGO's and prominent citizens. The stakeholder consultation meeting was carried out on 26.02. 2007 at 9:00 am at Panchmari, Madhya Pradesh. In total 25-30 stakeholders participated in the consultation. A large part of the stakeholders that participated in the consultation came from the local government in Madhya Pradesh. A list of participants is available on request. The stakeholder consultation was conducted in English and Hindi. The agenda of the consultation meeting was as follows:

Welcome address – *Shri. Hari Ranjan Rao, IAS,* *Director, Environmental Planning Coordination Organisation (EPCO), Bhopal..*
Introduction to Workshop - *Shri. Lokendra Thakkar,* *Project Coordinator, EPCO.*
Introduction to Cities for Climate Protection Campaign - *Shri. Emani Kumar**,*** *Executive Director ICLEI- Local Governments for Sustainability, South Asia(ICLEI).*
Inaugural Address- *Secretary/ Director Urban Administration and Development, Govt of MP*
Clean Development Mechanism - *Shri. S.K. Joshi,,* *(Ex) Jt Secretary, Ministry of Environment and Forest, Govt of India*
Presentation of the planned CDM project (*Shri. Anurag Mishra*, *Program Manager, ICLEI SA* CDM Option for Local Governments in Madhya Pradesh: *Shri. Anurag Mishra,* ***Program Manager, ICLEI***
Question & answer session

E.2. Summary of the comments received:

>>

All the stakeholders emphasised the need to address Climate Change and Energy issues on priority basis. All supported any action related to this and especially initiating a CDM project for Public Agency

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

>>

Only positive comments were received, requiring no action.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Environmental Planning & Coordination Organisation
Street/P.O.Box:	E- 5, Arera Colony
Building:	Paryavaran Parisar,
City:	Bhopal
State/Region:	Madhya Pradesh
Postfix/ZIP:	462016
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Telephone:	+91 755 2466859, 2466970
FAX:	+91 755 2462136
E-Mail:	epcobpl@sancharnet.in
URL:	http://www.epco.in
Represented by:	Executive Director ,EPCO
Title:	
Salutation:	
Last Name:	
Middle Name:	
First Name:	
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

NOT APPLICABLE

Annex 3

BASELINE INFORMATION

Not Applicable

Annex 4

MONITORING INFORMATION

- - - - -

The aim of the M&V is to enable this project to have a clear, credible, and accurate set of monitoring, evaluation and verification procedures.

The purpose of these procedures would be to direct and support continuous monitoring of project performance/key project indicators to determine project outcomes, greenhouse gas (GHG) emission reductions.

The project employs latest state of art monitoring and control equipment that will measure, record, report, monitor and control various key parameters. All monitoring and control functions will be done as per the internally accepted standards and norms.

All instruments will be calibrated and marked at regular intervals so that the accuracy of measurement can be ensured all the time.

Monitoring shall consist of monitoring either the "power" and "operating hours" or the "energy use" of the devices installed using an appropriate methodology. Possible methodologies include:
I) Recording the "Power" of the device installed (e.g. lamp of 28 watt) using nameplate data or bench tests of a sample of the units installed and metering a sample of the units installed for their operating hours using run time meters.

OR

II) Metering the "energy use" of an appropriate sample of the devices installed.

Frequency of monitoring:
The project developer installed all metering facilities within the project premises. The measurements are recorded and monitored on a continuous basis by the project developer.

Reliability
All measurement devices are with best accuracy and procured from reputed manufacturers. Since the reliability of the monitoring system is governed by the accuracy of the measurement system and the quality of the equipment to produce the result all measuring instruments must be calibrated once a year for ensuring reliability of the system.