

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM  
(CDM-SSC-CPA-DD) - Version 01**



**NAME /TITLE OF THE PoA:** CFL lighting scheme -- “Bachat Lamp Yojana”



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**CLEAN DEVELOPMENT MECHANISM  
SMALL-SCALE PROGRAM ACTIVITY DESIGN DOCUMENT FORM (CDM-SSC-CPA-DD)  
Version 01**

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**NOTE:**

- (i) This form is for submission of CPAs that apply a small scale approved methodology using the provision of the proposed small scale CDM PoA.
- (ii) The coordinating/managing entity shall prepare a CDM Small Scale Programme Activity Design Document (CDM-SSC-CPA-DD)<sup>1,2</sup> that is specified to the proposed PoA by using the provisions stated in the SSC PoA DD. At the time of requesting registration the SSC PoA DD must be accompanied by a CDM-SSC CPA-DD form that has been specified for the proposed SSC PoA, as well as by one completed CDM-SSC CPA-DD (using a real case). After the first CPA, every CPA that is added over time to the SSC PoA must submit a completed CDM-SSC CPA-DD.

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<sup>1</sup> The latest version of the template form CDM-CPA-DD is available on the UNFCCC CDM web site in the reference/document section.

<sup>2</sup> At the time of requesting validation/registration, the coordinating managing entity is required to submit a completed CDM-POA-DD, the PoA specific CDM-CPA-DD, as well as one of such CDM-CPA-DD completed (using a real case).

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**SECTION A. General description of small scale CDM programme activity (CPA)**

**A.1. Title of the small-scale CPA:**

>> CFL lighting scheme -- “Bachat Lamp Yojana” --Habsiguda District, Electrical Division of Ranga Reddy North of Central Power Distribution Company of Andhra Pradesh Limited, Andhra Pradesh, India

Version Number: 01

Date: 15 July 2009

**A.2. Description of the small-scale CPA:**

>> [The SSC-CPA shall refer to BLY-PoA document section A.4.2 and A.4.2.1 to complete this section. Project general operating framework and specific details may be included.](#)

The project will distribute a maximum of 4 CFLs to approximately 200,000 consumers in the Ranga Reddy North, Habsiguda Division of Andhra Pradesh (Central AP), India, to replace an equal number of ICLs (Project). CFLs will be distributed to those registered, grid connected consumers who freely decide to replace ICLs for CFLs. The Project aims to replace ICLs for CFLs in the following order<sup>3</sup>.

Percentage of distributed CFLs	Type of CFLs	Replaced ICLs
0%	9 – 10 CFLs	40W ICLs
34%	14W CFLs	60W ICLs
66%	23W CFLs	100W ICLs

C-Quest Capital Malaysia Limited (CPA Implementer) aims to install CFLs with those ICLs that are placed in high hourly usage areas, such as outsides, common areas, living room area and kitchen. Only under this condition, the replacement and usage of the CFL will lead to considerable energy and costs savings for households and ensure that the CFLs will be used most effectively. The CPA Implementer in cooperation with the Central Power Distribution Company of Andhra Pradesh Limited (DISCOM) will do this by virtue of an awareness campaign educating households that only in case the CFLs are placed in high usage areas, maximum energy savings and subsequent cost savings can be achieved.

The CPA Implementer, with support from the DISCOM and Philips Electronic India (Philips), self help groups (SHG) and other service providers will distribute the CFLs in the following manner:

- Distribution of CFLs and collection of previously used ICLs directly at each household; and/or
- Distribution of CFLs and collection of previously used ICL at dedicated distribution/ collection points.

The CPA Implementer aims to distribute the CFLs primarily through ‘door to door’ distribution, subject to local capacity, costs involved as well as the time, so as to mitigate risks that CFLs are not properly installed or disappear. In case the CPA Implementer distributes CFLs through collection points, it will undertake the following measures to mitigate this risk, being: ensuring that each household signs a contractual arrangement that forbids them to resell the CFLs, and regular spot checks after the

<sup>3</sup> Please note that the actual CFL distribution mix will be determined during the distribution process

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distribution to see whether the CFLs are indeed placed in the socket. The metering personnel of the DISCOM will undertake these spot checks during regular visits in the area. Following the outcome of the spot check the CPA Implementer will undertake appropriate actions, e.g. re-installing the CFLs distributed in the sockets.

The CFL to be used in the Project is the long life Philips CFLs with the ballast integrated into the CFL for direct replacement of ICLs. It has the following specifications:

- (a) Average nominal life of 10,000 hours;
- (b) Wattage not exceeding 23;
- (c) Meeting latest mandatory requirements under IS 15115 (Part 1 and 2)-2002 and any amendments thereof;
- (d) Lumen output of the CFL is equal to or greater than the baseline ICL.

The Project will ensure the appropriate and environmentally friendly system of destruction of the ICLs such that they are not reused in the market. The CPA Implementer will apply the following policy to ensure that each replaced ICLs are destroyed to avoid re-use of the ICLs elsewhere.

Recording

All replaced ICLs will be recording during the distribution process in a specially designed database software package programme (Database). The Database will identify the wattage of each replaced ICL.

Storage

The replaced ICLs will be collected and stored in appropriate boxes indicating the wattages of the replaced ICLs. Each box will state the number of ICLs stored in that box. The boxes will be stored at dedicated storage facilities.

Destruction

The CPA Implementer will arrange for destruction and inform the DOE well in advance of the date and time.

Supervision

The Destruction will be closely monitored and supervised by the CPA Implementer, preferably in conjunction with the DOE or any other independent agency to allow for credibility of the process.

Reduced energy demand from the households participating in the Project will lead to the reduction in air pollution and greenhouse gas (GHG) emissions resulting from the burning of fossil fuels for electricity production.

**A.3. Entity/individual responsible for the small-scale CPA:**

>> Here the information on the entity/individual responsible of the CPA shall be included, hence forth referred to as CPA implementer(s). CPA implementers can be project participants of the PoA, under which the CPA is submitted, provided their name is included in the registered PoA.

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As mentioned C-Quest Capital Malaysia Limited will act as the CPA Implementer and is the prime investor responsible for overall implementation and management of the Project. The CPA Implementer will work closely with the following entities:

- DISCOM
- C-Quest Capital Green Ventures Private Limited, Delhi, India
- Philips Electronics India (Philips)
- BEE<sup>4</sup>

The CPA Implementer will enter into various service agreements with the parties mentioned. The contact details of the CPA Implementer are as listed in Annex I.

Project Participants are as listed below.

<b>Name of Party involved ((host indicates a host Party)</b>	<b>Private and/or public entity(ies) project participants (as applicable)</b>	<b>Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)</b>
India (Host)	BEE (public entity)	No
Netherlands	C-Quest Capital Malaysia Limited (Private entity)	No

**SSC-CPA Unique Identification Number**

The SSC-CPA unique code assigned by the PoA managing entity (BEE) is 001-CQC-AP.

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

**A.4.1. Identification of the small-scale CPA:**

**A.4.1.1. Host Party:**

India

**A.4.1.2. Geographic reference or other means of identification allowing the unique identification of the small-scale CPA (maximum one page):**

>>Geographic reference or other means of identification<sup>5</sup>, Name/contact details of the entity/individual responsible for the CPA, e.g. in case of stationary CPA geographic reference, in case of mobile CPAs means such as registration number, GPS devices.

<sup>4</sup> The CPA Implementer by virtue of an assignment agreement has entered into a tri-partite agreement with the BEE.

<sup>5</sup> E.g. in case of stationary CPA geographic reference, in case of mobile CPAs means such as registration number, GPS devices.

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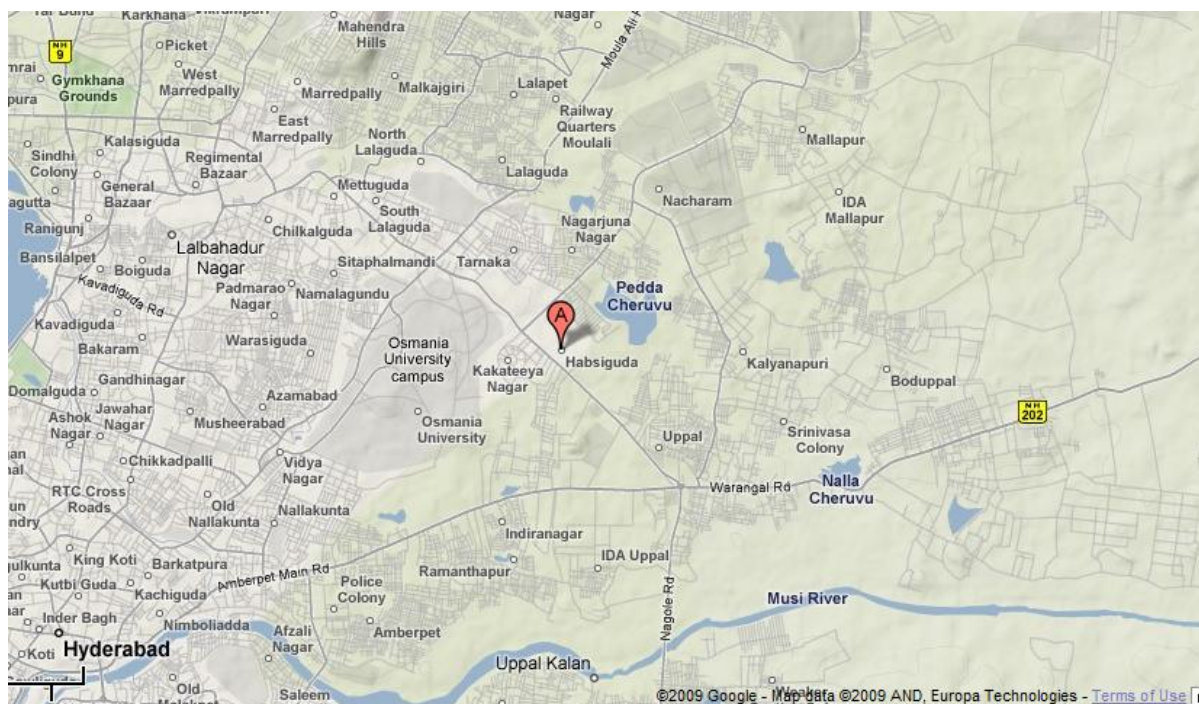
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State: Andhra Pradesh, served by the DISCOM  
Circle: Ranga Reddy North, Habsiguda Division

The state of Andhra Pradesh is divided in 23 districts. Ranga Reddy North is located in the centre of the state of Andhra Pradesh. Ranga Reddy North has three electrical divisions and 37 mandals.

The Project concerns the Habsiguda Division (Latitude 21.125498; Longitude 81.914063) which encompasses of various sections and subsections described in below table.

<b>Electrical Division of Ranga Reddy North</b>	<b>Subdivision</b>	<b>Section</b>
Habsiguda	Habsiguda	Habsiguda
		Maula Alli
		Nacharam
	Malkajgiri	Malkajgiri
		Mirzalguda
		Neredmet
		Vasantha Puri
		Vinayak Nagar
	Uppal	Ghatkeswar
		Narapally
		Ramanathpur
		Uppal



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**A.4.2. Duration of the small-scale CPA:**

**A.4.2.1. Starting date of the small-scale CPA:**

>>date of signing the Tri-partite agreement (TPA) in-between BEE, CPA implementer and DISCOM

23 September 2008.

**A.4.2.2. Expected operational lifetime of the small-scale CPA:**

>> The CPA operational life cannot be more than that of the distributed CFLs. This period is defined by the rated life of the CFLs.

The rated life of the CFL is 10,000 hours as per IEC 60969. Taking usage as 3.5 hours per 24 hours, the project operational lifetime is 7.8 years.

**A.4.3. Choice of the crediting period and related information:**

Fixed Crediting period

**A.4.3.1. Starting date of the crediting period:**

As per EB 47 for CPA validation prior to 31<sup>st</sup> December 2009 a date prior to the date of inclusion of the CPA in the registered PoA can be taken.

Hence the start date would be a date later of the two:

- (i) the date of inclusion of the CPA in the registered PoA; or
- (ii) the end date of the CFL distribution process as indicated by the CPA Implementer.

A tentative date is expected to be 01 February 2010.

**A.4.3.2. Length of the crediting period, first crediting period if the choice is renewable CP:**

>>NOTE: Please note that the duration of crediting period of any CPA shall be limited to the end date of the PoA regardless of when the CPA was added.

10 years.

**A.4.4. Estimated amount of emission reductions over the chosen crediting period:**

>>

Year	Estimation of annual emission reductions (tonnes of CO <sub>2</sub> e)
2009	0
2010	31,385
2011	34,715
2012	32,360

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2013	29,843
2014	26,251
2015	22,980
2016	19,640
2017	15,522
2018	273
2019	0
<b>Total estimated reductions</b>	<b>212,969</b>
<b>Total number of crediting years</b>	<b>10 years</b>
<b>Annual average</b>	<b>21,297</b>

**A.4.5. Public funding of the CPA:**

>>SSC-CPA implementer to provide “Information on sources of public funding for the project activity from Parties included in Annex I which shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of those Parties;”

No public funding will be used for this activity.

**A.4.6. Information to confirm that the proposed small-scale CPA is not a de-bundled component**

>>As per section A.4.4.1 of the BLY PoA, the SSC-CPA is exempt from performing de-bundling check.

AMS-II.J. requires that the maximum wattage rating of an ICL which can be replaced under the PoA is 200 W and the wattage of an equivalent CFL is similar to 40 W. For this CPA, the maximum annual energy saving potential from each CFL used 3.5 hours per day is  $3.5 \text{ hrs/day} * 365 \text{ days/year} * (200\text{W} - 40\text{W}) = 0.0002 \text{ GWh/year}$ .

Considering that the annual energy savings of 0.0002 GWh per CFL is smaller than the 0.6 GWh per annum for a single measure, this Project is exempted from performing de-bundling check.

**A.4.7. Confirmation that small-scale CPA is neither registered as an individual CDM project activity or is part of another Registered PoA:**

>> Confirmation that this Project will be neither registered as an individual CDM activity or is part of another Registered PoA. Should the CPA Implementer be undertaking another similar project activity in the same region, then confirmation that the households are uniquely identified and are not overlapping.

The CPA Implementer will undertake similar project activities in the district of Central AP, with each SSC-CPA having unique geographical boundaries and households to be identified by unique numbers such as utility bill numbers.

**SECTION B. Eligibility of small-scale CPA and Estimation of emissions reductions**

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**B.1. Title and reference of the Registered PoA to which small-scale CPA is added:**

CFL lighting scheme – “Bachat Lamp Yojana”.  
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**B.2. Justification of the why the small-scale CPA is eligible to be included in the Registered PoA :**

>> With reference to BLY-PoA section A.4.2.2, The eligibility criteria under the SSC-PoA shall be stated and confirmed in each SSC-CPA document by the SSC-CPA investors

The project is eligible for inclusion under the SSC-PoA DD of the BLY as it meets the following criteria.

S. No	Eligibility Criteria	Status
1	SSC-CPA follows the baseline and monitoring methodology AMS IJ	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2	The geographical boundary of the SSC-CPA area is uniquely defined by SSC-CPA investor at own cost e.g. using Geographical Information System (GIS), DISCOM maps, local district maps etc.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
3	CFLs distributed under the scheme: <ul style="list-style-type: none"> <li>- are distributed to grid-connected households</li> <li>- are long-life and conform to the IS : 15111:2002 requirements</li> <li>- Rs15 is collected from households, along with ICL</li> </ul>	<input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No
4	Confirm to have signed PoA liability indemnity agreement with BEE	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
5	Valid and signed tripartite agreement with DISCOM and BEE, specifying the duties and responsibilities under a SSC-CPA.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
6	Confirm to continue CFL metering & monitoring if opted for in SSC-CPA-DD, after 31 <sup>st</sup> March 2012, when the BEE funded-monitoring stops.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
7	Commitment towards collection and destruction of the ICLs generated out of SSC-CPA project and CFL disposal as per the applicable directions of MoEF / State Pollution Control Board.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

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8	Confirmation that this SSC-CPA is not registered or being registered, as a stand-alone CDM project outside of BLY SSC-PoA.	<input checked="" type="checkbox"/> Yes  <input type="checkbox"/> No
9	Confirmation that SSC-CPA is not a de-bundled component of another large-scale CPA or CDM project activity as per the latest guidance given in CDM EB. <sup>6</sup> As per EB 47, the BLY SSC-CPA-DD need not justify de-bundling.	<input checked="" type="checkbox"/> Yes  <input type="checkbox"/> No

**B.3. Assessment and demonstration of additionality of the small-scale CPA , as per eligibility criteria listed in the Registered PoA:**

**Additionality Demonstration**

Description of the barriers at PoA level is provided in provided in section A.4.3. The SSC-CPA shall adapt the arguments presented as per recent available information and project specific data to support CPA additionality. NOTE: SSC-CPA is free to use the latest version of the CDM large scale additionality tool provided, the CPA is seeking additional project recognition viz. Gold standard etc which require use of this tool.

**Additionality Justification**

Domestic appliances and lighting sector accounts for almost 22%<sup>7</sup> of the total electricity demand in India, and contributes almost fully to the peak load as well. It is estimated that there are over 400 million light points in India lighted using ICLs. ICLs are extremely energy in-efficient, with just 5% of the electricity input converted to light<sup>8</sup>. The remaining is lost as heat. In recent years the CFL has emerged as an energy efficient alternative, as a CFL uses only one-fifth as much electricity as an ICL to provide the same amount of illumination.

The replacement of the ICLs by CFLs would lead to a potential reduction of over 6,000 MW<sup>9</sup> in electricity demand<sup>10</sup>. The replacement potential of ICLs with CFLs is also borne out of the fact that in the year 2008, ICL sales in India were 734 million whereas CFL sales were just 199 million<sup>11</sup>.The

<sup>6</sup> At the time of submission of the SSC-PoA-DD for validation, the latest available CDM EB guidance is CDM EB 47 meeting report Annex 32, version 03 “Guidance for determining the occurrence of de-bundling under a PoA”. Para 9 stipulates the following:

9. If each of the independent subsystems/measures (e.g. biogas digester, solar home system) included in the CPA of a PoA is no greater than 1% of the small scale thresholds defined by the methodology applied, than that CPA of PoA is exempted from performing de-bundling check i.e. considered as being not a de-bundled component of a large scale activity. Under the BLY PoA, each CFL consumes much less than 0.6 GWh per annum.

<sup>7</sup> [http://www.cea.nic.in/power\\_sec\\_reports/general\\_review/0405/ch8.pdf](http://www.cea.nic.in/power_sec_reports/general_review/0405/ch8.pdf), pp 171

<sup>8</sup> <http://news.bbc.co.uk/2/hi/science/nature/5128478.stm>

<sup>9</sup> Supplementary material for Lok Sabha starred question diary number 9292 for answer on 18-08-2006

<sup>10</sup> BLY EFC Document, Bureau of Energy Efficiency, 2007, pp 3

<sup>11</sup> ELCOMA Statistics, May 2009

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penetration share of incandescent lamps for lighting in commercial and residential sector put together is thus nearly 80% in India.

Hence, it is not surprising to note that CFL sales have grown from 35 million in 2003 to more than 199 million in 2008<sup>12</sup>. However a majority of the CFL sales take place in the commercial sector and not the residential sector<sup>13</sup>. The reasons for this are:

- the domestic electricity tariff is very low (Rs 1.2 to 5.6) as compared to a much higher commercial sector tariff (Rs 4 to 11)<sup>14</sup>.
- the average hours of use in the commercial sector of CFLs is much more (> 5 hours/day) than the domestic sector (~ 3-4 hours/day), leading to a faster return on investment.
- the CFL first cost is a barrier for the domestic household sector. In the year 2008 a CFL would cost around Rs 80-130. On the other hand, an ICL costs just Rs 10-15.

Hence initiatives to decrease the use of ICLs are necessary to enhance CFL penetration in households. The BLY PoA scheme represents an initiative towards meeting this objective, and this CPA falls under the BLY PoA scheme to implement such an initiative. Under this Project, CFLs would be distributed to household consumers in exchange of an incandescent lamp for a sum not exceeding Rs 15. The additionality justification is provided from the perspective of the household and the institutional capacity.

The CPA Procedures require demonstration that in the absence of the CDM:

1. the proposed voluntary measure would not be implemented, or
2. the mandatory policy/regulation would be systematically not enforced and that noncompliance with those requirements is widespread in the country/region, or
3. the PoA will lead to a greater level of enforcement of the existing mandatory policy /regulation.

This shall constitute the demonstration of additionality of the CPA.

Further, according to the guidance given in attachment A to Appendix B of the “Simplified modalities and procedures for small-scale CDM project activities”, additionality of a small-scale CDM project can be demonstrated by showing that the project would not have occurred anyway due to the existence of one or more of the following barriers: (i) investment barrier, (ii) technological barrier, (iii) barrier due to prevailing practice, and (iv) other barriers.

An analysis of barriers are categorised and listed as under:

**A. Barrier at household consumer level**

1. **High initial price of CFL**– The price of CFL (Rs 80-130) to a household consumer is high when compared to an equivalent ICL (Rs 10-15), depending on the CFL wattage rating and manufacturer. Further, the Bureau of Indian Standards (BIS) has mandated that all CFLs starting 1 October 2009 would have a Power Factor (PF) of minimum 0.85 (at present the minimum PF is  $\geq 0.5$ ). These High PF Bulbs, given the technology built-in, are likely to be priced higher. With

<sup>12</sup> ELCOMA Statistics, May 2009

<sup>13</sup> ELCOMA communication to support

<sup>14</sup> <http://www.cea.nic.in/e&c/Estimated%20Average%20Rates%20of%20Electricity.pdf>



this included the costs of CFL would increase considerably. Thus in the business as usual case this implies the initial price barrier of CFLs would only increase in near future.

2. **Lack of consumer information** – domestic consumers in a developing country like India, have insufficient information about the costs and benefits of CFLs. Domestic consumers often have a limited understanding of the benefits of CFL life cycle costing. They are often cash-constrained and since the investment in CFL is nearly 10 times that of an ICL, domestic consumers are not willing to make such investments. Building consumer awareness on this aspect is difficult.
3. **Doubts that promised savings will accrue** – the initial CFL’s launched in the Indian market (circa 2000 to 2006) had low costs and also low quality leading to large scale failure rates. The poor performance of first generation CFLs (e.g. a tendency to flicker, and a higher rate of failure before the end of rated lifetimes) created consumer distrust in the CFL technology<sup>15</sup>. Since 2006, when the Indian Standard for CFLs is being enforced, a minimum level of quality is assured. Thus, consumers are still skeptical about the energy savings that will accrue from CFL use.
4. **Consumer Bias towards ICL** - CFLs unlike an ICL are more susceptible to failure under irregular electric supply conditions, which is common in India. CFL failure takes place as they include electronic parts whereas ICLs just make use of a resistive load. Moreover, ICLs can work at very low voltages and still emit light. CFLs on the other hand can emit light only with a voltage greater than 170 V. The Indian Ministry of Power is pushing for an Accelerated Power Development and Reform Programme (APDRP) to improve electricity supply<sup>16</sup>. However, the results for this will take some more years to bear fruit. Further, lighting choice is driven by consumer aesthetic preferences and ICL lampshades or luminaries are often aesthetically unsuitable for CFL.

The demonstration of energy savings using long life CFLs under the CPA would bring about consumer trust in adopting CFLs.

The efforts of the Bureau of Energy Efficiency (BEE) under the CPA are focused towards enhancing awareness and promotion of CFLs. The National stakeholder advertisements and the BEE website are steps in this direction. The local DISCOMs also contribute independently or through the CPA to promote CFL use.

#### **B. Barrier at market level**

1. **Un-sustainable institutional framework to promote CFLs in India:** Some of the progressive utilities in India have tried out bulk procurement and marketing of CFLs to household at below market prices and / or introducing replacement schemes. These efforts were taken by utilities in some states e.g. Andhra Pradesh, Bangalore in Karnataka, Haryana etc with limited success. However, the programmes faltered as either the funding support dried up or the subsidy was withdrawn or the utilities themselves were in poor financial status. The programmes thus could not be continued on a long-term sustainable basis.

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<sup>15</sup> ELCOMA/ BEE information

<sup>16</sup> <http://72.167.37.52:8090/rapdrp/>



The lack of a sustainable on-ground institutional capacity is sought to be overcome under the BLY scheme by enabling partnership in-between Private investors and Utility companies<sup>17</sup>.

The efforts of the BEE under the CPA are focused towards building a credible public-private partnership wherein resources from both entities are pooled in together to procure, distribute and monitor CFL use in households.

Though the CPA operational arrangement would last only for the crediting period of the SSC-CPA project, it is envisaged that at the end of the crediting period a permanent market shift in favour of CFLs would have taken place in the CPA region as:

- These projects would ensure that the scale of operation increases many fold, and the volume of sales reduces the CFL price
- Enhanced consumer awareness on the benefits of CFL vis-à-vis ICL under the CPA and first-hand experience of benefits of lower electricity bills due to shift to CFL and the demonstration of quality long life CFL under the CPA would have generated consumer confidence in CFLs
- The institutional mechanism developed under the CPA could also be sustained by manufacturers as a proxy to their marketing chain and effectively utilized to bring down costs as well increase consumer satisfaction

The CPA is expected to increase consumer confidence in using CFL. Further, manufacturers would gain experience in producing quality long life CFLs in the country.

Over a period of time, the enhanced consumer awareness should result in higher CFL demand leading to sustainable market transformation to CFL.

### **C. Investment Barrier**

***Sub-step 2a. Determine appropriate analysis method:*** Of the methods to determine the financial analysis, this Project will apply the investment comparison analysis. The fully absorbed cost per CFL distributed in the Project activity is ~EUR 3.50 - 4 per CFL. The Project revenue of EUR 0.23 (INR 15) per CFL collected from participating households is clearly not enough to cover these costs.

***Sub-step 2b. – Option II. Apply investment comparison analysis:*** This option shows that the revenues from the Project would represent a net loss to the project participants in the absence of the CDM project activity. The precise financial spreadsheet will be provided to the DOE upon project validation, but a summary is provided below.

The analysis suggests internal rate of return of 0% without the expected revenue stream from the sale of CERs. Only when revenues from sales of CERs are included in the Project, internal rate of return reaches ~20%, hence suggesting that CERs provide for the only financial incentive to implement the Project activity.

### **Alternatives to this CPA**

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<sup>17</sup> Ensuring a viable distribution on the ground requires access to managerial talent available with leading private investors. Over the BLY crediting period, the managerial capacity is expected to be shared with the utility companies.

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Three alternative scenarios are possible to the CPA. At the household level this implies:

1. *Mandatory replacement of ICL with new lighting devices with same or greater efficiency without being registered as a CDM project activity:* This alternative is not applicable as there is no mandated legal requirement for replacing ICLs with CFLs in India.
2. *Autonomously replacing ICL with new lighting devices with same or greater efficiency without being registered as a CDM project activity.:* This alternative-- autonomous growth of CFLs for domestic lighting in India is a possibility. As discussed under the prevailing Market Barriers in India, efforts by progressive utilities for the bulk procurement and marketing to domestic sector at below market prices through replacement schemes have not succeeded. Further as discussed under barriers at household level, the scale of growth required for a market transformation which is the stated goal of the BLY scheme faces a number of barriers and would not occur anyway.
3. *Continued use of ICLs:* The scenario of ‘Continued use of ICL’ as discussed in the barrier analysis above represents the lighting option choice in the business as usual scenario in Indian households.

**Conclusion**

The CPA is focused towards enhancing the uptake of CFLs. The demonstration of energy savings using quality long-life CFLs under the CPA would bring about consumer trust in using CFLs. The CPA focuses on building credible public-private partnerships wherein resources from both entities are pooled in together to procure, distribute and monitor CFL use in households which are likely to be institutionalized over a period of time. The enhanced consumer confidence should result in higher CFL demand leading to sustainable market transformation to CFLs. Overcoming the barriers at household consumer level viz. Institutional, Market and Investment barriers; requires the use of CDM benefit thereby proving that the CPA is additional.

Given all of the steps described above, this Project is considered additional (Please revert to the table below, summarizing the additionality test for easy reference).

S No	Barrier	SSC-CPA Self-Assessment
A	<b>Barrier at household consumer level</b>	
1	High initial capital cost of CFL	<input checked="" type="checkbox"/> Significant barrier <input type="checkbox"/> Not Significant barrier
2	Lack of consumer information	<input type="checkbox"/> Significant barrier <input checked="" type="checkbox"/> Not Significant barrier
3	Doubts that promised savings will accrue	<input type="checkbox"/> Significant barrier <input checked="" type="checkbox"/> Not Significant barrier
4	Consumer Bias towards ICL	<input checked="" type="checkbox"/> Significant barrier <input type="checkbox"/> Not Significant barrier

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<b>B</b>	<b>Barrier at market level</b>	
1	Un-sustainable institutional framework to promote CFLs in India	<input checked="" type="checkbox"/> Significant barrier <input type="checkbox"/> Not Significant barrier
<b>C</b>	<b>Investment Barrier</b>	<input checked="" type="checkbox"/> Significant barrier <input type="checkbox"/> Not Significant barrier
1	Over-seas Development Assistance ODA) funding utilised for SSC-CPA	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

**B.4. Description of the sources and gases included in the project boundary and proof that the small-scale CPA is located within the geographical boundary of the registered PoA.**

>> The project boundary is the physical, geographical location of each measure (i.e. each CFL) installed. The CFL installed is energy efficient in comparison to the comparable conventional incandescent lamp (ICL) and by virtue of installation in grid-connected households, reduces the need for electricity.

The electricity is supplied by the grid which is pre-dominantly fossil fuel based. Therefore, in-directly GHG emissions (CO<sub>2</sub>) from grid-connected power plants are reduced. Other sources/ gases are deemed negligible.

	Source	Gas	Included?	Justification / Explanation
<b>Baseline</b>	Power plants serving the electricity grid	CO <sub>2</sub>	Included	Main emission source.
		CH <sub>4</sub>	Excluded	Excluded for simplification. This emission source is assumed to be very small.
		N <sub>2</sub> O	Excluded	Excluded for simplification. This emission source is assumed to be very small.
<b>Project Activity</b>	Power plants serving the electricity grid	CO <sub>2</sub>	Included	Main emission source.
		CH <sub>4</sub>	Excluded	Excluded for simplification. This emission source is assumed to be very small.
		N <sub>2</sub> O	Excluded	Excluded for simplification. This emission source is assumed to be very small.

**B.5. Emission reductions:**

**B.5.1. Data and parameters that are available at validation:**

>>refer BLY-PoA section E.6.3 and apply

<b>Data / Parameter:</b>	N
Data unit:	--
Description:	Sample size of Monitoring Survey
Source of data used:	SSC-CPA database

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<b>Value applied:</b>	To be filled by SSC-CPA
Justification of the choice of data or description of measurement methods and procedures actually applied :	The SSC-CPA shall determine the representative sample size with minimum 90% confidence interval and 10% error margin. The sample size shall not be less than 100.
QA/QC procedures to be applied:	Sampling is statistically sound and random
Any comment:	Data to be reported to BEE for record

<b>Data / Parameter:</b>	$O_i$
Data unit:	Hours
Description:	Average daily operating hours of the CFLs of the group of “ <i>i</i> ”
Source of data used:	AMS IIJ default value per SSC-CPA database
Value applied:	3.5 hours per 24 hours period
Justification of the choice of data or description of measurement methods and procedures actually applied :	The SSC-CPA shall use 3.5 hours per 24 hrs period. The value applied will be entered into the SSC-CPA database.
QA/QC procedures to be applied:	
Any comment:	

<b>Data / Parameter:</b>	$TD_y$
Data unit:	%
Description:	Average annual technical grid losses
Source of data used:	AMS IIJ option
Value applied:	as justified by SSC-CPA
Justification of the choice of data or description of measurement methods and procedures actually applied :	The transmission and distribution losses for the SSC-CPA area will be determined from recent data published either by a national utility or an official governmental body. The CPA Implementer will provide this data during validation
QA/QC procedures to be applied:	
Any comment:	

<b>Data / Parameter:</b>	NTG
Data unit:	
Description:	Net-to-gross adjustment factor
Source of data used:	Default AMS IIJ value

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Value applied:	0.95
Justification of the choice of data or description of measurement methods and procedures actually applied :	The SSC-CPA shall use a default value of 0.95 under the BLY PoA.
QA/QC procedures to be applied:	
Any comment:	Data to be reported to BEE for record

<b>Data / Parameter:</b>	$LFR_{i,y}$
Data unit:	%
Description:	Lamp Failure Rate for CFL type $i$ in year $y$ (fraction)
Source of data used:	Calculated value
Value applied:	As per SSC-CPA database
Justification of the choice of data or description of measurement methods and procedures actually applied :	Determined as per the ex-ante estimate based as per AMS IIJ requirement.
QA/QC procedures to be applied:	
Any comment:	

<b>Data / Parameter:</b>	$L_i$
Data unit:	hours
Description:	rated average operating hours for CFL type $i$
Source of data used:	Manufacturer’s life test report of CFLs
Value applied:	10,000 hours
Justification of the choice of data or description of measurement methods and procedures actually applied :	Determined as per the independent life-tests of the CFLs as per international standard IEC 60969. According to IEC 60969, the rated life shall be that declared by the manufacturer or responsible vendor.
QA/QC procedures to be applied:	
Any comment:	

**B.5.2. Ex-ante calculation of emission reductions:**  
 >>refer BLY-PoA section E.6.2 and apply equations as per project values

**Emissions Reduction ( $ER_v$ )**

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Emission reduction ( $ER_y$ ) is net electricity savings ( $NES_y$ ) times an emission factor ( $EF_{CO2,ELEC,y}$ )

$$ER_y = NES_y \times EF_{CO2,ELEC,y} \quad (1)$$

Where:

$ER_y$  Emission reductions in year  $y$  (tCO<sub>2</sub>e)

$NES_y$  Net electricity saved in year  $y$  (kWh)

$EF_{CO2,ELEC,y}$  Grid Emission factor in year  $y$ , sourced from the publicly available CO<sub>2</sub> emission database by Central Electricity Authority (CEA) of India

**Net Energy Savings ( $NES_y$ )**

The net energy saved is derived using the equation (2) below:

$$NES_y = \sum_i Q_{PJ,i} * (1-LFR_{i,y}) * ES_i * [1 / (1 - TD_y)] * NTG \quad (2)$$

Where:

$$ES_i = (P_{i,BL} - P_{i,PJ}) * O_i * 365 / 1000 \quad (3)$$

Where:

$NES_y$  Net electricity saved in year  $y$  (kWh)

$Q_{PJ,i}$  Number of CFLs distributed or installed under the project activity. In total for all “ $i$ ”, this value shall be equal to or less than the documented number of all baseline ICLs destroyed. Once all of the project CFLs are distributed or installed,  $Q_{PJ,i}$  is a constant value independent from  $y$ .  $Q_{PJ,i}$  will be obtained from the first *ex post* monitoring survey, which is to take place within the first 12 months of CFL distribution.

$i$  Counter for lighting devices e.g. 40W incandescent bulb

$n$  Number of lighting devices

$ES_i$  Estimated annual electricity savings for CFLs of type  $i$  (kWh)

$LFR_{i,y}$  Lamp Failure Rate for CFL of type  $i$  in year  $y$  (fraction), calculated using the equation (4) below

$TD_y$  Average annual technical grid losses (transmission and distribution) during year  $y$  for the grid serving the locations where CFLs are installed. This (fraction) value shall not include non-technical losses such as commercial losses (e.g., theft/pilferage). Each CPA would have different  $TD_y$  from the most recent average annual grid loss data published either by a national utility or an official governmental body e.g. by the Central Electricity Authority (CEA) of India. Only if no recent data are available, a default value of 10% will be used.

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- NTG* Net-to-gross adjustment factor, a default value of 0.95; unless a more appropriate value based on a lighting use survey from the same region and not older than 2 years is available
- P<sub>i,BL</sub>* Rated power of ICLs of type *i*, which are the baseline lighting devices (Watts)
- P<sub>i,PJ</sub>* Rated power of CFLs of type *i*, which are the project lighting devices (Watts)
- O<sub>i</sub>* Average daily operating hours of the ICLs replaced by CFLs. fixed as 3.5 hours per 24 hrs period

**Lamp Failure Rate**

In the context of the SSC-CPA, the project lamp (CFL) failure rate shall be calculated *ex-ante* and then measured *ex-post* till the end of the crediting period as follows:

If  $y * X_i < L_i$ , then  $LFR_{i,y} = y * X_i * (100 - R_i) / (100 * L_i)$  **(4)**

If  $y * X_i > \text{or} = L_i$ , then  $LFR_{i,y} = 1$

Where:

- LFR<sub>i,y</sub>* Lamp Failure Rate for CFL in year *y* (fraction)
- L<sub>i</sub>* Rated average life for CFL type *i* (hours)
- R<sub>i</sub>* % of CFLs of type *i* operating at the rated lifetime (use a value of 50)
- X<sub>i</sub>* Number of operating hours per year for CFL type *i* (hours)
- y* Counter for year

<b>B.5.3. Summary of the ex-ante estimation of emission reductions:</b>
---

>>

Year	Estimation of project activity emissions (tonnes of CO <sub>2</sub> e)	Estimation of baseline emissions (tonnes of CO <sub>2</sub> e)	Estimation of leakage (tonnes of CO <sub>2</sub> e)	Estimation of overall emission reductions (tonnes of CO <sub>2</sub> e)
2009				0
2010				31,385
2011				34,715
2012				32,360
2013				29,843
2014				26,251
2015				22,980
2016				19,640
2017				15,522
2018				273
2019				0
<b>Total (tonnes)</b>				212,969



of CO <sub>2</sub> e)				
--------------------------	--	--	--	--

**B.6. Application of the monitoring methodology and description of the monitoring plan:**

**B.6. Application of the monitoring methodology and description of the monitoring plan:**

**B.6.1. Description of the monitoring plan:**

>>Refer BLY-PoA section E.7.2 and adapt as per project circumstance

As per applied methodology AMS III, the monitoring for the SSC-CPA would be carried out at the following levels:

1. CFL Distribution Data
2. Monitoring Surveys

The description of each of the levels is provided in the following pages.

**1. CFL Distribution Data**

Prior to distribution, the CPA Implementer will update the database with a list of households residing in the project boundary as provided by the DISCOM. The households will be uniquely identified either by number on the electricity bill or in any other form. The database will be updated with each households participating in the Project to record the following:

- Unique Project number
- CFL data:
  - Number of CFLs distributed
  - Type of CFL distributed
  - Date of CFL distribution
- ICL data:
  - Number of ICLs collected
  - Type of ICLs collected

The CPA Implementer will maintain the database in digital format to the extent possible and ensure that the dataset can be transparently attributed to the Project in order to prevent any occurrences of double counting.

**2. Monitoring Surveys**

Monitoring surveys under the Project will follow the procedures detailed in sections E.6.2 and E.7.1 of the PoA DD. Per PoA DD, the overall supervision is maintained by the BEE as PoA Co-ordinator whereas on-ground implementation takes place by the CPA Implementer in association with DISCOM and other relevant partners. The CPA Implementer will be in charge of the overall planning and management of the project monitoring. The CPA Implementer ensures that it will continue with the CFL monitoring post 2012 when the BEE-funded monitoring ends.

An overview of monitoring responsibility allocation amongst the various institutional agencies is given in table below.

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Table: Overview of monitoring responsibilities for the SSC-CPA

Step	Description	Responsibility		
		BEE	DISCOM	SSC-CPA
1	Selection of households to be included in the monitoring survey		√	√
2	Establishment of the SSC-CPA database	√*		√
3	Verification of the number of scrapped ICLs and distributed CFLs		√	√
4	Calculation of emission reductions	√		√

\*Supervisory responsibility.

First *ex post* Monitoring Survey

First *ex post* monitoring survey will be carried out within a year after installation of CFLs. This survey will count the number of CFLs with original marking placed in service and operating under the Project, which will then be used to determine the quantity of CFLs ( $Q_{P,i}$ ) in the emission reduction calculation.

Subsequent *ex post* Monitoring Survey

Subsequent *ex post* monitoring surveys will be carried out either once every three years or once for every 30% of the elapsed rated lifetime of the CFLs to determine the *ex post* Lamp Failure Rate ( $LFR_{i,y}$ ). This lamp failure rate will be used in *expost* emission reduction calculations

These monitoring surveys will be conducted based on the following principles:

- The sampling size is determined by minimum 90% confidence interval and the 10% maximum error margin;
- The size of the sample shall be no less than 50;
- Sampling group has a random distribution and is representative of target population; and
- Selection of the sampling group is random.

Specific monitoring plan under the Project is as follows:

- *Random Selection of households:* Random sample group will be determined using statistical tools as representing the households falling under the SSC-CPA area.
- *Size of Sampling:* Survey sample size shall be determined to have at-least 90% confidence level with 10 % margin of error.
- *Survey Design and Implementation:* The CPA Implementer will establish procedures to conduct the data collection including training of field personnel

The CPA Implementer shall develop a project handbook (i.e. the Implementation Booklet and Training Manual) before the start of the CFL distribution. This to ensure reliable and transparent data collection, which will include:

- Detailed instructions on data collection procedures.
- Outline of the data forms that are used for the data collection.
- Protocols which are applied to ensure a sufficient level of quality assurance.
- Guidance on the sample size

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The CPA Implementer will train all people involved in the data collection during the distribution phase and the monitoring phase before the start of the relevant distribution and monitoring. The CPA Implementer will design a software package to ensure the reliability, accuracy and integrity of the data collected, including the sample survey for monitoring purposes. The CPA Implementer will document the training.

The CPA Implementer will prepare compliance protocols for each monitoring step. With each compliance protocol, all the involved entities will confirm:

- Knowledge of the project handbook (i.e. Implementation Booklet and Training Manual).
- Complete application of the relevant data forms.
- Correct work according to the procedural instructions.

**C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:**

- This information is provided at the PoA level.  
SSC-CPA need not complete sections C.2. and C.3 of this form.

**C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:**

>> Not applicable

**C.3. Please state whether an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA), in accordance with the host Party laws/regulations:**

>> Not applicable

**SECTION D. Stakeholders' comments**

>>

**D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:**

- This information is provided at the PoA level.  
SSC-CPA need not complete sections D.2. to D.4 of this form.

**D.2. Brief description how comments by local stakeholders have been invited and compiled:**

>> Not applicable

**D.3. Summary of the comments received:**

>> Not applicable

**D.4. Report on how due account was taken of any comments received:**

>> Not applicable

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**Annex 1**

**CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE SMALL-SCALE CPA**

Organization:	C-Quest Capital Malaysia Limited
Street/P.O.Box:	Brighton Place, Lot U0215, Jalan Bahasa,
Building:	Equity Trust Business Centre
City:	Labuan F.T.
State/Region:	
Postfix/ZIP:	87011
Country:	Malaysia
Telephone:	
FAX:	
E-Mail:	info@cquestcapital.com
URL:	www.cquestcapital.com
Represented by:	Caleb Khoo
Title:	Mr.
Salutation:	
Last Name:	Khoo
Middle Name:	
First Name:	Caleb
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

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**Annex 2**

**INFORMATION REGARDING PUBLIC FUNDING**

No public funding is planned for this Project.

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**Annex 3**

**BASELINE INFORMATION**

The latest version of the “BASELINE CARBON DIOXIDE EMISSIONS FROM POWER SECTOR” developed by the Central Electricity Authority will be applied.

The data is published on the CEA website:

<http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm>



#### Annex 4

### MONITORING INFORMATION

Para 5 of AMSIIJ states

*“High quality lamps that have been independently tested must be used. To ensure this a relevant national or international testing standard shall be followed to determine the rated lifetime of the lighting equipment; the project design document shall cite the standard used to determine the rated lifetime of efficient lamps distributed under the project activity.”*

#### Interpretation under BLY Scheme

Under the SSC-CPA, the CFL laboratory test results are required to have information available on the project CFL rated life (refer para 15, AMS IJJ). Starting 1st October 2009, the Indian mandatory Standard for CFLs IS 15111 requires that the power factor (PF) of the CFL should be 0.85 and above for lamps with an average life time of 6000 hours and above.

At the time of BLY PoA submission the PF requirement is  $> 0.5$ , with most manufacturers having CFLs with a life of 6000 hours and some also have lamps up to 15000 hours life. The BLY scheme promotes high quality long life CFLs. Except in India, long life and high power factor lamps are not enforced anywhere in the world so far. Hence such rated life test reports are not readily available with the manufacturers. The rated life tests at the laboratory are likely to take over 18 months from the date of start of the test. However, rated life tests of CFLs with a power factor of 0.5 and long life is readily available with the manufacturers as per international standards (IEC 60969) and Indian standard IS 15111.

Hence the SSC-CPA at the time of validation shall use the available rated life test *in lieu* for those of the project CFLs. The project CFL rated life test would be furnished to verifying DOE at the time of second monitoring survey.