CDM Based DSM Initiative in India

Presentation by

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Energy Efficiency Potential and Outcome

Energy Conservation potential assessed as at present (IEP) (15% by DSM)	-	**20000MW**
Verified Energy Savings :		
-During X Plan period	-	**877 * MW**
-During 2007-08		**623 MW**
-Estimated for 2008-09		**1200 MW**
-Target for XI Plan period (5% reduction of energy consumption)	-	**10000 MW**

* *Only as indicated by participating units in the National Energy Conservation award scheme, for the previous five years.*

Legal and Policy Interventions to Promote Energy Efficiency

- **Energy Conservation Act, 2001, overcomes some market barriers by enabling:**
  - Setting of minimum energy standards for, and affixing energy-consumption labels on appliances and equipment
  - Promulgation of Energy Conservation Building Codes
  - Energy use monitoring, verification and reporting by large energy users, and the establishment of energy consumption norms for these consumers
- **BEE and SDAs set up to promote**:
  - Demand-side management by distribution companies
  - Enhancing energy conservation in existing buildings, especially through Energy Service Companies (ESCOs)
  - Outreach and awareness programmes

Policy Objectives

- Inclusive and sustainable development strategy, sensitive to climate change.
- Achieving national growth objectives through a qualitative change in direction leading to further mitigation of greenhouse gas emissions.
- Devising efficient and cost-effective strategies for end use Demand Side Management- ESCO delivery mechanisms, CDM, etc
- Engineering new and innovative forms of market, regulatory and voluntary mechanisms to promote energy efficiency
- Effecting implementation of programmes through unique linkages, including with civil society and local government institutions and through public-private-partnership.
- International cooperation

Energy Efficiency – Action Plan

- Bachat Lamp Yojana to promote energy efficient and high quality CFLs as replacement for incandescent bulbs in households.
- Standards & Labeling Scheme targets high energy end use equipment and appliances to lay down minimum energy performance standards.
- Energy Conservation Building Code (ECBC) sets minimum energy performance standards for new commercial buildings.
- Agricultural and Municipal DSM targeting replacement of inefficient pumpsets, street lighting, etc.
- Operationalising EC Act by Strengthening Institutional Capacity of State Designated Agencies (SDAs) : The scheme seeks to build institutional capacity of the newly created SDAs to perform their regulatory, enforcement and facilitative functions in the respective States.
- Energy Efficiency Improvement in Small and Medium Enterprises (SMEs): To stimulate energy efficiency measures in 25 high energy consuming small and medium enterprise clusters.

National Mission for Enhanced Energy Efficiency- 4 New Initiatives

- A market based mechanism to enhance cost effec-tiveness of improvements in energy efficiency in energy-intensive large industries and facilities, through certification of energy savings that could be traded. (Perform Achieve and Trade)
- Accelerating the shift to energy efficient appliances in designated sectors through innovative measures to make the products more affordable. (Market Transformation for Energy Efficiency))
- Creation of mechanisms that would help finance demand side management programmes in all sectors by capturing future energy savings. (Energy Efficiency Financing Platform (EEFP))
- Developing fiscal instruments to promote energy efficiency namely Framework for Energy Efficient Economic Development (FEEED)

CDM Based CFL Scheme- Bachat Lamp Yojana (BLY)

CDM Based CFL Scheme- Bachat Lamp Yojana (BLY)- Policy Objectives

- ✓Lighting accounts for about 22% of electricity use
- ✓Penetration of CFLs in household sector ~ 10%. In commercial sector almost 95%
- ✓High first cost the barrier – difference between price of incandescent and CFL ~ 10 times
- ✓Information asymmetry for households
- ✓Over 800 million incandescent bulbs produced every year – CFLs around 200 million
- ✓Various measures taken to overcome the price barrier- bulk procurement, incentive schemes, etc.
- ✓CDM based scheme most attractive.

CDM Based CFL Scheme- Bachat Lamp Yojana (BLY)

- ✓Launched by Minister of Power on 25th February, 2009
- ✓Scheme seeks to replace estimated 400 million incandescent bulbs by CFLs- could save 6000 MW by 2012
- ✓BEE has prepared a Programme of Activities (PoA) as a voluntary coordinated effort to facilitate the scheme in the entire country and reduce transaction costs
- ✓22 CFL manufacturers/ suppliers have agreed to participate- 14 states have initiated the scheme
- ✓Pilot projects in Andhra Pradesh registered by CDM Executive Board
- ✓Leveraging of CDM revenues to remove the high first cost barrier- market transformation in favour of efficient lighting

Basic Objectives of BLY

- Replace inefficient incandescent bulbs with CFLs **for households only**
- Reduce price of CFL to that of incandescent bulb- project developer (CFL Manufacturer/ DISCOM) provides initial investment
- Use CDM to recover balance cost
- Monitor energy consumption reduction in a project area as outlined in AMS-II.C of CDM-EB
- CERs generated after monitoring, validation and oversight of CDM Executive Board (CDM-EB) sold in international markets
- Revenue from sale of CERs used to service investments-Estimated revenue/ CFL of Rs. 25 per year- cost recovered in 2-3 years.
- Potential reduction in power consumption~6,000 - 10,000 MW – **XI plan target 4000 MW**

Project Steps

- Define project area- DISCOM based
- Manufacturer/ Trader of CFL for provision of adequate numbers of bulbs required
- Preparation of Project Design Document (PDD) as per CDM-EB approved templates
- Validation of PDD by certified agencies of CDM-EB- presently 5-6 in India
- PDD, on validation, considered and recommended by Designated National Authority (DNA) of CDM-EB - MOEF
- DNA recommended PDD posed for final approval of CDM-EB
- Monitoring/ validation commences as per AMS-II.C under this framework
- **Programmatic Approach to reduce individual project transaction costs for replicability**

Programmatic Approach

- **Programmatic approach allowed as a voluntary, coordinated effort**- AMS-II.C allowed to be used in PoA by EB in July, 2007
- Allows for an umbrella framework with many individual projects under an approved methodology
- The multiple PDDs (called CDM Project Activities-Design Documents CPA-DD) part of the PoA
- All PDDs have same monitoring/ validation requirements
- Approval process of individual PDDs simplified substantially- no individual approval of PDDs by EB
- PoA can be run by any agency including government

Programme Landscape under CDM Methodology AMS-II.C

Buyer in Annex I Country

Allocation of CERs as per BEE guidance

PoA -Manager

Communication

Monitoring report and interaction

Approval as PoA

DNA

CDM EB

DOE

- **Prepare PoA-DD**
- **Registration of PoA**
- **Monitoring**

Payment for CERs

CERs sold

CLF MANUFACTURERS

Fused CFL's returned

Replaced GLS lamp

HOUSEHOLD

Buying CFL

Safe disposal of returned CFL

MoU for joint implementation

DISCOM

Safe keeping of replaced GLS lamp for inspection

Distribution of CFL to replace GLS lamps is the CPA measure

Prepare CPA-DD
Database about consumers
Selection of sample groups
Power quality monitoring

CFL = Compact Florescent Lamp
GLS = General Lighting Service
DOE = Validators
BEE = Bureau of Energy Efficiency
DISCOM = Distribution Company

Role of BEE

- Awareness and information
- Development of Programme of Activities Design Document (POA-DD)
- Registration of Programme of Activities with UNFCCC CDM Executive Board.
- Monitoring of CFL use in sample households
- Support the CFL manufacturers/ DISCOMs to prepare CDM Programme Activity Design Documents (CPA-DDs)
- Inclusion of CPA-DDs under the PoA after validation
- Facilitate verification of CERs and recommend their allocation to the CFL manufacturers / DISCOM according to their share in emissions reductions in a specified period

Role of DISCOM

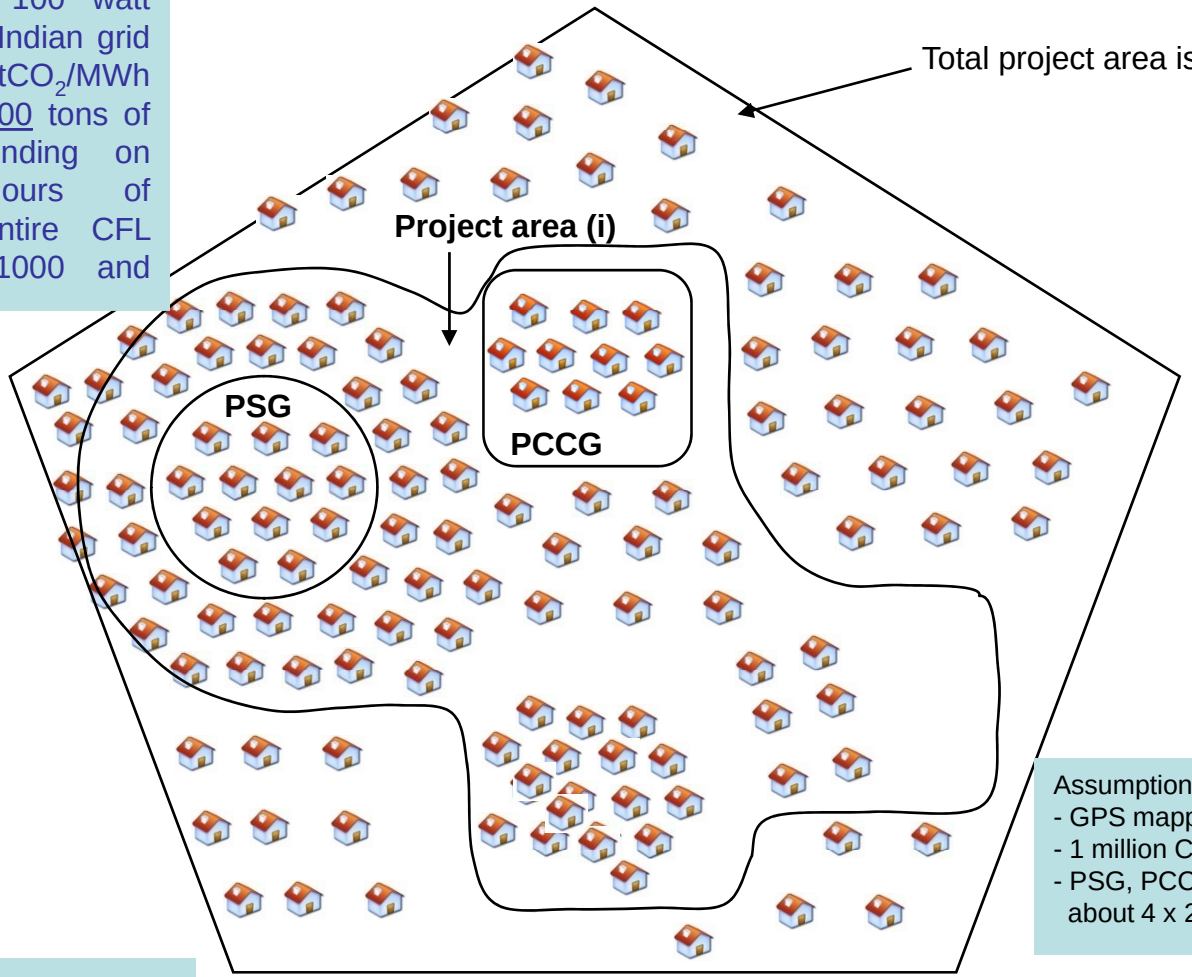
- Database of households to include name of users/address/average electricity consumption
- Assist in selection of **Project sample group (PSG)**, **Project sample buffer group (PSBG)**, **Project cross-check group (PCCG)** as required under AMS-II.C
- Information on Grid voltage supplied to
- Distribution of CFL Lamps and exchange of incandescent lamps
- Safe keeping of replaced GLS lamps for independent inspection
- Determination of the power correction factor
- Estimation of technical distribution losses in the electricity grid

Role of CFL Suppliers

- **Provide CFL at the price comparable to GLS lamps.**
- Preparing CDM Programme Activity Design Documents (CPA-DDs) for CDM project and submitting them to BEE.
- Collection of fused CFLs through buy-back schemes, and arranging for their safe disposal.
- Distribution of CFLs in association with DISCOM
- Initial investment for the cost differential
- Free Replacement of CFL during the life of project
- **Tripartite Agreement between BEE, DISCOM and CFL Supplier**

Groups involved in CFL Methodology AMS-II.C

1 Million CFL (18 Watt) distributed to replace 100 watt GLS will based on the Indian grid emission factor of 0.86 tCO_2/MWh earn about 50,000-75,000 tons of CO_2 per year depending on average annual hours of illumination of the entire CFL population, between 1000 and 1500



Assumption for one project area (i)
- GPS mapped
- 1 million CFLs distributed
- PSG, PCCG
  about 4 x 200 = 800 households

PSG = Project sample group
PCCG = Project cross-check group

Monitoring by GSM Based Smart Meters

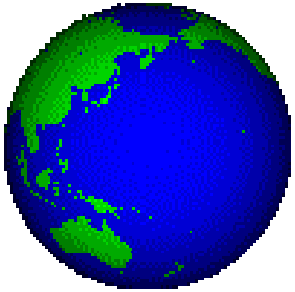
Implementation Steps

- Institute survey to assess penetration of CFLs in households
- Initiate one or two pilots in densely populated residential areas where the penetration of CFLs is low
- Select CFL supplier by a process of bidding from the list maintained by BEE- % share of CERs given to DISCOM to be the bidding selection parameter
- Sign TPA with BEE and CFL supplier
- Preparation of project documentation
- Installation of meters and distribution of CFLs

We all have our personal doomsday scenarios with respect to an extremely “energy hungry” world

Year 1900

Year 1800
Year 2050



Year 2000
CFL

Year 2020, LED

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Monitoring Steps under AMS-II.C

- **Step 1**: Determination of the project area (s)-Based on DISCOM areas each with a maximum of 1 million CFLs – could be more than 1 CPA area in a DISCOM with a cap of 60 GWh (60 MUs) (around 1 million CFLs).
- **Step 2**: Establishment of a project activity implementation plan
- **Step 3**: Installation of measurement equipment
- **Step 4**: Establishment of PSBG
- **Step 5**: Establishment of CPA database

Monitoring Steps under AMS-II.C...

- **Step 6**: Monitoring of utilization hours in the PSG
- **Step 7**: Determination of the power correction factor
- **Step 8**: Calculation of the mean and standard deviation of household electricity consumption for lighting
- **Step 9**: Estimation of technical distribution losses in the electricity grid
- **Step 10**: Cross-check of monitoring results by random sampling of households not included in the PSG and PSBG
- **Step 11**: Calculation of emission reductions