

**Framework  
for  
Implementing Energy Efficiency  
at Utility Level  
through  
ESCO**

Presentation by  
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# Benefits of Energy Efficiency for the Country

- Environmental and economic benefits
- Industry development without investing in energy infrastructures
- Rehabilitation of infrastructures
- Minimize increases in the energy and peak demand
- Save fossil fuel resources
- Reduce the dependency on imported resources
- Interest

# Benefits of Energy Efficiency for the Discom / Users

- Low operation cost
- High comfort level
- Reduce the need to borrow
- Reduce environmental impacts
- Optimisation of equipment and their life cycle
- Install new and modern equipment
- Improve competitiveness
- Improve product quality
- Green image

**IMPLEMENTATION OF  
ENERGY EFFICIENCY  
THRU  
ESCO**

# What is an ESCO ?

An Energy Service Company initiates:

- The identification
- The study
- The conception
- The financing
- The implementation
- The follow-up

... of the energy savings measures using a contractual engagement between the ESCO and the client (Discom/ User) through...an *Energy Performance Contract (EPC)*



## What is an EPC?

- It is a contract
- Financing of projects from energy savings
- Permits the realisation of projects for which Rupees may not otherwise be available
- Mobilises private capital
- Ensures that savings will be realised in a certain time frame

# What is an EPC?

## **ALSO KNOWN AS:**

- Third party financing
- Savings financing
- Sustainable mechanism
- Innovative financing!

## Important Characteristic of an ESCO

- The ESCO arranges the finance.
- It does not always finance through its own funds.
- It is not a bank.



# Why Deal with an ESCO

- **Single platform**
- **Ideal source for project realisation**
- **Experience**
  - › Proven method over the last 20 years
  - › Project realisation by experts in energy efficiency
- **Easy financing**
  - › No capital investment required
  - › Access to off-balance sheet financing
  - › Capital is available for other priorities

# Why Deal with an ESCO

- **Financial impact**
  - › Immediate and guaranteed savings
  - › New capital equipment
  - › Utility cost reduction
  - › Cost control instead of cost increase
- **Low risk:** monitoring of the implemented measures
- Employee skill upgrading and improvement of working conditions
- Added value to enterprise

# Why Deal with an ESCO

- **Time**

- › You may have the talent or the people but not the time

- **Experience**

- › ESCO is specialised in the packaging and the implementation of energy projects Risks

- › Payment is based on successful completion and obtaining energy savings

# Why Deal with an ESCO

- **Catalyst**

- › ESCO Performance Contracting guarantees energy savings within the client's organisational framework

- **Financing**

- › Should be the last reason to award an Energy Performance Contract. Every project should stand on its own merit.

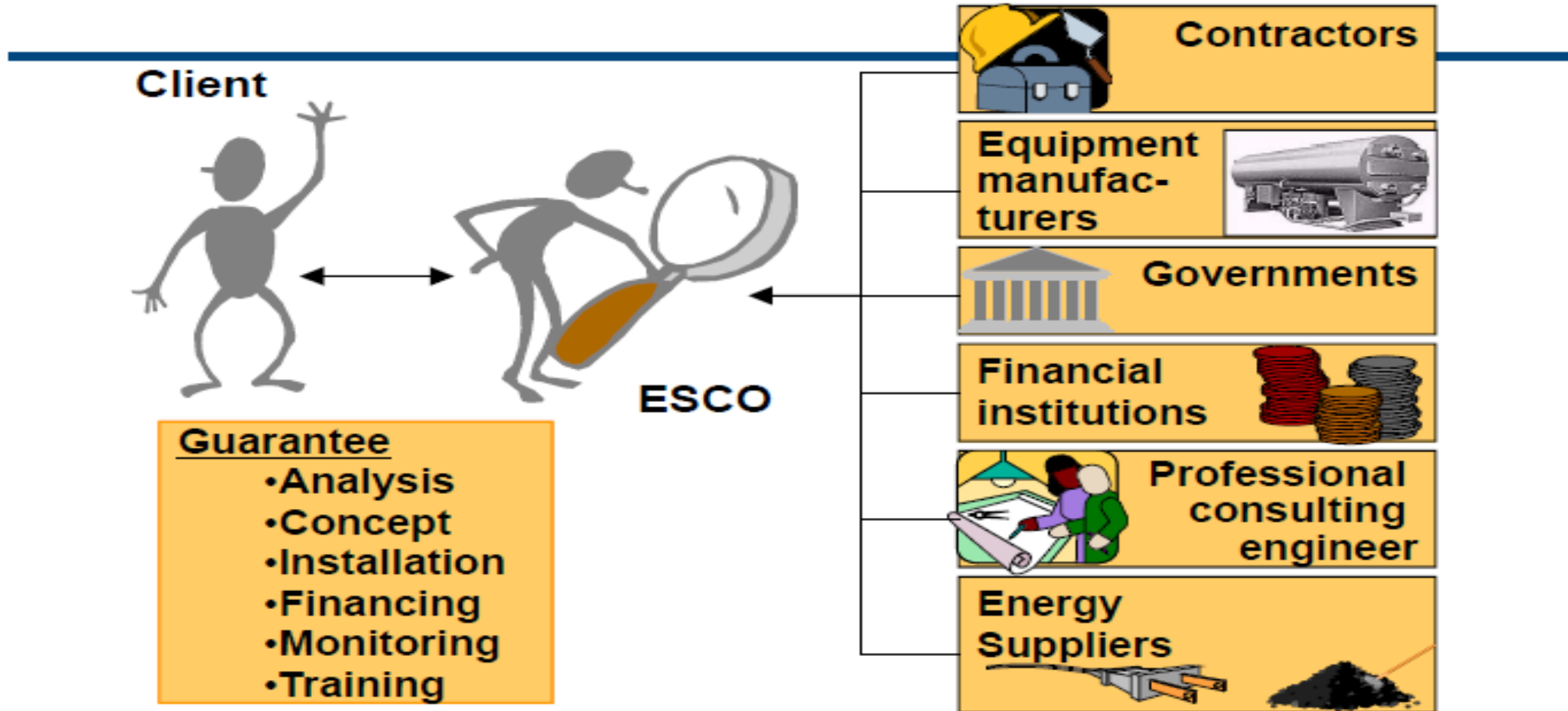
- Financing permits the realisation of projects for which funds would not otherwise be available

## ESCO – Sole Integrated Source of:

- consulting engineering
- general contracting
- energy analysis
- project management
- project financing
- training
- performance guarantees
- energy monitoring
- savings maintenance
- risk management

One stop solution  
for all energy  
efficiency  
requirements

# ESCO Approach



# ESCO Resources

- Engineers and technicians
- Project managers
- Energy specialists
- Accountants and economists
- Support personnel
- Legal advisors
- Etc..

# Difference between ESCO and Consulting Engineers

- Consulting engineers are typically paid for their advice rather than being paid for the results their recommendations may yield.
- They take no risk.
- An ESCO offers performance based projects. The compensation is tied to the amount of energy saved . The ESCO compensation is entirely at risk.



# Difference between ESCO and Consulting Engineers

- An ESCO offers specialised services:
  - › Energy based optimisation of equipment and process
  - › Implementation of new energy efficient equipment and technologies
  - › Energy management systems
    - › Simple example of an ESCO project:
      - › 500,000 \$US in investment
      - › 200,000 \$US of savings per annum
      - › Payback : 2.5 years
      - › 3 years guarantee by ESCO

# Perspectives of an ESCO

- Demand side management programme
  - Study
  - Implementation
  - Management
  - Evaluation
- Indoor air quality improvement
- Renewable energy and cogeneration
- Technology transfer
- Etc...

# Demand side Management

- Effective Demand side management (DSM) require:
  - Strengthening of capacity of private sector players (ESCOs, consultants, equipment suppliers, end users) to assess and implement DSM options
  - Enabling consumers to secure financing for DSM measures
  - Targeted outreach and awareness campaigns
  - Careful and inclusive planning, and program evaluation and mid course corrections

# Demand side Management Options

- Building energy efficiency and design of energy efficient buildings
- Efficient lighting
- Efficient motors
- Efficient power suppliers
- Efficient appliances

# Project Development Process for ESCO

- Opportunity Assessment
- Preliminary energy audit
- Investment Grade Audit
  - Engineering analysis
  - Economic analysis
- Project proposal
- Project implementation
- Commissioning and training
- Monitoring and verification

# Project Cost Breakdown

- Cost of work and equipment
- Interim financing
- Engineering fees for study, drawings, specifications and supervision
- Project management
- ESCO administration, overhead and profit

*Total project cost*

- Energy management, monitoring, and personnel training

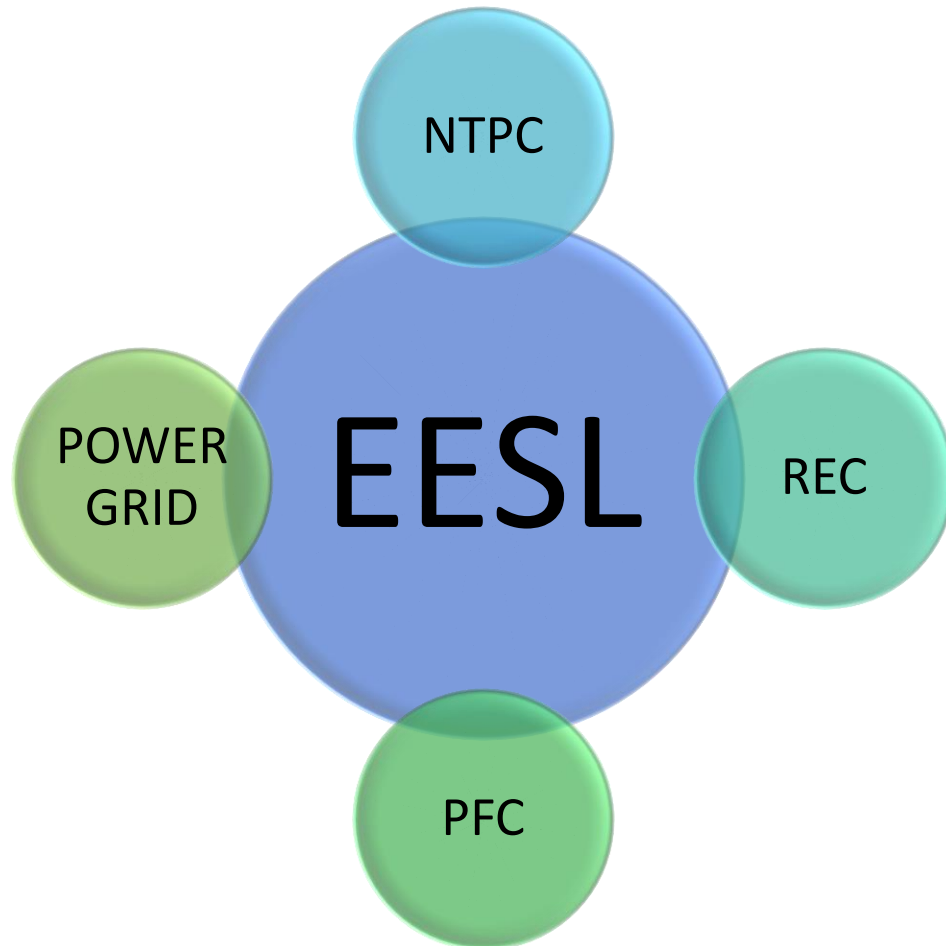
*Total / annual savings = simple payback*

## Basic Criterion of an ESCO project

- **Possibility to clearly define and measure potential savings**
- **Quantification of savings is essential**

# ENERGY EFFICIENCY SERVICES LIMITED

Creating an Energy Efficient India



## Energy Efficiency Projects for Demand Side Measures

- Agriculture
- Municipalities
- Buildings
- Distribution Efficiency, BLY projects
- Tri-generation
- Consultancy
- Any work awarded on energy efficiency under CSR activity

## Implementation of Central & State Gov. policies

- S & L Program
- Perform Achieve & Trade Scheme for industries

## Consultancy Services

- Policy advice to the government

## Development of Private ESCOs



# EESL Business Objective

- Create market access
  - In public and private facilities
  - Handholding, information dissemination, capacity building
- Develop projects for various sectors
  - Addressing specific barriers and challenges
- Design innovative risk mitigation measures
  - To address technical, financial and regulatory risks
- Provide and secure funding
  - At reasonable rates
- Develop model templates
  - Disseminate best practices



# EESL Business Model

- Partner with private sector entities
- Evolve risk sharing mechanism
  - Technical risk of the private sector partner
  - Revenue risk of EESL
- Selection of private sector partner
  - Through open competitive bidding
- Enable financing for PPP projects at reasonable rates
  - Through Banks/ FIs/ Bilateral and Multilaterals
- Partnership policy evolved to ensure good projects do not languish due to lack of financing



# EESL Business Model

- Guaranteed Savings

Type of contract with lower risks for the ESCO.

Usually the project is financed through a third-party bank or the customer itself, but the ESCO helps to arrange this financing.

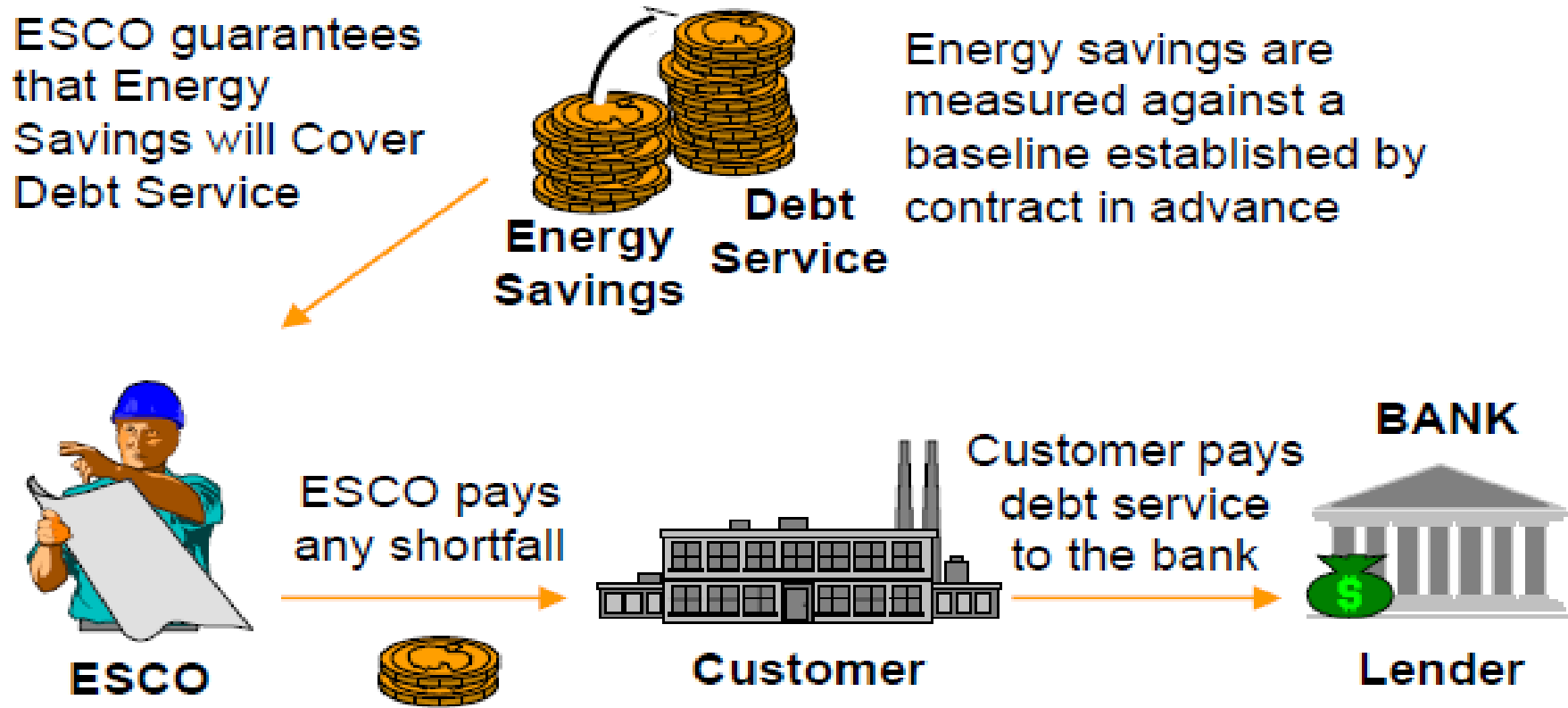
The ESCO provides a guarantee that a certain amount of savings will be realized.

The client must be sure that the ESCO is well established and has credibility as well as experience



# EESL Business Model - Guaranteed Savings

(Performance Guarantee)



# EESL Business Model

- Shared Savings

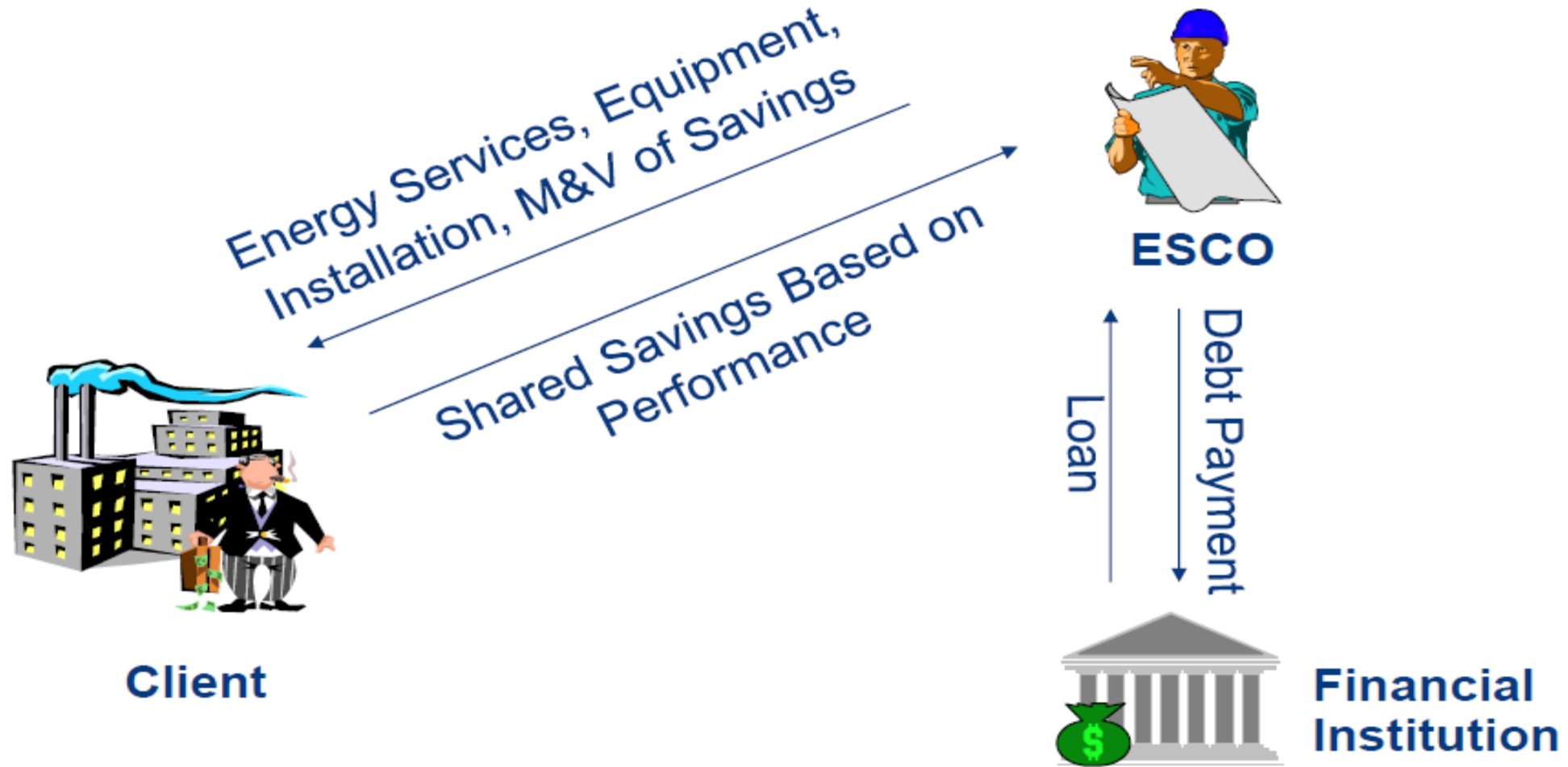
The ESCO is paid solely from a share of the savings.

Usually found in market where there is little or no competition

ESCO take usually higher risk in a new market and try to introduce more profitable scheme

If the ESCO provides financing, the ESCO will typically take a large portion of the savings (up to 90%) for a fixed period (corresponding to a notional repayment of debt).

# EESL Business Model – Shared Savings



# EESL Business Model

- Chauffage Contracts

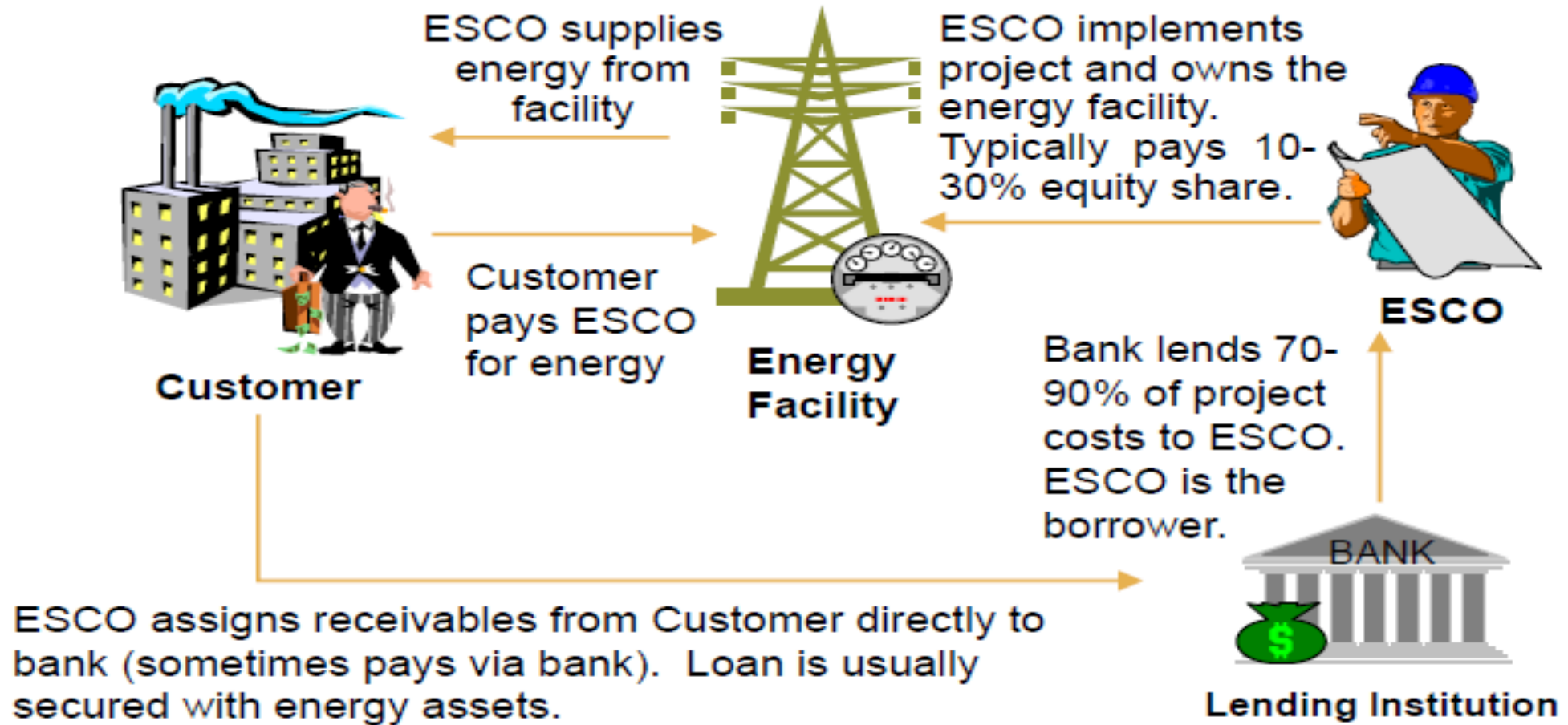
were originally a French term for heat supply contracts (often for buildings), but they have come to mean any contract in which the ESCO owns the assets and sells energy to the customers.

Usually found in market where the ESCO takes charge of the building operation and energy bills payment

› e.g. : power plant operation and energy efficiency program



# EESL Business Model - Chauffage Contract





# EESL Street Lighting Methodology

MoU

- MoU signed between Municipalities & EESL

DPR/ Re Validation Of DPR

- Detailed walk through energy audit for data validation of DPR and Joint Verification

Technology Demonstration

- Assess actual energy savings, determination of annuity payments technical specifications

Agreement

- Agreement between Municipalities & EESL for implementation

Payment Mechanism

- The Payment security mechanism to be finalized

Implementation

- EESL will implement the project based on own resources

M & V

- Deemed saving approach used



**Overall cost (energy and O&M) savings to Municipalities**

# Street Light Cost Savings

## Repair & Maintenance Cost Savings

S.No.	Municipality	Present Electricity Cost INR in Lacs	Present O & M Cost INR in Lacs	Total (Before LED Retrofit) INR in Lacs	Annuity (Inclusive of O & M) INR in Lacs	Electricity Cost with LED INR in Lacs	Total (After Project) INR in Lacs	Monetary Savings annually INR in Lacs
1	Kolkata Municipal Corporation	8,754	1,944	10,697	7,405	2,398	9,802	895
2	Sangali Municipal Corporation	596	58	654	432	190	623	32
3	Solapur Municipal Corporation	693	110	803	543	218	762	41
4	Nagpur Municipal Corporation	2,053	300	2,353	1,585	590	2,175	177
5	Ludhiana Municipal Corporation	3,235	240	3,475	2,273	982	3,255	220
6	Faridababd Municipal Corporation	767	37	804	519	253	773	31
7	Jabalpur Municipal Corporation	371	63	434	295	107	403	32
8	Trichur Municipal Corporation	417	26	443	288	123	411	32
9	Hyderabad Municipal Corporation	13,205	163	13,368	8,484	4,001	12,484	883
10	Bikaner Municipal Corporation	322	19	341	221	102	323	18

# Municipal Street Lights

- First project at Nashik Municipal Corporation approved by Board (EESL Investment Rs. 40 crores)– financial closure achieved (loan from Union Bank of India) – implementation to start on soon
- EESL methodology developed following the success of Nashik – disseminated to all states and municipalities
- EESL engaged with 9 states covering 24 municipalities in the country
- Total investment to be done in the next 2 years ~ 1500 crores (USD 250 m)
- Another \$ 500 m investment to come up in the next 3 years



# Municipal Street Lights

## LED Street Lighting at Naya Raipur, Chhattisgarh



# Street Lights demonstration at MC, Mohali



150 W SV Lamp



60 W LED Lamp

# Agriculture Scenario

- Agriculture sector consumes ~ 30% of total electricity supplied.
- Agriculture subsidies to be around 40,000 Cr INR per annum – equivalent to one fourth of India's fiscal deficit
- Utilities are facing huge burden of revenue loss
- Electricity supply is free or applicable tariff is very low
- Net Result ☐ Inefficient Pump-sets (low efficiency Pump sets 20-30%)
- Inefficient use of electricity lead to water depletion
- Agriculture consumes 85% of all available freshwater resources, no regulation.
- BEE has initiated Ag DSM programme in India to reduce the burden of shortage of electricity supply and financial burden on DISCOMs.

# Agriculture Pumping

- First phase of Hubli AgDSM project covering 600 pumps completed – 37% savings sustained
- Second phase covering 10,000 pumps in HESCOM to be taken up
- Replacement of 1500 pumps in Mysore initiated – PGCIL appointed as implementing partner
- BESCOM signed agreement to replace 1 lakh pumps – DPR for first phase covering 15,000 pumps under preparation
- Proposal to replace 3000 pumps in Haryana approved by Government
- Rajasthan – 4000 pumps to be taken up
- Total investment of EESL in the next 2-3 years of Rs. 1000 crores in PPP model

# EESL Agriculture DSM Methodology

MoU

- MoU to be signed between DISCOM & EESL

DPR/ Re Validation Of DPR

- Detailed energy audit for existing pumps

Technology Selection

- To assess actual energy savings and finalising technical specifications

Agreement

- Agreement to be signed between DISCOM & EESL for implementation.

Payment Mechanism

- The Payment security mechanism to be finalized -ESCROW

Implementation

- EESL will implement the project based on own resources

M & V

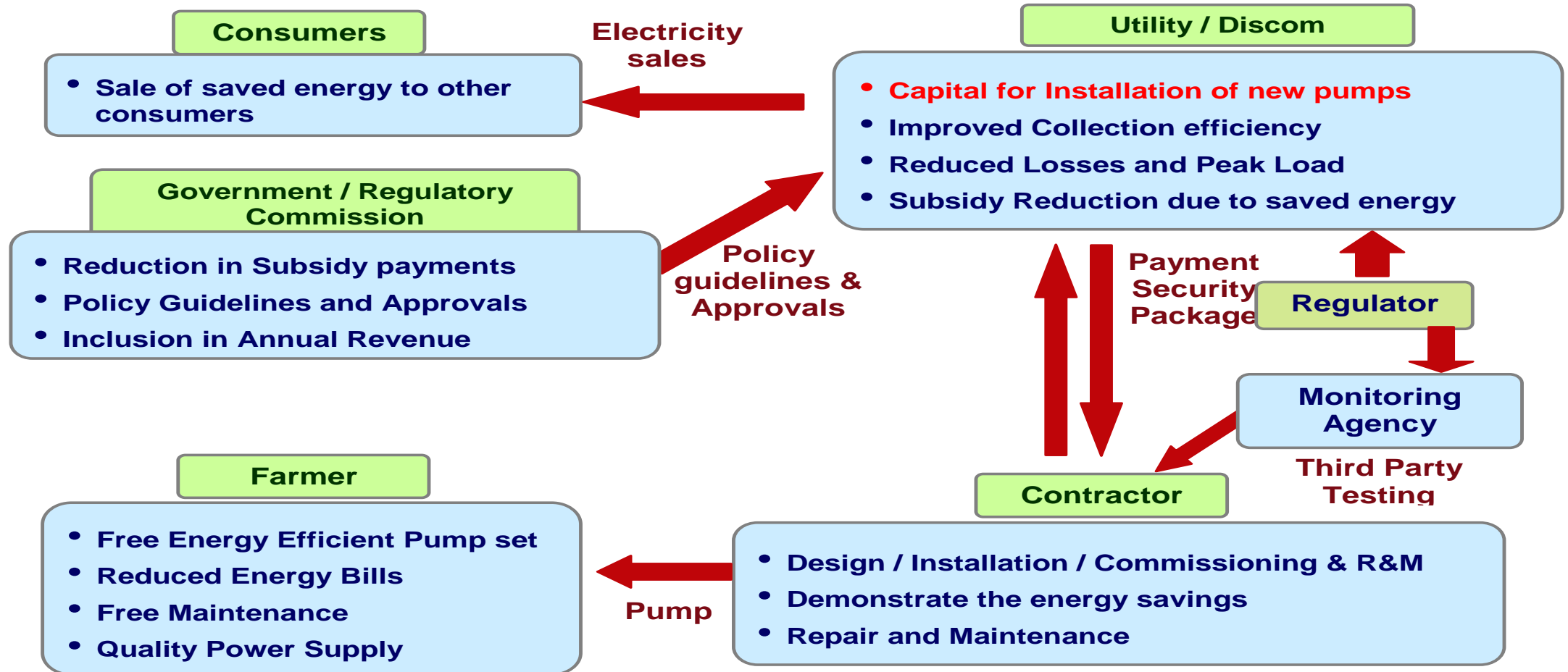
- Deemed saving approach used

**Subsidy savings to States**





# EESL Agriculture DSM Business Model



# Household Lighting (DSM based Efficient House Lighting – DELP)

- Innovative programme for replacement of incandescent with LEDs at Rs. 10 -25 each developed – BLY architecture followed
- Leverages energy savings for cost recovery
- In-principle approval of JERC obtained for first project in Puducherry
- Project approved for Puducherry – 7.5 lakh incandescent to be replaced – launched on 7<sup>th</sup> February.
- Three models for cost recovery evolved
  - (a) Standards Offer Programme – long term contract with DISCOM to ‘buy’ energy savings from EESL (Puducherry, West Bengal)
  - (b) Subsidy reduction of State Governments (Bihar and Jharkhand)
  - (c) Using DSM regulations

# EESL DELP Methodology

MoU/ Letter of Intent

- MoU/ Letter of intent between DISCOM & EESL

Sample Survey

- Sample survey to ascertain population of ICLs and usage pattern

Technology Selection

- To assess actual energy savings and finalising technical specifications of LED lamps

DSM-SOP Petition

- Petition to be finalised for cost recovery for submission to ERC

Payment Mechanism

- The Payment security mechanism to be finalized.

Implementation

- EESL will implement the project based on own resources

M & V

- Deemed saving approach used

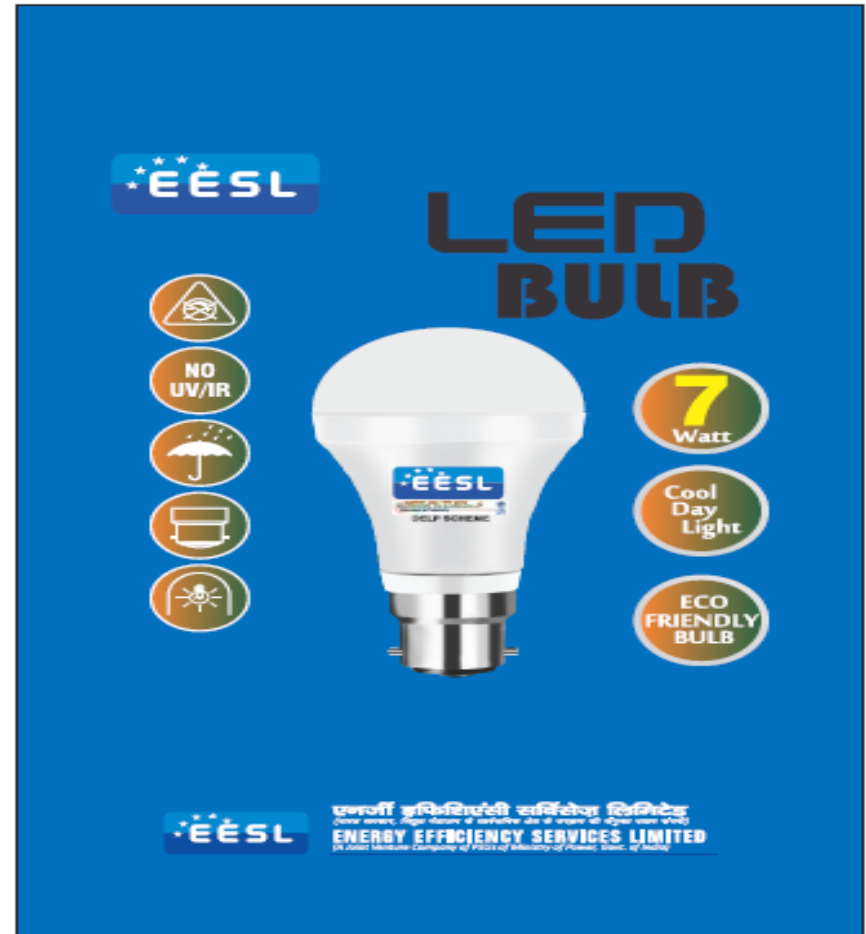
**Overall cost (energy) savings to DISCOMs**



# Picture of LED distributed in Puducherry



FRONT



BACK

# EESL DELP Market Potential

States	ICL Sale in 2012 (Fig in crores)	Energy Savings Potential (mKWh)	Cost Savings (Fig in Rs crores)
AP	6.82	4530.526	2265.263
Assam	0.86	571.298	285.649
Bihar	6.2	4118.66	2059.33
Chhattisgarh	1.8	1195.74	597.87
Delhi	5.1	3387.93	1693.965
Gujarat	4.21	2796.703	1398.3515
Haryana	1.91	1268.813	634.4065
HP	0.4	265.72	132.86
J & K	0.62	411.866	205.933
Jharkhand	1.56	1036.308	518.154
Karnataka	4.25	2823.275	1411.6375
Kerala	2.1	1395.03	697.515
Maharashtra	9.27	6158.061	3079.0305
Manipur	0.13	86.359	43.1795
Meghalaya	0.12	79.716	39.858
MP	3.6	2391.48	1195.74
Nagaland	0.12	79.716	39.858
Odisha	1.22	810.446	405.223
Punjab	1.81	1202.383	601.1915
Rajasthan	2.6	1727.18	863.59
TN	5.1	3387.93	1693.965
Tripura	0.2	132.86	66.43
UP	8.2	5447.26	2723.63
Uttarakhand	0.7	465.01	232.505
WB	6.2	4190.29	2095.15
Other states	0.7	465.01	232.505
<b>Total quantity in Crore pieces</b>	<b>75.8</b>	<b>50365.57</b>	<b>25212.79</b>





Thank you