



Innovative financing mechanisms for EE projects in India

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ICICI Bank

The complete solution provider



Wholesale Banking

- Corporate Finance
- Project Finance
- Commercial Banking
- Investment Banking

Retail Banking

- Accounts
- Deposits & Bonds
- Credit Cards
- Mortgages & Loans
- Depository



Internet

- B2B
- Consumer finance portals
- Web Trade

Technology Banking

- Development
- Commercialization
- Collaboration
- Capability Building

One of the most recognized brands in India



ICICI Bank in Technology Development

- Technology driven company with sound financial track record
- Experience of over two decades in implementation of projects for bilateral/multilateral agencies
- In-house technical expertise
- Diverse portfolio of financial instruments
- Strong network with companies, government agencies, R&D institutions and NGOs



Technology Finance Group

**A catalyst for
Technology Development and
Commercialization**



Technology Finance Group (TFG)

Set up to

- Encourage technology development and commercialisation
- Promote business driven research

Emerged as

- Centre of Excellence in the Indian financial sector in technology financing

One stop solution provider for technology financing

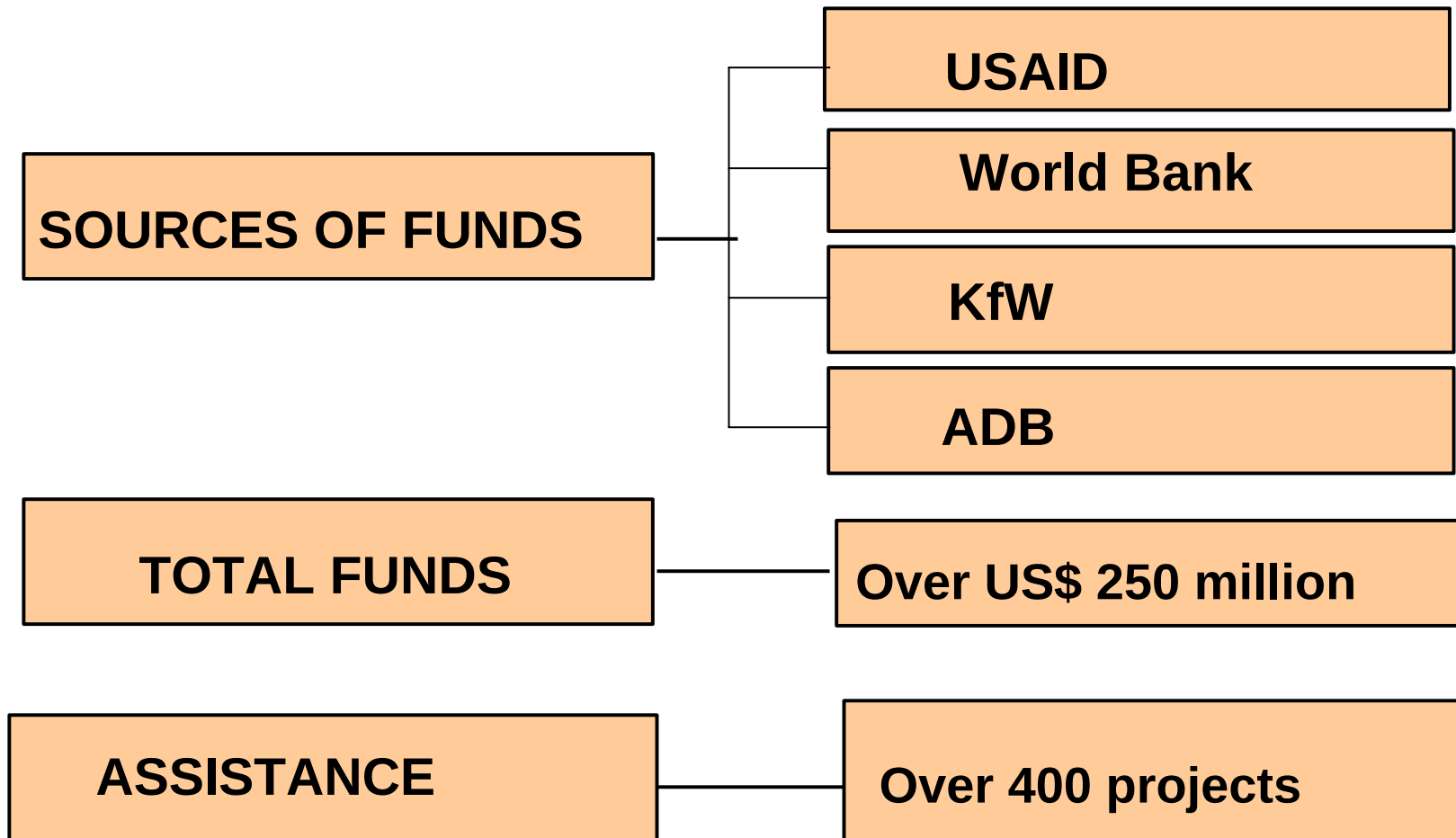


TFG's role

- **Manages technology development and commercialization programmes**
- **Acts as manager/ administrator for various programmes for the international agencies**
 - **USAID**
 - **World Bank**
 - **KfW**
 - **ADB**
- **Aggregate funding of over US\$ 250 million**



Technology Finance Group

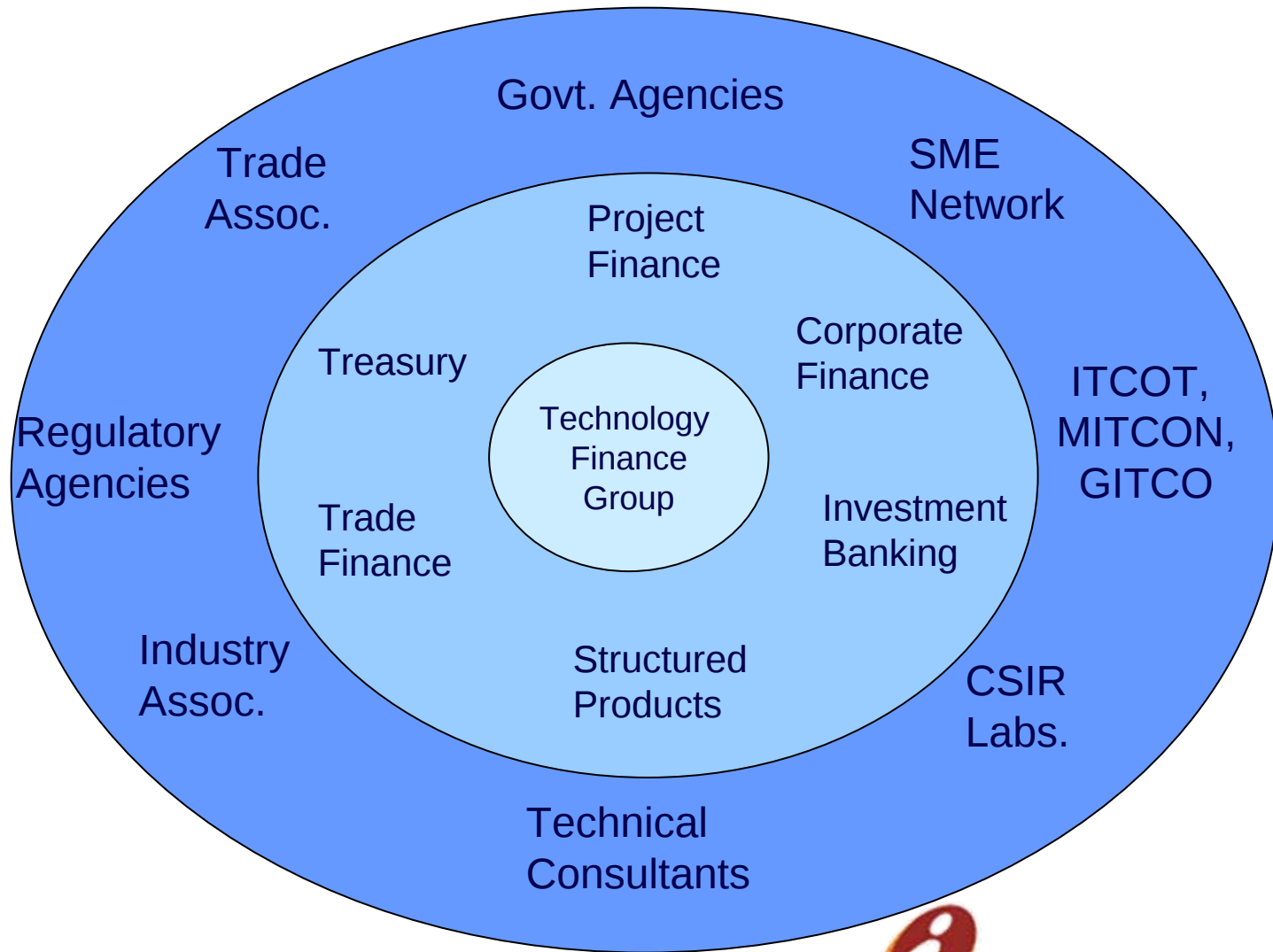


Technology Finance Group

- Supports demonstration projects & activities creating awareness
- The demonstration projects are:
 - innovative
 - bridge technology gaps
 - first of its kind in India
 - replicable
 - in line with the strategic objectives of the funding agency



The approach



EE Project Elements

- Sponsor's credentials
- Energy savings potential
- Technology Interventions
- Investment
 - Project cost
 - Means of Financing
- Energy Services Agreement
- ESCROW arrangement (trapping of receivables)



Energy Initiatives

Objectives

- Technology development in the energy sector
- Establish consortium approach for R&D projects
- Assist energy efficiency projects, promote energy service companies (ESCO's) and utility based Demand Side Management (DSM) programmes
- Reduce GHG emissions
- Capacity building of institutions, NGOs
- Alternate fuels for vehicles



Energy Initiatives

Approach

- Forming consortium of users, manufacturers and R&D institutions
- Assistance to private companies, NGOs, power distribution utilities
- Different financial mechanisms like concessional rupee loans, conditional grants, escrow mechanism, pooled finance

Focus Areas

- Energy conservation/energy efficiency
- Energy service companies
- DSM and distribution improvements
- Non-sugar cogeneration
- Renewable energy



National Level Initiatives

- Supporting development of India's first electric vehicle (Reva Car)
- Promoting municipal ESCO projects-street lighting & waterpumping
- Demand side management at utilities (Noida Power)
- Industrial waste heat recovery (Sterlite Industries)
- Fuel switching
 - Natural gas based foundry cupolas
 - Biomass briquette based gasifiers & power generation
- Ecotel hotels (Kamat Hotels)
- Utilization of industrial wastes



National Level Initiatives

Capacity building of technology institutions

- Support towards setting up of Bureau of Energy Efficiency (BEE)
- Assisting setting up of CII's Green Business Centre (CII-GBC)
- Energy rating for electrical appliances - Consumer Education & Research Centre (CERC), Ahmedabad
- Central Power Research Institute (CPRI) – Setting up of a laboratory for testing various transformer & power station characteristics at Bangalore
- Electrical Research & Development Association (ERDA) - Setting up of a short circuit laboratory & facilities for testing electrical appliances at Vadodara
- The Energy Research Institute (TERI) - Setting up of an instrument bank with calibration facility & creation of an energy efficiency advisory & training centre



Financial instruments introduced

- Technical assistance grants
- Conditional grants/loans (risk sharing)
- Multiple interest rate structures
- Term loans with flexible repayment options
- ESCO financing : shared savings
guaranteed savings



Case Studies



Energy Initiatives

Reva Electric Car Company

- **Sponsors : Mr. Chetan Maini**
- **Design and Manufacturing of India's first Electric Vehicle prototype**
- **Development of EV successfully implemented**
- **Developed air-conditioned EVs and left hand drive European models**
- **Company exporting EVs to several countries**
- **Company expanding its installed capacity**
- **Developing fuel cell vehicles with DRDO**



Energy Initiatives

Noida Power Company Limited

- Private distribution company for Greater Noida
- Commercial, industrial, residential and agricultural consumers
- Replacement of bare cables with insulated cables and LT lines with HT lines. Increase in HT/LT ratio from 0.85 to 2.46
- Distribution network improvements after load research – annual savings of 1.7 mn units against estimated 0.6 mn units
- Metering of unmetered consumers
- DSM – replacement of old pumps by energy efficient pumps (55% energy savings) besides 22% reduction in water consumption



Energy Initiatives

Noida Power Company Limited – Project Impact

- Reduction in transmission and distribution losses.
- Reduction in GHG emissions
- Metering of unmetered households, agricultural DSM expected to boost revenue.
- Growth in industrial and residential demand expected to continue with industrial growth
- The project was the first project of its kind in the country to undertake distribution reforms, metering and agricultural DSM in the same module



Energy Initiatives

Parakh Foods Limited (now Cargill Foods)

- Sponsors : Prakash Parakh
- Edible oil refinery at Kurkumbh, near Pune
- Steam required for processes
- Co-generation (top end) using biomass (bagasse)
- Generation of power 550 KW using microturbine
- Loan amount: Rs 20 million
- Annual savings: Rs 16 million
- Reduction of CO₂ emission: 4,350 tpa



Energy Initiatives

Agra Iron Founders' Association

- Agra dominated by small and medium foundry units
- Foundry units low in technology base and damaging Taj due to emissions (primary sulphur)
- Agra had highest levels of Suspended Particulate Matter (SPM), Sulphur Dioxide and other pollutants
- In 1996 Supreme Court directed creation of Taj Trapezium Zone, closure/shifting of all foundry units or to switch over to natural gas based
- Foundry units did not have access to gas based technology



Energy Initiatives

Agra Iron Founders' Association

- Through technical assistance technology development arranged with Cokeless Cupola Ltd., UK
- An experimental cokeless cupola designed and set up at one unit
- Savings of Rs. 1000/tonne of metal likely in shifting to cokeless operations
- Payback period ~ 1 year
- Support for technological and commercial validation for use at 10 member units



Energy Initiatives

Indus Smelters Limited

- **Sponsor: Lalit Kumar Singhanian**
- **30 tpd pilot plant for steel smelting at Raipur by utilization of wastes**
 - **mill fines**
 - **coal fines**
- **Innovative process**
- **Cost of production expected to be substantially lower**



Energy Initiatives

Sumaya HMX Systems Ltd.

- Development of “Ambiator”, an eco-friendly alternative to an AC
- Works on the indirect evaporative cooling technology by incorporating a wet plate and a cross flow heat exchanger
- Provides 100% filtered cool fresh air and consumes about 35% power compared to an AC making it about 65% more energy efficient compared to an AC
- Does not use chloro fluoro carbons (CFC), as it does not run on compressor-based technology
- The product has also been endorsed by TERI (DCS 001) and the Energy Management Centre (EMC) under GoI
- The company is currently improving on
 - increasing heat exchanger efficiency from 63% to about 80%
 - bringing min offer temperature below 23°C &
 - reducing product size



Energy Initiatives

Sahastratronic Controls Pvt. Ltd. (SCPL)

- Energy saving potential assessed jointly with Nasik Municipal Corporation (NMC)
- Energy Services Agreement for implementation of the project entered into between SCPL and NMC
- Savings to be shared for five years
- Current power bills - Rs 50.0 million per annum for area allotted to SCPL
- Estimated annual savings of Rs 16.0 million on a capital investment of Rs 16.6 million
- Project implemented in Nov 2005
- Payback period ~1.5 years



Energy Initiatives

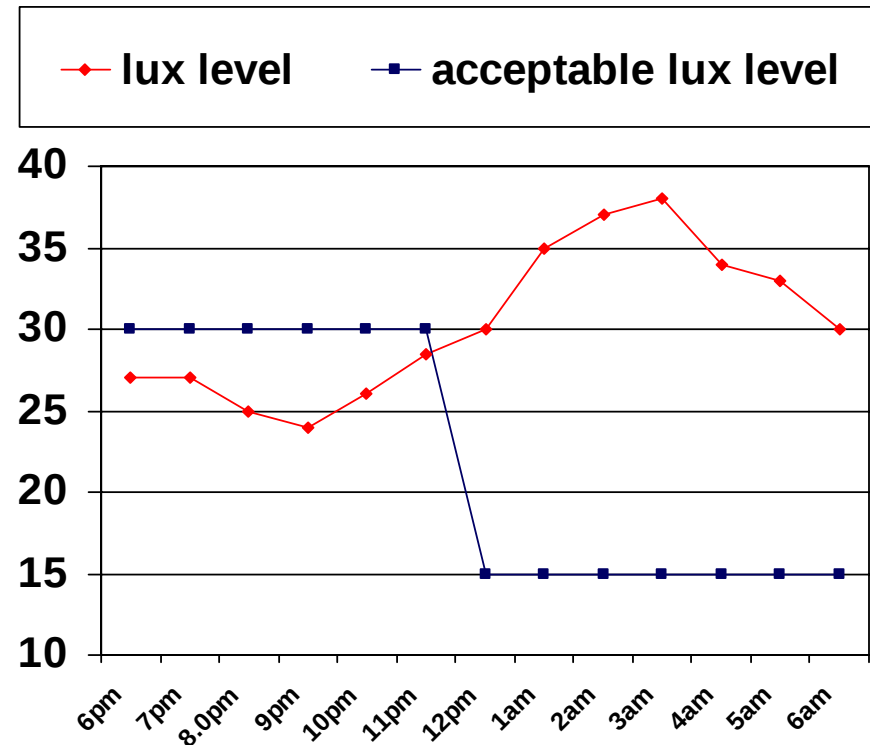
Salient Features of SLC

- Microprocessor based unit with a real time clock
- Three modes of operation (Start , Run & Dim)
- Voltage correction in Start mode as per lamp manufacturer specifications to enhance life of bulb
- Microprocessor changes mode to Run mode where voltage is changed to acceptable lux level
- At programmed time DIM mode takes over automatically to reduce illumination at an agreed value
- On/Off and sunrise/sunset timings for 52 weeks can be programmed



Street Light Controller

- The actual lux level varies due to variation in the voltage levels
- The red graph shows the approx lux level, whereas green graph shows the acceptable lux level
- Light level available during peak traffic hours is less than during low traffic hours.
- Large potential to save energy between 12 pm to 6 am

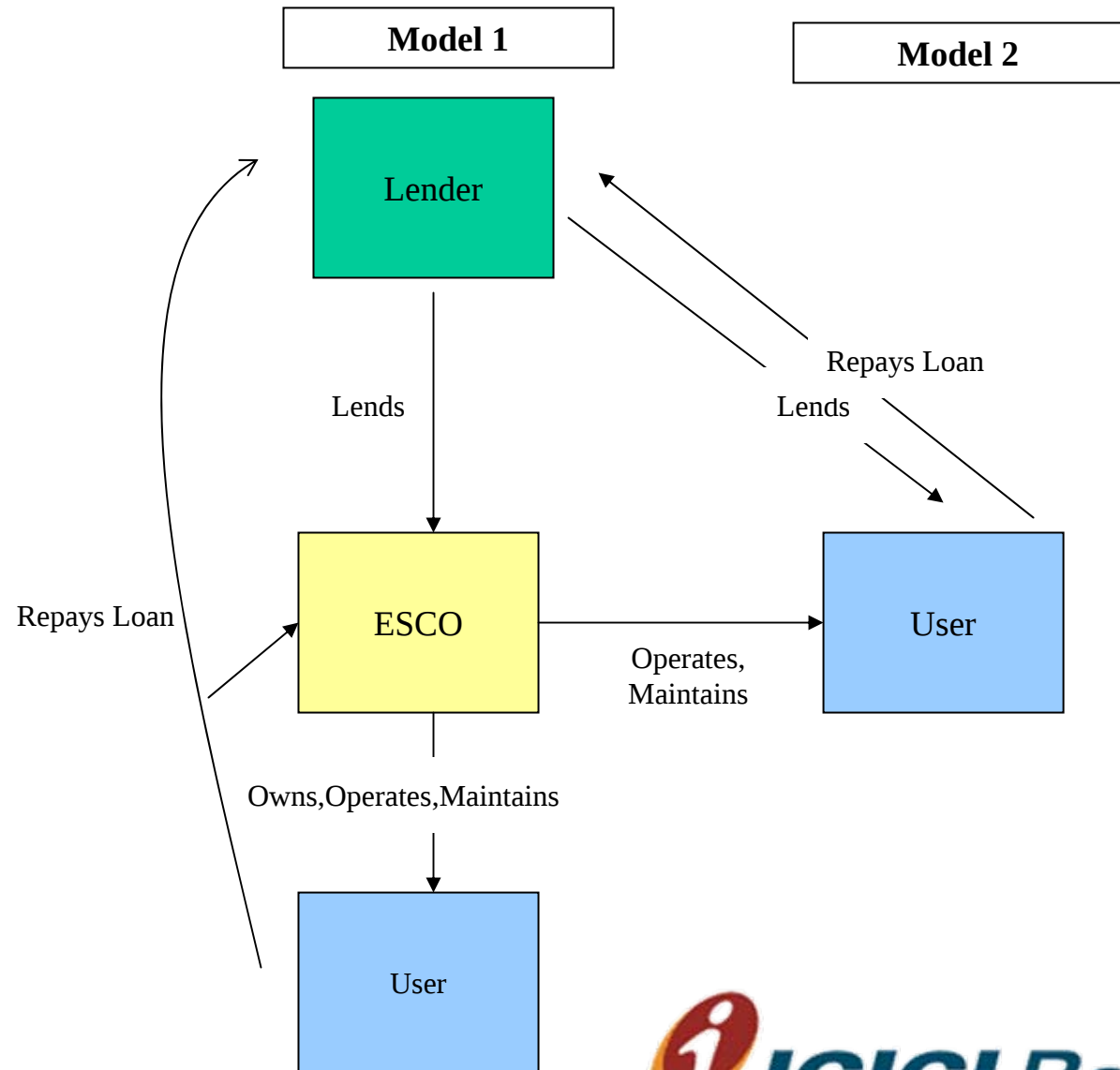


Proposed Action Plan for NMC

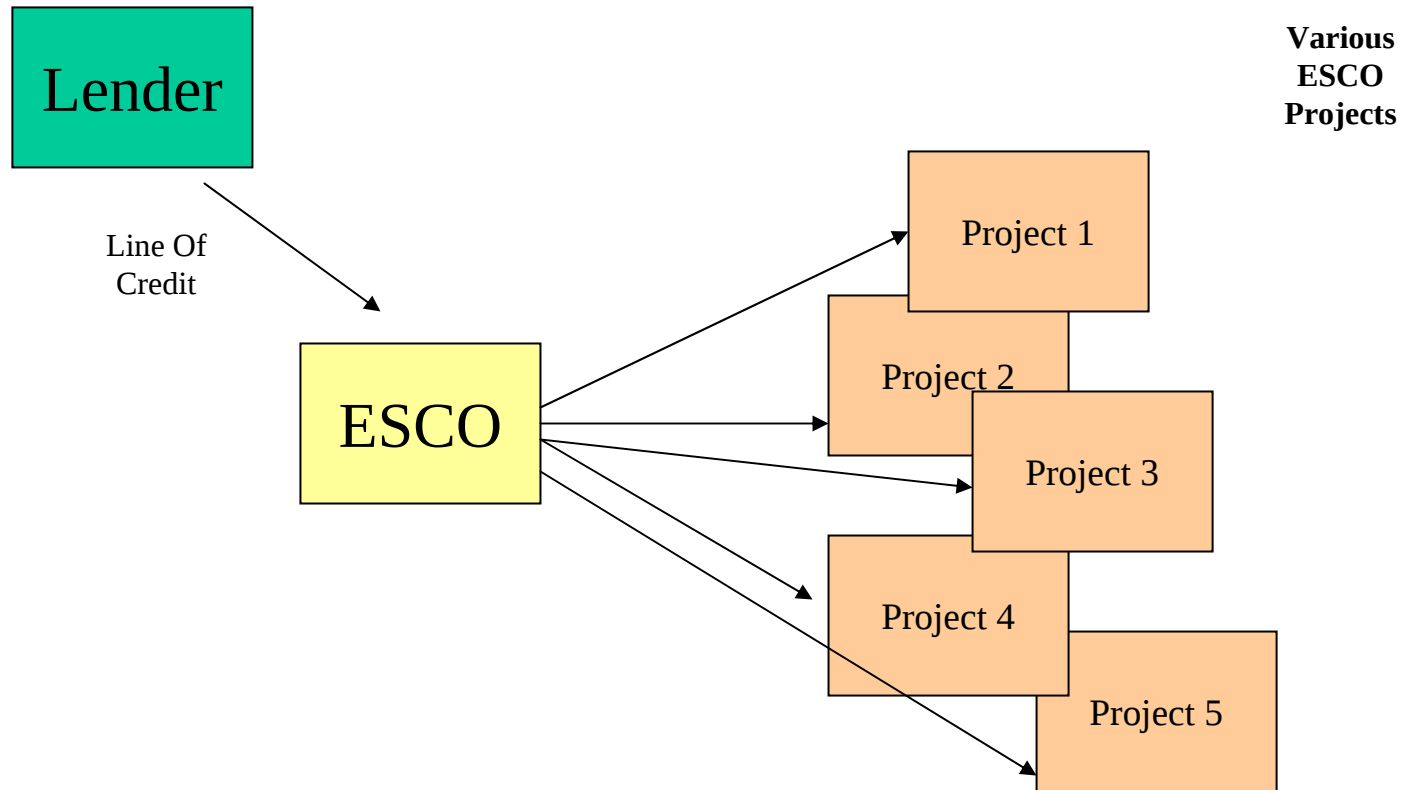
- Installation of 486 street light controllers covering about 19000 street lights at various lighting stations to improve street lighting efficiency
- Improvement in the existing electrical distribution network for
 - Reduction in cable losses
 - Power factor optimization



ESCO Business Models



ESCO: Line of Credit



Biomethanation Projects....

Pilot project discussed for financing:

Panchi Petha Store (Agra)

- **Sector** : Waste to energy
- **Project** : Establishment of 5 tpd Petha waste to energy
- **Project could not be successfully structured due to bank ability issues**



Project Structuring

Issues that guide the structuring of the business model

- Who invests in the assets?
- Are there minimum performance obligations?
- Are there minimum payment obligations?
- Are the assets subject to transfer at the end of term?
- Are payment obligations structured to ensure irrevocable payments to ESCO?
- What if the ESCO fails to perform?



Project Structuring

- Is there recourse to ESCO's parent if it defaults in obligations to user and Lenders?
- What is the integrity of baseline data and measurement/ verification ?
- Have special and user-specific technical and business problems been addressed?
 - e.g. Municipality losing rights to collect Octroi (escrowed to ESCO) abolished by law?
 - Should baseline be adjusted for change of fuel or energy sources on subsequent dates?
 - What if user carries out technical changes that could affect performance of the ESCO?
- There cannot be no one business model, but common safeguards can be built in



Bankability of Projects

- Innovative financial solutions are required to improve the bankability of the ESCO and increase access to credit
- Strong financial structure
 - Earmark cash flows
 - Limit scope for payment delays and restrictions
 - Use innovative financial mechanisms - escrow, securitisation, cash collateral, over-collateral, guarantees, etc.
- Robust Contract
 - Troubleshoot points of conflict
 - Stipulate unambiguous, non-subjective terms of reference and scope of work
 - Provide solutions for resolving conflicts and disputes



Bankability of Projects

- **Minimizing Performance Risk**

Determine baseline data with precision

- **Create suitable M&V protocols**
 - **Ensure minimum fulfillment of payment obligations to Lenders**
-
- **Shift the credit risk from the ESCO to the project and the user and structure payment obligations accordingly**



Contractual Issues

EE business is contract-driven. Requires clarity of purpose and resolution of contentious issues to ensure that lenders realise their monies.

- Is the scope of services defined precisely?
- Are inter se responsibilities clearly delineated?
- Is baseline established?
- Are Measurement & Verification protocols clear-cut and unbiased?
- Have areas of possible dispute been addressed?
- Are there minimum/ guaranteed performance standards?



Contractual Issues

- Are there minimum/guaranteed payment obligations?
- Is financial structure strong enough to ensure recovery of loans within contract period?
- Is security structure adequate to provide suitable collateral and late payment risk?
- Energy Savings billing - is the process well-defined?
- Is payment mechanism clear?
- Are termination valuation formulae in place?
- Attention to small print in the contract mitigates lending risks



Going forward

- Strengthen linkages with multilateral agencies
- Projects in the areas of
 - Energy efficiency/ESCO's
 - Clean fuels
 - Hybrid vehicles
 - Alternate sources of energy
 - Water energy nexus
 - Distribution reforms

Making Indian industry globally competitive by facilitating technology development through energy efficiency and environment friendly practices



Thank you !!

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