



Financing Norms for Energy Efficiency Projects

**T Padmanaban,
Technical Officer, IREDA**

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IREDA : The Beginning ...

Incorporated on March 11, 1987 as a Public Limited Government Company.

Mission

Be a pioneering, participant friendly and competitive institution for financing and promoting self-sustaining investment in energy generation from renewable sources, energy efficiency and environment technologies for sustainable development.



Sectors & Financing Schemes

Sectors

Solar Energy, Wind Energy, Hydro Energy, Bio Energy, Energy Efficiency and Conservation, Bio Fuels.

Financing Schemes

- Project Financing
- Equipment Financing
- Loans for Manufacturing
- Market Development (including Export Promotion)
- Energy Centres
- Financial Intermediaries
- Business Development Associates



IREDA's Financing Norms

(General)

Quantum of Assistance

- ▶ Upto 80% of Project Cost
- ▶ Upto 75% of Equipment Cost

Rate of Interest

- ▶ 5% to 12.5%

Moratorium

- ▶ Upto 3 Years

Repayment Period

- ▶ Upto 12 Years (incl moratorium)



IREDA'S Existing Financing Norms for Energy Efficiency / Conservation Project Financing

Sector	Interest Rate (%) p.a.	Repayment Period incl. Moratorium (Max.) (Years)	Term Loan/Lending Norms of IREDA
Energy Conservation/Ef ficiency Projects (including DSM) and Projects implemented in ESCO mode	11.00	10	Upto 70% of total project cost
	10.00	8	Upto 70% of total project cost



Equipment Financing

Sector	Interest Rate (%) p.a.	Repayment Period incl. Moratorium (Max.) (Years)	Term Loan/Lending Norms of IREDA
Energy Conservation/ Efficiency systems and equipments (including DSM)	11.50	10	Upto 80% of total project cost inclusive of the cost of Energy Audit and DPR preparation.
	9.50	7	
	9.00	6	



TYPES OF PROJECTS UNDERTAKEN BY IREDA IN 'ENERGY EFFICIENCY' SECTOR

- I) Waste Heat Recovery based power project
- II) DSM (Installation of Capacitor Banks)
- III) Energy Efficient equipments in sugar mill
 - Diffuser for juice extraction
 - Variable Frequency Drives for cane carrier
 - Quintuple Evaporator
 - De-watering Mill
 - DC motors for mills
 - Fibrizer Drives
- IV) Energy Efficient Equipments in Cement Mill
 - i) Multi stage pre-heaters
 - ii) High Efficiency Dynamic separators, Ball Mill
 - iii) VFD for Cooler Fans



General Security Conditions

Project Financing

- ✧ Mortgage of immovable properties (Exclusive / pari-passu charge)
- ✧ Hypothecation of movable assets.
- ✧ Guarantees by promoters/promoter directors and promoter companies.
- ✧ Trust & Retention Account / Special Account.
- ✧ Deposit of Post Dated Cheques.

Equipment Financing

1. Equipment financing loans upto Rs. 1 crore :

- ✧ Demand Promissory Note for the amount of loan.
- ✧ Trust & Retention Account / Special Account.



Security (Contd.)

- ✧ Exclusive/pari-passu charge by way of hypothecation of movable assets.
- ✧ Guarantees by promoters/promoter directors and promoter companies.
- ✧ Deposit of post dated cheques.
- ✧ Additional securities, if any, stipulated by IREDA.

2. Equipment financing loans above Rs. 1 crore :

- ✧ Exclusive /pari-passu charge by way of mortgage of immovable assets.
- ✧ Exclusive/pari-passu charge by way of hypothecation of movable assets
Demand Promisory Note for the loan.
- ✧ Trust & Retention Account / Special Account.
- ✧ Guarantees by promoters/promoter directors and promoter companies.
- ✧ Deposit of post dated cheques.
- ✧ Additional securities, if any, stipulated by IREDA.



Energy Service Company (ESCO)

Energy Service Company (ESCO)



∩ Role of ESCO

- Develop, Design and finance (in selected cases) energy efficiency projects
- Install and maintain the project
- Measure, Monitor and Verify the energy savings
- Assume the risk that the project will save the amount of energy guaranteed.



Business Models Of Energy Efficiency Projects



Energy Audit Model

Facility Owners implement the EE projects themselves based on the Energy Audit Report of Energy Auditors/ Consultants

- ➡ Investment & Financial Commitments by project sponsors
- ➡ Role of Energy Auditors/consultants is as Technical Advisor



Guaranteed Savings Model

Energy Auditors/Consultants guarantee the savings resulting from implementation of the project and covers the shortfall if any, from the guaranteed level

- Investment By Project Sponsors
- Project implemented through an ESCO-type entity
- ESCOs indentify the Energy Saving opportunities, design, implement, maintain the EE project and monitor the savings

Guaranteed Savings Model



Contd..

- ⌘ Risk of non-performance mitigated by performance guarantees of Energy Auditors/Consultants/ESCO



Limitation of Guaranteed Saving Model

- ✧ Convincing Project sponsors about financial ability of ESCOs to compensate them in the event of non-performance
- ✧ Non-availability of risk-mitigation products such as performance guarantee insurance



Shared Savings Model

Investment is made by the ESCO. The savings that is accrued from Implementation of the EE project is shared between the ESCOs and the facility owner on a pre determined ratio. ESCOS recover their investment through the shared Savings

- ⚡ In this model, project sponsors can concentrate on their core competencies and avoid blocking resources in EE projects
- ⚡ ESCOs pursue an integrated business model- Invest in EE project, build, operate & maintain



ESCO Concept Highlights

(Shared Savings Model)

- ⇒ **No upfront Payment by CLIENT.**
- ⇒ **Contract Period 5 to 6 years.**
- ⇒ **Ownership to client after contract Period with nominal cost.(Rs.10,000 per MW)**
- ⇒ **Sharing in Energy Saving Benefit ranging from 15% to 20% to CLIENT.**
- ⇒ **No risk for CLIENT in implementation and Performance.**



ESCO Concept Highlights

(Shared Savings Model)

- ⇒ **No Operation & Maintenance of Energy saving equipment required by CLIENTS.**
- ⇒ **Lesser Electricity Bills**
- ⇒ **Electricity Bill Payment by ESCO, Benefit to SEB and Client.**
- ⇒ **Full Energy Saving benefit to the client after the Contract Period.**
- ⇒ **Payment to ESCROW through TRA Mechanism.**



CASE STUDIES

Highlights of Energy
Efficiency/Conservation Projects
Financed by IREDA



Illustration 1: Mini Cement Plant

Retrofit of Energy Efficient Equipment

- Energy Audit was conducted at the plant and various energy measures were identified. The company approached IREDA for part funding of the project.
- Specific Energy Consumption*:

Source	Present	Projected
Electrical (Kwh/Tonne)	90.50	88.10
Thermal (Kcal/Tonne)	837	752

* for 1500 TPD clinker production

- Increase in clinker production from 900 TPD to 1500 TPD



Illustration 1: Mini Cement Plant

Retrofit of Energy Efficient Equipment

- List of Energy Efficiency Equipments/Systems:
 - Installation of New Impact Crusher
 - Modification in Raw Mill Grinding
 - Kiln Modifications
 - Installation of Six stage suspension Pre heater system
 - Installation of Belt Conveyors
 - Installation of Ball Mill
 - VFD Drives
 - High Efficiency Dynamic Separator
- Total cost of the project is Rs. 2384 lakhs. IREDA sanctioned a term loan of **Rs. 1669 lakhs.**
- The project would result in annual electricity savings of 4.88 **Mill Kwh** + Coal savings of 8,250 Metric Tonnes. The payback of the project is 5 years.



Illustration 2: Chemical Unit (Manufacturing Batteries)

Retrofit of Energy Efficient Equipment through ESCO Performance Contracting

- Manufacturing Industrial Batteries like Traction, Semi-Traction and Stationery Lead Acid Batteries
- Present Annual Energy Cost:
 - Electricity - Rs 52 lakhs
 - High Speed Diesel - Rs 15 lakhs
 - Liquefied Petroleum Gas - Rs 8 lakhs
- Energy Efficiency measures proposed:
 1. Lighting Upgrade (Installation of High lumen FTLs, Electronic Ballasts, Low Pressure Sodium Vapour Lamps, CFLs)
 2. Compressed Air System Upgrade (Installation of New High Capacity Air Compressor, Fully Welded Steel Piping)
 3. Lead Melting, Casting & Welding System Upgrade
 4. Formation Air Cooling System Modification
 5. Positive Plate Drying & HAG System Modification



Illustration 2: Chemical Unit (Manufacturing Batteries)

Retrofit of Energy Efficient Equipment through ESCO Performance Contracting

- ESCOs obligations:
 - Identification of opportunities for energy cost reduction that meet agreed financial and other criteria
 - Project Development
 - Baseline Establishment
 - Designing of Energy Efficiency Measures
 - Project Engineering & Procurement
 - Installation on turnkey basis
 - Monitoring & Verifications of savings

- ESCO Performance Guarantee:
 - Period: Till the Term Loan Repayment
 - Amount: Equal to Servicing of Term Loan.
 - Payment for deficit savings will be made on annual basis. If cumulative savings reduced subsequently, the owner will reimburse the ESCO for the amount of reduction in deficit savings.



Illustration 2: Chemical Unit (Manufacturing Batteries)

Retrofit of Energy Efficient Equipment through ESCO Performance Contracting

- **ESCO Payment:** ESCO will be paid a Service Fee of 50% savings achieved each month in excess of the Guarantee amount.
- Total cost of the project is Rs. 43 lakhs, while IREDA has sanctioned **Rs. 32 lakhs** as term loan.
- Annual Energy Cost saving: Rs 20.39 lakhs. The payback period of the project is **3 years**



Illustration 3: Kraft Paper Unit

Retrofit of Energy Efficient Equipment

- 50 TPD paper unit manufactures kraft & absorbent paper
- Energy Cost 16-26% of manufacturing cost. Plant operates 2.5 MW biomass based captive power plant
- Energy Efficiency Equipment & Systems proposed:
 - ⊕ Installation of VFDs for Re-winders, ID fan, Fan Pump, TDRs etc
 - ⊕ Boiler Air Excess Air Control
 - ⊕ Flash Steam heat Recovery
 - ⊕ Insulation for Boiler Hot Water Tank, Digestor
 - ⊕ Replacement of Vacuum Pumps & Fan Pumps
 - ⊕ Efficiency improvement in VT, Stock, Water Pumps
 - ⊕ Cooling Tower Automation
 - ⊕ Installation of Moisture Control on Paper Machine



Illustration 3: Kraft Paper Unit Retrofit of Energy Efficient Equipment

- Total cost of the project is Rs. 144 lakhs. IREDA has sanctioned **Rs. 93.75 lakhs** as term loan.
- The project would result in annual energy cost savings of Rs 74 lakhs. The payback of the project is 2.5 years.



Illustration 3: ESCO Financing

DSM Program for Improving Power Factor of Grid

- The ESCO has signed an MoU with a Private Utility for improving reactive power drawl with a target of power factor of 0.95 under the DSM Program of the Utility.
- The Scope of work includes supply, installation, own and maintain capacitors at consumers' premises on lease basis. A Tripartite agreement would be signed between each of the consumer, Utility and ESCO.
- The ESCO has given a performance guarantee to the Utility that the equipment supplied would give at least 90% of the designed value.



Illustration 3: ESCO Financing Arrangement Between Various Partners

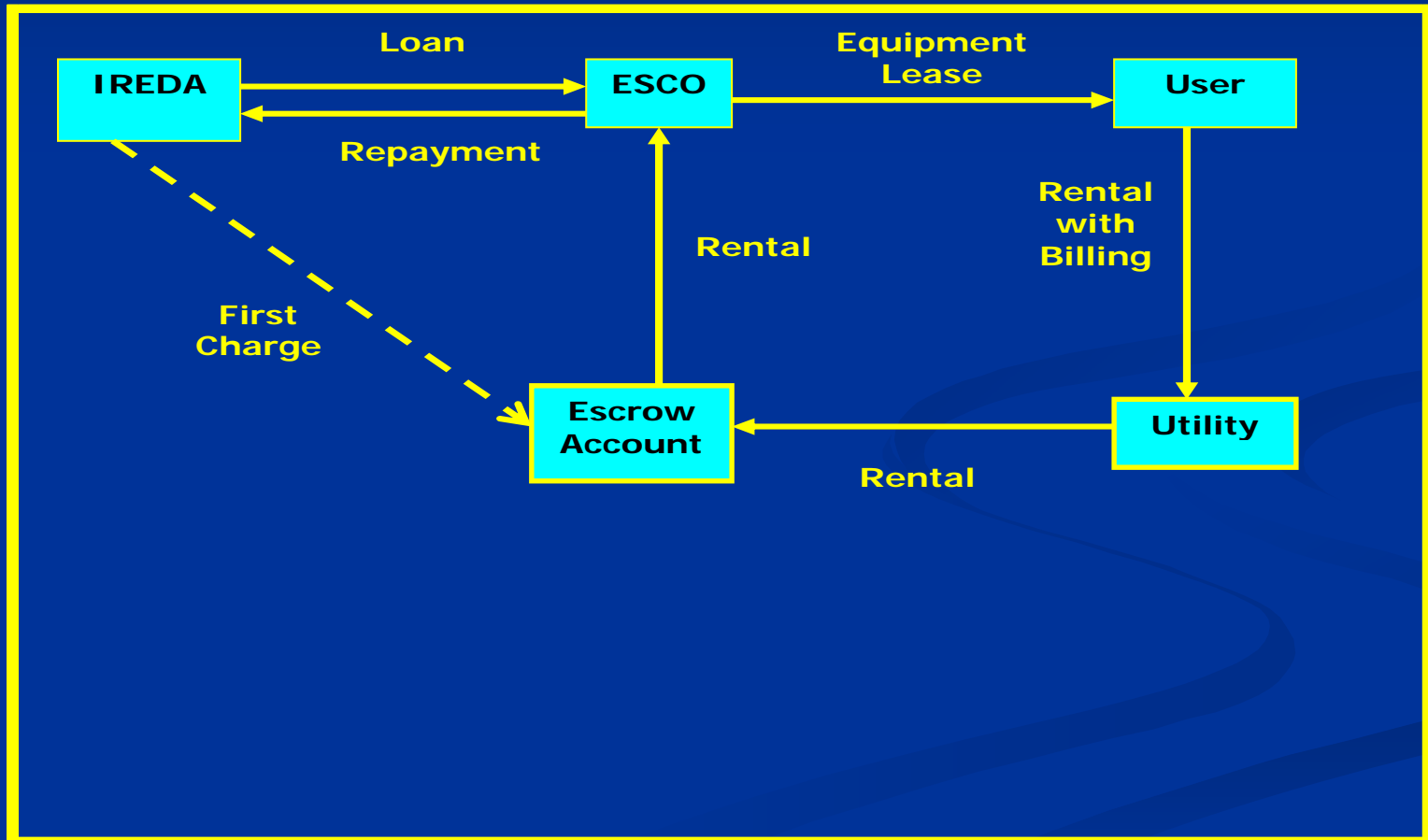




Illustration 3: ESCO Financing

Important Parameters for the Project

- IREDA sanctioned **Rs.10 Million** for the project during 1999.
- The project would result in energy saving of **2.75 Million kWh/ year**. Simple payback period of project is **3 years**.
- Total Carbon saving from the project is **780 MT** per year. The project would save SO_x emission to the tune of **6.50 MT/ year** and NO_x emission to the tune of **2.50 MT/year**.
- Project has been commissioned.
- IREDA had financed a similar power factor improvement project in a public utility in Delhi during the year 2000.



Thank You

Contact:

Indian Renewable Energy Development
Agency Limited,
India Habitat Centre Complex,
Core-4A, East Court, 1st Floor,
Lodhi Road, New Delhi - 110 003

Tel: 4682214-21 Fax: 011- 4682202

email: t.padmanaban@iredaltd.com