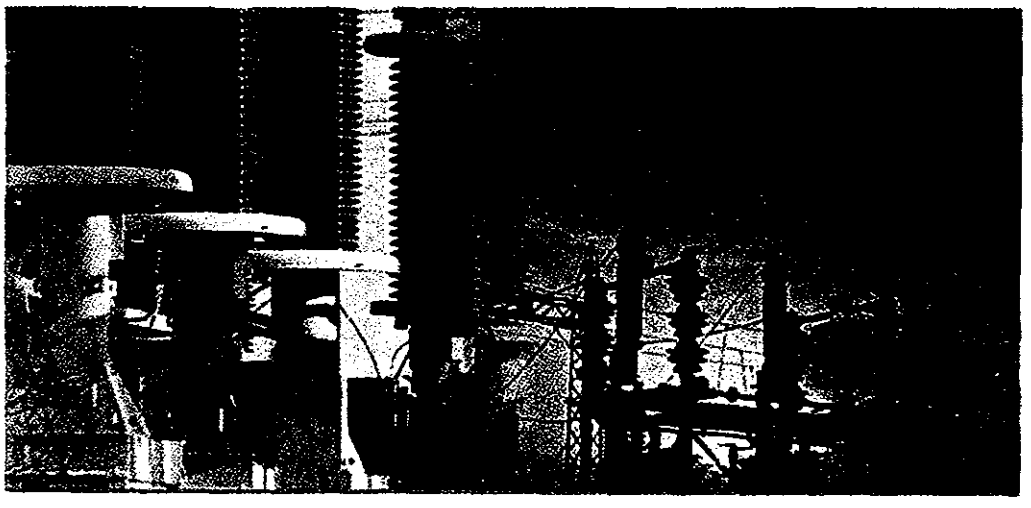
ECO

PN-ACQ-196

# Energy Conservation and Commercialization Project

*A Program of USAID, Ministry of Power & ICICI*



# MARKETING ENERGY EFFICIENCY PRODUCT

***March 2001***

*New Delhi*

***Activity 5 Milestone B***

**USAID Contract Number: LAG-I-809-98-00006-00**

**23865-809.0023** *Implemented by:* NEXANT INC

# Table of Contents

**Preface** 1

**Executive Summary** 2

**Feedback from Participants** 5

**List of participants: March 15, 16 & 17, 2001** 7

**The Faculty** 12

**Presentations**

*ECO Project and the EE product market – Brian Wood* 16
*Strategies to harness the power of direct marketing for EE products – Praphul Misra* 44
*Role of Energy Consultants in Marketing of EE Equipment – MV Ananthakrishna* 59
*Marketing Strategy: Financing based Promotion of EE Technologies – KK Jindal* 96
*Government Procurement – Virendra S. Kothari* 112
*A Success Story on marketing EE technologies, Ceylon Electricity Board* 139
*Load Research of Electricity Sector & DSM in Sri Lanka, Ceylon Electricity Board* 149
*International experience with EE products marketing – Lamps, Brian Wood* 160
*International experience with EE products marketing – AC & Refrigerators, Brian Wood* 180
*International experience with EE products marketing – Motors, Brian Wood* 202

***Addendum (Motor Session held on 8 June 2001)***

*Agenda* 218
*List of Participants* 219
*Participant Feedback* 222
*Overview of Discussions* 225
*Background* 226
*EE Motors Presentation* 231
*Presentation on EE Motors FAQ's* 246
*Presentation ABB Energy Efficiency Seminar* 250

# Preface

This report is the deliverable for Milestone 5B "Conduct three day marketing course on energy efficiency products" of the ECO Project. The report covers work done under this Milestone from January 2001 to April 2001.

The ECO Project is being implemented by Bechtel National Inc. (Nexant Inc) under a USAID contract, LAG-1-00-98-0000. This contract has been issued by the USAID Mission in New Delhi as a part of the IQC (Indefinite Quantity Contract) currently in place through USAID's Global Bureau. The project contract was signed on February 29, 2000, and continues through December 2003.

# Executive Summary

*Introduction*

The three-day course entitled "Marketing of energy efficiency products" was held in New Delhi on 15th through 17th March, under the joint responsibility of Nexant / ECO Project Office (New Delhi) and the following sub-contractors:

- Consulting Engineers Company, which made available the required expertise in direct marketing of EE products as well as innovative financing mechanisms – and indicated the need for non-EE related marketing and financial structuring expertise to expand the market for EE in India
- Innotem Services Private Limited, which provided insights in to the practices, systems and processes followed in Government procurement – and the relative neglect of energy efficiency considerations in Government procurement
- MK Raju Consultants Private Limited, which provided insights in to the practical aspects of marketing EE products and technologies in India, including but not limited to the role of consultants
- Conserve, which played a key role in getting the desired level and type of participation

In fact, given the collective opinion of the various personnel involved in the organization and conduct of this course, this three-day course was structured as follows:

- Day 1, to focus on EE lighting technologies and accessories
- Day 2, to focus on EE refrigeration, air-conditioning and HVAC
- Day 3, to focus on EE motors

Active participation, it was felt, would be facilitated in this format. The marketing personnel of manufacturers would not need to sit in for three days (which is not correct to expect any way), while participants from other organizations would have the option to attend one or more days.

*Course Attendance*

The three-day course was mandated to have a minimum participation of 25, or 75 person-days of attendance. The actual level of participation / attendance was well over 100 person-days, being over 50 on Day 1, 35 on Day 2, and 25 on Day 3. The list of participants and their contact details is provided. The participation was very high on Day 1 (15 March) because the Honourable Minister of Power (Government of India) was expected to inaugurate the course. Subsequently however, he could not come – a decision that was conveyed to the organizers less than 48 hours prior to commencement of the Day 1 proceedings.

The participant selection process represented a mix of mass mailing (particularly to many of the Council of Energy Efficiency Companies in and around the Delhi region) as well as targeted invitations to other participants (from utilities, regulators, NGO's, financial community, Government etc.).

Although the course pertains to marketing of EE products, the need to have participation from other players (eg. utilities, regulators, consumer groups, financial community etc.) was recognized, and participation was therefore sought from this wider audience. In fact, Nexant's previous experience in other developing countries also shows that such organizations / groups have an important role to play towards proper design and successful implementation of any innovative marketing programs.

The participants came from engineering / technical as well as management (mainly finance and marketing) backgrounds – only one participant had a legal background and was a practicing lawyer. Given this rather wide range, as well as the mix of organization types they represented, several perspectives were readily available and voiced on the various aspects deliberated during the three days.

*Course Structure*

The course structure included the following:

- Lectures by the various speakers
- Vendor presentations on selected technologies
- Participants' inputs in lecture and group discussion sessions

The session schedule and time-table for the three days are attached. The approach to the structuring of sessions may be summarized as follows:

- Beginning with the findings of previous ECO work – specifically from Milestones 4B and 5A, where the technical, economic and market potentials for the same set of technologies have been studied. In these, each day the focus shifted to the technologies under consideration
- The next set of lectures pertained to the direct marketing, innovative financing and government procurement aspects. Again, the focus shifted each day to align with the technologies under consideration on that day
- This was followed by presentations by selected vendors (who spoke on the technical and marketing aspects of their specific products) as well as experience from other countries

Depending on the technology(ies) under focus each day, each speaker provided case studies and examples pertaining to that specific technology(ies). The attached slides prepared by each speaker indicate show the examples and case studies relevant for each of three days – and therefore elaborated upon accordingly.

*Participants' feedback from Course Evaluation Forms*

Participants' feedback was sought in somewhat objective terms (in terms of a 5 point scoring system of "excellent – good – average – satisfactory – poor") on the faculty / speakers, course content, logistics and administrative arrangements. The findings basically show that:

- The faculty were considered to have performed well in general (at least 70% participants rated all speakers as excellent or good). Two speakers were considered good or excellent by more than 80% of the participants; and two were given a poor rating by some participants.
- On other aspects as well, the participants gave good ratings. More than 70% felt that the course content and course structure were good or excellent. And more than 80% rated the venue, the administrative arrangements, handouts etc. as being good or excellent. No participant rated them as poor.

Feedback on other aspects was more qualitative, and reflected to an extent, the feedback on the factors described above, as well as the fact that the participants represent a wide range of constituencies. For instance, it is clear that those who stated that their goal in attending this course was to understand how better to market EE products clearly represented manufacturers, those who stated their goals as being to understand the applications / usage of EE products represented other constituencies.

Likewise, in terms of follow-up actions they propose (after the course is over), the feedback also shows that the participants come from a variety of organizations – the feedback ranges from their desire to improve marketing of their EE products to implementing EE solutions in-house. However, many of them mention that they would like to either associate / keep in touch with the organizers or the faculty in some way, or like to attend further programs organized under the ECO project. More than 80% of the participants rated the venue, the administrative arrangements, handouts etc. as being good or excellent.

# Feedback from Participants

*Marketing EE Technologies*

**15-17 March, 2001**
**India Habitat Centre, New Delhi**

*1 Goals and their achievement*

*Goals for attending the course*

| | |
|---|---|
| To understand how better to market EE products | 14% |
| To understand / expand usage of EE equipt | 41% |
| To understand new trends / innovations in EE products | 41% |
| To promote / understand how to promote ESCO business | 5% |

*Measure of meeting goals*

| | |
|---|---|
| Large / great extent | 38% |
| Good extent | 13% |
| Satisfactory / some extent / partial | 46% |
| Can not say | 4% |

*2 Follow-up action after the course(s)*

*2.1 Towards implementation of EE solutions in-house*

| | |
|---|---|
| To discuss with energy auditors and conduct energy audits | 5% |
| Find out more about EE technologies / equipment | 8% |
| Contact EE manufacturers | 3% |
| Evaluate existing equipment (lighting, refrig, motors etc.) | 8% |
| Implement EE technologies internally | 10% |
| Do internal marketing / discuss with HO personnel | 8% |
| To identify opportunities for EE | 5% |
| **Total** | **46%** |

*2.2 Towards more efficient marketing of EE products*

| | |
|---|---|
| Prepare new marketing plan | 8% |
| Change strategy regarding pricing | 5% |
| Follow-up to understand financing issues in marketing EE products | 5% |
| To secure and begin marketing EE products | 3% |
| **Total** | **21%** |

*3 Suggestions / feedback on the course*

*3.1 On course configuration*

| | |
|---|---|
| All reading material in advance | 8% |
| Hold course periodically (eg. once a year) | 10% |
| Go slower - need more time to absorb the concepts | 3% |
| Need to be of longer duration | 3% |
| Need to be more interactive | 5% |
| Speakers should stick to time allotted | 3% |
| **Total** | **30%** |

*3.2 On participation*

| | |
|---|---|
| Increase participation / presentations from Financial Inst. | 10% |
| Increase participation from Regulators / Utilities | 8% |
| Increase participation from local institutions (schools, municipalities etc.) | 5% |
| Increase participation from large industrial consumers | 5% |
| To have participations from resident associations | 5% |
| Have intensive workshops with 10-15 people only | 3% |
| **Total** | **35%** |

*3.3 On course content*

| | |
|---|---|
| Need presentation on M&V as well | 3% |
| Address issues pertaining to Rural India (eg. EE lanterns) | 3% |
| Add real case studies | 3% |
| Discuss Govt subsidy also | 3% |
| Need more indepth presentations, with actual equipt. perf. data | 5% |
| Emphasize consumer applicability / suitability | 5% |
| **Total** | **20%** |

| *2.3 Towards greater role of utility in furthering EE measures* | |
|---|---|
| Spread message to consumers and increase awareness | 5% |
| Think of DSM seriously | 3% |
| Conduct similar seminar to increase awareness | 5% |
| Get technologies adopted by the general public | 3% |
| **Total** | **15%** |

| *3.4 General statements* | |
|---|---|
| Encourages debate on EE products and their benefits | 3% |
| EE good for eco friendliness | 3% |
| Program aims to make giant strides in popularizing EE equipment and appliances | 3% |
| **Total** | **8%** |

| *2.4 Greater follow-up with ECO project* | |
|---|---|
| Be in touch with organizers | 10% |
| Decide to come another day / days | 3% |
| Like to attend other such programs | 5% |
| **Total** | **18%** |

| *3.5 On further involvement* | |
|---|---|
| Partner with organizers to further EE movement | 3% |
| Some way for constant interaction with various speakers | 3% |
| Invite for all ECO programs | 3% |
| **Total** | **8%** |

| *Content (relevance / coverage)* | |
|---|---|
| Excellent | 7% |
| Good | 72% |
| Avg / Satisfactory | 21% |

| *Content (Workshop structure)* | |
|---|---|
| Excellent | 7% |
| Good | 64% |
| Avg / Satisfactory | 29% |

| *Venue* | |
|---|---|
| Excellent | 37% |
| Good | 56% |
| Avg / Satisfactory | 7% |

| *Administrative Arrangements* | |
|---|---|
| Excellent | 36% |
| Good | 50% |
| Avg / Satisfactory | 14% |

| *Handouts / Distributed material* | |
|---|---|
| Excellent | 21% |
| Good | 62% |
| Avg / Satisfactory | 17% |

| *Publicity / Invitation* | |
|---|---|
| Excellent | 11% |
| Good | 70% |
| Avg / Satisfactory | 19% |

| *Faculty 1 - P Misra* | |
|---|---|
| Excellent | 32% |
| Good | 45% |
| Avg / Satisfactory | 18% |
| Poor | 5% |

| *Faculty 2 - KK Jindal* | |
|---|---|
| Excellent | 11% |
| Good | 67% |
| Avg / Satisfactory | 22% |
| Poor | 0% |

| *Faculty 3 - Ananthakrishna* | |
|---|---|
| Excellent | 8% |
| Good | 63% |
| Avg / Satisfactory | 29% |
| Poor | 0% |

| *Faculty 4 - V Kothari* | |
|---|---|
| Excellent | 28% |
| Good | 52% |
| Avg / Satisfactory | 16% |
| Poor | 4% |

| *Faculty 5 - Jayalath* | |
|---|---|
| Excellent | 43% |
| Good | 43% |
| Avg / Satisfactory | 14% |
| Poor | 0% |

| *Faculty 6 - Brian Wood* | |
|---|---|
| Excellent | 18% |
| Good | 55% |
| Avg / Satisfactory | 27% |
| Poor | 0% |

# List of Participants

## List of participants – March 15, 2001

| Name | Organisation | Address1 | Address2 | City | Phone | Fax | E-mail |
|---|---|---|---|---|---|---|---|
| Anupama Sharma | AAA Marketing Pvt. Ltd. | E-108/4, FF, BGN Market, | Munirka | New Delhi | 011-6177599 | 011-6177599 | aaamarketing@vsnl.net |
| Mr. A K Upadhyay | AAA Marketing Pvt. Ltd. | E-108/4, FF, BGN Market, | Munirka | New Delhi | 011-6177599 | 011-6177599 | aaamarketing@vsnl.net |
| Mr. Rajiv Sahai | Accord Airtech | 289, Sheikh Sarai (RPS)-1 | | New Delhi | 011-6016201 | 011-6016235 | |
| Prashant Bajpai | Asian Electronics Ltd. | Surya Plaza, First Floor | K-185/1 Sarai Julena, NFC | New Delhi | 011-6317232 | 011-6837406 | aeldel@vsnl.com |
| Mr. Kapil Chanana | Bharati Cellular Ltd. | D-184, Okhla Industrial Area | Phase-I | New Delhi | 9810299410 | a | |
| Mr. Rahul Singh | BSES Limited | BSES Tower, A-2, | Sector-24 | Noida | 91-4557218 | 91-4558908 | bsesnoida@mantraonline.com |
| Mr. Probhash Chawla | Consultant | 507B, Beverly Park | DLF City Phase II | Gurgaon | 91-6386416 | | probhashchawla@hotmail.com |
| Mr. S Pramanik | Consultant | H3/37 Mahavir Encl. | Bengali Colony, Palam | New Delhi | | | |
| Mr. Vijay Panjawani | CPCB | 339, Law Chambers | High Court, | New Delhi | 011-3389635 | | |
| Mr. Inderjit S Anand | DFID | B-28, Tara Cresent, | Qutub Institutional Area | New Delhi | 011-6529123 | 011-6529296 | I-ANAND@dfid.gov.uk |
| Mr. B M Rai | DVB | DVB Sub Stn Bldg., Alak Nanda | Near Chander Lok Cinema | New Delhi | 011-6470708 | | |
| Mr. R P Nagpal | DVB | DVB Sub Stn Bldg., Alak Nanda | Near Chander Lok Cinema | New Delhi | 011-6470708 | | |
| Anil Bhatia | Escorts JCB Ltd. | 23/7 Mathura Road | Ballabhgarh | Haryana | 232308 | | |
| Mr. K Sharan | Greentech Foundation | M-39, St.#4 | New Mahavir Nagar | New Delhi | 011-5436736 | 011-5436736 | mail@greentech.org |
| Mr. G Prasad | Haryana Electricity Regulatory Commission | SCO 180, Sector 5, | | Panchkula | 0172-590869 | 0172-572359 | ghanshyam_prasad@yahoo.com |
| Mr. Ailawadi | Haryana Electricity Regulatory Commission | SCO 180, Sector 5, | | Panchkula | 0172-590869 | 0172-572359 | ghanshyam_prasad@yahoo.com |
| Mr. Ankur Gupta | Hero Puch | 601, International Trade tower, | Nehru Place | New Delhi | 011-6216666 | 011-6471230 | common@heromotors.com |
| Mr. Gagan Chitkara | Hero Puch | 601, International Trade tower, | Nehru Place | New Delhi | 011-6216666 | 011-6471230 | common@heromotors.com |
| Mr. Lakhbir Singh | Hi-Tech Service Engrs. | 29/2, Punjabi Bagh Ext, | | New Delhi | 011-5163935 | 011-5103735 | lakhbir@del.vsnl.net.in |
| Mr. K K Sharma | Holtec Consulting Pvt. Ltd. | A Blk, Sushant Lok, | | Gurgaon | 91-6385095 | 91-6385114 | kku@holtecnet.com |
| Mr. S S Sharma | Holtec Consulting Pvt. Ltd. | A Blk, Sushant Lok, | | Gurgaon | 91-6385095 | 91-6385114 | kku@holtecnet.com |
| Mr. Jaisingh Dhumal | ICICI | ICICI Towers Bandra Kurla Complex | | Mumbai | 022-6536475 | 022-6531268 | dhumali@icici.com |
| Mr. Ramesh Gupta | India Services | 67, Akash Kunj, | Sector 9, Plot 14, Rohini | New Delhi | 011-7864352 | 011-7268588 | indserv@mantraonline.com |
| Mr. V S Kothari | Innotem Services Pvt. Ltd. | B-7/92.1, Safdarjung Encl. | | New Delhi | 011-6100756 | | innotem@vsnl.com |
| Mr. Ajay Khandelwal | Khandelwal Enterprises | 22, Rabindra sarani, 1st Floor | Room # NN-18 | Calcutta | 033-2369829 | 033-2361278 | kent@cal2.vsnl.net.in |
| Mr. P K Sood | Linear Technolgies India Pvt. Ltd. | B-167, Freedom Fighters Encl. | Neb Sarai, Near IGNOU, Saket | New Delhi | 011-6854946 | 011-6854057 | lintek@vsnl.com |
| Mr. Kapil Sood | Linear Technolgies India Pvt. Ltd. | B-167, Freedom Fighters Encl. | Neb Sarai, Near IGNOU, Saket | New Delhi | 011-6854946 | 011-6854057 | lintek@vsnl.com |
| M V Ananthakrishna | MK RAJU Consultants | 16 Srinagar Colony | Temple Avenue | Chennai | 044-2351151 | 044-2351070 | ananthakrishnan@vsnl.com |
| Ms. Vatsala Sharma | National Power Training Institute | NPTI Complex, Sec.-33 | | Faridabad | 0129-5274919 | 0129-5277412 | vatsala@npti.delhi.nic.in |
| Mr. Arun Kumar | NDMC | New Delhi Municipal Council | Palika Bhawan | New Delhi | 011-3362429 | 011-4674861 | |

## List of Participants – March 15, 2001

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mr. H C Baweja | NDMC | New Delhi Municipal Council | Palika Bhawan | New Delhi | 011-3362429 | 011-4674861 | |
| Mr. R R Singh | NDMC | 17/124, Gali No. 3, Than Singh Nagar | Anand Parbat | New Delhi | 011-3346545 | | |
| Mr. Tarun Batra | NDMC | New Delhi Municipal Council | Palika Bhawan | New Delhi | 011-3362429 | 011-4674861 | |
| M S Jayalath | Nexant Inc. | D-4/5, 1st Floor | Vasant Vihar | New Delhi | 011-6155116 | 011-6155122 | |
| Mr. Gautam Ghosh | Noida Power Company Ltd. | A-46, Sector-26 | | Noida | 91-530090 | 91-533542 | npcl.noida@cesc.sprintrpg.ems.vsnl.net.in |
| Mr. Rajiv Goyal | Noida Power Company Ltd. | A-46, Sector-26 | | Noida | 91-4530090 | 91-4533542 | npcl.noida@cesc.sprintrpg.ems.vsnl.net.in |
| Mr. Amitabh Ray | PADCO | PADCO, Inc.,1025 Thomas Jefferson Street NW, | Suite 170, | Washington DC | 202-3372326 | 20-9442351 | |
| Mr. R C Jain | Paras Lubricant Ltd. | 101-102, Kundan Bhawan, | Azadpur | Delhi | 011-7227804 | 011-7253651 | info@palcolub.com |
| Mr. Akash Jain | Pranat Engineering Pvt. Ltd. | 103, Aggrawal Complex, Plot No. 1 | LSC Sural Mal Vihar | Delhi | 011-2152828 | 011-2146565 | pranat28@bol.net.in |
| Mr. T N Ramesh | Pranat Engineering Pvt. Ltd. | 103, Aggrawal Complex, Plot No. 1 | LSC Sural Mal Vihar | Delhi | 011-2152828 | 011-2146565 | pranat28@bol.net.in |
| Mr. Ravinder | R K Enterprises (Regd.) | Shop No.10, Sec. 18-D | | Chandigarh | 0172-572435 | 0172-545822 | |
| Mr. Ranjit Kulkarni | Shreeji Marketing Agency | 1st Floor, Dhanesh Textile Mill Compound | Vishweshwar Nagar, Goregaon (E) | Mumbai | 022-8728634 | 022-8724925 | shreejima@yahoo.com |
| Mr. Rohit Gupta | Shyam Telecom Ltd. | 246, Phase-IV, | Udyog Vihar | Gurgaon | 91-6340807 | 91-6341475 | rohitgupta@shyamtel.com |
| Mr. Rahul Arora | Solar Finance | | | | 4697400 | | |
| Mr. Atul Lotia | Superlite Industries | 1st Floor, Dhanesh Textile Mill Compound | Vishweshwar Nagar, Goregaon (E) | Mumbai | 022-8728634 | 022-8724925 | superlite@roltanet.com |
| Dr B D Sharma | Sustainable Energy Solutions Pvt. Ltd. | 302, Sai Plaza, 187-188, | Sant Nagar, Eastofd Kailash | New Delhi | 011-6405494 | | ses@mantraonline.com |
| Mr. Subodh Kumar | T B S Enterprises | APCTT Building | Qutub Institutional Area, PO Box 4575 | New Delhi | 011-6966509 | 011-6856274 | tbse@apctt.org |
| Mr. Manish Mittal | Tata Infotech Ltd. | System Integration Division, Plot 4&5, | Noida Export Processing Zone, | Noida | 91-4562356 | 91-4567635 | maneesh.mittal@tatainfotech.com |
| Rahul Walawalker | Tata Infotech Ltd. | 5, Gitanjalee, Shahji Raje Road | Ville Parle | Mumbai | 4933560 | | wrahul@vsnl.com |
| Ms. Aarti Sharma | TERI | Darbari Seth Block, Habitat Place | Lodhi Road | New Delhi | 4682100 | 4682111 | aarti@teri.res.in |
| Mr. V K Vohra | Trades International | 345, Airforce Naval Enclave | Plot 11 Sec 7 Dwarka | New Delhi | 011-5006218 | | |
| Mr. Manoj K Mathur | Trane india Ltd. | 813-814, International Trade Tower | Nehru Place | New Delhi | 011-6213801 | 011-6213803 | manoj_mathur@trane.com |
| Mr. Rajesh Sikka | Trane india Ltd. | 813-814, International Trade Tower | Nehru Place | New Delhi | 011-6213801 | 011-6213803 | rajesh_sikka@trane.com |
| Ms. K Usha Rao | UNDP | 55, Lodhi Estate | | New Delhi | 011-4628877 | 011-4627612 | usha.rao@undp.org |
| Sandeep Tandon | USAID | American Embassy | Shanti Path | New Delhi | 01-4198000 | | standon@usaid.gov |
| Jami Hossain | Winrock International India | 7 Poorvi Marg, | Vasant Vihar | New Delhi | 011-6142965 | 011-6146004 | jami@winrock.ernet.in |

# List of Participants – March 16, 2001

| Name | Organisation | Address1 | Address2 | City | Phone | Fax | E-mail |
|---|---|---|---|---|---|---|---|
| Anupama Sharma | AAA Marketing Pvt. Ltd. | E-108/4, FF, BGN Market, | Munirka | New Delhi | 011-6177599 | 011-6177599 | aaamarketing@vsnl.net |
| Mr. A K Upadhyay | AAA Marketing Pvt. Ltd. | E-108/4, FF, BGN Market, | Munirka | New Delhi | 011-6177599 | 011-6177599 | aaamarketing@vsnl.net |
| Mr. Rajiv Sahai | Accord Airtech | 289, Sheikh Sarai (RPS)-I | | New Delhi | 011-6016201 | 011-6016235 | |
| Mr. S K Anand | Amalgamated Consultants Pvt. Ltd. | 181, Golf Links | | New Delhi | 011-6113305 | 011-6113422 | |
| Mr. Hans Raj | Asija Battery | 110 Ring Road Market | Sarojni Nagar | New Delhi | 011-6887394 | | |
| Mr. Suresh Kumar | Blue Star Ltd. | 2A DLF, Corporate Park | Phase-III, | Gurgaon | 91-6359001 | 916359220 | sureshkumar@bluestarindia.com |
| Mr. S K Lalwani | CDC | 2nd Floor, Zone IV | India Habitat Centre, Lodhi Road , | New Delhi | 011-4602601 | 011-4602602 | cdc@giasdl01.vsnl.net.in |
| Dr. K Dwarakanath | Central Power Research Institute | NTPC'S CSES Campus, | Pipe Line Road | Murad Nagar | 01232-41744 | 01232-41744 | drkdwaraka@hotmail.com |
| Mr. S Pramanik | Consultant | H3/37 Mahavir Encl. | Bengali Colony, Palam | New Delhi | | | |
| Mr. Probhash Chawla | Consultant | 507B, Beverly Park | DLF City Phase II | Gurgaon | 91-6386416 | | probhashchawla@hotmail.com |
| Mr. Paramdeep Singh | DSCL | 2nd Floor, Kanchanjunga Bldg. | 18 Barakhamba Road | New Delhi | 011-3316801 | 011-3319062 | param1902@yahoo.com |
| Mr. B M Rai | DVB | DVB Sub Stn Bldg., Alak Nanda | Near Chander Lok Cinema | New Delhi | 011-6470708 | | |
| Mr. A K Rampal | HERC | SCO 180, Sector 5, | | Panchkula | 0172-590869 | 0172-572359 | anuprampal@yahoo.com |
| Mr. Ghanshyam Prasad | HERC | SCO 180, Sector 5, | | Panchkula | 0172-590869 | 0172-572359 | ghanshyam_prasad@yahoo.com |
| Mr. Ankur Gupta | Hero Puch | 601, International Trade tower, | Nehru Place | New Delhi | 011-6216666 | 011-6471230 | common@heromotors.com |
| Mr. Gagan Chitkara | Hero Puch | 601, International Trade tower, | Nehru Place | New Delhi | 011-6216666 | 011-6471230 | common@heromotors.com |
| Mr. C L Punjabi | Holtec Consulting Pvt. Ltd. | A Blk, Sushant Lok, | | Gurgaon | 91-6385095 | 91-6385114 | clp@holtecnet.com |
| Mr. Bhaskar Natarajan | ICEF | ICEF, 86 Pashchimi Marg | | New Delhi | 011-6144051 | 011-6146236 | bnatarajan@delhi.icco.net |
| Mr. Jai Singh Dhumal | ICICI | C-15, G Block | Bandra Kurla Complex Bandra (E) | Mumbai | 022-6536475 | 022-6531268 | dhumalj@icici.com |
| Mr. R R Singh | NDMC | 17/124, Gali No. 3, Than Singh Nagar | Anand Parbat | New Delhi | 011-3346545 | | |
| Mr. Tarun Batra | NDMC | New Delhi Municipal Council | | New Delhi | 011-3362429 | 011-4674861 | |
| Mr. Rajiv Goyal | NPCL | A-46, Sector-26 | | Noida | 91-4530090 | 91-4533542 | npcl.noida@cesc.sprintrpg.ems.vsnl.net.in |
| Mr. R C Jain | Paras Lubricant Ltd. | 101-102, Kundan Bhawan, | Azadpur | Delhi | 011-7227804 | 011-7253651 | info@palcolub.com |
| Mr. Akash Jain | Pranat Engineering Pvt. Ltd. | 103, Aggrawal Complex, Plot No. 1 | LSC Sural Mal Vihar | Delhi | 011-2152828 | 011-2146565 | pranat28@bol.net.in |
| Mr.T N Ramesh | Pranat Engineering Pvt. Ltd. | 103, Aggrawal Complex, Plot No. 1 | LSC Sural Mal Vihar | Delhi | 011-2152828 | 011-2146565 | pranat28@bol.net.in |
| Mr. Raghu Nath | Reliable System | 30, Sadhana Enclave | | New Delhi | 011-6011456 | | |
| Mr. Rohit Gupta | Shyam Telecom | | | Gurgaon | 916340808 | | rohitgupta@shyatel.com |

## List of Participants – March 16, 2001

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mr. Satender Mishra | Silver Stone Enterprises | 1666 A Govindpuri Extn | | New Delhi | 6468084 | | |
| Mr. Rameshwar Sharma | Surya Instruments | D-155 Sector 7 Noida | | UP | 91454545031 | 914-853160 | |
| Dr B D Sharma | Sustainable Energy Solutions Pvt. Ltd. | 302, Sai Plaza, 187-188, | Sant Nagar, Eastofd Kailash | New Delhi | 011-6405494 | | ses@mantraonline.com |
| Mr. V K Vohra | Trade International | 346, AFNO, Plot-11, Sector 7 | Dwarika | New Delhi | 011-5006218 | 011-6479870 | vohra-vinodkr@hotmail.com |
| Mr. Pankaj Gupta | Trane India Ltd. | 813-814, International Trade Tower | Nehru Place | New Delhi | 011-6213801 | 011-6213803 | pankaj_gupta@trane.com |
| Mr. Rajesh Sikka | Trane India Ltd. | 813-814, International Trade Tower | Nehru Place | New Delhi | 011-6213801 | 011-6213803 | rajesh_sikka@trane.com |
| Jami Hossain | Winrock International India | 7 Poorvi Marg, | Vasant Vihar | New Delhi | 011-6142965 | 011-6146004 | jami@winrock.ernet.in |
| Mr. Brahm Dutta | World Aid Express | Post Bag No. 4915 | Safdarjung Enclave, | New Delhi | 011-6499209 | 011-6490029 | |
| Mr. P. Sinha | YSU Ltd. | 12-B, Amrita Lal Bose Street | | Kolkata | 033-5550316 | 033-5551995 | htsu@cal3.vsnl.net.in |

# List of Participants – March 17, 2001

| Name | Organisation | Address1 | Address2 | City | Phone | Fax | E-mail |
|---|---|---|---|---|---|---|---|
| Anupama Sharma | AAA Marketing Pvt. Ltd. | E-108/4, FF, BGN Market, | Munirka | New Delhi | 011-6177599 | 011-6177599 | aaamarketing@vsnl.net |
| Mr. A K Upadhyay | AAA Marketing Pvt. Ltd. | E-108/4, FF, BGN Market, | Munirka | New Delhi | 011-6177599 | 011-6177599 | aaamarketing@vsnl.net |
| Mr. D K Sharma | AAA Marketing Pvt. Ltd. | E-108/4, FF, BGN Market, | Munirka | New Delhi | 011-6177599 | 011-6177599 | aaamarketing@vsnl.net |
| Mr. S P Agrawal | Advisor, DERC | 112 Nirman Vihar | Vikas Marg | New Delhi | 011-2043560 | | |
| Mr. OP Anand | Anand Consultants | Madhuban, Vikas Marg | | New Delhi | 011-2218572 | | |
| Dr. K Dwarakanath | Central Power Research Institute | NTPC'S CSES Campus, | Pipe Line Road | Murad Nagar | 01232-41744 | 01232-41744 | drkdwaraka@hotmail.com |
| Mr. S K Lalwani | CDC | 2nd Floor, Zone IV | India Habitate Centre, Lodhi Road , | New Delhi | 011-4602601 | 011-4602602 | cdc@giasdl01.vsnl.net.in |
| Mr. S Pramanik | Consultant | H3/37 Mahavir Encl. | Bengali Colony, Palam | New Delhi | | | |
| Mr. K N Singh | World wide Engg. | | | | 6499209 | | |
| Mr. Vineet Agrawal | Corporate World | 38-D-1412 Sec. 34 | | Noida | 451484 | | vineet@hotmail.com |
| Mr. Vijay Panjawani | CPCB | 339, Law Chambers | High Court, | New Delhi | 011-3389635 | | |
| Mr. B M Rai | DVB | DVB Sub Stn Bldg., Alak Nanda | Near Chander Lok Cinema | New Delhi | 011-6470708 | | |
| Mr. R P Nagpal | DVB | DVB Sub Stn Bldg., Alak Nanda | Near Chander Lok Cinema | New Delhi | 011-6470708 | | |
| Ujjwal Bhattacharjee | E-gateway India Pvt. Ltd. | 302/3 Second Floor | Sona Apartments, K Park | New Delhi | 011-6511857 | | ujjwalbh@hotmail.com |
| Mr. A K Rampal | Haryana Electricity Regulatory Commission | SCO 180, Sector 5, | | Panchkula | 0172-590869 | 0172-572359 | anuprampal@yahoo.com |
| Mr. Ailawadi | Haryana Electricity Regulatory Commission | SCO 180, Sector 5, | | Panchkula | 0172-590869 | 0172-572359 | ghanshyam_prasad@yahoo.com |
| Mr. Ghanshyam Prasad | HERC | SCO 180, Sector 5, | | Panchkula | 0172-590869 | 0172-572359 | ghanshyam_prasad@yahoo.com |
| Mr. Gagan Chitkara | Hero Puch | 601, International Trade tower, | Nehru Place | New Delhi | 011-6216666 | 011-6471230 | common@heromotors.com |
| Mr. Ankur Gupta | Hero Puch | 601, International Trade tower, | Nehru Place | New Delhi | 011-6216666 | 011-6471230 | common@heromotors.com |
| Mr. Lakhbir Singh | Hi-Tech Service Engrs. | 29/2, Punjabi Bagh Ext. | | New Delhi | 011-5163935 | 011-5103735 | lakhbir@del.vsnl.net.in |
| Mr. Rajiv Goyal | Noida Power Company Ltd. | A-46, Sector-26 | | Noida | 91-4530090 | 91-4533542 | npcl.noida@cesc.sprintrpg.ems.vsnl.net.in |
| Mr. Gautam Ghosh | Noida Power Company Ltd. | A-46, Sector-26 | | Noida | 91-530090 | 91-533542 | npcl.noida@cesc.sprintrpg.ems.vsnl.net.in |
| Mr. H R Bhatia | Power Engineering Consultants | 102 Kumar Tower, 15 Community Center | Wazirpur Indl. Area | Delhi | 011-7210808 | | hansraj-b@yahoo.com |
| Mr. M K Ahuja | Prism Power Consultants | A-185, Madhuban | Vikas Marg | New Delhi | 011-2209185 | | |
| Mr. Raghu Nath | Reliable System | 30, Sadhana Enclave | | New Delhi | 011-6011456 | | |
| Mr. Anil Nath | Television Electronic Media | J- 167, Saket | | New Delhi | | | |
| Mr. P. Sinha | YSU Ltd. | 12-B, Amrita Lal Bose Street | | Kolkata | 033-5550316 | 033-5551995 | htsu@cal3.vsnl.net.in |

# The Faculty

### Praphul Misra

Mr. Misra is Associate Vice President & Deputy General Manager of Result McCann, New Delhi, where he has worked for over five years. Prior to this, he was a Partner with the WorldMark Group in Dallas (USA), and with Publicis Bloom in Dallas and New York. In his ten years of work experience, he has provided the full range of training and consulting services, from market research through to strategic planning to support product development. He has also worked on various custom research projects, including MIS development for Liggett Brands.

Mr. Misra has an MBA in Marketing and International Business form the SUNY Buffalo, and a Bachelor in Engineering from University of Roorkee.

### K K Jindal

Mr. Jindal is Program Director & Senior faculty at the Institute of Banking Studies and Corporate Management. His 30 years of work experience includes banking as well as industry experience. Key positions held in his banking career include: Head of Credit division and Head of Merchant Banking at UCO Bank in India, as well as Senior Manager in UCO Bank's London branch.

His experience in training extends 11 years, during which time he has conducted training programs for senior bank officers and corporate executives on various aspects of banking and finance, including instruments like leasing, bill discounting, factoring, merchant banking, treasury management, foreign exchange etc.

### M. V. Ananthakrishna

Mr M V Ananthakrishna is a graduate of the Guindy Engineering College in Electronics and Communication Engineering, with an MBA from the University of Michigan, Ann Arbor. After working as a consultant with Environmental Protection Agency in US and later with Texas Instruments Inc., he joined M K Raju Consultants Private Limited. His specialisation includes Corporate Strategy, Turn Around of sick companies, Cost Improvement Programs, Executive Information Systems, Computer aided Financial Analysis. He is currently Executive Director, in charge of consultancy assignments in the areas of Energy Strategy, Onsite Power Generation, Combined Heat and Power Systems (CHP).
His work includes advising various manufacturing companies on energy efficiency matters, convincing top management of the rationale and benefits of investments in energy efficiency measures etc.

### Virendra S. Kothari

Mr. Kothari, Principal of Innotem Services, has over 20 years of experience in energy audits, energy technology assessments, policy analysis, and training through consulting positions in both the US and India. His relevant work includes:

- DSM Plan for Patancheru Industrial Area, Hyderabad
- Feasibility Study of DSM Program for Electric Motors
- Study on Opportunities to Improve Electricity End-Use Efficiency in India
- Tata Energy Research Institute, Manager of Industrial Energy Efficiency Group, activities included energy audits, technology assessments, training programs, etc.
- Engineers India, Ltd., Energy Conservation Group, projects in refineries.

Most recently, for the ECO project, Mr. Kothari has worked on government procurement policies, and their implications for energy efficient equipment purchases. Mr. Kothari holds MS, Mechanical Engineering (Princeton) and BT, Mechanical Engineering (IIT Kanpur).

**Anil Sachdeva**

Mr. Sachdeva has 15 years of experience in energy efficiency, policy analysis, and technology assessment. Representative projects include:

- Status of ESCO companies in India/CANIDA. Identifying barriers to ESCO business in India and suggesting changes to administrative and legal policy to strengthen ESCO development.
- Energy Audits. Conducted facility energy audits and load management studies for National Panasonic, Gillette, Indian Railways Workshops, and plants in automotive, engineering, dairy, brewery, rubber, chemical, and other industries.
- Recently, he has also worked for ECO, towards assessing the technical, economic and market potentials for various EE technologies.

Mr. Sachdeva received his BS, Mechanical Engineering in 1984. He is a member of the board of directors of Council of Energy Efficiency Companies of India.

**MS Jayalath**

Mr. Jayalath has over 20 years of work experience. In the Ceylon Electricity Board, he led the activities of the Demand Side Management Branch, where he was responsible for managing and coordinating the very successful efficient lighting and building energy management programs.

He has recently joined the SARI/E project office in New Delhi.

**Brian Wood**

Mr. Wood has twenty years of experience in the energy sector, with substantial periods of that time devoted to training, energy efficiency project implementation, and energy efficiency market and program development. For example, Mr. Wood was manager of a 2-year industrial DSM program for USAID's Energy Conservation and Environment Project in Egypt. In this program, Mr. Wood conducted and/or managed training programs in energy auditing for utility personnel and energy efficiency technology workshops for industrial plant employees covering topics such as lighting design, motor repair, pump and fan system optimization, boiler operations, process controls for furnaces, energy efficiency project procurement, preventive maintenance, etc. He managed six EE project implementations under this project at different industrial facilities. Previously, Mr. Wood has managed industrial energy efficiency technology evaluations to support program efforts at North American utilities such as Ontario Hydro, Southern California Edison Company, Southern California Gas Company, Georgia Power, a Wisconsin utility-regulator-intervenor collaborative, Pacific Gas and Electric Company, and others. Such projects generally involved training workshops as well as written reports. Mr. Wood also has experience as an energy auditor and EE program administrator at Pacific Gas and Electric Company.

# *Marketing courses on EE products*

March 15, 2001: India Habitat Center, New Delhi

| *Day 1 – focus on Lighting technologies and accessories* | | |
|---|---|---|
| 9.00-10.00 AM | Registration | |
| 10.00-10.45 AM | Opening session | |
| | Introduction to Energy Efficiency | Charlie Fafard, Nexant |
| | Introduction to ECO project | A Sarkar, USAID |
| | US Govt and USAID programs in energy | R. Edwards, USAID |
| | Vote of Thanks and general presentation on energy efficiency issues | S Ahuja, Conserve |
| 10.45-11.00 AM | Tea / coffee | |
| 11.00 AM – 1PM | Marketing Strategies in India (with a focus on lighting) | |
| | - Direct marketing (an overview) | P Misra, Result McCann |
| | - Financing based promotions | KK Jindal, Inst. Of Banking Studies and Corporate Management |
| | - Role of Consultants in EE marketing | MV Ananthakrishna, MKRC |
| 1 – 2 PM | Lunch | |
| 2.00-2.30 PM | Marketing Strategies in India (with a focus on lighting) (contd.) | |
| | - Government procurement | V Kothari, Innotem |
| 2.30-4.00 PM | Salient features of marketing approaches adopted by selected vendors | S Dhingra, Asian Electronics Ltd.<br>Sood, LINTEK Lighting Group |
| 4-4.15 PM | Tea / coffee | |
| 4.15-5.30 PM | Overseas experience | |
| | Innovative mechanisms with relevant case studies from overseas (eg. GreenLights and related programs) | BG Wood, Nexant |
| | Marketing of EE Lighting in Sri Lanka | MS Jayalath, SARI/E Project Office |

March 16, 2001: India Habitat Center, New Delhi

| *Day 2 – focus on EE Refrigeration and Air-conditioning* | | |
|---|---|---|
| 9.00-9.30 AM | Registration | |
| 9.30-10.30 AM | Introduction to ECO and Summary of findings of work carried out in ECO thus far (specifically Milestones 4B and 5A) | BG Wood, Nexant |
| 10.30-10.45 AM | Tea / Coffee | |
| 10.45AM – 1PM | Marketing Strategies in India (with a focus on EE refrigeration and air-conditioning) | |
| | - Direct marketing (an overview) | P Misra, Result McCanne |
| | - Government procurement | V Kothari, Innotem |
| | - Selected case studies | MV Ananthakrishna, MKRC |
| 1 – 2 PM | Lunch | |
| 2-4.15 PM | Experience from other countries | |
| | - Innovative mechanisms with relevant case studies from overseas | BG Wood, Nexant |
| | - Energy Efficiency Building Code in Sri Lanka | MS Jayalath, SARI/E Project office |
| 4.15-4.30 PM | Tea / coffee | |
| 4.30 - 5.30 PM | Salient features of marketing approaches adopted by selected vendors | Rajesh Sikka, Marketing Manager, Trane India Ltd. |

March 17, 2001: India Habitat Center, New Delhi

| *Day 3 – focus on EE Motors* | | |
|---|---|---|
| 9.00-10.00 AM | Registration | |
| 10-11.45 AM | Introduction to ECO and Summary of findings of work carried out in ECO thus far (specifically Milestones 4B and 5A)<br><br>Innovative mechanisms with relevant case studies from overseas | BG Wood, Nexant |
| 11.45-12.00 | Tea / Coffee | |
| 12.00 – 1 PM | Financing based promotions of EE equipment | KK Jindal, Inst. Of Banking Studies and Corporate Management |
| 1 – 2 PM | Lunch | |
| 2-3.15 PM | Selected case studies in marketing of EE motors | MV Ananthakrishna, MKRC |
| 3.15-3.30 | Tea / coffee | |
| 3.30-4.00 PM | Salient features of marketing approaches adopted by selected vendors | Amit Jain, Crompton Greaves |
| 4.00-5.00 PM | Group Discussion | Lead Discussants – BG Wood, A Sachdeva, V Kothari, MV Ananthakrishnan |

## ECO Project and the EE product market

# ECO Project and The EE Product Market

***Marketing Energy-Efficient Products***

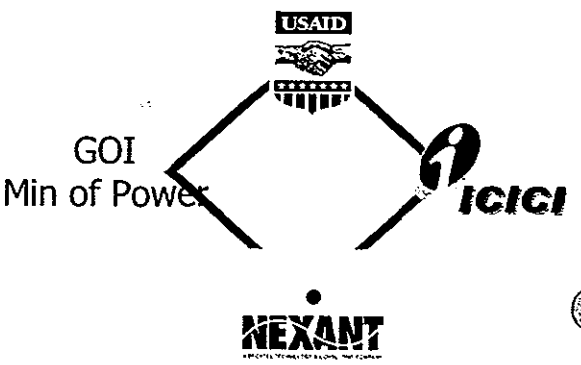
An ECO Project Course

Presenter: Brian Wood, Nexant

15, 16 and 17 March 2001, New Delhi

# ECO: Energy Conservation and Commercialization Project

ECO Project Team




*Project Goal*

Facilitate EE improvements in India's transitioning power sector

## ECO's Two Main Components

- Market Development and Financing
- Policy and Institutional Reforms

## Market Development and Financing

*REMOVE BARRIERS TO EE MARKETS*

- EE project structuring services
- Development of financial incentives
- Support to ESCO industry
- Efficient technology promotion
- Market conditioning and promotion
- Non-sugar cogeneration development

## Policy and Institutional Reforms

- Energy auditor certification program
- Consumer product labeling & standards
- Government procurement & national buildings programs
- Regulatory reform and restructuring
- DSM in public & private electric utilities
- State EE financing schemes

## EE Market Development: EE Technology Promotion

- 
- 
- Assessment of EE market chain
- Efficient technology promotion
  - Identify options for promotion program
  - Host 4 workshops on EE product promotion
  - Facilitate EE promotion program workplan
- Energy information clearinghouse

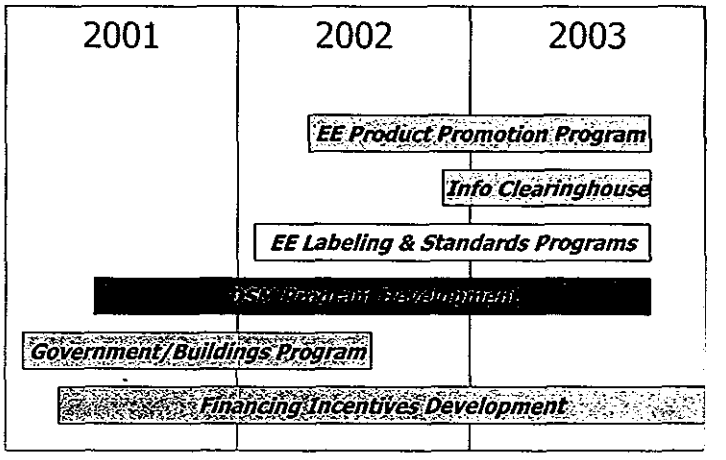
## EE Market Development: Conditioning and Promotion

- 
- Marketing course on EE products
- Innovative marketing channels for EE equipment distribution
- Market potential of control systems, IT and advanced energy audits
- Market readiness report: 4 equip types
- Labeling program: 2 appliance types

## Key Points To Link with Trade Allies to Develop EE Market

- EE promotion program design
- Development of information clearinghouse
- EE labeling and standards programs
- Also
  - DSM program development
  - Government/buildings program
  - Financing incentive programs

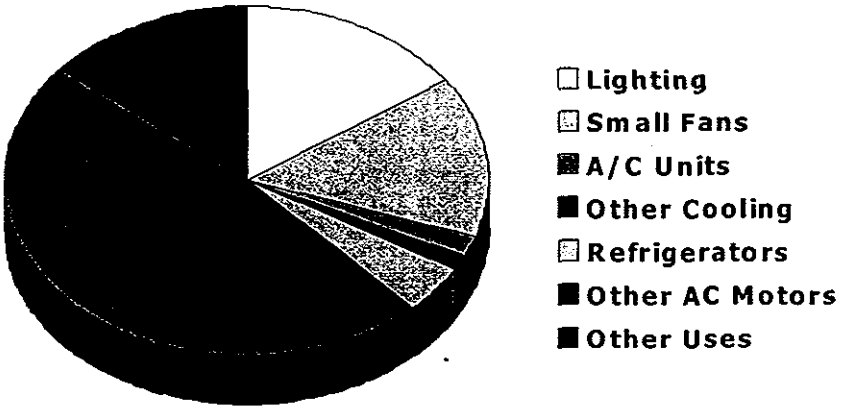
# ECO Activity Schedule




# EE Product Market Overview

- A few products have a dominant role in India's power requirements
  - Electric lighting and lighting products
  - Electric motors
  - Domestic refrigerators
  - Comfort products
    - Electric fans
    - Air conditioning machines

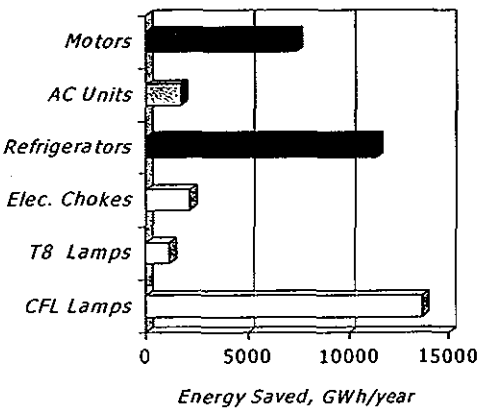
# Profile of Power Consumption




# Limits to Growth

- Constraints on supply availability
  - Investment requirements
  - Return on investment issues
- Power distribution constraints
  - Quality of supply to consumers
  - Implications of poor power quality for consumer products
- Consumer attitudes to EE products
  - Quality perceptions
  - Affordability issue

# Potential Contribution of EE Products to Power Crisis




- Potential in 2000
  - 20,000 megawatts
  - 40 power plants
  - 2,500-3,000 crore in investment
- *Additional* potential by 2010
  - 15,000 megawatts
  - Over 2,000 crore investment

# Benefits of EE Improvement

- Improved availability (and quality) of power
- Greater market for consumer products
- Reduced air pollution
- Reduced power investment needs
- Economic growth
- Better standard of living

# Lighting

## Focus on Lighting: Market Overview

- Lamps
  - Over 900 million lamps sold each year
  - Consumers spend
    - over 2,000 crore on lamp purchases each year
    - over 8,000 crore on lighting energy costs each year
  - Principal lamp types
    - GLS / incandescent
    - Fluorescent
    - High intensity discharge (HID): mercury vapor, halogen, high pressure sodium, metal halide, etc.

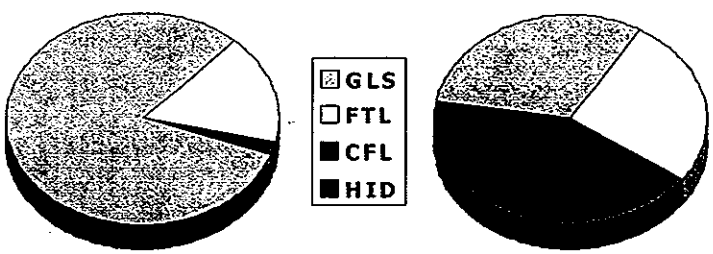
# Lighting Market Overview

- Other lighting products
  - Luminaires or fixtures
    - Reflectors and lenses
  - Control equipment
    - Chokes or ballasts
    - Switches
    - Sensors and automatic controls

# Lamp Market

Sales Distribution

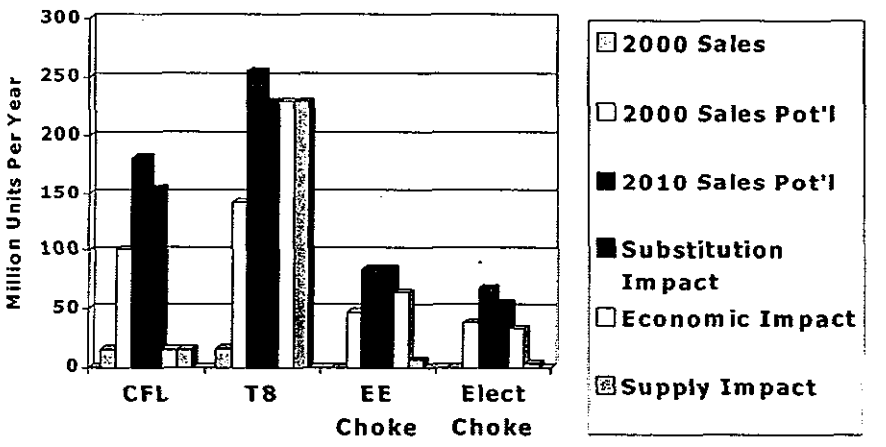
Value of Sales Distribution



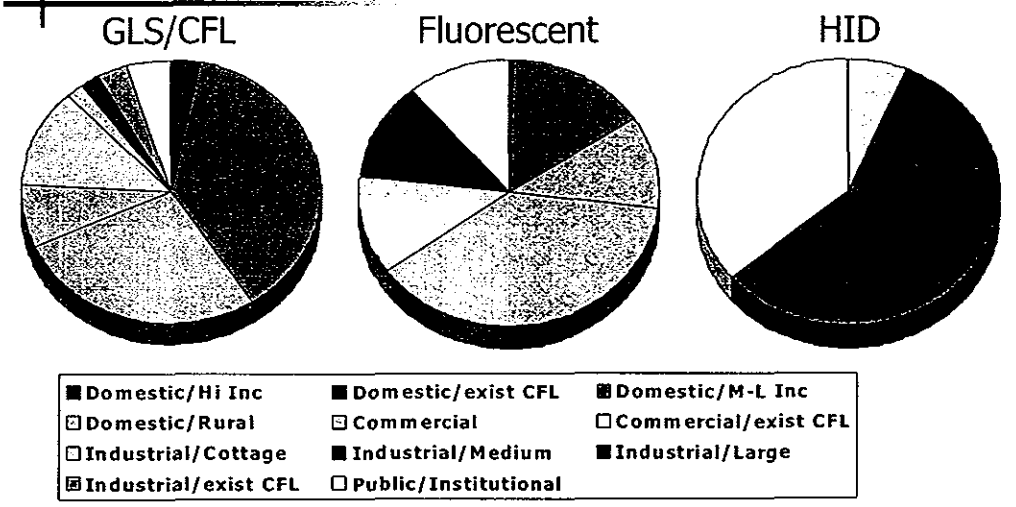
# Principal EE Opportunities and Impacts: Lighting

| EE Product | Savings | Monthly Savings (Rp) | Payback Period (yrs) |
|---|---|---|---|
| CFL Lamp | 65-80% | 2 – 25 | 2 – 20 |
| T8 Lamp | 10% | 0.5 – 4 | immediate |
| EE Choke | 40% | 0.5 – 7 | 2 – 25 |
| Elec. Choke | 80+% | 1 – 14 | 0.8 - 10 |
| Others<br>T5 Lamp<br>FTL reflectors<br>HID Lamps | | | |

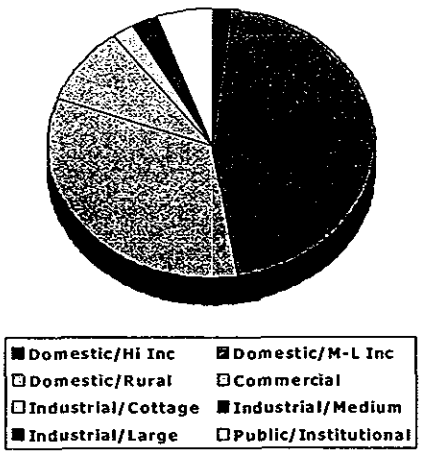
# Implication of Market Potential for EE Product Sales



# Distribution of Potential Sales Among Consumer Markets




# Principal Barriers to Market Growth for EE Products: CFL



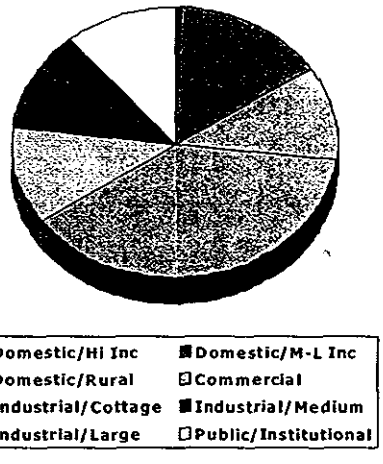

CFL Growth Barriers

- Cost of CFL for household markets
- Skepticism of claims
  - Product lifetime
  - Energy savings
- Consumer awareness
- Inst.: fear of theft; first cost orientation
- Best markets already penetrated
- Supplier competition

# Opportunities for Market Development: CFLs

- Remaining niche markets among high-income households, commercial, small-medium scale industrial
- Public programs necessary to penetrate largest markets:
  - Financial assistance to households
    - Many potential program approaches
  - Change in procurement guidelines for public/government buildings

# Principal Barriers to Market Growth for EE Products: T8



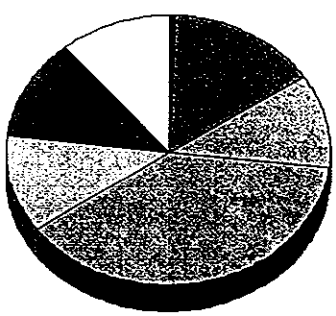

T8 Growth Barriers

- Consumer awareness
- Quality perceptions vs. supplier claims
  - Reduced lifetime
  - Power quality sensitivity
  - Rapid lumen depreciation
- Distributor availability
- Cost not a barrier

# Opportunities for Market Development: T8 Lamps

- Independent product testing to assess manufacturer claims
- Promotion program to raise consumer and distributor awareness, addressing:
  - Energy savings
  - Misconceptions about poor quality
  - Sales incentives
- Specialty T8 products with quality features

# Principal Barriers to Market Growth: EE & Elec. Chokes




Growth Barriers

- Cost competitiveness
- Competition from small-scale suppliers
  - Technology constraint
  - Preference by GOI policy
- Consumer awareness
  - Cost / quality perception
  - Mistrust of supplier claims
  - Opportunities among industrial & commercial markets

## Opportunities for Market Development: EE/Elec. Chokes

- Promotion aimed at quality-conscious consumers:
  - Medium and large-scale industrial
  - Commercial
  - High-income residential
- Packaging with FTL fixtures
- Programmatic assistance
  - Loans for equipment upgrades to small suppliers
  - Product testing
  - Financial assistance to households
  - Government procurement guidelines

## Other EE Market Opportunities

- T5 lamps have potential to penetrate:
  - Commercial and industrial markets
  - Perhaps all residential markets
  - HID lamp markets
- EE FTL Reflectors
- Timer and photocell controls
- HID lamps in industrial, public lighting markets

# HVAC and Refrigeration

## Focus on Refrigeration & HVAC: Market Overview

- Refrigerators
  - 2 – 3 million units sold each year
  - Consumers spend
    - over 2,000 crore on refrigerator purchases each year
    - over 1,000 crore on refrigerator energy costs each year
  - Product characteristics
    - 165 litre is typical size; larger in urban HH's
    - EE refrigerators have less than 5% market share
    - On today's market, typical units use about 1.1 kwh/day, while most efficient Asian units use about 0.6 kwh/day

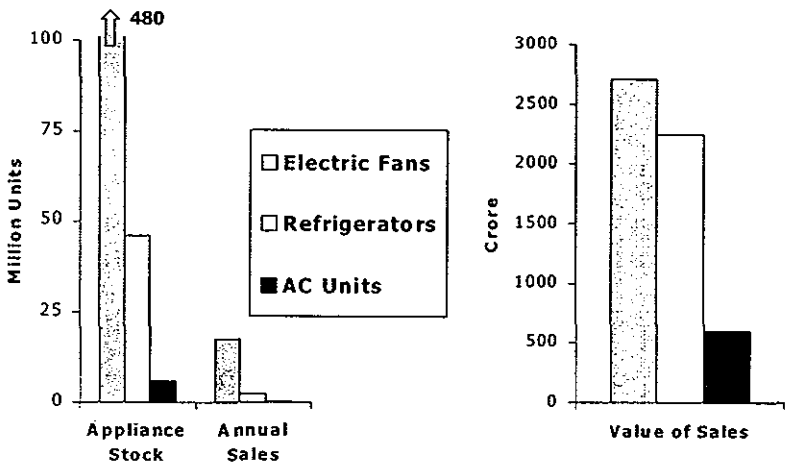
# Focus on Refrigeration & HVAC: Market Overview

- Room air conditioner units
  - About 0.2 million units sold each year (?)
  - Consumers spend
    - over 600 crore on AC unit purchases each year
    - over 4,000 crore on AC energy costs each year
  - Product characteristics
    - 1.5 ton is typical size
    - Broad range of efficiencies available, but this not strong driver of consumer choice
    - Typical units have EER of 8-9. High efficiency units available at 10 EER, but not as high as international models

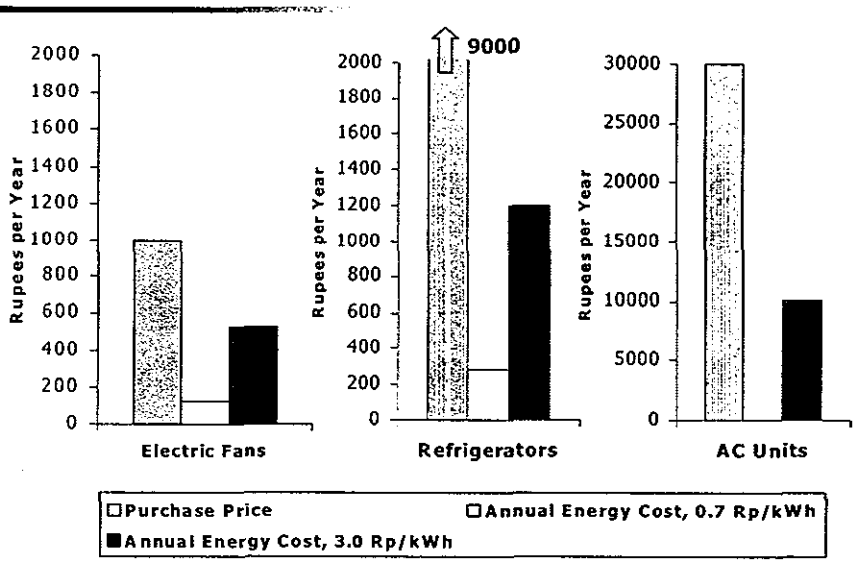
# Focus on Refrigeration & HVAC: Market Overview

- Electric fans
  - Perhaps nearly 20 million units sold each year
  - Consumers spend
    - 2,000 – 3,000 crore on fan purchases each year
    - over 5,000 crore on fan energy costs each year
  - Product characteristics
    - 35- and 70-watt are typical sizes
    - Efficiency levels can vary widely, by 20-30%

# Appliance Market Characteristics




# Appliance Market: Consumer Spending

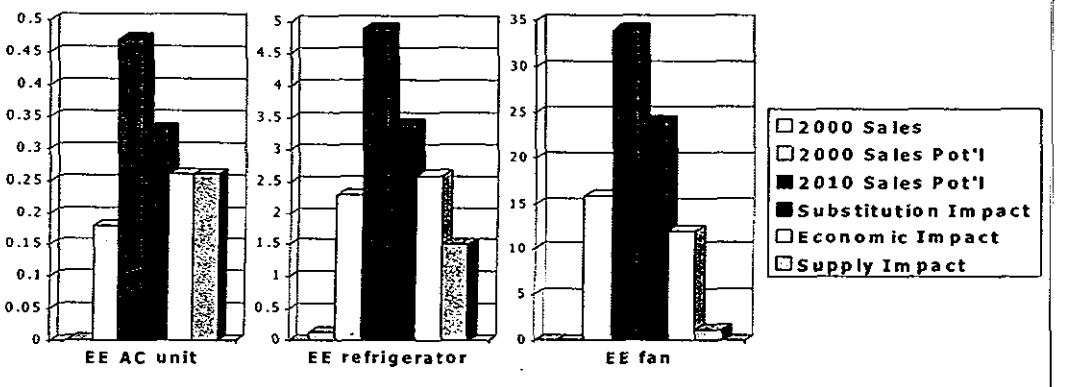


# Principal EE Opportunities and Impacts

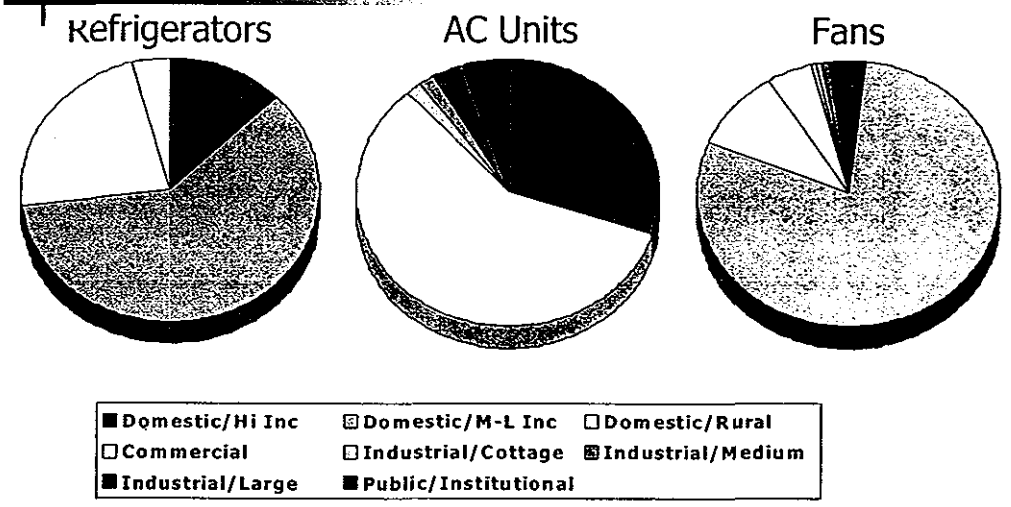
| EE Product | Savings | Monthly Savings* (Rp) | Payback Period (yrs) |
|---|---|---|---|
| Refrigerator | 15-50% | 4 – 70 | 2 – 30 |
| AC Unit | 15-40% | 150 – 400 | 1.5 – 2 |
| Fan | 10-25% | 2 – 12 | 1 – 6 |

*** For "typical" size product**

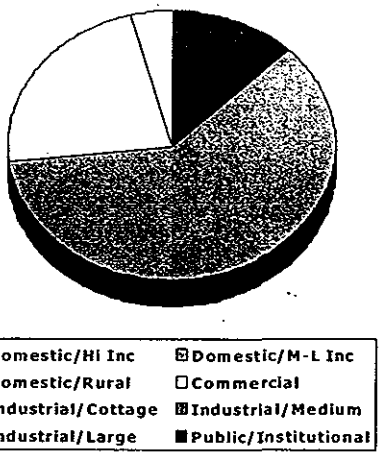
# Implication of Market Potential for EE Product Sales



# Distribution of Potential Sales Among Consumer Markets




# Principal Barriers to Market Growth: EE Refrigerators



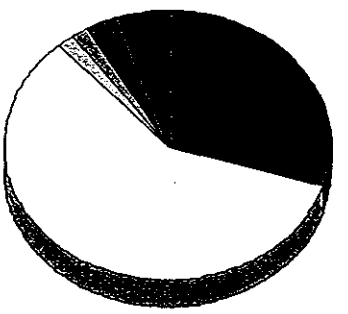

Growth Barriers

- Poor awareness of energy costs or relative efficiency
- Feature competition
  - Brand name
  - Cooling capacity
  - Perceived durability
  - Frost-free, other features
- Price sensitivity
- Consumer skepticism of manufacturer claims

# Opportunities for Market Development: EE Refrigerators

- Consumer awareness is probably a greater barrier than EE price premium: promotion
- Bundling with other quality product features
- Low-end, 165-litre EE unit positioned for lower income household may be good target
  - Promotion
  - Product positioned with limited features to minimize price premium
  - Product-targeted financial assistance
- Labeling program to provide credible reference on relative energy costs

# Principal Barriers to Market Growth: EE AC Units



| | |
|---|---|
| Domestic/Hi Inc | Domestic/M-L Inc |
| Domestic/Rural | Commercial |
| Industrial/Cottage | Industrial/Medium |
| Industrial/Large | Public/Institutional |

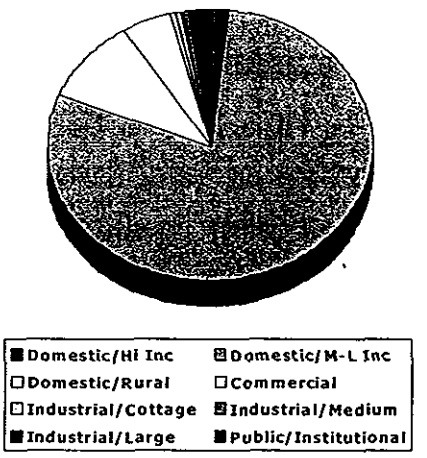
Growth Barriers

- Half the market served by non-branded products: price-driven
- Domestic consumers prefer features; not so sensitive to price or operating costs
- Low awareness of energy costs

# Opportunities for Market Development: EE AC Units

- Commercial sector faces high prices and should respond to EE cost savings
- Promotion/consumer education about costs of cooling and value of more energy efficient AC units
- Participation in EE labeling program to add credibility to EE cost-saving claims
- Smaller market opportunities in industrial sector

# Principal Barriers to Market Growth: Small Electric Fans




Growth Barriers

- Highly cost-competitive market
- OEMs have little incentive to use EE motors
- Poor consumer awareness of energy costs or product differences
- Credibility of supplier claims

## Opportunities for Market Development: EE Fans

- Medium- to high-income domestic consumers want a better quality product, at a reasonable price premium
- Initially, EE feature needs to be paired with other high-end features associated with quality products
- Labeling program would boost credibility of EE claims

## Other EE Market Opportunities

- Window film, particularly for commercial and institutional markets
- Geyser blankets for domestic markets
- Speed controllers for ceiling fans
- High efficiency room heaters in North India
- Thermal energy storage in buildings
- Commercial building shell improvements

# Motors

## Focus on Electric Motors: Market Overview

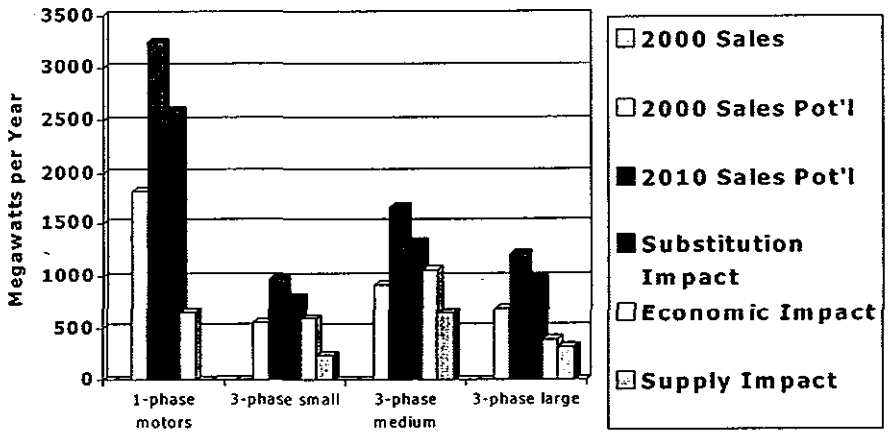
- Over 60,000 MW installed stock of motors
- Annual consumer spending is significant
  - Over 30,000 crore on motor energy use
  - Over 3,000 crore on motor purchases
  - Few consumers realize that they spend 10-100 times a motor's initial cost to operate it over its lifetime

# Principal EE Opportunities and Impacts

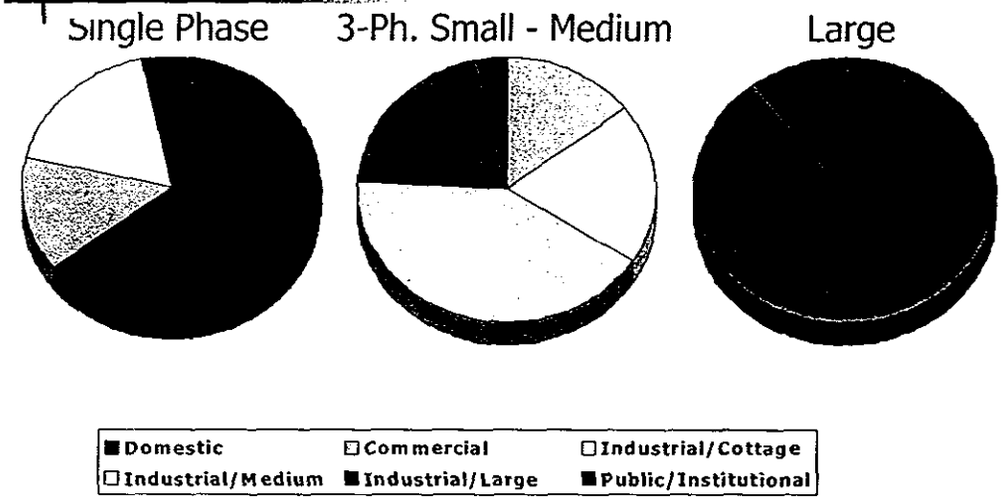
| Motor Size | Savings | Monthly Savings* (Rp) | Payback Period (yrs) |
|---|---|---|---|
| 1-phase | 10-15% | 10 – 40 | <1 – 2 |
| 3-ph, <7.5 kw | 3-5% | 50 - 300 | <1 – 6 |
| 3-ph, 9-15 kw | 2% | 80 – 250 | <1 – 4 |
| 3-ph, 18-30 kw | 2% | 200 – 2,000 | <1 – 3 |
| 3-ph, 37-45 kw | 1% | 150 – 1,000 | 1 – 6 |
| >45 kw | 1% | 200 – 4,000 | 1 – 6 |

* For "typical" size product

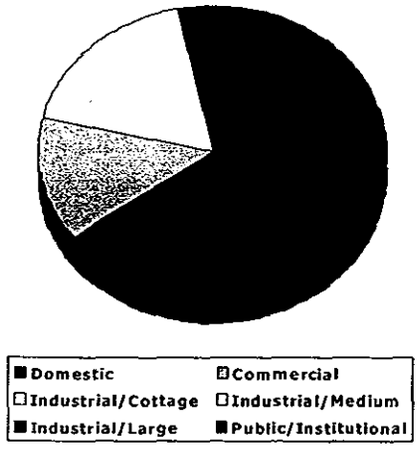
# Implication of Market Potential for EE Product Sales



# Distribution of Potential Sales Among Consumer Markets




# Principal Barriers to Market Growth: Single-Phase Motors



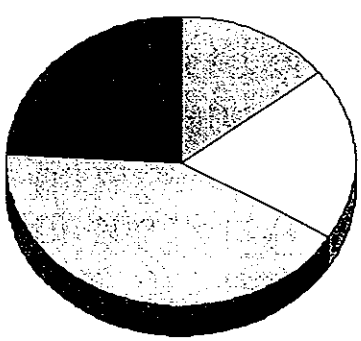

Growth Barriers

- OEMs have no incentive to use EE motors
- Not economic for domestic and small industrial consumers
- No consumer awareness
- Consumer skepticism of manufacturer claims
- Price sensitivity

# Opportunities for Market Development: 1-phase Motors

- Large efficiency improvement potential
- Limited opportunities due to OEM dominance
- Potential to bundle EE motors into a high-volume EE consumer market, such as ceiling fans
- Labeling program to provide credible reference on relative energy costs

# Principal Barriers to Market Growth: Small-Medium Motors



Domestic | Commercial | Industrial/Cottage | Industrial/Medium | Industrial/Large | Public/Institutional

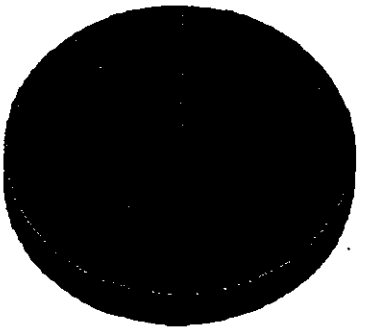
Growth Barriers

- Low awareness of energy costs or EE motors among smaller consumers
- OEM influence
- Distributor indifference
- Limited EE motor availability
- Price sensitivity

# Opportunities for Market Development: Sm-Med Motors

- EE motors are cost-effective for most consumers, except small industrial
- Good opportunities for awareness building and programmed purchase policies among large industrial, some medium industrial
- Specialty, technically oriented distributors offer good EE market opportunity

# Principal Barriers to Market Growth: Large Motors



| | |
|---|---|
| Domestic | Commercial |
| Industrial/Cottage | Industrial/Medium |
| Industrial/Large | Public/Institutional |

Growth Barriers

- Preference to rewind large motors
- Limited EE savings potential

## Opportunities for Market Development: Large Motors

- Large industrial consumers are more receptive to EE message
- Interest in quality and durability advantage of EE motors
- Replacement with downsized EE motor for good payback
- Motor control applications

## Other EE Market Opportunities

- Adjustable speed drives (ASDs)
- Other motor controllers
- High quality motor rewind services
- Consulting and maintenance services
  - System performance optimization
  - Motor purchasing policy
  - Evaluation and preventative maintenance

**Strategies to harness the power of direct marketing for EE products**

# Strategies to Harness the Power of Direct Marketing for Energy Efficient Products

- Lighting Lamps & Accessories

*by*

*Praphul Misra*

## Agenda

- What is Direct Marketing?
  - Concept
  - Imperatives
- What's Keeping You Awake at Night?
- Interactive Solution

## Changes in the Market

**_OUTSPOKEN CUSTOMERS**

Customers demand more choices in buying precisely what meet their needs, and they expect individual attention.

**_ENABLING TECHNOLOGY**

Of both Production & Marketing systems has made it possible to tailor products, service & communications to meet these expectations.

## CHANGES IN MARKETING PROCESS

New emphasis on long term relationship vs. short term sales

Re-conceptualisation of the customer as a partner and not as a target

Reengineering the corporate structure to merge current islands of specialisation

# Changes in Marketing Process

| *MARKETING*-DRIVEN<br>**Transaction Focus** | *MARKET*-BASED<br>**Relationship Focus** |
|---|---|
| •Short-term market share mindset | •Long-term market creation mindset |
| •Immediate single-sale emphasis | •Lifetime multiple-sale emphasis |
| •Product-features emphasized | •Value to customer emphasized |
| •Discontinuous one-way customer contact | •Continuous two-way customer dialogue |
| •Lower emphasis on customer service | •Higher emphasis on customer service |
| •Lower commitment to meeting customer expectations (fixed product) | •Higher commitment to meeting customer expectations (customized product) |
| •Product quality is the concern of production staff | •Product quality is the concern of all staff |

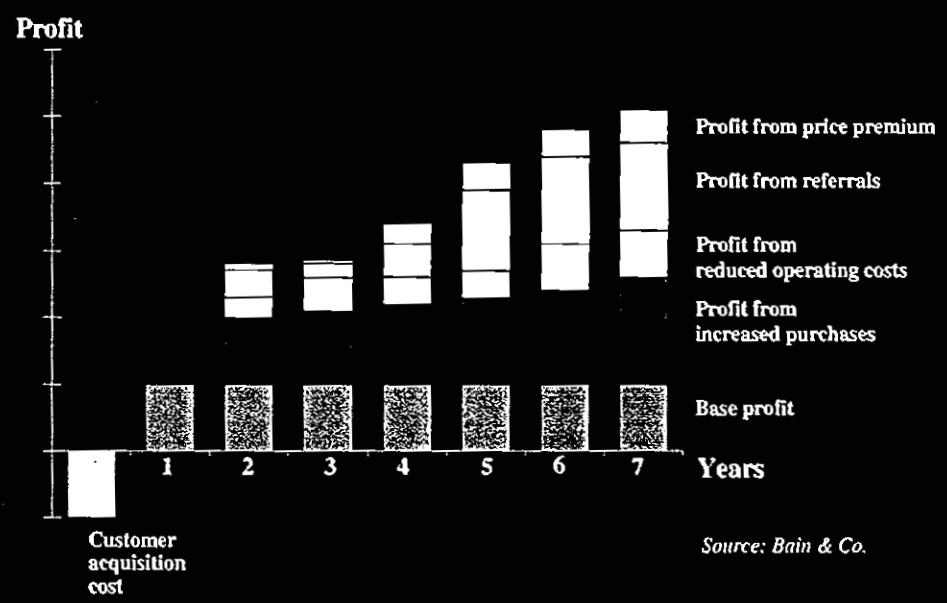
# IN SUM, A CHANGE FROM...

'FIND THE CUSTOMER AND SELL THE PRODUCT'

TO

'HOW CAN WE SERVE YOUR UNIQUE NEEDS'

# CUSTOMERS ARE MORE PROFITABLE OVER TIME




*Source: Bain & Co.*

# What it NOT Direct Marketing

- Direct Selling
- Multi-level Marketing

# What is Direct Marketing

Build long term and profitable relationships with chosen customers

*Customer Expectations*

*Profitability*

*Risk*

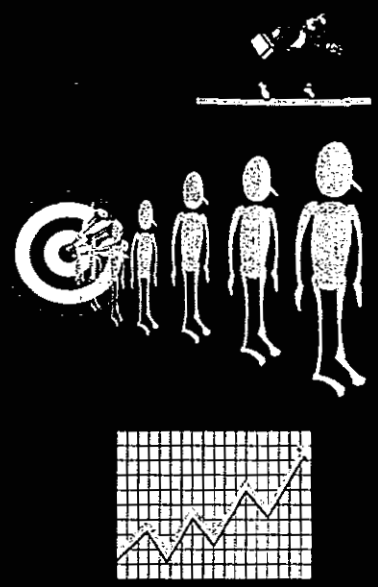
# Getting it right!

Market the right
to the right
at the right

Satisfied customers
reduced costs,
increased revenue.

## Elements of Direct Marketing

- Segmentation/Profiling
- Acquisition
- Activation
- Enhancement
- Retention
- Loyalty



## Profiling / Segmentation

Which Customers To Target?

What Are the Traits of Most Profitable Customers?

Who Are My Most Expensive Customers?

Objective:

Get the Highest ROI Over a Lifetime

# Acquisition

Communicate

Rational & Emotional Benefits

With a view to generate a qualified prospect

Some Tools

- Direct Mail
- Telemarketing
- Seminars & Product Briefings
- Response Advertising
- Public Relations
- WWW

# Activation

Encourage customer to use the product

Experience the promise

Notice and acknowledge the difference

## Enhancement

80% More Expensive to Acquire New Ones Than Retain Current Customers

Sell more products to the same customer

- Same SKU (depth)
- Different SKUs (breadth)

Increase Cross/Up-Sell

- Predicting Likeness to Buy Based on Purchasing Patterns

Increase Life-Time Value

## Retention

Especially for B2B customers

Extra Value Proposition

# Loyalty

Creating Brand Ambassadors

# Let's get Direct!!

What's Keeping You Awake?

## The Product

- Lighting - Compact Fluorescent Lamp (CFL)
  - Price Rs 250/- minimum for branded product
    - cheaper version coming from imports
  - Lasts 8000-10000 hours (claimed)
- Competes with GLS lamp
  - priced at Rs.10 lasts 1000 hours (claimed)
- CFL saves about 70% of energy as compared to GLS for same light output

## The Product (contd.)

- Lighting Accessories - Ballast
  - EE Product Priced at Rs 250 minimum
    - Consumes around 2 Watts
  - Ordinary Ballast costs start at Rs 50-80
    - Consumes around 15 to 18 watts

## Define your sector

Non-durable vs durable

Institutional vs consumer

## So why is the customer not buying?

Rational vs Emotional Barriers

Short vs Long Term Solution

## Who is buying & why?

- Demassifying the target within the segments
  - Residential
  - Commercial
  - Industrial
- Rational vs Emotional Triggers

## What is the Purchase Process

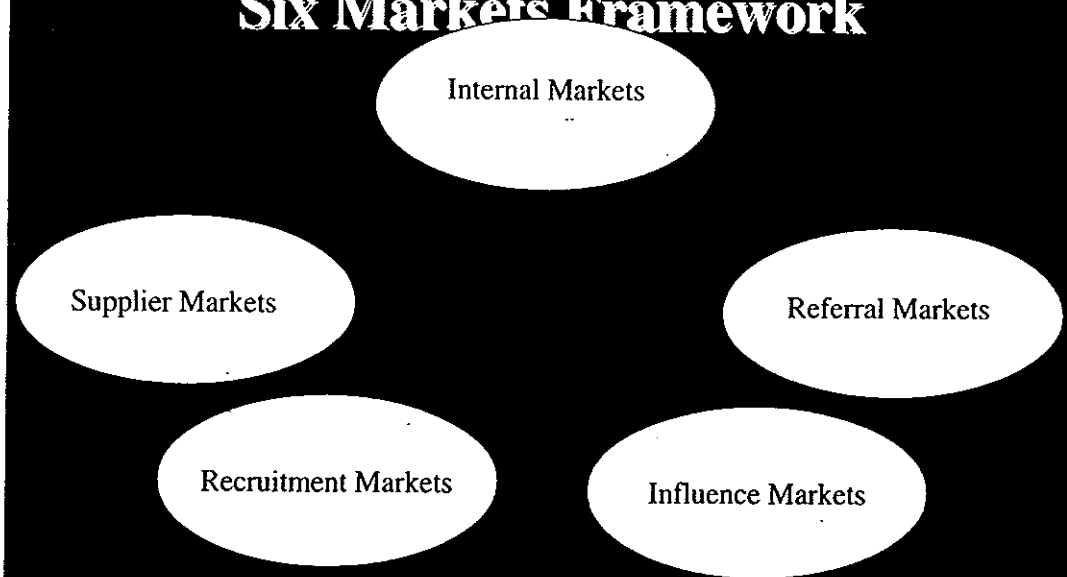
- Information Gathering
- Role of Influencers
  - micro level & macro level
- Key Decision Makers

- Define the touch-points

# Where, What & How can I communicate

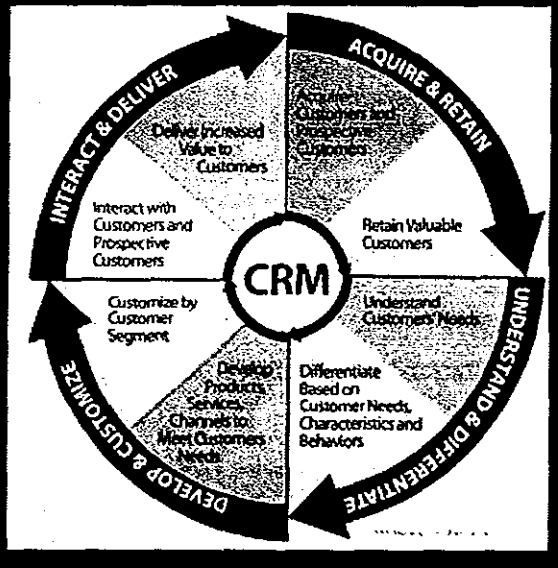
- Contact
- Context
- Content

# Six Markets Framework



## Five Core Areas of Business Transformation

| | | | | | |
|---|---|---|---|---|---|
| **BUSINESS FOCUS** | | | | | |
| Product | Sales | Channel | Marketing | Service | Customer |
| **ORGANIZATIONAL STRUCTURE** | | | | | |
| Product Management | Place Management | Promotion Management | Channel Management | Contact Management | Customer Management |
| **BUSINESS METRICS** | | | | | |
| Product Performance | Place Performance | Program Performance | Customer Revenues | Customer Patterns & Profitability | Customer Lifetime Value and Loyalty |
| **MARKETING FOCUS** | | | | | |
| Mass Advertising | Sales Promotion | Marketing Campaigns | Integrated Marketing Communications | Segment Specific Marketing | Customer Relationship Management |
| **TECHNOLOGY** | | | | | |
| Transaction Processing | Data Maintenance | Data Access | Data Warehouse | Data Marts | Customer Touchpoint Systems |



## A CRM Oriented SOlution

- **Build** an Enterprise View of Customer
- **Define** Comprehensive and Consistent Customer Profiles
- **Understand** Customer Needs, Behavior and Profitability
- **Predict** Customer Behavior
- **Increase** Retention and Acquisition of Most Profitable Customers
- **Deliver** Customer Information to All Employees Enterprise-Wide
- **Focus** on Rapid Return on Investment

## Tomorrow

Companies will move from selling products to selling subscriptions.

Marketing will become less visible - more of a private affair between consumers and the companies they buy from.

Role of Energy Consultants in Marketing of EE Equipment

# Role of Energy Consultants in Marketing of EE Equipment

YEARS
1974 - 1999

New Delhi, March 15-17, 2001

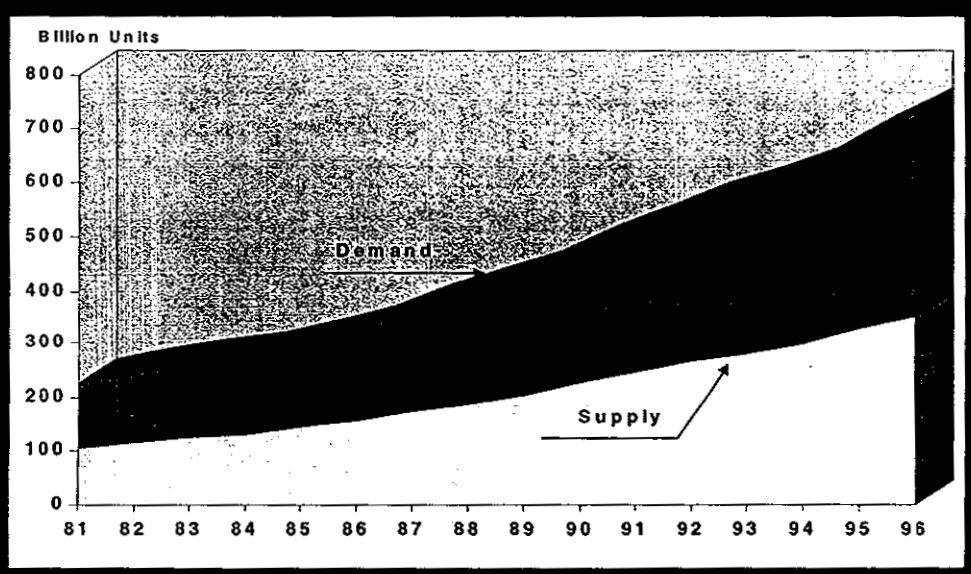
M V Ananthakrishna
MK Raju Consultants Private Limited

## Agenda

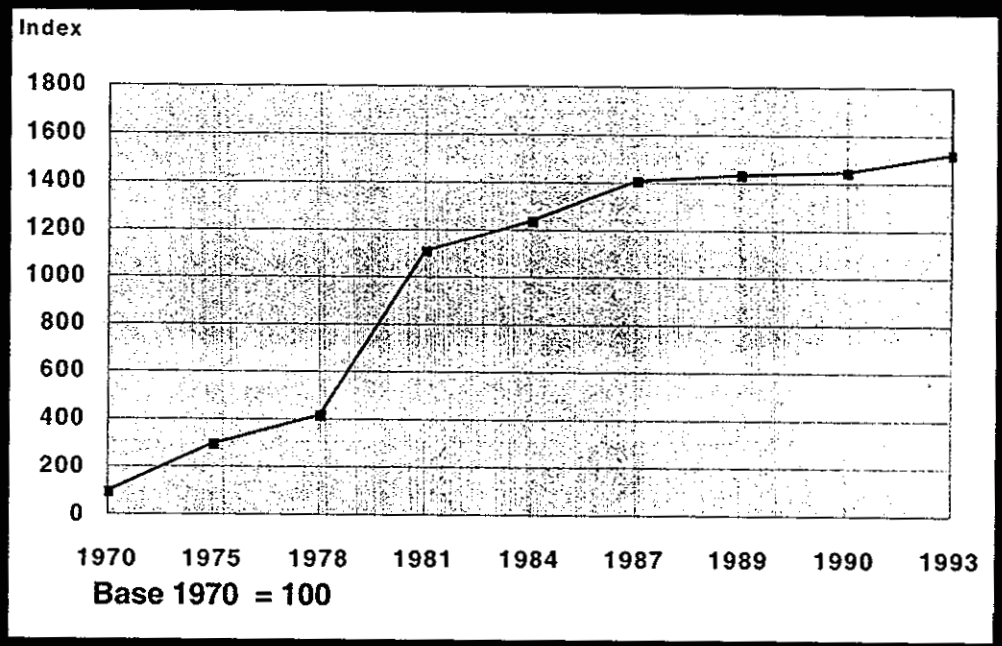
- The back ground - Energy and Environmental Efficiency of India compared to the rest of the World
- Barriers to Energy Efficiency
- Role of Energy Consultants
- Some Case Studies

# Indian Energy Scenario . . .

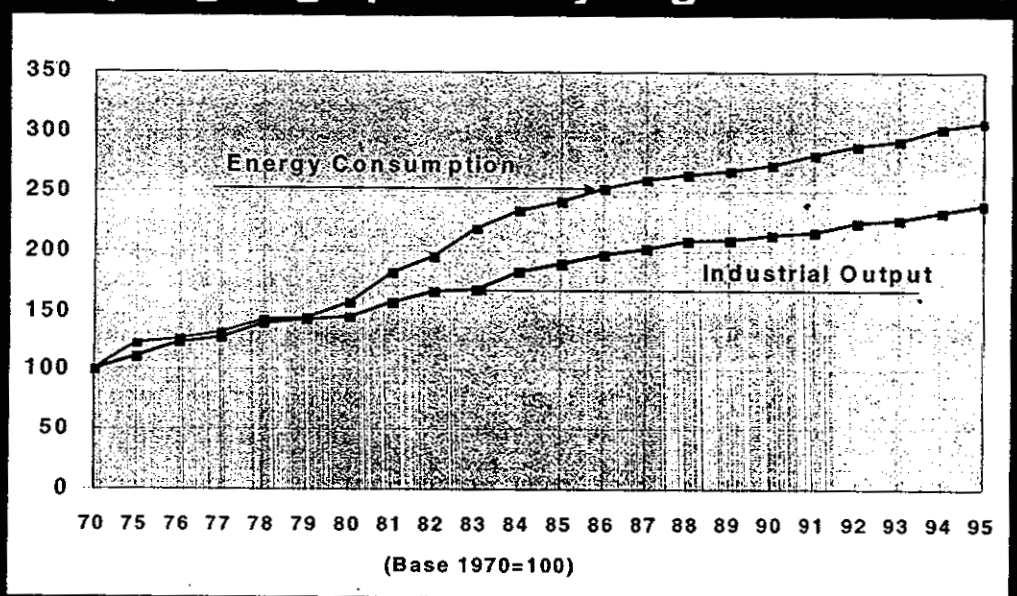
## Electrical Energy Demand - Supply Gap



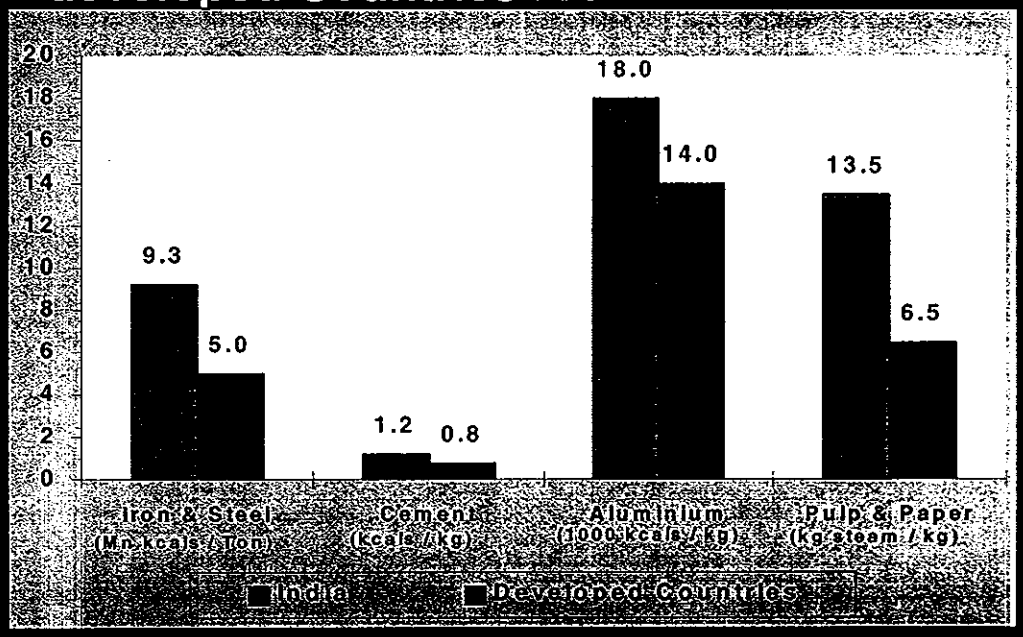
## Oil Price Trend in India . . .




## Energy consumption per unit of industrial output going up contrary to global trends ...



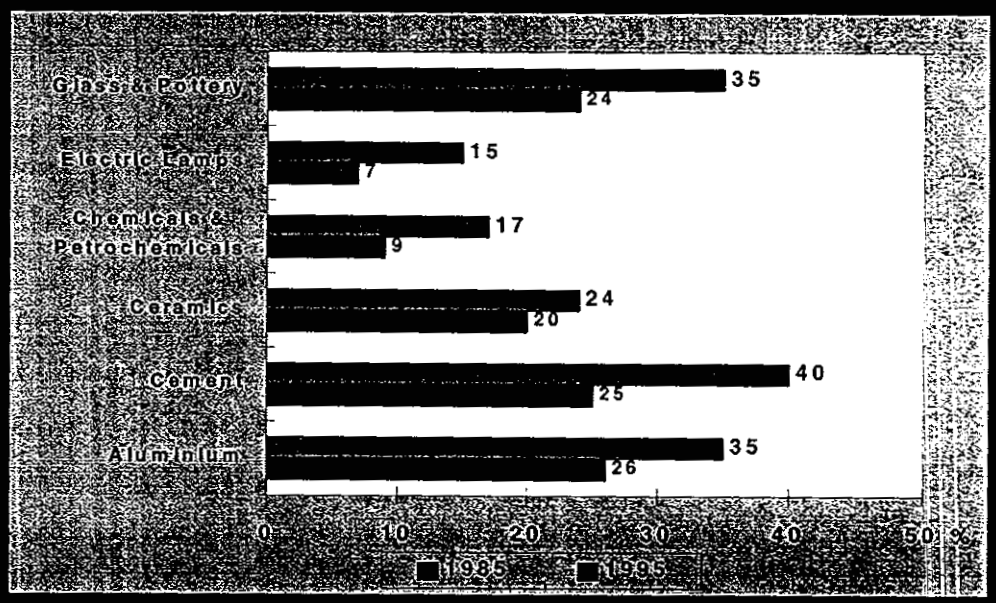
## Energy Consumption higher than developed Countries . . .



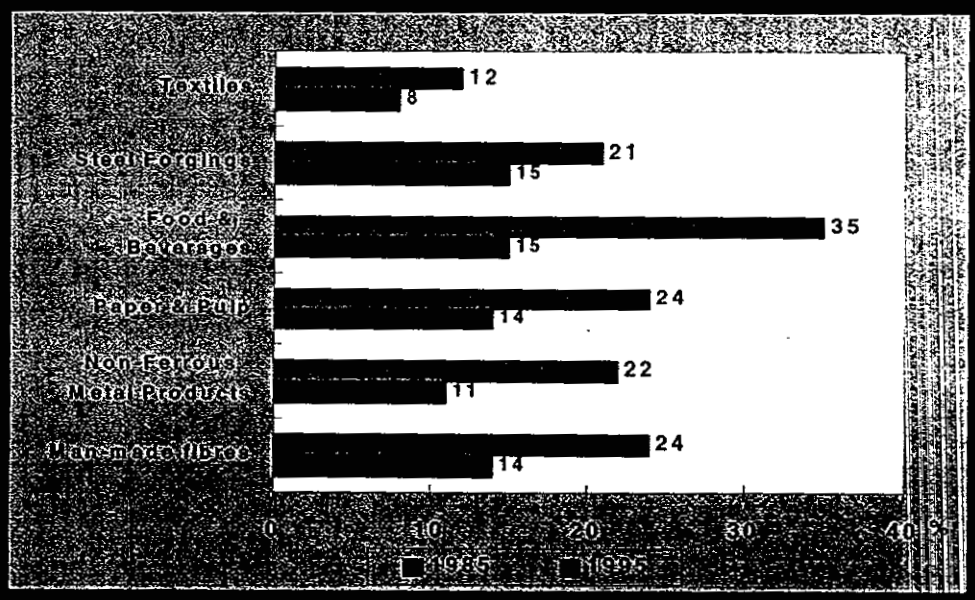

## Energy . . .

- forms a significant element of cost of production and it is on the rise in India

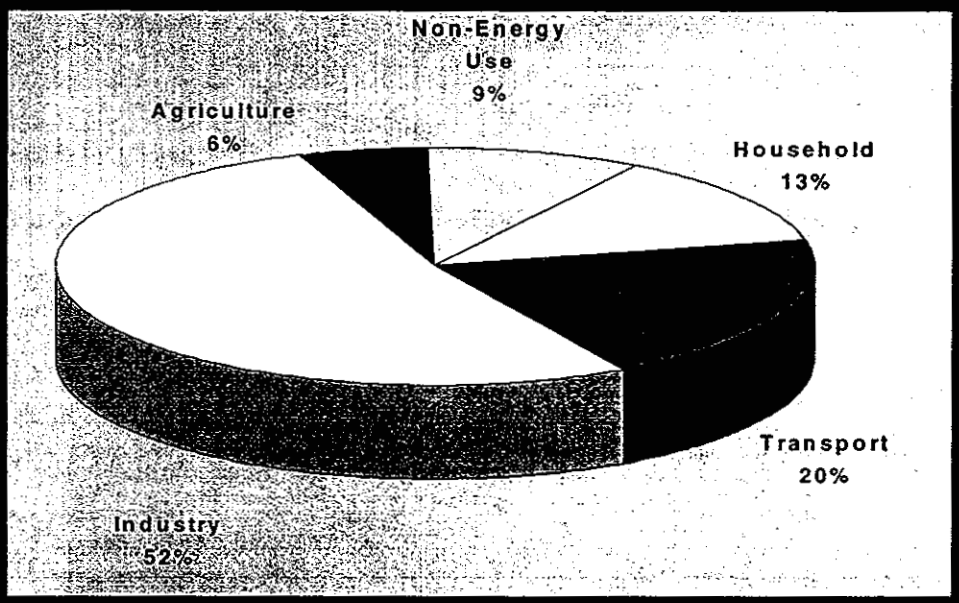
## Energy costs increase as % of Production Costs




## Energy costs increase as % of Production Costs



## Industry takes lions share (52%) of Commercial Energy . . .




Indian industries consume more energy than similar plants elsewhere in the developed countries - and mind you, energy - whether electricity or coal - is always highly capital intensive

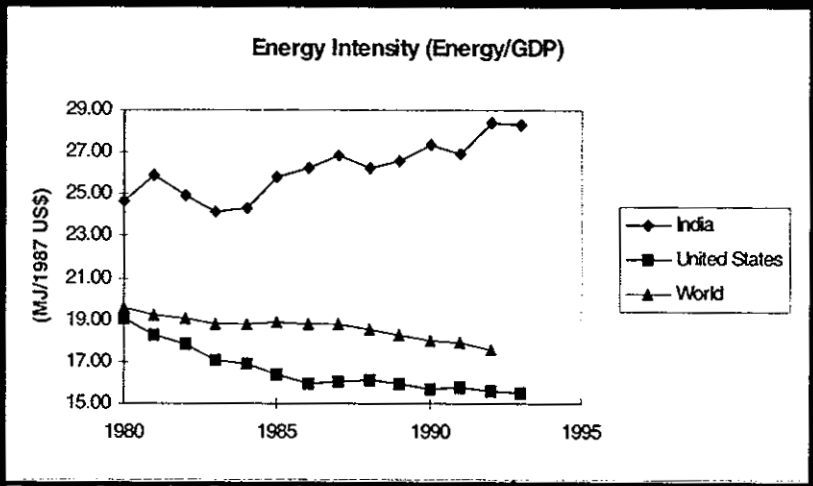
## India way behind . . .

- Thermal plants are operating at 24% efficiency against World's best 40%.
- Transmission & Distribution losses are 22% against World's best of 5%.
- Inefficient utilization in all sectors - industrial, commercial, agriculture & transport.

## India - low per capita consumption . . .

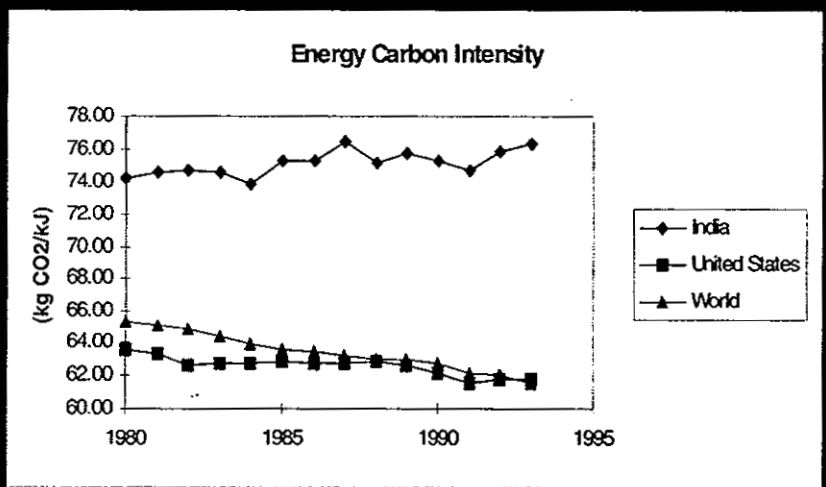
| Country | Barrels of oil equivalent per year |
|---|---|
| USA | 52 |
| Germany | 27 |
| Ex USSR | 23 |
| China | 2.4 |
| World Average | 6.0 |
| India | 0.9 |

# Comparison of Energy Intensity




Energy Intensity Comparison
Source: MIT Energy Lab: *World Energy Statistics*

# Comparison of Carbon Intensity




Energy Intensity Comparison
Source: MIT Energy Lab: *World Energy Statistics*

Industry survey reveals an average savings of 20% on energy bill in the industry.

Undisputed potential . . .

- M K Raju Consultants estimate an all India annual savings potential of Rs.5,000 crores
- Several surveys confirmed this. Much has been said about this.
- Cogeneration (CHP) potential in the industrial sector 15,000 MW

## It is also no surprise that potential tapped is minimal . . .

- It is just the tip of the ice berg.
- The reasons are many, but none insurmountable.

## Barriers to Energy Conservation . . .

- Protected market for many industries
- Emphasis on 'output' rather than 'output with efficiency'
- Outdated/unsuitable equipment
- Inhibition to adapt new processes & developments

## Barriers to Energy Conservation . . .

- Lack of direction, thrust & accountability for conservation
- Absence of effective enforcement of energy policy
- Many in the industry think that there is nothing they need to know. Several others feel threatened to be helped by external experts.

## Barriers for Energy Conservation . . .

- Ignorance, lack of awareness and even disbelief of the conservation potential
- By and large, generalised claims made on conservation achievements. But few can quantify what is actually saved.
- Inertia - not sensitive to national & global concerns.

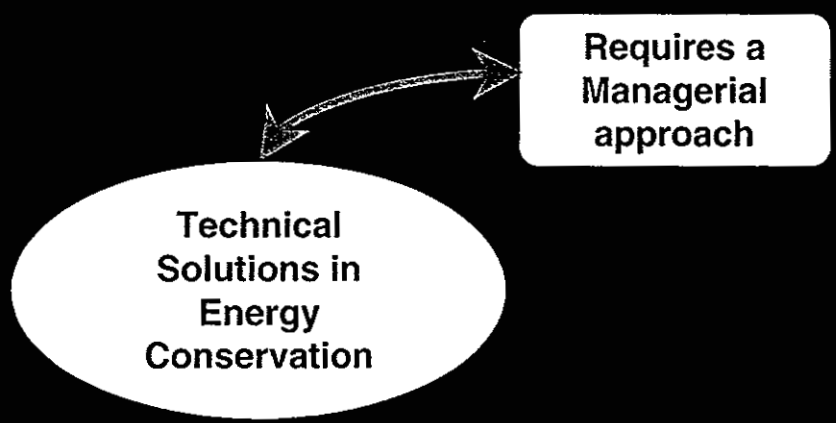
## Barriers for Energy Conservation . . .

- Poor quality of coal, power cuts, peculiar working conditions cited as alibis
- Financial constraints to new investment
- Lack of simple, accessible and quick medium-term financing for energy-efficient investments
- Consultants have, therefore, to work in an environment which may not always be receptive if not hostile

## Role of Consultants . . .

- It is a pre-requisite to take cognizance of the barriers and evolve solutions specific to each industry

## Energy Conservation requires a Managerial Approach . . .




- What is the role of Client Management in saving energy?

## Management Attitude is the key . . .

- What is the sign on your brain?

## NO ADMISSION!

The "No Admission Man"says .-

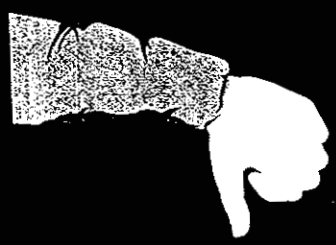
- "It won't work".
- "We have tried that years ago".
- "What do you know about my business?"
- "We don't want to make a change now".
- "We are perfectly satisfied with our present method".

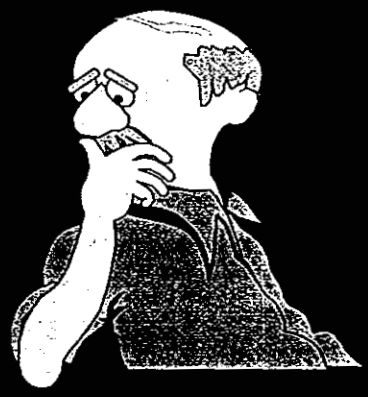
## DO NOT DISTURB !

The "Do not disturb" man says . . .

- "We will consider it at some future date".
- "You have a good idea but conditions are not right"
- "Yes - But I am too busy now".
- "There may be something in your plan but the time is not ripe for a change".
- "Bring this to my attention after the first."

## "IT"S NO GOOD -WE HAVE TRIED IT"





- Was it given a fair try?
- Was it considered objectively?
- Can we benefit from past failures and turn them into success?

# WELCOME

"The Welcome man" says . . .

- "Well, what are we waiting for?"
- 'Let's go, why not try"
- "Let's check up and see if it will work".
- "Thanks -that's worth trying"

He is the one who makes things happen.

# Key . . .

- It must be recognized that the operating personnel in the plant form the key to a successful conservation program
- Lead must come from plant personnel for self-imposed energy conservation discipline
- This calls for commitment and dedication. Their attitude determines the success

What does a consultant do to save energy for his clients?

## Identify, Implement & Achieve Savings

- The consultant helps the client to not only Identify savings but also in:
  - Vendor Selection - guaranteed performance
  - Implementation
  - Measurement and verification of Savings

## Identify, Implement & Achieve Savings

- Cases - H - VFD for AHU fans - trial conducted and savings proved.

## Access to all stake holders

- It is difficult to identify the decision maker in the plant for sale of EE equipment. In this context a Consultant who has access to Top management & all the stake holders can help make the sale.
- Scale effect.
- Ability to deal with rejection or slow pace.

## Access to all stake holders

- Cases - L - Executive Committee cleared Rs 10 lacs for investment they said implement immediately.
- Cases - L - Energy efficient lamps, transformer for lighting although not accepted for current plant implemented for a new project involving plant expansion
- Cases - M - Supermisers although not accepted for current plant implemented for a new project involving plant expansion

## Access to all stake holders

- Cases - H - Replace VCC with VAC using steam from plant. High investment cleared by top management when plant was unable to make a decision. They were not willing to push it but consultant had to do it.

## Equipment is a means to an end

- Client gives weight for consultants point of view
- Consultant wants to save Energy. Equipment is a means towards this end. Therefore Client gives weight for consultants point of view

## Equipment is a means to an end

- Cases - H - VAC vs VCC economics VCC is cheaper if power cost is low but VAC is cheaper if steam is cheaper.
- Cases - M - Conventional motor vs energy efficient motor payback is usually there for new projects for replacement projects payback may be affected in which case retrofits (VFD / Supermiser) are in order.

## Applicability in different situations

- Consultant is able to identify similar situations where an Energy Savings concept can be applied across industries.
- Cogen is usually implemented for sugar and paper only but equally applicable to all other industries\
- Cases - L - extend savings proposal to all group companies.

## Applicability in different situations

- Cases - M - Energy Efficient Motors in design stage itself.
- Cases - M - Supermisers in design stage itself.
- Cases - H - AHU Valves - 3 way to 2 way valves - Hotels, commercial complexes, buildings, Pharma industries etc.
- Case - H - VFD for AHU fans - Hotels, commercial complexes, buildings, Pharma industries etc.

## Identifies needs and creates demand

- Consultant will identify areas where energy efficient equipment can be used creating more demand.
- Cases - L - Hotel CFL in place of incandescent lamps in hotel originally not agreed by client due to aesthetics but consultant and vendor gave a new shade so all lamps were changed.
- Cases - M - Variable load motors VFD. For high starting torque and low operating load Supermiser. Permanently under loaded change motor.

## Identifies needs and creates demand

- Cases - H - OPG -> WHR -> VAC replaces VCC
- Cases - H - OPG -> Jacket water WHR -> VAC inlet air cooling with 5% savings in fuel consumption.
- Cases - H - OPG - Jacket Water WHR to reduce or switch of compressor or reduce fuel consumption in boiler.
- Cases - L - Replace twin 40 W lamps with Singly 36 W energy Efficient lamps as technology improved with more efficient lamps.

## Guarantees help whom?

- Vendors, client or consultant - everyone.
- Cases - L - Replacement of defective ballasts by vendor increased confidence of client
- Cases - L - Increase in guarantee period from 1 to 2 years in special cases recommended by consultant.

## Guarantees help whom?

- Cases - M - VFD for motors implemented after consultants recommendation.
- Cases - M - VFD problems fixed by vendor even after guarantee period of 1 year. The plant purchased 200 to 300 drives in future expansion plans.

## Whole System Approach

- Savings in one area may result in additional costs in another area
- Consultant in familiar with the whole plant so he is able to assess the full impact both negative and positive.
- Consultant is able to recommend the M&V protocol necessary to prove the savings.

## Whole System Approach

- Case - L - lighting proposal - client wanted to measure month end bills but variation is much more than projected savings
- Case - L - Savings in lighting load will reduce the refrigeration load.
- Cases - M / H - on off controller for Cooling towers will save motor power but increase refrigeration motor load.

## Whole System Approach

- Case - M / H - Frequent on off will reduce the life of the motor so the hunting should be avoided in design.
- Cases - H - VFD for cooling water pumps will increase chilling system motor load trade off must be carefully considered.

## Life Cycle Costs

- In the case of longer life, more expensive & more energy efficient tube lights
- Simple payback does not reveal the total benefits a life cycle analysis indicates the total benefits
- Case - L - lifecycle analysis to prove actual benefits

## 10 year Cash Flow Analysis

- NPV of cash flows indicates the financial attractiveness of projects
- Effect of 100% depreciation and import duty benefits if applicable will used to prove attractiveness of projects.
- Cash flow analysis - for less than 3 years payback proposals a detailed Cash flow will indicate that all cash flows are positive after the down payment.

## 10 year Cash Flow Analysis

- This means in effect the payback is one year.
  - Cases - detailed spread sheet will be discussed
- This will help sell projects which will otherwise not be considered

## Phased implementation

- Low or nil payback proposals can be implemented and the cash flow from these can be used to finance the higher payback proposals.
- Energy conservation can be a self sustaining proposition.
- ESCO approach for lack of funds

## Mitigation of Risks

- Sharing experience
- Giving Expert opinion
- using a cross industry knowledge base for Energy Conservation.
- Giving proof of actually seeing the equipment work
- Time savings for client - no need to reinvent the wheel.
- ESCO's

## Mitigation of Risks

- Cases - H - VFD trial where number of units are at stake.
- Cases - L - Trials order to establish savings and guarantee for expected life.
- Cases - M - Energy efficient motors trail order to prove concept.

## Consultant a Catalyst

- he can represent the plant to the top management.
- Bridge between vendor and client user departments.
- Helps both client and vendor and achieve savings
- Quantification of savings.
- Scaling concept to group companies.

## Consultants Helps vendor to deal with sunk costs concept.

- Cases - L / M - don't wait for replacing a burnt motor or light do it immediately. Sunk costs are not relevant.

## Consultant does Problem Solving if implementation problems arise

- In cases where anticipated savings do not accrue consultant does problem solving and proves the savings.
- Cases - H - defective damper identified as reason for no savings with VFD

## Consultant and EE Equipment Vendor collaboration for mutual benefit

## What does the consultant look for from a vendor?

- Quotations
- Technical literature
- Trials to prove savings / visits to other sites where implemented
- performance guarantees

## What does the EE vendor get?

- Increased probability of sale.
- Access to decision maker.
- A convinced client making the sale easier.
- Scale effect

## Some of the slides we use to convince clients

## Which is the best way of increasing profits?

- Increasing profits

  Or
- Saving energy
- Let us examine this further

## Take the case of an industrial plant with

| | Rs Crores |
|---|---|
| Turnover | 123 |
| Energy Consumption | 27 |
| Profits | 9 |

## Save energy . . .

| | Turnover Rs Crores | Energy Bill Rs Crores | Profits Rs Crores |
|---|---|---|---|
| Before EC | 123 | 27 | 9 |
| After EC | 123 | 23 | 13 |

- By saving energy of Rs 4 Crores, you increase profits by Rs 4 Crores (1:1)

## If you do not save energy. . . To make the same profit . . .

| | Turnover Rs Crores | Profit Rs Crores | Energy Rs Crores |
|---|---|---|---|
| Existing | 123 | 9 | 22 |
| Increase sales without EC | 170 | 13 | 33 |

- You have to increase turnover by Rs 47 crores (38%) and consume Rs 11 Crores more energy (50%)

## Which is faster?

- Increasing turnover by about 50% or
- Saving energy by 18%
- How many opt for which?

When you make an investment, which is better, projects or energy?

## ICICI portfolio

- According to ICICI portfolio of financial performance of companies, the return of capital employed in the fiber industry averaged 12% during the past five years
- This means, it takes more than eight years to recover your investment.

## ICICI portfolio

- Whereas, the payback for capital investment for energy is 2 to 3 years
- Which do you prefer: energy investments or capital projects?

## Energy cost reduction

- Least investment
- Returns assured
- High returns
- No or least gestation
- Incidental benefits

## The easy way to improve profits . . .

- Energy savings is the easiest, fastest and most important way of improving profits
- That is why energy savings takes priority over everything else

## To sum up . . .

- EE equipment vendors and consultants can together deal with the barriers to energy conservation and benefit mutually. Each can use the strengths of the other.
- Actual savings realized by the client is the way forward to increase the sale of EE equipment.
- Guarantees and after sales service will become integral to sale of EE equipment.

**Marketing Strategy Financing based Promotion of EE Technologies**

# MARKETING STRATEGY FINANCING BASED PROMOTION OF EE TECHNOLOGIES

**Presentation by**
K. K. JINDAL
PROGRAMME DIRECTOR
NIBSCOM
A-30, Sector-62, Institutional Area
NOIDA - 301 307.

## FINANCING BASED PROMOTIONS

- LEASING
- FACTORING
- BILL DISCOUNTING
- BUYER CREDIT
- SUPPLIER CREDIT

# Lease Financing

- Definition
  - Leasing is, "an agreement whereby the lessor conveys to the lessee in return for rent the right to use an asset for an agreed period of time".
  - It can be also stated as "a lease is a contractual obligation to rent specified property for specific terms at a predetermined rental rate"
  - Essentials of a lease transaction
    - There are two parties Lessor and Lessee
    - There is a contractual obligation
      - to offer asset by the lessor
      - to pay rent by the user-lessee
  - The ownership rests with the lessor, only possession is shifted to the lessee
  - Assets will, generally, be returned to lessor at the end of a specified period.

# Types of Leasing

- **Financial lease**
- **Operating lease**
- **Sale and lease back and**
- **Leveraged lease**

# Financial Lease

- Financial lease (which is also referred to as finance lease, Capital lease or full payment lease) is one where the contract is irrevocable for the primary lease period and the rentals to be paid during this period will be adequate to recover the total investment of the lessor in the asset leased.

- There may be an unwritten understanding of a purchase option to the lessee at the end of the primary period at a predetermined rate or on a nominal value. Here the lesser is only making available the finance, whereas it is the duty of the lessee to select the equipment place orders settle the terms of the sale service and warranty backing it. The cost towards insurance, repairs and other incidental cost will have to be borne by the lessee only. The risk of obsolescence is also placed on the lessee as the contract of lease is non-cancelable, during the primary period which may be fairly long, say 5-7 years. Majority of the leasing transactions in India fall under this group.

# Operating Lease

- In an operating lease the lessee has an option to terminate the contract after giving due notice. Further the rentals payable for the primary period will not be sufficient to cover the cost of the assets leased, hence the lessor will have a continuing interest in the asset as owner and will also be taking the risk of obsolescence. In areas of rapid technological development like computers an operating lease will be advantageous to the lessee.
- Period of lease will be short say 1-2 years and at its end, the assets will be returned to the lessor, who will, thereafter, attend to the insurance, maintenance and repairs etc.

# Sale and Lease back

- The lessee (user) who is the owner of certain equipments sells first these equipment to the lessor and immediately enters into a lease agreement for the use of the same equipments at an agreed rental per month.
- The benefit accruing to the lessee here is that he is able to mobilise his blocked up investments by selling the assets to the lessor alternative uses and at the same time he is able to make use of the same equipments on account of the leasing agreement.
- Such transactions are entered into to take advantage of the tax concession. As the lease rentals are fully deductible, the cost of the equipment may be liquidate in a shorter period than would otherwise have been taken by availing depreciation.

## Distinction between leasing and hire purchase

- In a lease transaction, the lessee has only the possession of the equipment and he is not the owner of the same. However, in a hire purchase agreement, the party purchases the equipment, but enters into an agreement to make the payments in installments. The ownership and possession are transferred to the hire purchaser.
- Further, under the hire purchase transaction, the assets will appear in the balance sheet of the purchaser as assets, while under the lease it will be reflected in the books (Balance Sheet) of the lessor only.

## Advantages of leasing-lessee

- A new and easy source of finance for acquiring long term assets.
- Lessee company need not block up available capital in long term assets.
- Companies which are unable to mobilise resources from other sources say - capital market, financial institutions are able to meet their capital expenditure the, lease financing.
- The lessee is able to project a much better debt/ equity position, as leasing is not forming part of the borrowings. This is an "off the balance sheet" means of finance, which therefore improves the apparent liquidity, profitability and solvency position of lessee.

- Considerable tax advantages to the lessee, as the rentals are fully tax deductible. Often this component will outweigh the depreciation portion, if the same equipment was owned instead of leased.
- The lessee is able to get finance without the usual delays and restrictive conditions associated with term lending institutions.
- Leasing will afford hedge against obsolescence and inflation.
- Leasing will avoid dilution of management control. In the Indian context the financing institutions are even appointing nominee directors in assisted companies. This can be avoided under leasing. This is one of the major attractions of leasing.

- Leasing often provides 100% finance, hence the lessee need not block up resources to wards margin. It also facilitate the lessee to pay for capital assets out of current/future incomes.
- As leasing may result in bulk purchases for the lessor economies of scale can be reaped and the same may be passed on to the lessee also.
- Avoid registrations, under the MRTP Act, as leased assets are not included for the purpose of computation of assets.

Annexure - I

# Lease or Buy Decision - An Illustration

| | | | | | |
|---|---|---|---|---|---|
| P.B.T. (A-B) | 800 | 905 | 1004 | 1096 | 1184 |
| P.A.T. (45%) | 360 | 407 | 450 | 493 | 532 |
| Total Cash Flow (PAT + Dep) | 660 | 662 | 666 | 677 | 688 |
| Outflow (Loan Instalments) | 400 | 400 | 400 | 400 | 400 |
| Net Intl. | 260 | 262 | 266 | 277 | 280 |
| (B) Leasing | | | | | |
| Income | 2000 | 2000 | 2000 | 2000 | 2000 |
| Expenses | 600 | 600 | 600 | 600 | 600 |
| Lease Rentals | 660 | 660 | 660 | 660 | 660 |
| | 1260 | 1260 | 11260 | 1260 | 1260 |
| P.B.T. | 740 | 740 | 740 | 740 | 740 |
| P.A.T. (45%) Net Inflow | 333 | 333 | 333 | 333 | 333 |
| (II) Zero Tax Company | | | | | |
| Borrowing (Inflow) | 1100 | 1160 | 1220 | 1280 | 1340 |

Borrowing is advantageous

Notes:

Loan Amount 2000

Depreciation 15% W.D.V.

Loan Interest 15% P.A.

Loan Period 5 Years

# Factoring

- A continuous arrangement in which the agent (factor) primarily provides finance against the bills receivable of the seller of goods (client).
- Factor purchases the debts of the client and makes him immediate payment against the sale invoice (70-80%) for a commission and later collects the debt when it fall due
- It relieves the client of sales collection

**The basic function of factor of financing and collection of receivable can be supplemented with other functions like:**

- Sales ledger management
- Credit control and protection
- Advisory services
- Advance payments
- Regulating cash flows

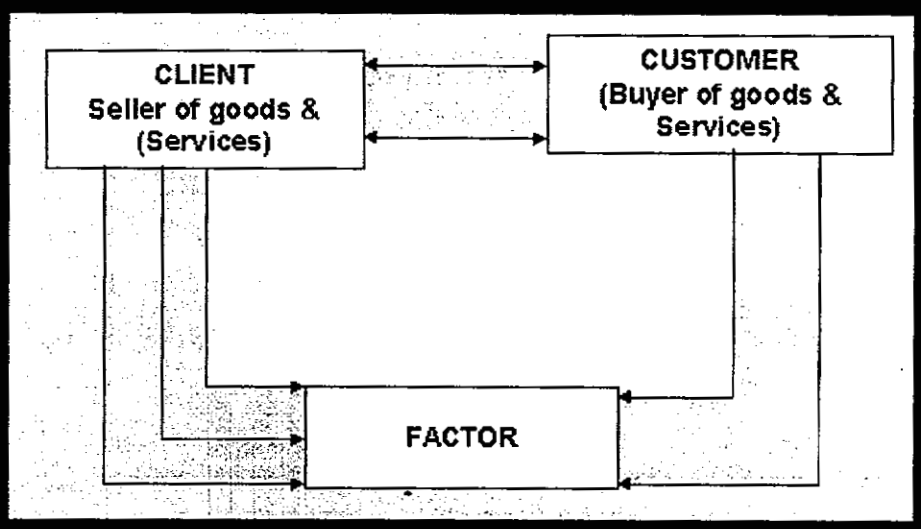
## Factoring Process

- Factor review client' customers and approves them for credit
- Client delivers goods/services and submits invoice(s).
- Invoice is payable to factor, not client
- Factor receives and processes invoice(s).
- Factor verifies invoice(s). Verifies goods/services delivered

- Factor verifies debtor intends to pay invoice
- Factor disburses advance. Usually within 24 hours
- Factor tracks invoice for payment
- Factor receives payment from client's customer
- Factor disburses reserve balance minus agreed-on fee.

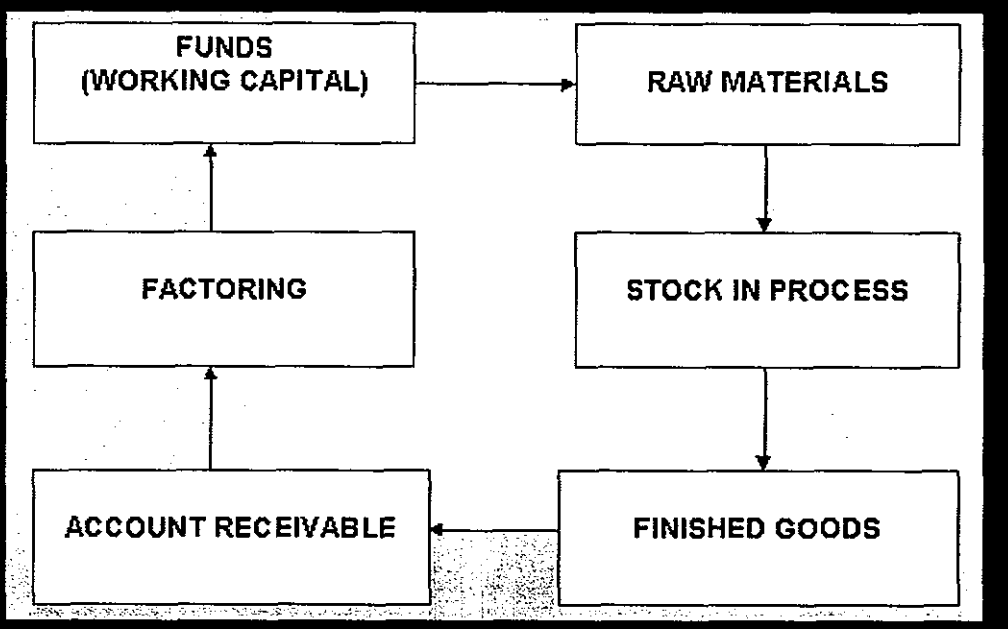
- **Customer places an order with the client for goods and/or services on credit**
- **Client delivers the goods and invoice with a notice to pay to the factor.**
- **Client send of invoice to the factor.**
- **Factor pre-pays to the client say 80-90 per cent of the invoice value.**
- **Monthly statement of accounts and follow-up if invoice remains unpaid by due date.**
- **Customer pays to the factor (i.e. collects book debts)**
- **Factor makes the balance payment of the invoice to the client.**

# OPERATING CYCLE




- ✓Customer places an order with the client for goods and/or services on credit
- ✓Client delivers the goods and invoice with a notice to pay to the factor.
- ✓Client send of invoice to the factor.
- ✓Factor pre-pays to the client say 80-90 per cent of the invoice value.
- ✓Monthly statement of accounts and follow-up if invoice remains unpaid by due date.
- ✓Customer pays to the factor (i.e. collects book debts)
- ✓ Factor makes the balance payment of the invoice to the client.

## OPERATING CYCLE




## PRICING

ADMINISTRATIVE CHARGES
0.5-2.5% of the full net invoice value of the receivable
types of industry, client, volume of sales, avg. invoice value

+

DISCOUNT CHARGES
Linked to base interest rate of bank

## Advantages

- Financial and credit protection benefits
- Sales management and benefits
- Reduction in administrative costs
- Advisory benefits
- Reduction in bad debts

## Limitations

- Non suitable for small company with lesser turnover
- Company having a high concentration of limited debtors
- Company indulging in speculative business
- Company having insufficient /weak managements
- Company having large number of debtors of small amounts

| BILL DISCOUNTING | FACTORING |
|---|---|
| 1. Finance alone is provided | Total services are provided |
| 2. Advance is made against bills | Purchase of Trade Debt by Assignment |
| 3. Security is provided | Purchase of debt for consideration |
| 4. Charge registered with ROC | Owner of Trade Debt |
| 5. Drawee knows about Bill Discounting | In undisclosed factoring customers are not notified |
| 6. Individual transaction oriented | Whole turnover-bulk finance is provided |
| 7. In Balance sheet financing | Off-Balance Sheet financing |

## Buyer's Credit

- ✓ Items to be "valid import"
- ✓ Overseas seller's banker directly finances the importer (buyer)
- ✓ Known as export credit with insurance cover for export credit agency of the concerned country. e.g. Eximbank of USA, ECGD of U. K., Export Import Bank of Japan.
- ✓ Exporter gets payment immediately from his banker's loan granted tot he importer
- ✓ Buyer's credit

♦ ***At Preshipment Stage***

- 'Red Clause' letter of credit authorising the exporter's bank to extend preshipment to the exporter.

♦ ***At Postshipment Stage***

- The exporter's bank makes immediate payment to the exporter by extending loan to the buyer(importer)

**Credit > 6M requires RBI approval**

- Importer's banker to guarantee the repayment of the loan by the importer (RBI permission required).
- Credit Risk borne by exporter's banker
- Forex risk to be borne by the buyer (Importer).

## Supplier's Credit

- Credit extended by supplier with or without the insurance cover by export credit agency.
- Supplier avails credit from his bank or uses its own funds and allows the importer to pay at a later date.
- Transactions financed by supplier credit.

♦ ***At Preshipment stage***

- For RM, SIP, FG and upto shipment stage

♦ ***At postshipment stage***

- Supplier may extend credit to the buyer agreeing for instalment payments
- Seller bears the risk of Non-payment by the buyer.
- Seller also faces exchange risk if his borrowings are in local currency while exporters may be in foreign currency.
- Supplier's credit > 6M requires prior approval of RBI.

# GOVERNMENT PROCUREMENT

**Virendra S. Kothari**
**Innotem Services Private Limité**
**New Delhi**

**Marketing Course for EE Products**
**New Delhi, 15-17 March**

# *Preface*

This presentation is based on a report entitled " Procurement Policies and Practices for purchase of high electricity use products by Government Departments, Bodies and Organizations". This report was finalized in March 2001, under ECO Milestone 9A.

The relevance of this work in this course on "Marketing of Energy Efficiency Products" comes from the fact that it enables the marketers to understand and appreciate Government's procurement policies, procedures and concerns, the determinants of evolution of the procurement policies and practices,– and hence the strategies that the EE equipment suppliers may possibly adopt.

## ☛ Government Procurement

*Outline*

- Government procurement of high-electricity use devices
- Procurement policies, procedures and practices
- Energy efficiency considerations in procurement
- Changes in procurement policies, procedures and practices for promoting energy efficiency
- Life cycle costing

# VALUE AND QUANTITY OF ANNUAL PURCHASES OF DEVICES ON DGS&D RATE CONTRACT

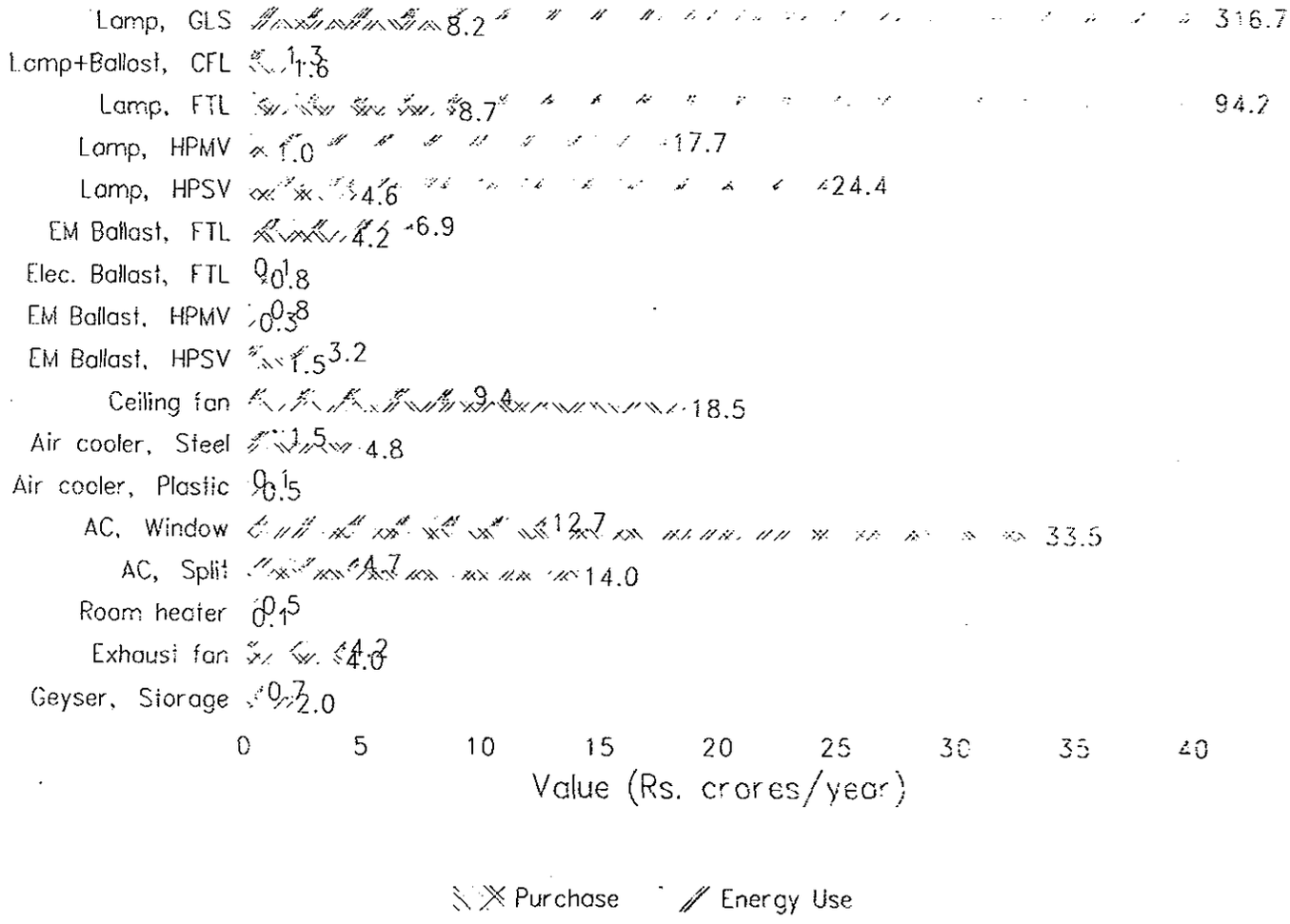
| Device | Value (Rs crores/Year) | Quantity (Nos/Year) |
|---|---|---|
| GLS lamp | 8.20 | 10,640,500 |
| Compact fluorescent lamp | 1.60 | 78,800 |
| Fluorescent lamp | 8.70 | 2,452,500 |
| HPMV lamp | 1.00 | 80,800 |
| HPSV lamp | 4.60 | 92,900 |
| Electro-magnetic ballast, FTL | 4.15 | 480,900 |
| Electronic ballast, FTL | 0.80 | 23,000 |
| Electro-magnetic ballast, HPMV | 0.32 | 18,400 |
| Electro-magnetic ballast, HPSV | 1.52 | 52,800 |
| Ceiling fan | 18.50 | 279,700 |
| Air cooler, Steel body | 4.83 | 21,000 |
| Air cooler, Plastic body | 0.50 | 1,200 |
| Air conditioner, Window | 33.50 | 14,400 |
| Air conditioner, Split | 14.00 | 3,700 |
| Exhaust fan | 4.04 | 40,100 |
| Room heater | 0.09 | 1,500 |
| Geyser, Storage | 2.00 | 9,500 |
| Water cooler | 5.85 | 2,900 |
| Submersible pump | 0.50 | 300 |

# VALUE OF ANNUAL PURCHASES & ANNUAL ELECTRICITY CONSUMPTION OF ANNAL PURCHASES & TOTAL STOCK OF DEVICES

*(Rs. crores/Year)*

| Devices | Value of Annual Purchases | Electricity Consumption Annual Purchases | Electricity Consumption of Total Stock |
|---|---|---|---|
| GLS Lamp | 8.2 | 791.7 | 316.7 |
| Compact Fluorescent Lamp | 1.6 | 3.4 | 1.3 |
| Fluorescent Lamp | 8.7 | 235.4 | 94.2 |
| HPMV Lamp | 1.0 | 44.2 | 17.7 |
| HPSV Lamp | 4.6 | 61.0 | 24.4 |
| Electro-magnetic ballast, Fluorescent Lamp | 4.2 | 17.3 | 6.9 |
| Electronic ballast, Fluorescent Lamp | 0.8 | 0.3 | 0.1 |
| Electo-magnetic ballast, HPMV Lamp | 0.3 | 2.0 | 0.8 |
| Electo-magnetic ballast, HPSV Lamp | 1.5 | 8.1 | 3.2 |
| Ceiling Fan | 18.5 | 23.5 | 9.4 |
| Air Cooler, Steel body | 4.8 | 3.9 | 1.5 |
| Air Cooler, Plastic body | 0.5 | 0.2 | 0.1 |
| Air Conditioner, Window | 33.5 | 31.7 | 12.7 |
| Air Conditioner, Split | 14.0 | 11.8 | 4.7 |
| Room Heater | 0.1 | 1.2 | 0.5 |
| Exhaust Fan | 4.0 | 10.6 | 4.2 |
| Geyser, Storage | 2.0 | 1.8 | 0.7 |

# VALUE OF ANNUAL PURCHASES AND ANNUAL ELECTRICITY CONSUMPTION OF DEVICES



# Parties involved in the Government Procurement

- Directorate General of Supplies & Disposals (DGS&D)

- Government departments, bodies and organisations (Indentors)

  - central government departments
  - state government departments
  - public sector undertakings (PSUs)
  - autonomous bodies
  - quasi-public bodies, local bodies, etc.

- Suppliers

  - **Firms who supply indigenous items**
    - Manufacturers
    - Assemblers
    - Converters
    - Sole selling agents / Authorised agents / Distributors of Indian manufacturers
    - Stockists for indigenous stores
  - **Firms who supply imported stores**
    - Foreign manufacturers
    - Foreign manufacturers and their accredited agents in India
    - Stockists of imported stores
    - Suppliers of imported stores

# Directorate General of Supplies & Disposals

- Directorate General of Supplies & Disposals (DGS&D), under the Department of Supply, Ministry of Commerce, is the central purchase and quality assurance organisation of the Government of India.

- Functions of DGS&D

  - Purchase and/ or inspection of stores
  - Concluding rate contracts for common user items
  - Arranging clearance and shipment of stores
  - Registration of suppliers
  - Imparting/ arranging training for government departments and industries in the field of Purchase and Quality Management

## Indentors

- Indentors are divided into two categories

  - Central government departments / Union Territories, constitutional bodies like Union Public Service Commission, Election Commission, Supreme Court, Comptroller & Auditor General, etc. These are all indentors who draw funds for their expenditures from the Consolidated Fund of India.
  - State government departments, public sector undertakings, autonomous bodies, local bodies, etc.

- Consequent to the decentralisation policy introduced in December 1991, central government departments have been delegated full powers to meet their adhoc requirements and are authorised to issue the supply orders directly to suppliers having valid rate contracts.

- In case of urgent requirements, the items on rate contract can even be purchased by the departments from the open market as long as the price to be paid for such items does not exceed those stipulated in the rate contracts. Such purchases should not exceed Rs. 20,000 at a time and Rs. 1 lakh in aggregate in a year.

- Central government departments may indent on DGS&D for stores covered under rate contract and for other class of stores where they are unable to make suitable arrangements for supply.

- Indentors in the second category, i.e. state governments, PSUs, quasi-public bodies, etc. who want to utilise the DGS&D rate contract have to place their indents on DGS&D, and DGS&D will then place orders for their requirements.

- These indentors can also place direct orders for rate contract items with or without the proviso for pre-despatch inspection by Quality Assurance (QA) Wing of DGS&D.

## Suppliers

- DGS&D procures stores only from approved or registered firms. Any firm, situated anywhere in India or abroad, which is in the business of manufacturing, stocking or marketing of stores is eligible for DGS&D registration.

- Registration with DGS&D is a process by which firms can get enlisted with DGS&D as an approved supplier for their stores to enable them to be adequately prequalified before participation in any procurement programme of DGS&D or other procurement agencies.

- Firms are registered for a fixed period, depending on the category of registration. At the end of this period, fresh registration has to be applied for.

- For registration, application in prescribed registration forms has to be submitted to the concerned registration centre. After preliminary scrutiny of the application, DGS&D further obtains:

  - Banker's report
  - Annual turnover report
  - Inspection report on capability and capacity by concerned QA Wing field office
  - Test reports (for stores where test report from a laboratory is required)

- DGS&D registration centres are required to complete the process of registration within 30 days.

- Under the Single Point Registration scheme, small-scale units can also apply for registration to National Small Industries Corporation Ltd. (NSIC), New Delhi. Firms registered under this scheme are entitled to all benefits of DGS&D registration subject to certain conditions.

## Purchase Preferences

- Purchase policy provides preferences to stores manufactured by cottage and small-scale industries and public sector undertakings over those manufactured by private large-scale industries. These preferences relate to:

  - Product reservation
  - Price preference
  - Purchase preference

- Product reservation

  Presently, 358 items are reserved for exclusive purchase from firms in the small-scale sector. These include:

  - Chokes for light fittings
  - Streetlight fittings
  - Air/ room coolers
  - Domestic electric appliances as per BIS specifications: Electric toaster, Electric iron, Hot plates, Electric mixer, Grinders, Room heaters & convectors, Ovens
  - Squirrel cage induction motors up to and including 10 kW, 440 volts, 3 phases

- Price preference

  As a general rule, if offers are received from both large scale and SSI units but some of the lowest offers are from large scale units, the offers of the SSI units should merit acceptance by according price preference up to 15 % over the lowest acceptable offer from the large scale private sector units.

- Purchase preference

  Where the price quoted by public sector undertakings is within 10 % of lowest acceptable price, other things being equal, purchase preference may be granted at the lowest acceptable price. This is applicable up to 31 March 2002.

## Rate Contracts

- Rate contracts are the principal instruments used for procurement action by government users.

- A rate contract is an agreement between the purchaser and the supplier to supply specified stores at specified prices for a specified time period.

- A rate contract is not a supply contract. It forms the basis upon which a supply order is placed by the indentor on the supplier.

- Items which fulfil the following criteria are considered for rate contract:

  - Items which are identified as common user items and are needed on recurring basis.
  - Items of standard types preferably having BIS specifications.
  - Items for which prices are likely to be stable and not subject to considerable market fluctuations.
  - Items for which rate contract is convenient to operate.
  - Items with an estimated annual drawal of Rs. 25 lakhs or more.
  - Items which are not scarce/ critical/ short supply items.

- For conclusion of rate contract, tender enquiry is issued. After receipt of tenders, negotiations/ counter-offer may be resorted to with the lowest tenderer (L-1) only for arriving at a reasonable/ acceptable price and the rate contract awarded at the agreed negotiated price. This price is then counter offered by DGS&D to all other higher quoting firms, and the firms accepting the counter offered prices or below are awarded parallel rate contracts.

- Rate contracts are generally concluded for a period of one year and renewed on year-to-year basis.

- As on 25 December 2000, 326 items were on rate contract.

- Information on rate contracts

  - DGS&D Directory of Stores on Rate Contracts, which is published annually, gives the complete information regarding the items and particulars of the rate contracts such as names and addresses of suppliers, rate contracts no. and date, and the rates.
  - This is updated in the monthly issues of DGS&D Bulletin.
  - The complete information is also available on the DGS&D website (http://commin.nic.in/dgsnd) along with other information related to DGS&D.

- The decision to bring or delete an item on rate contract is taken by the Standing Review Committee (SRC). The committee associates representatives from major indenting departments, state governments and trade organisations. Once an item is approved by SRC, fresh approval of SRC is not required for each and every size/ capacity of items to be brought on rate contract.

## Procurement Specifications

- The specifications to which procurement is made by DGS&D could be as per:

  - Indian Standard (IS) specifications
  - IS specifications with improved parameters or additional parameters, like performance criteria, alternative raw materials etc.
  - Indentor's specifications
  - DGS&D specifications/ drawings which are developed in line with requirements of the user departments
  - Standard specifications formulated by major departments like Defence, Railways, Posts, Electronics, etc.

- IS specifications shall be the barest minimum to which the stores are to be procured.

- Although the specifications may require compliance with Indian standards, the requirement of ISI marking is not necessary.

- Certain stores are to be procured with ISI mark only. These include:

  - GLS lamps (above 100 W)
  - Fluorescent tubes
  - Exhaust fans

- In Indian standards, when energy consumption is specified as a parameter within the standard, it is usually in the form of a maximum value of energy consumption that should not be exceeded. This is also the requirement in the tender specifications. During the process of concluding rate contracts, no consideration or weightage is given if the given specifications are bettered.

## Procurement Process

- Whereas government procurement was earlier being done by DGS&D, it is now considerably decentralised. Decentralisation has resulted in most of the procurement by government departments, bodies, agencies, institutions and organisations being now done directly by them and not through DGS&D.

- The main feature of procurement by government users is that the procurement is done on the basis of the DGS&D rate contract for goods under rate contract.

- For items under rate contract, tenders for procurement are not floated. Procurement is done from among suppliers having valid rate contracts on the basis of the rates specified in the rate contract.

- In the case of central government departments/ offices, the procurement is done against the rate contract. In the case of non-central government departments/ offices, the procurement is generally done outside the rate contract, but based on the rate contract.

## Procurement Practices

- The result of the practices followed by DGS&D in concluding rate contracts is that, for all practical purposes, there is no difference in rates among different suppliers for items available under DGS&D rate contract.

- The effect of all firms offering goods at the same rate is that initial cost is not a factor considered by users in the decision making process.

- The main factors considered are service and quality. Delivery period, supplier size and supplier reputation are other factors. The actual consideration of these factors is based on their own prior experience regarding these goods and their suppliers, or on their subjective assessments in this regard.

- Energy consumption and energy efficiency are not considered, by and large, as factors in the decision making process.

## Energy Efficiency considerations in Procurement

- Energy consumption and energy efficiency are not considered, by and large, as factors in the decision making process.

- The purchase specifications for the devices are based on the specifications in the relevant Indian Standard (IS) standards. By virtue of the procurement being based on the rate contract, these specifications are implicitly followed by users. Additional or more stringent specifications are not prescribed.

- Reasons attributed for this situation:

  - As the rates of devices of all makes are the same, they are expected to be similar in terms of performance and features, including energy consumption.

  - The commonly observed situation is that if performance or some features are superior, then the price is also higher reflecting a higher cost or a premium. Since price of devices of all makes are the same, the perception is that it would not make commercial sense for any manufacturer to offer a superior device.

  - Energy consumption is also not expected to vary among different devices as all devices are believed to be conforming to the specifications of the relevant standard.

  - Even if it is felt that energy consumption could vary, any sense of the range of such variation is not there.

- As mentioned earlier, the specification regarding energy consumption is in the form of a maximum value of energy consumption that should not be exceeded. The same is mentioned in the product literature of suppliers. The actual energy consumption of the product is not given and hence not known. In the absence of this information, users have no knowledge about the variation, if any, and have no basis to consider energy consumption variations in decision-making.

## Changes in procurement policies, procedures and practices for promoting energy efficiency

- Changes required on the part of DGS&D:

  - Changes in purchase specifications
  - Bringing energy-efficient devices under rate contract
  - Allowing devices with different levels of energy consumption under rate contract
  - Introduce life cycle cost analysis
  - Provide more information and make information more accessible to users
  - Organise training on life cycle cost analysis and other changes in procurement system

- Changes required on the part of users:

  - Use life cycle cost analysis

## Life Cycle Costing

- The capital cost of an energy-efficient device is typically higher, while the operating cost is lower.
- The higher capital cost is incurred initially at one point in time, while the benefit of lower operating cost is obtained over the life of the device.
- Commonly used measures of cost-effectiveness such as payback period do not adequately consider the benefits of savings over the entire life of the device.
- The concept of life cycle cost (LCC), also known as total owning cost (TOC), involves consideration of all costs over the life of the device, i.e. the cost of purchase and the cost(s) of operation.
- Life cycle cost = initial cost + capitalised value of future costs
- The capitalised value of future costs is obtained by determining the present value of these costs based on their occurrence in time and using a suitable discount rate.
- In general, all costs of operation, maintenance, repair and replacement should be included for determining life cycle cost.
- However, in the present context, the cost of operation that is most relevant is the cost of energy.

## Life Cycle Energy Cost

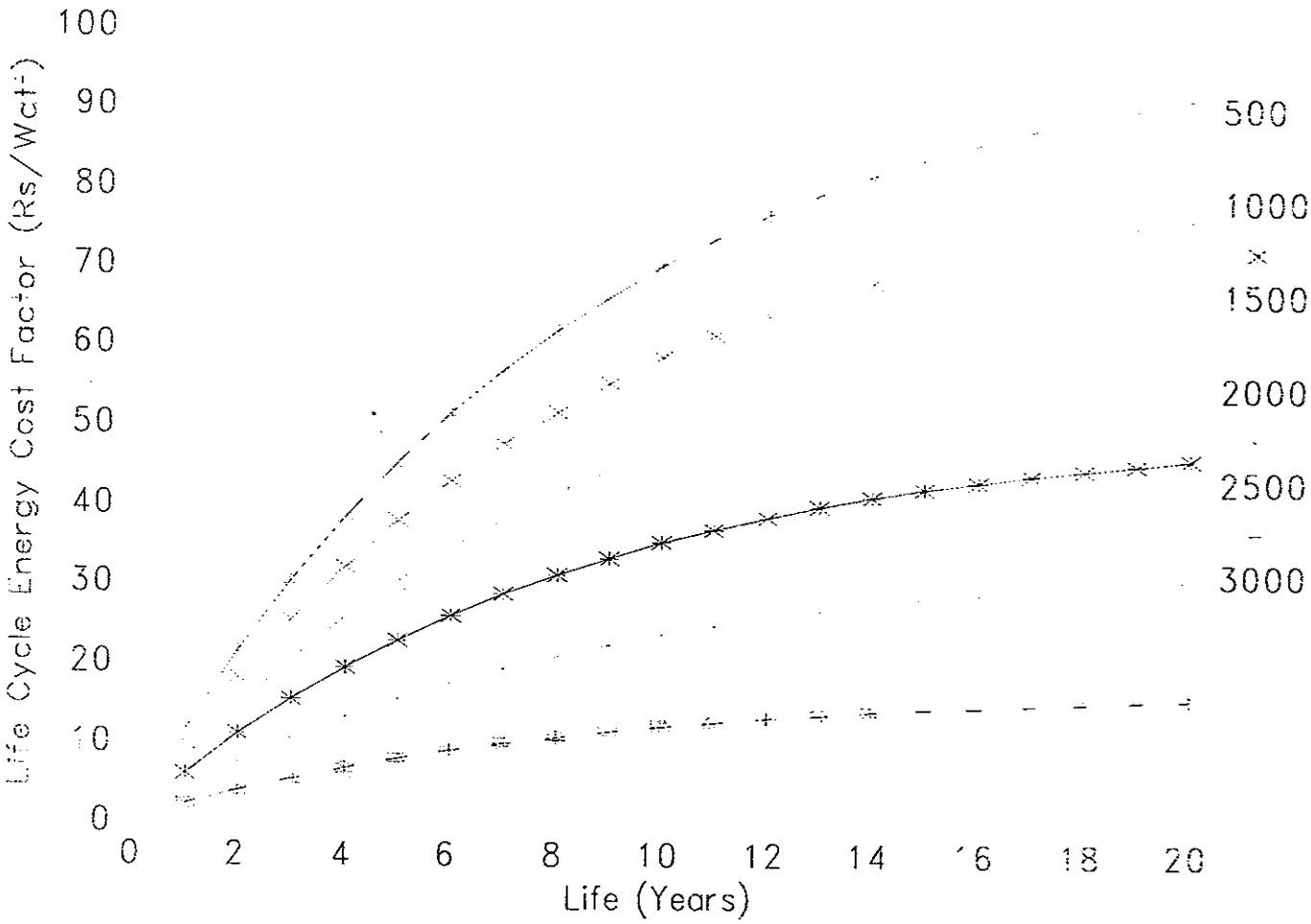
- The capitalised value of future energy costs is the life cycle energy cost of a device.

- Life cycle energy cost is a function of 5 parameters:

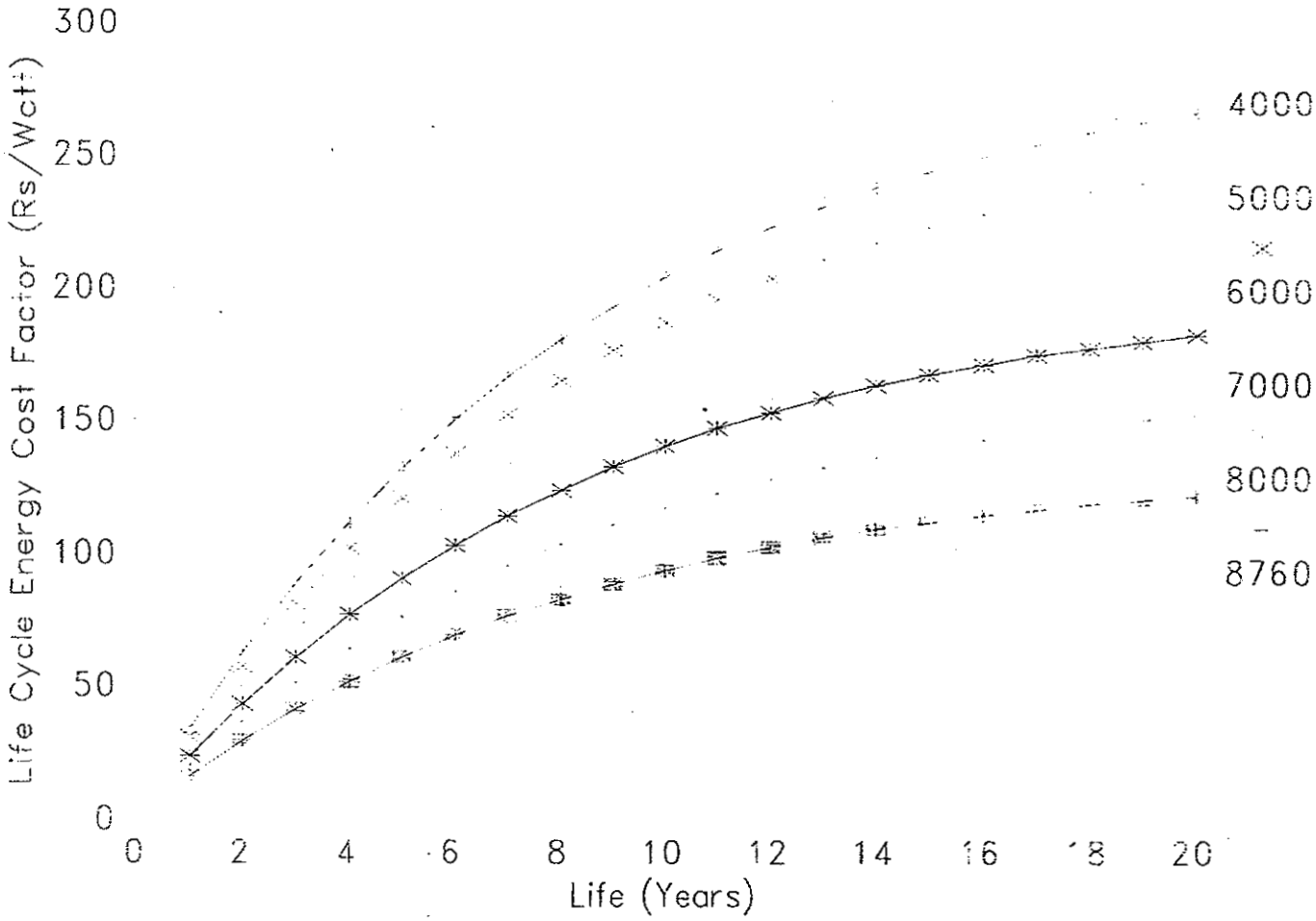
  - device load/ rating (watts)
  - device usage (hours/year)
  - device life (years)
  - cost of electricity (Rs/kWh)
  - cost of capital (real discount rate, %).

- Based on device load/ rating and device usage, the annual energy consumption (kWh/year) can be determined. The annual cost (Rs/year) of this can then be determined considering the tariff or cost of electricity. This cost is incurred annually over the life of the device. The capitalised value can then be determined by applying an acceptable discount rate to obtain the present value of this periodically and regularly occurring cost. Since electricity bills are generally paid monthly, the discounting can be done for monthly rather than yearly periods.

# LIFE CYCLE ENERGY COST FACTOR (DISCOUNT RATE: 12 %, TARIFF: 4.00 RS/KWH, USAGE: 500-3000 HOURS/YEAR)



# LIFE CYCLE ENERGY COST FACTOR (DISCOUNT RATE: 12 %, TARIFF: 4.00 RS/KWH, USAGE: 4000-8760 HOURS/YEAR)



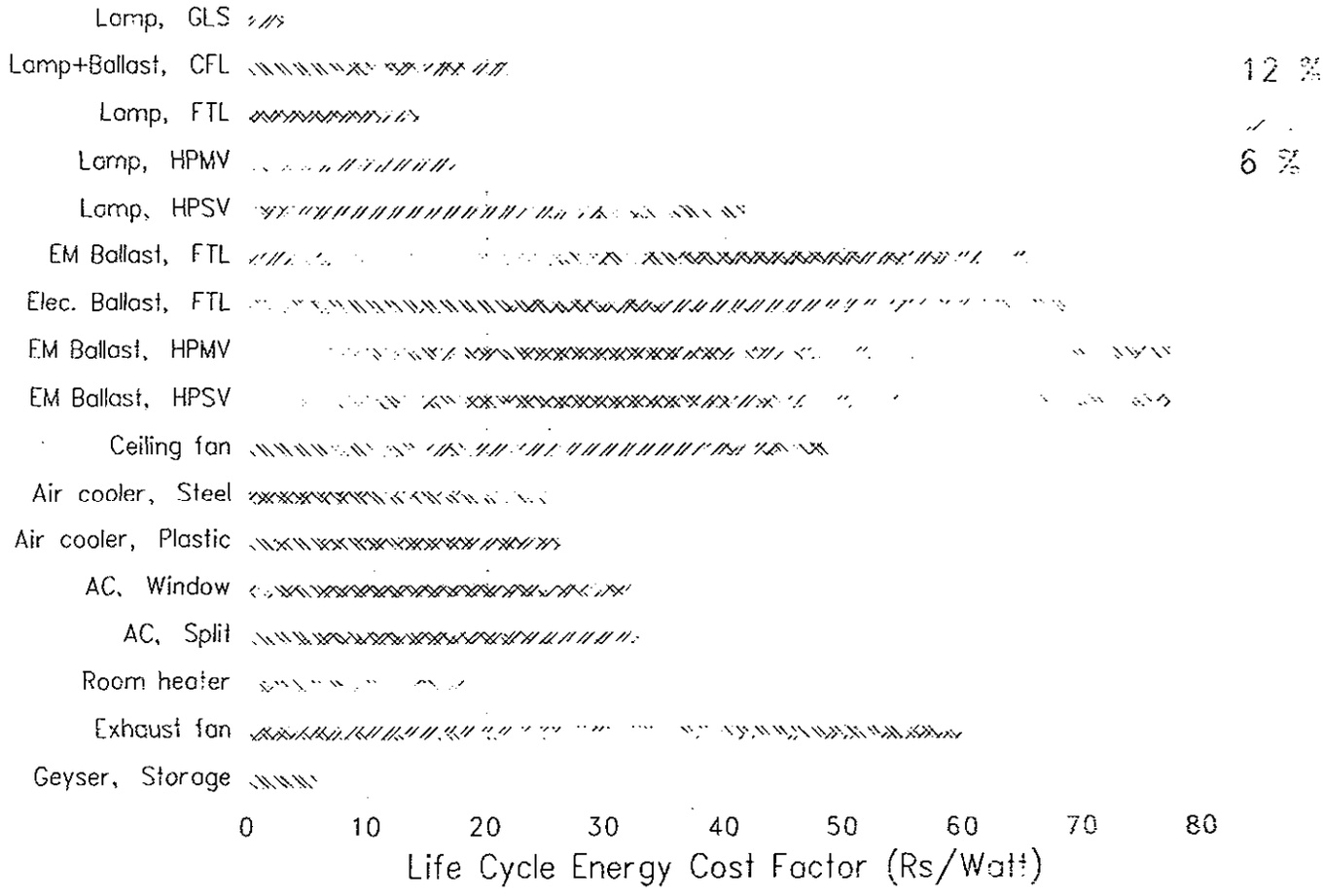
# LIFE CYCLE ENERGY FACTOR AND LIFE CYCLE ENERGY COST OF DEVICES

| Device | Capacity/ Rating | Watts | Hours/ Year | Life Year | KWh/ Year | Rs/ Year |
|---|---|---|---|---|---|---|
| GLS Lamp | 100 W | 100 | 2400 | 0.3 | 240 | 960 |
| Lamp+Ballast, CFL | 20 W | 23 | 2400 | 2.5 | 55 | 221 |
| Lamp, FTL | 40 W | 40 | 2400 | 1.6 | 96 | 384 |
| Lamp, HPMV | 125 W | 125 | 4380 | 1.0 | 548 | 2190 |
| Lamp, HPSV | 150 W | 150 | 4380 | 2.6 | 657 | 2628 |
| EM Ballast, FTL | 40 W | 15 | 2400 | 9.4 | 36 | 144 |
| Elec. Ballast, FTL | 40 W | 5 | 2400 | 9.4 | 12 | 48 |
| EM Ballast, HPMV | 125 W | 25 | 4380 | 5.1 | 110 | 438 |
| EM ballast, HPSV | 150 W | 35 | 4380 | 5.1 | 153 | 613 |
| Ceiling Fan | 1200 mm | 70 | 1200 | 15.6 | 84 | 336 |
| Air cooler, Steel body | 1800 m3/h | 230 | 800 | 11.3 | 184 | 736 |
| Air cooler, Plastic body | 2000 m3/h | 250 | 800 | 11.3 | 200 | 800 |
| Air conditioner, Window | 1.5 T | 2200 | 1000 | 11.3 | 2200 | 8800 |
| Air conditioner, Spilt | 2.0 T | 3200 | 1000 | 11.3 | 3200 | 12800 |
| Room heater | 2.0 kW | 2000 | 400 | 20.0 | 800 | 3200 |
| Exhaust Fan | 300 mm | 110 | 2400 | 7.8 | 264 | 1056 |
| Geyser, Storage | 25 l | 1500 | 125 | 20.0 | 188 | 750 |

| Device | Life Cycle Energy Cost (Rs/watt) | | | Cost | Life Cycle Energy Cost (Rs) | | |
|---|---|---|---|---|---|---|---|
| | Discount Rate, % | | | (Rs) | Discount Rate, % | | |
| | 12.0 | 6.0 | 0.0 | | 12.0 | 6.0 | 0.0 |
| Lamp, GLS | 2.93 | 2.96 | 3.00 | 8 | 293 | 296 | 300 |
| Lamp+Ballast, CFL | 20.65 | 22.24 | 24.00 | 489 | 475 | 511 | 552 |
| Lamp, FTL | 13.62 | 14.28 | 15.00 | 35 | 545 | 571 | 600 |
| Lamp, HPMV | 16.86 | 17.41 | 18.00 | 124 | 2107 | 2177 | 2250 |
| Lamp, HPSV | 38.56 | 41.61 | 45.00 | 495 | 5784 | 6241 | 6750 |
| EM Ballast, FTL | 53.88 | 68.71 | 90.00 | 86 | 808 | 1031 | 1350 |
| Elec. Ballast, FTL | 53.88 | 68.71 | 90.00 | 348 | 269 | 344 | 450 |
| EM Ballast, HPMV | 66.94 | 77.29 | 90.00 | 177 | 1673 | 1932 | 2250 |
| EM Ballast, HPSV | 66.94 | 77.29 | 90.00 | 287 | 2343 | 2705 | 3150 |
| Ceiling fan | 33.81 | 48.60 | 75.00 | 661 | 2367 | 3402 | 5250 |
| Air cooler, Steel | 19.71 | 26.13 | 36.00 | 2298 | 4533 | 6011 | 8280 |
| Air cooler, Plastic | 19.71 | 26.13 | 36.00 | 4115 | 4927 | 6533 | 9000 |
| AC, Window | 24.63 | 32.67 | 45.00 | 23338 | 54194 | 71865 | 99000 |
| AC, Split | 24.63 | 32.67 | 45.00 | 38301 | 78828 | 104530 | 144000 |
| Room heater | 12.11 | 18.61 | 32.00 | 593 | 24219 | 37222 | 64000 |
| Exhaust fan | 48.53 | 59.76 | 75.00 | 1007 | 5338 | 6573 | 8250 |
| Geyser, Storage | 3.78 | 5.82 | 10.00 | 2111 | 5676 | 8724 | 15000 |

***Basis***
Electricity cost = Rs 4.00/kWh

# LIFE CYCLE ENERGY COST FACTOR OF DEVICES
## (TARIFF: 4.00 RS/KWH)



# VALUE OF ANNUAL PURCHASES AND LIFE CYCLE ENERGY COST OF DEVICES

*(Rs. Crores/Year)*

| Devices | Annual Purchases | Life Cycle Energy Cost Discount Rate, % | |
|---|---|---|---|
| | | 12.0 | 6.0 |
| GLS Lamp | 8.2 | 311.8 | 315.5 |
| Compact Fluorescent Lamp | 1.0 | 1.0 | 1.0 |
| Fluorescent Lamp | 8.7 | 133.6 | 140.1 |
| HPMV Lamp | 1.0 | 17.0 | 17.6 |
| HPSV Lamp | 4.6 | 53.7 | 58.0 |
| Electro-magnetic ballast, Fluorescent Lamp | 4.2 | 38.9 | 49.6 |
| Electronic ballast, Fluorescent Lamp | 0.8 | 0.6 | 0.8 |
| Electro-magnetic ballast, HPMV Lamp | 0.3 | 3.1 | 3.6 |
| Electro-magnetic ballast, HPSV Lamp | 1.5 | 12.4 | 14.3 |
| Ceiling Fan | 18.5 | 66.2 | 95.2 |
| Air Cooler, Steel body | 4.8 | 9.5 | 12.6 |
| Air Cooler, Plastic body | 0.5 | 0.6 | 0.8 |
| Air Conditioner, Window | 33.5 | 78.0 | 103.5 |
| Air Conditioner, Split | 14.0 | 29.2 | 38.7 |
| Room Heater | 0.1 | 3.6 | 5.6 |
| Exhaust Fan | 4.0 | 21.4 | 26.4 |
| Geyser, Storage | 2.0 | 5.4 | 8.3 |
| **TOTAL** | **107.8** | **786.0** | **891.3** |

***Basis***
Electricity cost = Rs 4.00/kWh

# Case Study

*LAMPS: Case Study 1- GLS lamps: Replacement of Compact fluorescent lamps*

| Device | GLS Lamp | CFL |
|---|---|---|
| Device load/rating (watts) | 100 | 20+3 |
| Device usage (hours/year) | 2400 | 2400 |
| Device life (year) | 0.3 | 2.5 |
| Cost of electricity (Rs/kWh) | 4.00 | 4.00 |
| Real discount rate (%) | 12 | 12 |
| Life cycle energy cost factor (Rs/watt) | 2.93 | 20.65 |
| Adjusted factor (Rs/watt)* | 20.65 | 20.65 |
| Life cycle energy cost (Rs) | 2065 | 475 |
| Life cycle energy cost savings (Rs) | | 1590 |
| Capital cost (Rs) | 8 | 489 |
| Adjusted cost (Rs)* | 62 | 489 |
| Life cycle cost (Rs) | 2126 | 964 |
| Life cycle cost savings (Rs) | | 1162 |

*LAMPS: Case Study 2- Electro-magnetic ballasts for 40 W fluorescent lamps with Electronic ballasts*

| Device | EM Ballast | Elec Ballast |
|---|---|---|
| Device load/rating (watts) | 15 | 5 |
| Device usage (hours/year) | 2400 | 2400 |
| Device life (year) | 9.4 | 9.4 |
| Cost of electricity (Rs/kWh) | 4.00 | 4.00 |
| Real discount rate (%) | 12 | 12 |
| Life cycle energy cost factor (Rs/watt) | 53.88 | 53.88 |
| Life cycle energy cost (Rs) | 808 | 269 |
| Life cycle energy cost savings (Rs) | | 539 |
| Capital cost (Rs) | 86 | 348 |
| Life cycle cost (Rs) | 894 | 617 |
| Life cycle cost savings (Rs) | | 277 |

* For same life as CFL

*HVAC: Case Study 1- Window air conditioners: Efficiency improvement*

| Device | Std AC 1.5T | Eff AC 1.5T |
|---|---|---|
| Device load/rating (watts) | 2200 | 1800 |
| Device usage (hours/year) | 1000 | 1000 |
| Device life (year) | 11.3 | 11.3 |
| Cost of electricity (Rs/kWh) | 4.00 | 4.00 |
| Real discount rate (%) | 12 | 12 |
| Life cycle energy cost factor (Rs/watt) | 24.63 | 24.63 |
| Life cycle energy cost (Rs) | 54186 | 44334 |
| Life cycle energy cost savings (Rs) | | 9852 |

*HVAC: Case Study 2- Ceiling fans: Efficiency improvement*

| Device | Std Fan 1.5T | Eff Fan 1.5T |
|---|---|---|
| Device load/rating (watts) | 70 | 60 |
| Device usage (hours/year) | 1200 | 1200 |
| Device life (year) | 15.6 | 15.6 |
| Cost of electricity (Rs/kWh) | 4.00 | 4.00 |
| Real discount rate (%) | 12 | 12 |
| Life cycle energy cost factor (Rs/watt) | 33.81 | 33.81 |
| Life cycle energy cost (Rs) | 2367 | 2029 |
| Life cycle energy cost savings (Rs) | | 338 |

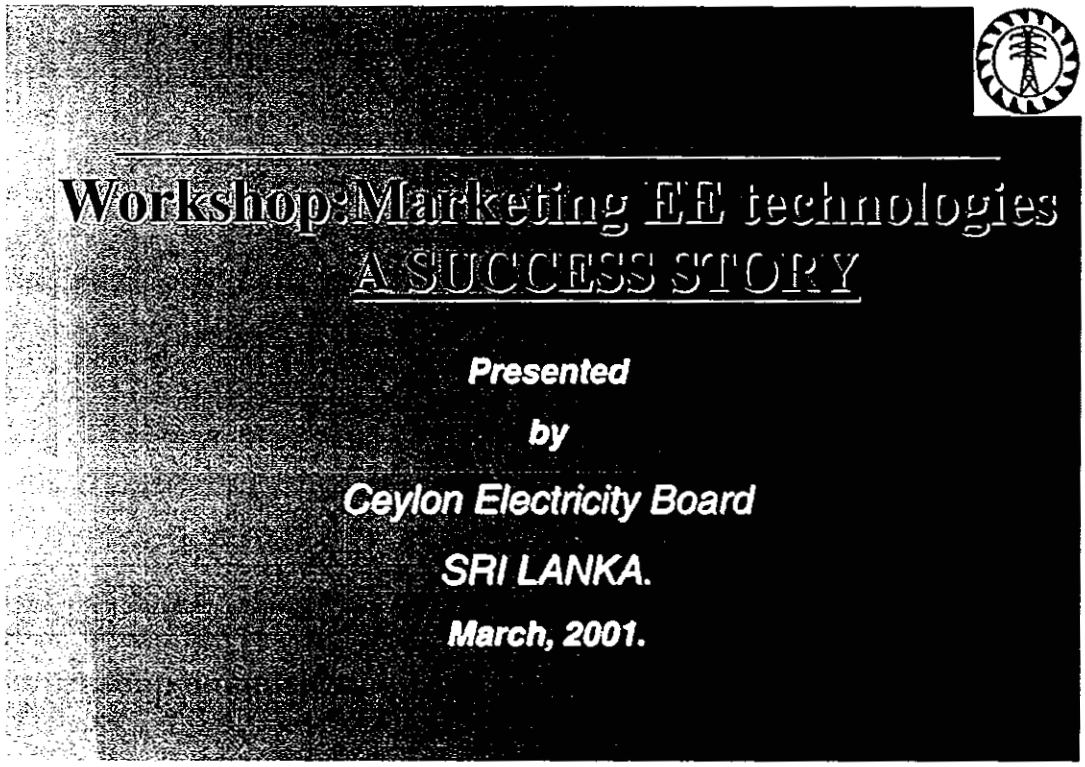
*MOTORS: Case Study 1- **11kW, 4 Pole Motor***

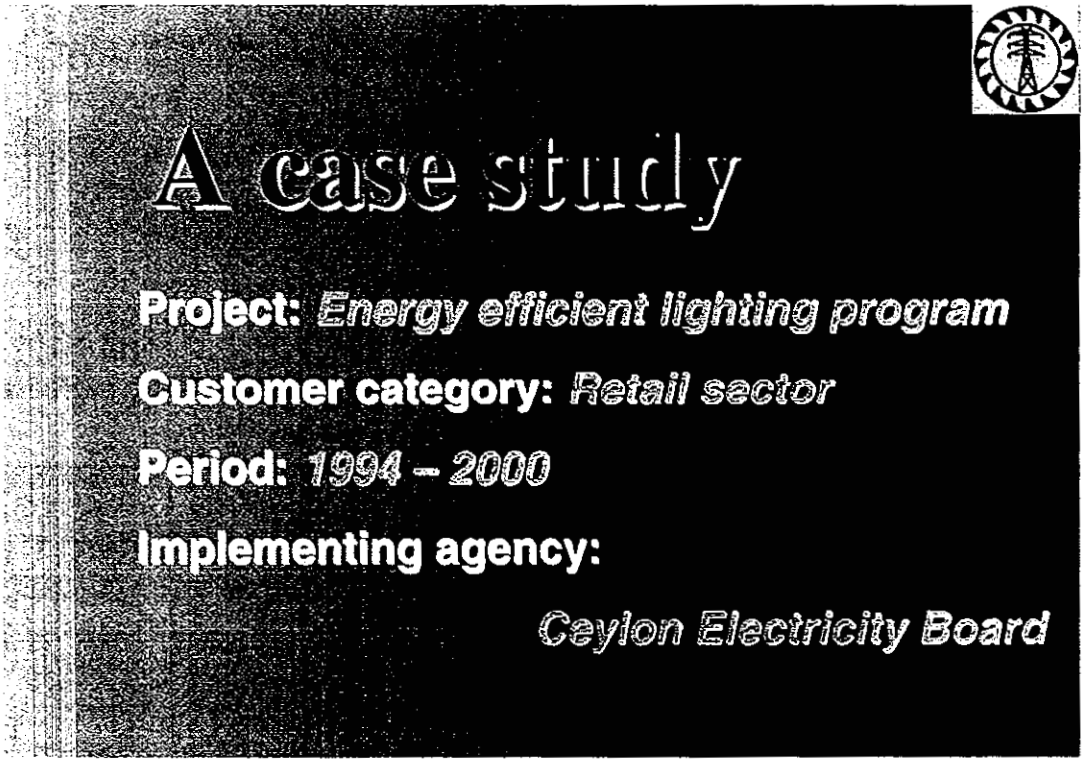
| Device | Std Motor | EE Motor |
|---|---|---|
| Device rating (kW) | 11.0 | 11.0 |
| Device load (%) | 75 | 75 |
| Device efficiency (%) | 86.0 | 91.0 |
| Device load (kW) | 9.59 | 9.07 |
| Device usage (hours/year) | 5000 | 5000 |
| Device life (years) | 6 | 6 |
| Cost of electricity (Rs/kWh) | 4.00 | 4.00 |
| Real discount rate (%) | 12 | 12 |
| Life cycle energy cost factor (Rs/watt) | 85.25 | 85.25 |
| Life cycle energy cost (Rs) | 817,811 | 772,877 |
| Life cycle energy cost savings (Rs) | | 44,934 |
| Capital cost (Rs) | 14,500 | 16,675 |
| Life cycle cost (Rs) | 832,311 | 789,552 |
| Life cycle cost savings (Rs) | | 42,759 |

*MOTORS: Case Study 2- **11kW, 4 Pole Motor***

| Device | Std Motor | EE Motor |
|---|---|---|
| Device rating (kW) | 11.0 | 11.0 |
| Device load (%) | 50 | 50 |
| Device efficiency (%) | 82.0 | 90.5 |
| Device load (kW) | 6.71 | 6.08 |
| Device usage (hours/year) | 2500 | 2500 |
| Device life (years) | 12 | 12 |
| Cost of electricity (Rs/kWh) | 4.00 | 4.00 |
| Real discount rate (%) | 12 | 12 |
| Life cycle energy cost factor (Rs/watt) | 63.45 | 63.45 |
| Life cycle energy cost (Rs) | 425,563 | 385,593 |
| Life cycle energy cost savings (Rs) | | 39,970 |
| Capital cost (Rs) | 14,500 | 16,675 |
| Life cycle cost (Rs) | 440,063 | 402,268 |
| Life cycle cost savings (Rs) | | 37,795 |

## Workshop on marketing EE technologies



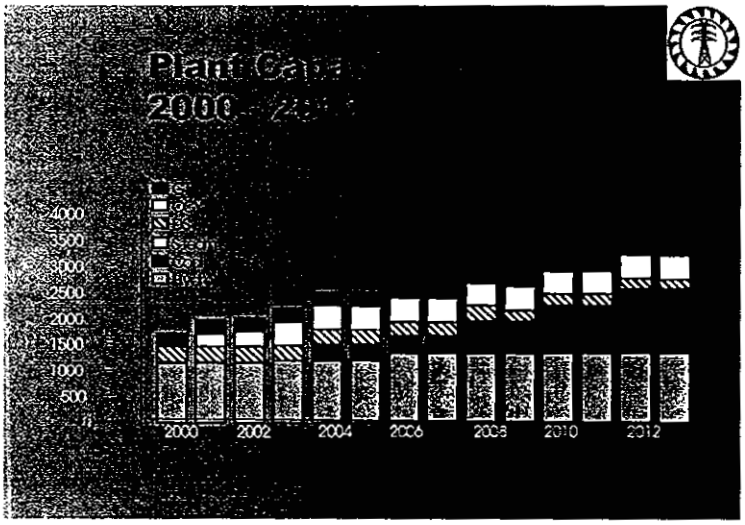
# EE lighting project: *Goals*

**Short-term:**

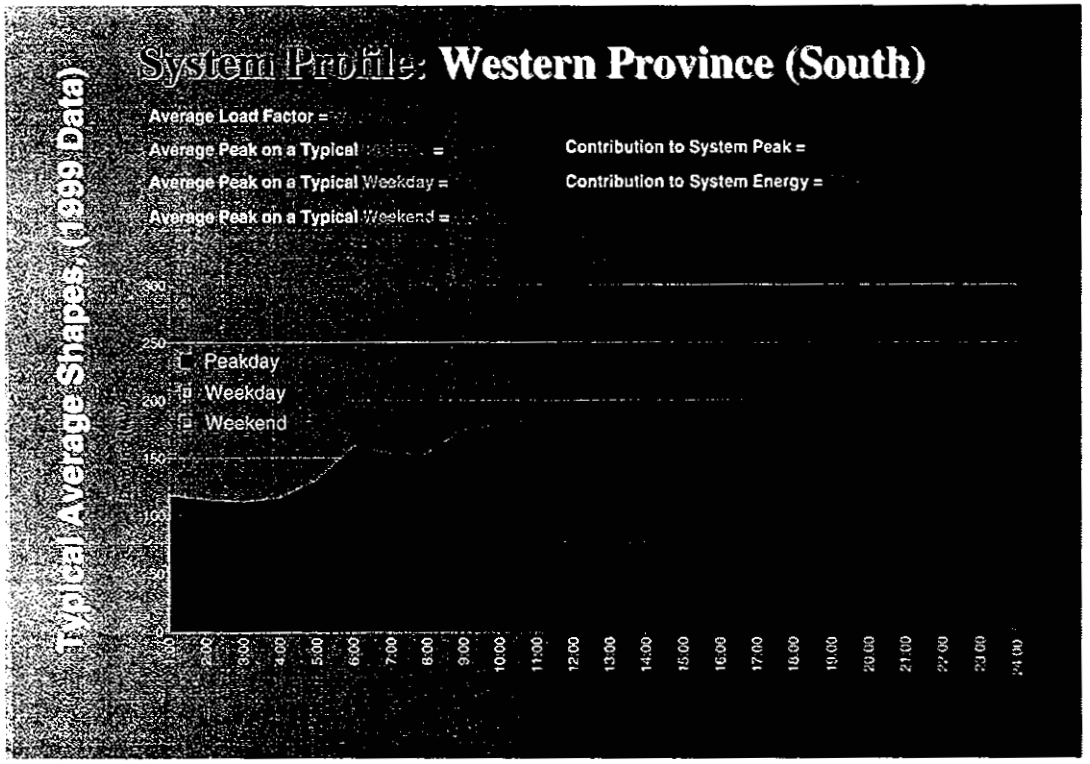
- *Reduce impact from power crisis in 1996.*
- *Reduce high thermal costs to the utility.*

**Long-term:**

- *Reduce long-term demand increase.*
- *Improve load factor.*
- *Reduce investment on infrastructure.*
- *Improve reliability & reduce system loss.*



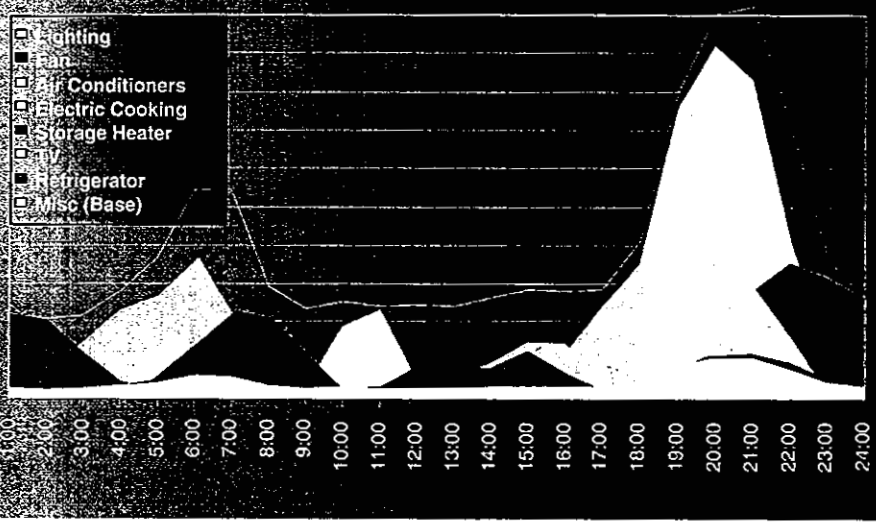
Fossil Fuel Requirement for Thermal Plants
Coal
Furnace
Residual
Diesel
Naptha
Year


Typical Average Shapes, (1999 Data)
System Profile: Western Province (South)
Average Load Factor =
Average Peak on a Typical =
Average Peak on a Typical Weekday =
Average Peak on a Typical Weekend =
Contribution to System Peak =
Contribution to System Energy =
Peakday
Weekday
Weekend
300
250
200
150
100
50
0
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
24:00

# Retail Sector End-Use Load Profile

## (Typical Weekday)

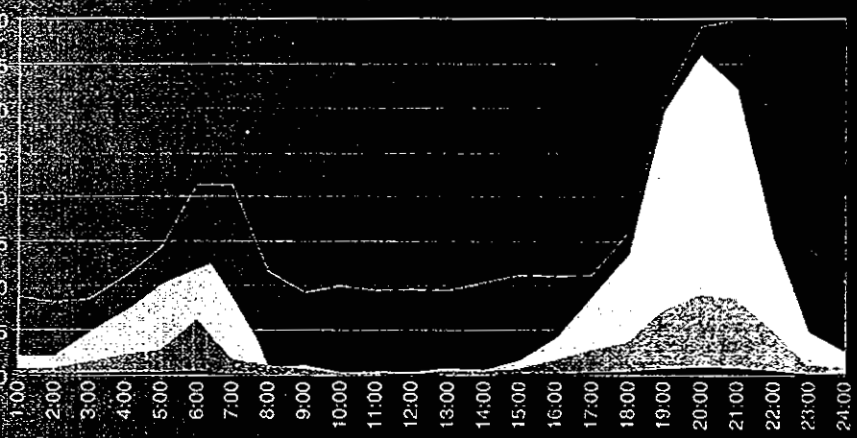
| | % Sector kWh | % System kWh | Contrib to System Peak |
|---|---|---|---|
| Lighting | 38.9% | 07.1% | 19.4% |
| TV | 15.1% | 03.0% | 06.5% |
| Refrigeration | 14.1% | 02.8% | 01.7% |
| Fan (Ventilation) | 17.3% | 03.4% | 03.7% |




# Retail Sector Lighting by Technology

## (Typical Weekday)

| | % Sector kWh | % System kWh | Contrib to System Peak |
|---|---|---|---|
| Incandescent | 27.0% | 05.3% | 15.2% |
| Fluorescent | 08.2% | 01.7% | 03.8% |
| CFL | 00.8% | 00.2% | 00.4% |



## EE Lighting project: Technologies available/selected

- Compact fluorescent lamps with integral ballasts: electronic & magnetic ballast.
- Compact fluorescent lamps, modular type.
- Linear fluorescent lamps.

Technology selected:

CFL with integral ballasts: electronic & magnetic

## EE lighting project: CFL program

Replacement of incandescent lamps with CFLs

- Pilot project: 1994-1995.
- Project stage 1: 1995-1997.
- Project stage 2: 1997-1999.
- Project stage 3: 1999-2001.

## CFL program: *Pilot Project*

- **Purpose:** ***Customer acceptability & reliability.***
- **Fund:** ***From the Energy Conservation Fund.***
- **Sample:** ***600 Island-wide.***
- **Lamps:** ***CFLs with Integral ballasts (magnetic & electronic)***
- **Procedure:**
  - *02 lamps distributed free to every participant.*
  - *Monitoring done at the end six month intervals for 1½ years.*

## CFL program: *Results of pilot Project*

- **Customer acceptability:** *over 95%.*
- **Customers' view on initial cost:** *too high.*
- **Lamp type:**

  *80% preferred CFLs with electronic ballasts:* reliability, smaller & lighter, quality of light & suitable for most fittings.

## CFL program: Stage 1
### Main features

- 100,000 CFLs from leading manufacturers in the world, purchased by the utility.
- Lamps sold at subsidized cost by the utility.
- Two year warranty for lamps.
- Lamps distributed through the utility island-wide area network.
- Publicity from the utility.
- Project completed in 12 months.

## CFL program: stage 1
### Results

- High customer acceptability.
- Failure rate less than 1.5%.
- Estimated Savings :
  - Demand reduction = 5 MW
  - Energy reduction = 7.5 GWh/annum

## CFL program: Stage 2
### Main features

- An interest free loan to purchase lamps from utility.
- Government grants an import duty wavier.
- Marketed by listed suppliers in a competitive environment.
- Loan repayment in 12 installment with electricity bills.
- Quality standards for lamps offered by listed suppliers.
- Compulsory 2 year warranty.
- Independent testing arranged for supplier registration.
- Payments to suppliers made by the utility on behalf of customer.

## CFL program
### Results (up to end 1999)

- Number of lamps purchased by participants = 173,000
- Number of lamps purchased by free riders due to increased publicity = 725,000

Savings: Demand Saving = 45 MW
Energy Saving = 66 GWh/annum

- Cost effectiveness:

| | |
|---|---|
| Reduced supply costs | = Rs. 252 Million/annum |
| Customer bill saving | = Rs. 212 Million/annum |
| Program costs | = Rs. 3 Million/annum |
| Net Benefit to the Utility | = Rs. 37 Million/annum |

## CFL program: Stage 3
### Features

- Utility introduces a further subsidy to reduce increasing lamp costs.
- Revised standards for suit low voltage conditions and system deficiencies.
- Increased publicity.

## EE lighting program:
### Total benefits: end 2000

- Number of lamps purchased by participants = 261,000
- Number of lamps purchased by free riders due to increased publicity = 1,235,000
- Savings:

| | | |
|---|---|---|
| Demand Saving | = | 74 MW |
| Energy Saving | = | 110 GWh/annum |

- Cost effectiveness:

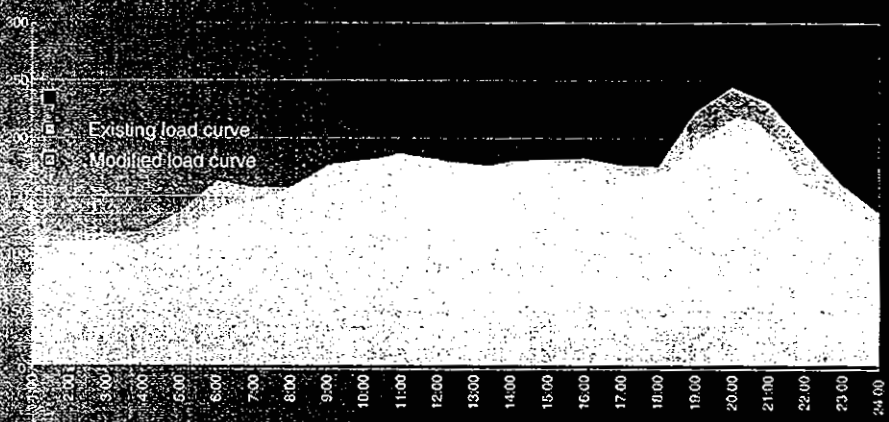
| | |
|---|---|
| Reduced supply costs | = Rs. 650 Million/annum |
| Customer bill savings | = Rs. 456 Million/annum |
| Program costs | = Rs. 18 Million/annum |

Net Benefit to the Utility = Rs. 176 Million/annum

## Modified System Profile - West South

**Average load factor = 57 %**

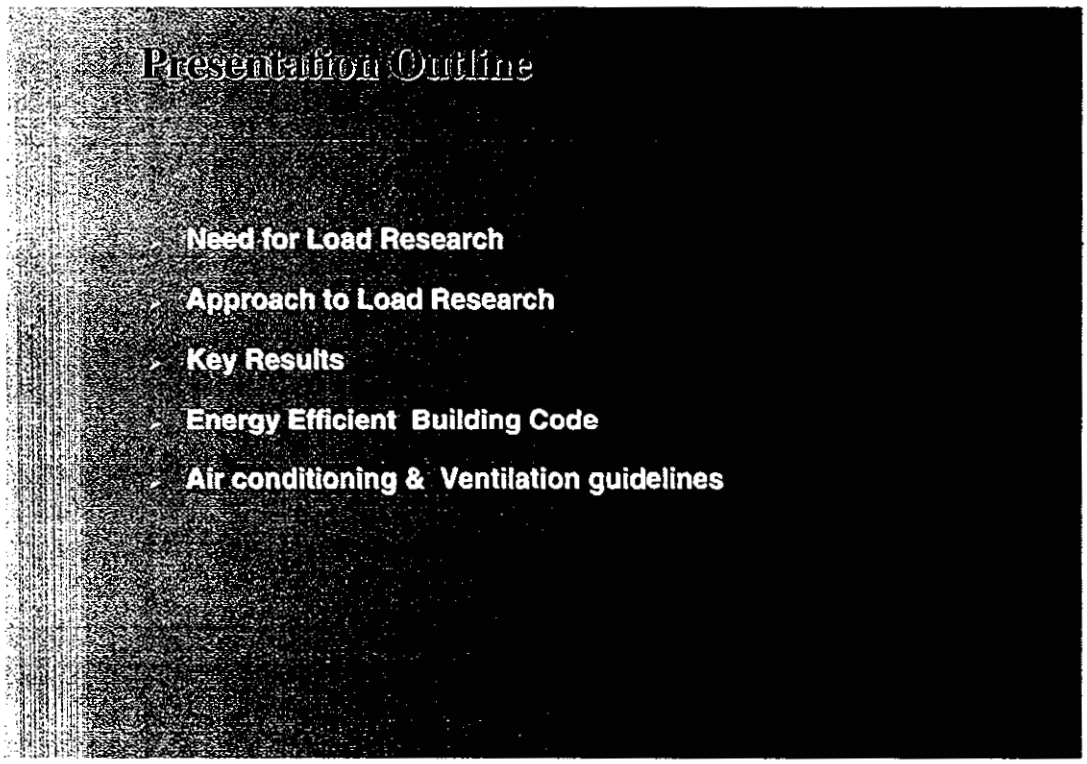
**Average improved load factor with DSM = 60 %**

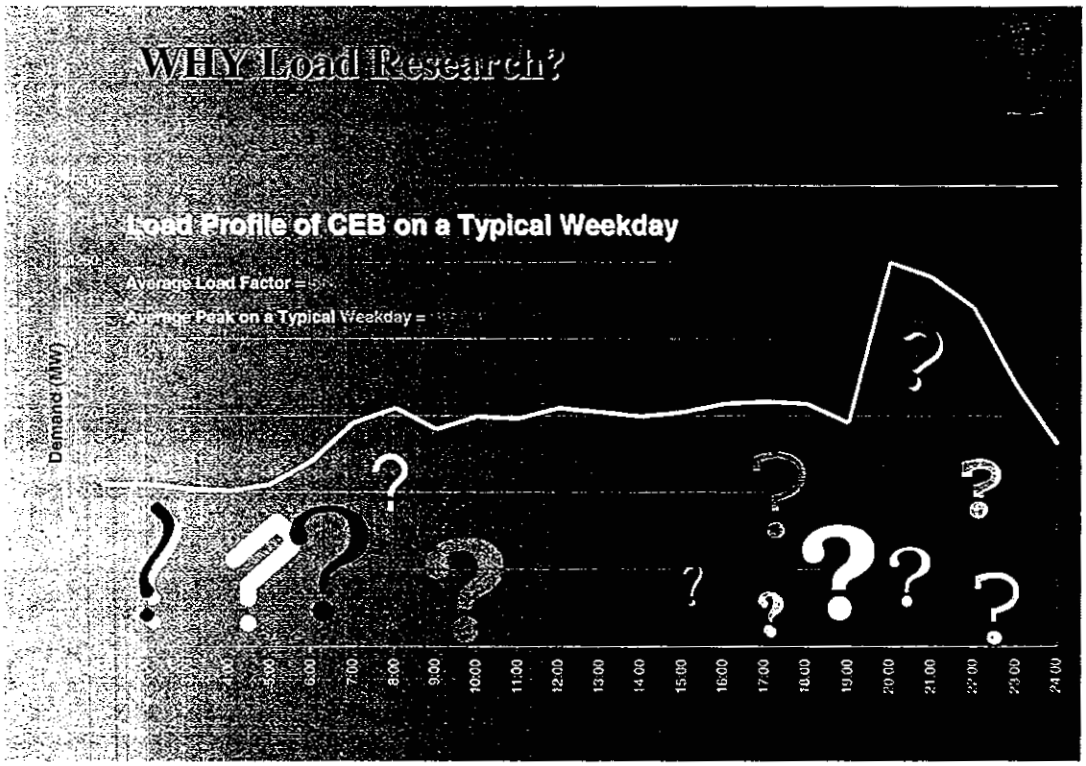


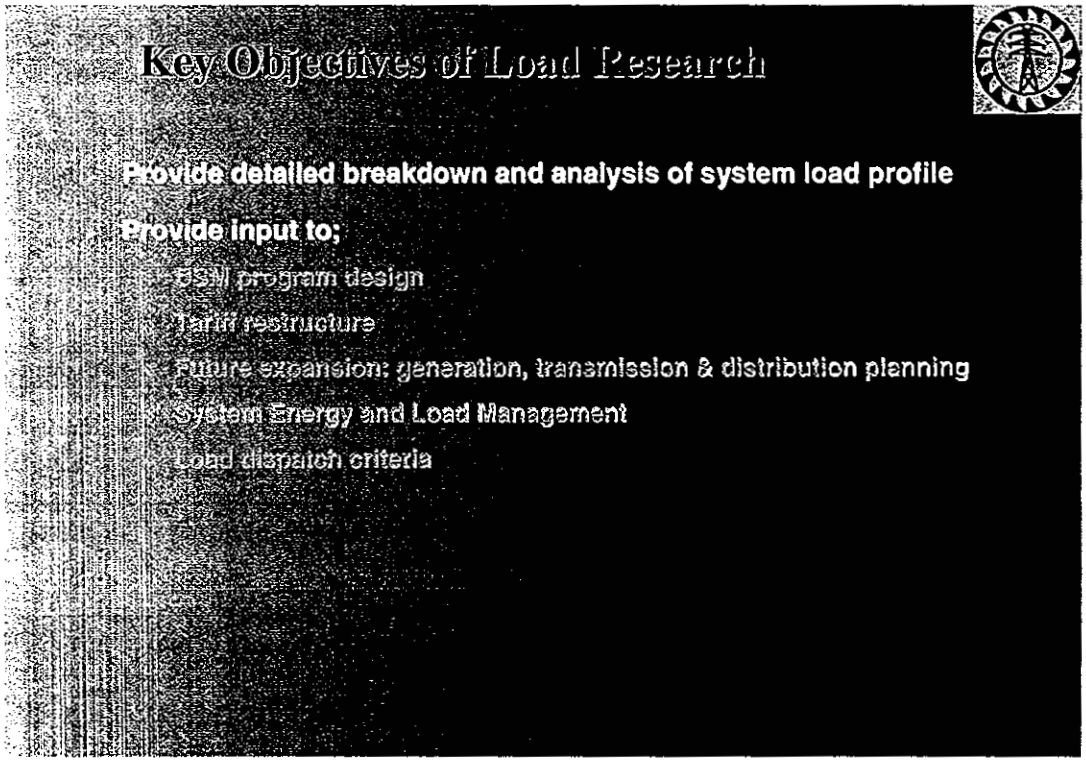

## EE lighting program: *Further improvements*

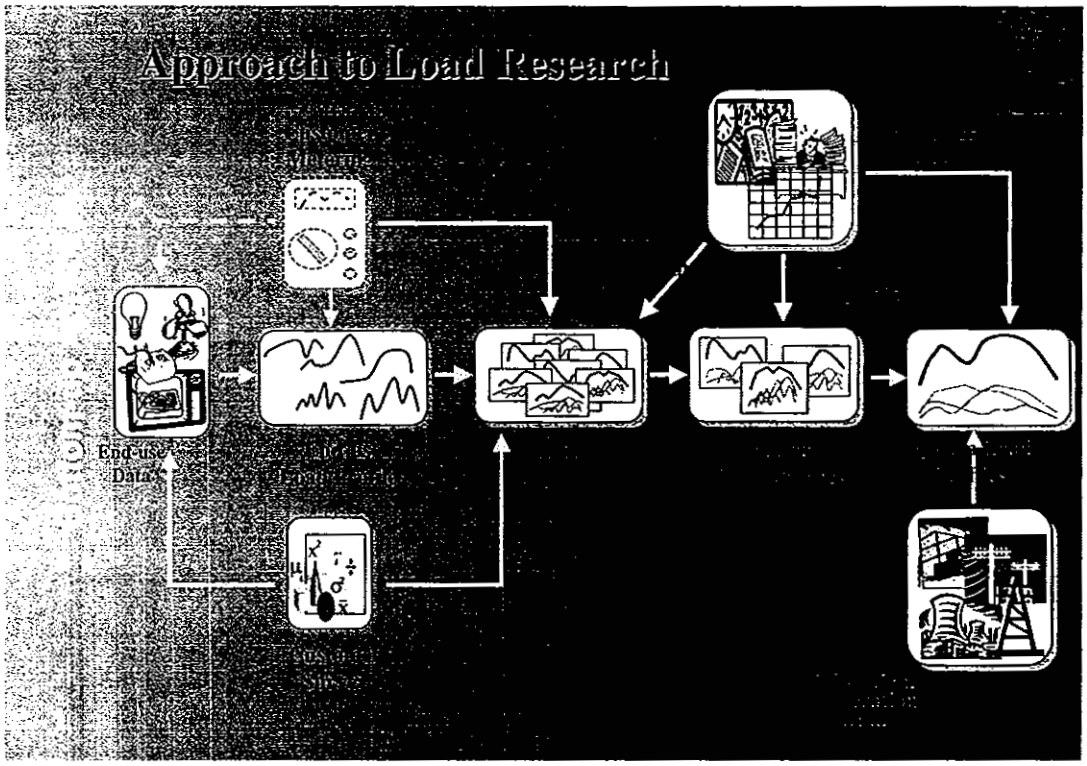
- ***Further reduction in prices.***
- ***Lamp + control gear standards & labeling.***
- ***Lamp + control gear testing facility to be established.***
- ***New programs to grant lamps with new connections.***
- ***A concession for customers in defined poverty levels.***

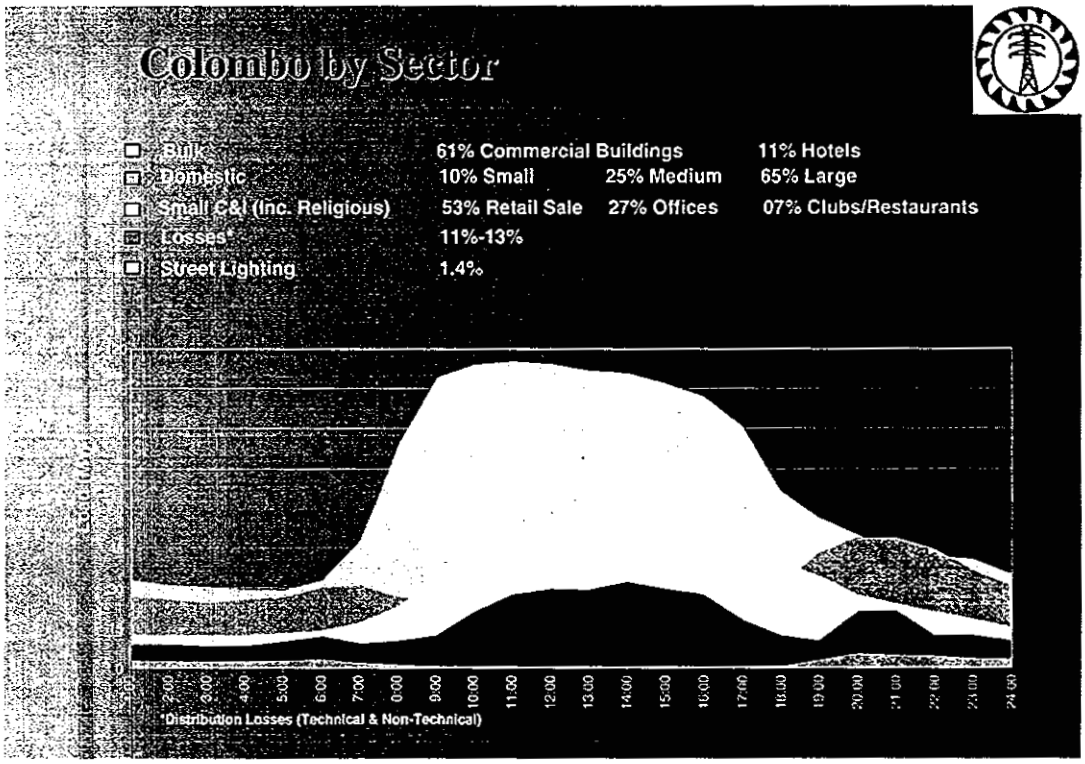
# Load Research of Electricity Sector & DSM in Sri Lanka

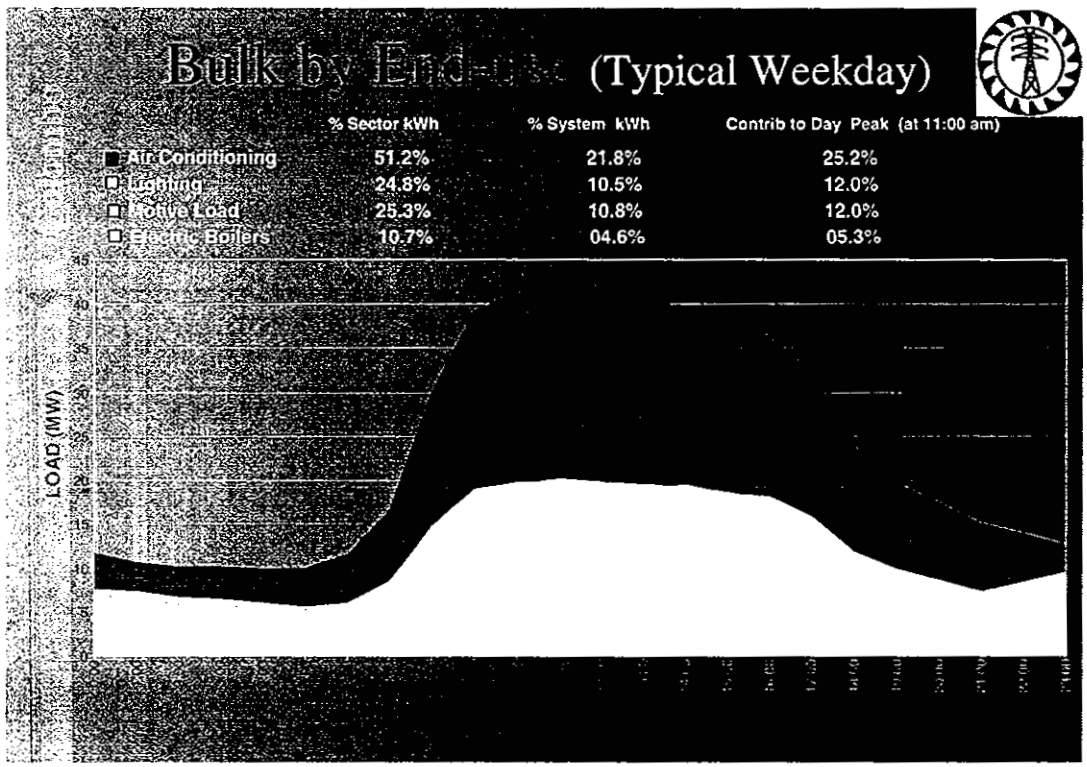



WHY Load Research?
Load Profile of CEB on a Typical Weekday
Average Load Factor =
Average Peak on a Typical Weekday =
Demand (MW)
24:00


Key Objectives of Load Research
Provide detailed breakdown and analysis of system load profile
Provide input to;
DSM program design
Tariff restructure
Future expansion; generation, transmission & distribution planning
System Energy and Load Management
Load dispatch criteria

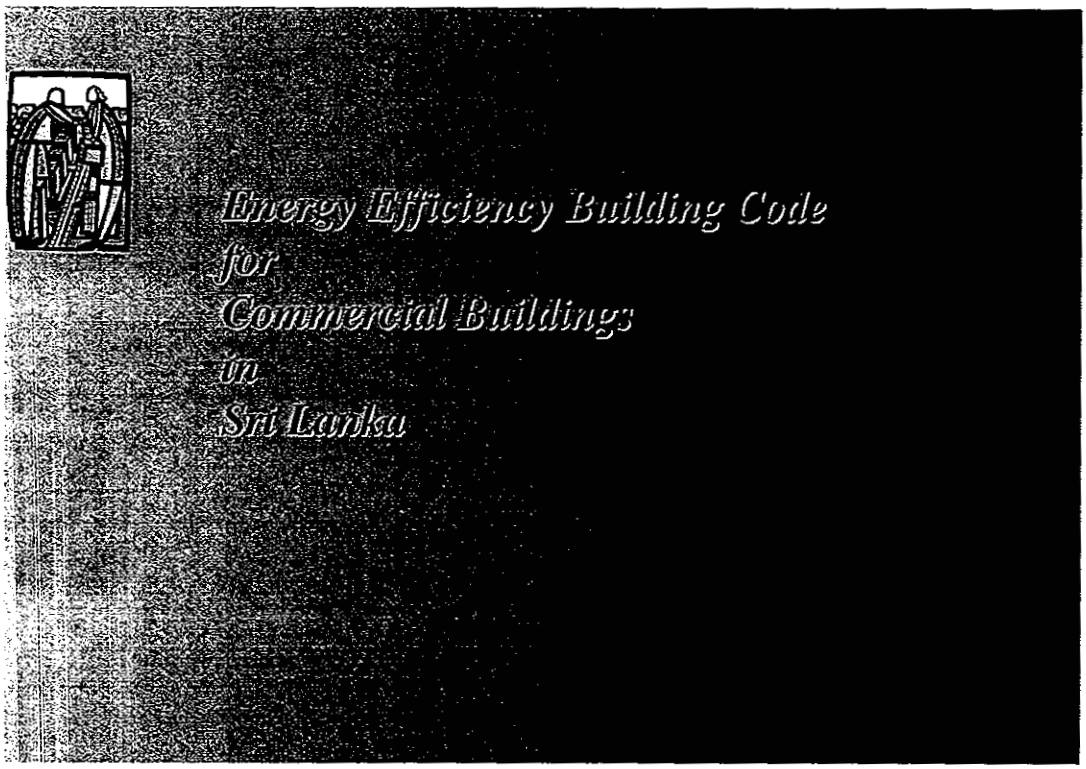

Approach to Load Research
End-use Data

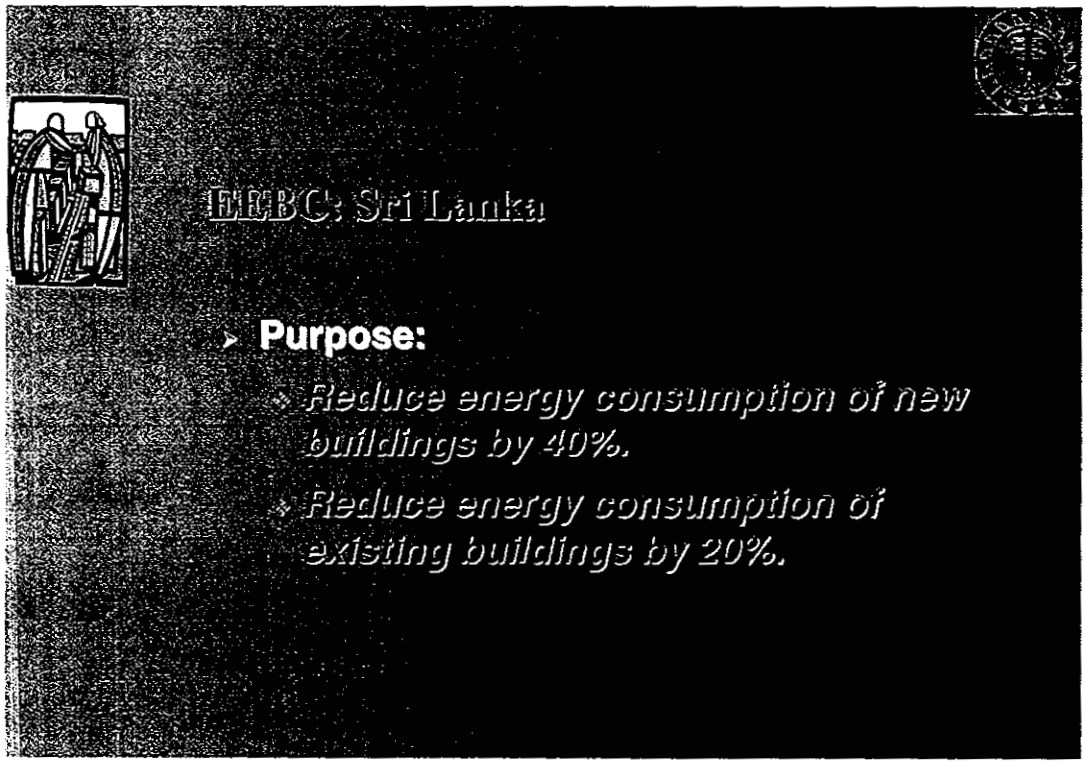

Colombo by Sector
Bulk
Domestic
Small C&I (Inc. Religious)
Losses*
Street Lighting
61% Commercial Buildings
11% Hotels
10% Small
25% Medium
65% Large
53% Retail Sale
27% Offices
07% Clubs/Restaurants
11%-13%
1.4%
*Distribution Losses (Technical & Non-Technical)




## DSM Options [illegible] Provinces

| | Domestic | | | | | | | Bulk | | | | General | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Lighting | Fans | Refrigerator | TV | A/C | Cooking | Others | Motive load | A/C | Lighting | Process equipment | EEBC | TOD | Tariff Restructure |
| West South | 1 | 2 | - | 3 | - | - | - | 1 | 2 | 3 | | | ✓ | ✓ |
| West North | 1 | 3 | - | 2 | - | - | - | 1 | 2 | 3 | | | ✓ | ✓ |
| North Western | 1 | 3 | - | 2 | - | - | - | 1 | 3 | 2 | | | ✓ | ✓ |
| LECO | 1 | 2 | 3 | - | - | - | - | 1 | 3 | | 2 | ✓ | ✓ | ✓ |
| Colombo city | 1 | 3 | 2 | - | - | 3 | - | 3 | 1 | 2 | | ✓ | ✓ | ✓ |


Energy Efficiency Building Code
for
Commercial Buildings
in
Sri Lanka


EEBC: Sri Lanka
Purpose:
Reduce energy consumption of new buildings by 40%.
Reduce energy consumption of existing buildings by 20%.

## EEBC: Sri Lanka

**Areas considered for the code:**

- *Ventilation & air conditioning*
- *Lighting*
- *Building envelope*
- *Electrical power & distribution*
- *Service hot water systems*

Section 3
Ventilation
A/C

## EEBC: Sri Lanka

**Section 3**

*Ventilation*

*&*

*Air Conditioning*

Section 3
Ventilation
A/C

## EEBC: Sri Lanka

- **Load Calculation**

- *Calculation procedure:*
  - *ASHRAE guidelines or equivalent.*
- *Indoor design condition:*
  - *24°C ±1 & RH 55%±5%.*
- *Outdoor design condition:*
  - *Drybulb = 32°C & Wet bulb = 27°C.*
- *Ventilation and exhaust:*
  - *ASHRAE Standard 62 - 1999.*

Section 3
Ventilation
A/C

## EEBC: Sri Lanka

- **System and equipment sizing:**
  - *Designed to provide only calculated load*
  - *Two separate refrigerant circuits if the calculated load is above 700kW.*
  - *Optimal operations with controls for multiple units.*
  - *Minimum capacity of individual units should be 20kW.*

Section 3
Ventilation
A/C

## EEBC: Sri Lanka

- **Fan System Design Criteria**
  - 590 l/s per kW input power for Constant air volume system
  - 420 l/s per kW input power for variable air volume systems
  - Requirement for separation of non homogeneous operation zones
  - **Insulation of ventilation duct**

Section 3
Ventilation
A/C

## EEBC: Sri Lanka

- **Pumping system design criteria:**
  - Friction rate < 2 $mH_2O$/100 m.
  - Flow speed < 2.5 m/s
  - 70 % pump efficiency
  - **Insulation requirement**
  - Variable flow/speed system
  - Life cycle cost analysis for selection

Section 3
Ventilation
A/C

EEBC: Sri Lanka

- **Air Conditioning Systems**
  - Temperature Controls requirement
    - Thermostat, location, quantity
  - Time clock control
  - Temperature set-up
  - Outdoor air shutoff when unoccupied
  - Zoning for control purpose

Section 3
Ventilation
A/C

EEBC: Sri Lanka

- **AC Equipment**
  - Performance :
    - Shall meet or exceed minimum
  - Equipment selection :
    - Minimizing life-cycle cost
    - Based on applied part-load value (APLV)

Section 3
Ventilation
A/C

## EEBC: Sri Lanka

- **Minimum Efficiency for AC Equipment**

- For cooling tower, maximum flow rate at rated condition divided by motor nameplate output power

Section 3
Ventilation
A/C

## EEBC: Sri Lanka

- **Minimum efficiency for AC** *Standard Rating Conditions (°C) for Air Cooled systems:*

Section 3
Ventilation
A/C

EEBC: Sri Lanka

- **AC Equipment - Others requirement**
  - *Hot Gas bypass restriction*
  - *Condenser heat recovery*
  - *Multi speed cooling tower*
  - *Testing, Balancing, Commissioning*
  - *Water Treatment*
  - *Maintenance*

## International experience with EE products marketing - Lamps

# International Experience with EE Product Marketing

***Marketing Energy-Efficient Products***

An ECO Project Course

Presenter: Brian Wood, Nexant

15, 16 and 17 March 2001, New Delhi

# EE Product Marketing Background

- Technology innovations generally have driven market change:
  - Incandescent lamps—early 1900s
  - Fluorescent lamps—1940s
  - HID sources (1960s-'70s) for industrial, outdoor spaces, and now commercial and other applications
  - Improved fluorescent lamp technology
    - Thin-tube (T8)—1980s
    - Improved phosphors—1980s
    - CFL—1980s
    - Ultra-thin tube (T5)—late 1990s

## Market Shifts Due to Multiple Feature Improvements

- Scope of feature improvements for lighting
  - Light distribution
  - Color rendition and other aesthetics
  - Operating and replacement costs
  - Lamp life, durability, reliability
- Incremental EE improvements, alone, have difficulty in penetrating the market
  - Competition with other features
  - Lack of consumer awareness
  - Consumer indifference

## Success of EE Products Depends on Market Events

- Electricity tariff increases that raise awareness of energy costs
- Technology or styling innovations that attract consumer interest
- Standards/ratings/labeling to address consumer risk aversion
- Sustained marketing efforts
  - Promotion
  - Financial incentives
  - Direct assistance

## Contributors to Successful Market Penetration

- Significant non-energy benefits
  - Performance
  - Convenience
  - Aesthetic appeal
- Low incremental costs
- Relatively simple market structure

## Importance of Non-Energy Benefits for EE Products

- New EE products must meet or exceed performance attributes of existing products
- Energy cost savings are typically not sufficient to induce consumers to *RISK* a shift to a new technology
- Multiple product attributes attract BOTH retailers and consumers

## Dealing with Added Cost of Energy Efficiency

- Incremental price must correlate with *perceived* value
- Common approaches to overcome consumer barriers
  - Education, marketing, and rebates/promotions to induce trials
  - Incentives to retailers/dealers/contractors to motivate sales and increase stocking
  - Manufacturer "buy-downs" to leverage cost reductions to consumers

## Approaches to EE Lighting Market Development

- Intensive promotional efforts
- Initially aggressive financial incentives
  - Free product distribution to consumers
  - Instant or mail-in rebates to consumers
  - Retailer/distributor incentives
  - Manufacturer buy-downs
  - Installment payment programs
- Product testing and certification
- Branding and labeling
- Retailer training and merchandising support

## Review of Selected Marketing Efforts Abroad

- Focus on CFL, T8 and electronic ballasts
- CFL programs in Latin America, Poland, China, Egypt, South Africa, Thailand
- Market development activities in "mature" EE product markets

## Residential Market CFL Programs in Latin America

BACKGROUND

- As in India, commercial sector adopted CFLs quickly, but households did not
- LA countries face critical power shortages, while residential lighting is a dominant source of peak power demand
- CFL lamps were seen as a solution, but not affordable to the largest consumer population

## Electric Utility CFL Programs in Latin America

- Utilities supported CFL programs to meet both emergency and sustained needs:
  - Defer costly distribution upgrades
  - Avoid power shortages
  - Reduce demand when hydro resources low
- Since mid-'80s, CFL programs in Argentina, Bolivia, Brazil, Chile, Costa Rica, Cuba, Ecuador, Guadalupe, Jamaica, Martinique, Mexico, Nicaragua, and Peru
  - Peak load reduced by 250-500 MW
  - Increased CFL sales by 10 million

## Financial Incentives in Latin American CFL Programs

- Give-aways
  - Aimed primarily at low income consumers
  - Sometimes combined with installation service
  - Largest program: 89,000 CFLs in 1 year (Brazil)
- Price discount or rebate coupons
  - Mailed to selected consumers in elec. bill
  - Coupons redeemed for price discounts in selected sales outlets
  - Coupon value ranging from $4 to $8 per lamp
  - In most cases the number of lamps is limited
  - Largest programs: 2.5-4 million lamps (Cuba/Mex.)

# Financial Incentives in Latin American CFL Programs

- Sales at cost
  - Bulk purchase (for resale) by utility establishes a low, wholesale price available to consumers
  - Aimed at higher income consumers
  - Largest program: 0.6 million lamps (Peru)
- Installment payment programs
  - Terms range from 5 – 24 months
  - Interest rates range from 0 – 4%/month
  - 1-year guarantees offered in some programs

# Marketing Approaches in Latin American CFL Programs

- Programs heavily promoted in TV, print, and radio media; direct mail
- Sales outlets vary
  - Utility offices
  - Select group of retailers
  - All retailers
  - Traveling salesmen
- Most programs find that marketing approach could be improved

## Poland Efficient Lighting Project (PELP)

- Polish lighting market about 1/3 the size of Indian market
- Approach
  - Manufacturer buy-down to reduce price
  - Branding of the marketed CFL lamps
  - Extensive promotion and public education program

## PELP: Manufacturer Buy-Down Approach

- Selected because offers largest increase in sales at lowest cost
- Manufacturers compete for subsidies
  - Compete on basis of savings versus costs
  - Free to choose eligible product lines and how to apply subsidies
  - If promised sales level not achieved, subsidy allotment reverts to a more successful competitor

## PELP: Manufacturer Buy-Down Approach

- Manufacturer agreed to pass full value of subsidy into lower wholesale price
- "Proof of Performance" documentation
- Suggested retail prices printed on packaging to prevent distributors and retailers from retaining the discounts
- Manufacturers encouraged to
  - Contribute own additional price reductions
  - Cover promotion and labeling costs

## PELP: Leveraging Value of Manufacturer Buy-Down

- Cuts mark-ups on the subsidy:
  - 15% wholesaler mark-up
  - 25% retailer mark-up
  - 22% value-added-tax
  - $1 subsidy provides $1.75 to consumer
- Average PELP price reductions:
  - $2.14 average subsidy
  - $1.23 average manufacturer contribution
  - $2.54 reduced mark-ups and taxes
  - $5.91 total discount to consumer

## PELP Marketing Campaign

- Public education component: consumer info on EE lighting benefits by trusted, non-industry source
- PELP "Green Leaf" logo promoted as consumer brand, connoting energy efficiency and high quality
- Advertised linked PELP logo with respected consumer and environmental organizations
- Print, TV, media advertising, promotions, publications, school education programs
- Training in merchandising by manufacturers

## PELP Results

- 800,000 CFLs sold through program in 2nd year, double the 1st year
- Subsidy values reduced over time as market grew
- CFL penetration increased from 1 in 10 households owning at least one CFL to 1 in 3 after 1st year
- Significant increase in number of shops carrying CFLs, and their range of products

## China Green Lights Program

- Coordinated government-industry program to boost EE lighting products
- In 1995, aggressive goals set for the program period, 1996 – 2000:
  - 200 million CFL sales
  - 100 million T8 and T5 sales
  - To achieve 26.8 TWh, 7.2 Gigawatts saving

## China Green Lights Principal Initial Elements

- Low-interest financing for manufacturer capacity expansions
- CFL pilot programs
  - Chicken farms around Beijing
  - Provincial promotion/(limited) rebate programs
  - 10 million lamps sold in Shandong; 300 MW saved
- Public education campaign
- Exhibition center
- International exhibitions/exchange programs

## China Green Lights Initial Results

- Commercial consumers responded to operating cost savings
- Residential consumers increased light levels
  - Doubled light level from GSL lamps
  - Still reduced energy use by 50%
- Residential consumers disappointed by poor lamp quality (short life)

## China Green Lights Response to Initial Results

- Quality warranty initiative
  - 6 – 8 months for commercial
  - 8 – 12 months for residential
  - Caused 30% sales boost in Shanghai
- Standards development and quality testing (voluntary standards)
  - None of the largest manufacturers passed in 1998

## China Green Lights Results of Program by 1998

- Sales
  - CFL: 3M in '94 52M in '98
  - T8: 30M in '95 84M in '98
  - T5: 0 in 95 7M in '98
- Products widely available
- Prices reduced by 37%
- Quality improved
  - 1995 average life less than 1,000 hrs
  - 1998 most below 3,000 hrs; some at 5,000 hrs

## China Green Lights Next Steps

- Testing and certification of CFLs
  - Annual random testing
  - Certification center and labeling
- Promotion
  - Publication of test results
  - Manufacturer training on CFL standards
  - Promotion of certification label
- EE standards for other products
- Bulk purchase program to pool scattered end-user demand groups

## Importance of Product Differentiation

- In many cases, EE features are not visibly or readily recognizable by consumers
  - T8 versus T12 fluorescent lamps
  - Product lifetimes are not evident
- Value of establishing a trusted brand or label
- Value of independent testing and certification of products

## US Programs: T8 Lamps and Electronic Ballasts 1986-2000

- Initially, market penetration reduced by
  - High price
  - Early performance issues
- Key strategy of utility/government programs:
  - Rebate programs based on value of savings
  - In some cases, incentives to distributors and wholesalers

## US Programs: T8 Lamps and Electronic Ballasts 1986-2000

- Short-Term results
  - Full participation, as suppliers competed to use them to boost sales
  - Large sales volume: rebates easy to use
  - Awareness developed through programs
  - Product quality improvements driven by programs

## US Programs: T8 Lamps and Electronic Ballasts 1986-2000

- Long-Term results
  - Prices fell as demand grew (50% drop in incremental price for lamps, ballasts)
  - Market share rose to 50% in program areas
  - With competition, manufacturers improved:
    - Reliability
    - Features
    - Level of promotion
  - In non-program areas, EE market share still low, partly due to difficulty in product differentiation

## Other Approaches to Financial Incentives

- Supplier-financed relamping projects
  - Long-term loans for lighting improvements, payments linked to estimated savings levels
  - Egypt example of IFC-financed projects
- Energy Service Company (ESCO) approach with performance contracting
  - Capital provided by utilities via DSM bidding or through government financing
  - Long-term contracts with performance guarantees by ESCO to share risk

## Green Marketing to Industry and Government

- Objective: influence procurement practices of large buyers
- After initial consumer education, engage in challenge to set and meet EE goals
- Support implementation through
  - Promotional info, newsletters
  - Brochures with product information
  - Technology updates and evaluations
  - Lifecycle costing evaluation tools
  - Web-based marketing and ordering opportunities
  - Awards for best performance

## US Programs: Renewed Emphasis on Marketing

- Emphasis on coordination with manufacturers, retailers, wholesalers
- Incentives: shift in emphasis
  - Aimed at new product introductions
  - Manufacturer buy-downs (phased out gradually) rather than rebates
  - Bulk purchasing to reduce prices in small stores
- More intensive, coordinated promotion and merchandising
- Branding under Energy Star label

## Promotion Approaches

- Cooperative promotional funds
  - For retailers & manufacturers
  - Advertising and promotional projects
- Publicity campaigns
  - Print, radio, and TV
  - Phase 1: develop Energy Star brand awareness
  - Phase 2: specific EE lighting messages

## Promotion Approaches

- Point of Purchase (POP) materials
  - Hangtags
  - Shelf talkers
  - End-cap displays
  - Banners and signs
  - Hands-on displays and demonstrations to dispel consumer concerns
  - brochures

## Promotion Approaches

- Catalog sales, with discounted products
- Special events
  - Sidewalk sales
  - Holiday promotions
  - Manufacturer media coverage
- Builder/contractor mailing lists
- Small store/grocery store pilot programs

## Field Services

Field reps, or "circuit riders," target 2 of the 4 keys to successful EE marketing

- Change consumer purchase preferences
- Change architect/builder practices
- Change retailer stocking preferences
- Change manufacturer product offerings

## Functions of Field Representatives

- Build relationship with retailers through frequent (monthly) visits
- Train retail sales staff on selling EE products
- Generate enthusiasm for products
- Merchandising
  - Secure favorable positioning on shelf
  - Assure sufficient stocking
  - Assure packaging in good condition
  - Install POP materials
  - Conduct demonstrations, promotional events

# Common Themes of Success in EE Market Transformation

- Effective positioning of EE benefits with other features
- Establishing trusted brand identification
- Financial incentives, ultimately scaled back
  - Rebates, discounts, buy-down, volume purchasing, lease, performance contract
- Recruitment, training, incentives, and promotion to distribution chain
- Product certification, standards, labeling
- Merchandising and promotion
- Niche marketing (e.g., large consumers)

**International experience with EE products marketing – AC & Refrigerators**

# International Experience with EE Product Marketing

***Marketing Energy-Efficient Products***

An ECO Project Course

Presenter: Brian Wood, Nexant

15, 16 and 17 March 2001, New Delhi

# EE Product Marketing Background

- Technology innovations generally have driven market change for AC and refrigerators:
  - Compressors: smaller, more efficient, quieter
  - Manufacturing technology for heat exchangers
  - New refrigerants
  - Control technology
  - Insulation materials
  - CFC-free refrigerants
  - Improved compressors

## Market Shifts Due to Multiple Feature Improvements

- Scope of feature improvements:
  - AC units: cooling capacity, size, modularity (window/split), auto control, durability, styling
  - Refrigerators: size, interior modularity, freezer capacity, frost-free, reliability, control, styling
- Incremental EE improvements, alone, have difficulty in penetrating the market
  - Competition with other features
  - Lack of consumer awareness
  - Consumer indifference

## Success of EE Products Depends on Market Events

- Electricity tariff increases that raise awareness of energy costs
- Technology or styling innovations that attract consumer interest
- Standards/ratings/labeling to address consumer risk aversion
- Sustained marketing efforts
  - Promotion
  - Financial incentives
  - Direct assistance

## Contributors to Successful Market Penetration

- Significant non-energy benefits
  - Performance
  - Convenience
  - Aesthetic appeal
- Low incremental costs
- Relatively simple market structure

## Importance of Non-Energy Benefits for EE Products

- New EE products must meet or exceed performance attributes of existing products
- Energy cost savings are typically not sufficient to induce consumers to *RISK* a shift to a new technology
- Multiple product attributes attract BOTH retailers and consumers

## Dealing with Added Cost of Energy Efficiency

- Incremental price must correlate with *perceived* value
- Common approaches to overcome consumer barriers
  - Education, marketing, and rebates/promotions to induce trials
  - Incentives to retailers/dealers/contractors to motivate sales and increase stocking
  - Manufacturer "buy-downs" to leverage cost reductions to consumers

## Approaches to EE Appliance Market Development

- Intensive promotional efforts
- Initially aggressive financial incentives
  - Instant or mail-in rebates to consumers
  - Retailer/distributor incentives
  - Manufacturer buy-downs
  - Installment payment programs
- Product testing and certification
- Branding and labeling
- Retailer training and merchandising support

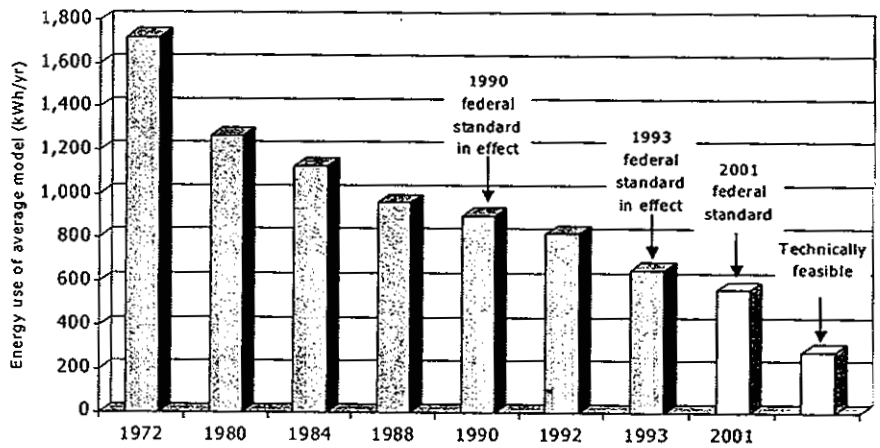
## Review of Selected Marketing Efforts Abroad

- EE refrigerator programs
- EE air conditioner programs
- Example of successful EE product development: EE clothes washer
- Market development activities in "mature" EE product markets

## EE Refrigerator Marketing Programs in the US

- 1970s: Energy crisis and technology advances led to large EE gains by manufacturers
- 1980s: Electric utilities initiated rebate programs for EE models
- 1990s: Federal EE standards and technology push

# Energy Consumption of US Refrigerators




# Electric Utility-Manufacturer Programs in the 1980s

- Gap between least and most efficient models as much as 500 kWh/year
- Marketing programs emphasized
  - Energy Guide labeling
  - Rebate coupons worth up to $100 for eligible models, as consumer incentive
  - Limited use of other financing incentives
  - Consumer education about refrigerator energy costs and tips for EE operation

## Influences on EE Marketing Program Evolution

- Recognition that price varies with size and features, not necessarily by EE rating
- Federal standards drove EE improvements
- Limitations in EE model stocking
  - Many EE models at 10-15% below standard
  - Few EE models better than 20% below standard
  - Consumer indifference to small incremental EE savings, compared to desire for other features

## EE Marketing Program Innovations

- Some utilities retain aggressive rebates for very efficient models, influencing stocking practices
- Incentives to retailers of EE products
  - Award credits to managers and sales staff
  - Redeemable for cash, travel, etc.
- Retirement of old refrigerators
  - Free removal, sometimes small payment

## Super Efficient Refrigerator Program (SERP)

Background

- Research indicated refrigerators could use 25% less energy than 1993 standard with existing technology
- Limited consumer interest
- High development cost
- Too risky for manufacturers, due to limited expected rewards

## SERP Strategy (1992)

- Utilities pooled incentive funds and issued a tender for development and marketing of super efficient refrigerator
- One manufacturer to receive $30 million
- Winner based upon greatest expected energy savings (balanced by expected success level)
- Minimum production and sales level commitments also specified in tender

## SERP Results

Short Term Results

- Whirlpool selected, developed 2-door model meeting guidelines
- Sales difficult where no rebate available
- Model discontinued after meeting production commitment

## SERP Results

- Whirlpool results indicated high efficiency levels possible using off-the-shelf, cost-effective technology
- Influenced new minimum EE standards
  - Efficiency of all refrigerators to improve by 25-30%
  - Effective in 2001

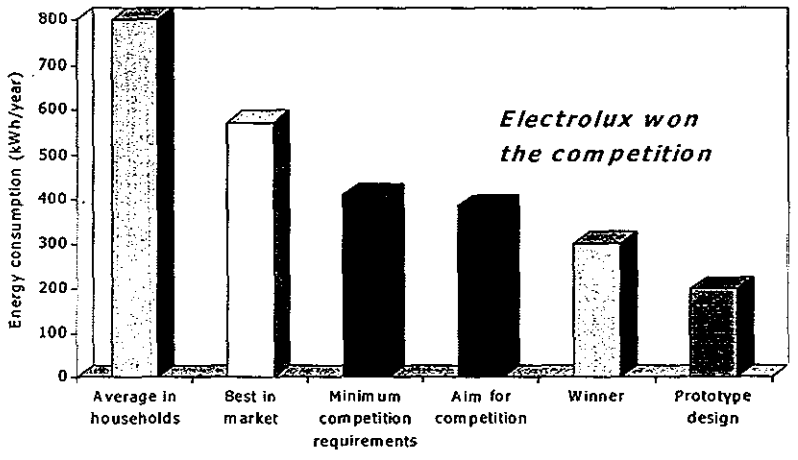
## Influence of Buying Power on EE Product Availability

- Cooperation of NYPA and NY Housing Authority
- NYPA contracted with manufacturers to supply 40,000 small EE refrigerators
  - 1996 contract for best available technology
  - 1997 contract for 37% improvement
- Smaller housing authorities able to join; EE models became available nationally

## Swedish EE Refrigerator Competition

- 1990 technology purchasing project by Swedish government agencies and housing associations
  - Minimum requirement: 1 kWh/litre/year
  - Incentives for entries below 0.9 kWh/l/yr
- Winner guaranteed orders
- Consumers offered subsidy for purchases

# Swedish Competition Results




# Thailand's EE Refrigerator Program

- Part of larger EE marketing effort begun in 1993
  - EE refrigerators
  - EE air conditioners
  - Thin tube fluorescent and CFL lamps
- Appliance labels show
  - EE rating (up to 25% more EE than average)
  - Estimated annual energy use and cost
  - Volumetric size for refrigerators

# Thailand EE Refrigerators: Program Elements

- Consumer information
  - Over $8 million spent on TV advertising and promotion campaigns for EE products
  - Educational campaigns for consumers
- Product availability
  - Voluntary agreements with manufacturers and importers to boost production/imports in exchange for advertising and promotion
- No financial incentive offered for refrigerators

# Thailand EE Refrigerator Program Results

- Market share of level 5 EE refrigerators increased from 12% in 1995 to 96% in 1998
- Market survey results
  - Salespeople ranked energy as 2nd highest consumer priority, after brand
  - EE rating used as selling point by 80% of sellers
  - 90% of recent purchasers aware of labeling program within 2 years of program start
  - 28% of consumers put EE among top 3 criteria
  - Broad support for government role in EE promotion

## Refrigerator/Freezer Programs in Brazil

- Evolving programs
  - mid-80s standard test procedure
  - 1986 testing and labeling program
  - 1994 voluntary EE targets
  - 1995-99 awards for top models
  - 1996-98 pilot rebate program
  - 1998 revised test procedure & label

## Refrigerator/Freezer Programs in Brazil by PROCEL

- Branding
  - Early program performance mixed, as labels appeared in few stores
  - Introduced new logo in 1995: *selo-PROCEL* for top 2-3 models of all EE products
  - $20 million spent on promotion since 1995
- Pilot programs offer financial incentives
  - Low interest financing, or
  - Rebate of $30

## EE Air Conditioners in the US

- A more varied array of program approaches and incentives
- Steady efficiency improvement since 1960
  - Testing and rating system by ARI
  - National minimum standards set in 1990 and 2000
  - Utility incentive programs since 1980s
  - Government incentive programs since 1990s
  - Units sold in 2000 use 33% less energy than those sold in 1980, 25% less than in 1990

## Key US Program Elements

- Financial incentives
  - Rebates that vary by unit size ($30 - $100/ton) plus efficiency gain over minimum ($3-10/ton per 0.1 increase in EER or SEER)
  - Rebate by reduced load ($125 - $300/kw)
  - Financing for EE units
  - Dealer sales incentives
  - Federal tax credits
- Branding with Energy Star label
  - AC units since 1996
  - Buildings since 1991 and homes since 2000

## Key US Program Elements for EE Air Conditioners

- Broad manufacturer partnership efforts have led to better financing terms through links with major finance companies
- Tools for users
  - Worksheets for calculating energy savings for consumers and sales people
  - Installation guidelines for contractors (offering more energy savings than AC equipment for ducted systems)
- Advertising and promotion programs
- Programs achieved 20% market share for EE models (SEER > 12.0)

## Innovative EE Marketing Approaches: HVAC Services

- End Use Pricing by Wisconsin utility
  - Purchase, operate, maintain users' cooling equipment, for commercial & institutional customers
- Flat-fee service to install and operate cooling equipment on 10-yr contract (Entergy utility company)
- Comfort Lease program from Carrier

## Thailand's EE Air Conditioner Program

- Voluntary testing and labeling program
- Zero-interest loan available for highest rated EE air conditioners
- Consumer information promotions
- Voluntary agreements from manufacturers to increase production of EE models

## Thailand's EE Air Conditioner Program Results

- Increased market share of EE products from 19% in 1996 to 38% in 1998, and is expected to reach 50%
- High consumer interest in labeling: 76% reported looking for the energy rating label
- Large "pull" effect: while only 26% of models had energy label, 82% of surveyed customers had bought labeled models

## Philippines' Air Con Standards and Labeling Program

- Program conceived in 1983
- Fuels and Appliance Testing Lab started in 1991
- Standards and labeling in effect in 1993
- Average efficiency of AC units sold increased by 25% within one year

## Importance of Product Differentiation

- In many cases, EE features are not visibly or readily recognizable by consumers
- Value of establishing a trusted brand or label
- Value of independent testing and certification of products
- In US, Energy Star aims to be a recognizable branding platform for a wide array of energy efficient products

## Green Marketing to Industry and Government

- Objective: influence procurement practices of large buyers
- After initial consumer education, engage in challenge to set and meet EE goals
- Support implementation through
  - Promotional info, newsletters
  - Brochures with product information
  - Technology updates and evaluations
  - Lifecycle costing evaluation tools
  - Web-based marketing and ordering opportunities
  - Awards for best performance

## Coordination with Green Buildings Initiatives and Codes

- New construction presents significant opportunity for EE product sales
- EE air conditioners help contractors & builders to meet EE codes, if they are properly informed
- EE marketers have a role in a wide variety of Green Buildings programs and should participate in promotional programs

## US Programs: Renewed Emphasis on Marketing

- Emphasis on coordination with manufacturers, retailers, wholesalers
- Incentives: shift in emphasis
  - Aimed at new product introductions
  - Manufacturer buy-downs (phased out gradually) rather than rebates
- More intensive, coordinated promotion and merchandising
- Branding under Energy Star label

## Promotion Approaches

- Cooperative promotional funds
  - For retailers & manufacturers
  - Advertising and promotional projects
- Publicity campaigns
  - Print, radio, and TV
  - Phase 1: develop Energy Star brand awareness
  - Phase 2: specific EE AC messages

## Promotion Approaches

- Point of Purchase (POP) materials
  - Hangtags
  - Shelf talkers
  - End-cap displays
  - Banners and signs
  - Hands-on displays and demonstrations to dispel consumer concerns
  - brochures

## Promotion Approaches

- Catalog sales, with discounted products
- Special events
  - Sidewalk sales
  - Holiday promotions
  - Manufacturer media coverage
- Builder/contractor mailing lists

## Field Services

Field reps, or "circuit riders," target 2 of the 4 keys to successful EE marketing

- Change consumer purchase preferences
- Change architect/builder practices
- Change retailer stocking preferences
- Change manufacturer product offerings

## Functions of Field Representatives

- Build relationship with retailers through frequent (monthly) visits
- Train retail sales staff on selling EE products
- Generate enthusiasm for products
- Merchandising
  - Secure favorable positioning
  - Assure sufficient stocking
  - Install POP materials
  - Conduct demonstrations, promotional events

## Common Themes of Success in EE Market Transformation

- Effective positioning of EE benefits with other features
- Establishing trusted brand identification
- Product certification, standards, labeling
- Financial incentives, ultimately scaled back
  - Rebates, discounts, loan financing, lease, performance contract
- Recruitment, training, incentives, and promotion to distribution chain
- Merchandising and promotion
- Niche marketing (e.g., large consumers)

## Common Themes of Success in EE Market Transformation

- Aggregated market influence
- Branding and consumer appeal
- Financial incentives
- Recruitment, training, incentives, and promotion to distribution chain
- Technology procurement and volume purchases
- Minimum efficiency standards/codes
- Other strategies (cash awards, tax credits, product swaps, etc.)

**International experience with EE products marketing - Motors**

# International Experience with EE Product Marketing

***Marketing Energy-Efficient Products***

An ECO Project Course

Presenter: Brian Wood, Nexant

15, 16 and 17 March 2001, New Delhi

# EE Product Marketing Background

- There is no disputing that improved energy efficiency offers tremendous benefits to national economies and global environment
- EE marketers tend to be evangelists for the virtues of EE, but fall into a trap of appearing one-dimensional, and unresponsive to consumer interests

## Market Shifts Due to Multiple Feature Improvements

- Few product innovations achieve enduring appeal on the basis of their economic benefits alone
- Incremental EE improvements, alone, have difficulty in penetrating the market
  - Competition with other features
  - Lack of consumer awareness
  - Consumer indifference

## Success of EE Products Depends on Market Events

- Electricity tariff increases that raise awareness of energy costs
- Technology or styling innovations that attract consumer interest
- Standards/ratings/labeling to address consumer risk aversion
- Sustained marketing efforts
  - Promotion
  - Financial incentives
  - Direct assistance

## Contributors to Successful Market Penetration

- Significant non-energy benefits
  - Performance
  - Convenience
  - Aesthetic appeal
- Low incremental costs
- Relatively simple market structure

## Importance of Non-Energy Benefits for EE Products

- New EE products must meet or exceed performance attributes of existing products
- Energy cost savings are typically not sufficient to induce consumers to *RISK* a shift to a new technology
- Multiple product attributes attract BOTH retailers and consumers

## Dealing with Added Cost of Energy Efficiency

- Incremental price must correlate with *perceived* value
- Common approaches to overcome consumer barriers
  - Education, marketing, and rebates/promotions to induce trials
  - Incentives to retailers/dealers/contractors to motivate sales and increase stocking
  - Manufacturer "buy-downs" to leverage cost reductions to consumers

## Approaches to EE Motor Market Development

- Intensive promotional efforts
- Initially aggressive financial incentives
  - Instant or mail-in rebates to consumers
  - Retailer/distributor incentives
  - Manufacturer buy-downs
  - Installment payment programs
- Product testing and efficiency standards
- Training for consumers and distributors
- Motor specification tools

## EE Motors Programs in the USA

- In the 1980s, motors recognized as the leading users of electricity, as utility DSM programs focused on industry
- Marketing of EE or premium EE motors, and rebates to urge consumer purchases
- Wide variety of marketing programs
  - No consistency in incentives
  - Confusion in market over EE vs. high efficiency vs. premium efficiency

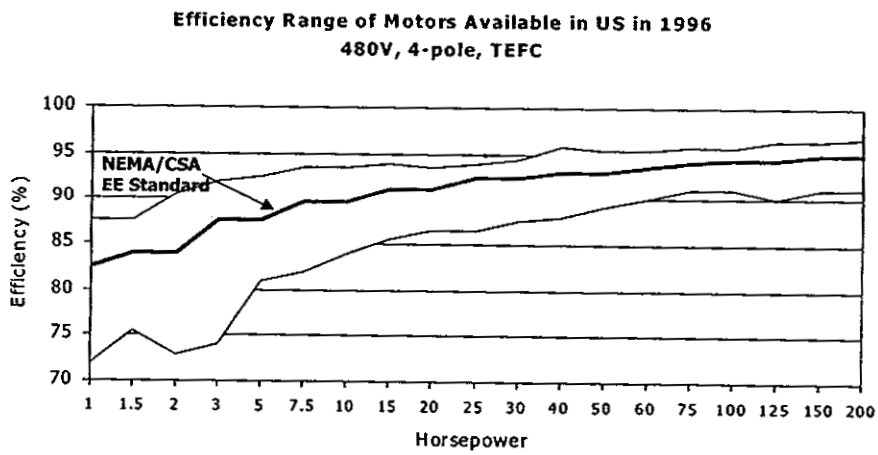
## Motor Challenge Program

- Government-industry partnerships for leadership in EE motor adoption
- Encourages systems approach to motors, drives, motor-driven equipment
  - Engineering
  - Specification
  - Maintenance
- Evaluation tools and training to support EE motor selection (MotorMaster+ software)

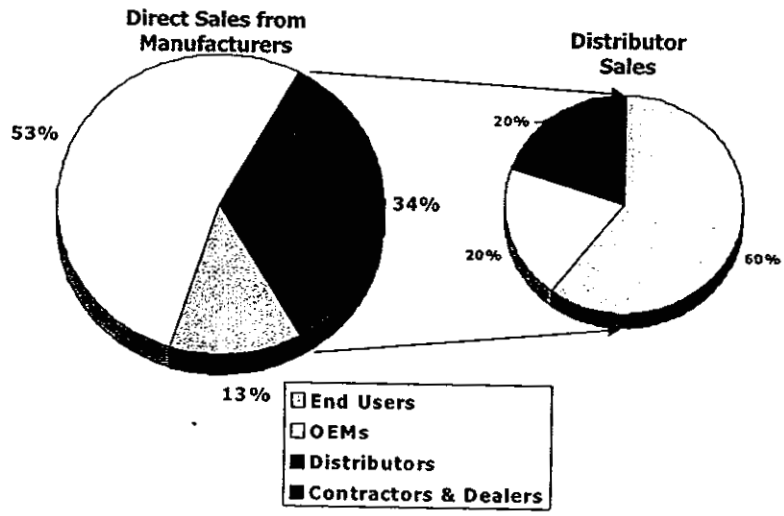
# Motor Challenge Program

- Information clearinghouse
  - Staffed with experts, accessible by toll-free phone and internet
  - Publications, technical bulletins, databases of motor-systems components
- Demonstration case studies
- Partnerships with trade organizations to develop best practices and standards

# Establishment of Motor Efficiency Standards



# Understanding the Market




# Results of Market Surveys

- OEMs buy 60% of poly-phase and nearly 100% of single phase motors
  - Only 5-10% of OEM motor purchases were energy efficient
- 40-45% of motors sold by distributors are energy efficient
- Net 30% of US motor sales are EE in the range 1-200 hp

## Types of Distributors

- Repair-oriented
  - Repairs are primary source of income
  - 20% of non-OEM purchases (Few EE)
- Volume-oriented
  - Most revenues from motor sales; sell to OEMs
  - 45% of non-OEM purchases (20% EE)
- Technically oriented
  - Most revenues from installation, service, repair
  - 23% of non-OEM purchases (61% EE)
- Warehouse distributors
  - 12% of non-OEM purchases (5% EE)

## Strategies for the OEM Market

- OEM perspective: little incentive to use EE motors
  - Highly competitive, commodity business
  - Motors are "invisible" component to customers
- Standards used to create a minimum performance level
- Increasingly, coordinated performance targets in regional marketing programs to push OEM and manufacturer response

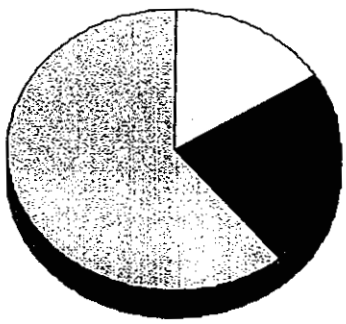
## BC Hydro Case Study

- Key program elements
  - Strong educational component
  - Intensive interaction with large industrial customers, motor dealers, rewind shops
  - Analytical tools for dealers and consumers
  - Marketing support for participating businesses
  - Published database of EE motors sold in region
  - Provided 20% of incentives to dealers
- In 4 years, raised EE market share from 3% to 60% for OEM purchases

## Compaq Case Study

- Compaq executive noted high efficiency cooling towers available in Japan
- Set a spec at this level, though not available on US market
- Assured purchase of large quantity
- US manufacturers developed products to match, moving the market for other consumers as well

# The End User Market: 33% of Total Motor Sales




Two Buyer Profiles

- Maintenance staff
  - Replacement motors
- Engineering staff
  - New construction & major renovations
  - Planned retrofits

# Maintenance Staff Buyer Profile

- Typically no engineering expertise
- Key criterion in replacements is timeliness
  - A few hours of lost production can be more costly than one year's energy cost
- Majority aim to match the failed motor
- Affected by OEM restrictions
  - Restricted availability of replacement motors
  - Warranty voided if nonauthorized vendor
  - No EE model available for frame size

## Engineering Staff Buyer Profile

- Key criterion in design is performance of the system
  - Motor oversizing to minimize performance problems
- Next most important criterion is minimizing the capital cost of system
  - Selection of least expensive motors

## Establishing Corporate Motor Purchase Policies

- Majority of firms have no motor purchase policy (survey showed just 20% of large firms do)
- Motor purchase policy includes
  - Motor inventory and spec for appropriate EE motor replacement
  - EE motor stocking policy
  - Replacement vs. rewind decision points
  - Program for preemptive replacements

# Regional US Programs to Boost EE Motor Sales

- Northwest Alliance
  - Modest dealer incentives to stock EE motors
  - Vendor and end-user training
  - Motor testing
  - Industrial manufacturer program
    - Motor inventory management planning
    - Motor purchase policy
    - Analysis of policies for repair vs. replace decision
    - Quality standards for motor rewinding

# Regional Programs to Boost EE Motor Sales

- Northeast Energy Partnership
  - Marketing materials
  - End-user incentives, promoted by vendors
    - As much as full incremental cost for motors up to 20 hp
  - Field representatives to meet regularly with dealers for training, stocking assistance, promotion with customers

## Regional Programs to Boost EE Motor Sales

- California
  - Incentives to major regional motor distributors for sales of very efficient motors
  - Incentives to increase EE motor stocking by distributors
  - Cash incentives for high-performing sales people

## NEES Super Efficient Rebate Program

- Offered generous rebates, but only for motors that significantly exceeded efficiency standards
- Initially, many manufacturers had no such models available
- Most manufacturers developed models to be eligible, later made available nationwide

## Other Approaches

- Financing options
  - Rebates set according to motor size
  - Equipment leasing
  - Shared savings or performance contracts
- Technical services in lieu of financing
  - Motor system audits
  - Design and specification
  - Installation, maintenance, verification
- Support to improvement in motor repair practices

## Green Marketing to Industry and Government

- Objective: influence procurement practices of large buyers
- After initial consumer education, engage in challenge to set and meet EE goals
- Support implementation through
  - Promotional info, newsletters, brochures
  - Technology updates and evaluations
  - Lifecycle costing evaluation tools
  - Motor specification tools
  - Web-based marketing and ordering opportunities
  - Awards for best performance

## Common Themes of Success in EE Market Transformation

- Effective positioning of EE benefits with other features
- Product certification, standards, labeling
- Financial incentives, ultimately scaled back
  - Rebates, discounts, loan financing, lease, performance contract
- Recruitment, training, incentives, and promotion to distribution chain
- Coordination with trade associations to influence specification in new projects
- Promotion
- Niche marketing (e.g., large consumers)

## Common Themes of Success in EE Market Transformation

- Aggregated market influence
- Branding and consumer appeal
- Financial incentives
- Recruitment, training, incentives, and promotion to distribution chain
- Technology procurement and volume purchases
- Minimum efficiency standards/codes
- Other strategies (cash awards, tax credits, product swaps, etc.)

# Addendum

## Marketing of Energy Efficient Motors
## New Delhi, 8 June 2001

# ECO Project
# Marketing of Energy Efficient Motors
**New Delhi, 8 June 2001**

| | | |
|---|---|---|
| 9-10 AM | Registration | |
| 10 – 10.15 AM | Introduction to ECO | Kapil Thukral |
| 10.15 AM -12 noon | Presentations by EE motor manufacturers | |
| | • Kirloskar Electric Co. (KEC) | RK Soni |
| | • Bharat Bijlee Ltd. (BBL) | P Kumar / R Paul |
| | • ABB Ltd. | Raina / S Srivastava |
| 12 noon – 1 PM | Group discussion on marketing strategies.<br>Issues to be covered:<br>• Supply chain related<br>• Quality / technology related<br>• Pricing related<br>• Awareness related | Panelists from KEC, BBL, ABB, Siemens, Batliboi |
| 1 – 2 PM | Lunch | |

# ECO Project
# Marketing of Energy Efficient Motors
**New Delhi, 8 June 2001**
## List of Participants

| SNo | Name & Designation | Company Name & Address | Tele | Fax | E-Mail |
|---|---|---|---|---|---|
| 1 | Mr. S. Srinivasan<br>Sr. Consultants | Dalal Consultants & Engineers | 3389386 | 3389386 | dalaldel@nde.vsnl.net.in |
| 2 | Mr. S.K. Sanju<br>Area manager | Eurotherm Del I. Ltd.<br>410-411, Padma Tower I,<br>5 Rajendra Pace<br>New Delhi-8 | 5733635 | 5758179 | salesdelhi@eurothermdel.com |
| 3 | Mr. Ranjan Bhat<br>Sale Engg. | Eurotherm Del I. Ltd.<br>410-411, Padma Tower I,<br>5 Rajendra Pace<br>New Delhi-8 | 5733635 | 5758179 | salesdelhi@eurothermdel.com |
| 4 | Mr. Manoj Kumar Dubey | DSCL Energy Services<br>2nd Flr Kanchanjunga Building<br>New Delhi -1 | 3316801 | 3319062 | mkdubey@rediffmailcom |
| 5 | Mr. U.P.Singh | EMC, PHD CCI<br>Khel Gaon<br>New Delhi-11 | 6852418 | 6568392 | upsingh@bol.net.in |
| 6 | Mr. Prem Shankar<br>Elec. Eng. | EMC, PHD CCI<br>Khel Gaon<br>New Delhi-11 | 6852418 | 6568392 | |
| 7 | Mr. Sanjeev Srivastav<br>Product Manager | ABB<br>Chandiwala Estate Maa Anand Marg<br>Kalkagi | 6826390 | 68226434 | sanjeev.srivastava@in.abb.com |
| 8 | Mr. V.Raina | ABB<br>Faridabad | 915-5234375 | 915-5234288 | vinod.raina@in.abb.com |
| 9 | Mr. S.Sarkar<br>Sr. Mgr. Technology | ABB Ltd<br>Faridabad | 915-5233314 | 915-5234428 | swapan.sarkar@in.abb.com |
| 10 | Mr. Satish Sabharwal<br>Energy Economist | EMC, D-1,<br>Green Park,<br>New Delhi | 6864867/8 | 6933907 | satish.sabharwal@usa.net |
| 11 | Mr. S Ramaswamy<br>Energy Economist | EMC, D-1,<br>Green Park,<br>New Delhi | 6864867/8 | 6933907 | |
| 12 | Mr. K.K. Chakravarty | EMC, D-1,<br>Green Park,<br>New Delhi | 6864867/8 | 6933907 | |
| 13 | Mr. R.K.Soni<br>Manager | Kirloskar Electric Co.<br>35 Link Road,<br>Lajpat Nagar III,<br>New Delhi 110024 | 6934684 | 6933907 | |
| 14 | Mr. B.K. Shukla | Kirloskar Electric Co.<br>35 Link Road,<br>Lajpat Nagar III, | 6934684 | 6933907 | |

| | | | | | |
|---|---|---|---|---|---|
| | | New Delhi 110024 | | | |
| 15 | Mr. I.M. Saxena | Kirloskar Electric Co.<br>35 Link Road,<br>Lajpat Nagar III,<br>New Delhi 110024 | 6934684 | 6933907 | |
| 16 | Mr. R.P. Nagpal | D.V.B<br>Substation Bldg. Alaknanda<br>C.R.Park N.D.-19 | 6470708 | | |
| 17 | Mr. B.M. Rai | D.V.B<br>Substation Bldg. Alaknanda<br>C.R.Park N.D.-19 | 6470708 | | |
| 18 | Mr. S.S. Sharma | Holtec Consulting Pvt. Ltd.<br>A Block, Sushant Lok,<br>Gurgaon-122001 | 91-<br>6385095<br>extn.-256 | 91-<br>6385114 | sss@holtecnet.com |
| 19 | Mr. R.K. Ghosh<br>Energy Consultant | FICCI,<br>Federation House<br>Tansen Marg | 3738760<br>extn-382 | 3721504 | ii@bol@del3.vsnl.net.in |
| 20 | Mr. P.Kumar | Bharat Bijlee Ltd.<br>4th flr. Milap Niketan<br>8a BSZ Marg | 3350643 | 3319413 | bbldelhi@del.bharatbijlee.com |
| 21 | Mr. R.K. Paul | Bharat Bijlee Ltd.<br>4th flr. Milap Niketan<br>8a BSZ Marg | 3350643 | 3319413 | ravinderpaul@usa.net |
| 22 | Dr.B.D. Sharma | Sustainable Energy Solutions<br>3778,Netaji Subhash Marg | 6210685 | | ses@mantraonline.com |
| 23 | Mr. Manoj Kapur | Asiatic Engg.& Trd. Co.<br>2865/66,Shardhanad Marg | 3214058 | 3218744 | asiatic18@hotmail.com |
| 24 | Mr. P.V.Ramprasad<br>Asst. Director | NPC<br>Lodhi Road<br>New Delhi-3 | 4697446 | 4651002 | pvramprasad@yahoo.com |
| 25 | Mr. K.R.Goyal | National Experts<br>Organisations<br>Block 2D, Deepa Complex,<br>10-I.P.Extn. Delhi-92 | 2231212 | 2482953 | |
| 26 | Mr. Sanjeev Sapra<br>Partner | Electro Sales<br>2419A S.N. Marg | 3216264 | 3217598 | |
| 27 | Mr. S.K. Dandona<br>V.President | DESEIN Pvt.Ltd.<br>DESEIN House<br>G.K.-II, New Delhi 48 | 6453761 | 6238393 | |
| 28 | Mr. R.R. Singh<br>E.E. (R&D)E. | NDMC<br>Elecricity dpt.<br>6th flr.Pragati Bhawan<br>Jai Singh Road,<br>New Delhi | 3346545 | | |
| 29 | Mr. Arun Kumar<br>Sptd. Engineer<br>(Energy Conservation) | NDMC<br>Palika Kendra<br>New delhi-1 | 3362429 | | |
| 30 | Mr. Rajiv Gupta<br>(Prorietor) | Gupta Elec.Co. | 3212121 | 3214874 | rajivarti@yahoo.com |
| 31 | Mr. Anil Pant | Batliboi Ltd.<br>Jeevan Vihar<br>Parliament Street | 3340164 | 3344867 | bmg@del.batliboi.com |

| | | | | | |
|---|---|---|---|---|---|
| | | New Delhi 110001 | | | |
| 32 | Mr. Deepak Gupta | Batliboi Ltd.<br>Jeevan Vihar<br>Parliament Street<br>New Delhi 110001 | 3340164 | 3344867 | bmg@del.batliboi.com |
| 33 | Mr. K. Tandon | ARAMCO Engg. | 3545788/9 | 3559716 | |
| 34 | Mr. Kuldip Raj Ahir | Bureau Of Indian Standards<br>BSZ Marg | 3231192 | 3221535 | |
| 35 | Mr. Rajnish Sharma<br>Manager | SIEMENS Ltd<br>4A Ring Road<br>IP Estate<br>New Delhi | 3325697<br>98100928<br>11 | 3312043 | rajnish.Sharma@del2.seimens.co.in |
| 36 | Dr. Naval Karrir | PCRA | 6198856 | 6109668 | |
| 37 | Mr. Sanjeev Bhatia<br>Dy. Manager | BSES<br>A-2,Sec-24<br>Noida-201301 | 91-4557119 | 91-4558908 | engineering.bsesnoida@mantraonline |
| 38 | Mr. R.C. Padhay | BSES<br>A-2,Sec-24<br>Noida-201301 | 91-4557119 | 91-4558908 | engineering.bsesnoida@mantraonline |
| 39 | Mr. Raghunath | Reliable Systems | 91-4531046 | | |
| 40 | Mr. N.K. Sawhney | The Delhi Flour Mills Co.Ltd.<br>&DFM Foods Ltd. | 3947553 | 3932409 | nksawhney-dfm@net4india.com |
| 41 | Mr. R.K.Khetan | Lifting equipments &<br>Accessories<br>B-13/1,<br>Jhilmil Ind. Area Shadara | 2283468 | 2228736 | |
| 42 | Mr. A.S. Bedi | Bharat Electricals Industries<br>A-76,Madhuban,<br>(Near Preet Vihar) | 2224091 | 2462317 | |
| 43 | Mr. P. Mathur | MTNL | | | |
| 44 | Mr. Mukesh Wadhwa | MTNL | 6170802 | | |
| 45 | Mr. H.S.Puri | MTNL | 6165289 | | |

# ECO 5B
# Marketing of Energy Efficient Motors
# New Delhi, 8 June 2001
## Participant Feedback

**Content (relevance / coverage)**

| | |
|---|---|
| Excellent | 19% |
| Good | 42% |
| Average / Satisfactory | 19% |
| Poor | - |

**Content (workshop structure)**

| | |
|---|---|
| Excellent | 11% |
| Good | 52% |
| Average / Satisfactory | 37% |
| Poor | - |

**Venue**

| | |
|---|---|
| Excellent | 48% |
| Good | 48% |
| Average / Satisfactory | 4% |
| Poor | - |

**Administrative Arrangements**

| | |
|---|---|
| Excellent | 31% |
| Good | 52% |
| Average / Satisfactory | 17% |
| Poor | - |

**Handouts**

| | |
|---|---|
| Excellent | 15% |
| Good | 44% |
| Average / Satisfactory | 30% |
| Poor | 11% |

**Seminar Publicity / Invitation**

| | |
|---|---|
| Excellent | 31% |
| Good | 31% |
| Average / Satisfactory | 38% |
| Poor | - |

# ECO 5B
# Marketing of Energy Efficient Motors
# New Delhi, 8 June 2001
## Participant Feedback (contd.)

## Goals and their achievement

*Goals for attending the course*

| | |
|---|---|
| To find out more details of EE motors | 44% |
| To understand barriers / acceptance of EE motors in the Indian market | 31% |
| To get in touch with manufacturers | 3% |
| To find if any financing schemes are available | 3% |
| To associate with the objective of promoting EE motors | 6% |
| To tell manufacturers that they have to take the lead in promotion of EE motors | 3% |
| To understand / update standards | 3% |
| To appraise participants of initiatives taken in manufacturing and marketing | 6% |

*Extent to which goals are achieved*

| | |
|---|---|
| Great / large extent | 50% |
| Significant extent | 21% |
| Some extent | 29% |

## Follow-up action after the course

| | |
|---|---|
| To continue interaction with Nexant / ECO project | 13% |
| To think seriously on deploying EE motors | 6% |
| To get in touch with manufacturers for further details | 19% |
| To understand more about EE motors and recommend to users | 6% |

## Suggestions and feedback

| | |
|---|---|
| Manufacture only EE motors | 6% |
| Use of EE motors to be made mandatory | 13% |
| Legislation, if necessary, to discontinue use of standard motors | 3% |
| Show EE motors in the market / develop several pilot projects | 10% |
| Create mass awareness through focused campaigns | 13% |
| Consultants and energy auditors to be trained to carry the message | 6% |
| Manufacturers to take the lead with support from NGC's | 3% |
| To encourage performance contracting | 3% |
| Start pilot projects at the earliest | 3% |
| Provide more reports on actual case studies / energy savings | 3% |
| Create smaller specific groups for better focus | 3% |
| Good occasion to tell Govt of problems and prospects of using EE motors | 3% |
| Have more such meetings / longer duration of such meetings | 19% |

| | |
|---|---|
| To appraise management to manufacture EE motors | 9% |
| To educate customers and spread the message on EE motors | 23% |
| To spread message of EE motors within company | 3% |
| To conduct energy audits inhouse | 3% |
| Increase EE motors in company installations | 3% |
| To make recommendations to Govt from information received | 3% |
| To propose upgrading Indian standards | 6% |
| To try for suitable pilot projects | 6% |

| | |
|---|---|
| To have a website for online chats | 3% |
| A very good start | 6% |

# ECO 5B
# Marketing of Energy Efficient Motors
# New Delhi, 8 June 2001
## Overview of Discussions

Following the three manufacturer presentations (by Kirloskar Electric, Bharat Bijlee and ABB) and the brief Q&A / discussion that followed each presentation, the panel discussion session (in which five manufacturers were represented – Siemens and Batliboi in addition to the three listed above) was used as a forum to highlight some actions that could possibly be taken to accelerate the market development for EE motors.

The action points that were discussed are listed below:

- Training of auditors, NGO's and consultants on various aspects of EE motors
- Increasing awareness of students in at least technical colleges and universities
- Setting up pilot / demonstration projects in all states
- Encouraging the formation of ESCO's
- Having improved after-sales service
- Encouraging users to go to manufacturer authorized repair centers / increasing the number of such authorized repair workshops
- Upgrading Indian standards on EE motors
- Proper testing and labeling of all motors (standard as well as EE)
- Establishing sectoral / industry priorities for pushing EE motors

This list, it was clarified, was relevant at least for the Northern Region in India. In other parts of the country, it may well be that some other types of interventions and actions may be necessary.

# ELECTRIC MOTORS

## BACKGROUND

Electric Motors consume about 74% of total industrial electricity use in India. Furthermore, as industrial loads constitute a significant component of the utility system peak load, the share of electric motors in the peak load is also considerable. Electricity use and load in motors can be reduced by improving the efficiency of motors and motor drive systems, e.g. use of high efficiency motors etc. Motor efficiency and its electricity consumption are also influenced by factors such as the quality of motor rewinding since poor motor rewinding practices can result in significant increases in motor losses.

Motor efficiency and its electricity consumption depend on the extent of intrinsic losses that occur in the motor during its operation. Motor losses consist of no load or fixed losses, namely magnetic core losses and friction and windage losses, which occur even when the motor runs at no load, and load or variable losses, namely stator copper losses, rotor copper losses, and stray load losses, which increase as motor load increases. While these losses depend on the motor design, they are also influenced by external factors such as quality of power supply, maintenance practices, and the quality of motor rewinding after failure due to burn out.

## MOTOR MANUFACTURERS AND DEALERS
## KEY ISSUES

The key issues and findings related to motor manufacturers and dealers are:

- Most of the major motor manufacturers offer standard and high efficiency motors.
- Efficiency improvements in high efficiency motors are mainly through use of greater quantity of active materials and materials of better grade.
- Manufacture of high efficiency motors is capital intensive.
- Sales of high efficiency motors are about 2-5% of motor sales.
- Delivery periods of high efficiency motors are very long.
- Most manufacturers are gradually moving towards up-gradation of standard motors.
- Indian standards specify performance characteristics for both standard and energy efficient motors. However, the specifications are for a limited range of ratings, and there also is considerable scope for upward revision of the stated values.
- Rewinding or repair of failed motors is not done by manufacturers, but who do not have any specification for rewinding.
- Manufacturers feel that awareness of users regarding selection and maintenance of motors is increasing.
- Motor dealers cater mainly to replacement purchases and are not much involved in the technical aspects of the purchase.
- Dealers' awareness regarding high efficiency motors is limited.
- General response for energy efficiency motor in India is very poor. Even they ask, they can be easily satisfied with standard motor as they look for cheap motors and they are not interested in true energy efficiency motor as they cost more.

## ECONOMIC INCENTIVE FOR PURCHASE OF HIGH EFFICIENCY MOTORS

- Purchase of energy efficiency motors and spare motors to be encouraged.
- First time purchase of the motor on new industrial units should be given incentive.
- High-level interaction with the major motor manufacturers and their authorized dealers, regarding likely demand of energy efficient motors on a periodic basis to plan production and thereby expedite availability and delivery.
- Energy audits – Promote energy audit in industrial units by sharing part of their cost and by helping units to access qualified energy audit consultants to initiate the process of increasing energy efficiency, improve level of awareness and also result in other benefit to the utility.

## ENERGY EFFICIENT MOTORS (KEC)

Existing standard IS12615 covers motors having out put from 0.12 KW upto and including 37KW in 4-pole version. Draft standard brought about by BIS covers upto 160KW.

1 HP – 100HP have certified by Canadian Standard Association for energy efficiency. KEC is the first Company in India to have CSA certificate. KEC meet US EP Act requirement. Motors have been tested as per IEE112/CSA 390.

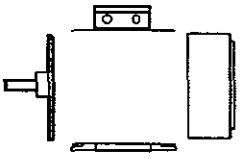
KEC standard motors meet EEF2 level as per this standard.

KEC can make motors for EFF1 level at premium cost.

KEC already made 2000 nos. motors and despatched to America where they are being sold.

## INDUSTRIAL UNITS: KEY ISSUES

- Cost is the most important criteria in purchase of new motors.
- Failure of motor is a problem prevalent to all industrial units.
- Maximum failure rates are in the range of 3.7KW to 15KW.
- Burned-out motors are rewound repeatedly and put back in service.
- Acceptance test done in motors after rewinding are simple and crude.
- No data are available on measurement of actual extent of decrease in efficiency OR increase in electricity consumption due to poor rewinding practices.



# ENERGY EFFICIENT MOTORS

**Bharat Bijlee Limited**

## National Priority

The use of Energy Efficient motors is a NATIONAL PRIORITY

Consider

70% of electrical energy used in India is used for driving electric motors

80% of motors are below 15 kW

# National Standard for Energy Efficient Motors

The Bureau of Indian Standards (B.I.S.) has adopted the following standard:

IS 12615 of 1989
Induction Motors - Energy Efficient,
Three Phase Squirrel Cage - Specification

IS 12615 specifies the efficiencies of Energy Efficient motors from 0.75kW to 37 kW

## Why does IS 12615 stop at 37 kW?

Standard motors of higher outputs have very high efficiencies - 93% to 95%

Even at 37 kW output, the efficiency value specified in IS 12615 is only 92%

Eff. of a standard motor from reputed manufacturers is higher: 92.5%

# How is efficiency improved?

| Reduction of Iron Losses | Reduction of Copper Losses |
|---|---|
| Achieved by<br>Low loss magnetic material<br>*or* Reduced Flux density | Achieved by<br>Increased Copper section and<br>consequently increase in Slot area |

↓ ↓

Achieved by increase in Stator Yoke

↓

Resulting into reduced rotor diameter and consequently into reduced torque

*Core length has to be proportionately increased to maintain rated torque*

## Efficiency improvement by use of Low Loss Stamping & increased Fe and Cu

| **11 kW 1500 rpm** | **Standard** | **Low Loss Stamping** | **+ Cu & Fe↑** |
|---|---|---|---|
| Iron losses | 455 W | 330 W | 255 W |
| Friction & Windage | 120 W | 120 W | 120 W |
| **Constant Losses** | 575 W | 450 W | 375 W |
| **Load related Losses** | 925 W | 925 W | 850 W |
| **Total Losses** | **1500 W** | **1375 W** | **1225 W** |
| **Efficiency** | 88.0% | 88.9% | 90.0% |

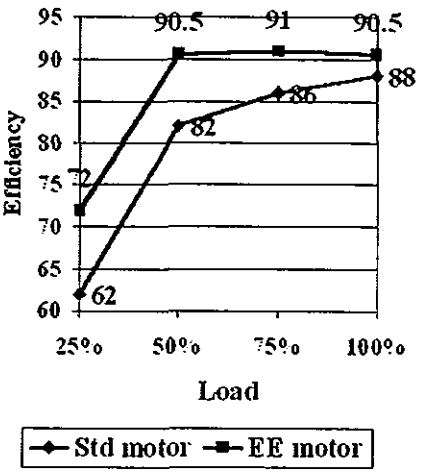
# Flat Efficiency Vs Load Characteristic

IS 12615 has introduced this new concept by specifying Efficiency at both 75% and 100% load

Consider

- Motor rating is selected for max. load conditions and next preferred rating
- Most motors operate on an average around 75% load

**Efficiency is almost same from 50% to 100% load in a well designed EE motor**




# Efficiencies of Standard & Energy Efficient Motors

| Output 4 pole | Std motor to IS 8789 | EE motor to IS 12615 |
|---|---|---|
| 0.75 kW | 71.0 % | 77.0 % |
| 1.5 kW | 76.0 % | 80.0 % |
| 3.7 kW | 83.0 % | 86.0 % |
| 7.5 kW | 85.0 % | 88.5 % |
| 11.0 kW | 85.5 % | 89.5 % |
| 18.5 kW | 87.0 % | 91.5 % |
| 37.0 kW | 88.5 % | 92.0 % |

Efficiency values are subject to tolerance as per IS 325

# Payback Period of 4 pole Energy Efficient Motors

| | Std motor to IS 8789 | EE Motor to IS 12615 | Difference |
|---|---|---|---|
| Output | 11 kW | 11 kW | |
| Eff. at Full Load | 85.5 % | 89.5 % | |
| Working hrs p.a. | 5,000 | 5,000 | |
| Energy kWh p.a. | 64,330 | 61.450 | |
| Price per kWh | Rs. 3.50 | Rs. 3.50 | |
| Energy cost p.a. | Rs. 225,155 | Rs. 215,075 | Rs. 10,080 |
| Purchase price of motor | Rs. 14,500 | Rs. 16,675 | Rs. 2,175 (+15%) |

**Payback Period is 2.6 months for a usage of 5000 hours per annum**

# Payback Period for Replacement

## Assumptions

An old 11 kW Standard motor conforming to IS 8789 is replaced by an EE motor (IS 12615)

The Standard motor has zero salvage value

Usage is 5000 hrs p.a.

Cost of power is Rs 3.50 per kWh

Purchase price of EE motor is Rs 16,675

**Payback period is 1.7 years**

# Payback period is in fact lower

The pay back period for a replacement motor is in reality much lower than 1.7 years for the following reasons:

Salvage value of the old motor is significant

Older designs had much lower efficiencies than present day standard motors; hence energy savings are in fact more

## Case Study - Replacement with Energy Efficient motor

A customer had an 18 year old motor

11 kW - 4 pole; loaded to 6.5 kW for 4800 hrs p.a.

Efficiency was 83.0 % at 6.5 kW

Efficiency of a new EE motor was:

90.8 % at 6.5 kW

Energy cost was Rs 4.0/kWh

Cost of new EE motor was Rs 16,675

Payback period is 1.3 years

# Energy savings increase at partial loads

11 kW - 4 pole Bharat Bijlee EE motor

| Load | 100 % | 75 % | 50 % |
|---|---|---|---|
| Working hrs. p.a. | 1,000 | 3,000 | 1,000 |
| Eff. of Std. BB motor | 88.0 % | 86.0 % | 82.0 % |
| Eff. of EE BB motor | 90.5 % | 91.0 % | 90.5 % |
| Power input in kW | 0.345 | 0.527 | 0.629 |
| Energy Saving pa @Rs 3.5 | Rs 1,200 | Rs 5,500 | Rs 2,200 |

Total energy saving per annum: Rs 8,900
Additional price of EE motor over Std motor: Rs 2,175

Payback Period (5000 hrs p.a.) is 2.9 months

# Case Study - 1
# EE motor at Actual site

Site : M/s. Parry Confectionery Ltd.,
4/111 Mount Poonamalle High Road
Manappakkam, Chennai - 600 084.

Application: Kay Compressor used in ETP Plant Machine
Code AB 102

Carried out: Under guidance of Mr..R.Vincent Prabhakar
Executive Manufacturing

Site chosen as the motor is in continuous operation for almost 24 hrs everyday

Case Study - 1 Contd.

## Specification / details of motors

| Existing | | Energy Efficient | |
|---|---|---|---|
| | | Type | - 1LE 3074-4-132S |
| kW/HP | - 5.5/7.5 | kW/HP | - 5.5 / 7.5 |
| RPM | -1440 | RPM | - 1445 |
| F.L.Current | - 11.0A | F.L.Current | - 10.5A |
| Mounting | - B3 | Mounting | - B3 |
| Efficiency | - 84% | Efficiency | - 87.5% |
| Machine No. | - 6-01 - 480 | Machine No. | - K 4921778 |
| Year of Installation 1995 | | BBL Make | |
| | | Date of testing | -10.1.2000 |

Case Study – 1 Contd..

- The existing motor was run and all measurements including energy consumption recorded.

- The existing motor was then replaced at the same place by Energy Efficient motor and all measurements including energy consumption recorded.

Case Study – 1, Contd..

Date : 23.12.99

**Readings on existing standard motor**

| | | |
|---|---|---|
| Voltage | RY/YB/BR - 399/397.3/405.3V | |
| Frequency | 48.1c/s | |
| Current | R/Y/B | 12.11/11.49/12.27 |
| kWH Reading at 4.15 p.m. | | 1480 |
| at 4.30 p.m. | | 3360 |
| | | --- |
| | Consumption | 1880 w hr |
| | | 7520 w hr - 1hr |
| | | 7.52 units |
| | | --- |

Case Study –1, Contd..

Date : 10.1.2000

**Readings on Replaced EE motor**

| | | |
|---|---|---|
| Voltage | RY/YB/BR - 417.7/414.1/422.8 | |
| Frequency | 50.91 | |
| Current | R/Y/B | 9.865/9.657/9.916 |
| kWH Reading at 5.10 p.m. | | 0000 (set) |
| at 6.10 p.m. | | 5986 w hr |
| | | --- |
| | Consumption | 5986 w hr |
| | | 5.99 units |
| | | --- |

Case Study – 1, Contd..

## Energy Saving Calculation

Units saved per Hr of working 7.52 - 5.99 = 1.53

for 20 hrs of working per day

| | | |
|---|---|---|
| Units saved per day | = | 30.6 units |
| Units saved per annum | = | 11169 |
| Savings at Rs.3.50/unit | = | Rs.39091.50 |

# Case Study : 2

**Date : 23.02.01 & 25.02.01**

Site : M/s. Sunil Agro Flour Mills
Hoskote Industrial Area
Hoskote, Bangalore Dist

Application: Roller Flour Mills

Carried out: Under guidance of Mr.Bhat - Purchase Dept
Mr. Narsaram & Mr. Vincent - Electrical Dept

# Case Study 2 contd..

## Existing Motor Details

Rating: 11kw, 1000rpm, B3 Motor

Frame size : 160L
FLC : 22 A
Class of Insulation: F
Duty : S1
Initial reading of Energy Meter: 12.380 kwh
Final reading of Energy Meter : 178.214 kwh
Power consumed in 24 Hrs : 165.834 kwh

# Case study 2 contd.

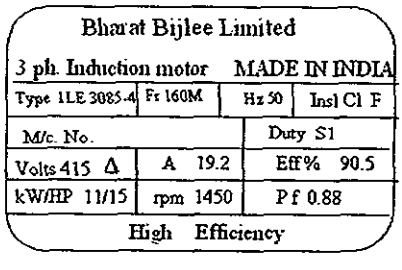
The Motor was replaced with
Make : BBL
Rating : 11kw 1000 rpm B3
M/c No. : K5100754
Frame Size : 160L
Type Ref : 1LA4087-6
Class of Insulation : F
Duty : S1
Initial reading recorded on Energy Meter : 316.595 kwh
Final reading recorded on Energy Meter : 445.928 kwh
Power consumed in 24 hrs : 129.333 kwh

# Case Study 2 contd...

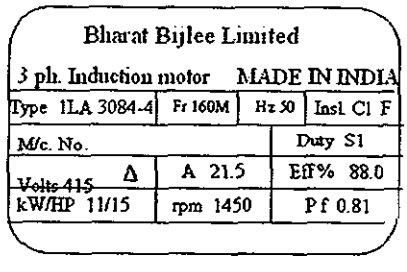
Energy consumed by existing Motor for 24 hrs
= 165.834 kwh
Energy consumed by BBL Motor for 24 hrs
= 129.333 kwh
Therefore Energy saved for 24 hrs using BBL EE motor
= 36.501kwh
Energy saved per motor per annum by using BBL EE motor = 13,322.86 kwh
Energy saved per annum considering energy cost @ Rs.3.25 per kwh = Rs.43,299.31

NOTE: There are 10 motors working in the existing flour mill which will be replaced with BBL make motors and the total saving for 10 motors will be Rs.4,32,993.11

# Nameplates - marking of Efficiency



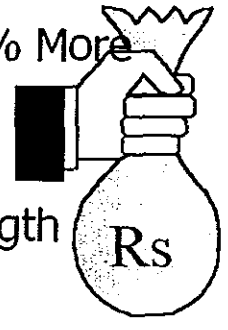

Energy Efficient Motor




Standard Motor

**Bharat Bijlee EE motors are clearly labeled "High Efficiency"**
**Efficiency and pf values are marked on both Std and EE motors**

## Why is the Energy Efficient motor more expensive?




Energy Efficient motors Costs 15 % More than Standard Motors

More Copper

More laminations - longer core length and/or

Higher grade i.e. low loss laminations

Sometimes higher frame size is required

## When is the Energy Efficient motor the right choice?

Over a Standard motor, an Energy Efficient motor has a payback period of 3 to 4 months when the utilization is 5000 hrs p.a.

Purchase Energy Efficient motors when the utilization is more than 1500 hours per annum

# Intermittent duty applications....?

Intermittent duty motors are typically used in crane, hoist, valve actuators and other applications with frequent starts

In these applications, motors are designed for low starting losses rather than low running losses

For intermittent duty applications EE motors are not the best choice

# Summary and Conclusions

***There exists a national standard*** for three phase 4 pole induction motors up to 37kW

IS 12615 of 1988

***Energy savings are more at partial loads*** because Energy Efficient motors have a Flat Efficiency Vs. Load Characteristic

***Payback period is about 1 year*** for 1500 working hours per annum

# Energy Efficient Motors -- abstract

The use of Energy efficient motors is a national priority since 70% of the energy consumed is used for driving electric motors

There exists a national BIS standard for three phase EE induction motors upto 37 kW

Energy Efficient motors are about 15% more expensive. With this increase in price the payback period is only about 1 year for 1500 working hours per annum

# E.E.Motors-FAQs

Frequently Asked Questions

Bharat Bijlee Ltd.

1

## 1-What is an Energy Efficient Motor?

- Efficiencies should exceed or equal minimum levels specified in IS12615
- They are constructed with superior materials clubbed with high manufacturing techniques
- They have lesser vibration,lower waste heat output and more reliable
- Efficiency vs Load ch.is flat-50%to100%load.

3

## 2-When should I consider buying Energy Efficient Motors?

- For all new installations/ modifications.
- Instead of rewinding old standard efficiency motors
- To replace over sized under loaded Motors.
- As a part of Energy conservation program considering motors that work in excess of 1500 hours per annum and ratings less than 37kw.

5

## 3When is EE Motor cost effective?

- Pay back periods will be shorter only in cases of motors working continuously for long periods say 5000 hours per annum
- Cost saving will only be substantial in situations of continuous running not in cases of frequent starting and intermittent running
- .

6

## 4-Should I rewind a failed Motor?

- Rewinding reduces efficiency by 1% to 2% or more if it is a very old motor
- If at all to be rewound, permanent electrical damage must be checked and low temp bake out ovens (below700*f) should be used
- Better to replace with EE Motor if rewinding cost exceeds 40%price of new motor

7

## 5-What design factors should I consider when choosing new EEmotor?

- Sizing motor to operate between 60% to 90% of load
- Correct speed for operating centrifugal loads

8

## 6-Voltage variation.

*When choosing motors for an electrical system use a motor specifically designed for that voltage rather than "Tri-Voltage" motor as these motors are compromise design that are likely to run hotter, less efficient and less reliable.

*Unbalanced system increases system losses and reduces motor efficiency.

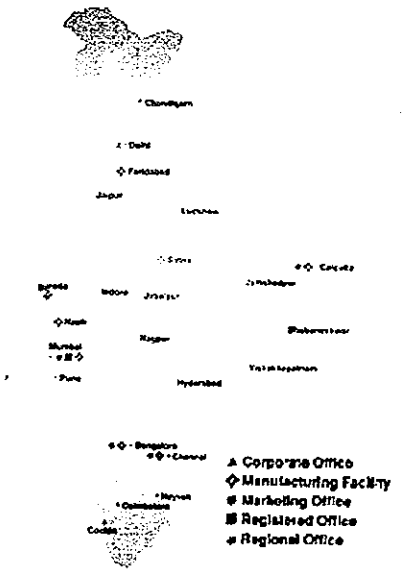
13

## 7-How should I begin a Motor efficiency improvement program?

- List out all Motors in the Plant which are of rating below 50hp
- Based on hours of working group them into
  a) above5000hrs-fast payback
  b)3000 to5000hrs-medium payback
  c)1500 to 3000hrs-slow payback

14

## ABB in India




**ATEML- 2001**
ABB -ATP - Page 1
Review-2000 - Prepared by VR 20.4.2001

ABB

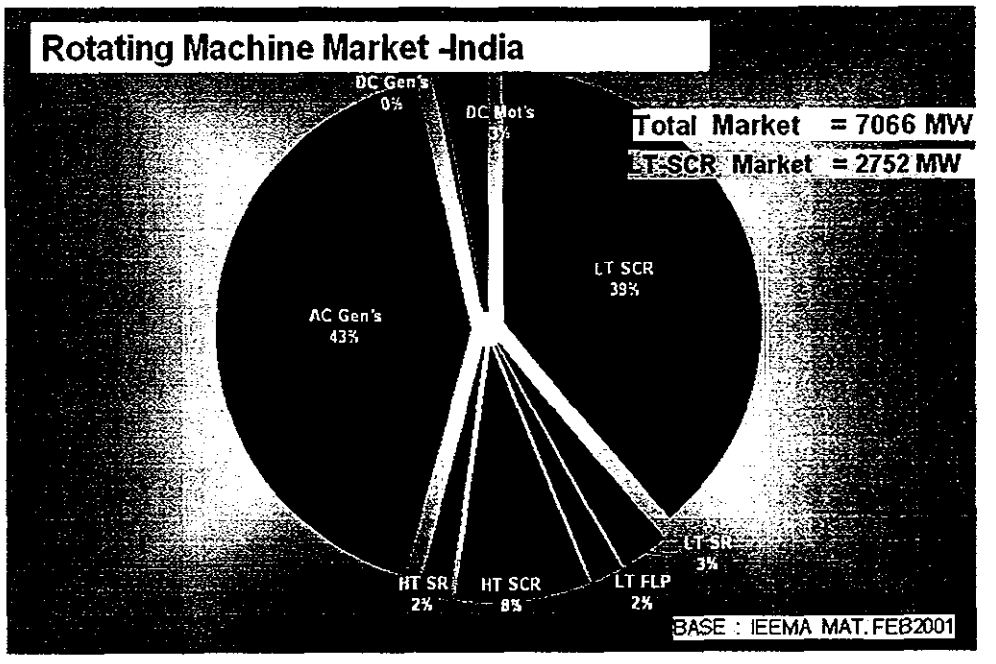
# Faridabad Works

## Manufacturing range

| | |
|---|---|
| • Type | Three-phase squirrel-cage induction motors |
| • Output | 0.18 ... 315 kW; 0.25 ... 425 hp |
| • Voltage | 415 V; 220 ... 660 V |
| • Frequency | 50 Hz; 25 ... 60 Hz |
| • Duty | S1 ... S8 acc. to IS:12824 |
| • Ambient | 45°C; 20 ... 70°C |
| • Altitude | up to 1 000 m |
| • Insulation | Class 'F'/Class 'H' (VPI on request) |

**ATEML- 2001**
ABB -ATP - Page 2
Review-2000 - Prepared by VR 20.4.2001

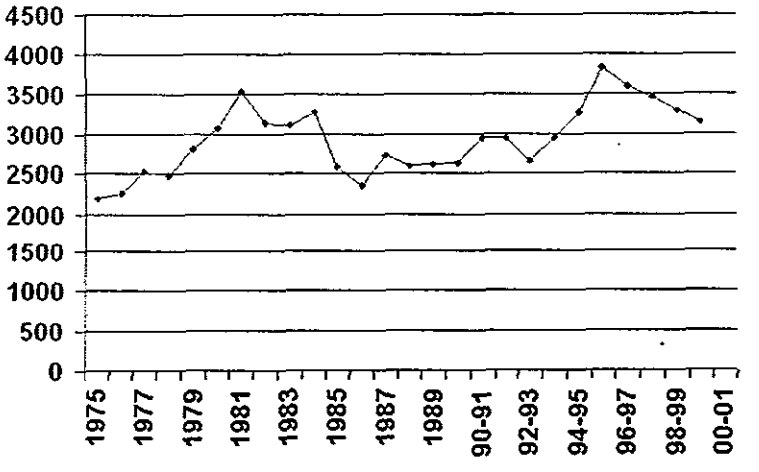
ABB




ATEML- 2001
© ABB - ATP - Page 3
Review-2000 - Prepared by VR 20.4.2001

ABB

## ALL INDIA LT-AC MOTORS MOVEMENT - IN MW




ATEML- 2001
© ABB - ATP - Page 4
Review-2000 - Prepared by VR 20.4.2001

ABB

## Market Scenario

### Factors effecting EE Motors

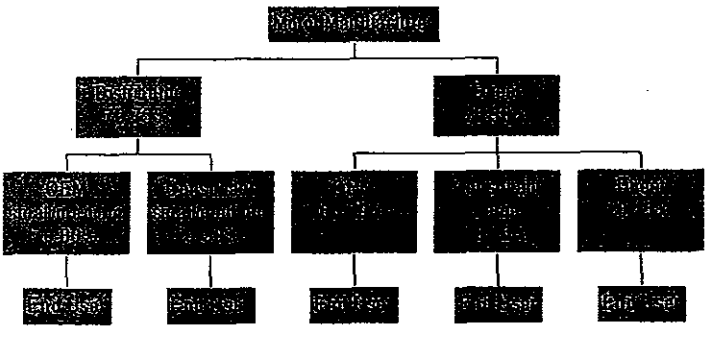
- Standards
- Labelling
- Energy rates(Subsided)
- Awareness'
- Regulation
- Higher initial cost
- Replacement of rewinding motors
- Right selection of motor- keeping inventory
- Maintenance practice
- Purchase decision making
- Availabilty of low loss stamping.

**ATEML- 2001**
© ABB -ATP - Page 5
Review-2000 - Prepared by VR 20.4.2001

ABB

## Market Scenario

**Distibution channel**



- % ages are only indicative
- does not include the unorganised sector

- **Distributors effects the buyers decision**
- **Consultants/ OEM can influence the market**

**ATEML- 2001**
© ABB -ATP - Page 6
Review-2000 - Prepared by VR 20.4.2001

ABB

## Market Scenario

Buyer Behavior

| OEM | End User |
|---|---|
| Not the User-<br>EE not critical | Buys but Price Factor |
| Performance<br>Critical-EE costly | Recognisation<br>of energy saving secondary |

- Energy Efficiency is not Paramount
- Purchase decision maker different priorities from users
- Users are particular about the plant running and Efficiency



ABB

## EE motors -Benefit to users

Savings in energy costs = KW X (1/n1-1/n2) X Hrs X Unit cost

For 11 Kw /4 p motor:

| | cost Rs | | Extra cost |
|---|---|---|---|
| eff1 = 91% | 18000/- | (1-2) | 3500/- |
| eff2 = 88.4% | 14500/- | (1-3) | 5500/- |
| eff3 = 85.5% | 12500/- | (2-3) | 2000/- |

Considering Rs. 4.50 per unit

| **Saving p.a** | **2500 hrs** | **5000 hrs** | **7500 hrs** |
|---|---|---|---|
| eff1/eff3 | 8748/- | 17496/- | 26244/- |
| eff2/eff3 | 4748/- | 9496/- | 14244/- |
| eff1/eff2 | 4000/- | 8000/- | 12000/- |

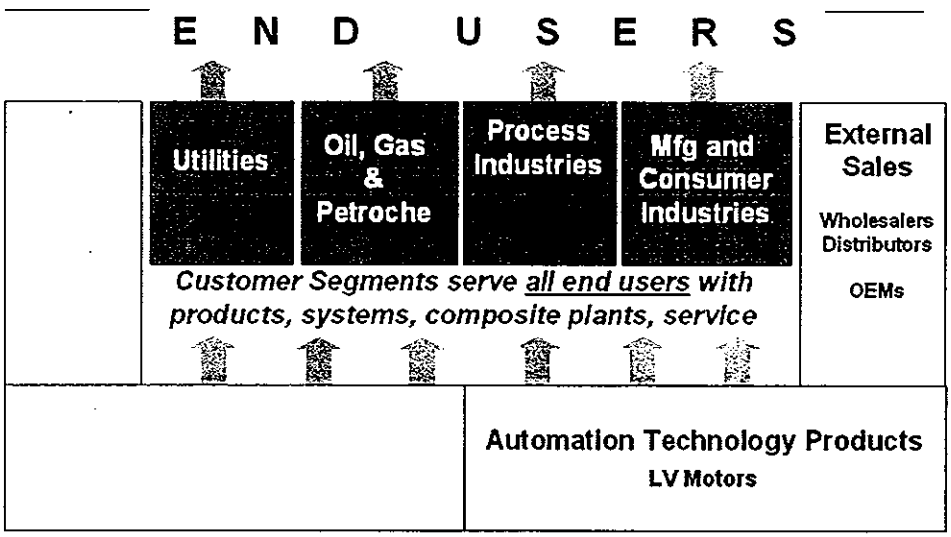
Payback period in months

| | | | |
|---|---|---|---|
| eff1/eff3 | 7.54 | 3.77 | 2.51 |
| eff2/eff3 | 5.05 | 2.52 | 1.68 |
| eff1/eff2 | 10.5 | 5.25 | 3.50 |



ABB

## Organization built around customers




*Product Segments supply all generic products internally, plus direct sales to external channel partners*

ATEML- 2001
© ABB -ATP - Page 10
Review-2000 - Prepared by VR 20.4.2001

**Theory and Standards**
**Motor Loss Categories**

No Load Losses

- **Core Losses**
- **(F&W) Friction and Windage Losses**

Factors affecting these Losses

- **Type and quantity of magnetic material**
- **Selection and design of fans, bearings and sealings**

ATEML- 2001
© ABB -ATP - Page 11
Review-2000 - Prepared by VR 20.4.2001

**Theory and Standards**
**Motor Loss Categories**

Load Losses

- **Stator I2R Losses**
- **Rotor I2R Losses**
- **Stray Load Losses**

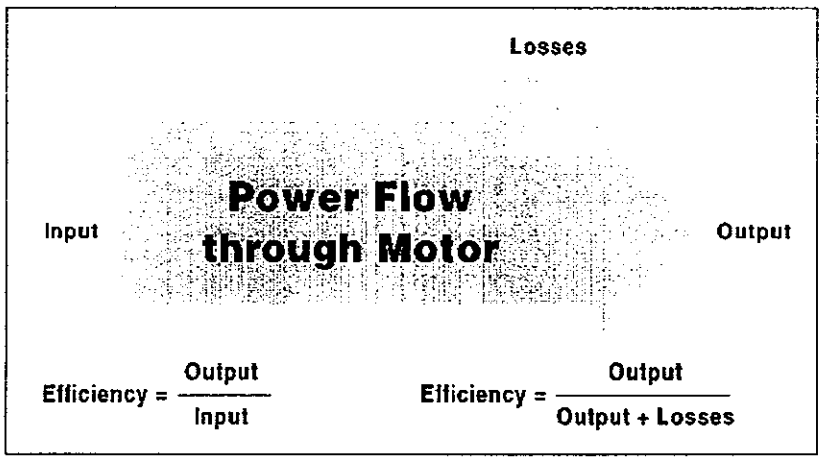
Factors affecting these Losses

- **Stator conductor size**
- **Rotor conductor size and material**
- **Manufacturing and design methods**

**ATEML- 2001**
© ABB -ATP - Page 12
Review-2000 - Prepared by VR 20.4.2001

ABB

**Theory and Standards**
**Losses and Efficiency**



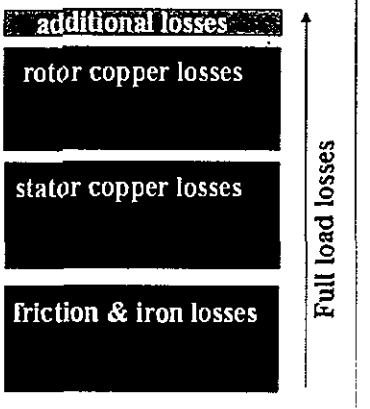

**ATEML- 2001**
© ABB -ATP - Page 13
Review-2000 - Prepared by VR 20.4.2001

ABB

**Theory and Standards**
**Losses in Electrical Machines**

friction losses
iron losses
stator copper losses
rotor copper losses
additional losses

- losses vary with load
- "constant losses"




ATEML- 2001
© ABB / ATR / Page 46 / Efficiency / B4 / 97-06-05
Review 2000 - Prepared by VR 20.4.2001

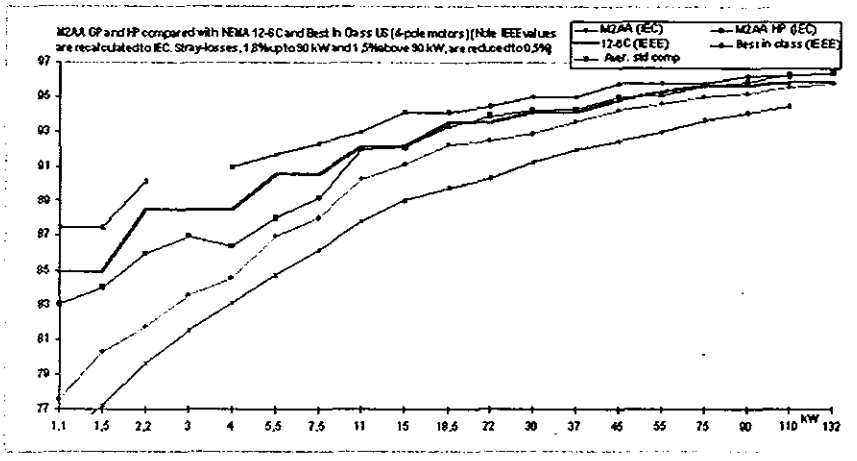
**Theory and Standards - Efficiency Results from Various Motor Testing Standards**

Full-load Efficiency (%)

| Standard | 5.5 kW | 15 kW |
|---|---|---|
| CSA C- 390 | 80.3 | 86.9 |
| IEEE - 112 Method B | 80.3 | 86.9 |
| IEC 34 - 2 | 82.3 | 89.4 |
| BS - 269 | 82.3 | 89.4 |
| JEC - 37 | 85.0 | 90.4 |
| Eff1(EU) | 89.2 | 91.8 |
| Eff2(EU) | 85.7 | 89.4 |

ATEML- 2001
© ABB / ATR / Page 46 / Efficiency / B7 / 97-06-05
Review 2000 - Prepared by VR 20.4.2001

**ABB Motors Policy - M2000 Efficiency**
**Comparison with average of European competitors and US requirement and best in class**




ATEML- 2001
© ABB -ATP - Page 16
Review-2000 - Prepared by VR 20.4.2001

ABB

# M-2000 MOTORS

**The M2000 series is the latest in the family of ABB Motors.**

**These are very popular in market as 'M2BA' Motors.**

ATEML- 2001
© ABB -ATP - Page 17
Review-2000 - Prepared by VR 20.4.2001

ABB

# M-2000 MOTORS

## Special features

- High efficiency motors
- Standard 50 deg C ambient
- Low temperature rise
- Low vibration
- Low noise
- Flexible terminal box position
- HT grease
- Dual mounting holes

ATEML- 2001
© ABB -ATP - Page 18
Review-2000 - Prepared by VR 20.4.2001

ABB