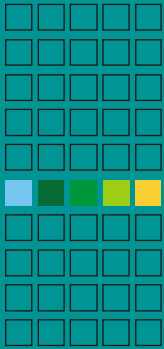
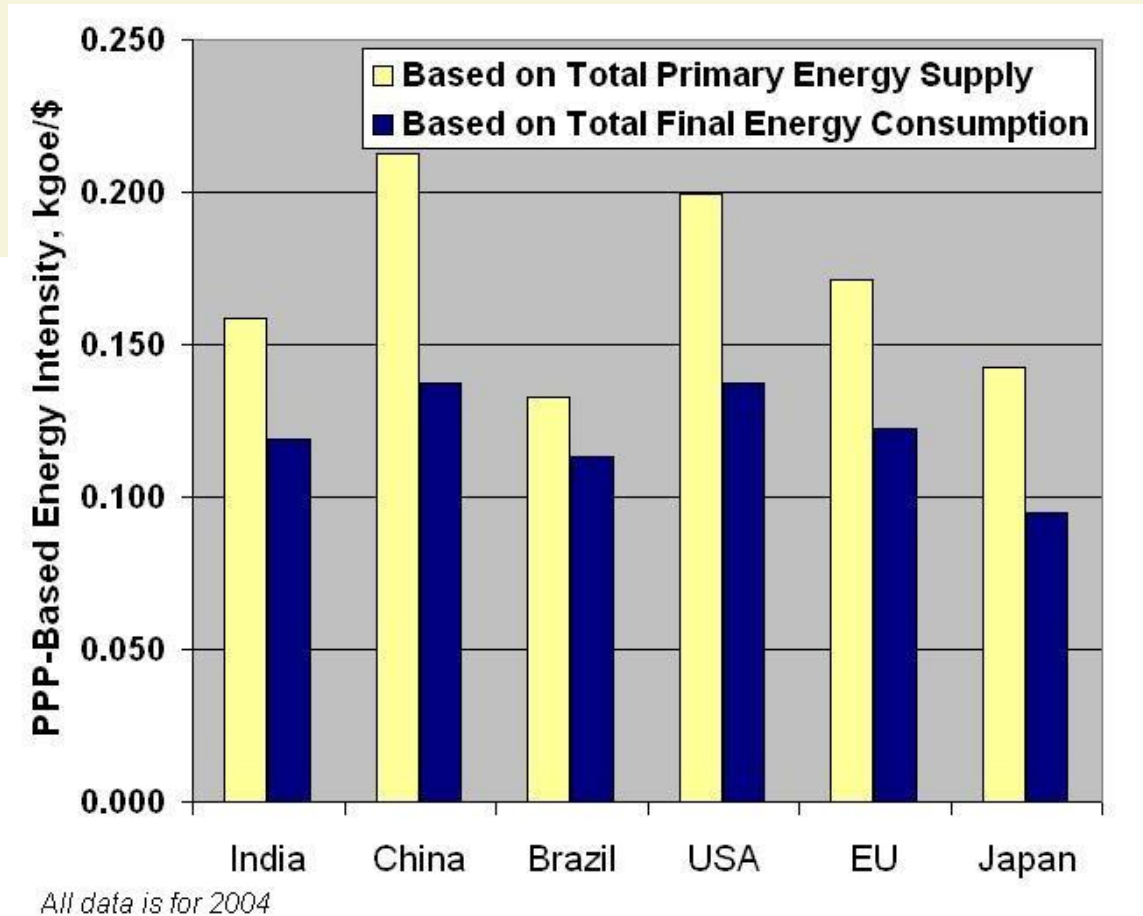


Promoting End-Use Energy Efficiency in India through Energy Conservation Act : An Overview



K K Chakarvarti
Bureau of Energy Efficiency
Ministry of Power
Government of India

India's Energy Intensity is fifth lowest in the world



Ø Japan, Denmark, UK and Brazil have lower energy intensity

Ø Energy intensity is declining at about 1.5% per year

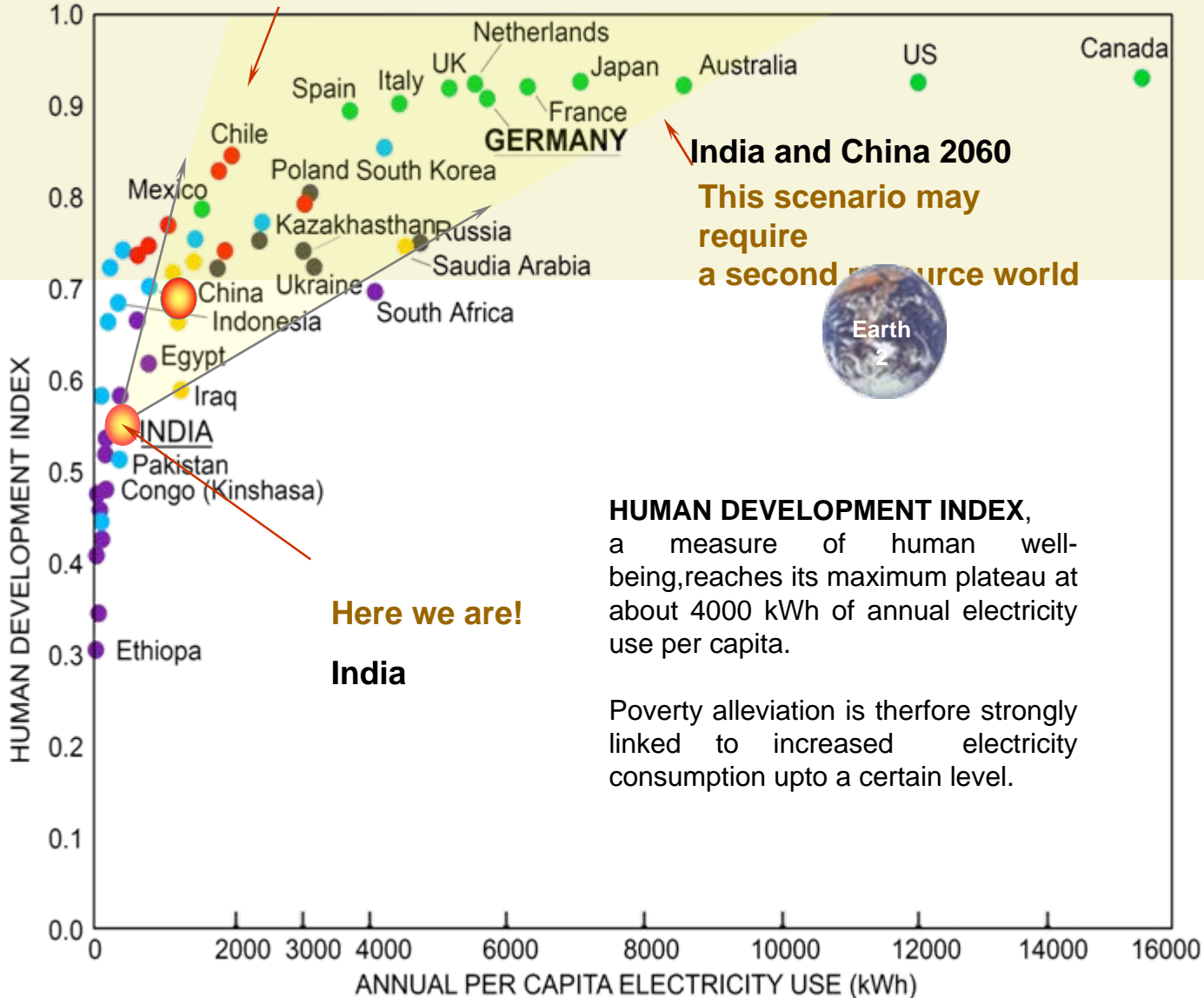
Energy Use in India

- **Energy consumption in India is low, though efficiency of use is reasonable**
 - Per capita energy consumption is 530 kgoe; world average is 1770
 - Energy intensity of Indian economy was 0.18 kgoe/\$-GDP(PPP) in 2004; compared to 0.14 in Japan and 0.19 in the EU
- **Energy demand is increasing due to rising incomes, accelerated industrialization, urbanization and population growth**
 - 2003-04 : 572 Mtoe
 - 2016-17 : 842-916 Mtoe
 - 2026-27 : 1406-1561 Mtoe
- **Meeting the increasing demand only through increases in supply may lead to:**
 - Reduced energy security due to volatility in availability and prices of imported fuels
 - Adverse environmental impacts
 - Strain on balance of payments
- **Energy conservation and energy-efficiency are an essential part of national energy strategy**

Energy modesty as inconvenient truth

Best case future scenario !

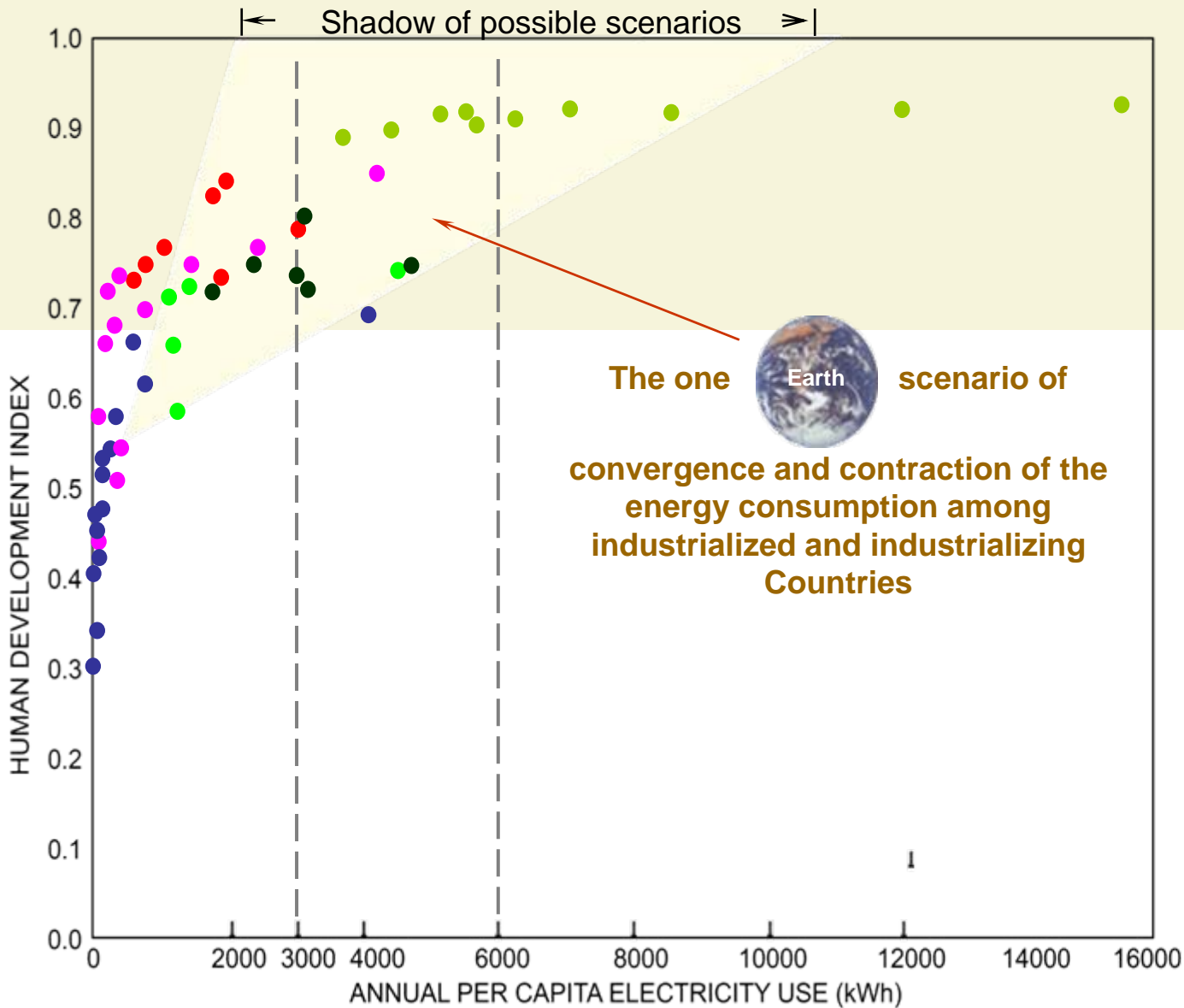
India and China 2060



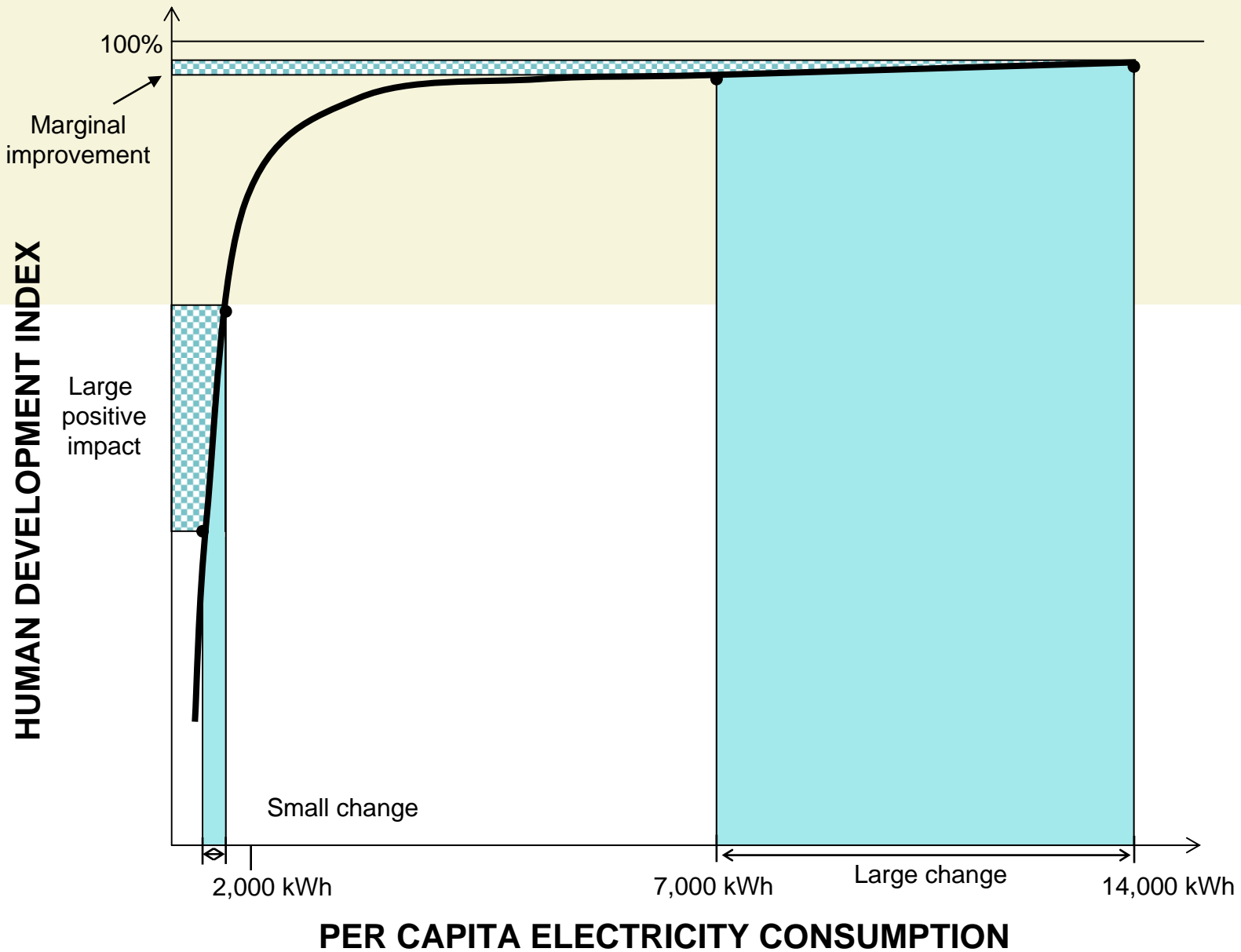
HUMAN DEVELOPMENT INDEX,
 a measure of human well-being, reaches its maximum plateau at about 4000 kWh of annual electricity use per capita.

Poverty alleviation is therefore strongly linked to increased electricity consumption upto a certain level.

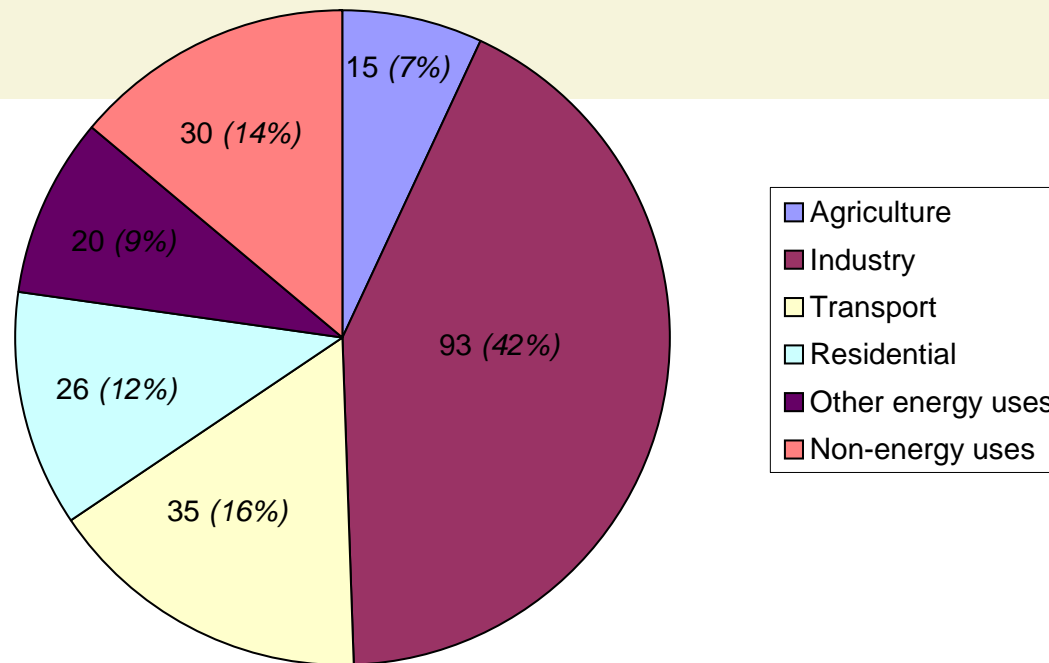
Vision 2060



The asymptotic behavior of the HDI



SECTORAL SHARE OF COMMERCIAL ENERGY CONSUMPTION (MTOE) (2003-04)



BEE - Scope of Activities

- **The Bureau of Energy Efficiency (BEE) was established on 1st March 2002, under the Energy Conservation (EC) Act, 2001.**
- **BEE is responsible for spearheading the improvement of energy efficiency in the economy through various regulatory and promotional instruments**
 - **Plan, manage and implement provisions the EC Act**
 - **Appliance standards and labeling**
 - **Industrial energy benchmarks**
 - **Energy Conservation Building Codes**
 - **Monitor energy use in high energy-consumption units**
 - **Certify and accredit energy auditors and energy managers**
 - **Provide a policy framework and direction to national energy conservation activities**
 - **Disseminate information and knowledge, and facilitate pilot and demonstration projects**
 - **Establish EE delivery systems through Public-Private Partnerships (PPP).**

Standards and Labeling of Appliances

- **Evolve minimum energy performance standards (MEPS) for notified equipment and appliances**
- **Prohibit manufacture, sale and import of equipment and appliances not conforming to MEPS**
- **Introduce Energy labeling to enable consumers to make informed choice**
- **The National Energy Labeling Programme has been launched by Union Minister of Power on 18th May, 2006**
 - **House-hold refrigerators, fluorescent tube lights (4 feet), and air conditioners have been included in the programme on voluntary basis; 70% of refrigerator production, 90% of tubelight production; and 40% of AC production is now covered by the programme.**
 - **Other appliances/equipment, such as general purpose electric motors, LPG burners and ceiling fans are also planned to be launched in end 2007.**

Sample Labels



| BEE STAR RATING PLAN | | | | | |
|------------------------------------|-----|------------|------------|------------|-------|
| STAR RATING | * | ** | *** | **** | ***** |
| Lumens per Watt at 0100 hrs of use | <61 | >=61 & <67 | >=67 & <86 | >=86 & <92 | >=92 |
| Lumens per Watt at 2000 hrs of use | <52 | >=52 & <57 | >=57 & <77 | >=77 & <83 | >=83 |
| Lumens per Watt at 3500 hrs of use | <49 | >=49 & <54 | >=54 & <73 | >=73 & <78 | >=78 |

Under test conditions when tested in accordance with IS 2418. Actual efficiency will vary as per site conditions.

Tubular Fluorescent lamp

POWER SAVINGS GUIDE

ELECTRICITY CONSUMPTION
300*
UNITS PER YEAR

| | |
|----------------|----------------|
| Appliance | : Refrigerator |
| Brand | : XX |
| Model | : XX |
| Type | : xx |
| Gross volume | : XX |
| Storage volume | : XX |

ENERGY IS LIFE
BEE
CONSERVE IT

Refrigerator

Introducing the BEE LABEL. The new sign of cost savings.

Save Energy. Save Money. BEE Happy

POWER CONSUMPTION
415
UNITS PER YEAR

The next time you buy a refrigerator, look for the BEE label. It follows a star system to rate the refrigerator on energy efficiency - the most energy efficient refrigerator having 5 stars and the least one with 1 star. Make an informed choice and cut down your electricity bill.

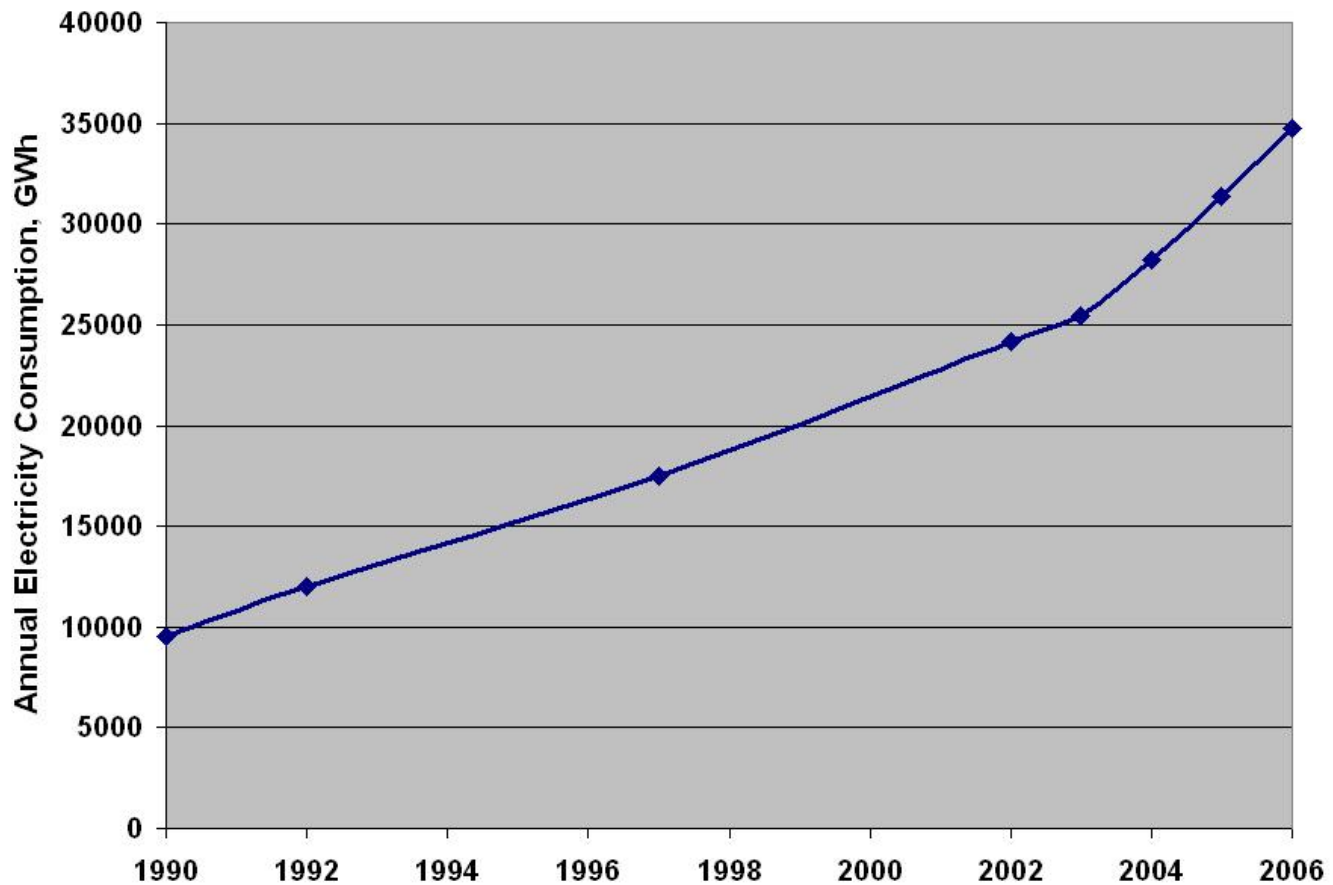
ENERGY IS LIFE
BEE
CONSERVE IT

BUREAU OF ENERGY EFFICIENCY
MINISTRY OF POWER

www.bee-india.nic.in

*Under test conditions, when tested in accordance with XXX. Actual electricity consumption will depend on how the appliance being used.

Electricity Use in the Commercial Sector is exploding!



Energy Conservation Building Code



- Draft ECBC covering the following components prepared:
 - Building Envelope (Walls, Roofs, Windows)
 - Lighting (Indoor and Outdoor)
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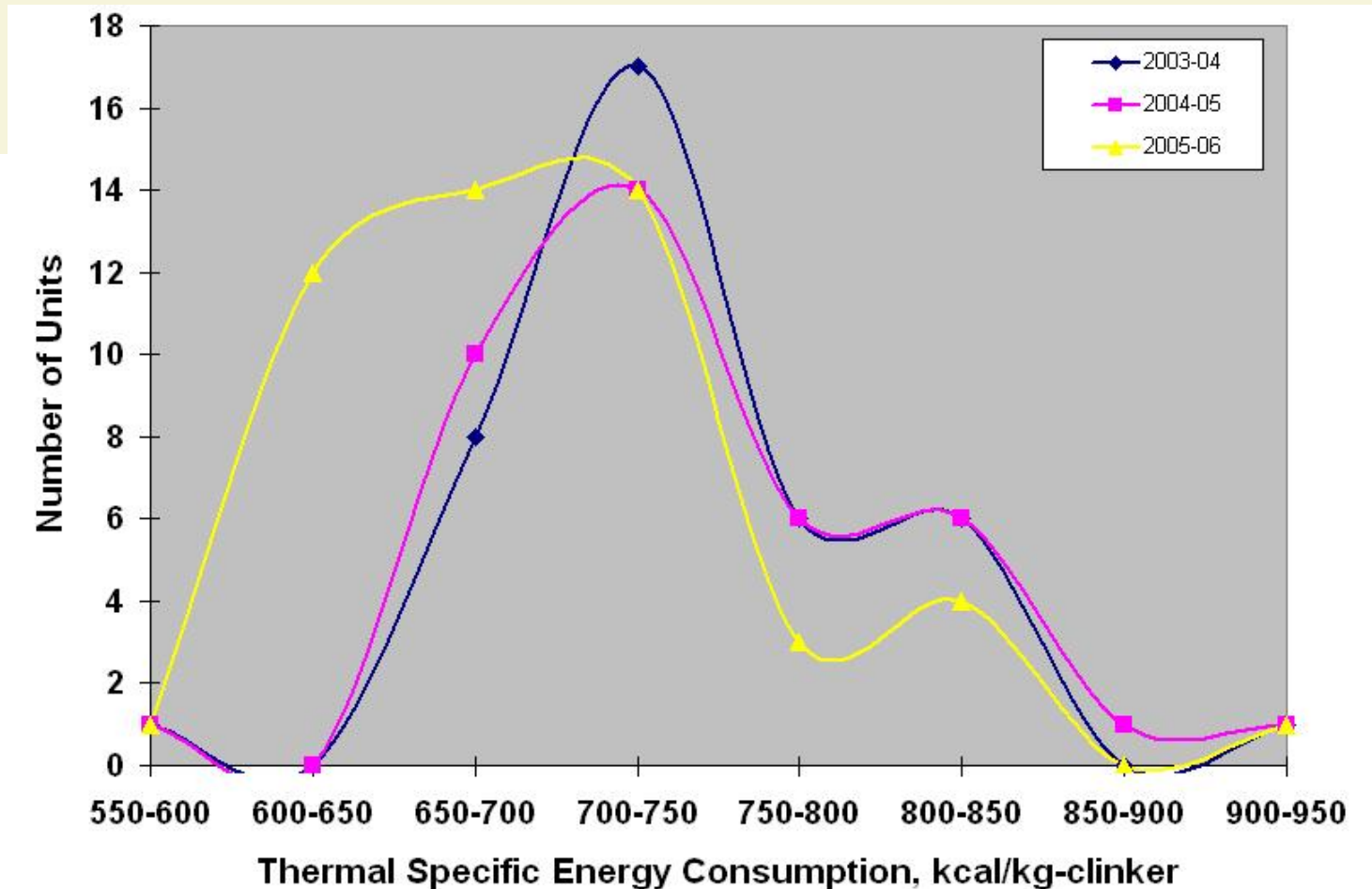
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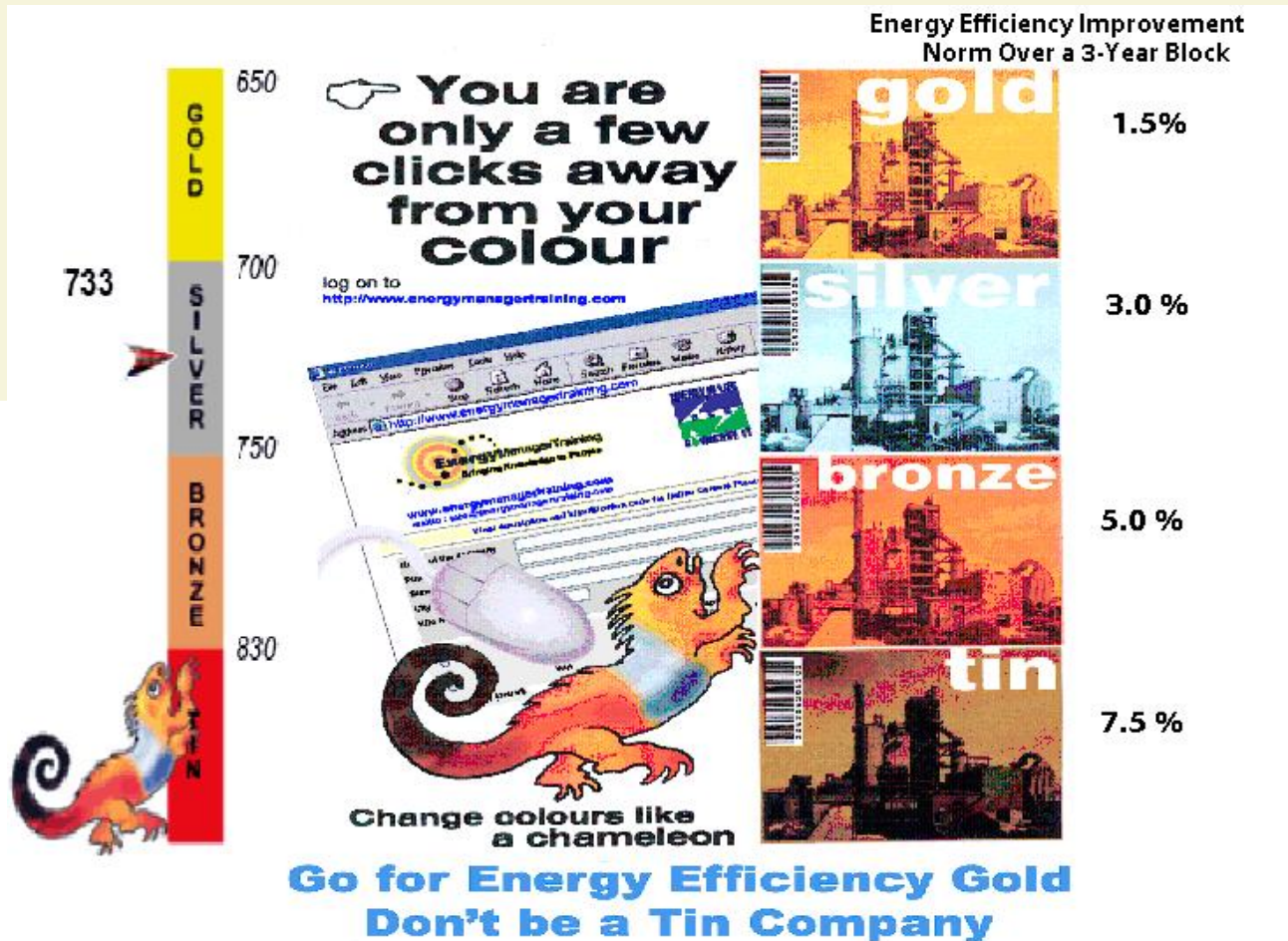
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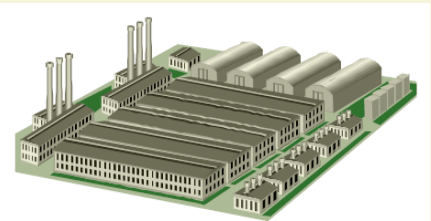


Go for Gold !



- Decrease the energy-efficiency bandwidth of the sector
- Tin tries harder than bronze, ... , Gold sets world standards

BEE Codes & Manuals



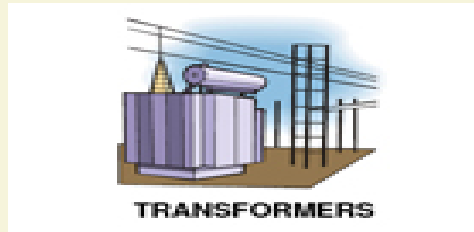
COGENERATION



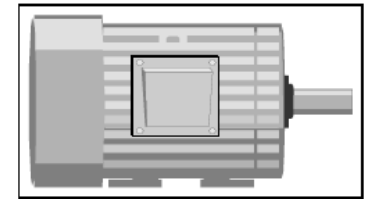
HVAC-CHILLERS



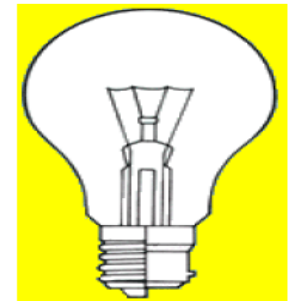
FLUID PIPING SYSTEMS



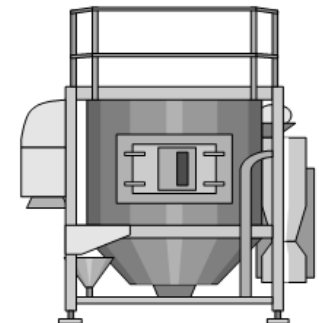
TRANSFORMERS



ELECTRIC MOTORS



LIGHTING



DRYERS

BEE Codes and Manuals 2006
COGENERATION, DRYERS, ELECTRIC MOTORS,
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CONSERVE IT

Certify and Accredit Energy Auditors and Managers

- Three national examinations conducted to certify energy managers and auditors
 - 2023 persons have qualified as energy auditors and energy managers, and 713 have qualified as energy managers only
- 64 organizations have been accredited as energy auditing agencies
 - Over 3,000 energy audits have been carried out by the accredited agencies over the past three years
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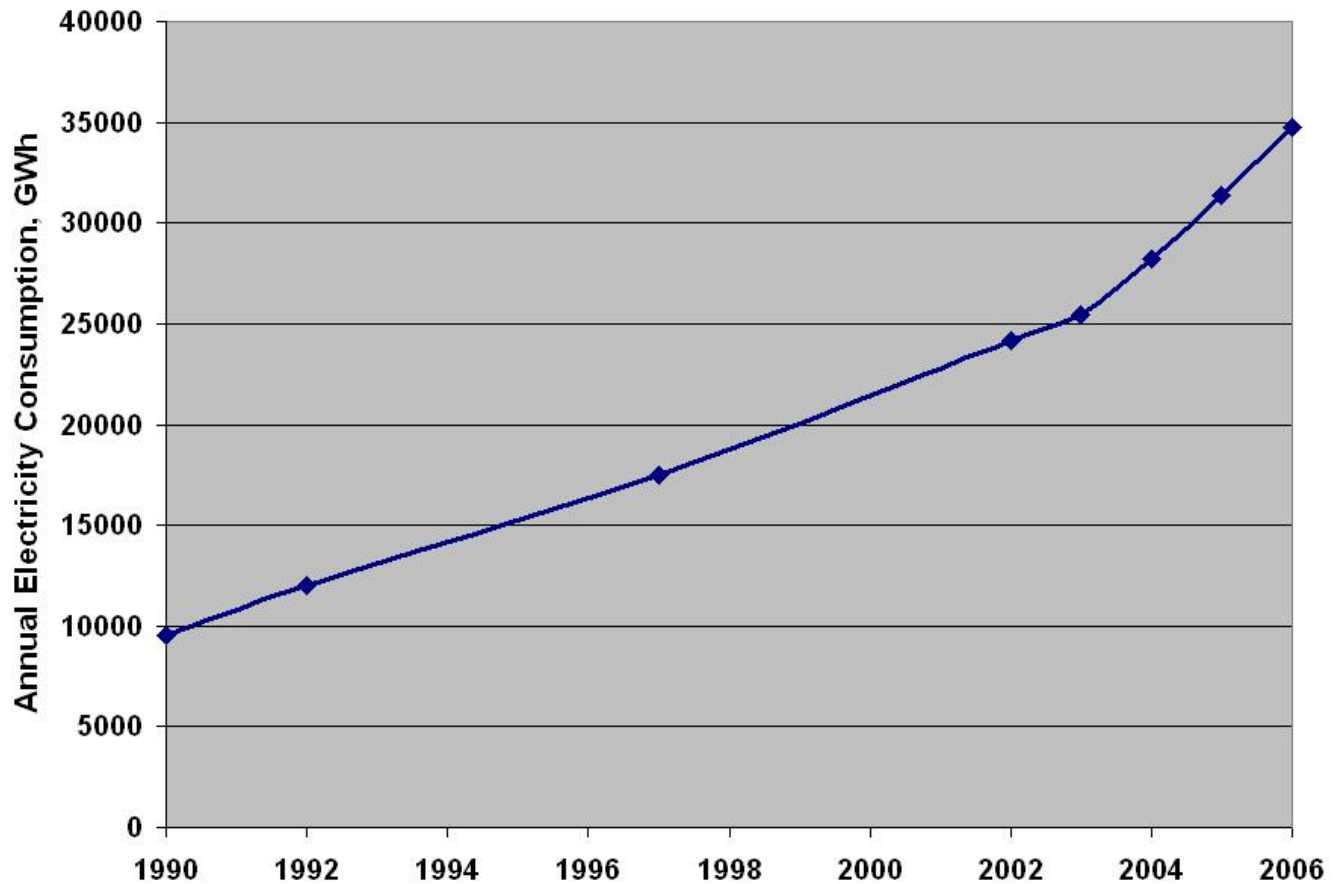
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| Name of the State | Examination 2004 | | Examination 2005 | | Examination 2006 | | Sub Total | |
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| | Energy Managers | Energy Auditors | Energy Managers | Energy Auditors | Energy Managers | Energy Auditors | Energy Managers | Energy Auditors |
| Andhra Pradesh | 16 | 28 | 10 | 35 | 22 | 61 | 48 | 124 |
| Assam | 9 | 2 | 3 | 5 | 2 | 16 | 14 | 23 |
| Bihar | 4 | 2 | 1 | 4 | 1 | 5 | 6 | 11 |
| Chhattisgarh | 2 | 9 | 1 | 16 | 7 | 13 | 10 | 38 |
| Goa | 2 | 2 | 0 | 4 | 1 | 5 | 3 | 11 |
| Gujarat | 53 | 50 | 35 | 78 | 17 | 95 | 105 | 223 |
| Haryana | 11 | 15 | 3 | 30 | 10 | 35 | 24 | 80 |
| Himachal Pradesh | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Jammu & Kashmir | - | 0 | 0 | 1 | 0 | 1 | 0 | 2 |
| Jharkhand | 1 | 7 | 1 | 1 | 0 | 13 | 2 | 21 |
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| Pondichery | 0 | 1 | 1 | 2 | 1 | 2 | 2 | 5 |
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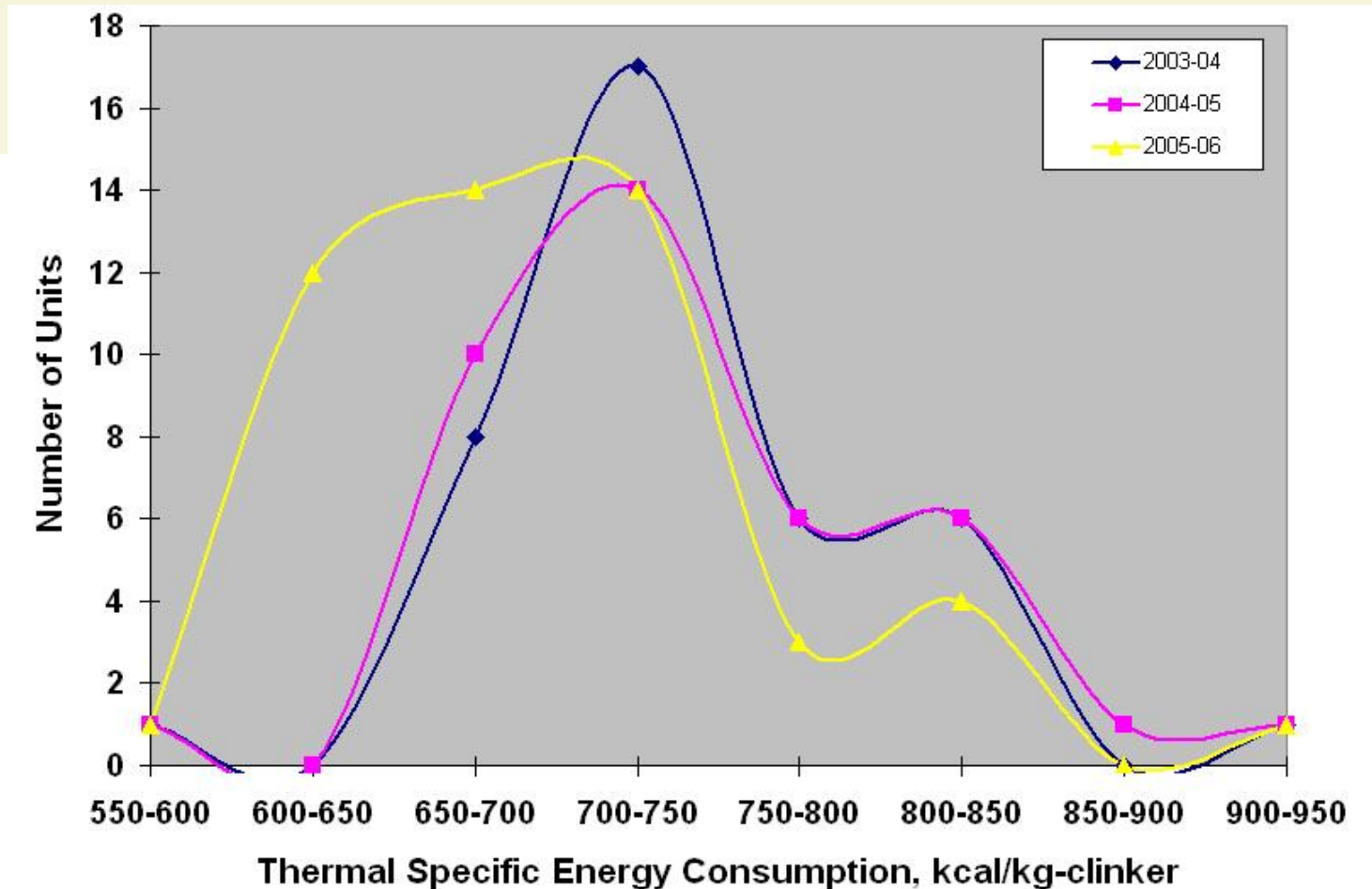
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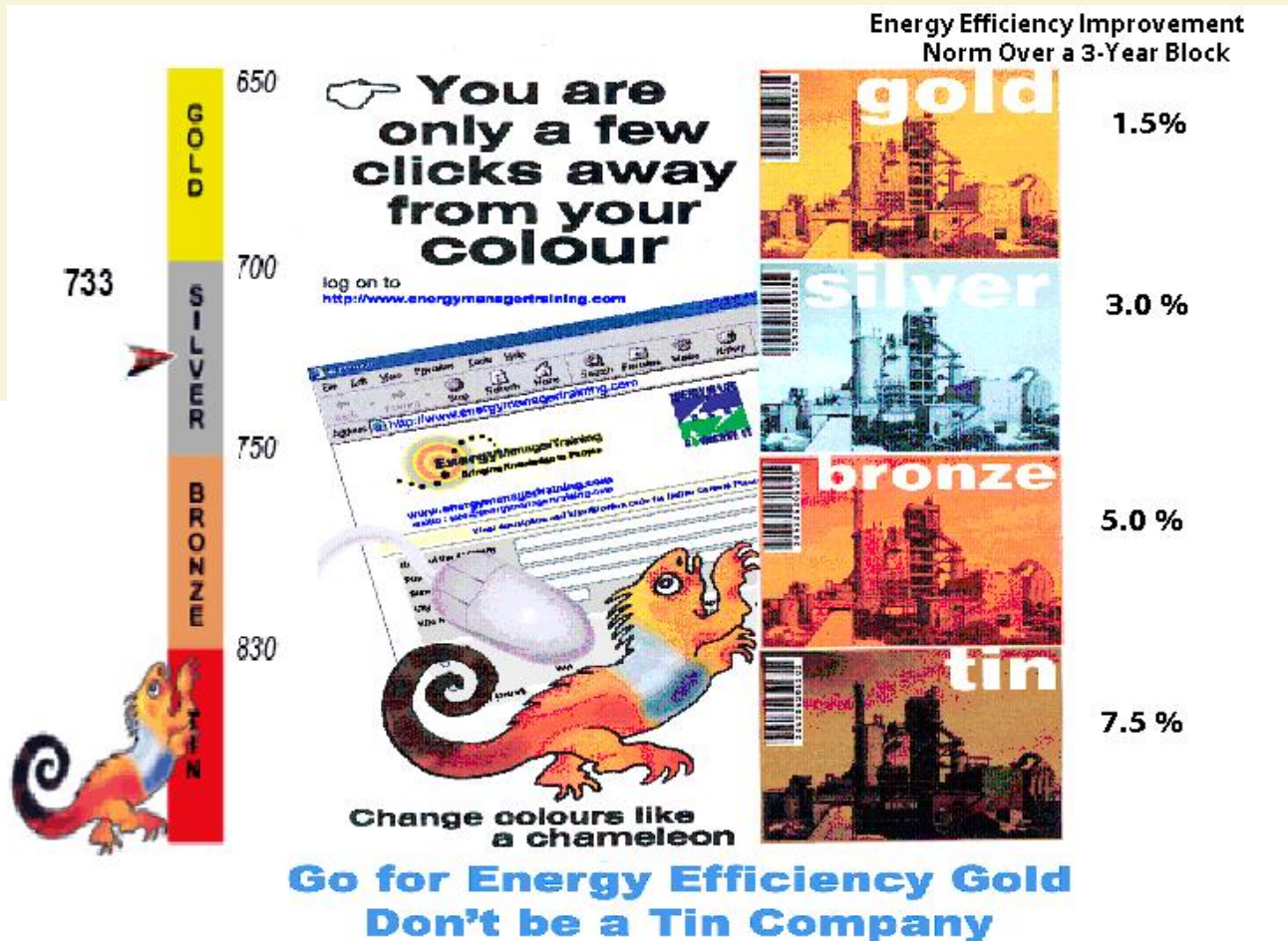
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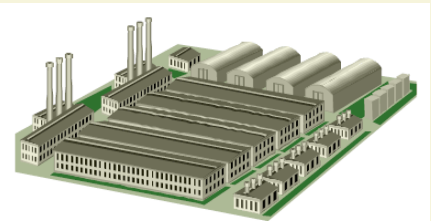


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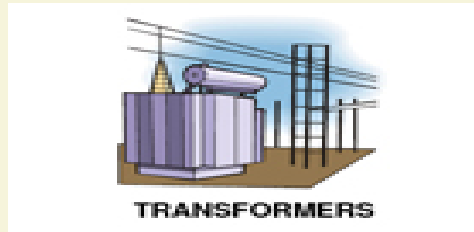


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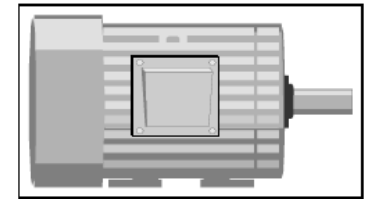
BEE Codes & Manuals



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TRANSFORMERS



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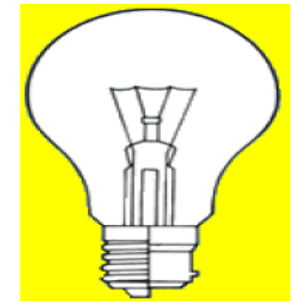


HVAC-CHILLERS

BEE Codes and Manuals 2006
COGENERATION, DRYERS, ELECTRIC MOTORS,
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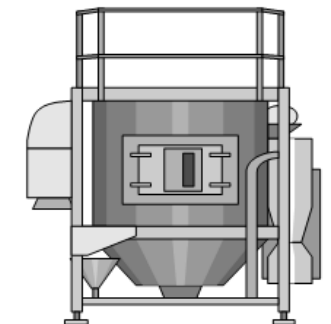
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