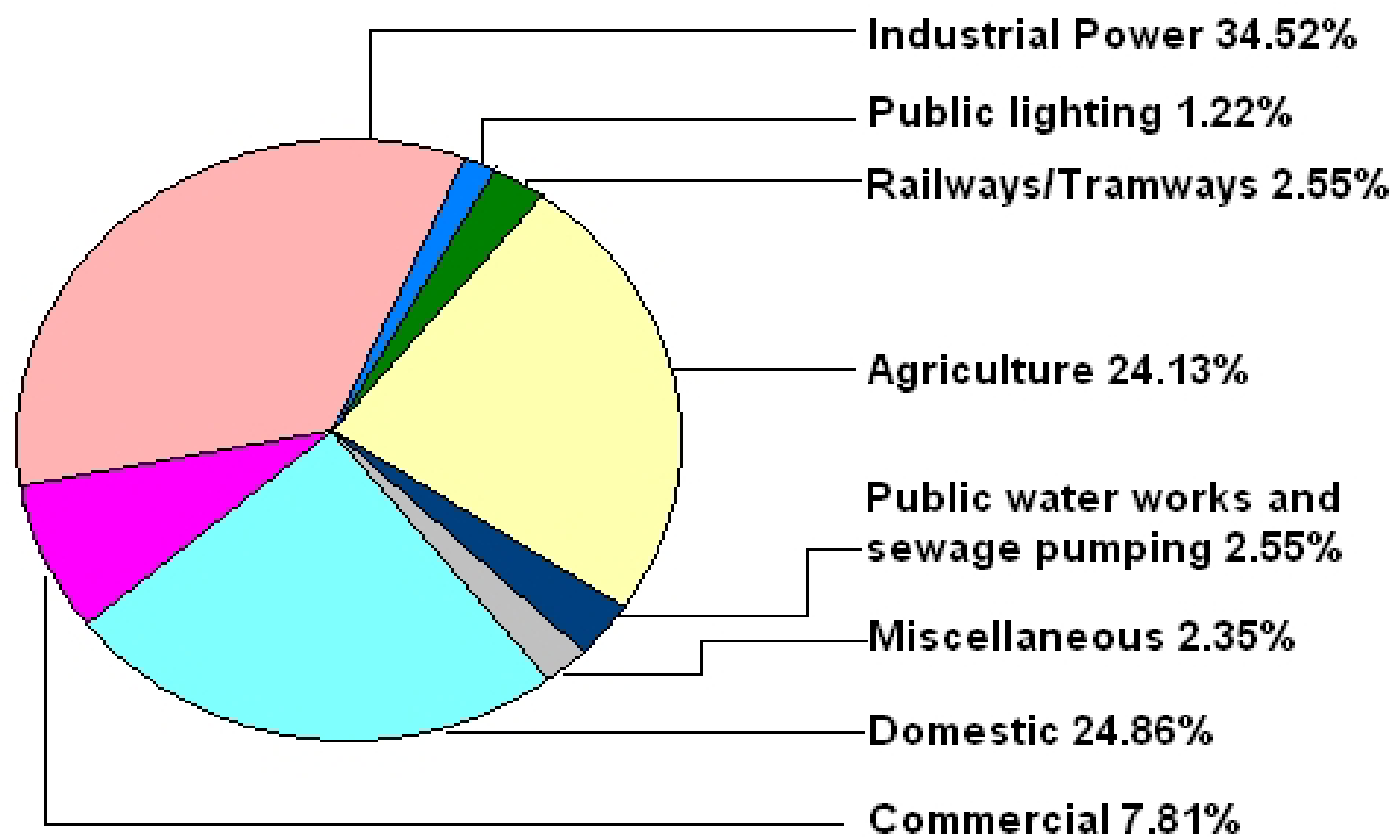


**PRESENTATION**  
**ON**  
**OPERATIONAL FRAMEWORK TO**  
**PROMOTE ENERGY EFFICIENCY IN**  
**BUILDING CODES**

**BY**  
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## SECTOR-WISE ENERGY CONSUMPTION-NATIONAL (2003-04)



Source: TEDDY TERI Year Book

# ENERGY CONSERVATION

## AT NATIONAL LEVEL

- Peak demand shortage is approx. 11% - 13%
- Energy saving potential is about 23%
- Peak demand shortage can be overcome through energy efficiency measures in the short and medium term
- Implementing end use efficiency and demand side management can save nearly 25,000 MW capacity
- Which means saving of Rs.10,000 crores

## DOMESTIC/ COMMERCIAL BUILDINGS - ENERGY CONSUMPTION

- Construction sector is growing at 13% and real estate at the rate of 30% (Source : CII Green Buildings)
- Energy consumption in commercial building sector is 5.6% of total energy consumption (Source : TERI)
- Potential of energy saving in domestic / commercial building sector is estimated at 20% (Source : BEE, Govt. of India)

# ENERGY USE PATTERN IN BUILDINGS

- In Lighting - 60%
  - In Air conditioning - 32%
  - And in other applications - 8%
- 
- In conventional Indian buildings, energy consumption is 200 kWh per sq. meter
  - This energy consumption can be reduced to 120 kWh per sq. meter by applications of energy efficient building techniques
  - Saving upto 60% can be achieved.

(Source : TERI & BEE, Govt. of India presentations)

# ENERGY CONSERVATION BUILDING CODE (ECBC) 2006

- ECBC has been drawn with the objective to reduce the baseline energy use in buildings by supporting the adoption and implementation of building energy codes;
- As per the current definition of the draft Energy Conservation Building Codes, these codes are applicable to future “commercial buildings” or building complexes those which shall have;
  - connected load of 500 KW or more
  - contract demand of 600 KVA or more
  - all buildings with a conditioned floor area of 1000 meter square (10,000 sq. ft. ) or more

# GAPS IN PRESENT DRAFT ECBC

- It is silent on the buildings which are not connected with the grid and shall have captive power generation of 500 KW or more.
- The term “commercial buildings” needs to be elaborated and other types of commercial activities like its use for hospitals, educational institutions, Government offices and NGO etc. needs to be included in the definition of commercial building.
- The present scope of ECBC does not cover the existing commercial, industrial, institutional and Government sector buildings which are having connected load of 500 KW or more;
- The industrial, Government & institutional buildings, which shall come in future have also been left out from the scope of ECBC.
- Implementation/ monitoring/ verification mechanism & penalties for non-compliance needs to be defined.

# COMMENTS ON DRAFT ECBC - HARYANA

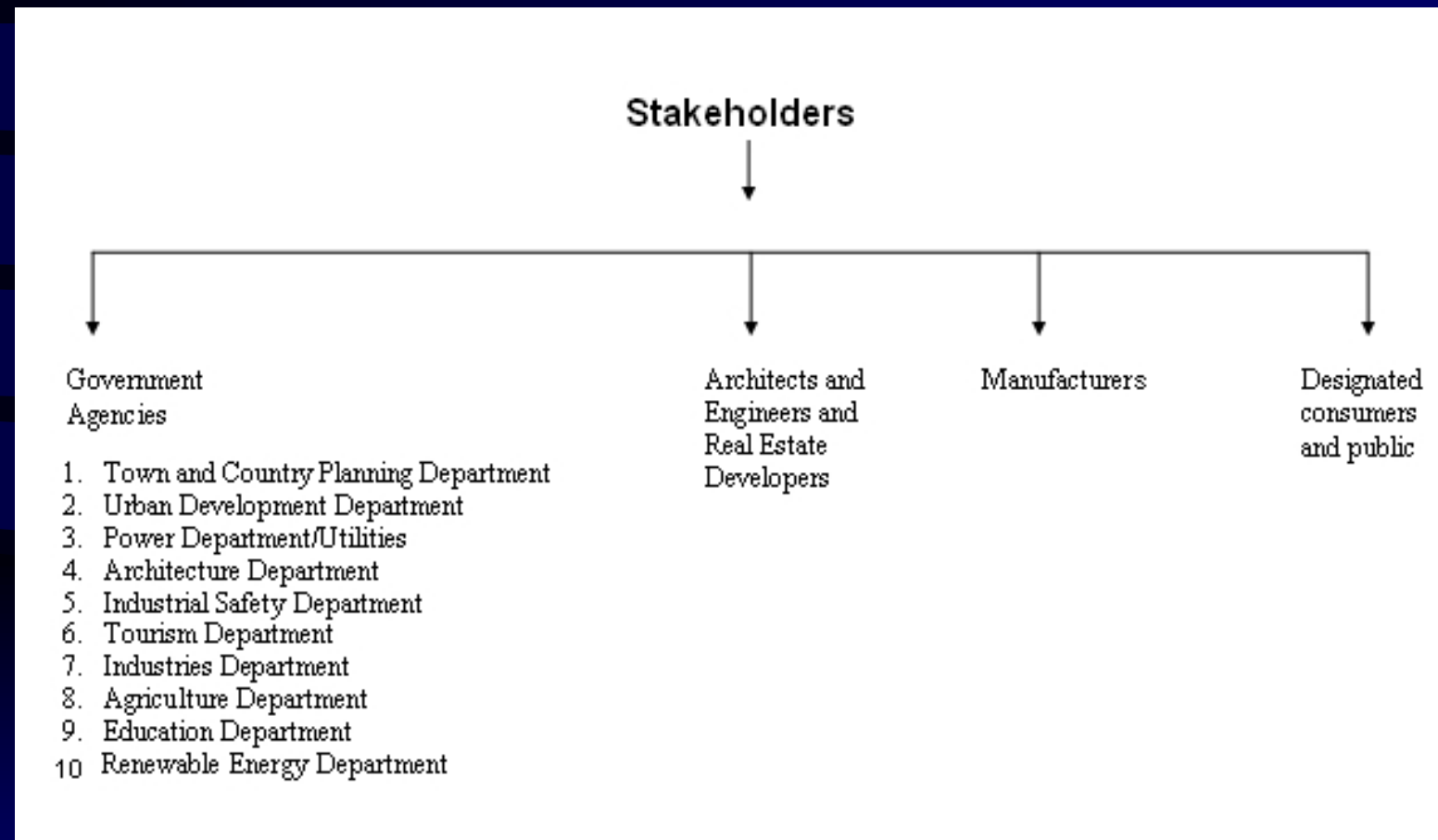
- On the draft ECBC, comments of the following stakeholder Departments have been obtained.
  1. Town & Country Planning Department, Haryana
  2. Public Health Department, Haryana
  3. PWD (B&R) Department, Haryana
  4. Architecture Department, Haryana
  5. Urban Development Department, Haryana

## SUMMARY OF COMMENTS ON DRAFT ECBC

1. Non-applicability of this code to commercial buildings having connected load less than 500 KW may be reconsidered as it is felt that this code should be applicable on smaller buildings like Shop-cum-Office Complexes etc. having connected load between 100 KW to 500 KW.
2. It will be difficult to achieve a power factor between 0.98 to 1 for 3 phase electricity supply exceeding 100 Amps. – More flexibility required.
3. By fixing the parameters of various factors like U factor, R factor, the flexibility of aesthetical play in facades may get restricted thereby affecting architectural design.
4. It is recommended to simplify these codal recommendations that these are easily interpreted and can be incorporated in buildings bye-laws in a simpler form e.g. size of aperture with reference to gross floor area rather than technical value

- (5) Occupancy sensors as proposed under Para 7.2.1.1 as mandatory may be made optional because these can be useful only in big halls and Govt. offices and these will not be cost effective for smaller units.
- (6) Fenestration – It should be mentioned with reference to the planning norms i.e. percentage of fenestrations with reference to floor area and orientation.
- (7) U.Factor and Solar Heat Gain Coefficient (S.H.G.C) factor for each material with the specifications needs to be defined.
- (8) For opaque surfaces, U.factor of various cladding materials needs to be defined so that the selection of material can be made accordingly.
- (9) R-Value – Various materials may be specified to maintain the required R Value according to the orientation.

# STAKEHOLDERS IN IMPLEMENTATION OF ECBC



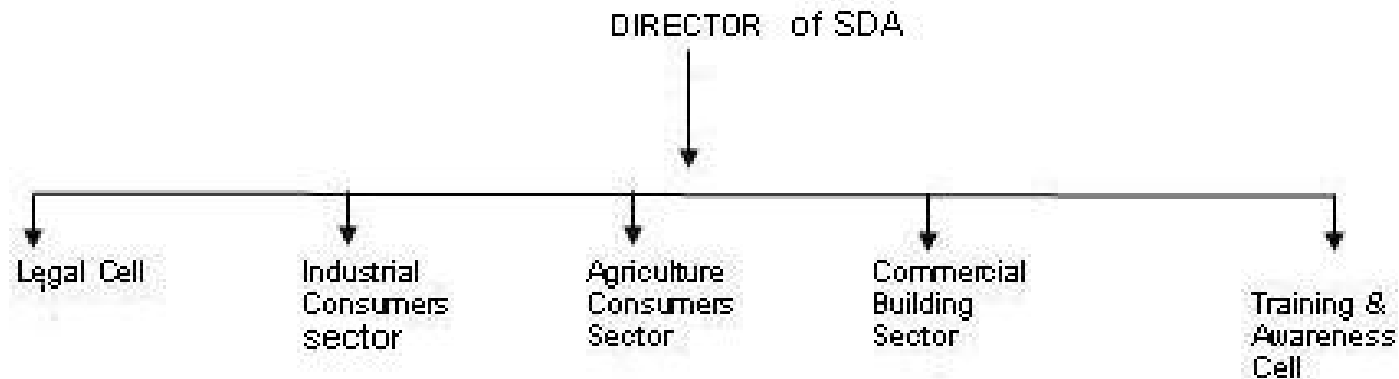
# PROMOTING EE BUILDINGS - SECTOR SPECIFIC APPROACHES NEEDED

- Develop sector specific road-map for implementing EC Act, 2001;
- Design & implement capacity building programmes for various stakeholders- Specific intervention to enhance capacity & preparedness among manufacturers, architects, engineers and policy makers
- Create awareness through press / electronic media/ seminar/ workshops for information dissemination on EE technologies/ products available in the market
- Create data-base on manufacturers, suppliers, designated consumers, energy consumption patterns, technology suppliers, experts etc.
- Define and issue energy consumption benchmarks and standards to be followed for enforcing ECBC;
- Define by regulations the monitoring, measurement, verification & inspection protocols for enforcing ECBC, energy audit and other provisions of the EC Act;
- Provide fiscal and financial incentives for promotion of EE technologies by the designated consumers (E.g:rebate on electricity bill, tax benefit, rebate on VAT etc.);
- Define mechanisms for monitoring and feedback – create institutional arrangements at State / local levels;
- BEE should approve a national rating system for energy efficient buildings and a package of incentives should be linked to achieving specified rating levels.

# COORDINATION & MONITORING FOR ENFORCING ECBC

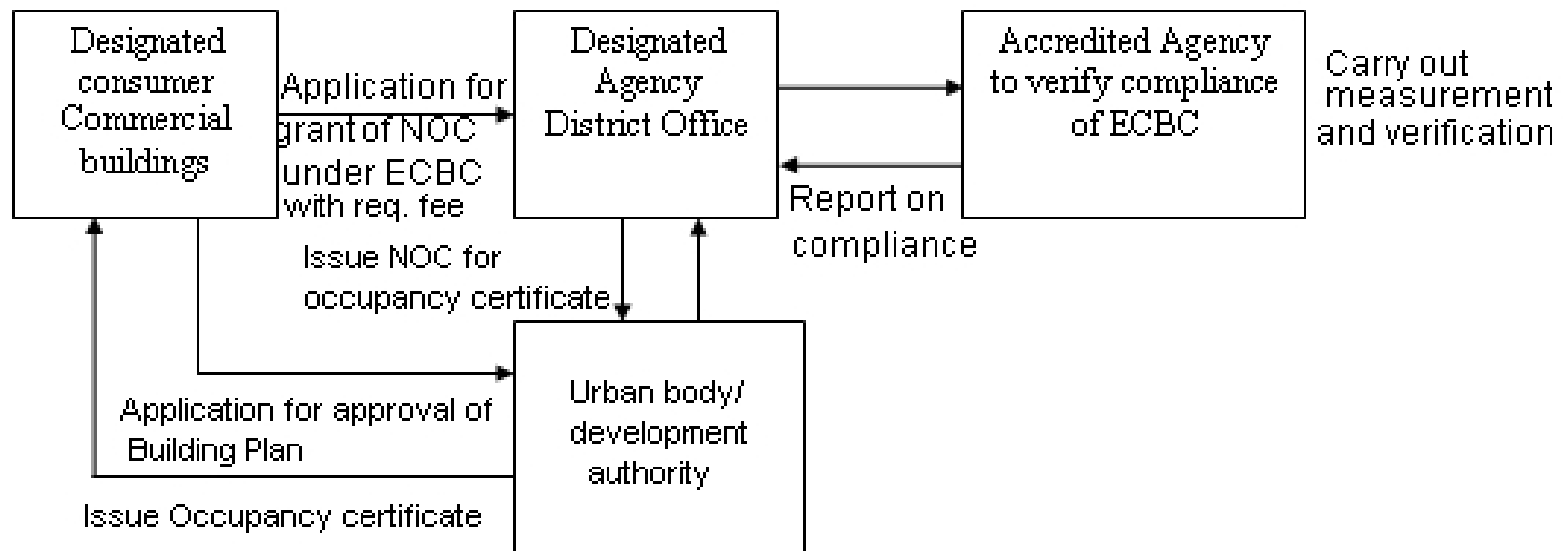
- A broad based inter-departmental committee required at the State level consisting of all major stakeholder Departments/ Agencies like Town Planning, Architecture, Power, PWD (B&R), Public Health, Urban Development, Public Relations, Industries and Renewable Energy for coordinating the enforcement of ECBC as well as representatives from the architects bodies, industries associations and other stakeholders.
- Uniform national guidelines for the institutional framework and staff required for EC Act, 2001 implementation.

## PROPOSED INSTITUTIONAL SET UP REQUIRED FOR IMPLEMENTATION OF EC-2001 AT STATE LEVEL



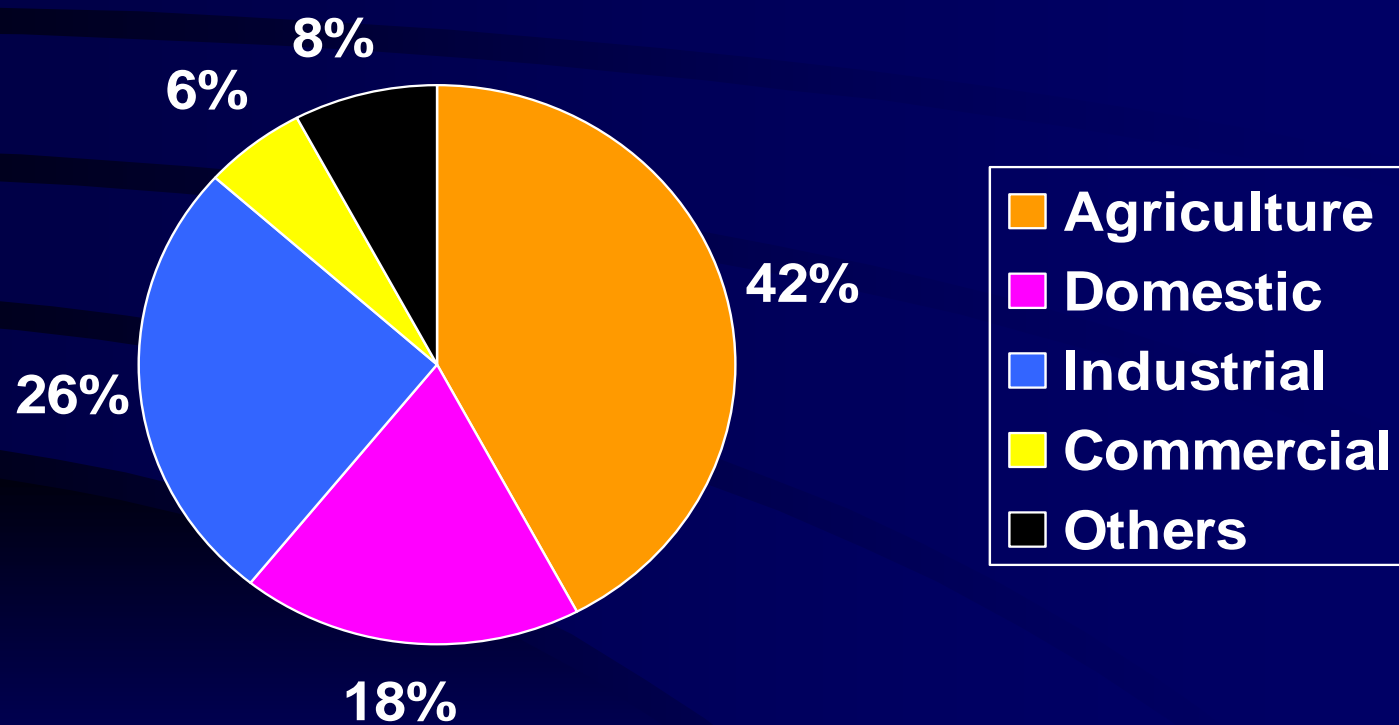
In these cells experts from civil, architecture, electrical, legal and science background shall be required to implement the various provisions of the act

## Framework for compliance of ECBC At District/City level



District level staff of SDA would need sufficient training, model protocols to scrutinize proposals.

# HARYANA - SECTOR-WISE ENERGY CONSUMPTION



# HARYANA - ENERGY SAVING POTENTIAL

Sr. No.	Sector	Total consumption (million units)	Saving potential (in units)	In MW	Saving potential in %
1.	Agriculture	5675.9	1702.7	279.1	30
2.	Domestic	2841.9	568.4	93.2	20
3.	Industrial	3479.5	869.9	142.6	25
4.	Commercial	755.4	151.1	24.8	20
5.	Others	1027.9	154.2	25.3	15
	Total	13780.6	3446.3	565	

# HARYANA - INITIATIVES FOR IMPLEMENTATION OF EC ACT, 2001

## INSTITUTIONAL SET UP

1. State Designated Agency notified (Renewable Energy Department, Haryana)
2. An Energy Conservation Cell has been set up in the Department for the implementation of the Act;
3. Comprehensive notification dated 29.7.2005 on promoting various energy conservation measures in agriculture, industrial and Government sector issued.

## REGULATORY MEASURES ADOPTED

1. Use of CFL and T-5 fixtures (28 watt) in place of 40 watt conventional tubes have been made mandatory in all Govt. buildings/ buildings of autonomous bodies of State Government;
2. Use of ISI mark pump sets have been made mandatory in agriculture sector
3. A scheme on providing incentives to the farmers on installation of ISI mark pump sets has been launched
4. All new buildings in Govt. sector to incorporate energy efficiency and solar passive design concepts from 30.6.06 onwards.
5. Use of solar water heating system made mandatory in all functional Govt. buildings and process industries, which need hot water and others like hotels, hospitals, hostels etc.

Contd....

## PROMOTIONAL MEASURES ADOPTED

- A scheme on Energy Audit of Govt. Buildings launched
- Scheme on State awards for Energy Conservation launched from 2005-06;
- Awareness campaigns - essay writing , slogan writing, painting competitions, Run for Energy, seminars etc. on energy conservation for school students;
- Prescriptive manual on EE Buildings uploaded on HAREDA web-site.

## CAPACITY BUILDING

1. A manual on Sustainable Building Design – developed in collaboration with TERI under Asia Urbs Programme for use of Planners, Architects and Builders.
2. A training course on Energy Efficient Buildings for the Architects and Engineers of line Departments organized in collaboration with MNES and TERI in June, 2006.
3. A web-site on Energy Efficient Building Design namely [www.sustainable-buildings.org](http://www.sustainable-buildings.org) launched in association with TERI.19
4. Regional Workshop on EE and Solar Passive Building Design for the stakeholder Departments and architects on 21-10-2005.
5. Prototype energy efficient designs of some selected buildings of Government sector being developed in collaboration with outside experts– Mini Secretariats, PHCs, CHCs, SDO Civil Complex and HAREDA Office building.

## DATA-BANK ON DESIGNATED CONSUMERS

1. Work on creating a data-bank on Designated Consumers of industrial sector having connected load of 1000 KW or more initiated.
2. Work on creating a data-bank on Designated Consumers of commercial sector having connected load of 500 KW or more initiated.

## MONITORING MECHANISM

1. An inter-departmental committee to scrutinize the new building plans of the Govt. sector constituted to ensure new Govt. buildings are energy efficient compliant
2. A State level committee under the Chairmanship of Chief Secretary, Haryana has been set up to monitor the enforcement of EC Act, 2001 in the State.

# FINDINGS OF ENERGY AUDIT OF SELECTED STATE GOVT. BUILDINGS

Sr. No	Name of building	Annual energy consumption (KW)	Potential of energy saving (KWH per year)	Approx. investment required (Rs. in lacs)	Approx. energy saving (in %)	Payback period (months)
1.	Krishi Bhawan	1,64,928	50,320	6.72	30	38
2.	HUDA Bhawan	3,39,396	1,37,569	13.78	40	29
3.	Sinchai Bhawan	3,18,050	1,76,632	7.79	55	13
4.	HVPN	4,55,800	1,82,290	18.95	40	29
5.	Pashu Dhan Bhawan	65,517	38,310	3.6	58	22
6.	Jan Swasthaya Bhawan	1,28,136	38,094	4.87	29.7	35
7.	HAFED	3,92,310	1,75,976	10.37	44.8	17
8.	Awas Bhawan	87,387	29,912	3.72	34	33
9.	Mandi Bhawan	1,90,000	38,490	4.06	20	29
10.	Pollution Control Board	84,000	26,484	2.02	31	21

# ENERGY SAVING ACHIEVED AFTER ENERGY SAVING MEASURES (2005-06)

## DOMESTIC SECTOR

	<u>Saving per annum</u>
• Promotion of Compact Florescent Lamps -	1.32 million units
• Mandatory use of Solar Water Heating Systems - (up from <u>0.776 million units in 2004-05</u> )	<u>1.489 million units</u>

## AGRICULTURE SECTOR

• Mandatory use of ISI mark motor/ pump-sets -	28.9 million units
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## GOVERNMENT BUILDINGS

• Expected energy saving in 10 Government buildings -	1.149 million units
• Phase-II of EA Programme being launched.	

## MOVING FORWARD....

- 13 major Government buildings like Haryana Civil Secretariat, Haryana Bhavan (Delhi and Chandigarh) and Civil Secretariats at District HQ's being taken up for EA and EE measures in turn key mode by HAREDA.
- State Level testing lab for testing EC parameters with mobile testing facilities.
- A Partnership Scheme following an integrated approach for Government sector buildings for Energy Audit and implementation of EE measures through ESCO mode.
- 4. A Public-Private Partnership Scheme on conducting energy audit for industrial, institutional, Government and commercial sector on 50% cost sharing basis is being developed – to enter into energy efficiency agreements committing them to carry out energy audits and implement the recommendations.

## CHALLENGE AHEAD

- The formation of ECBC code is the first step –  
the real challenge will be in how we devise mechanisms for its effective, transparent and hassle free implementation across sectors.

# THANKS

**Web-site : [www.hareda.gov.in](http://www.hareda.gov.in)**

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