



Building Codes current situation in India – future challenges

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GROWTH PROFILE IN INDIAN COMMERCIAL SECTOR



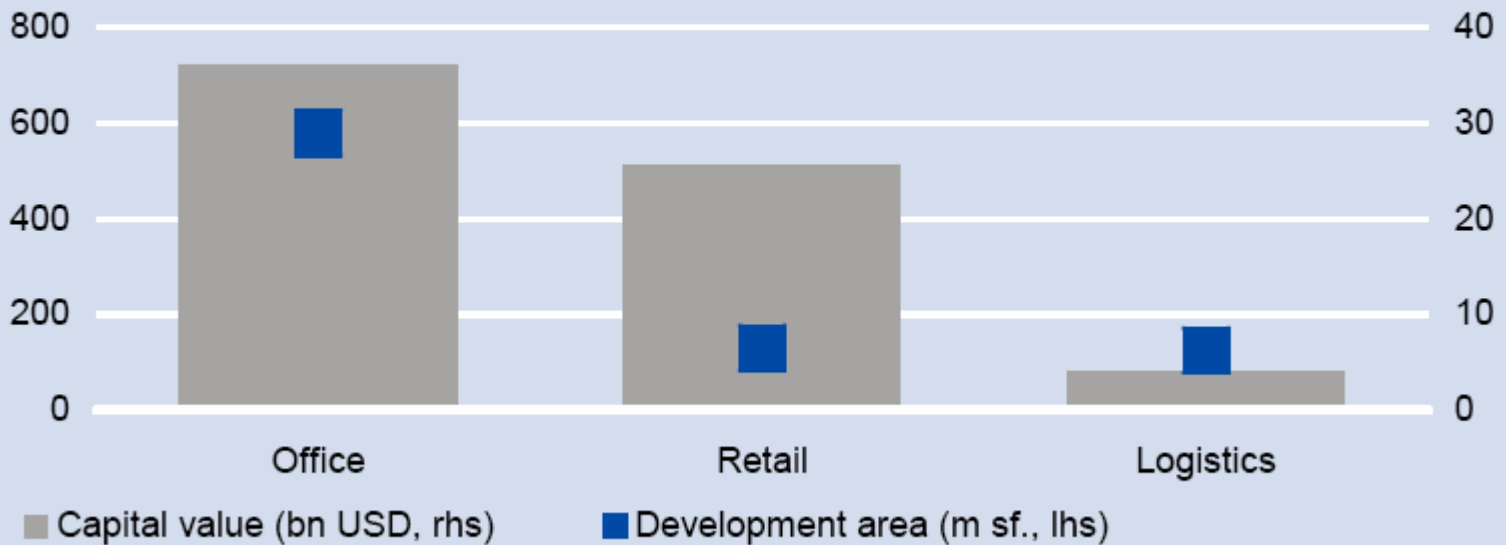
- Demand for OFFICE SPACE in India is driven by the increasing share of the services sector in the Indian economy
 - Office space supply shifting from Central Business Districts to secondary centers (office and IT parks)
 - Modern office buildings in newly developed areas enable the higher quality standards that are essential for IT services
 - All India office market
 - 70% by IT Services companies (more than 7000 No.) in India
 - 15% by financial service providers & pharmaceutical sector
 - 15% by other sectors
 - Office stock must increase nearly 20 million sf/year in New Delhi, Mumbai, Bangalore to keep pace with growing demand
 - Conservative estimate (for India): Approx. 55 million sf/year
- SHOPPING CENTRES/MALLS
 - By the end of 2008, space of 79 million sf in 257 centers are estimated in 15 largest cities of India

OUTLOOK FOR INDIA'S COMMERCIAL REAL ESTATE MARKET



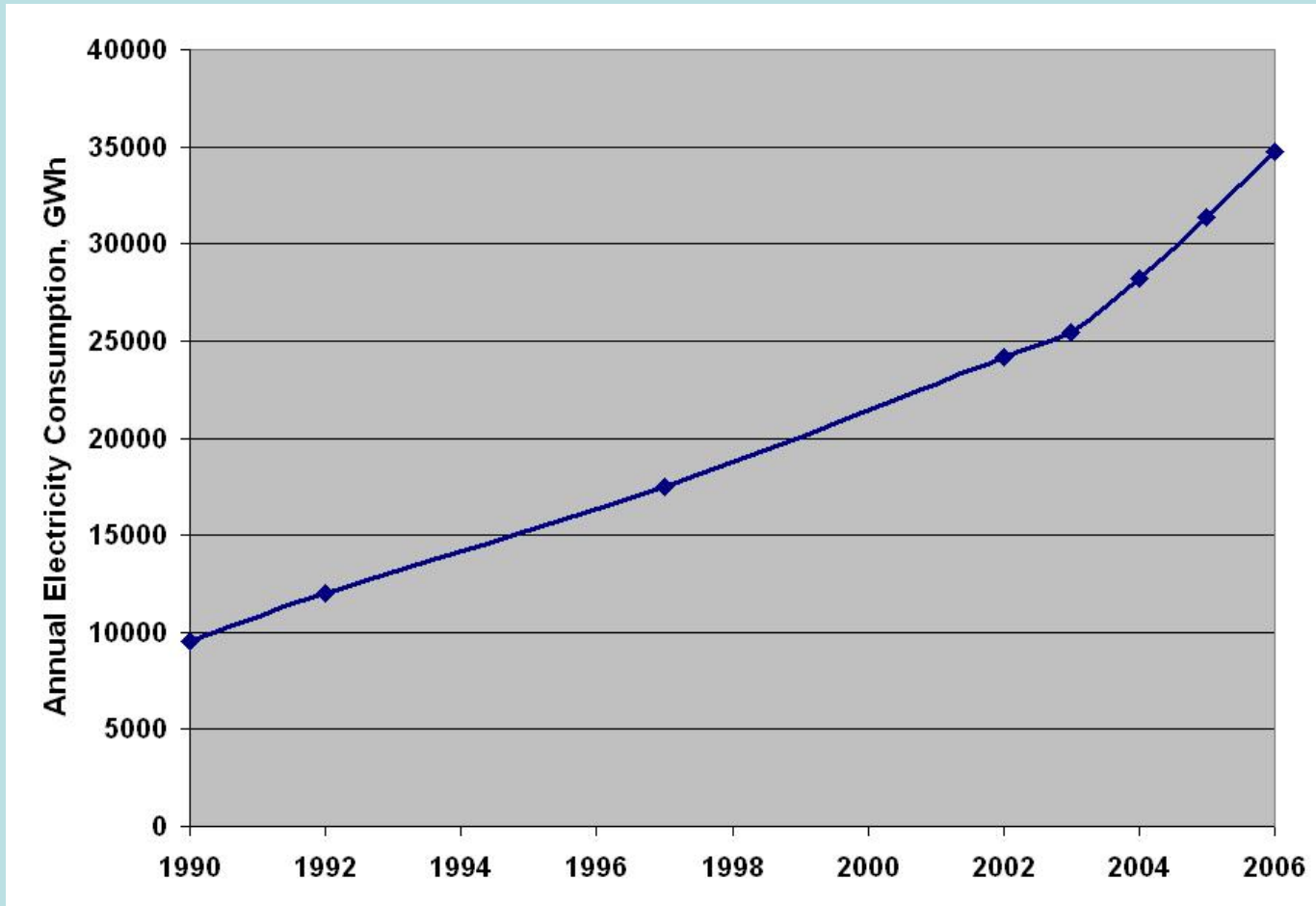
Growth potential on India's commercial real estate market

Change in total stock, 2006 - 2010



Sources: RREEF Research, DB Research

ELECTRICITY USE IN COMMERCIAL SECTOR IS EXPLODING



ENERGY CONSERVATION BUILDING CODE (ECBC)



- Covers new commercial buildings
- Building components included
 - Building Envelope (Walls, Roofs, Windows)
 - Lighting (Indoor and Outdoor)
 - Heating Ventilation and Air Conditioning (HVAC) System
 - Solar Water Heating and Pumping
 - Electrical Systems (Power Factor, Transformers)
 - **Potential to save 1.7 billion units annually on mandatory application**
 - **Expected reduction in XI plan 500 MW**

ECBC launched by Govt. of India on 27th May,2007

ENVIRONMENTALLY SENSITIVE DESIGN MAKES SENSE



- Energy savings are of the order of 50%
- Initial cost increases by 10 to 15%, but payback is obtained in 5 to 7 years
- The most cost effective way to meet the ECBC requirement is to design buildings with appropriate regard to climate and sun.
- A design not sensitive to sun and climate will have to invest more to meet the minimum ECBC standard

BARRIERS TO ENERGY EFFICIENCY



- Lack of information about comparative energy use
- Perceived risk due to lack of confidence in performance of new technologies – in appliances, building design, industrial technologies
- Higher cost of energy-efficient technologies
- Asymmetry in sharing of costs and benefits – especially in the building sector

INTERVENTIONS



- Utility Driven
 - Rebate in tariffs
 - Public Awareness Campaign
 - Incentives to consumers for adopting efficient lighting, solar water heater, etc.

- Regulatory
 - Provide energy use information
 - Reduce perceived risk
 - Performance guarantee contracting, through ESCOs
 - Mandate Standards- Building Codes

ONGOING INITIATIVES ON ECBC



➤ **CAPACITY BUILDING / TRAINING**

- 25 training programmes/ workshops involving about 1500 professionals have been conducted till date

➤ **PANEL OF ECBC EXPERT ARCHITECTS**

- To provide advice to design professionals to meet the ECBC requirements.
- BEE is providing assistance to MH&FW to develop the six AIIMS like institutes under the “Pradhan Mantri Swasthya Yojna” (PMSSY) Scheme as ECBC compliant buildings

ONGOING INITIATIVES IN ECBC



➤ DEVELOPMENT OF TECHNICAL REFERENCE MATERIAL

- Tip sheets on envelope design, lighting, HVAC and energy simulation have been developed

➤ CURRICULUM DEVELOPMENT

- 20 architectural/ engineering colleges have committed to develop architectural and engineering courses for energy efficient and sustainable building design.

➤ ECBC PROGRAMME COMMITTEE

- To facilitate development of ECBC compliant building design
- Credible implementation of few demonstration project
- Setting up compliance and evaluation procedures by creating appropriate institutional mechanism .

ENERGY EFFICIENCY IN EXISTING BUILDINGS/FACILITIES



- There is vast scope for energy efficiency improvement in buildings/ existing facilities.
- Energy Audit Studies have revealed a savings potential to the extent of 40% in end use such as lighting, cooling, ventilation, refrigeration etc.
- Audits identify the Energy baselines in existing facilities along with Energy Efficiency Measures.

ENERGY EFFICIENCY MEASURES



- Energy efficiency measures bring about energy savings due to reduced energy consumptions.
- Energy savings are determined by comparing energy baseline with energy consumed after implementation of EE measures.
- Energy cost savings resulting from EE measures directly benefit building owners and occupants over the life cycle of the building.

ENERGY EFFICIENCY PROGRAMME IN BUILDINGS



- Energy saving potential in the range of 23% -46% has been identified through energy audits conducted in public buildings
- Under the 1st phase of Energy Efficient Govt. Buildings Programme 9 public buildings were taken up for energy audits
- 17 additional Government buildings undertaken for 2nd phase through performance contracting under the ESCO route
- A national programme for existing buildings has been prepared

DELIVERY MECHANISM



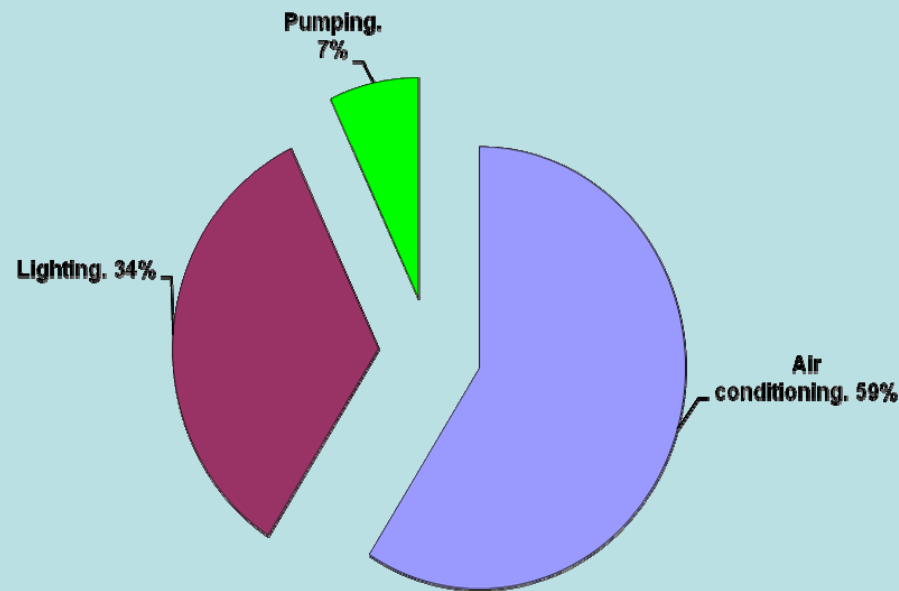
- Promotion of performance contracting through ESCOs
- Build their confidence through regular inter-action and getting feedback
- Standardize Monitoring and Verification Protocol for assessment of savings
- Development of mechanism for contractual compliance of parties to the performance contract to increase credibility of providers of energy efficiency services.
- Innovative financial instruments for promoting performance contracting are being developed to overcome lack of effective delivery mechanism

ENERGY EFFICIENCY IMPROVEMENTS AT RASHTRAPATI BHAWAN



EEMS AT RASHTRAPATI BHAWAN

Energy Saving Measure	Electricity savings (kWh/ year)	Savings (mllion Rs./ year)
Air conditioning	5,54,266	3.53
Lighting	3,25,028	2.07
Pumping	54,140	0.345
Total	9,33,434	5.945



SUMMARY OF SAVINGS AT RASHTRAPATI BHAWAN



Month & year	Target savings		Actual Savings	
	Units (Kwh)	Amount (Mill Rs.)	Units(Kwh)	Amount (Mill Rs.)
08/2006 to 07/2007	953688	60.78	1020650	65

- The savings up to the Guaranteed savings are being shared by Govt. Facility & Performance Contracting Agency in the ratio of 3:1 respectively.
- The excess savings achieved over and above the guaranteed savings in the ratio 1:1 by the Govt. Facility and the Contracting Agency.

ONGOING INITIATIVES IN EXISTING BUILDINGS



- **Guidelines for promoting Investment Grade Audits**
 - IGEA in government/ public buildings in States through the SDAs and other central Government organizations have been prepared and issued by BEE.

- **Empanelment of ESCOs**
 - 37 ESCOs have been empanelled by BEE through an open invitation and evaluation process.

- **Energy Assessment Guide for Commercial Buildings**
 - Raise awareness of commercial building owners/ managers on the energy audit/ assessment processes
 - Identifying and implementing energy saving opportunities,
 - Energy Assessment Guide for Commercial Buildings has been developed



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