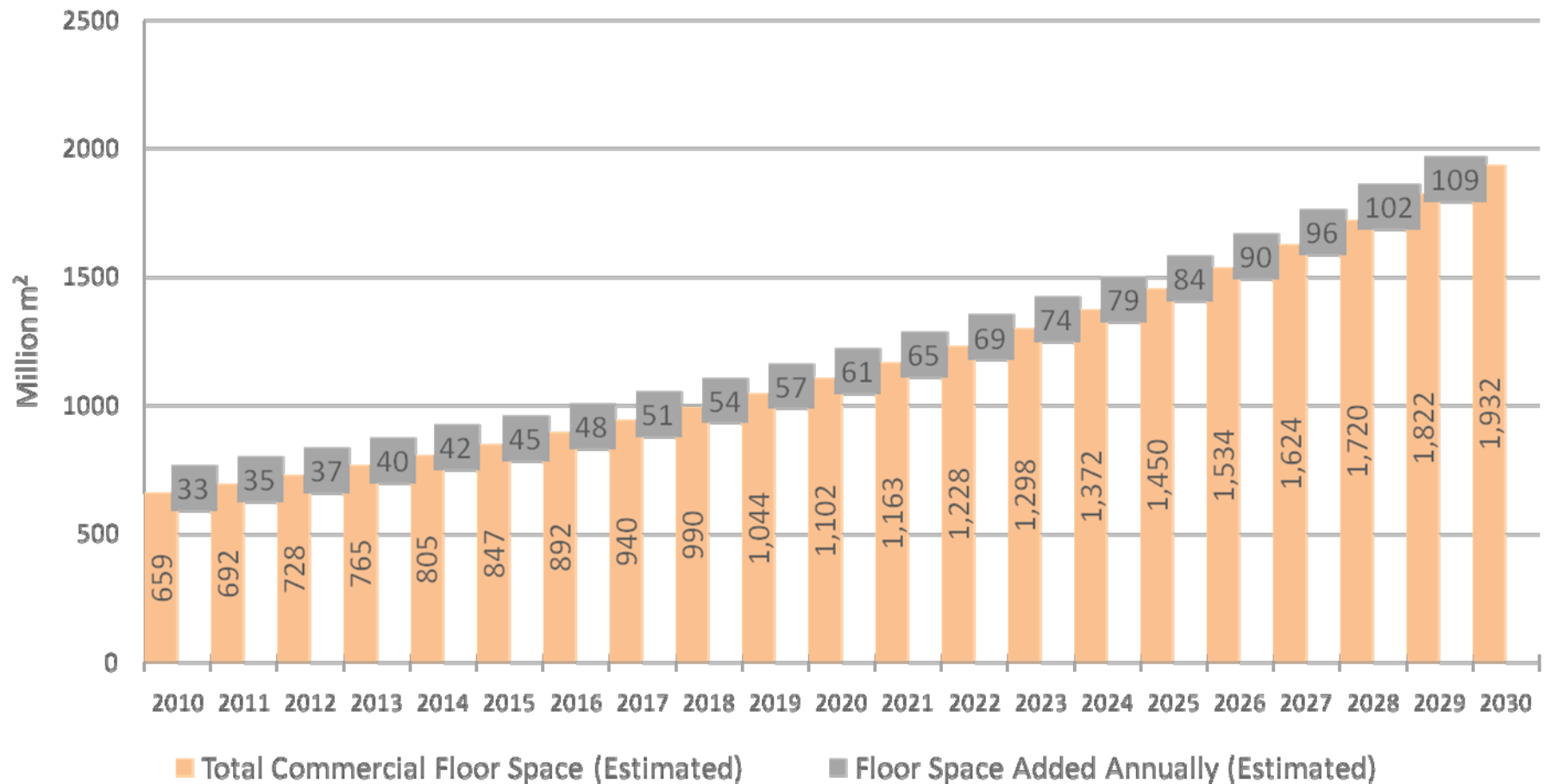


# Concerns and Challenges in Reducing Energy Use in Existing Buildings

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Media Briefing Workshop  
“Build them Green: Deconstructing the Building Sector in India  
June 28, 2012

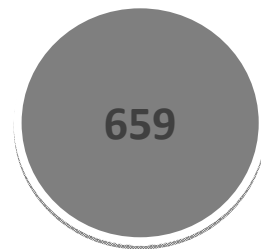
# Commercial Buildings Growth Forecast



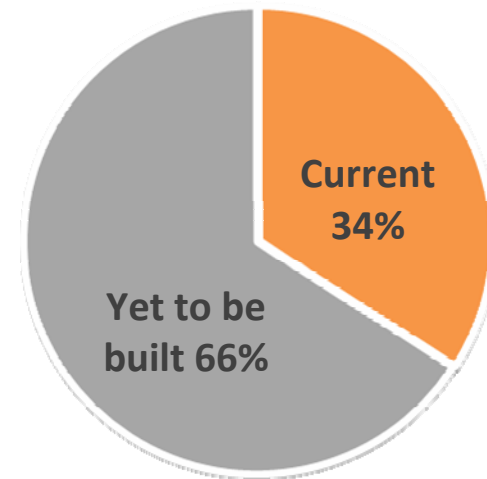
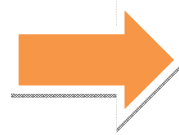
**Commercial Floor Space Projection for India (Assuming 5-6% annual growth)**

# Commercial Buildings Growth Forecast

- Currently, ~ 659 million m<sup>2</sup> (USAID ECO-III Internal Estimate Using MOSPI, CEA and Benchmarked Energy Use data)
- In 2030, ~ 1,900 million m<sup>2</sup> (estimated)\*
  - 66% building stock is yet to be constructed



Year: 2010

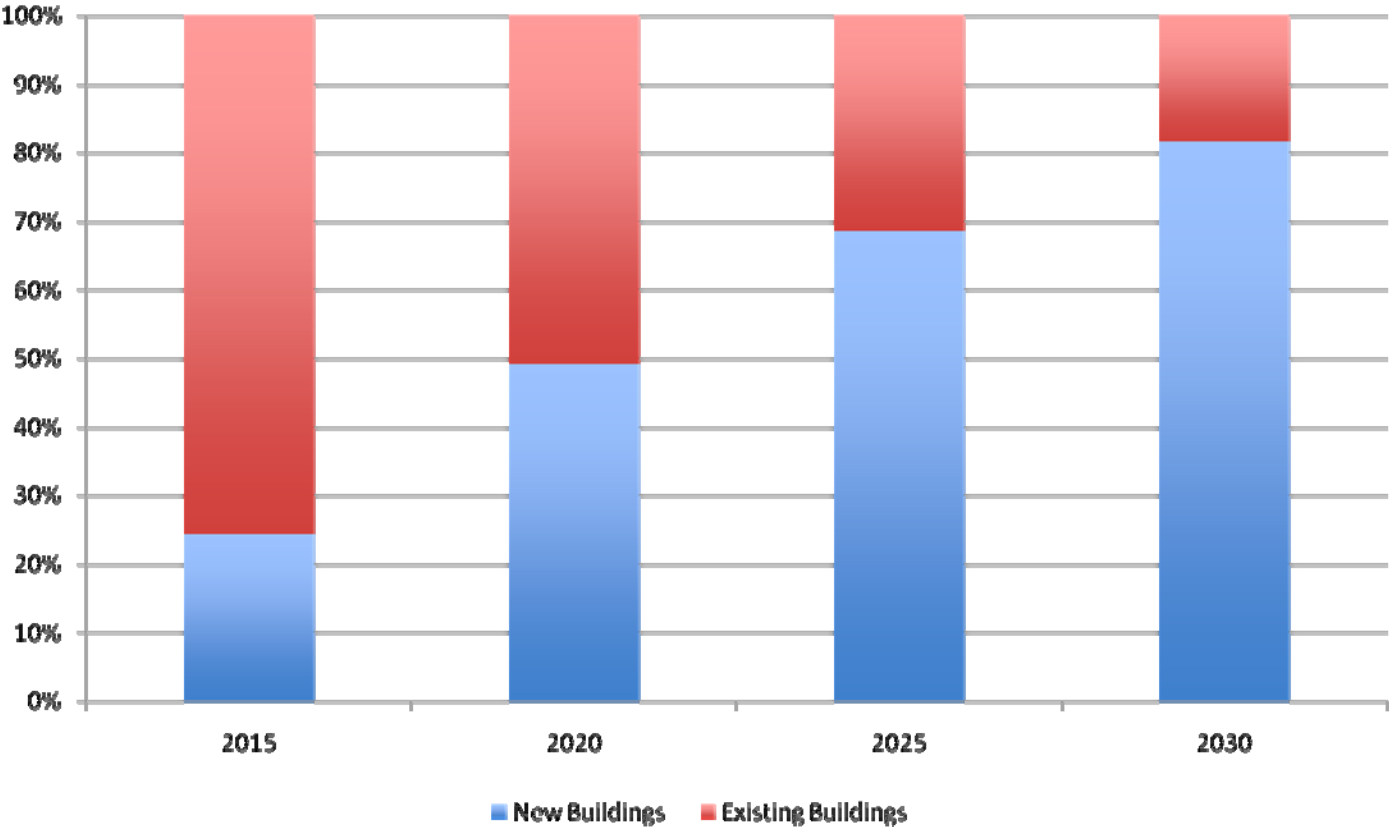


Year: 2030

*\* Assuming 5-6% Annual Growth*

SOURCE: USAID ECO- III Project

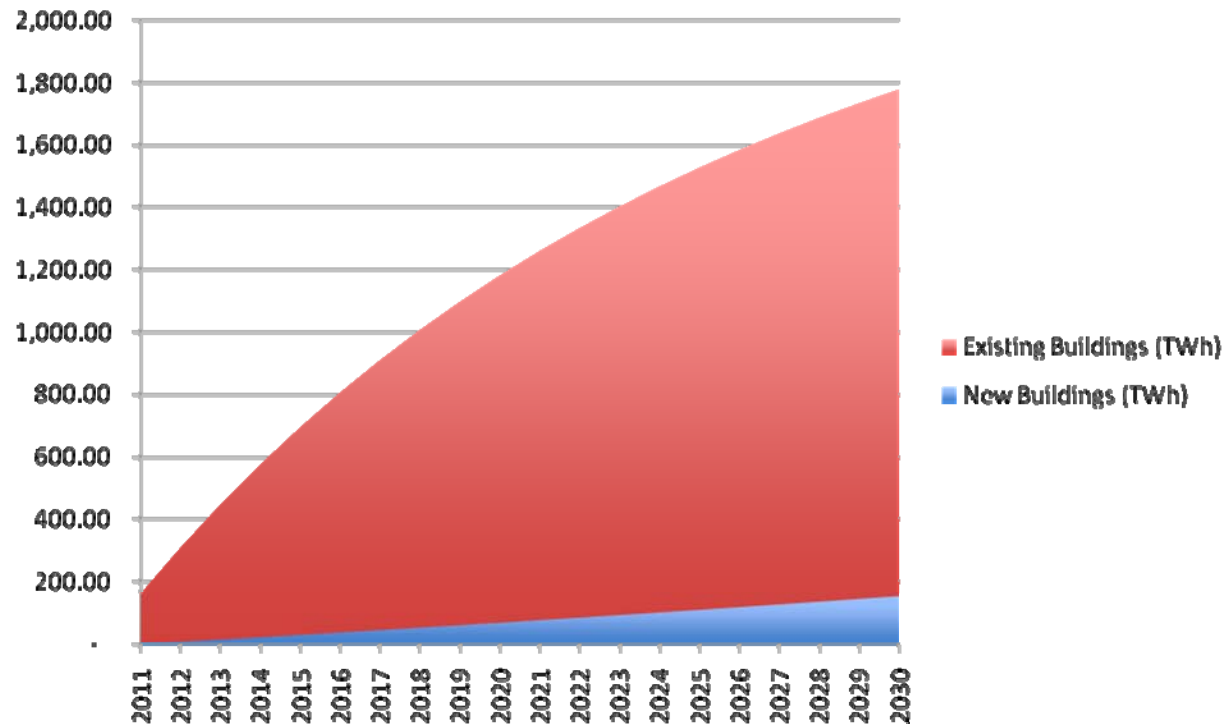
# Annual Energy Consumption of New and Existing Buildings in India



# Why Existing Buildings?

- Business as Usual Existing Buildings:
  - Energy use intensity –  $\sim 250$  kWh/sq. m.
    - Based on benchmarked data for over 1,000 commercial buildings all over India
- Best Practice (Cost-Effective) New Building:
  - Energy use intensity –  $\sim 70-80$  kWh/sq. m.
    - Actual numbers from Infosys building in Hyderabad

# Cumulative Energy Consumption of New and Existing Buildings



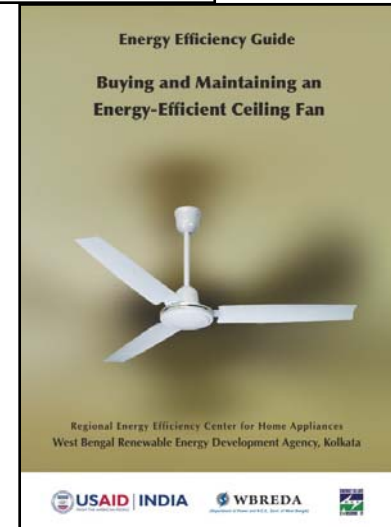
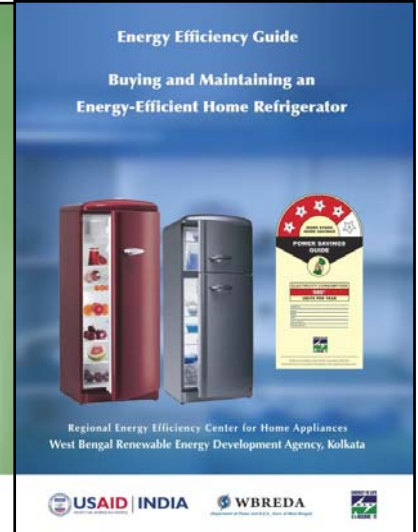
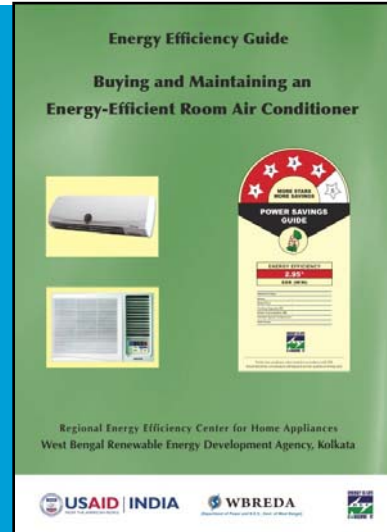
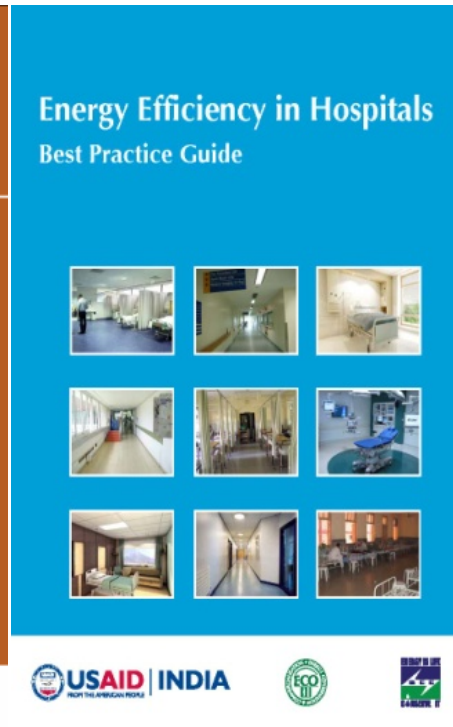
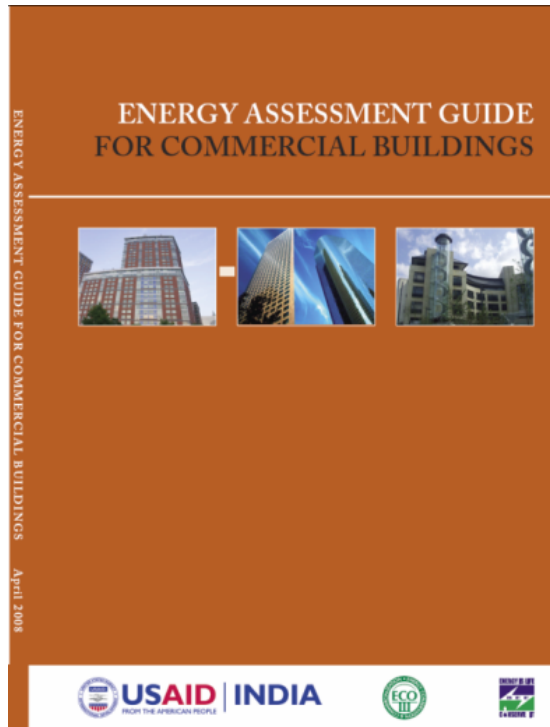
20 years from now, as we look back, 90% of the total electricity used will be in our existing buildings

Electricity consumed annually by existing buildings today is more than the total electricity that will be consumed by all new buildings constructed over the next 20 years

# Challenges to Energy Efficiency in Existing Buildings

- How do we start?
- Where do we stand?
- “But this is how we’ve always done it...”
- Absurd payback expectations – 2 year payback (50% ROI)
- Split incentives
- We’re trying to save energy, they’re trying to:
  - Stay comfortable
  - Raise a family
  - Meet their targets at work
- Energy is invisible – saving energy is the absence of use of this invisible energy

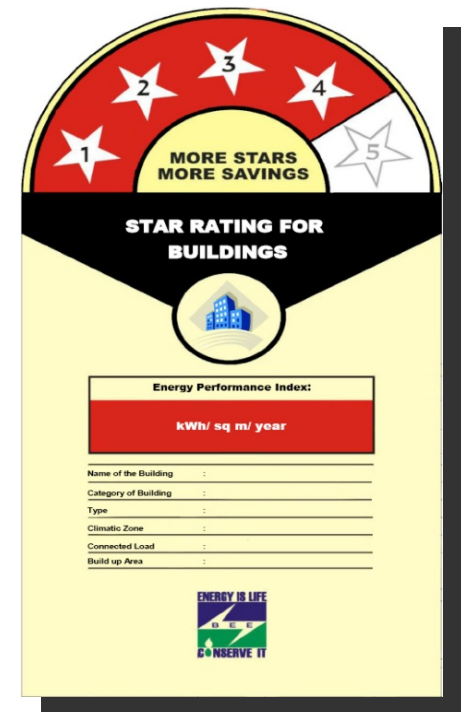
# Energy Efficiency Guides





# Building Benchmarking and Star Rating Program

- Rating based on actual building performance (Energy Performance Index – kWh/m<sup>2</sup>/year)
  - Based on preliminary results from BEE/ECO-III benchmarking study
- Launched Star Rating Program for
  - Office Buildings in February 2009
  - Business Process Outsourcing (BPO) Buildings in Dec 2009
- Under development
  - Retail Malls
  - Hotels
  - Hospitals



# Empire State Building Energy Efficiency Retrofit

- 280,000 sq. m.
- Saves 38% of energy use, with a 3-year payback
- Integrative design yields 2–3x the savings normally cost-effective
- Remanufacturing 6,500 windows onsite into super-windows cuts their winter heat loss by  $\frac{2}{3}$  and their summer heat gain by  $\frac{1}{2}$
- That plus better lights and office equipment cut cooling loads by  $\frac{1}{3}$
- Old chillers can then be reduced and renovated, not replaced and expanded—saving capital that helps pay for the other improvements



# The Way Forward – Deep Retrofits

- Up to 40% cost-effective savings possible (70% if you believe some of the latest studies coming out of Europe)
- Timing is everything – synchronize EE upgrades with planned replacement cycles
- Right steps in the right order – envelope before lighting & equipment before HVAC
- Evaluate bundles / packages of EE measures

# Thank You

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