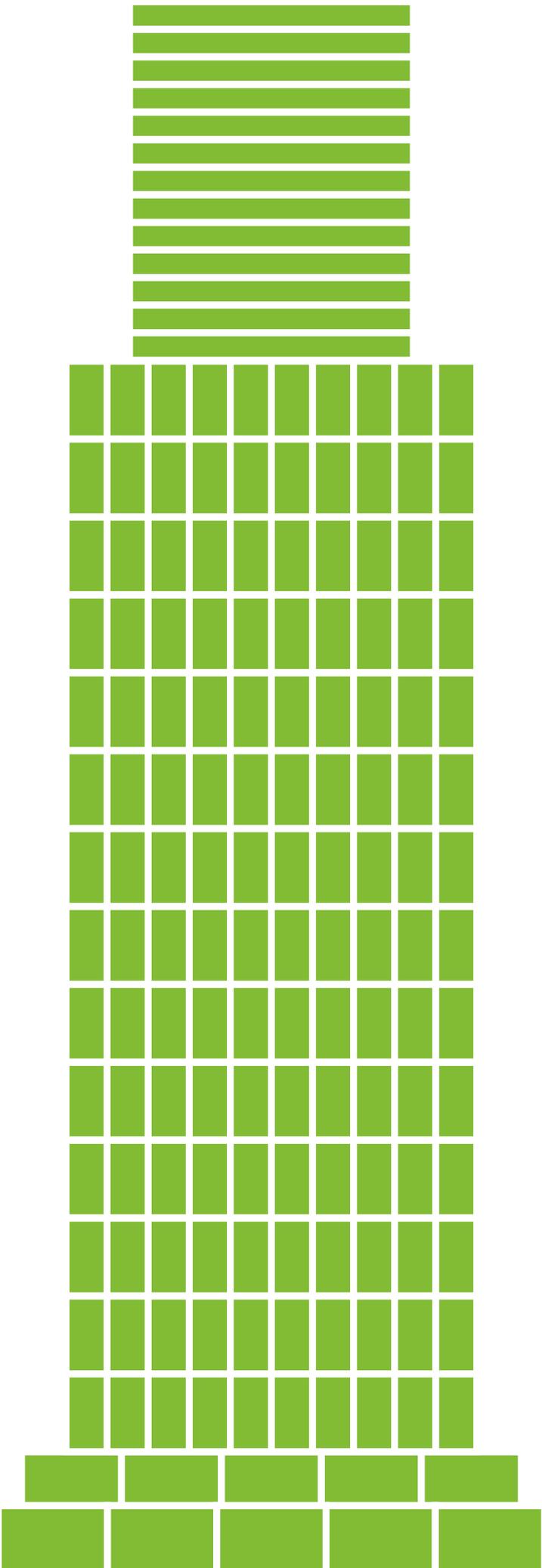


**simple**  
ways,  
**great**  
savings



### Lets change the world with Green Buildings.

Today, when the natural resources are depleting rapidly, The Green Building concept proves to be vital for conservation of our environment.

The Green Building concept takes complete care of Energy Efficiency (EE) and Energy Conservation (EC), thus contributing in making this world a great place for everyone to live in. So lets come together to ensure that your building is

built on the principals of 'Green Building' concept.

Let us create a world that is healthy, efficient & pleasant .Green buildings include following measures to reduce Energy Usage.

- Solar water heating is provided to reduce the energy needs.
- On-site generation of renewable energy through solar power, wind power, hydro power, or biomass can significantly reduce the environmental impact of the building.
- Use of high-efficiency glazing and insulation in walls, ceilings and floors. This increases the efficiency of the building envelope.
- Orientation of windows, walls and placement of porches. Trees are planted to shade windows and roofs during the summer while maximizing solar gain in the winter.

- Day lighting is provided to maximize natural light and minimise the need for electric lighting during the day.

### How are building rated in India?

In our country, the buildings are rated by two building rating systems viz.

-LEED (Leadership in Energy & Environmental Design) India

-TERI (The Energy & Resources Institute) Griha.

The LEED-India Green Building rating system came into effect on 01Jan 2007 based on the LEED rating system with minor modifications so as to suit Indian conditions and priorities.The various rating levels in the rating viz.'Platinum','Gold','Silver'and 'Certified' are awarded in recognition of the extent to which the building outperforms the expectations of the national codes.

LEED - India adopts a number of Indian Codes and Standards viz. National Building Code (NBC), Ministry of Environment & Forests (MoEF) guidelines, Central Pollution Control Board norms and the Energy Conservation Building Code (ECBC).

TERI, Griha Green building rating system facilitates design, construction, operation and evaluation of environment friendly buildings. It prescribes voluntary rating system for new commercial, residential and institutional buildings. It is a point based scoring system to evaluate buildings on "green scale"

LEED - India rating system has allotted 17 out of total 69 points to the Energy Conservation initiatives in New Constructions, which the highest weight assigned to any single category.

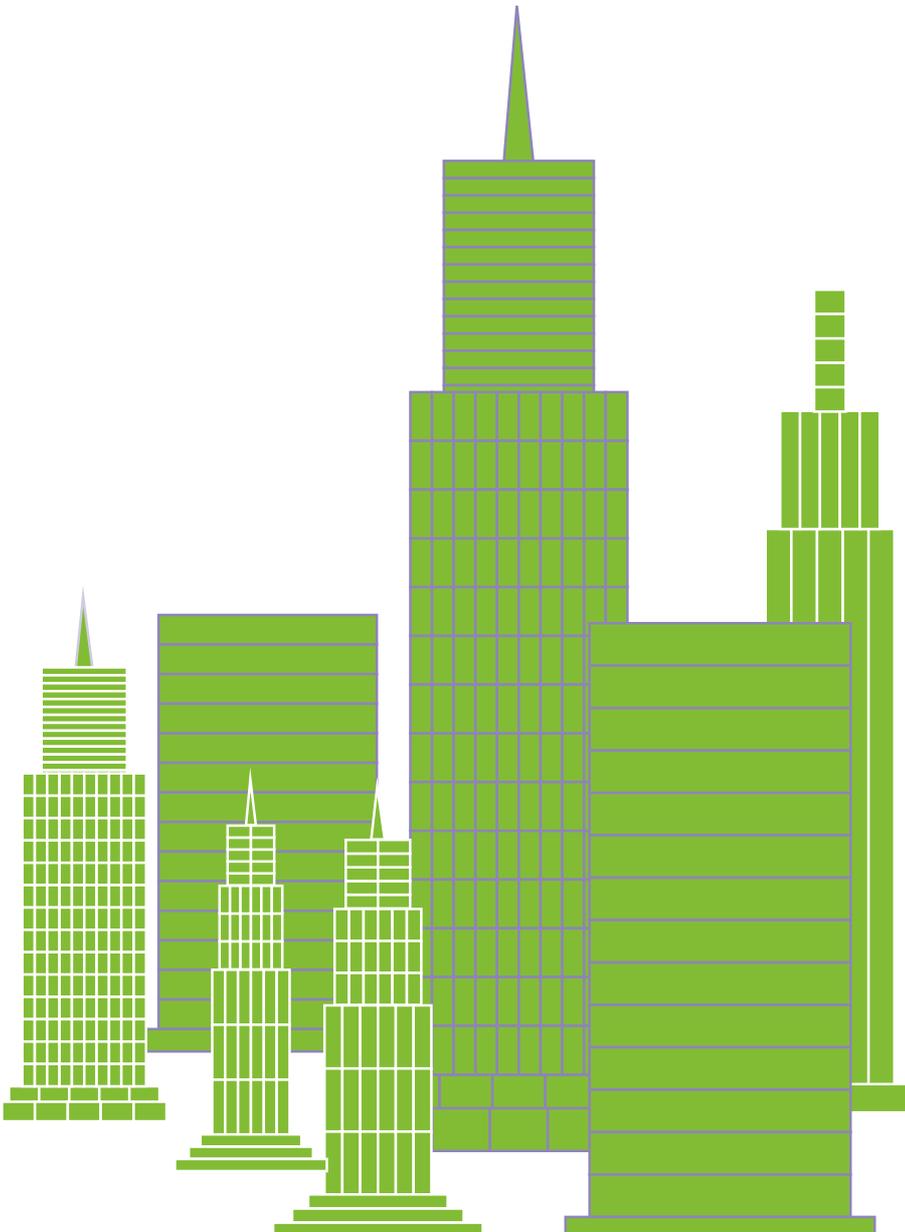
In India ECBC has been developed to set the standard for Energy Efficiency in buildings. ECBC has been developed by India's Bureau of Energy Efficiency (BEE), and is mandated by the Energy Conservation Act, 2001.

ECBC sets minimum energy efficiency standards for design and construction of buildings. It encourages Energy efficient design or retrofit of buildings and has appropriate regard for economic considerations.

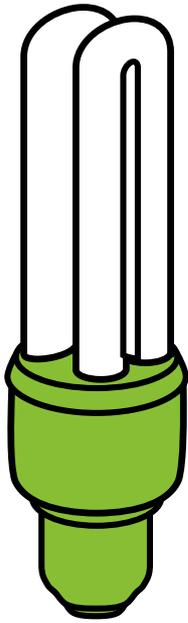
ECBC finds its scope encompassing Building Envelope, Indoor and Outdoor lighting, Heating Ventilation and Air Conditioning (HVAC) System, Service Water Heating and Pumping and Electrical Systems including motors and transformers.

ECBC is applicable to all buildings having connected load greater than 500kW or contract demand grater than 600KVA.

Various studies indicate 27-40% energy savings in ECBC-compliant buildings compared to a typical commercial building with annual energy consumption of 200kWh/m<sup>2</sup>.



## LIGHTING LOAD



### Check the suggestions to surprisingly reduce the Lighting Load

Introduce natural light into the interior of the building through windows and skylights. This would reduce the need for electric lighting.

- > Design the glazing and windows to allow daylight to enter the room while avoiding solar heat gain.
- > Use double glazing or solar reflective glass for the windows to minimize the heat gained by the interiors of the building.

- > Use shades and blinds to prevent entry of direct sun light through windows when required.
- > Decorate the interiors using light colors since they reflect more light thereby reducing the demand for electrical lighting.
- > Use occupancy sensors and motion sensors to dim or turn off electric lighting when not required.
- > Use BEE labeled energy efficient light fixtures and energy saving lighting options like CFL, T5 tube lights and LEDs.
- > Maintain Light Power Density less than 5.445 watts/m<sup>2</sup> for interior spaces and 3.26 watts/m<sup>2</sup> for common areas.

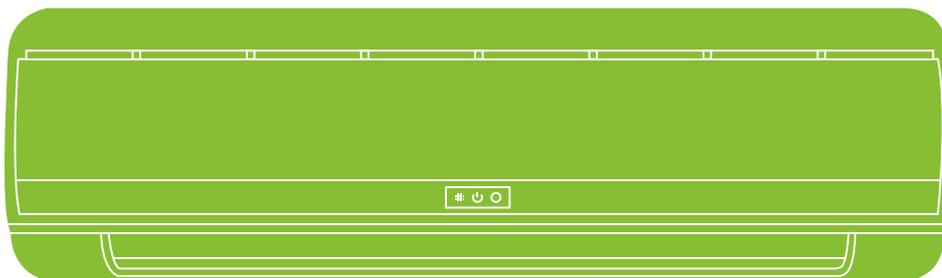
## COOLING LOAD

### Check the suggestions to Surprisingly reduce the Cooling Load

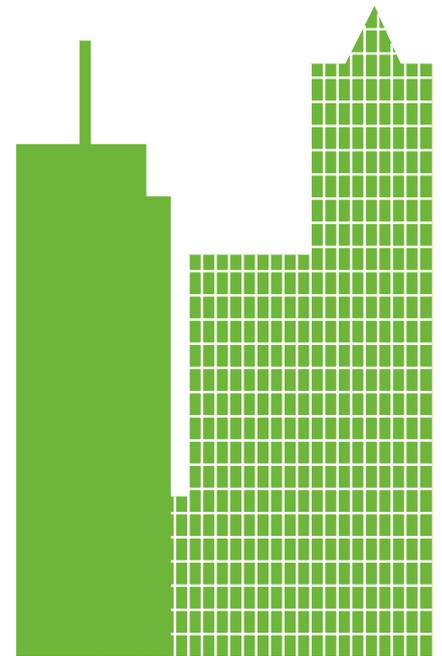
Minimise apertures and large glazing surfaces on the east and especially the west to minimise solar heat gain.

- > Solar heat gain through the roof, walls, windows, doors, and other openings need to be minimised to reduce the cooling load.
- > Provide proper insulation of roof and walls, appropriate selection of glazing and framing for windows, and suitable shading strategy to incorporate energy efficiency in buildings.
- > Allow entry of outside air into the building particularly during evening/night hours. This facilitates night cooling by cooling the building during night hours and reducing overall cooling load for the next day.
- > Use solar-reflective surfaces for roofs.

- > Plantation of trees on roof tops (Green roofs) helps reduce summer time temperatures. Paint the roof and exterior of the building with light colours as dark surfaces are heated more and directly raise the summer time cooling demand of the building.
- > Minimise apertures and large glazing surfaces on the east and especially the west to minimise solar heat gain.
- > Design right-sized HVAC equipment by correct calculation of heating and cooling load.
- > Use BEE labeled energy efficient equipments and appliances with higher star rating.
- > Only use HVAC system and unitary air conditioners with CFC free refrigerant.
- > Design the ductwork to maximize HVAC performance by considering type of building, location etc.
- > Ensure correct operation and maintenance of HVAC system to achieve expected energy savings.
- > Provide temperature controllers and sleep mode for air conditioners.



## BUILDING COMMON LOAD



### Check the suggestions to minimizing the Building Common Load

- > Employ energy efficient lighting, lifts and water pumps
- > Provide level controller in over head water tanks
- > Install solar photo voltaic system for common area lighting and water heating