Sustainable Buildings Division at TERI

Creating Innovative Solutions for a Sustainable Future

Services

- Building policy research and advocacy
- Green Building Consultancy
- Training and Capacity Building
- Project Management Unit
- Resources & Energy Efficiency Audit
- Research & Development

Creating Innovative Solutions for a Sustainable Future
Creating Innovative Solutions for a Sustainable Future
### Findings

<table>
<thead>
<tr>
<th>Building</th>
<th>Office, Hospital, Hotel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate zone</td>
<td>Moderate, Composite, Hot &amp; Dry, Warm &amp; Humid</td>
</tr>
<tr>
<td>Area Covered</td>
<td>1.3 million sq. m</td>
</tr>
<tr>
<td>Electricity Saving Potential</td>
<td>26 million units</td>
</tr>
<tr>
<td>Cost Saving Potential</td>
<td>Rs 221 million</td>
</tr>
</tbody>
</table>

#### Electricity saving potential
- **26 million units**

#### Percentage Saving potential
- HVAC: 82%
- Lighting: 18%

Saving potential in HVAC = 21.3 million units
Saving potential in Lighting = 4.7 million units

---

*Institution logo and keywords*
Environmental Impacts

- Annual Coal Savings: 15600 tonne
- Annual Water Savings: 104 million litre
- Annual CO₂ Emission avoided: 21000 tonne
Electricity consumption growth in commercial buildings in India

Annual Growth in Electricity Consumption by Building Sector

Average growth rate of 9% in last 10 years (2001-2011)

At a conservative 9% growth rate electricity consumption of building sector by 2020 will be more than 2 times the consumption in 2010-11
Electricity consumption break-up in Commercial buildings

- 55%–60% of electricity consumption is due to HVAC
- 15%–20% of electricity consumption is due to lighting
Energy Saving Potential

Estimated Electricity Saving Potential of Building Stock (2021)

<table>
<thead>
<tr>
<th>GWH</th>
<th>Existing Buildings (Through retrofitting)</th>
<th>In upcoming buildings (2012-2021)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,00,000</td>
<td>8,699</td>
<td>90,014</td>
</tr>
<tr>
<td>1,80,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,60,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,40,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,20,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,00,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Commercial Sector

- Building Envelope
- Lighting
- Chillers
- Automation
Challenges

• Energy Audit Methodology
• Retrofit guidelines
• Energy rating systems

• No format/layout
• Parameters
• Frequency of data collection

Codes/Standards/Ratings

Energy Reporting

Implementation

Energy Saving Measures

• Measurement and Verification protocol
• Financial Mechanism

• Energy Audit
• Tools/techniques
Detailed energy audit

HVAC, Electrical, Lighting systems survey

Thermal + visual comfort survey

Recommendations: ECMs

Cost-benefit/payback analysis

Contact:
pardeep.chauhan@teri.res.in
Mob. 9654312541