

Building the Future: An analysis of the Change in Carbon Emissions from Adopting Building Codes

Topic: Sector specific analyses: services I

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In 2006-07, commercial buildings in India occupied approximately 300 million sq. m. of area and consumed 38 TWh of electricity or 8.7% of the electricity supplied by utilities. Over the last two decades, the rapid growth in the Indian economy has had a two-pronged effect on the demand for commercial space in India. Firstly, as the boom was experienced in the services sector, there has been an increase in the demand for commercial space especially near urban areas. Also, the growth in the economy has led to an increase in the per capita income in such a way that the disposable income particularly in urban areas has seen a rise. This has attracted a number of companies in the organized and unorganized retail sectors that has also brought about an increase in the demand for commercial space. In addition, the energy used in commercial buildings is expected to grow in the coming years as a number of commercial areas adopt appliances for lighting, space conditioning and other processes that had previously been uneconomical due to their high cost.

The Ministry of Power launched the Energy Conservation Building Code (ECBC) developed by the Bureau of Energy Efficiency (BEE) in May 2007 for its voluntary adoption in the country. The Code is an attempt to provide minimum requirements for energy-efficient design and construction of buildings and their systems for all the five climatic zones of the country. The provisions of this code apply to: Building envelopes, except for unconditioned storage spaces or warehouses, Mechanical systems and equipment, including heating ventilating, and air conditioning, Service hot water heating, Interior and exterior lighting, and Electrical power and motors. It is applicable to all new buildings that have a connected load of 500 kW or greater or a contract demand of 600 kVA or greater. The code is also applicable to all buildings with a conditioned floor area of 1,000 m² (10,000 ft²) or greater. Estimates suggest that ECBC compliant buildings can use 40 to 60% less energy than conventional buildings.

The paper will attempt to identify a typical commercial building built before 2009 and estimate the annualized carbon emissions from the building and compare it to the emissions if the building had been built using ECBC guidelines. This will be achieved using an Input Output Methodology, to fully understand the economy wide impact of emissions from using these materials and products for commercial buildings. These findings will be used to estimate the increase or decrease in the Carbon Dioxide emitted under ECBC and the cost of mitigating Carbon Dioxide in the commercial building sector in India. The paper will utilize the Indian Environmental Input Output Matrix for 2003/04 that has been jointly developed by researchers from Keio University, Japan and The Energy and Resources Institute (TERI), New Delhi.