



Residential Buildings in India: Energy Use Projections and Savings Potentials

GBPN / CEPT University

September 2014

As energy consumption from residential buildings is predicted to rise by more than eight times by 2050 under the business as usual scenario, it is of vital importance for India to develop energy-efficiency strategies focused on the residential sector to limit the current trend of unsustainable escalating energy demand.

The aim of the report was to bridge the current knowledge and data gap in the residential building sector in India. For this purpose, CEPT University conducted a high quality field survey of 800 households in the four main habituated climate zones in India in order to map current penetration rate of appliances and better understand electricity consumption patterns for different sizes of residential units with varying occupancy rates and appliances. Based on the building energy modelling, comfort benefits and the energy savings potentials of better-performing building envelopes were quantified using the “Energy Conservation Building Code” (ECBC) envelope characteristics.

This report demonstrates that a very aggressive building energy efficiency policy and market driven scenario can substantially reduce future energy demand in the residential sector and help India address current challenges posed by the population growth, higher comfort expectations and the increased use of appliances.

The report investigates four possible residential electricity consumption projections up to 2050 compared to today's levels: business-as-usual, moderate, aggressive

and very aggressive. The study specifically focuses on assessing the role of the building envelopes in relation to comfort air conditioning systems and appliances in order to ensure energy efficient dwellings for urban and rural residential sectors. Under the business-as-usual scenario, electricity consumption could rise by more than eight times by 2050 compared to 2012 levels. However, using focused policy and market efforts, the moderate, aggressive, and very aggressive strategies can respectively limit the consumption increases to five, four and three times the current energy use, which would represent relative energy savings of 27%, 44%, and 57% compared to business-as-usual.

To achieve the potentials, the report identifies the following recommendations for action:

- 1) *Better Data*: Introduction of a residential baseline energy data programme using a large survey to provide a detailed picture of current residential energy consumption patterns;
- 2) *Policy Roadmaps*: Elaboration of policy roadmaps that can support the implementation of energy efficiency measures for residential buildings;
- 3) *Residential Building Energy Code*: Development of a specific code focussing on residential building envelope efficiency adapted to the different climate zones to realise the saving potentials of all building envelope components to address the rising demand for thermal comfort.