EFFICIENCY OF COMMERCIAL LIGHTING AND APPLIANCES

A historical assessment of electricity consumption in the commercial sector shows an annual growth rate of 12% between 2005 and 2012. Aggregate consumption of commercial sector stood at 70 TWh in 2012, of which heating, ventilation and air conditioning (HVAC), lighting and others comprised 55%, 25% and 20% respectively.

The scenarios of 'energy conservation' through efficient building materials and design are dealt with separately in the 'Building envelope and design optimization' trajectories, and serve to bring the demand down further by reduction in hours of use of HVAC and lighting appliances. Here we take only efficiency of appliances. A combination of lighting & appliances, and building envelope optimization trajectories for commercial sector will reveal a complete picture of electricity demand. Adoption of building efficiency measures would reduce this demand at various levels of compliance of building codes.

Starting from a base year ((Low,Medium,High) (L,M,H)) configuration of (50%,50%,0%), different combinations of technologies are obtained by 2032 in Levels 1 to 4, after which their shares stabilise. Level 1 is dominated by 'low' efficiency technology and 4 by 'high' efficiency technology. 2 and 3 represent intermediate levels of energy efficiency. Hence, the present analysis factors in different levels of energy efficient devices in commercial lighting and other appliances sector.

Level 1

Level 1 is the most pessimistic case of efficiency whereby the base year configuration does not improve. The market is unresponsive to better technologies and potentially reduced life-cycle costs, while policy imperatives/regulatory requirements and institutional support are largely missing or inadequate. Level 1 yields an aggregate demand of 983 TWh in 2047.

Level 2

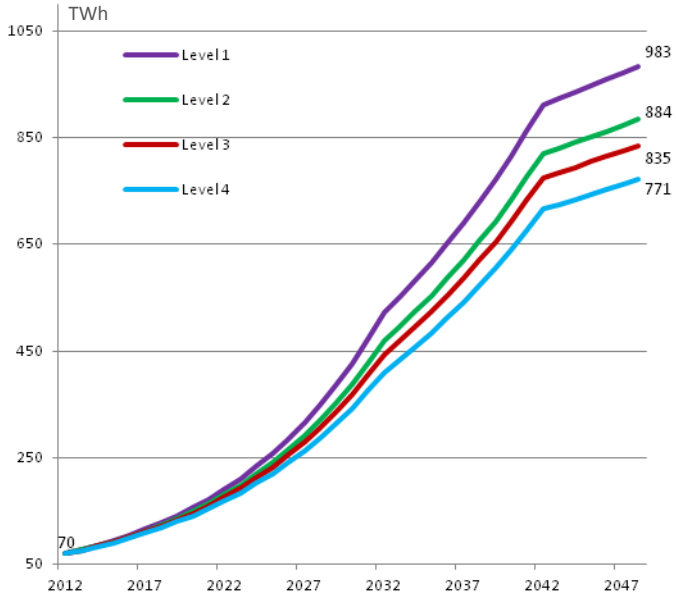
Level 2 assumes that 20% of the service demand is met by low-efficiency appliances, 50% by medium efficiency appliances and the remaining by the Best Available Technology (BAT). While there is considerable improvement in overall efficiency of the mix, the penetration of high or BAT is limited by high upfront costs and low institutional support to newly established commercial centers in rural areas and class 2 towns. The resultant aggregate demand obtained is 884 TWh in 2047.

Level 3

In level 3, 50% of the market of low technology in BAU is appropriated by BAT or high technology through a combination of policy mandates and institutional support. The resultant (L,M,H) configuration of (20%, 50%,30%) yields an aggregate demand of 835 TWh in 2047.

Level 4

Level 4 is the optimistic case, whereby low technology is eliminated from the market; the medium technology only satisfies 20% of the service demand and the remaining 80% is met through the BAT. The resultant aggregate demand further comes down to 810 TWh in 2047.



Note: Please see detailed documentation for references.