

Residential Lighting and Appliances

Residential sector contributed to 25% of the total electricity consumption in India in 2011. Lighting and major appliances like ceiling fans, televisions, refrigerators and air-conditioners account for about 80% of the residential electricity consumption. The rest comes from smaller and lesser used appliances like washing machine, geysers, computers etc. Appliance ownership is significantly increasing both in rural and urban households due to rise in income levels.

This analysis captures the effect of a transformation towards higher efficiency appliances in the residential sector, which when accounted with other factors, will determine the total demand for electricity in this sector. The star rating programme of the Bureau of Energy Efficiency is expected to have a major role in this sector.

The scenarios of energy conservation through efficient building materials are dealt with separately in the 'Building envelope optimization' trajectories, and serve to bring the demand down further by reduction in hours of use of appliances. A combination of the appliances, and building envelope optimization trajectories for the residential sector will reveal a complete picture of electricity demand. Water heating demand in residential establishments is also considered for the final electricity demand in addition to appliance demand.

LEVEL 1

Level 1 assumes only slight improvement in efficiency over 2007 levels. In 2047, 98% of appliances are assumed to be of low efficiency, 1% are of medium efficiency, and 1% are of high efficiency. Incandescent bulbs still form the major source of lighting although there is a substantial mix of Compact Fluorescent Lamps (CFL) and thin tube-lights. Low efficiency motors are used in ceiling fans, refrigerators and air-conditioners. A number of televisions still use the Cathode Ray Tube (CRT) technology. The usage hours of appliances are also high.

LEVEL 3

Level 3 assumes a 45% share of high efficiency appliances and a small 13% share of low efficiency and the balance being medium efficient in 2047. The lighting demand is halved due to increased penetration of LED bulbs and tube-lights. TVs use advanced LED backlit LCD technology to decrease the consumption. The efficiency of other appliances like washing machines, geysers etc. also improve. Public awareness on conservation leads to decrease in usage.

LEVEL 2

Level 2 assumes, in 2047, 45% of the appliances have low efficiency while 38% have medium efficiency with balance 17% being high efficiency appliances. Use of incandescent bulb is reduced while that of CFL and thin Tube-light is increased along with a small share of LED lights.

LEVEL 4

Level 4 assumes a complete market transformation to high efficiency appliances. Incandescent bulbs are almost eliminated and 90% of the lights are LED tube-lights and bulbs. Ceiling fans use advanced technology like BLDC motors. All the refrigerators use high efficiency compressors and better insulations. ACs have variable speed compressors resulting into high energy efficiency ratios. There is high public awareness on conservation, resulting in 80% of appliances being high efficiency, 17% being medium efficiency and 3% being low efficiency.

