Lighting and appliances

Domestic and commercial ownership of electric lighting and appliances such as refrigerators, ovens, televisions and computers is steadily increasing. The energy performance of many such devices continues to improve. Around half of all light bulbs installed are now more efficient than incandescent models, and the average energy consumed per appliance is falling.[28]

In the 2050 Calculator, the lighting and appliance sector's future energy use is determined by:
- demand and efficiency (described here);
- electrification of cooking (described in a separate note).

Trajectory 1

Trajectory 1 assumes that the energy demand per household for lighting and declines by 15% between 2013 and 2050 (but because of the growth in the number of households and stable cooking demand overall demand increases by 20%). There is a market trend towards more energy-efficient equipment, but this is partially counteracted by more electronics and computers in each home. This level also assumes that overall energy demand from commercial lighting and appliances increases by 20% between 2013 and 2050 (equivalent to a reduction of 10% per building).

Trajectory 2

Trajectory 2 assumes that the demand per household declines 30% by 2050 (total domestic demand stays relatively stable). All appliances are replaced with efficient alternatives, CFL replaces traditional lighting, and smart meters are used to monitor and manage home energy consumption. This level also assumes that by 2050 the demand from commercial lighting and appliances increases by 10% (but declines by 20% per building).

Trajectory 3

Trajectory 3 assumes that demand per household declines by 50% by 2050 (total domestic demand falls by around 30%). All lighting is replaced with very efficient light emitting diodes (LEDs); appliance manufacturers take substantial extra steps to improve the energy efficiency of their equipment; and consumers are smarter about how and when they use equipment. This level also assumes that overall demand from commercial lighting and appliances decreases by 10% by 2050 (34% per property).

Trajectory 4

Trajectory 4 assumes that demand per household declines by 60% by 2050. There are technological breakthroughs in the efficiency of equipment and households take substantial care in how they use energy. Equipment manufacturers act to reduce power consumption by their products. This trajectory also assumes that the energy demand for commercial lighting and appliances decreases by 25% by 2050; that 90% of lights are high-efficiency LEDs; that commercial fridges are much more efficient designs; and that computing systems are designed to be low energy.

Figure 11. Lighting and appliance energy use (cooking excluded), domestic and commercial buildings, (TWh/yr)