Commercial demand for heating and cooling

This sector considers the amount of energy for heating, cooling and hot water in commercial buildings such as shops, hotels, offices, and schools; it doesn't include industrial buildings which are covered under the industry sector. In 2013, commercial premises used an estimated 8.1 TWh/yr of energy for heating, 1.4 TWh/yr for hot water, and 1.0 TWh/yr for cooling.[25]

The 2050 Calculator assumes that the number of commercial properties increases by 1% per year, from 109,000 in 2013 to ~160,000 in 2050.[26] In addition to economic and building stock growth, drivers in the trajectories include efficiency improvements, increasing penetration of information and communication technology, and more stringent building standards.[27]

Trajectory 1

Trajectory 1 assumes that in 2050, heating and hot water demand are higher than in 2013, reaching 11.7 TWh/yr for heating and 2 TWh/yr for hot water. This means that in 2050 each building requires about the same heat and hot water as in 2013 and few large refurbishments occur. Almost half of commercial buildings are air-conditioned in 2050, increasing energy demand for cooling to 3 TWh/yr. The total energy demand for commercial heating and cooling including conversion losses in 2050 is 17.9 TWh/yr.

Trajectory 2

Trajectory 1 assumes that in 2050, heating demand grows to 9.4 TWh/yr, while hot water demand grows by 33% to 1.9 TWh/yr. This means each building requires 20% less heat and 10% less hot water in 2050. The share of commercial buildings with air conditioning is similar to today (~23%), increasing energy demand for cooling by 40% to 1.4 TWh/yr. The total energy demand for commercial heating and cooling in 2050 is 13.6 TWh/yr.

Trajectory 3

Trajectory 2 assumes that in 2050, total heating and cooling demands remain at 2013 levels, at 9.5 TWh/yr for heating and 1 TWh/yr for cooling. This means each building requires 45% less heat and air-conditioning in 2050. The total energy demand for commercial heating and cooling in 2050 is 11.3 TWh/yr.

Trajectory 4

Trajectory 3 assumes that in 2050, total heating and cooling demands are slightly lower than in 2013. Heating demand falls to 7 TWh/yr, hot water demand grows to 1.5 TWh/yr, and cooling demand falls to 0.6 TWh/yr. This means each building needs 40% less heat, 30% less hot water and 60% less air-conditioning in 2050. The total energy demand for commercial heating and cooling in 2050 is 9.7 TWh/yr.

Interaction with other choices

2050 Calculator users should choose the technologies for heating and air-conditioning in the 'Domestic and commercial heating choices' sector.

Figure 9. Commercial demand for heating and cooling, (TWh/yr).

Note: Share of electrification set at B (~20%)
Fuel choice set at A (mainly gas, biogas if available)