Buildings: Insulation

This lever controls the sub-levers listed in the table, and ambition levels are for the end year shown on the right-hand side. Units of 'Index' are relative to 2015.

The thermal performance of a building can be given by the heat rate. The heat rate is how much heat flows per degree of temperature difference between the inside and outside. The heat rate is the "leakiness" of a building measured in W/°C. Poorly performing buildings lose more heat per degree of temperature difference, meaning more energy is needed to maintain the inside temperature. This can be improved with insulation.

25 million homes that are standing today are expected to still exist in 2050; therefore, insulation measures are needed to improve the performance of old buildings. The average thermal performance of homes in 2015 was about 200 W/°C. Improved building standards requires new builds to be less leaky. Improving insulation for existing buildings can be represented by the number of buildings subject to a 'complete standard retrofit' and is assumed to lead to an improvement of a little over 20% in the building thermal performance.

Non-residential buildings (NRB) are subject to similar improvements. In 2015, new NRBs built according to best practice used 60% of the energy consumed by the average NRB. It is assumed that new NRBs will be built according to best practice. NRBs are measured by the floor area they occupy; in 2015, there was 1.5 million m^2 of non-residential floor area. By 2050, there is expected to be 2.3 million m^2.

Key Interaction

Insulation measures and new build standards reduce the heat loss rate which along with assumptions about internal temperature, gives the space heat demand.

Improving thermal performance makes buildings more suitable for installing heat pumps.

Level 1

Incentives to retrofit existing homes with insulation measures are reduced and insulation rates are only 100,000 homes/year, resulting in 2.5 million homes (10%) having complete retrofits by the end year. Building standards for new homes do not improve. For non-domestic buildings, there are no retrofits to existing buildings and only a small improvement in new build standards.

Level 2

About 1/3rd of existing homes and NRBs have a complete retrofit. Thermal performance of new build homes is 100 W/°C.

Level 3

Nearly 2/3^{rds} of existing homes and NRBs have a complete retrofit. Thermal performance of new build homes is around 60 W/°C.

Level 4

90% of existing homes have complete retrofits. All non-residential floorspace is retrofitted. All new homes and NRBs are built to near Passivhaus standard (25 W/°C).

Default Timing

Start year: 2020, End year: 2040

Sub-Lever	Units	2015	Level 1	Level 2	Level 3	Level 4
Residential Dwellings						
Insulation Retrofits	Million	0.00	2.50	9.00	16.00	22.50
New Build Standards	W / °C	150	150	100	63	25
Non-Residential Buildings						
Insulation Retrofits	share	0%	0%	33%	67%	100%
New Build Standards	Index	1.00	0.60	0.30	0.20	0.10