

# Buildings: Temperature

*This lever controls the sub-levers listed in the table, and ambition levels are for the end year shown on the right-hand side.*

The total demand for electricity in 191.49kWh/ person in 2016 while for dwellings with AC, demand was 285.81kWh/person. Demand for hot water was approximately 33% of electricity bill that is 63.19 kWh/person. Currently most of the residential homes in Kenya are naturally ventilated, with estimate 1% of homes using AC. For dwellings with AC, demand was 33% of electricity bill that is 369.41kWh/dwelling. Non-Residential Buildings (NRBs) had average space cooling demand of 31% of average EUI of 184 KWh/m2/year, approximately 57.04KWh/m2/ year. Total floor space was 7,000,000 (1,500,000 offices and 5,500,000 non offices) in 2018. Demand for hot water in NRB is driven mostly by non-office floor space, mostly hotels approximately 22% of EUI of 184 kWh/m2/year, approximately 40.48 kWh/m2/year.

## Key Interaction:

From 2017 to 2018, energy intensity for space cooling continued to increase by 2.7%. Solar water heating regulations of 2012 required that residential buildings with more than 100 liters demand of hot water install solar water heating. An increased uptake will reduce demand. SWH adoption is approximately 0.54%. The KNEECS targets to develop minimum energy performance standards for new buildings. 10% of share of newly built floor area compliant with energy efficiency requirements and ensure 25% of buildings under affordable housing are green buildings by 2025. Green buildings will reduce cooling demand. Kenya's Minimum Energy Performance Standards (MEPS)

and labels for electrical appliances aim to promote the use of energy-efficient equipment. The KNEECS targets and annual efficiency increase of 3% to 15% efficiency saving year 2025 through adoption of efficient technology. Kenya has an electrification rate of 69.8% (50.4% grid and 19.3% solar). The KNEECS project an annual increase in electrification by 6% every year. A higher electrification access will increase demand.

## Level 1

Space cooling and HW demand continues to increase by driven by population and floor space growth, urbanisation, and higher electricity access. There are no major ambitions to improve building code standards in NRB, and no effort to drive or enforce use of SWH. Cooling demand increases by 10% in domestic dwellings and 20% for NRB by the year 2050. HW demand increases by 30% in domestic and 20% in NRB.

## Level 2

Installation of SWH is partly implemented and some awareness in development of passive cooled green buildings driven by individual investment. There are however no mandates to enforce use. By 2050, share of AC use in homes increases by 5% and hot water demand increases by 20% from base year levels. Hot water demand in NRB increases by 10%. A reduction by 10% in cooling demand is seen.

## Level 3

Installation of SWH is substantially implemented driven by individual investment. Several buildings are passively cooled driven by lower operational costs. There are mandates but partly enforced. By 2050, cooling in homes reduces to base year levels and hot water demand increases by 10% from base

year levels. Cooling demand in NRB has reduced by 40% and hot water demand in NRB has remained at base line rates.

## Level 4

The development and adoption of MEP for green buildings with passive cooling enhances behavioral shift and homes no longer need AC and NRB reduces need for cooling. Approximately 30% adoption of SWH further reduces demand for HW in homes. By 2050, cooling demand reduces to 0% in homes and by 80% in NRB. HW demand is maintained at base year levels for homes and in NRB reduces by 10%.

## Default Timing

Start year: 2016, End year: 2050

	Units	Base	Level 1	Level 2	Level 3	Level 4
Domestic						
Share of dwellings AC	Share	1%	10%	5%	1%	0%
HW Demand/person	Index	1	1.30	1.2	1.1	1
Share of HW-Elec	Share	69.8%	70%	70%	70%	70%
Share of HW-SWH	Share	0.5%	0.5%	10%	20%	30%
Share of HW-Wood	Share	29.7%	29.7%	20%	10%	0%
Non Domestic						
HW Demand/Area	Index	1	1.2	1.1	1	0.9
Share of HW-Elec	Share	20%	20%	35%	50%	70%
Share of HW-SWH	Share	1%	1%	10%	20%	30%
Share of HW-FF	Share	75%	75%	52%	30%	0%
Share of HW-Wood	Share	5%	5%	3%	1%	0%
Cooling Demand/Area	Index	1	1.2	0.9	0.6	0.2