

Building Regulations Part L 2013: How energy calculations work

Standard Assessment Procedure

Part L uses a Standard Assessment Procedure (SAP) to calculate if your new building passes the requirements.

An energy consultant enters data about the building into SAP. This broadly includes:

- Floor area of each home
- Area of exposed fabric (wall, floor, roof, windows etc.)
- Thermal performance (u-values) of all exposed elements
- Orientation of windows
- Airtightness
- Thermal bridges
- Ventilation (natural or mechanical system)
- Heating and hot water systems and their performance
- Lighting performance

Actual Building

The above model contains information about the new building, so it is called the 'actual' building.

Notional building

From the 'actual' building SAP automatically generates a replica building called the 'notional'. This 'notional' building takes the same building area and volumes as the 'actual' but applies its own predefined set of performance values (u-values, airtightness, system values etc.). It also sets a maximum window area of 25% of the floor area.

How to pass Part L 2013

If your 'actual' building is better than the 'notional' both in terms of **carbon emissions** and **fabric energy efficiency standards (FEES)** then the building passes.

Actual dwelling



Notional dwelling



VS

Form and exposed surfaces	Same	
Home area and volume	Same	
Glazed areas	Windows as per design	Windows are limited to 25% of the floor area
U-values (W/m ² .K)	As per your design	Walls - 0.18 Party walls - 0.00 Floor - 0.13 Roof - 0.13 Windows - 1.4 Doors - 1.0
Air tightness (m ³ /hr.m ² @50Pa)	As per your design	5
Thermal bridging	As per your design	~ 0.05
Systems	As per your design	Notional spec



If this...



is better than this in terms of carbon and fabric (FEES)

= Pass

Future Homes 2020: Fabric performance is likely to get worse

Why is Fabric Important?

The more we can insulate our homes the less energy they will use for heating. We should not be designing and building homes that will need retrofitting with additional insulation in the future. A well insulated building represents our greatest chance of meeting our climate commitments in new homes. The Future Homes Standard 2020 does not promote a well insulated building fabric, in fact under the new regulations new homes could be less insulated in 2020 than under Building Regulations 2013.

In 2013, FEES and the 'notional' fabric prevented poorly insulated homes

Under Part L 2013 there is a Fabric Energy Efficiency Standard (FEES) metric which helps prevent homes being designed with a fabric worse than the 'notional' building. While the 'notional' fabric specification has been improved marginally in the Future Homes 2020 consultation, the FEES target has been scrapped. This means that homes can be designed using the 'minimum' building fabric u-values as long as the building passes the carbon target.

Where an energy efficient heating system (such as an air source heat pump) is specified the building is able pass the carbon target. This overrides the need to have a well insulated fabric.

A home in 2020 could be less insulated than it was in 2013

Both homes are identical but the loss of the Fabric Energy Efficiency Standard (FEES) now means that a home with Part L minimum u-values will pass building regulations in 2020, but would have failed in 2013.

Building Regs 2013



'Minimum' Part L 2013 U-value = **Bad**



Future Homes 2020



'Minimum' Part L 2020 U-value = **Bad**



Element	Part L 2013 minimum	Part L 2020 minimum	Part L 2020 notional	Suggested fabric
External wall	0.30	0.26	0.18	0.15
Party wall	0.20	0.20	0.00	0.00
Floor	0.25	0.18	0.13	0.10
Roof	0.20	0.16	0.11	0.10
Windows	2.00	1.60	1.20	0.8
Doors	2.00	1.60	1.00	1.00
Air tightness	10	8	5	<3



Bad



Still bad



Better - but these u-values are meaningless without FEES



LETI's suggested fabric targets

Minimum Fabric Standards

There are new minimum fabric standards (u-values) which are marginally better than Part L 2013, but without FEES the notional fabric does not have the same importance.

Future Homes 2020: Carbon and Primary energy metrics do not result in low energy homes

Carbon Factors

Building Regulations 2013 and Future Homes 2020 both use carbon factors to calculate carbon emissions from energy consumption.

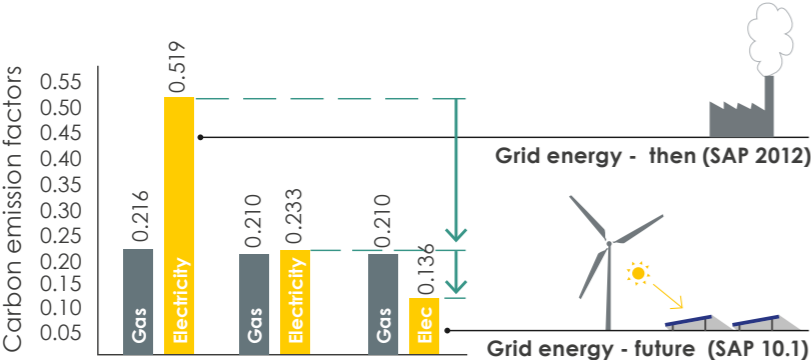
The electricity grid is decarbonising as more renewables are connected. This means electricity will be lower carbon than gas, therefore gas boilers are likely to be swapped for electric systems to reduce carbon emissions.

A carbon factor is multiplied by the energy consumption to determine carbon emissions from a building. While an important metric, carbon is also a confusing metric - it hides how the building is actually performing.

Primary Energy

Primary Energy is a new metric brought in by Future Homes 2020. Like carbon, it is also a factor that is multiplied by the actual energy consumption of the building, which changes as the grid decarbonises.

Primary energy is confusing and will not help us reduce the energy consumption of homes.



Carbon factors disguise the energy efficiency of a home

Crude example:

Building Regs 2013



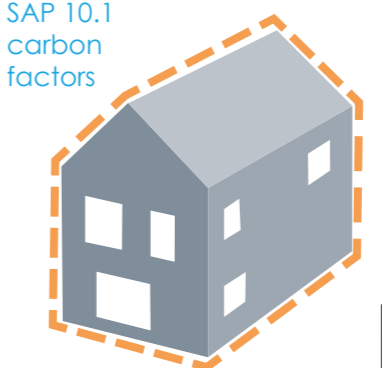
'Notional' building fabric = OK + Air source heat pump



~3% reduction in CO₂



Future Homes 2020



'Notional' building fabric = OK + Air source heat pump



~75% reduction in CO₂



The energy consumption is the same but the 2020 home appears to use less carbon than the 2013 home. This masks the energy efficiency of the home.

(primary energy has the same problem as this)

Future Homes 2020: Local Authorities will be stripped of the ability to set local targets

Climate Emergency

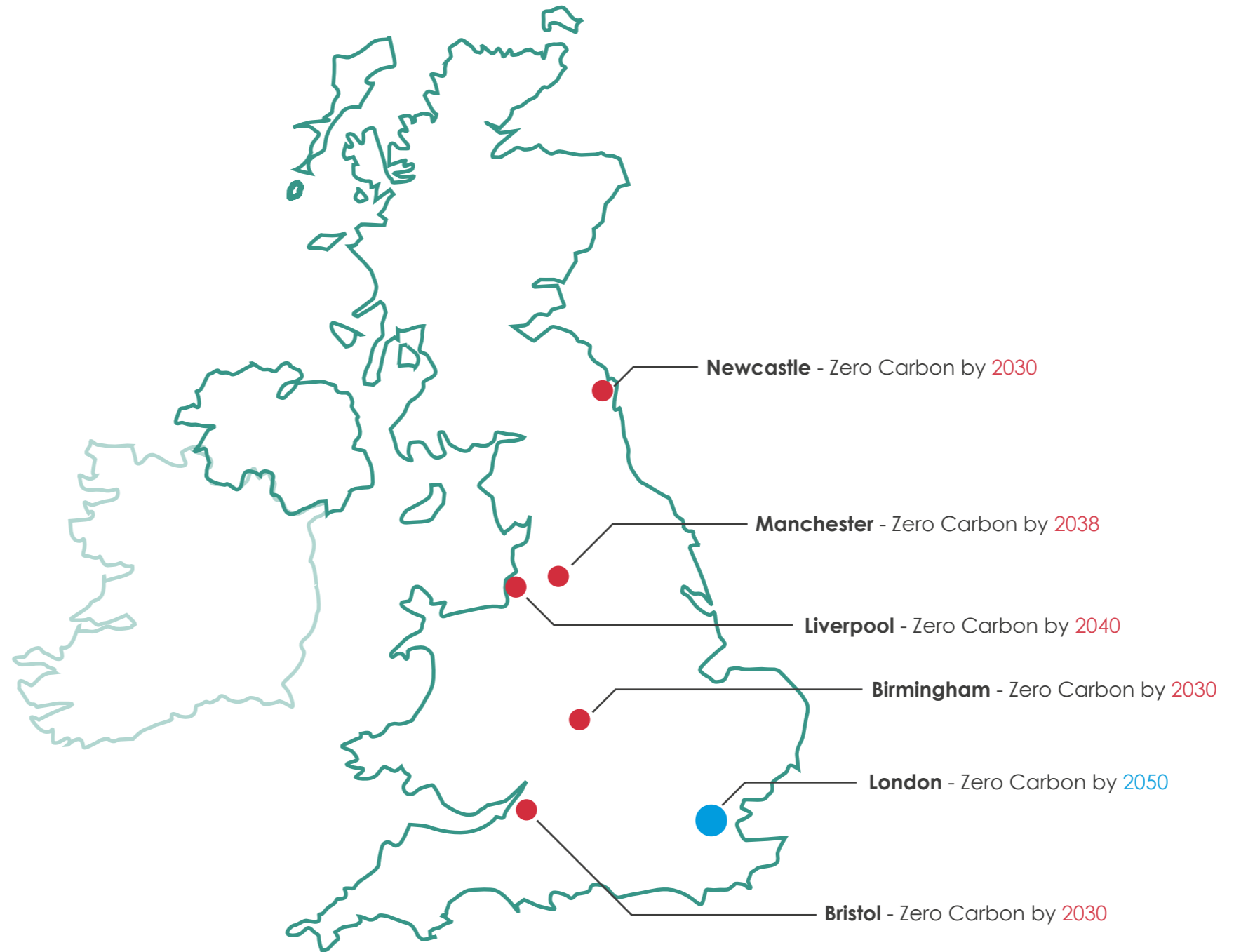
The Intergovernmental Panel on Climate Change (IPCC) report (Oct18) makes it clear that it is now urgent that we reduce carbon emissions, stating that we have less than 12 years to stop climate change.

65% of local authorities across the UK have responded to this by declaring a climate emergency and setting their own stretching planning targets. Local authorities are much better placed to assess local need and viability.

Our ability to slow climate change depends on their ambitious response. Government should therefore not be seeking to take this away from local authorities but instead supporting them.

The national planning policy framework (NPPF) supports local authorities setting their own standards.

Future Homes 2020 proposes the removal of powers from local authorities to prevent them setting their own targets.



These cities along with hundreds of other local authorities will lose the ability to meet their zero carbon targets