Photo: Paul Riddle

THE LOOK OF LIVING

The Future Homes Standard is finally here, and will come into force next March. Helen Raymond explores five ways in which it could transform the design of masonry homes, from the floors beneath our feet to the roofs over our heads

It is potentially the biggest change to the way we build homes since the advent of central heating. After a long gestation period, the Future Homes Standard (FHS) has been announced, and will come into force in England next March, paving the way for net-zero-ready homes. Gas boilers will effectively be banned from new-build homes, with low-temperature heating systems – predominantly air-source heat pumps – taking their place. Most will also be required to have solar panels on their roofs covering an area equivalent to 40% of the ground floor space.

While much of the focus has understandably been on the new technologies, how they work and what they will cost, the wider implications for housing design and construction are potentially enormous. New workflows will be needed, integrating heating specialists into the earliest stages of design, maximising efficiency, ensuring buildings perform as designed, and helping homeowners as they get used to unfamiliar systems.

Equally, the way homes look will change. Heat pumps and solar panels have unique requirements that cannot just be shoehorned into existing templates, and so much of housing design is interlinked, with knock-on implications that may not be immediately apparent. Here, we explore five key ways that our homes could evolve as housebuilders and designers adapt to the FHS.

1 The floor becomes the radiator

To work effectively, low-temperature systems need to deliver heat over as large a surface area as possible. This means that new homes will need either much larger radiators – between two and four times the size – or underfloor heating. In the short term, radiators are likely to remain common: people are familiar with how they work and upfront costs are lower. This is a critical factor when the government's impact assessment puts the average capital cost uplift of the FHS at more than £5,000 for houses and low-rise flats.

However, underfloor heating is likely to prove more appealing as new technologies become more established and the costs fall. The Ministry of Housing, Communities and Local Government (MHCLG) projects that heat pump prices will reduce by around 30% and solar PV by around 40% over the next decade. As people become more familiar with how such systems work, they will undoubtedly appreciate the greater flexibility of radiator-free walls. Most importantly, underfloor heating is the most efficient emitter for low-temperature systems, which means lower bills over the long-term.

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2 Goodbye carpet?

Underfloor heating could have huge implications for domestic interiors. For some clues, we can turn to the recent update to Part L of the Building Regulations for Wales, which is intended to align with the FHS and comes into force in March 2027. The consultation suggested that the thermal resistance of floor coverings over underfloor heating systems should be 0.15m^2K/W or less to ensure they work as efficiently as possible. This target has not been included in the final version, but it does state that "underfloor systems should be designed to account for the thermal resistance of floor coverings in order to provide the heat output required".

This might lead designers to propose surfaces such as screed and tiles or polished concrete, in place of the carpet or wooden floors typically favoured in UK homes. For comparison, the thermal resistance or R-value of carpet is about 0.23m^2K/W and 14mm wood flooring over low-tog underlay is 0.11m^2K/W. On the other hand, a 20mm levelling screed with14mm porcelain tiles is 0.019m^2K/W, and 75mm polished concrete is 0.054m^2K/W, which comes with big, additional benefits for fire and flood resilience.

It is worth noting that concrete can be used on upper floors too: a thin, levelling screed over timber floors works well in retrofit projects. For new-builds, either polished concrete on beam and block or a profiled steel deck floor can be designed in, both of which require a masonry inner leaf.

But will designers be able to persuade customers to forgo perceived cosiness and adopt finishes associated with hotter climates? The answer may be in the question: as the climate warms, one of the most compelling arguments for materials with high thermal mass is that they can be chilled in summer to provide passive cooling. ▶

Opposite and right: Knight's Park in north-west Cambridge by Alison Brooks Architects. The all-electric townhouses are part of the Eddington net-zero urban quarter and are formed in traditional loadbearing masonry with precast concrete hollowcore floors. The unusual roof geometry provides different options for solar arrays

Drawings: Alison Brooks Architects

Photo: Tim Crocker / GPAD

Above: All Saint's Passage in south-west London by architect GPAD. The all-electric four-storey apartment block uses air-source heat pumps and solar panels, which are integrated into a communal rooftop garden. Exposed soffits and floors provide thermal mass as well as avoiding the embodied carbon of additional finishes

Most heat pumps can be run in reverse, to circulate cold rather than warm water, and when paired with screed and tiles or concrete, this creates a chilled slab effect. This doesn't happen with wood or carpet, and radiators carrying cold water are prone to condensation, mould and corrosion.

In spring and autumn, meanwhile, finishes with high thermal mass can store direct solar gain from windows, and stay warm for longer when the heating is on – you notice the difference even with a thin screed and tiles.

3 More consistent detailing

Another change is the move towards a new calculation methodology for energy performance, the Home Energy Model (HEM), following a two-year transition period. Unlike the current Standard Assessment Procedure, or SAP, it will be based on half-hourly simulations rather than monthly averages, enabling more realistic measurement of low-carbon technologies such as heat pumps and solar PV.

HEM will highlight the role of thermal mass more clearly, showing that spaces require more energy for the initial warm-up, but stay warmer for longer and require heating for fewer days of the year, if they are designed to take advantage of passive solar gains in spring and autumn. This will flatten heating loads over the year, according to Baz Iyer, chief executive of home energy modelling software provider Vulcan.

Another significant difference between SAP and HEM is the approach to thermal bridging: vulnerable areas of the building fabric, such as windows, doors, lintels or floor-to-wall junctions through which heat can potentially escape. Under SAP, builders can choose to adopt default thermal bridging values, which assume a high level of heat loss but avoid the need for complex calculation methods. With HEM, on the other hand, designers will either need to model these thermal bridges individually or use a standardised set of construction details, such as Recognised Construction Details. They will need an accurate assessment of heat loss in order to make sure that heat pumps are sized correctly, avoiding unnecessary extra capital outlay and running costs.

One potential outcome is that building geometry will become less complex, with fewer bespoke details. Form factor – the ratio of a building's heat loss area to its total floor area – will be an ever more critical design parameter, potentially pushing boxier, more generic structures.

4 Less plasterboard, bigger windows

HEM will give a more detailed picture of how occupants drive energy use and when peak loads occur. As a consequence, it will be able to gauge more accurately the benefits of building attributes such as thermal mass, which can store energy and distribute it more evenly throughout the day.

A 100mm layer of exposed concrete or similar masonry material on the inside is generally considered the optimal thickness for storing and releasing heat within a 24-hour cycle, providing a valuable energy buffer for days when solar generation is low. This can be particularly effective when combined with passive solar gain from south-facing windows.

This is an additional advantage of specifying concrete or tiled floors with underfloor heating. But designers may also consider harnessing the thermal mass of masonry walls by specifying external or cavity insulation and leaving the inner leaf exposed. This could also help to meet the overheating requirements of Part O of the Building Regulations, currently under review, ensuring these highly insulated homes remain comfortable in increasingly warm summers.

With thermal mass, nighttime ventilation needs to be embedded in the design, to allow it to be cooled and recharged. Rooflights over stairwells help to generate a stack effect, without compromising security. Alternatively, window systems or openings with integrated louvres can provide cross-ventilation.

As calculation methods become more refined and regulations get tighter, designing a home will become more of a push-pull between different strategies, and marginal gains could add up to significant benefits elsewhere. For example, incorporating thermal mass could allow designers to increase window sizes, using CIBSE's TM59 methodology for the assessment of overheating risk in homes.

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5 Roofs: ditch the pitch?

Apart from heat pumps, the most eye-catching element of the FHS is the scale of solar provision. This clearly poses a challenge for traditional pitched roofs, which can only face south across about half of their surface at best. Orientation of the building is obviously critical, but has to factor in a number of other constraints: from placemaking and road layouts to passive solar gain and overheating. Even the placement of the heat pump needs careful thought: these work most efficiently on a north-facing site, which could present space and security challenges if it's a street front rather than a back garden.

In this context, could flat roofs offer a solution? The angle of the solar array would no longer be constrained by the orientation of the house, and virtually the whole surface area would be at the designer's disposal. It could also provide a secure, well-exposed site for the heat pump.

This on its own may not be enough to convince developers to ditch the pitch. Many have long-held reservations about flat roofs, based on the perceived difficulties of maintaining traditional systems – insurers and warranty providers are likewise often wary.

But modern solutions, employing high-quality waterproof membranes on robust structural decks, are often easier to access and maintain than sloped alternatives. There would also be a benefit from a fire point of view: inset solar panels provide no fire protection to the roof structure, so current thinking leans towards adding a non-combustible board or membrane.

There would be useful synergies too. The humble rooftop is becoming the focus of a number of related challenges. Green roofs supported on a horizontal deck can play a crucial role in sustainable drainage systems (SuDS) by controlling the rate of rainwater run-off – a really important consideration as climate-related storm events become more frequent. Blue or blue-green roofs also include storage tanks, enabling water to be used on site and alleviating stress on the water network. Add in the biodiversity benefits of green roofs and even the possibility of using them as outdoor space, and the argument for flat roofs becomes more persuasive.

Beyond net-zero

One of the potential dangers as we strive to deliver net-zero homes is that building physics starts to take over from building design. Approaches such as those outlined above are not inevitable outcomes of the FHS, but they do all offer the same compelling advantage: they enable designers to meet ever tougher energy requirements while preserving the flexibility to create well-crafted, site-responsive, resilient homes.

Design decisions matter more than ever. We are getting better at measuring not only energy, but also comfort, health and wellbeing. We can see precisely how damp, mould and cold affect health outcomes, and how poor design exacerbates isolation and loneliness. At the same time, climate change is intensifying risks through flooding, overheating, more frequent, severe storms and wildfires and by encouraging non-native pests.

The benefits of the FHS for residents will be significant: warmer, better ventilated houses, lower bills, protection from fossil fuel price volatility. But delivering truly future-ready homes remains one of the defining challenges of our times. ●

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Below: Exposed concrete blockwork and polished screed floors at Catching Sun House in north London by StudioShaw, winner of a 2025 RIBA London award. The all-electric house is heated by an air-source heat pump with underfloor heating

Photo: James Brittain