



CARBON REDUCTION

Aim for a low-impact build, says Adam Knibb of Adam Knibb Architects (adamknibbarchitects.com)

- Zero carbon refers to both embodied energy, which is used in the manufacture of the building materials, and operational energy, which is used to heat, cool and power an extension.
- If the entire building isn't being upgraded, then even if you deliver a zero-carbon extension the overall house will still have the same carbon footprint. In theory, the extension could be below zero, generating energy sufficient to power the house, but I haven't heard of anything like this being done before.
- Concrete is still the industry standard for foundations but it has high embodied energy. You can reduce the embodied CO2 of foundations through different cement mixes or use of limecrete, but not offset it completely. One of our new timber-frame houses is set on a compacted gravel trench foundation, using aggregate from the previous demolished house with mechanically compacted layers, topped with limecrete to bind it all together.
- Build using timber frame, which has low embodied energy; all buildings ideally need to be constructed this way to minimise the environmental damage. Modern solutions such as SIPs (structural insulated panels) and CLT (cross-laminated timber) are best for reducing the carbon footprint.
- Cob or straw bale could be used but it's important to think holistically about the building. They don't lend themselves to airtightness so additional membranes to reduce leakage will be needed.
- Follow the energy hierarchy: Be Lean - select the highest standards for materials. Be Clean - keep emissions low. Be Green - include renewables.
- Design your extension with good insulation, airtightness and building orientation in mind, then go for renewables such as air source heat pumps. The house will become more sustainable, with a lower carbon footprint, over time.

Design choices

Building in masonry is a tried and trusted method but there are modern alternatives worth considering. Timber frame and SIPs (structurally insulated panels) offer faster build times. Cladding options include brick, render, wood, metal and more unusual materials. Check before you commit whether your council stipulates that the material must match the original house since some may require an identical finish.

'You can make a building more legible by using a different type of cladding, particularly one that speaks of sustainability and low carbon construction,' says Jerry Tate, partner at architect Tate Harmer (tateharmer.com). »

ABOVE AND RIGHT Simon Whitehead Architects (simonwhitehead.com) came up with a unique solution for this five-bedroom detached Victorian house in south-east London, designing two extensions totalling 40.6sqm to enclose a 20sqm outdoor space. Existing floor levels were lowered by 540mm and the outdoor seating area by 820mm. The space includes a kitchen and utility by Roundhouse (roundhousedesign.com), plus a boot room/toilet/pantry and an open-plan seating area

