

Back to the future with nature's own construction materials?

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Europe's construction industry has a crucial role in cutting carbon emissions and energy consumption. But getting companies to ditch traditional building materials for greener, bio-based alternatives remains an uphill struggle. They are more costly and questions remain over safety, reliability and durability

The concept of building with bio materials is nothing new – mud and grass has been used in some countries for centuries.

"Thirty percent of houses in Germany include clay as building materials. Many of them have stood for more than 100 years," said Manfred Lemke, from Claytec, a Germany-based developer and producer of clay [building materials](#) and systems.

"Ancient buildings with clay can be visited all over the world, the oldest date back to 10,000 BC. Other materials haven't boasted such a life span."

But in today's [construction industry](#), bio-based insulation materials are relatively niche. This is due to higher costs and because builders are yet to be fully convinced that alternative ingredients – plant waste, straw, clay, grasses and the like – are reliable, and the way forward.

"Of course, modern times need more guaranties than just experience," commented Lemke.

Claytec is part of the European ISOBIO project which aims to develop and boost the use of sustainable materials in building and construction – materials which could offer 20 percent better insulation than their traditional counterparts.

By also reducing the energy and CO2 emissions needed to create and transport [construction materials](#), the cut in total 'embodied energy' across the whole lifestyle of a building could be up to 50 percent.

"Clay plaster requires just 10 percent of the energy input of gypsum plaster. The unique ability of clay-based materials is that they can be re-plastified at any time of use. Using just water, the material can be reactivated, for repair for example," said Lemke. "At their end of their life, clay-based materials can be re-used without additional efforts," he continued, "low energy input in production, re-plastification at any time and re-use are all clear environmental benefits."

Lemke admitted that clay-based materials cost more than others, but stressed, "the advantages in use justify the costs."

"Clients get more for more: improved indoor climate, easy maintenance and repair and zero end-of-life risks," he said. The University of Rennes 1, in France, is also working on the ISOBIO project, focusing on technical characteristics of materials to be developed.

Their initial studies have revealed more than 60 companies in Europe are producing more than 230 bio-based insulation products.

"New bio-based materials must allow outdoor insulation, particularly in the case of building retro-fitting. Their durability must also be assessed for such use, taking into account fire and decay risks," said Professor Christophe Lanos, from the university. "Products need to meet requirements in terms of both mechanical and thermal characteristics. A compromise must be found, but it is a particular problem."

Lanos added that "environmental quality, technical performance and economical competitiveness" all need to be proven for bio-products to stand a chance of being adopted more widely.

Construction companies have a major role to play in helping to decarbonise Europe's economy by 2050. With this in mind, ISOBIO is taking a radical approach to create construction materials that are useable in high volume in traditional ways – as well as developing markets such as the exterior insulation of existing housing stock.

The project aims to define the most effective [materials](#), focus production on high-quality and credible insulation and reduce overall costs. Its ambitions are being welcomed in the UK, where construction companies are under pressure to build thousands of new homes every year.

The Home Builders Federation (HBF), which represents members in England and Wales, says the industry has a "proven track record" for introducing new technologies and is "always keen" to explore new developments.

But HBF spokesman Steve Turner added: "as with all new technologies, a full understanding of the implications of using them is required before they can be considered for mainstream use. "Further work in this regard would be useful for biomass products, to better inform the industry of the potential of its wider use."

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