

# Historic Scotland's Embodied Energy Research

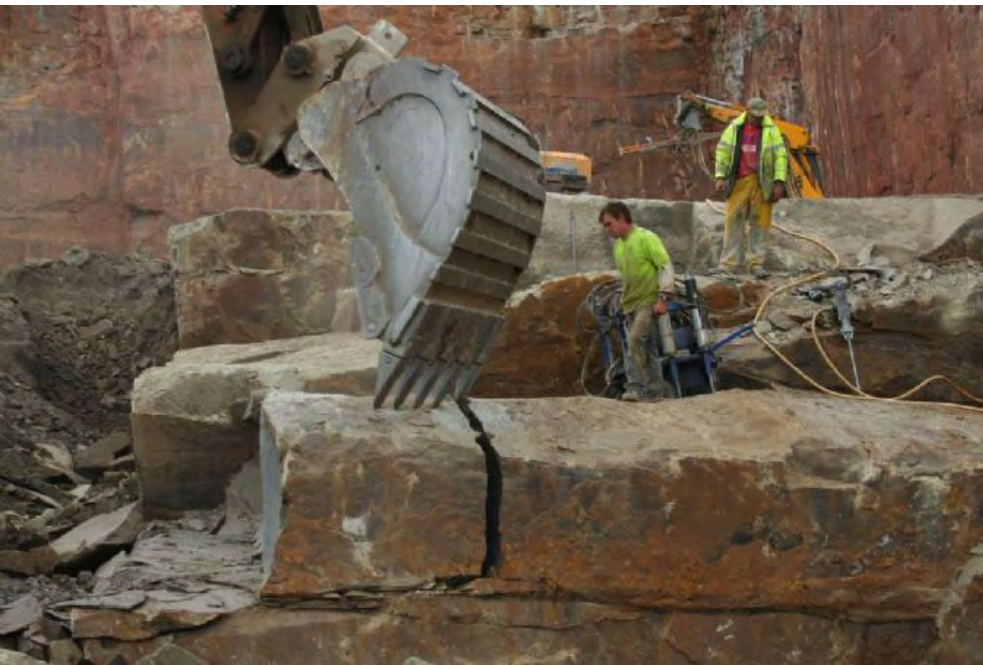
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Energy used in the creation of a product is known as *embodied energy*.

Carbon emitted during the creation of a product is the *embodied carbon*.

Some manufactured materials have a high embodied energy (i.e. metals, concrete)

Others have a low embodied energy (natural materials – wood, stone)



Traditional buildings tended to use locally sourced, natural materials.

## **Low carbon, low embodied energy**

However...

*‘When an old, inefficient building is replaced with a new, efficient one, the embodied energy in the construction process [of the new building] will be offset within a few years by the lower energy consumption of the more efficient building in occupation: thereafter, the more efficient building will represent savings throughout its lifetime’*

“40% House”, ECI, 2005

Why not make the old building more efficient?

## Case Study - Stone

Few quarries in Scotland still operate in producing dimensional stone.

For new build, replacement, repair, etc. material needs to be imported.





Carbon dioxide emissions from ships do not come under the Kyoto agreement or any proposed European legislation.

We did not know:

- The effect of making an older building more efficient
- The true embodied energy and embodied carbon of building materials
- The embodied energy and embodied carbon of importing stone for repair and replacement purposes (i.e. Chinese granite)

Knock-on consequences for:

- Carbon reduction targets
- Ethical procurement
- Sustainability of buildings, materials and local economy