Clayworks

SUSTAINABILITY DATA

for Clayworks Smooth, Tonal,
Demi Rustic and Rustic Finishes

Natural Clay Plasters

INTRODUCTION

Clayworks was born from a love of nature and belief in natural, sustainable building practices. The company has always believed in design being holistic and respectful of the needs of people and planet. We also believe that through great design and a fabric first approach we can make sustainability second nature.

We understand that buildings are a leading contributor to greenhouse gas emissions and our mission is to create materials that can do less harm, release less carbon and that are healthier.

Readily available, affordable and easy to use material options can reduce net up front carbon: these tend to be natural building materials and include clay plasters.

Our fundamental aim in this document is to distil the complexity of sustainable architecture and design into outcomes that Clayworks can partly help to achieve.

PRINCIPLES

- Use 3rd party expertise where possible to verifyy our products and statements.
- Easily communicate the sustainability benefits of clay plasters to built environment professionals in ways that are relatable to recognised standards and policies.

100% NATURAL

absorbs toxins
low embodied energy
passive regulator
zero voc emission
low embodied carbon
100% compostable
non toxic
100% natural
recycleable

Clay plasters are 100% natural, non-toxic, with Zero VOC emissions and no synthetic, concrete or lime additives. Made from readily available, naturally abundant materials, they require no processing, only blending. During this process very little energy is required, no water is used, and there is zero waste produced. Clayworks Clay Plasters are packaged in Brown Paper sacks that contain no plastic.

BUILDINGS AND CLIMATE CHANGE

Buildings contribute to climate change in 3 distinct ways:

1. Up-front embodied carbon: the emissions arising from the harvesting, extraction, manufacturing, fabrication and transportation of building materials.

(Also known as Net Zero Embodied Carbon Dioxide).

2. Energy Efficiency: the amount of energy consumed by buildings expressed as energy use

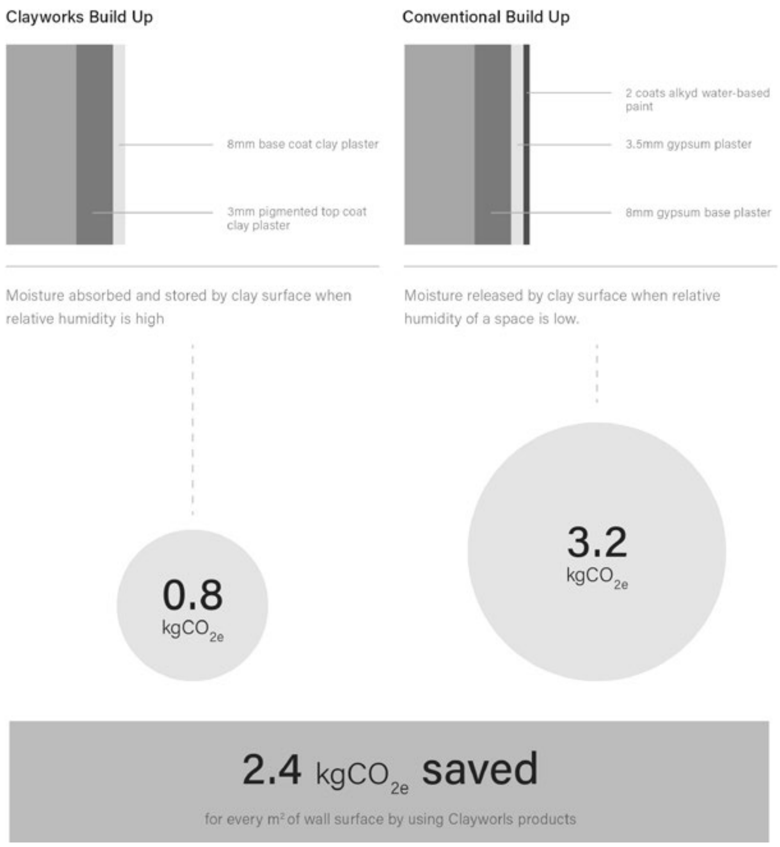
3. Fuel source emission: the fuel used to heat, cool and power a building.

(The thermal and breathable performance benefits of clay plasters reduce the requirement for mechanical intervention.)

It is generally recognised that reducing up front embodied carbon is a more effective intervention than improving energy efficiency.

Clayworks can reduce the upfront embodied carbon due to use of local materials, lack of processing, no water in processing, no waste produced and circular nature of material.

Clay plasters have one of the lowest embodied CO^2 of any interior finishes.



EMBODIED CARBON

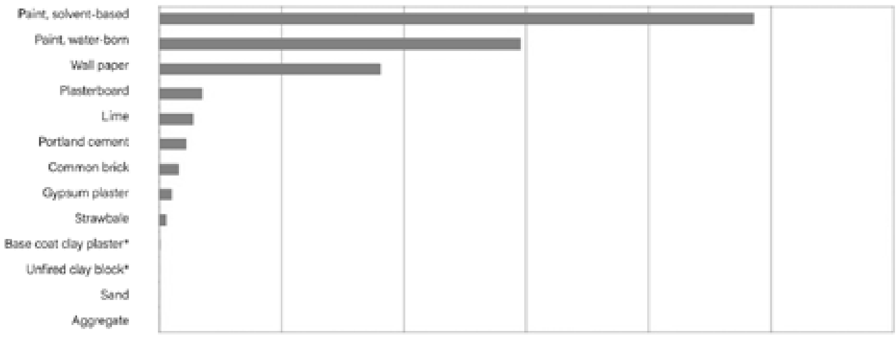
This is a concept best explained by Jane Anderson of PE INTERNATIONAL. http://www.greenspec.co.uk/building-design/embodied-energy/?$

As regulation and voluntary measures such as BREEAM and the Code for Sustainable Homes have looked to reduce operational carbon, there has been an increasing focus on embodied carbon – the carbon which is associated with the materials in the building. Embodied carbon normally encompasses both CO² and other greenhouse gases, and includes emissions from all the extraction, transport and manufacturing processes required before products are ready at the factory for delivery to the customer – such an assessment is known as 'cradle to gate'.

The Centre for Alternative Technology (CAT) produced a useful paper on embodied energy written by Carol Atkinson http://www.homegrownhome.co.uk/pdfs/Energyassessmentofastrawbalebuilding.pdf. (Carol Atkinson, MSc Architecture: Advanced Environmental and Energy Studies Energy Assessment of a Straw Bale Building, Jan 2008.

Carol lists the measurements she took (kWh/m³) of all the constituent materials. The clay plasters were not Clayworks and were sourced/made in Yorkshire and included hemp. [15].

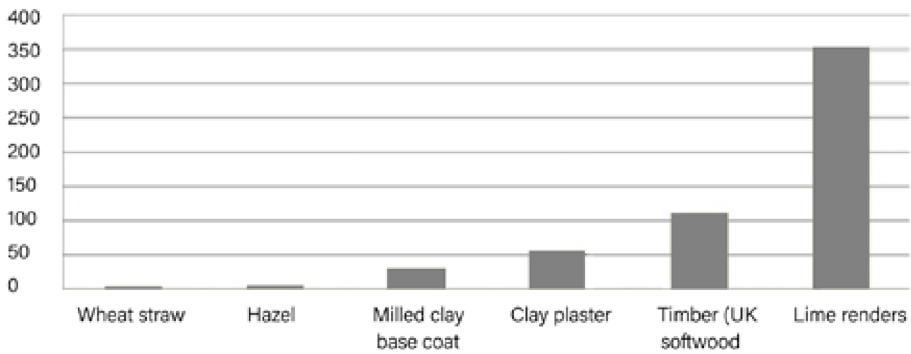
Embodied Energy (MJ/kg)



Source: 'Inventory of Carbon & Energy (ICE)' V2.0 Prof.Geoff Hammond & Craig Jones, 2011 and 'sand' from Busbridge.

* values derived by Clayworks based on composit materials information of named sources.

Embodied Energy (kWh/m²)



Source: Carol Atkinson, Msc Architecture:
AAES, Energy Assessment of a Straw Bale Building, Jan 2008

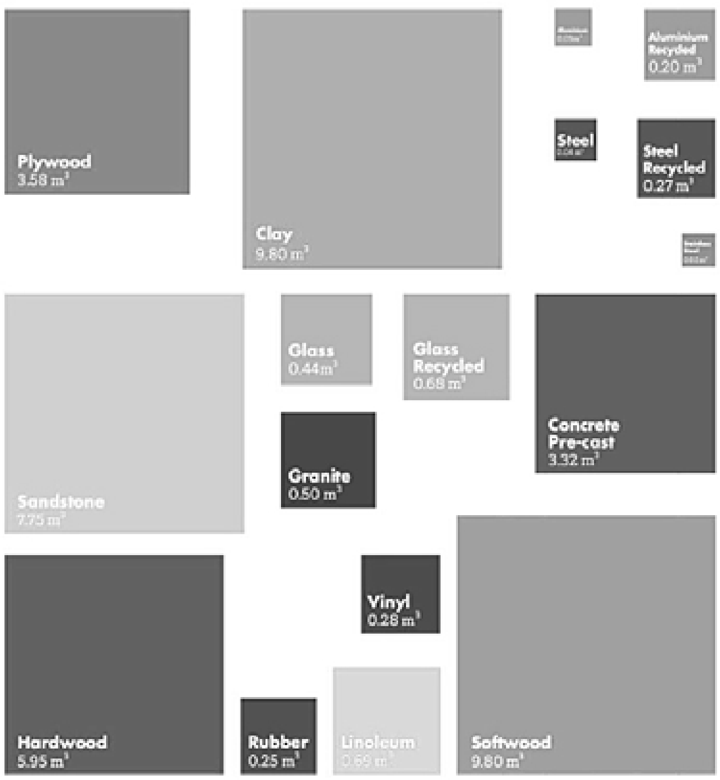
Source: http://www.greenspec.co.uk/building-design/embodied-energy/?$

The UK's Materials Council https://www.materialscouncil.com/exhibitionsandevents/in-the-scale-of-carbon/ has concluded that up to 2.4KG of Carbon could be saved by using a clay plaster wall build up rather than Gypsum and Paint. Their calculations were based on Clayworks Clay Plasters while using data produced by the University of Bath www.bath.ac.uk/mech-eng/sert/embodied/published. (Prof. Geoff Hammond & Craig Jones, 2011. Sustainable Energy Research Team (SERT) of the University of Bath).

by Materials Council · circular ecology · in the Scale of Carbon · RAW ARCHITECTURE WORKSHOP · ARCHI TONIC

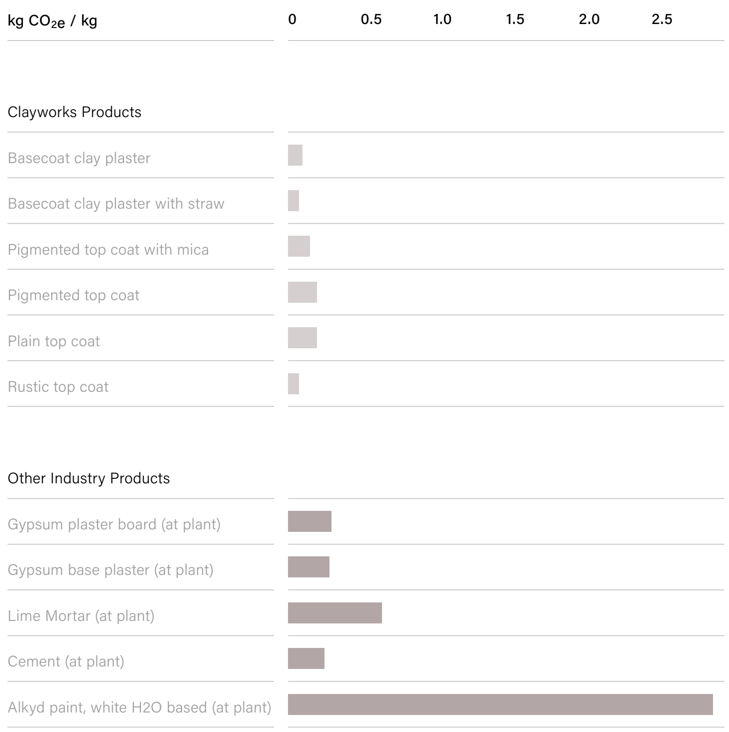
As a measure of sustainability, buildings, materials and processes are commonly judged by their 'embodied carbon' – the amount od carbon dioxide (CO^2) that is produced during their operation or manufacture. CO2accounts for 76% of all greenhouse gas emissions making it the primary contributor towards climate change, but, by its nature,quantities of this colourless gas remain frustatingly intangible.

In the Scale of Carbon brings carbon dioxide emissions out of the abstract by physically representing the volume of various architectural materials that can be produced for one tonne of CO^2 emissions. The larger the cube, the greater the volume of material that can be manufactured for the same quantity of CO^2 emissions.



WHY DO CLAY PLASTERS HAVE LOW EMBODIED CARBON?

- Use of raw, readily abundant materials.
- In a world where building products undergo a long chain of transformation – embedding carbon, toxins and releasing pollutants and waste at every stage – clay plasters remain in a raw state throughout their entire life cycle.
- Negligible operational water use.
- Zero waste in the manufacturing process.
- Very little operational energy use.
- Recyclable packaging.
- No synthetics, additives, pollutants used during the process: only natural materials that can be returned to the earth.
- Clay plasters contain or release no contaminants including VOCs and formaldehyde. They do not off-gas.
- No waste on construction site: left over material can be kept for repairs or disposed of into the ground. Zero Construction waste diverted to landfill. – Design building for the disassembly and circular economy.
- If applied onto sustainable, natural backing boards the surfaces can be composted, a concept known as Cradle to Grave.
- Naturally through pigmented, clay plasters will never require painting. By using natural earth minerals we can take out multiple manufacturing processes involved in the production of paint over the lifetime of the building.



RIBA 2030 CHALLENGE

In June 2019 the Royal Institute of British Architects (RIBA) voted to join the global declaration of an environment and climate emergency. The climate emergency demands urgent action and leadership by architects and the wider construction industry. RIBA has developed its 2030 Climate Challenge, https://www.architecture.com/-/media/files/climate-action/riba-2030-climate-challenge.pdf an initiative setting targets for practices to adopt to reduce operational energy, embodied carbon and potable water.

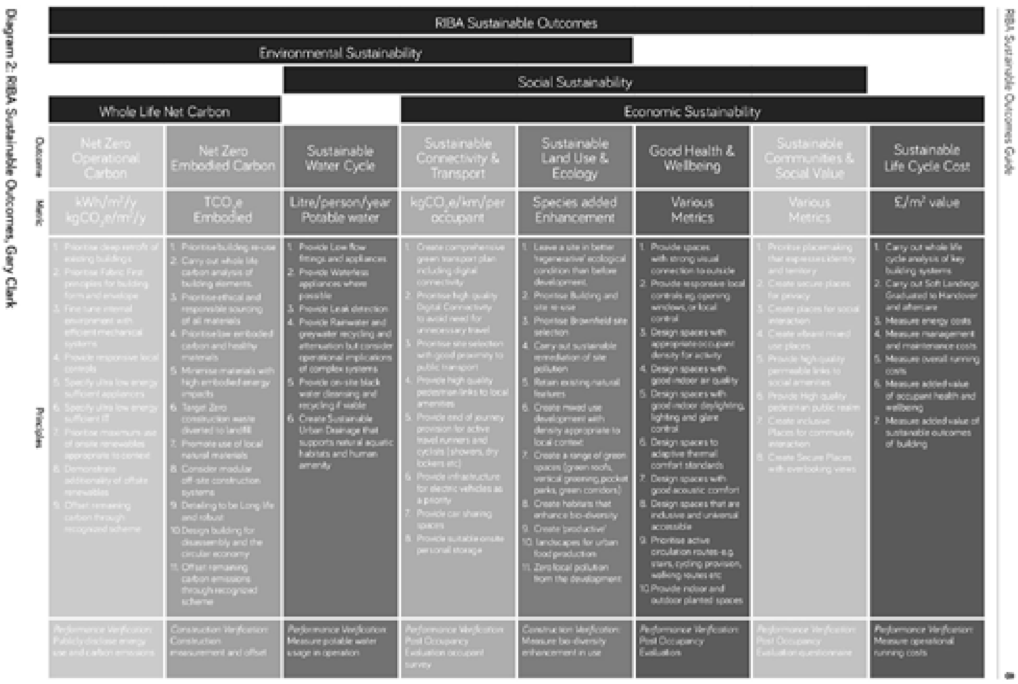
- RIBA wants to reduce embodied carbon by at least 50 – 70% before UK offsetting.
- It wants to achieve all core health and wellbeing targets on overheating, daylighting, internal CO^2 levels and the levels of contaminants including VOCs and formaldehyde

Architects are challenged in having all of the information and data they need to make informed decisions and it is our job to help to collaborate and inform.

UN SUSTAINABLE DEVELOPMENT GOALS AND RIBA SUSTAINABLE OUTCOMES

The RIBA Council has published the UN Sustainable Development Goals and RIBA Sustainable Outcomes to explain the ways in which architects and architecture can contribute to supporting all 17 UN SDGs.

The outcomes are clear and realistic.



Source:
https://www.architecture.com/-/media/GatherContent/Test-resources-page/Additional-Documents/RIBASustainableOutcomesGuide2019pdf.pdf

The table below illustrates the various outcomes that Clayworks can specifically help to achieve.

Net Zero Operational Carbon

1. Prioritise deep refit of existing buildings.
2. Prioritise Fabric First principles for building form and envelope.

Net Zero Embodied Carbon

1. Prioritise building re-use.
2. Carry out whole life carbon analysis of building elements.
3. Prioritise ethical and responsible sourcing of all materials.
4. Prioritise low embodied carbon and healthy materials.
5. Minimise materials with high embodied energy impacts.
6. Target zero construction waste diverted to landfill.
10. Design building for disassembly and the circular economy.
11. Offset remaining carbon emissions through recognised scheme.

Good Health and Wellbeing

4. Design spaces with good indoor air quality.
5. Design spaces with good indoor daylighting, lighting and glare control.
6. Design spaces with good acoustic comfort.

Source: https://www.architecture.com/-/media/GatherContent/Test-resources-page/Additional-Documents/RIBASustainableOutcomesGuide2019pdf.pdf

UK GREEN BUILDING COUNCIL
'By 2030, all buildings and infrastructure will, throughout their lifetime, be climate resilient and maximise environmental net gains, through the prioritisation of nature based solutions.'

Climate resiliance and embracing nature: An ambition for the built environment.
https://www.ukgbc.org/ukgbc-work/climate-resilience-and-embracing-nature-an-ambition-for-the-built-environment%e2%80%af/

RETROFIT AND EMBODIED CARBON

Retrofit is becoming an increasingly important solution to the climate crisis. All buildings retain embodied carbon and demolition wastes this energy. Energy required for a new building causes emissions at the outset. If we are serious about reaching zero – carbon targets then retrofitting exiting buildings to the highest standards of sustainability are one of the single most important things the construction industry can do.

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