The Positive+ House

Beyond Sustainability; creating a regenerative home that positively contributes to the local environment and community using locally sourced, low-grade timber alongside a decentralised, decarbonised supply chain brought together in a 'flying factory' for a digitalised and distributed manufacturing process.

We now live in a world where humanity has increasingly become divorced from nature and each other. At the current rate of habitat destruction and resource exploitation, our shared climate and biodiversity will not have the ability to fight back. We are at the tipping point. We need to regain an equilibrium: to actively restore and regenerate our planet and build places for people to reconnect to each other.

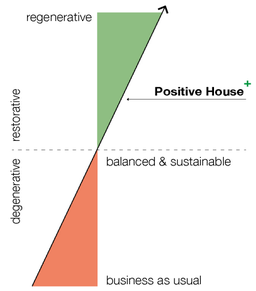
We have a single chance to take this opportunity and create truly positive change, and that time is now.

By succeeding, we can turn the tide of environmental catastrophe and simultaneously create an opportunity to improve the way we live and dwell.

Restoring of our planet can restore our lives. Working together to do this will challenge social inequality and vastly improve the way in which we lead our lives.

The places in which we live, work, socialise and are educated in have a profound effect on our mental and physical well-being. With this is mind we have created a design to learn new habits, to embed more cohesive social and environmental values. These principles flow through all aspects of our proposal; from landscape, communities and to building design, biogenic materials and delivery.

- The Positive+ Collective



Towards a Restorative Circular Economy

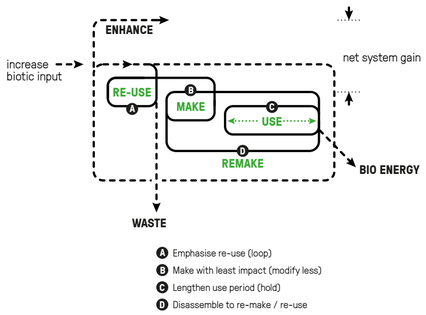


Diagram 1: Circular Economy

Positive+ House is made with biogenic materials; avoids carbon emissions; and is disassembled and re-used. Constituent components can be re-manufactured into new systems, restoring the ecosystem and biodiversity.

Operational & Embodied Carbon Store

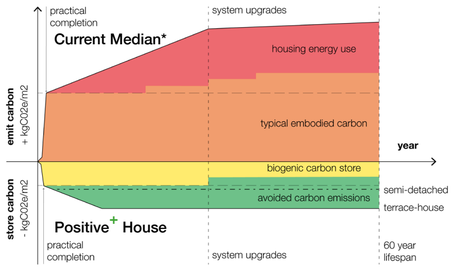


Diagram 2: Carbon Store/Emissions

*Positive+ House stores carbon over 60 years plus. *Benchmarking the Embodied Carbon of Buildings November 2017 DOI: 10.1080/24751448.2017.1354623 by de Wolfe et al. **Numbers are approximate and subject to further studies.*

A tree for a house

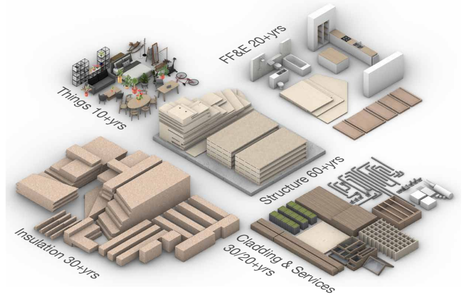
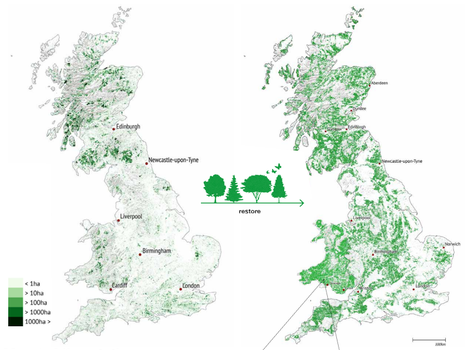


Diagram 3: A kit-of-parts approach to manufacturing

A typical family home is laid bear. Made from a single mature spruce, each element holds a different service life; therefore designing for disassembly allows for circularity.



Map 1: Afforestation

UK map showing existing forestry cover compared with possible cover if suitable low-value land is converted doubling cover and immeasurably increasing biodiversity gain.

Positive+ House is designed for manufacturing and disassembly using readily available products and systems from multiple suppliers brought together either in a 'flying factory', reducing supply chain risk, reducing capital investment, and bringing greater efficiency and competition to its delivery.

The main load-bearing structure uses thin, UK grown grade C16+ cross-laminated timber (CLT) walls, and the insulation is woodfibre. Through collaboration with Edinburgh Napier University, NMITE, and aligning with Home-Grown Homes, and initiatives by Woodknowledge Wales, we envisage better and greater use of local Welsh timber used within the construction industry.

Working to decarbonise the entire supply chain, our approach promotes the use of buildings as carbon stores, and provides for easier alteration and end of life disassembly. This critically supports future markets for wood-based materials as part of essential UK reforestation, carbon offsetting and circular economy needs, enhancing biodiversity, and increasing local employment opportunities.

Positive+ House uses biogenic materials throughout with the majority of materials originating from trees; a natural material which should be grown in far greater quantities in the UK. The two maps above illustrate the current woodland and forestry cover in the UK compared with what could become possible if low value agricultural land is converted to forestry. The Friends of the Earth states we could double the existing tree cover in the UK as just '13% of the UK's total land area has tree cover (compared to an EU average of 35%)'. The DEFRA target for English tree planting would take English tree cover from 10% to only 12%.

An enormous advantage of using biogenic materials such as structural cross laminated timber (CLT) is the improvement on our health physiologically and psychologically. Studies have found our heart rate and stress levels are reduced and cognitive abilities increased by up to 100% *(The role of wood in healthy buildings, TRADA)*. The physical benefits of natural materials include humidity and temperature control and human comfort. It is also well understood that connections to plants and better landscaping has psychological benefits. It feels right to be in a wooden building. When extended to biodiversity the value of forests, as both carbon pools, but also sources of diverse ecosystems also become evident.

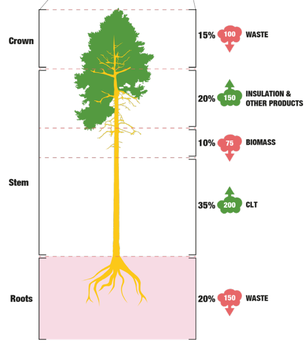
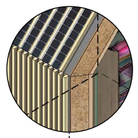
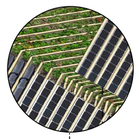


Diagram 4: A tree for a house

A mature Sitka Spruce which reaches around 55m in a 45 year period in height will have a volume of approximately 75m3 (bark-free), enough to construct a single house.

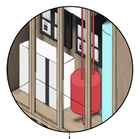


UK-grown C16+ graded Cross Laminated Timber with wood-fibre insulation and treated timber cladding manufactured in a local flying factory and assembled on site as a balloon frame.

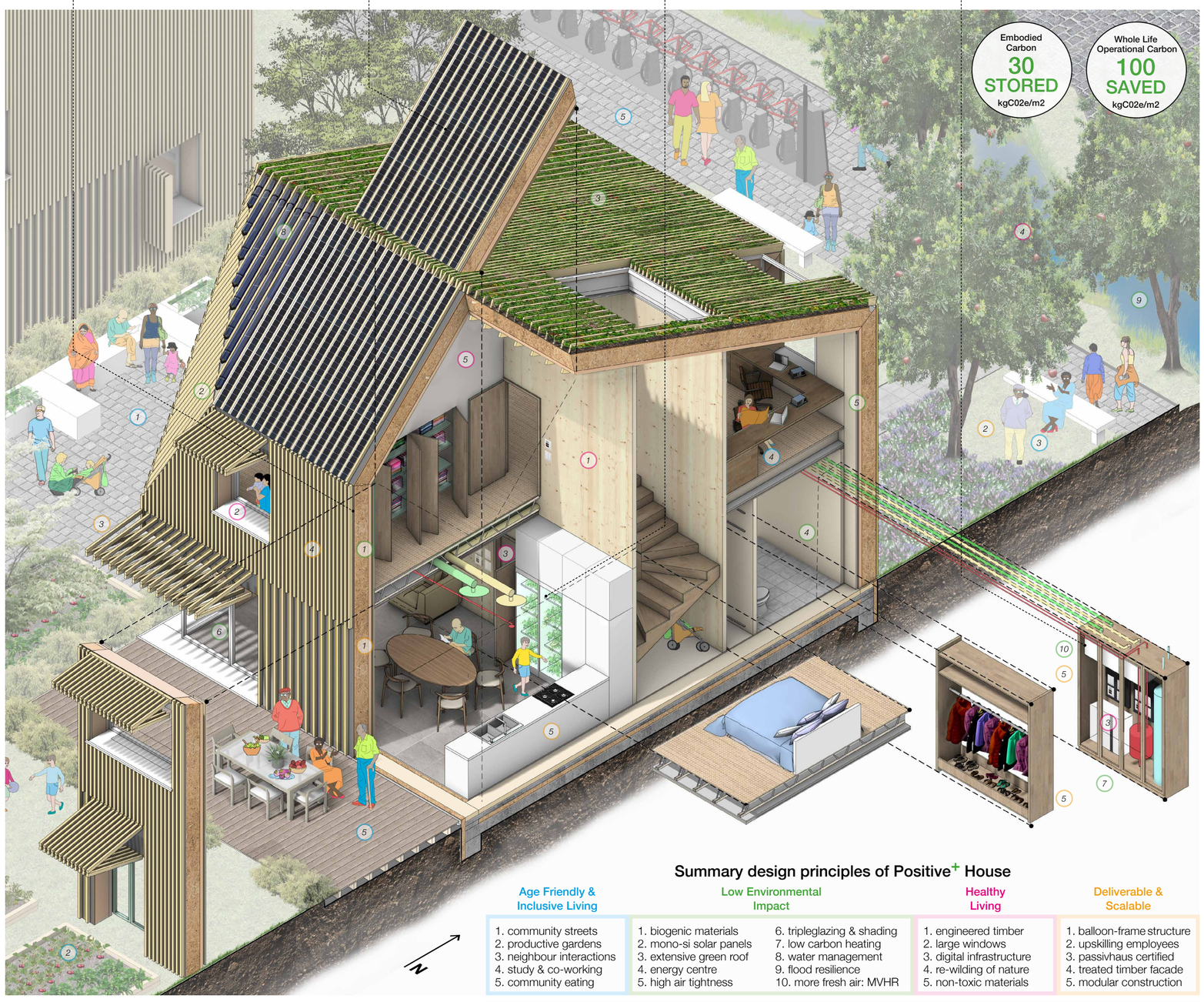


Vertical monocrystalline solar panels and solar water heating are positioned between timber slats, on 45° south facing roofs. To the north are extensive green roofs helping water runoff and biodiversity.

Inside, social interactions have been encouraged, with a focus on eating. Minimising consumables and waste will become essential in the future. Residents can even grow their own food in AgriTech incubators.



The brains of the house. Wireless technologies will enable flexibility. Hot water tank, a MVHR, electricity store and house computer will monitor and adjust the internal climate automatically.



Summary design principles of Positive+ House

Age Friendly & Inclusive Living	Low Environmental Impact		Healthy Living	Deliverable & Scalable
1. community streets	1. biogenic materials	6. tripleglazing & shading	1. engineered timber	1. balloon-frame structure
2. productive gardens	2. mono-si solar panels	7. low carbon heating	2. large windows	2. upskilling employees
3. neighbour interactions	3. extensive green roof	8. water management	3. digital infrastructure	3. passivhaus certified
4. study & co-working	4. energy centre	9. flood resilience	4. re-wilding of nature	4. treated timber facade
5. community eating	5. high air tightness	10. more fresh air: MVHR	5. non-toxic materials	5. modular construction

Positive+ Collective

humblebee

perpendicular change building

The Positive+ Collective is a group formed by the individual members left and supported by consultants below and right. Together, we believe the whole is far greater than the sum of our parts and only through collaboration will we be able to tackle the complex issues we currently face today.

DESIGN FIRE CONSULTANTS

GT

ECOSYSTEMS TECHNOLOGIES LTD

Centre for Offsite Construction + Innovative Structures

ARUP

Edinburgh Napier UNIVERSITY

EXTERIOR ARCHITECTURE

GrowUp FARMS