

WALLS

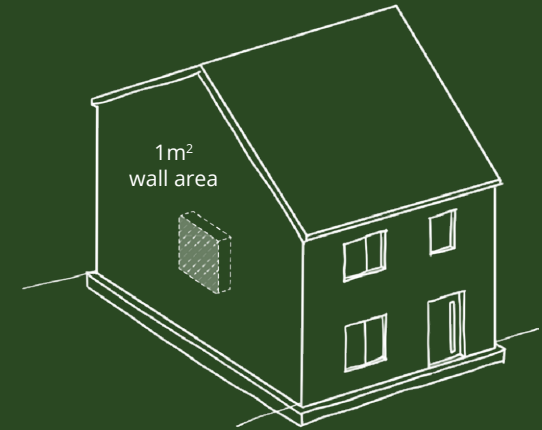
Estimation of upfront embodied carbon impacts.

Calculated per m² external wall area to a common U-value of 0.13W/m²K.

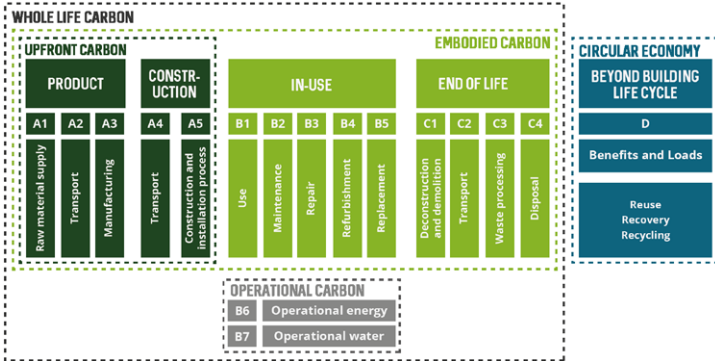
Includes wall structure, insulation, internal lining, membranes and cladding.

Brick cladding has been assumed for all options. An allowance has been made for wall ties and fixings according to the wall structure.

Excludes additional structural elements such as lintels or double studs.



Based on a notional detached 2-storey 3B house of 80m²



WE FOCUS ON UPFRONT CARBON AS THEY ARE MOST LIKELY THE MAJORITY OF EMBODIED CARBON IMPACTS ASSOCIATED WITH A PROJECT.

INCLUDED ARE PRODUCT STAGES A1-A3, PLUS TRANSPORT A4 TO WALES AND MATERIAL WASTE FROM CONSTRUCTION INSTALLATION A5W.
EXCLUDED ARE A5A EMISSIONS DUE TO ENERGY USAGE ON SITE DURING CONSTRUCTION AND INSTALLATION.



IT'S IMPORTANT TO COMPARE BUILD-UPS TO THE SAME PERFORMANCE AND U-VALUE TO ACCOUNT FOR DIFFERENT THICKNESSES OF MATERIALS!

ALWAYS BEAR IN MIND THE CONTEXT OF YOUR PROJECT, ANY ADDITIONAL REQUIREMENTS, AS WELL AS WIDER INFLUENCING FACTORS WHEN CHOOSING A BUILD-UP, MATERIAL OR SYSTEM.

NEVER RELY ON ONE SINGLE METRIC AND KEEP THE BIGGER PICTURE IN MIND!

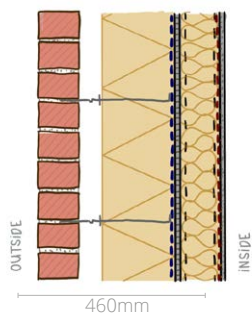
EMBODIED CARBON IMPACTS

WALLS

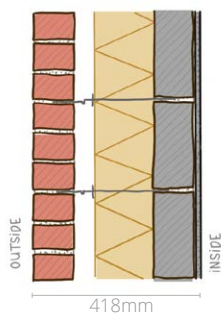
EMBODIED CARBON: EXAMPLE OF WALL BUILD UPS

A1-A4 plus A5w site wastage (excludes A5a)
0.13W/m²K

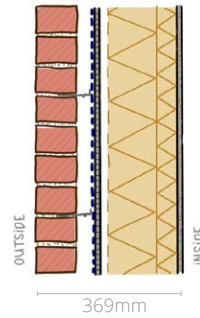
Lightweight Steel Frame
Mineral Wool



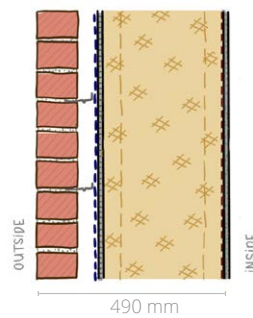
Brick and Block
PIR



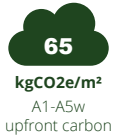
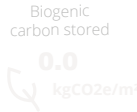
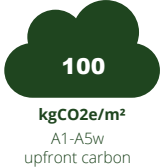
Solid Timber Frame
PIR



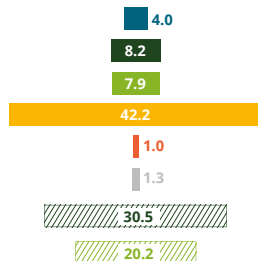
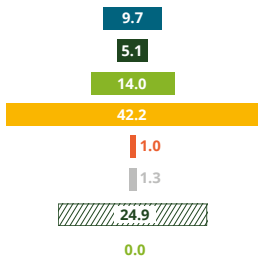
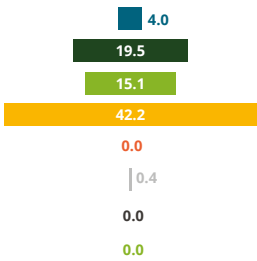
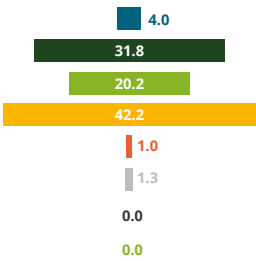
Timber I-Beams
Cellulose



Estimated
Upfront Carbon
Impacts
per m2 wall area



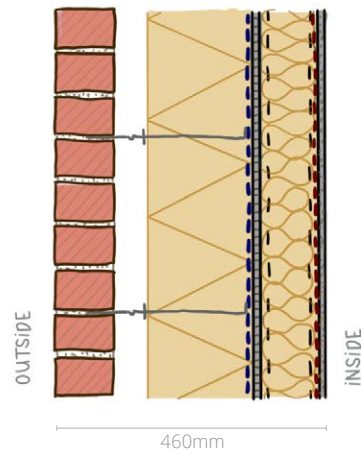
- Internal lining
- Wall structure
- Insulation
- Cladding
- Membranes
- Fixtures etc
- Wall structure biogenic stored
- Insulation biogenic stored



EMBODIED CARBON: EXAMPLE OF WALL BUILD UPS

A1-A4 plus A5w site wastage (excludes A5a)
0.13W/m²K

Lightweight Steel Frame with Mineral Wool



102.5mm facing brickwork
50mm ventilated cavity
180mm mineral wool rainscreen slab (55kg/m³)
Breather membrane
12mm fibre cement sheathing board
100mm mineral wool slabs (31kg/m³) between steel studs @ 600mm ctrs
Vapour control layer
12.5mm plasterboard
3mm plaster skim



DENSITY OF MATERIALS, ESPECIALLY FOR INSULATION, IS REALLY IMPORTANT FOR CARBON IMPACTS!

Combined upfront embodied carbon per m² wall

100.5
kgCO₂e/m²

A1-A5w carbon impact

0.0
kgCO₂e/m²

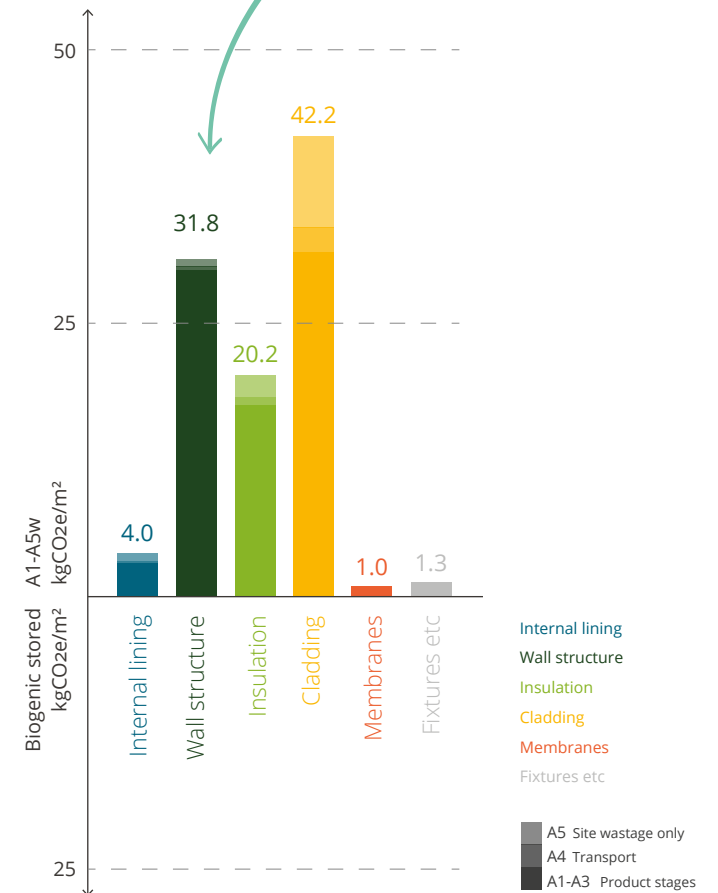
Biogenic carbon stored



MATERIALS LIKE STEEL AND MINERAL WOOL DON'T STORE CARBON AS THEY ARE NOT BIO-BASED.



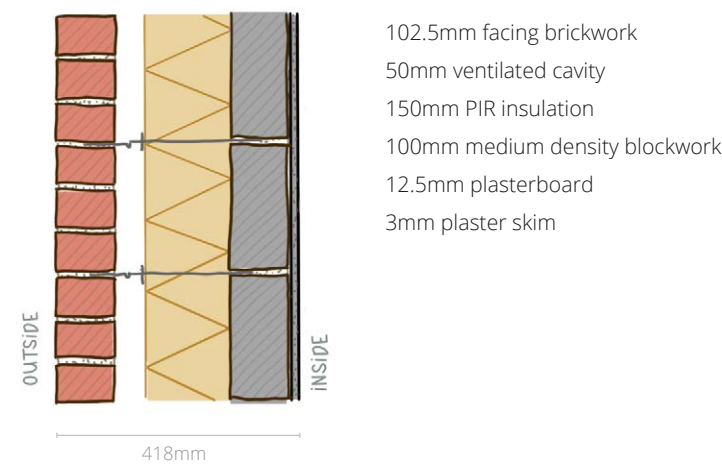
STEEL IS HIGH IN UPFRONT EMBODIED CARBON!



EMBODIED CARBON: EXAMPLE OF WALL BUILD UPS

A1-A4 plus A5w site wastage (excludes A5a)
0.13W/m²K

Brick and Block with PIR



Combined upfront embodied carbon per m²

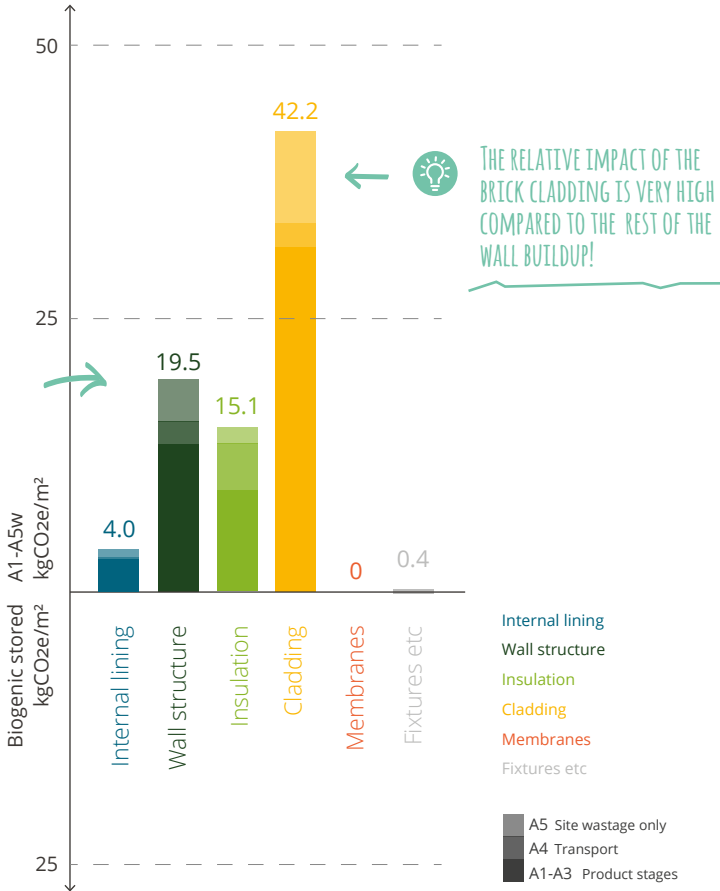


A1-A5w carbon impact



Biogenic carbon stored

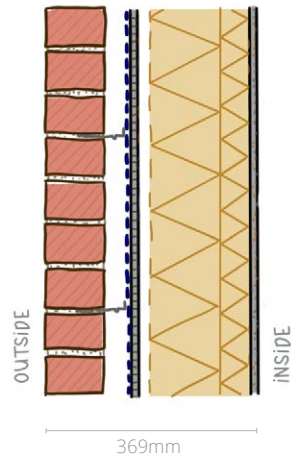
BRICKS, CONCRETE BLOCKS AND PIR INSULATION TEND TO HAVE A HIGH AMOUNT OF SITE WASTAGE.



EMBODIED CARBON: EXAMPLE OF WALL BUILD UPS

A1-A4 plus A5w site wastage (excludes A5a)
0.13W/m²K

Timber Stud Frame with PIR



102.5mm facing brickwork
50mm ventilated cavity
Breather membrane
11mm OSB/3 sheathing board
140mm timber studs with 120mm PIR insulation @ 600mm ctrs
62.5mm insulated plasterboard
3mm plaster skim

THE INTERNAL LINING IMPACT IS HIGHER DUE TO THE PIR-BACKED PLASTERBOARD.

Combined upfront embodied carbon per m²

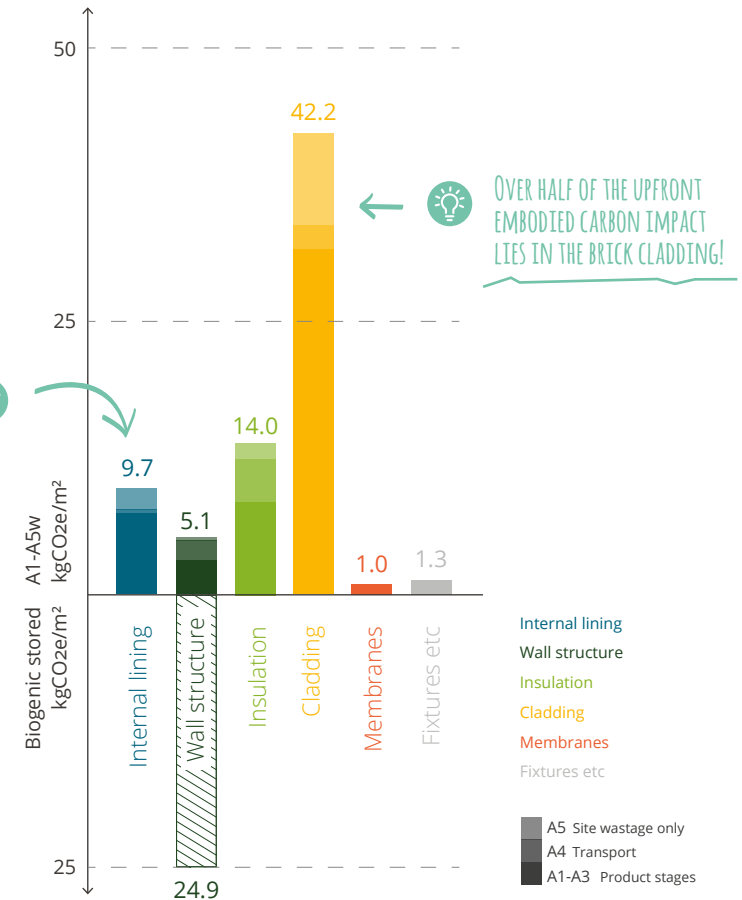
73.3
kgCO₂e/m²

A1-A5w carbon impact

24.9
kgCO₂e/m²

Biogenic carbon stored

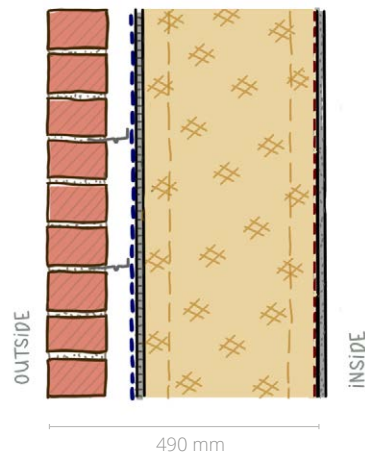
BIOGENIC CARBON IS STORED IN THE TIMBER FRAME!



EMBODIED CARBON: EXAMPLE OF WALL BUILD UPS

A1-A4 plus A5w site wastage (excludes A5a)
0.13W/m²K

Timber I-Beams with Cellulose



102.5mm facing brickwork
50mm ventilated cavity
Breather membrane
11mm OSB/3 sheathing board
300mm blown cellulose insulation (50kg/m³)
between I-beams @ 600mm ctrs
Vapour control layer
12.5mm plasterboard
3mm plaster skim

THE A4 TRANSPORT EMISSIONS OF CELLULOSE ARE RELATIVELY HIGH DUE TO THE MANUFACTURER LOCATION IN CENTRAL EUROPE, BUT IT IS STILL BY FAR THE LOWEST IMPACT INSULATION OPTION!

Combined upfront embodied carbon per m²

64.5
kgCO₂e/m²

A1-A5w carbon impact

50.7
kgCO₂e/m²

Biogenic carbon stored

BIOGENIC CARBON IS STORED IN THE TIMBER FRAME AS WELL AS THE CELLULOSE INSULATION!

