

# **BUILDINGENERGY** BOSTON

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## **Hempcrete 101: Back to the Future for Natural, Carbon-Beneficial Buildings**

Thursday, June 18, 2020

**The Webinar Will Begin At 1:00pm**

Brought to you by:



William Stanwix and Alex Sparrow

# The Hempcrete Book

Designing and building with hemp-lime

## Hempcrete 101 – Back to the Future with natural, carbon-beneficial buildings

**Alex Sparrow, Director of UK Hempcrete**

Co-author of *The Hempcrete Book: Designing and building with hemp-lime*

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CEO of Energia**

*NESEA Lifetime Member, , BPA/BPI, USHBA, IHBA, USGBC*



UK HEMPCRETE

**HEMPSTONE**











**Hemp hurd + Lime-based binder + Water**



**= Hempcrete, or Hemp-lime**





# **“Hempcrete” / “Hemp-Lime” / “Hemp concrete”**

***A bio-composite walling and insulation material***

***(not hemp fiber insulation or lime-hemp plaster)***

**Bio-aggregates –  
Hemp, rice husk, sugar cane,  
coconut fiber, sunchoke, etc.**

**Binders –  
hydraulic/air lime, natural limes  
(NHL), formulated limes (PHL),  
earth binders**











The image shows the interior of a room under construction. The walls are made of a light-colored, textured material, likely hempcrete. The ceiling features exposed wooden beams and rafters. A single arched window with a dark frame is visible on the back wall. The floor is made of light-colored wooden planks. A semi-transparent white box with rounded corners is overlaid on the left side of the image, containing text about hempcrete density.

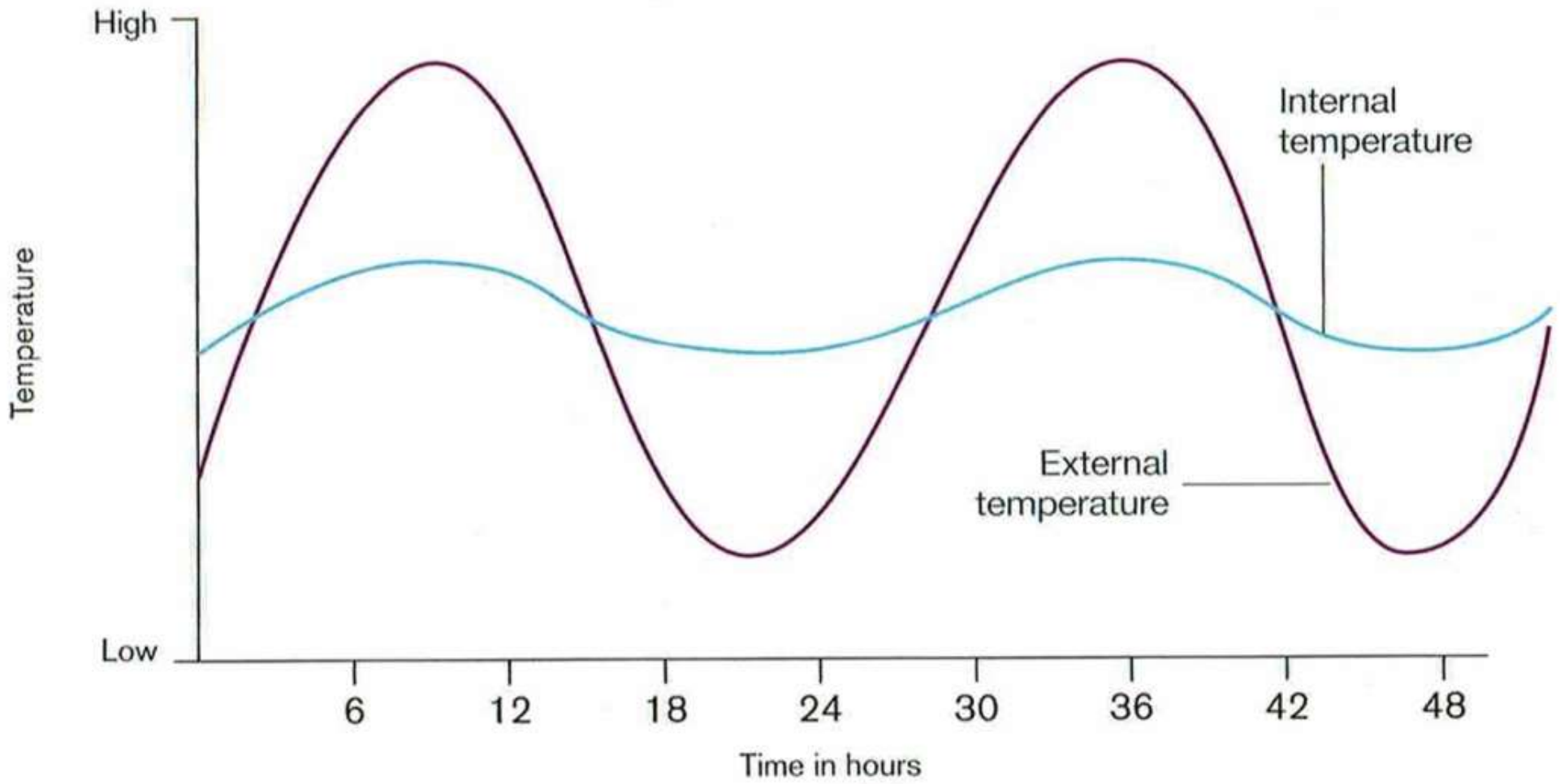
## Hempcrete Density

Roof ~200kg/m<sup>3</sup>  
(~13 lb/ft<sup>3</sup>)

Walls ~300kg/m<sup>3</sup>  
(~19 lb/ft<sup>3</sup>)

~500kg/m<sup>3</sup>  
(~31 lb/ft<sup>3</sup>)

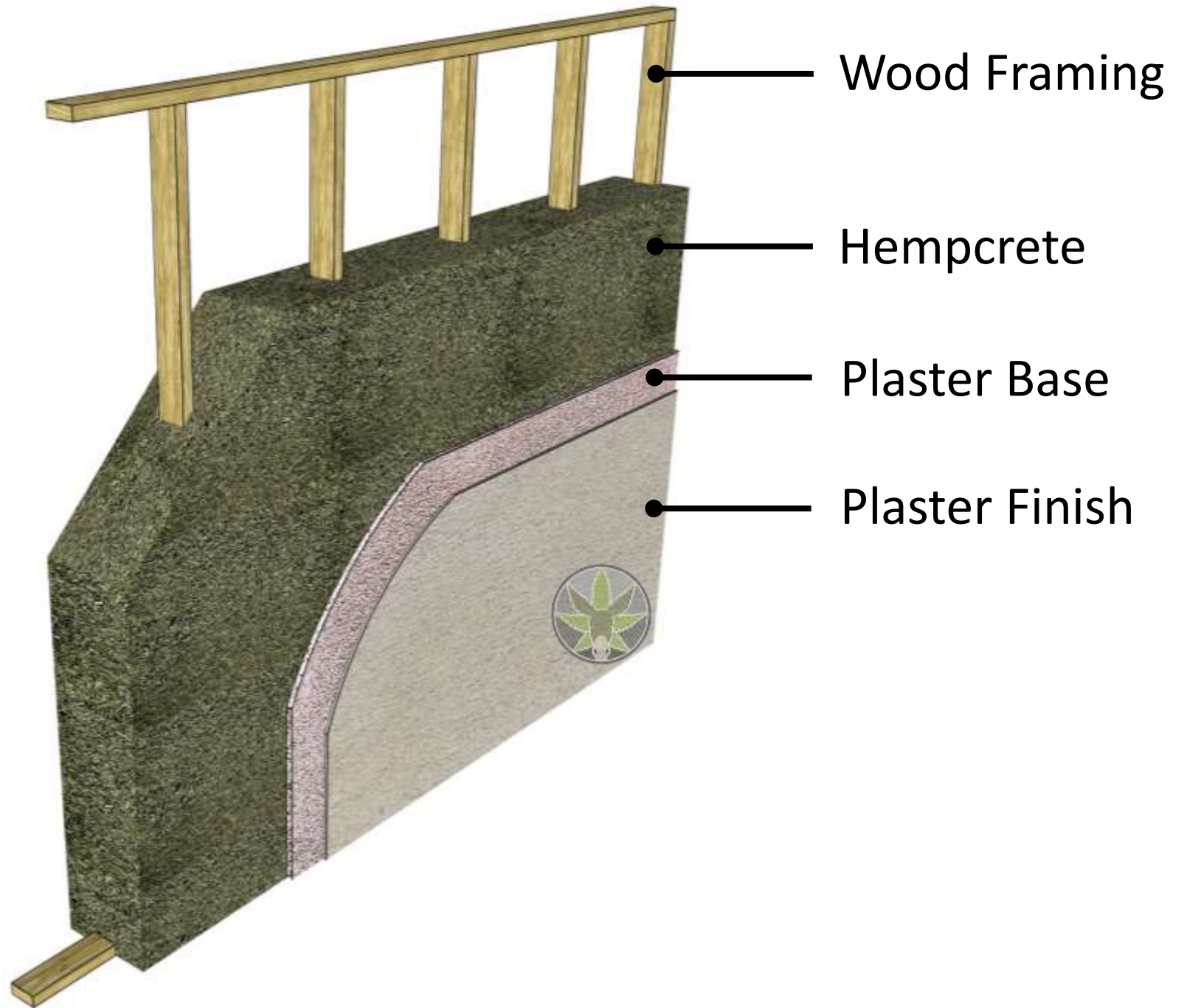




**Figure 4.** A building with high thermal mass 'buffers' daytime and night-time temperature variations, maintaining a steady internal temperature and thus reducing the costs of heating or cooling the building.

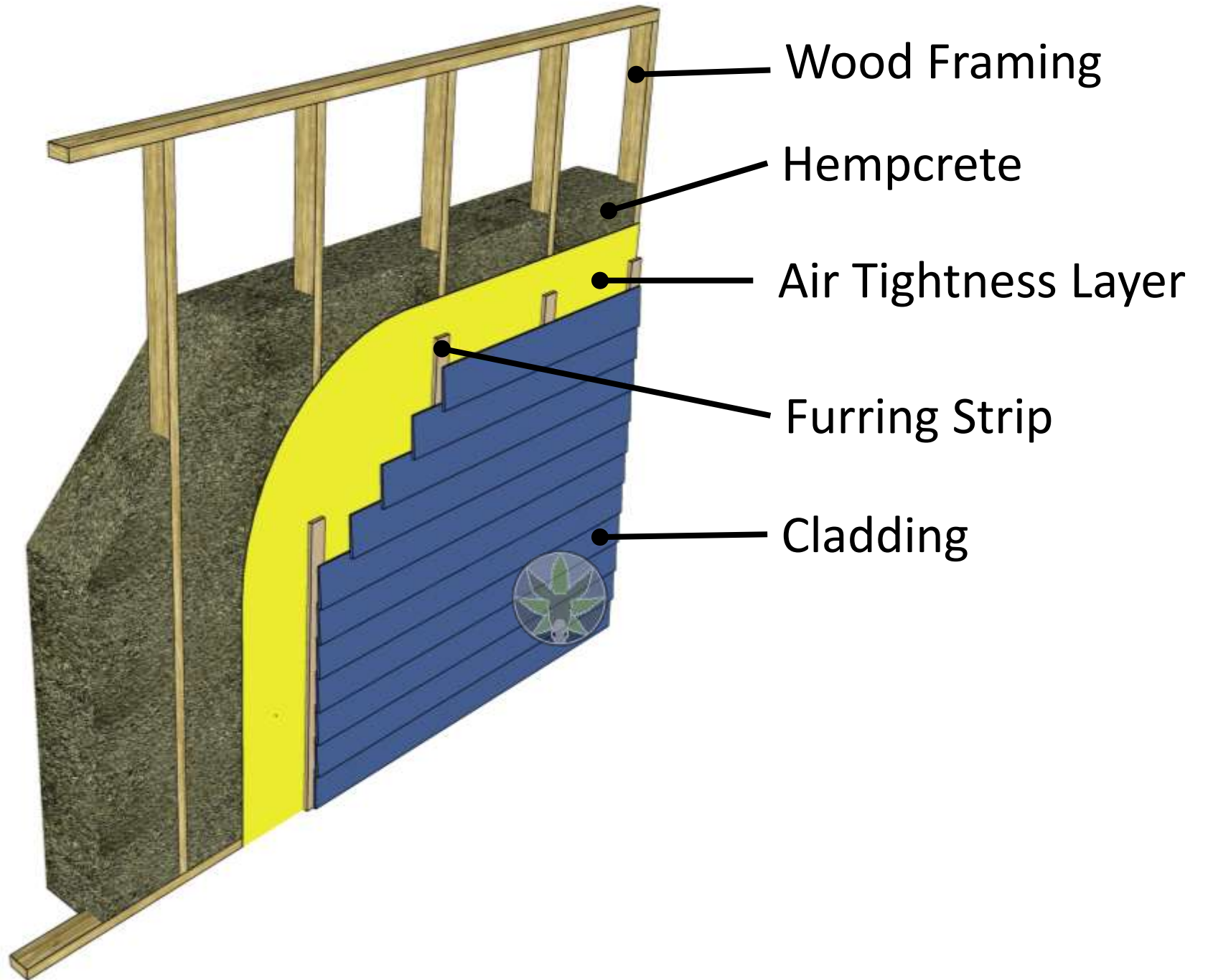


# Simple Cast-in-Place Hempcrete Assembly



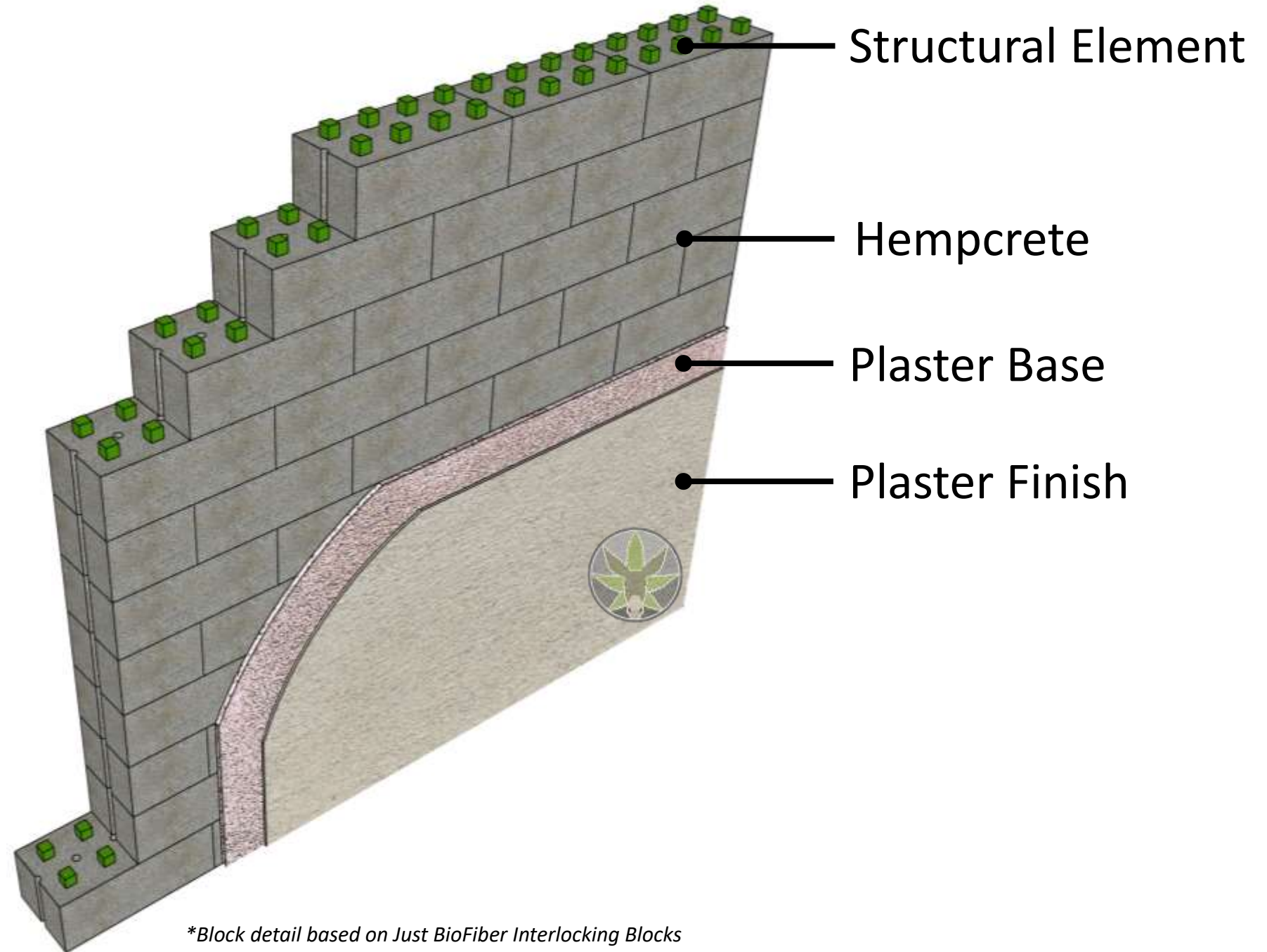


# Simple Cast-in-Place Hempcrete Cladding Assembly





# Simple Pre-cast Hempcrete Block\* Assembly



*\*Block detail based on Just BioFiber Interlocking Blocks*


















**Poll: Pick your top 3 criteria for a construction material or assembly:**

- **Durability/Resilience**
- **Low Toxicity**
- **Fire resistance**
- **Ease of installation**
- **Deters insects and vermin**
- **Low embodied carbon eCO2**
- **Thermal performance**
- **Humidity control**
- **Mold resistance**
- **Cost**



























# Development of the North American Hemp Building Industry

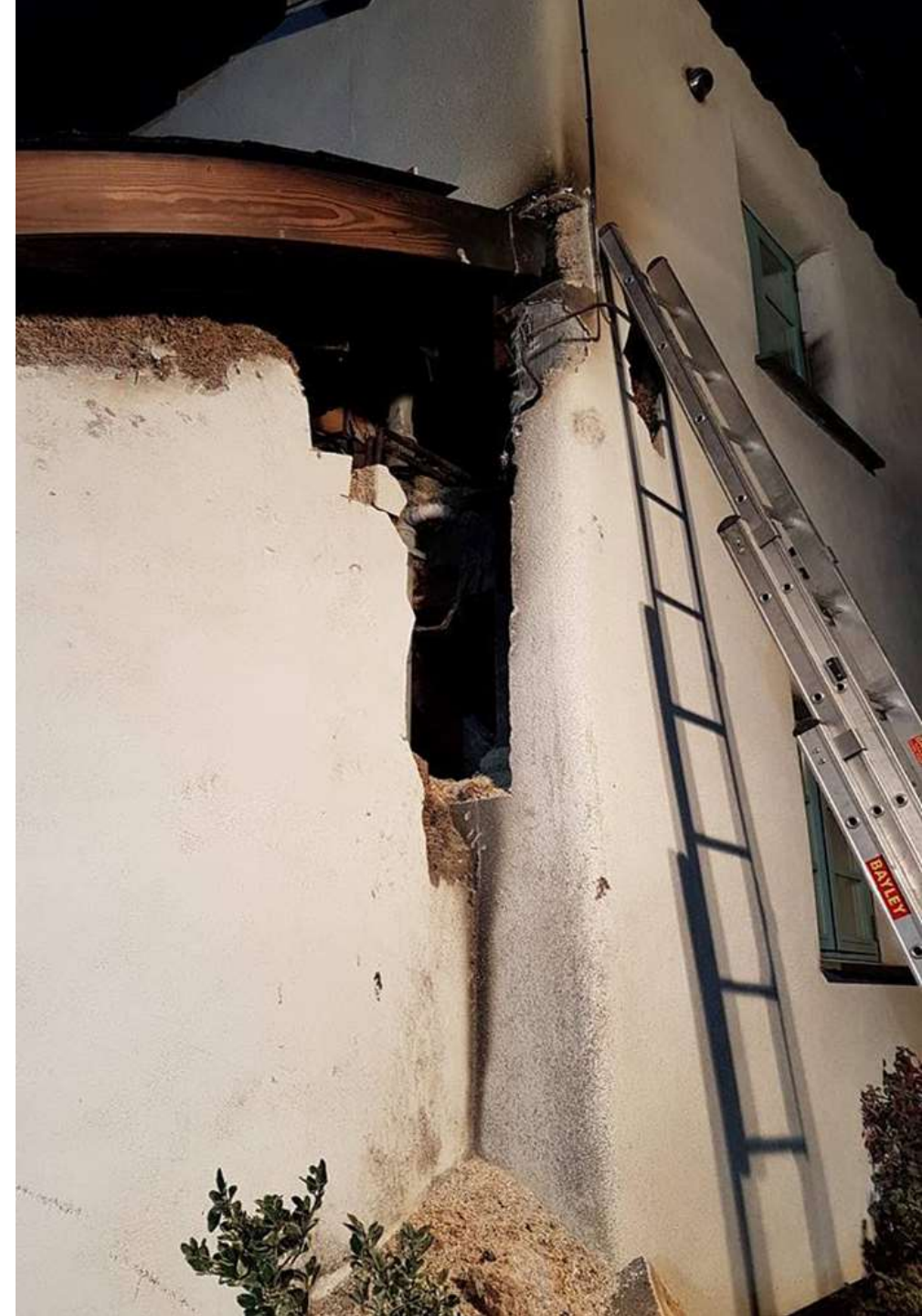
## Regulatory / Permitting

































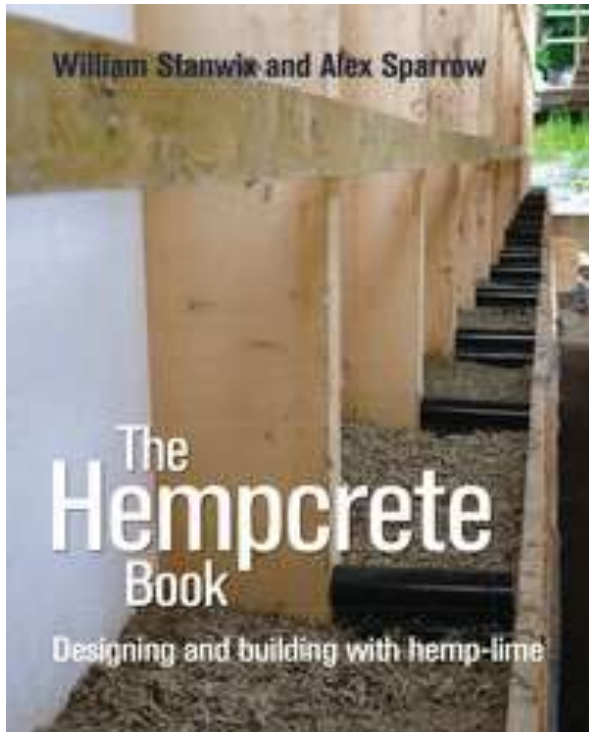
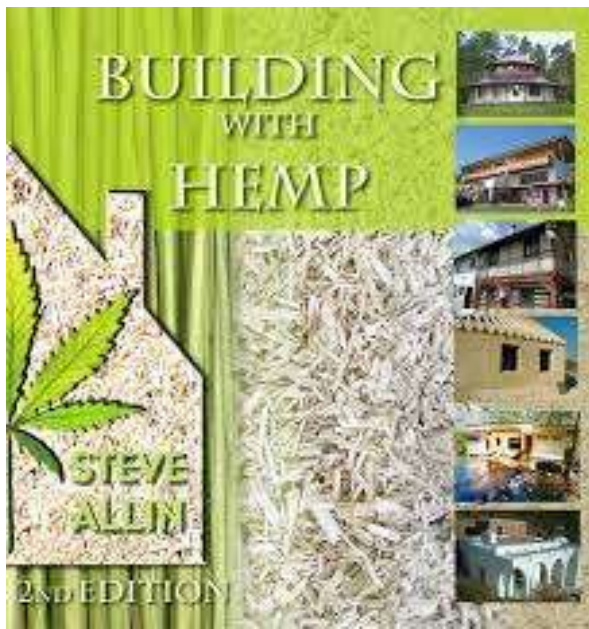
# Costs & Carbon

Costs per SF of Net Wall Area (Estimated/Rounded)	Conventional (2x6,Fiberglass)	Conventional (2x6,Cell+Polyiso)	HP (Double 2x4, Cellulose)	Hempcrete Cast 12" (2x4)
Framing	X	X	X	X
Sheathing	X	X	X	
Siding (Hardie)	X	X	X	
Insulation	X	X	X	
Drywall	X	X	X	
Trim (Interior & Exterior)	X	X	X	
Painting (Interior Only)	X	X	X	
Tapes and Membranes	X	X	X	X
Hempcrete				X
Plaster				X
<b>Subtotal</b>	<b>\$20.75</b>	<b>\$24.25</b>	<b>\$28.50</b>	<b>\$34.00</b>
<i>R Value (Static)</i>	<i>R19</i>	<i>R33</i>	<i>R40</i>	<i>'R24'</i>
<i>Effect on Embodied Carbon (lb-CO<sup>2</sup>e/ft<sup>2</sup> habitable space)*</i>	<b>+4.9</b>	<b>+3.3</b>	<b>-0.2</b>	<b>-1.65</b>

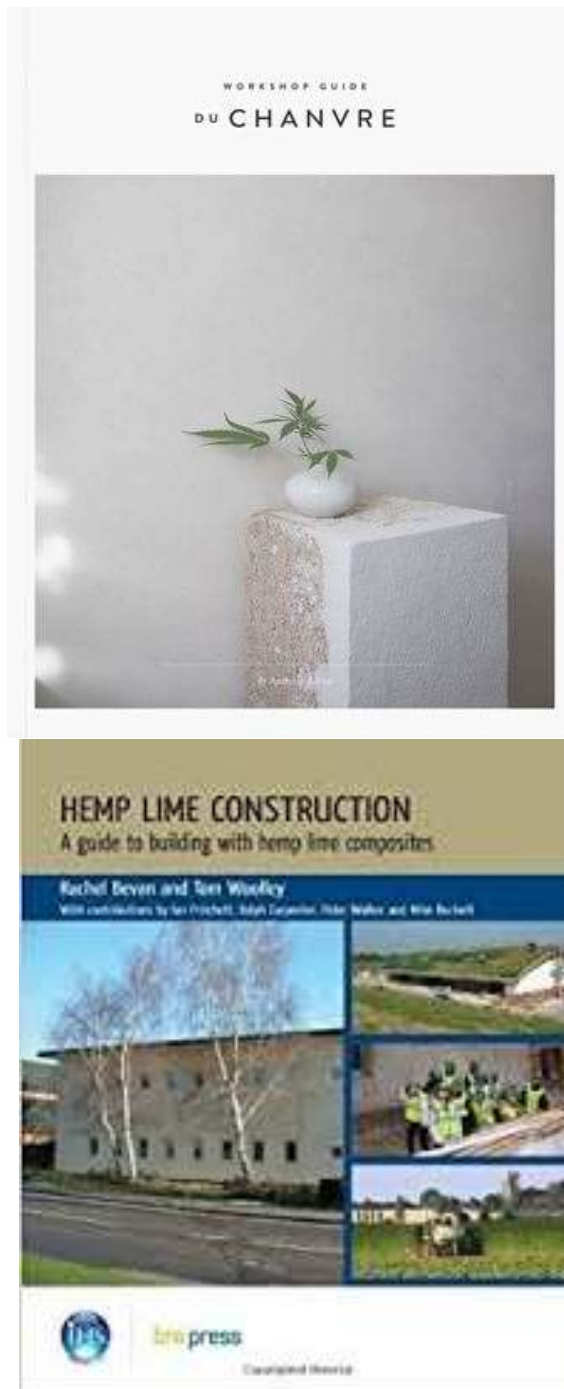
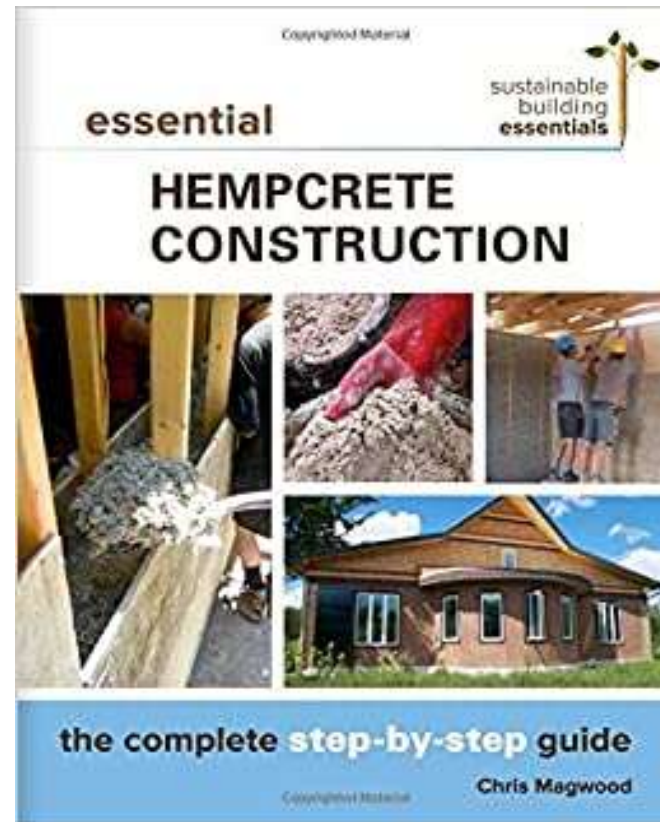
\*Building calculated at 1,000ft<sup>2</sup> (92.9m<sup>2</sup>) using Builders for Climate Action Beta Calculator, Version 8, Analyzed by HempStone.

X – BfCA beta calculator does not currently include CO<sup>2</sup> figures for tapes/membranes, trim (wood or composite), or paint

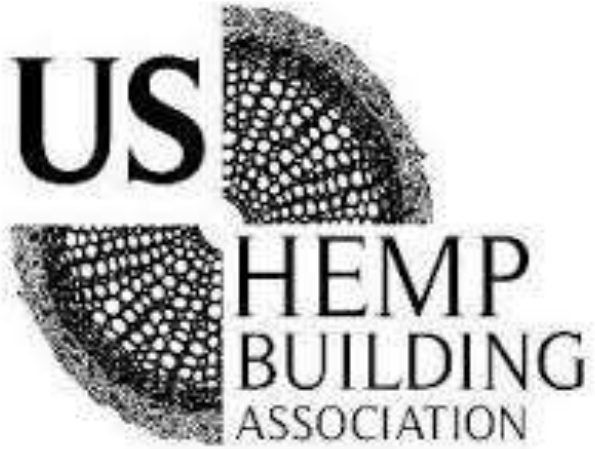




# Resources







## USHBA Established Regions

- 1 – WA, OR
- 2 – CA, NV
- 3 – ID, MT, WY
- 4 – UT, AZ, CO, NM, NE, KS
- 5 – ND, SD, MN
- 6 – OK, TX, AR, LA
- 7 – IA, MO, WI, IL, MI, IN, OH
- 8 – VT, MA, NH, CT, RI, ME, Upstate NY
- 9 – NY, PA, NJ, DE, MD, DC, VA
- 10 – KY, TN, MS, AL, GA, SC, NC
- 11 – FL





# HEMPCRETE II

*NESEA BuildingEnergy Boston  
Conference*

*AUGUST 12-14, 2020 (exact time TBD)*

**POLL: What more do you want to know?**

**Design and Construction Details**

**Sourcing and Supply**

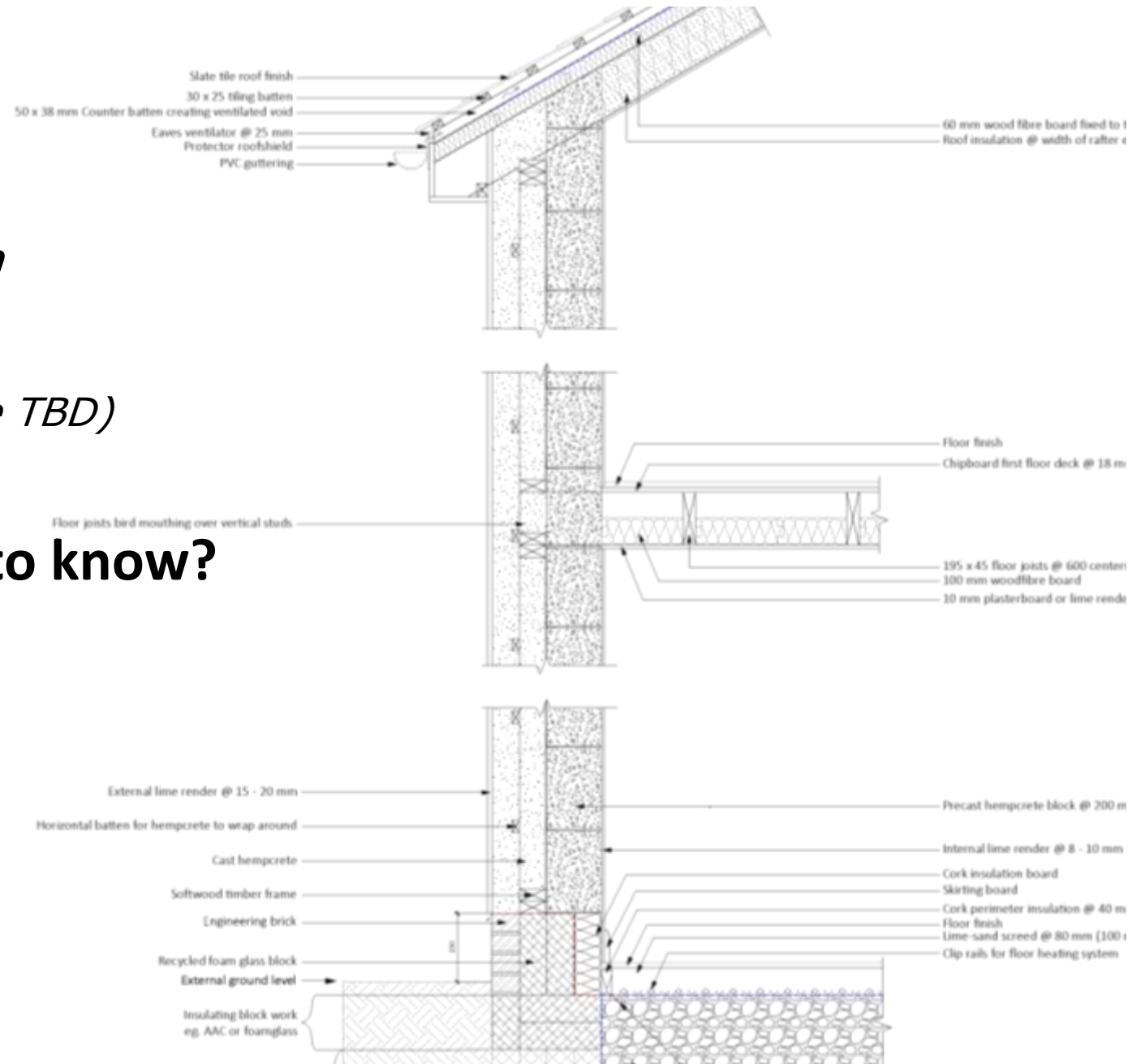
**Cost Comparison**

**Carbon Calculations**

**US Case Studies**

**Testing and Certification**

**Regulatory / Permitting**





# What are your burning questions?

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