



Santa Barbara

Committee On
The Environment

for



ESTABLISHED 1872

SANTA BARBARA
YACHT CLUB

The evolution
of sustainable
Design and
Construction



Santa Barbara

The evolution of sustainable Design and Construction



Presented by:

Ed deVicente, AIA



and

Ryan Cullinen



ALLEN
CONSTRUCTION

AIASB COTE Sponsored by:

The evolution of sustainable Design and Construction



Santa Barbara has
been a hub for
environmentalism
since the 1970's
energy crisis



California has
made a big push.

2006 AB32 Reduce
Greenhouse Gas
emissions to 1990
levels by 2020



Goal reached
in 2016!!

The Green
Building
Industry
began to
gather more
formally in the
1990's

- Focus was primarily:
- passive solar design
 - better insulation
 - heating/cooling
 - lighting technologies

This is where
the future is
headed

✓ All new homes in the City of Santa Barbara as of January 1, 2022 will be all-electric, alongside many other California cities.

✓ 1 in 4 homes in the U.S. are now all-electric.

References:

Federal Energy Information Administration. (2019). "One in four U.S. homes is all-electric."
<https://www.eia.gov/todayinenergy/detail.php?id=39293>

The “Allen Five” Pillars of Sustainability

- ✓ 1 Decarbonization
- ✓ 2 Electrification
- 3 Resiliency
- 4 Indoor Environmental Quality
- 5 Resource Efficiency & Conservation

How does Decarbonization In design and construction work?

1

Energy Systems:

Focused design and construction that moves away from energy systems that produce (CO₂) and other greenhouse emissions.

2

Material Selection:

Reducing the embodied carbon, or CO₂ emissions, associated with materials throughout the lifecycle of a building.

What Impact do building Energy Systems have on Climate Change?

1

User Impact:

Fossil fuels burned in our buildings are causing 28% of climate change*.

2

Delivery Impact:

Natural gas leaks upstream of our appliances are responsible for another 25%*

1. UN Environment Global Status Report 2017; EIA International Energy Outlook 2017
2. Environmental Defense Fund. (2020). Methane, The Other Important Greenhouse Gas. EDF calculation based on IPCC AR5 WGI Chapter 8." Note that other sources like livestock (e.g. cows) contribute to methane emissions also.

Electrification

1

All-Electric:

All systems in the house are run by electricity, and there is no natural gas or propane powering the home or equipment.

2

Net-Zero:

Your home produces as much energy as you are using.

Key Components of an **All Electric Net Zero Home**

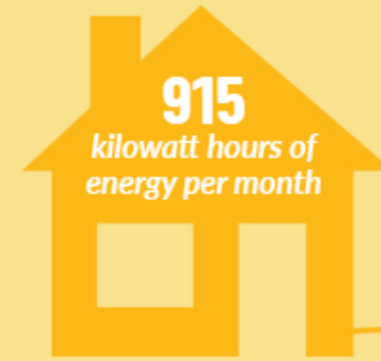
- ✓ Heat pump dryer
- ✓ Heat pump HVAC system
- ✓ Heat pump water heating
- ✓ Induction cooking
- ✓ Solar panels
- ✓ Home battery storage system
- ✓ Electric vehicle

Santa Barbara Clean Energy

sbcleanenergy.com



MAKE A DIFFERENCE



Average U.S. Household

There is a lot of room for improvement and **every person matters.**



2018 **= 33%**

CARBON-FREE ENERGY
ONLY MADE UP:

11% Energy
Consumption

of U.S. energy-related CO₂
emissions was released by
generating electrical power



EDISON

Edison chooses
mix

**GREEN
START**

At least 50%
carbon-free
energy



**100%
GREEN**

100%
carbon-free
energy



RESILIENT

Solar paired with
either 100%
Green or Green
Start

Retrofitting Existing Homes

redwoodenergy.net

A Pocket Guide to All-Electric *Retrofits* of Single-Family Homes



A Big Chill Retro Induction Range



A Water Vapor Fireplace by Nero Fire Design



A NeoCharge Smart Circuit Splitter

REDWOOD ENERGY

February 2021

Recommended Sequence

1

Identify your goals

2

Analyze your home to determine maximum efficiencies are made to the building shell

3

Select and install the most efficient electrical appliances and heating/cooling systems

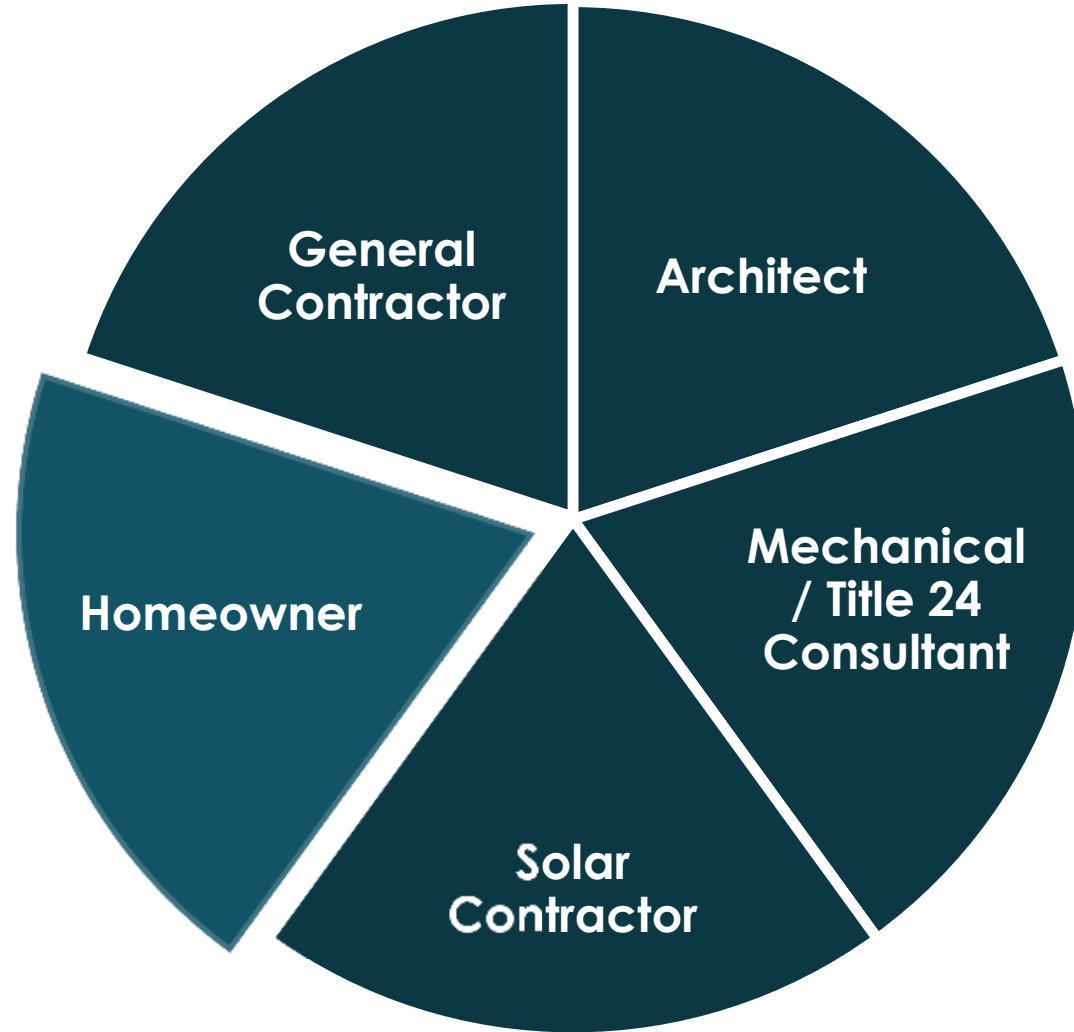
4

Forecast and analyze electrical usage

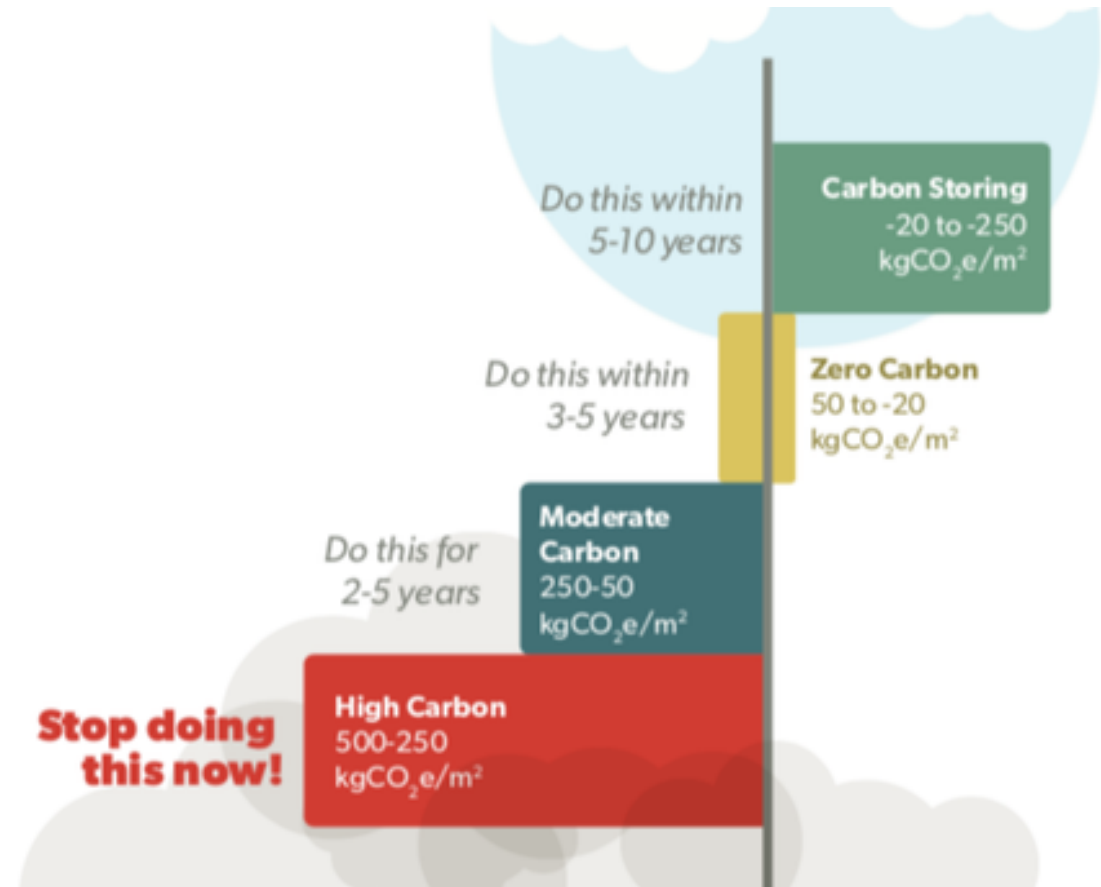
5

Design PV and/or battery backup system to meet or exceed system usage

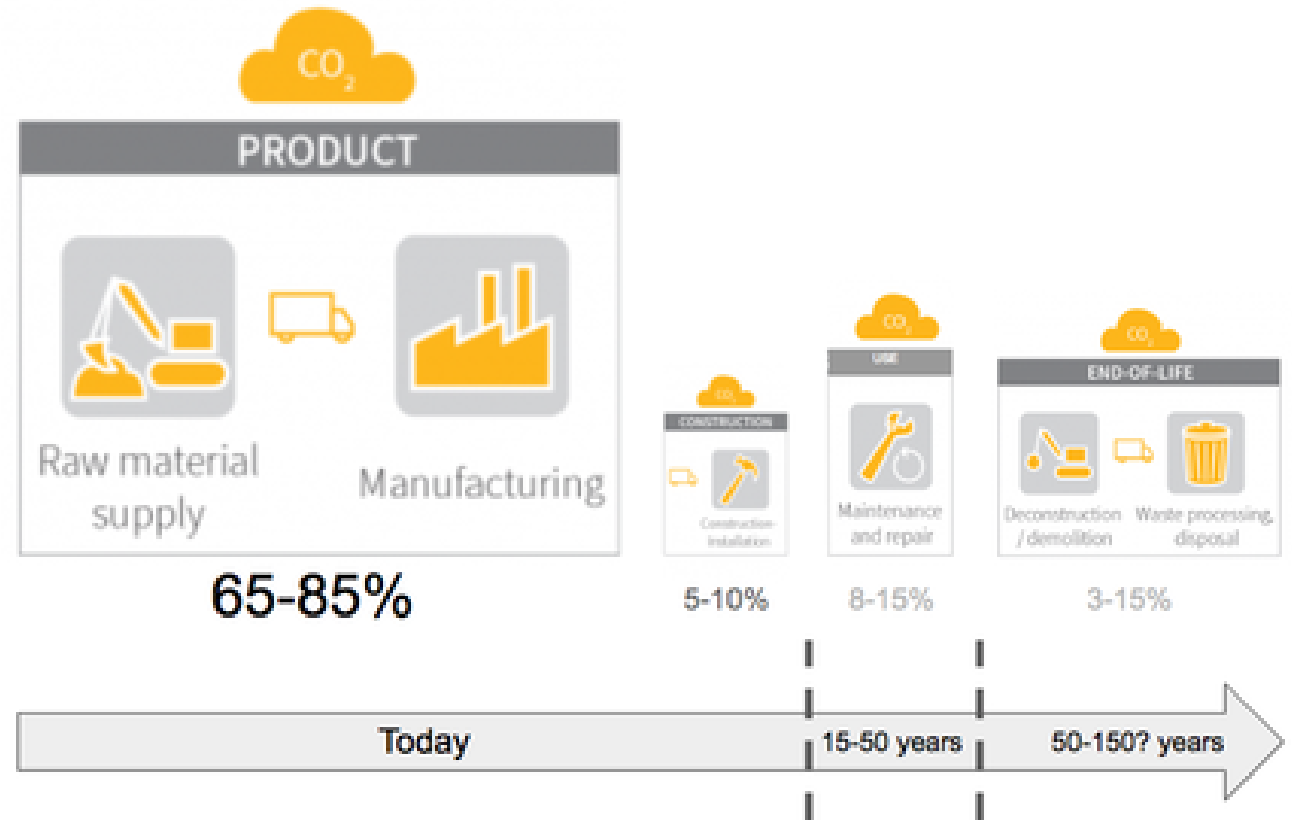
Your Team



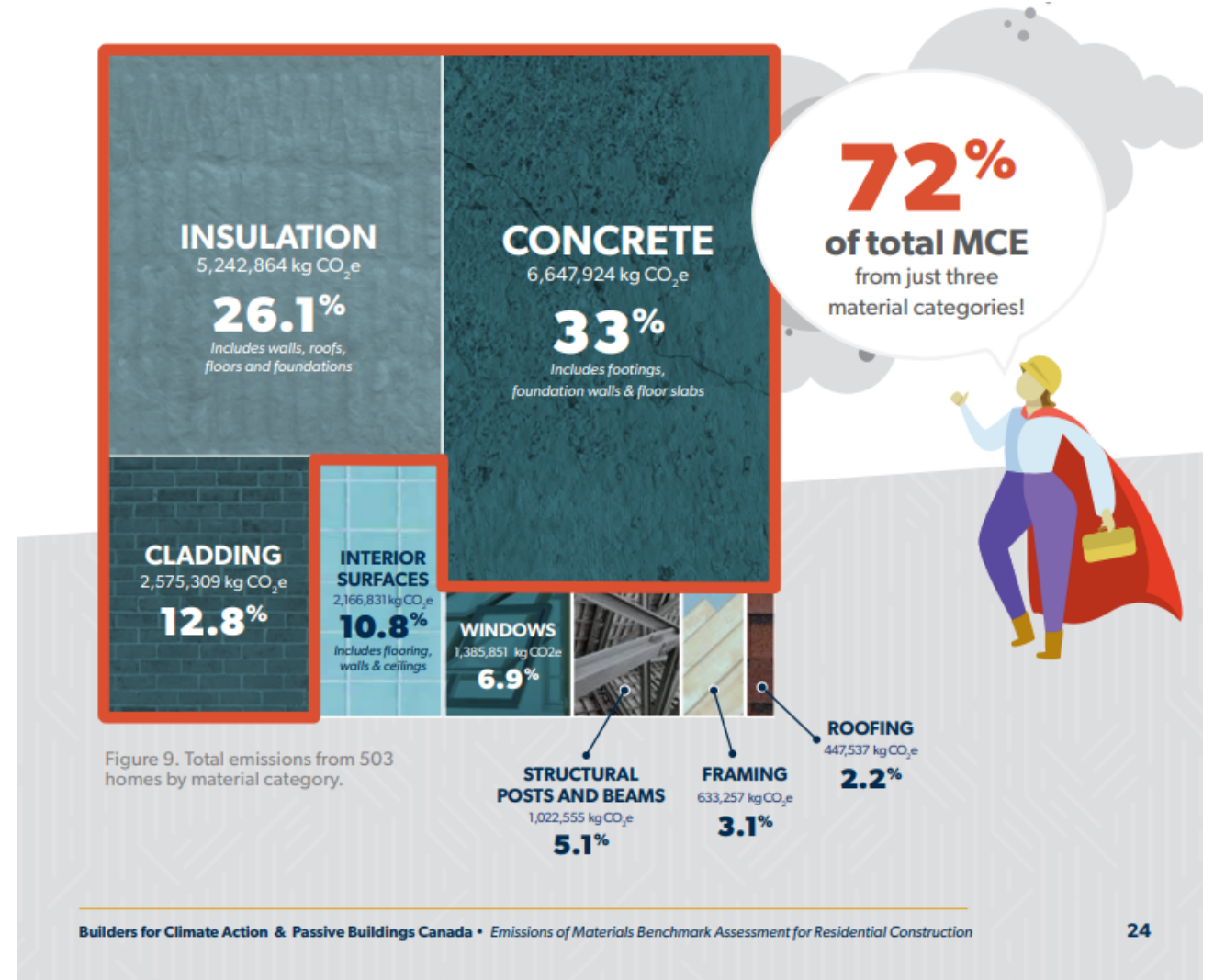
The construction of New Homes in North America are responsible for 50-60 tons of emissions per year.



Where do the majority of material carbon emissions come from?



Where can you focus to make the largest impact?



If cement production were a country, it would be the third largest greenhouse gas emissions producer behind China and the U.S.

 **BRIMSTONE**

—
Introducing the world's first carbon negative Portland cement

Carefully sourced insulation materials have the greatest opportunity for negative carbon, or carbon storing.

Insulation Emissions Comparison for 100 m² @ R5

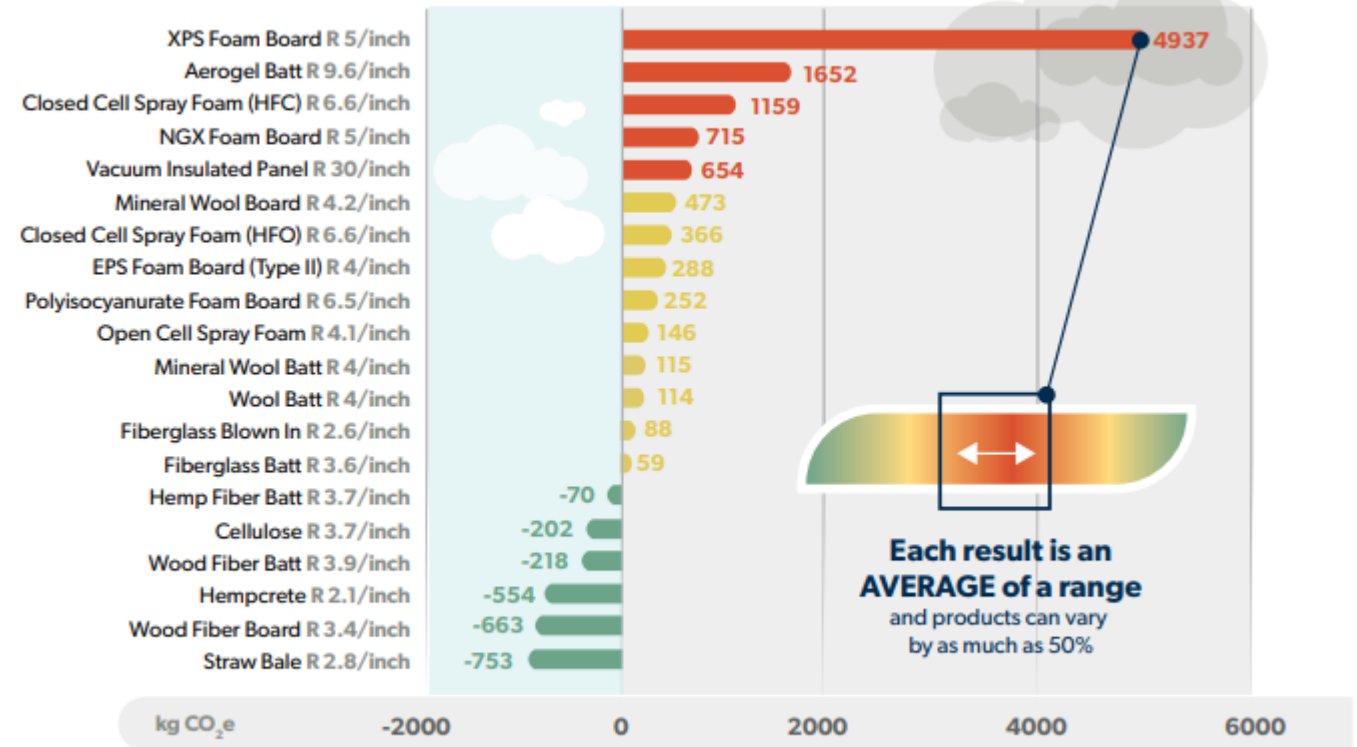


Figure 11. Range of net emissions for different insulation types from BEAM software.

Most cladding in Santa Barbara needs to be high fire rated limiting use of wood.

Cladding Emissions, kg CO₂e/100m²

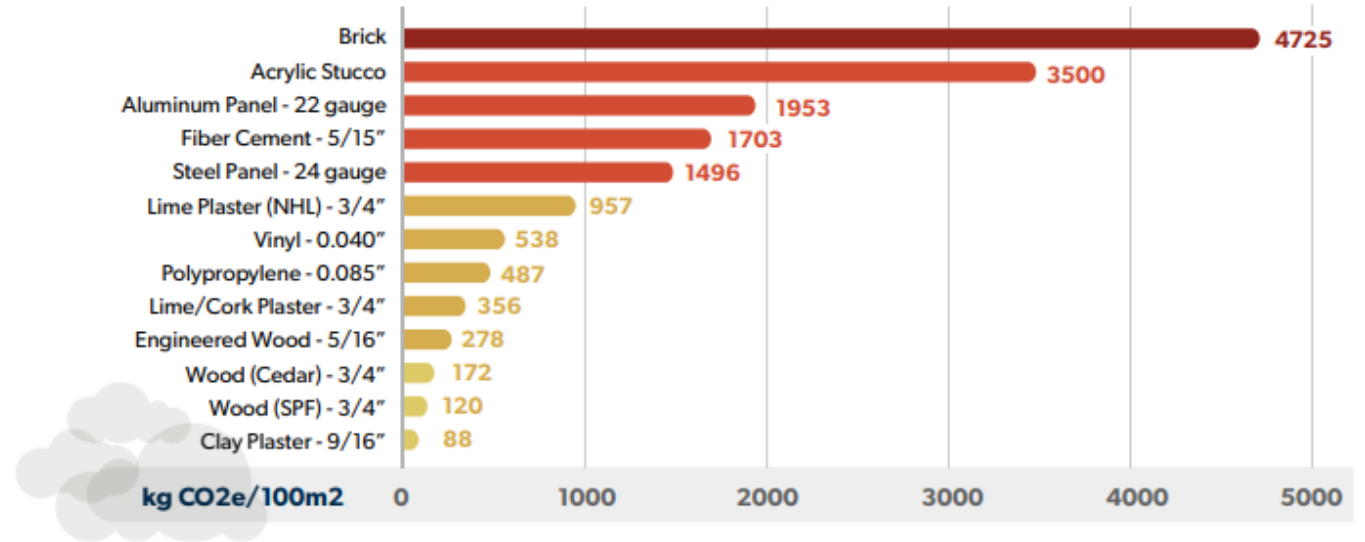


Figure 13. BEAM results for cladding

Thank you!

Questions?



Learn more with the following resources:

<http://aiasb.com/sustainability-resources/>

<https://www.sbcleanenergy.com/>

<https://redwoodenergy.net/wp-content/uploads/2021/11/SF-Retrofit-Guide-2021-09-08.pdf>

<https://www.buildersforclimateaction.org/>



Committee On
The Environment