Lifecycle Carbon for New Construction

Bruce King,
Ecological Building Network
buildings and greenhouse gases

40%
Build Positive

Or:

Do we want energy efficiency, or
climate effectiveness?
Build Positive

Or:
Do we want energy efficiency, or climate effectiveness?
Build Positive

Or:

Do we want energy efficiency, or

climate effectiveness?
Energy

1. Efficient **buildings**
   for whom?
   And, so what?
1. Efficient buildings for whom? And, so what?

2. Efficient Bay Area for everyone, except . . .
1. Efficient buildings for whom? And, so what?

2. Efficient Bay Area for everyone, except . . .

3. Effective Bay Area for everyone
Real Zero
reduce operational
and
embodied emissions
Real Zero
reduce operational and embodied emissions

Build Positive first,

Where are the emissions, and

How do you know?
How do you know? the state of LCA
Life Cycle Analysis
Where’s the carbon?  mostly in:

foundations
Life Cycle Analysis
Where’s the carbon?  mostly in:

superstructure
foundations

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Life Cycle Analysis

Where’s the carbon?  mostly in:

- skin
- superstructure
- foundations
Life Cycle Analysis
Where’s the carbon?

or, mostly in: concrete cement 8% of global
concrete

is artificial rock –
gravel, sand, and glue
concrete is artificial rock – gravel, sand, and glue

1. Use less/different glue
1. Use less/different glue
2. Give it time

concrete
is artificial rock – gravel, sand, and glue
concrete is artificial rock – gravel, sand, and glue

1. Use less/different glue
2. Give it time
3. Feed it carbon
Concrete is artificial rock – gravel, sand, and glue

1. Use less/different glue
2. Give it time
3. Feed it carbon
4. Squeeze it
the low-carbon concrete building code
Life Cycle Analysis

Where's the carbon?

or, mostly in:

concrete
cement 8% of global

metals
steel 7% of global
metals

Use FSC wood instead
Life Cycle Analysis

Where’s the carbon?

or, mostly in:

concrete
cement 8% of global

metals
steel 7% of global

refrigerants
the Drawdown surprise:
#1 climate target
Life Cycle Analysis

Where’s the carbon?

- insulate

refrigerants

the Drawdown surprise:

#1 climate target
but insulate with what?
Life Cycle Analysis

Where’s the carbon?

Hydrofluorocarbons – foam insulation

refrigerants

greenmyhomenow.com
replace plastic

![Carbon Impacts of Insulation Chart]

CO₂ per 4'x8' wall panel at R-28:
- 1040.60 lb CO₂ emitted
- HIGH DENSITY SPRAY FOAM
- MED. DENSITY SPRAY FOAM
- EXTRUDED POLYSTYRENE (XPS)
- EXPANDED POLYSTYRENE (EPS)
- MINERAL WOOL BATT
- FIBERGLASS BATT
- DENIM BATT
- WOOL
- DENSE PACK CELLULOSE
- CORK
- HEMPRETE
- STRAW BALE

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Chris Magwood / Architecture 2030
materialspalette.org/insulation/
replace plastic

Carbon emitting

Carbon *absorbing*
Whole Building Life Cycle Analysis
the larger picture

Median
230 kg/M²
47 lb/ft²
Life Cycle Analysis

What should I spec?
Life Cycle Analysis
What should I spec?

SEE ALSO

WOOD
STRAW-BALE
STEEL
SHEEP’S WOOL
INSULATION
HEMPCRETE
CONCRETE

Architecture 2030
Carbon Smart Materials Palette

materialspalette.org
Takeaways

What can you do?
Takeaways
What can you do?
concrete

1. Use less/different cement
2. Give it time
3. Feed it carbon
4. Squeeze it
Takeaways

What can you do?

1. Use FSC wood instead
Takeaways
What can you do?
refrigerants

1. Insulate!
2. with carbon!
another New York City every 35 days
another New York City every 35 days
urbanity
urbanity
urbanity
in the city  What can you do?
Pros and Cons

FSC wood superstructure
in the city  What can you do?  
Pros and Cons

FSC wood superstructure

carbon insulation
in the city  What can you do?  
Pros and Cons

FSC wood superstructure

carbon insulation

low-carbon concrete

and much more
a price on carbon

the carbon payback
Build with carbon!

THE NEW CARBON ARCHITECTURE

BUILDING TO COOL THE CLIMATE

BRUCE KING

“TRULY, WHAT A FANTASTIC, TIMELY, IMPORTANT BOOK!”

— PAUL HAWKEN, author of Drawdown and Blessed Unrest

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