

Passive to **POSITIVE**
PASSIVE HOUSE AND LOW IMPACT DESIGN

MICHAEL HINDLE CPHC – Owner, Principal
michael@passivetopositive.com
240-431-1281

CHRISTINA ASSMANN NCARB, LEED AP BD+C, WELL AP, CPHC
christina@passivetopositive.com



LOW CARBON DESIGN PROJECT COMPARISON





Image credit: Oregon Public Broadcasting

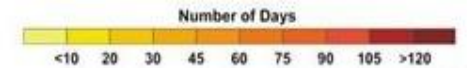
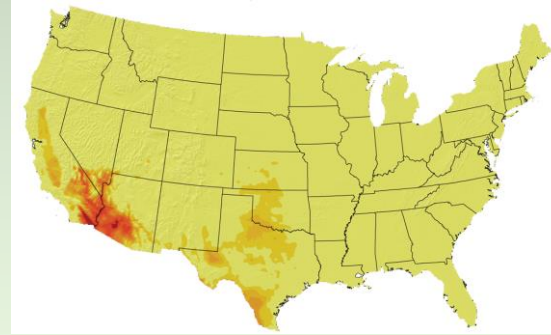


Image credit: Oregon Public Broadcasting

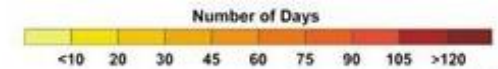
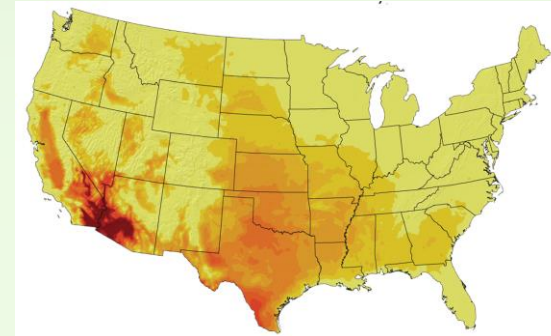
OUR CLIMATE IS CHANGING FASTER THAN ANTICIPATED

1 DEGREE TEMPERATURE RISE RESULTS IN 10% LOWER AGRICULTURAL YIELDS

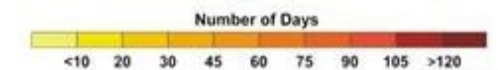
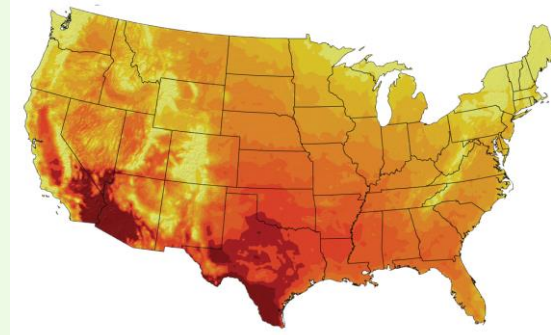
Recent Past, 1961 - 1979



Lower Emissions Scenario, 2080-2099



Higher Emissions Scenario, 2080-2099



temperature map images: U.S. Global Change Research Program



PROFLIGATE CONSUMPTION

FOSSIL FUELS AND INTERNAL
COMBUSTION SUPERCHARGED
EVERYTHING

...and made our culture **TOTALLY** unsustainable

WE NEED THREE PLANETS

A photograph of Earth from space, showing the curvature of the planet and a bright light source on the horizon. The image is a composite of two photos, with the top half showing a clear view of the Earth's surface and the bottom half showing a darker, more obscured view of the same area. The text "WE NEED THREE PLANETS" is overlaid at the top in a bold, sans-serif font. The text "WE HAVE ALREADY OVER-SHOT CARRYING CAPACITY BY 20% FOR EVERYONE TO LIVE AS WE DO WOULD REQUIRE 3 PLANETS TO MEET PROJECTED POPULATION AND MATERIAL GROWTH OF THE NEXT 40 YEARS WOULD REQUIRE 6-12 PLANETS" is overlaid at the bottom in a smaller, bold, sans-serif font.

WE HAVE ALREADY OVER-SHOT CARRYING CAPACITY BY 20%
FOR EVERYONE TO LIVE AS WE DO WOULD REQUIRE 3 PLANETS
TO MEET PROJECTED POPULATION AND MATERIAL GROWTH OF THE NEXT 40
YEARS WOULD REQUIRE **6-12 PLANETS**

EXTRACTIVE, LINEAR ECONOMICS



A ONE-WAY TRIP

UNSPEAKABLE LEVELS OF **DIS-INVESTMENT**



Industry chases poverty for low-cost labor and then abandons communities once a cheaper source is found

SINKING IN WASTE



Child Waste picker in Malaysia:JP Getty Images

The west and rich populations export all negative externalities



THE ULTIMATE CLOSED-LOOP SYSTEM

WE ONLY GET ONE

ONE ATMOSPHERE

ONE BIOSPHERE

ONE LIFE

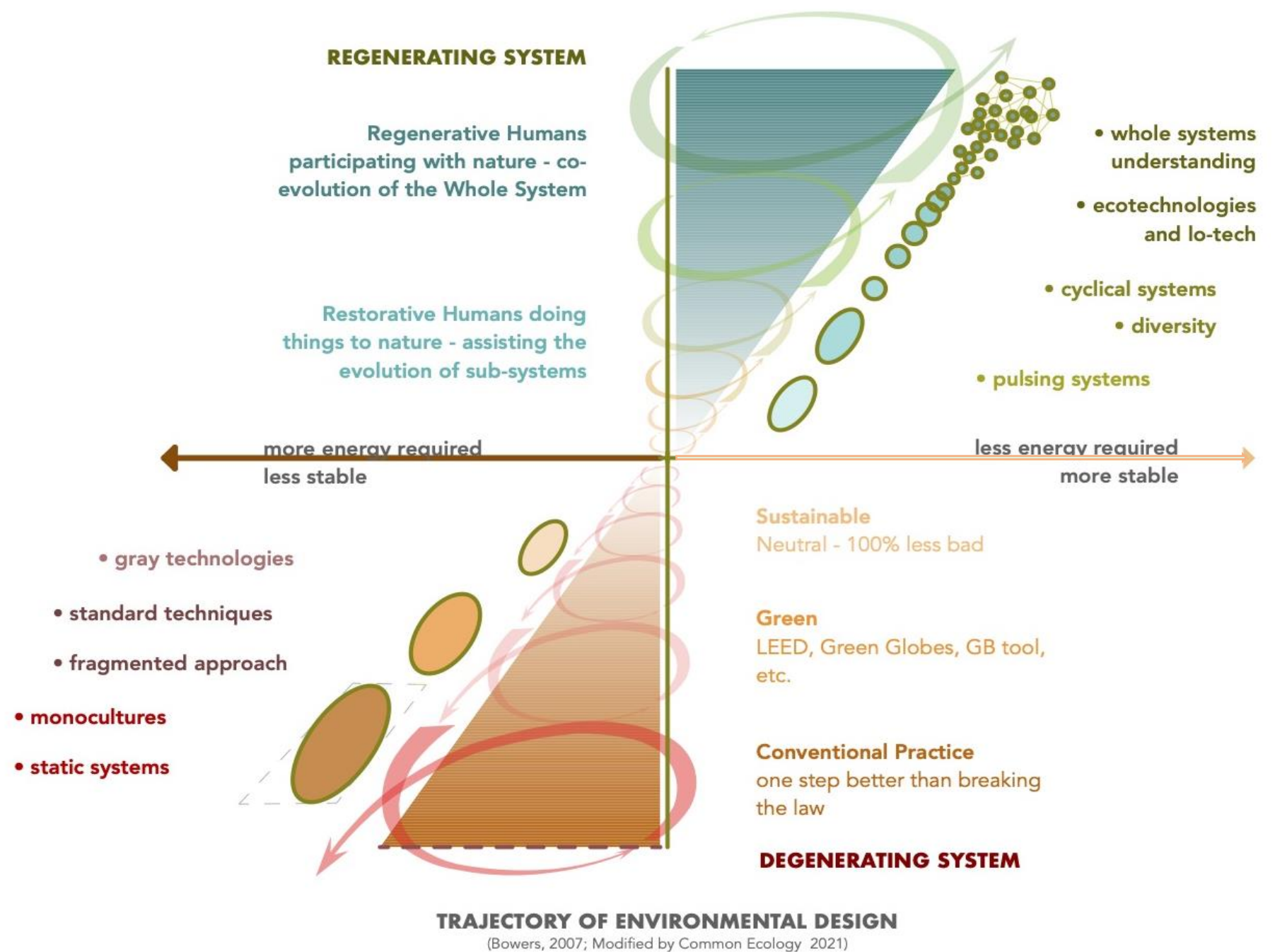


Sustainable = meeting present needs without
impairing future generations' ability to thrive.

(sorry, not good enough, it's too late – we have already done too much damage)

Regenerative = Repair and regenerate the
damaged systems.

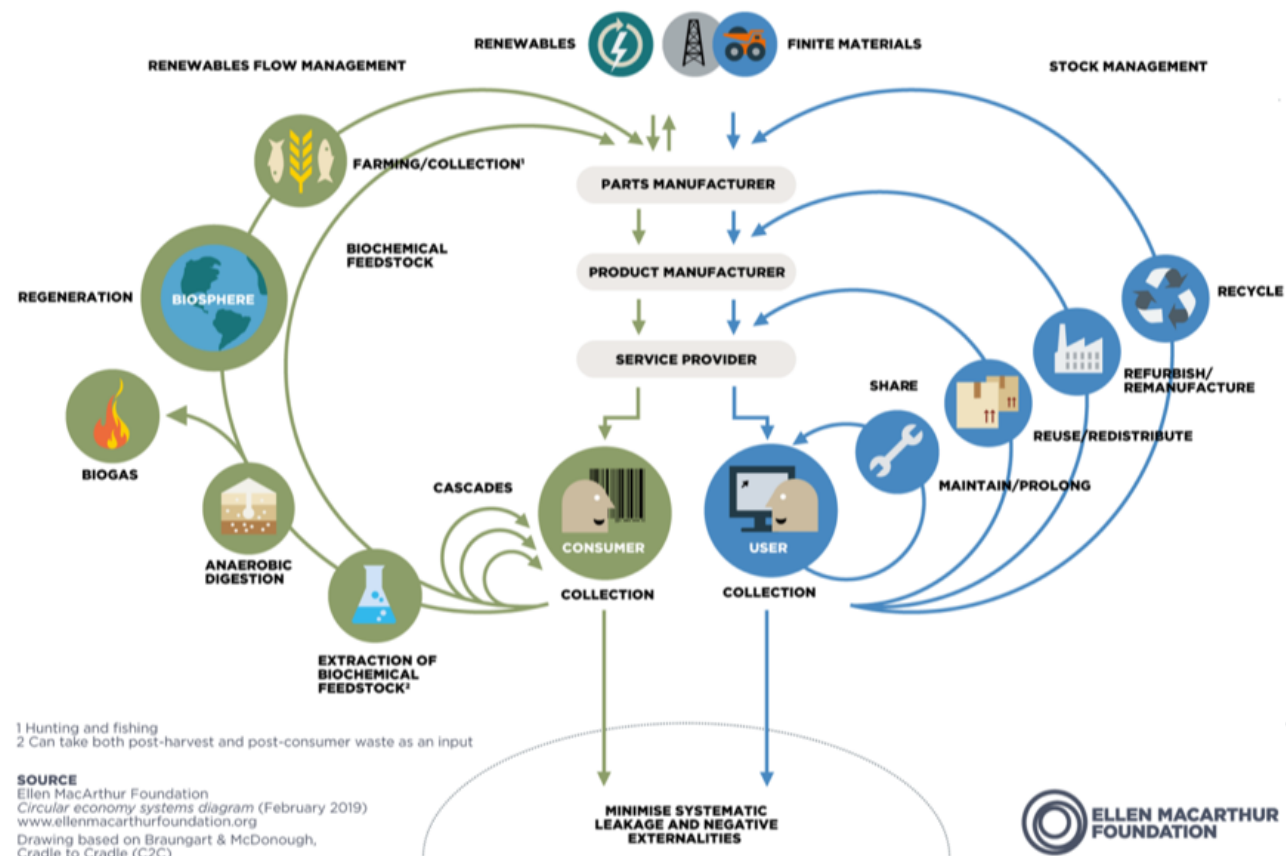
THE NECESSARY PARADIGM SHIFT



THE NECESSARY PARADIGM SHIFT

6

THE CIRCULAR ECONOMY SYSTEM DIAGRAM



At the Ellen MacArthur Foundation we have tried to capture the essence of the circular economy in the diagram above, which is somewhat understandably nicknamed the 'butterfly diagram'.

The diagram tries to capture the flow of materials, nutrients, components, and products, whilst adding an element of financial value. It builds on several schools of thought, but is perhaps most recognisably influenced by Cradle to Cradle's two material cycles.

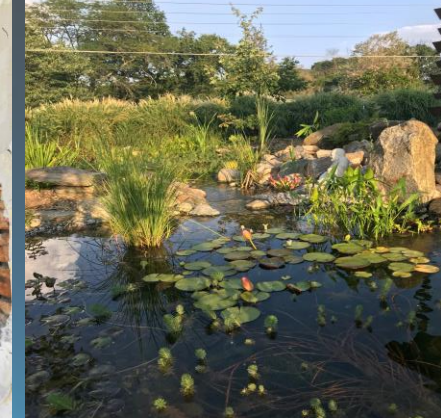
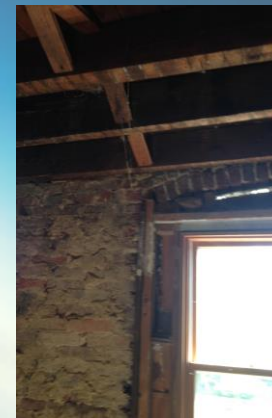
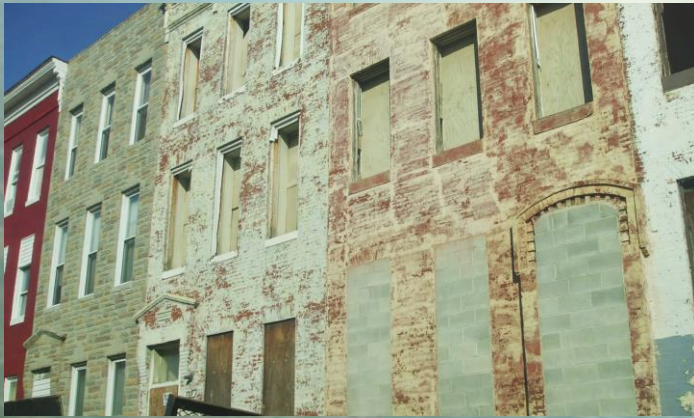
CONSERVATION FIRST - DO NO HARM

RE-USE + RESTORE EXISTING FABRIC

REPAIR THE COMMONS

PEOPLE + CULTURE

A HEALING SYSTEM



APPROPRIATE SCALE,
APPROPRIATE TECH,
REGENERATIVE MATERIALS
SUPPORTING SYSTEMS

CARBON



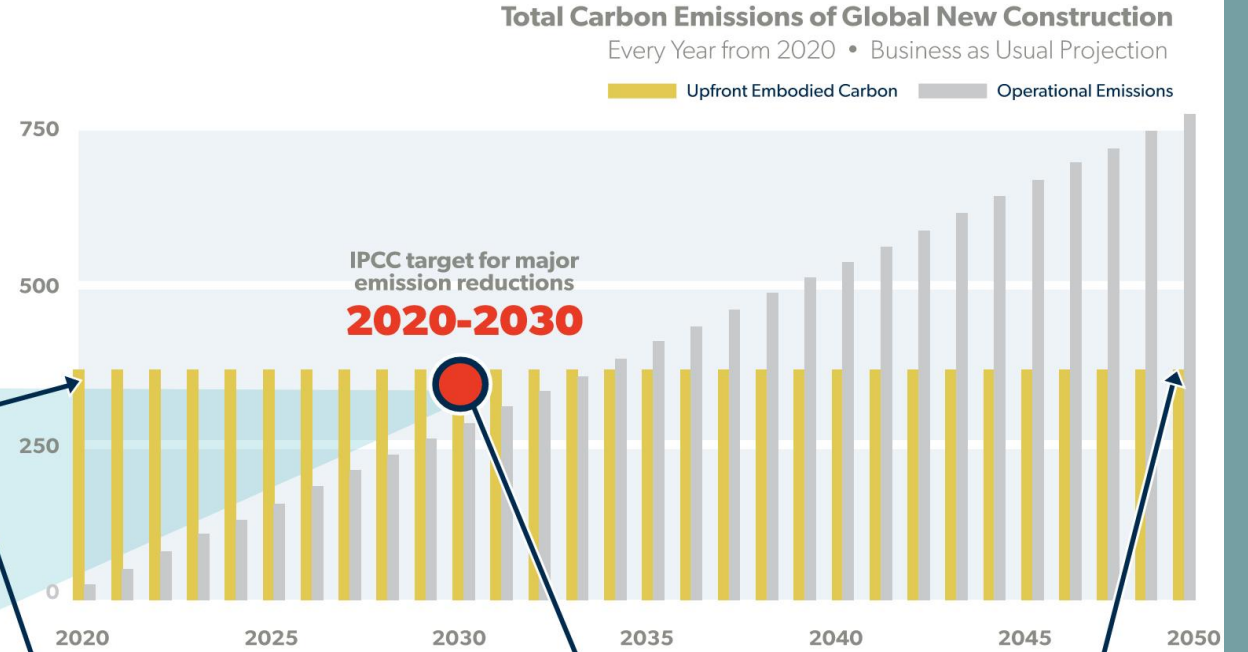
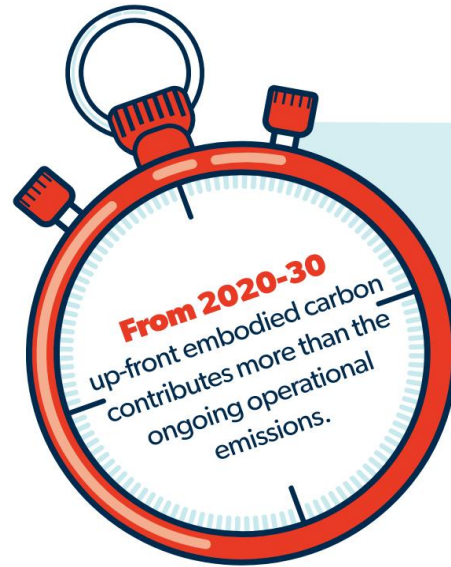
REDUCING
OPERATIONAL ENERGY
DEMAND IS NOT
ENOUGH

THE TIME VALUE OF CARBON

Time is a Critical Factor

TIME is a critical factor

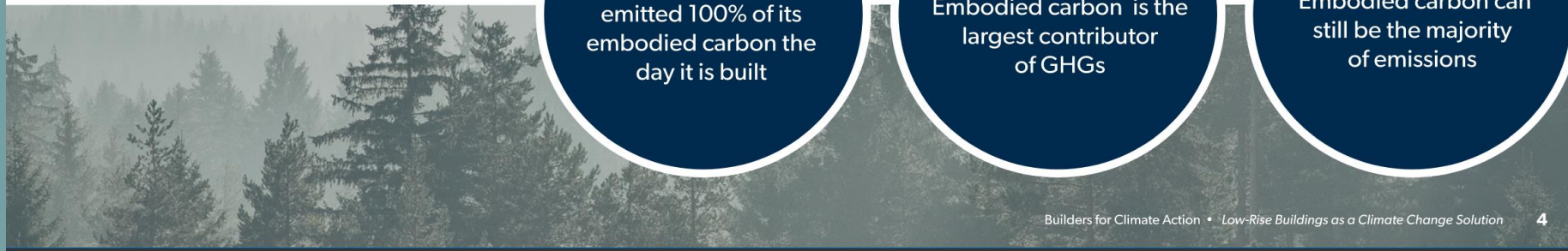
Emissions averted today contribute more to slowing climate change than emissions averted in the future



DAY 1
A building will have emitted 100% of its embodied carbon the day it is built

TODAY to 2030
Embodied carbon is the largest contributor of GHGs

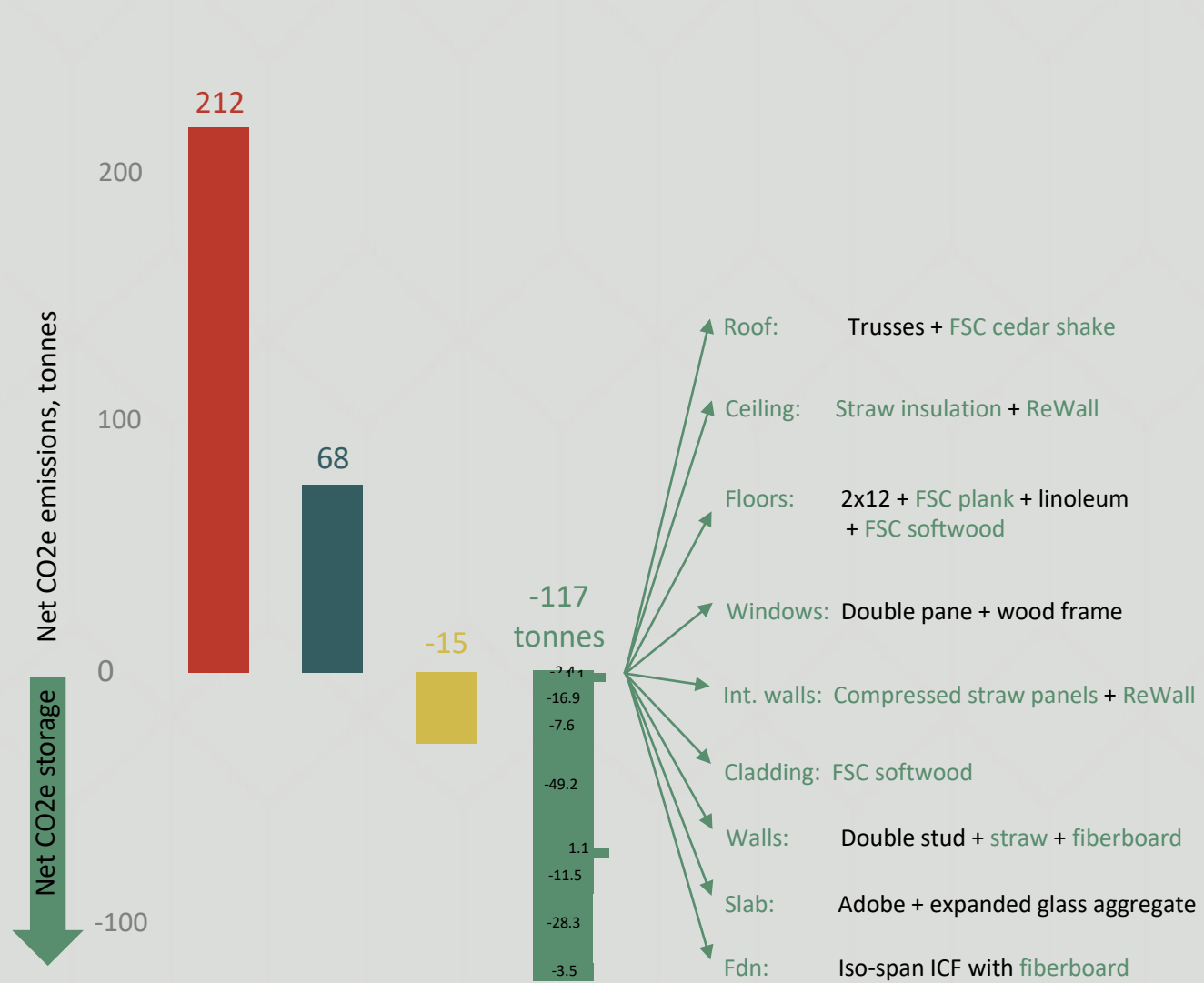
BY 2050
Embodied carbon can still be the majority of emissions



Materials Matter

SOURCE: Builders for Climate Action

Upfront embodied carbon comparison



Materials Matter

The same building can have very different up-front embodied carbon emissions (UEC)





school using Modcell Anglesey, Wales

CARBON ARCHITECTURE

CAPTURE AND STORE CARBON



CARBON ARCHITECTURE

CAPTURE AND STORE CARBON

MATERIAL SELECTION FOR REGENERATIVE IMPACT



Project Case Studies



- DEEP ENERGY RETROFIT WITH SOME REBUILD
- PASSIVE HOUSE
- ZERO ENERGY (RESIDENTIAL)
- 7 ROW HOME RETROFIT
- 18 UNITS
- AFFORDABLE HOUSING
- FIRST FLOOR RETAIL

- FIRST PHASE – RETROFIT OF MID CENTURY HEBREW SCHOOL + TWO STORIES NEW CONSTRUCTION
- PASSIVE HOUSE
- ROW HOME RETROFIT
- 45 UNITS AFFORDABLE HOUSING
- PHASE 2 REGEN RETROFIT OF 1923 SYNAGOGUE ROTUNDA – 10,000SF
- COMMUNITY WORSHIP SPACE, PERFORMANCE SPACE, FINE ARTS AND REGENERATIVE FARM HEADQUARTERS/EDUCATION SPACE

WORKFORCE HOUSING – W. NORTH AVE BALTIMORE

- DEVELOPER: **SCHREIBER BROTHERS DEVELOPMENT**
- ARCHITECT: **ONION FLATS ARCHITECTS**
- MEP: **STAENGL ENGINEERING**
- PASSIVE HOUSE: **PASSIVE TO POSITIVE**
- OWNERS REP: **COMMON ECOLOGY**
- RATER: **NEW ECOLOGY**



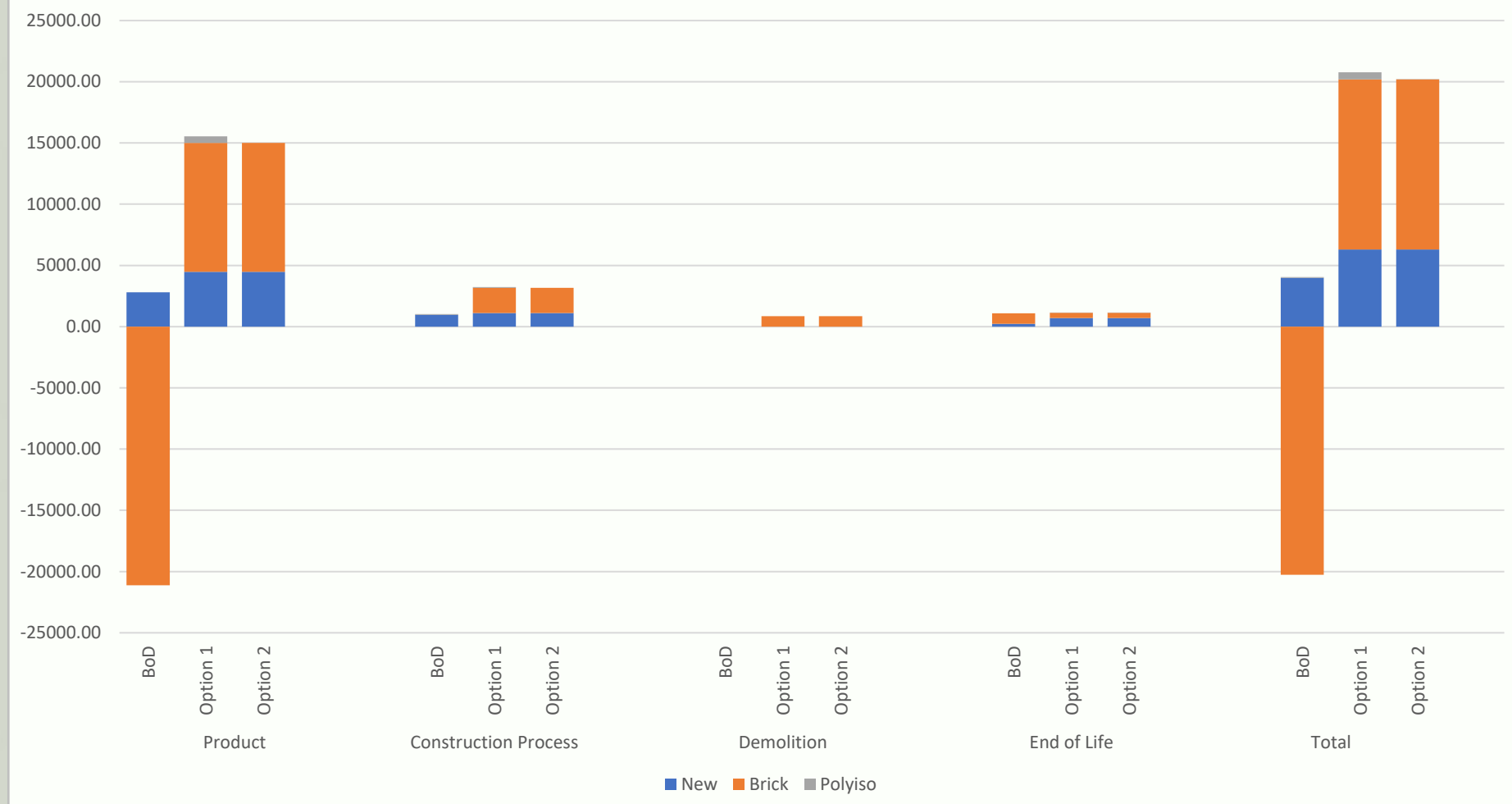
WE NEED THREE PLANETS

NORTH AVE WORKFORCE HOUSING

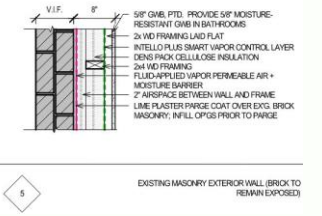
CIRCULAR ECONOMY
 SAVE OLD BRICK + SALVAGED POLYISO

HALOGEN FREE
 RECLAIMED
 NONE?

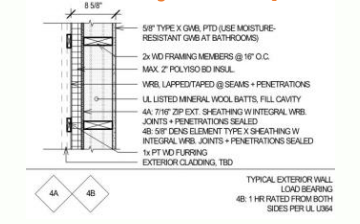
Front Façade Embodied Carbon Study



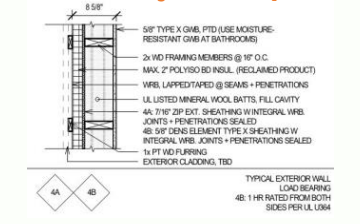
Front Façade BoD



Front Façade Option 1



Front Façade Option 2



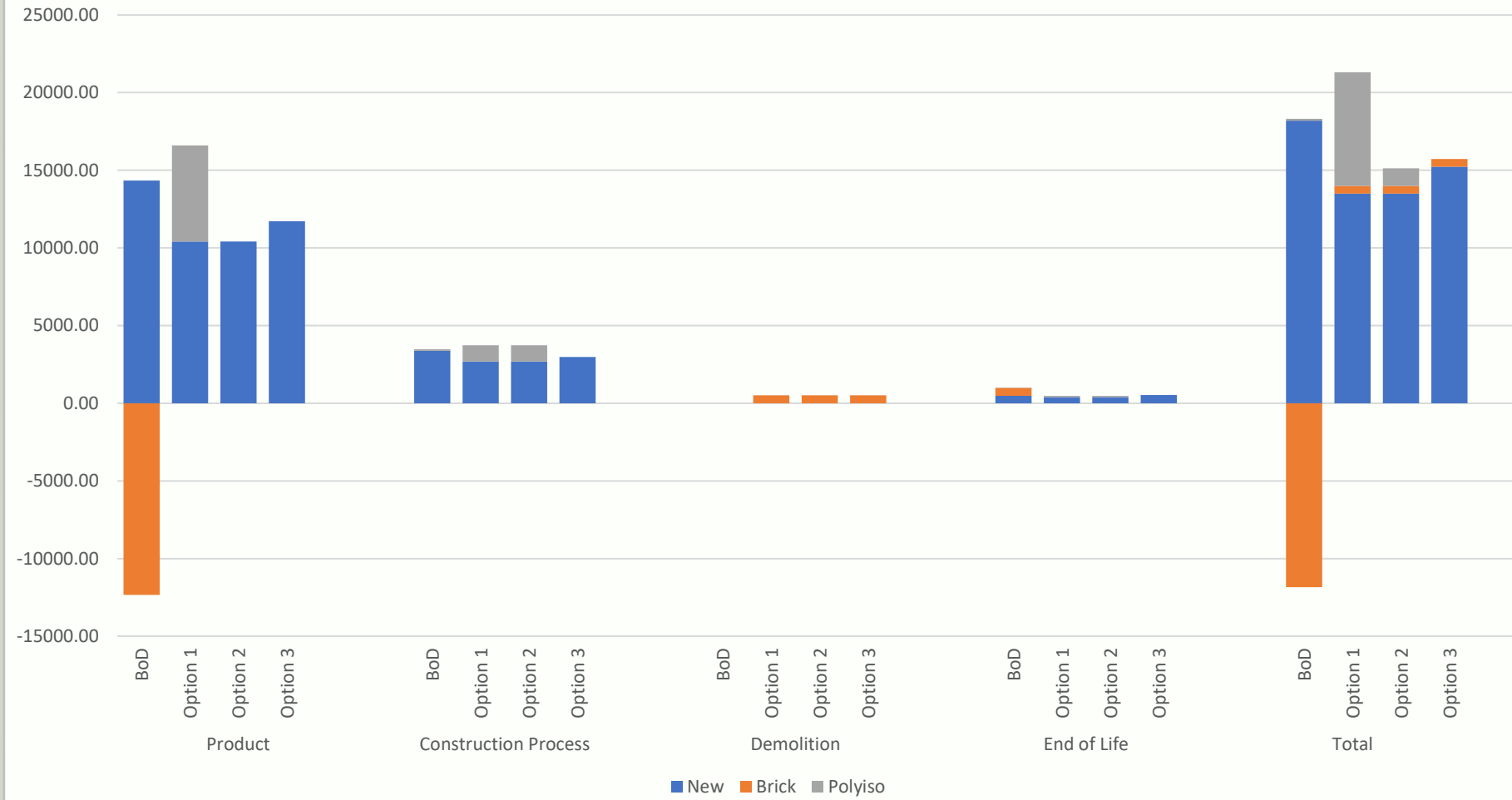
WE NEED THREE PLANETS

NORTH AVE WORKFORCE HOUSING

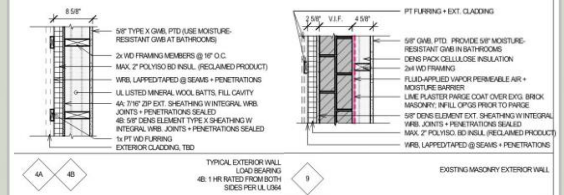
CIRCULAR ECONOMY

SAVE REAR WALLS WHERE POSSIBLE VS ALL NEW BUILD

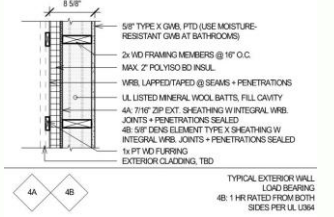
Rear Wall Embodied Carbon Study



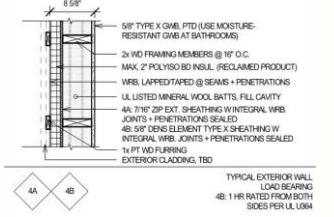
Rear Wall BoD



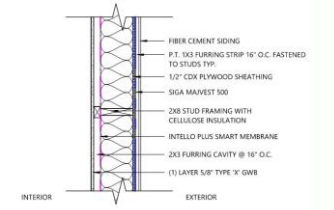
Rear Wall Option 1



Rear Wall Option 2

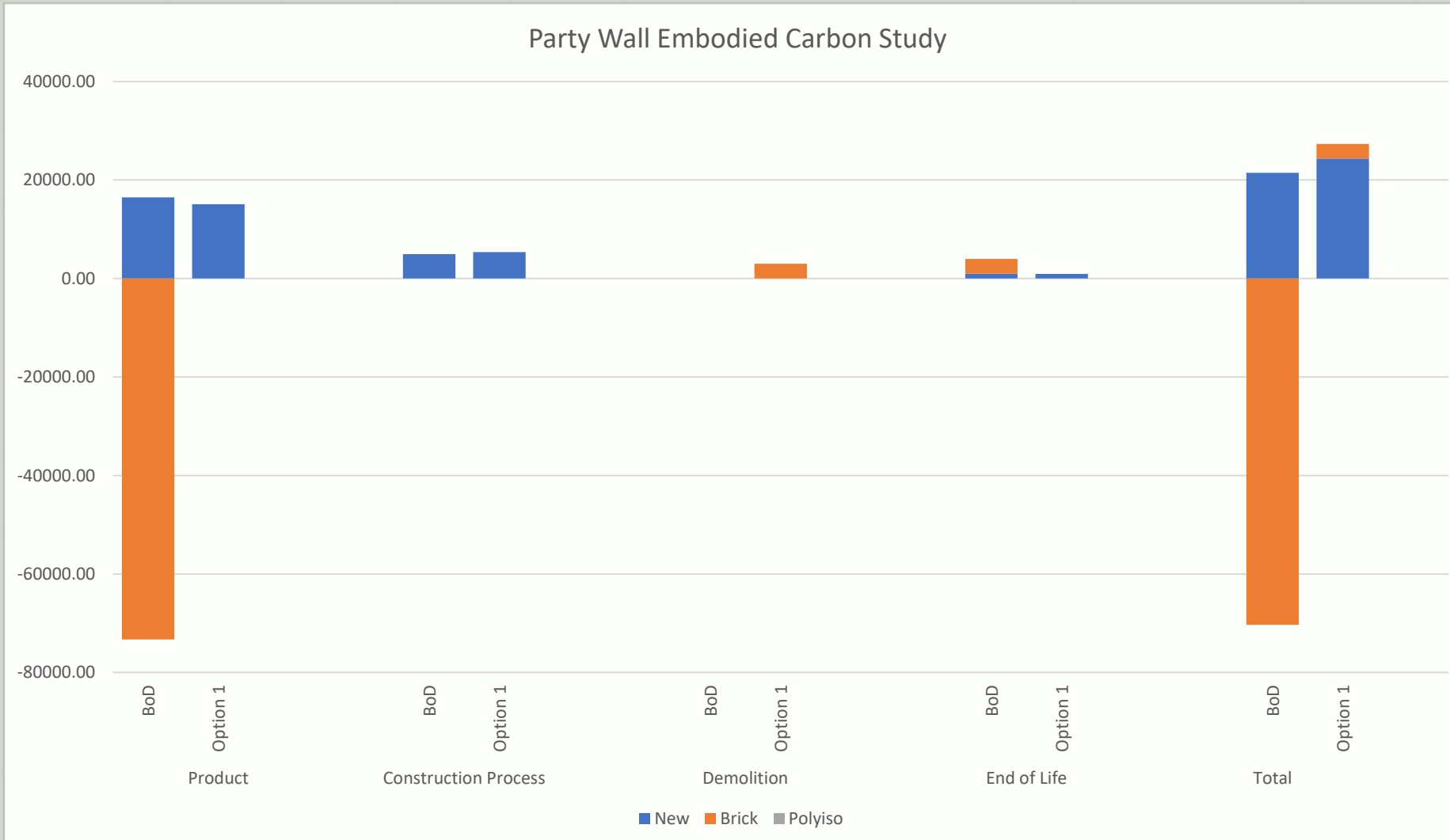


Rear Wall Option 3

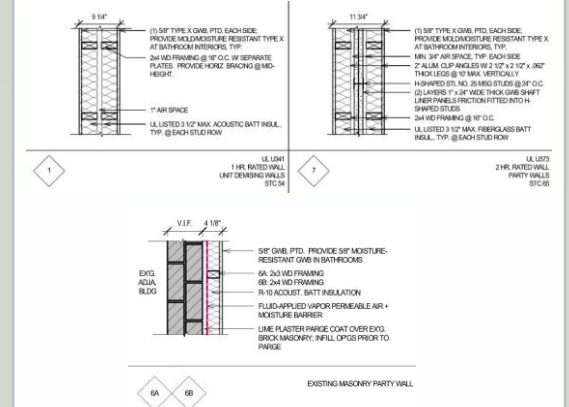


CIRCULAR ECONOMY SAVE PARTY WALLS

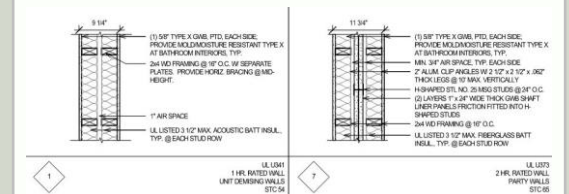
Party Wall Embodied Carbon Study



Party Wall BoD



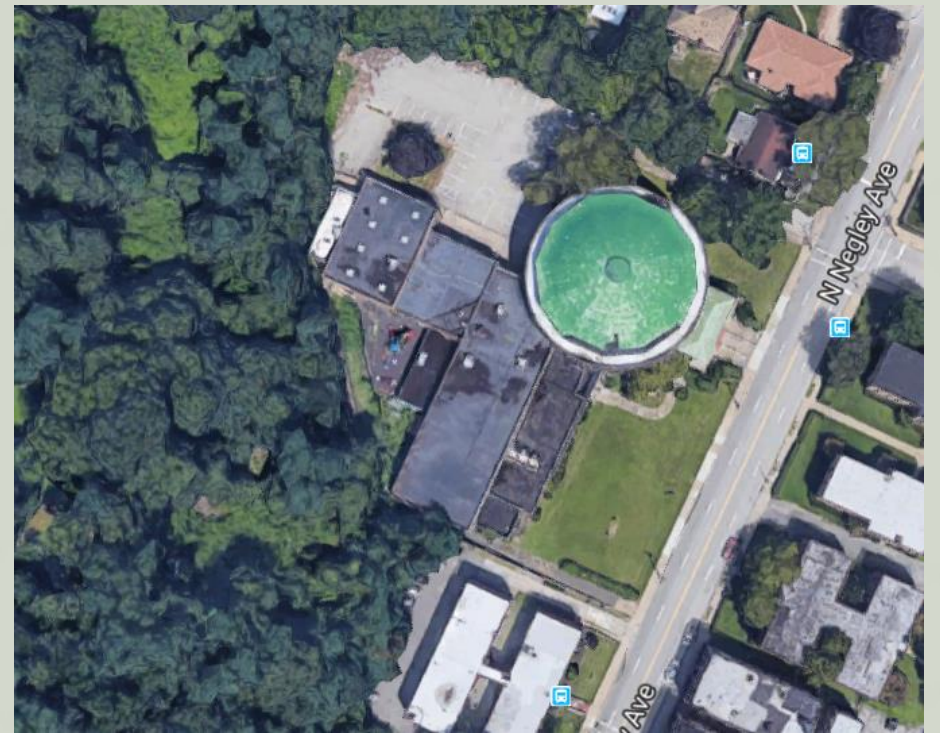
Party Wall Option 1





North Negley Ave. Pittsburgh, PA

- DEEP ENERGY RETROFIT
- ADAPTIVE RE-USE
- AFFORDABLE HOUSING
- PERFORMACNCE VENUE
- COMMUNITY WORKSPACE
- PASSIVE HOUSE PRE-CERTIFIED
- RESILIENCY HUB MICROGRID
- URBAN REGENERATIVE AGRICULTURE



DEEP ENERGY RETROFIT AND NEW CONSTRUCTION

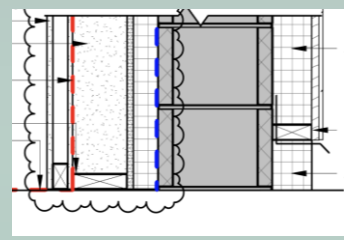


PRESERVE FORESTS - THEY KEEP US COOL, SEQUESTER CARBON
+ PROVIDE RENEWABLE MATERIALS

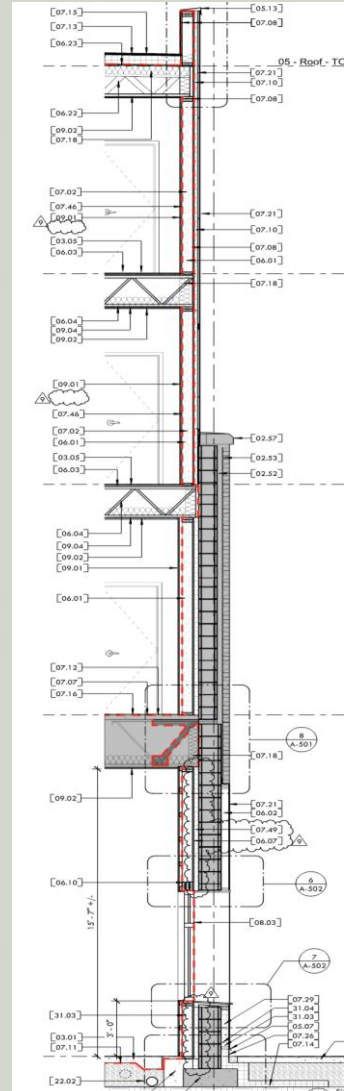
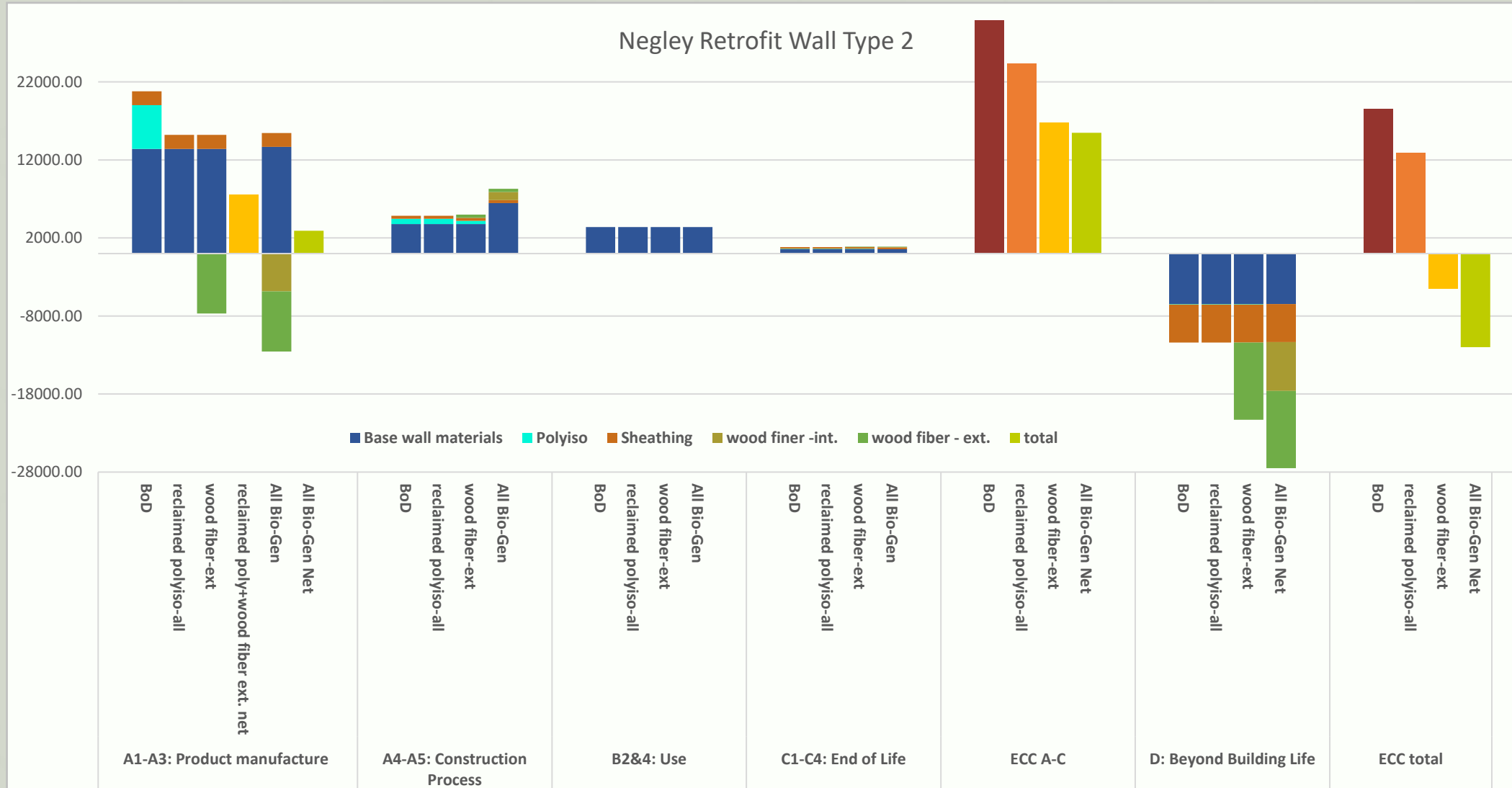


WE NEED THREE PLANETS

NEGLEY RETROFIT WALL COMPARISON

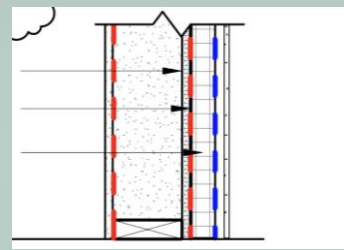


RETROFIT WITH POLYISO vs. BIOGENIC INSULATION

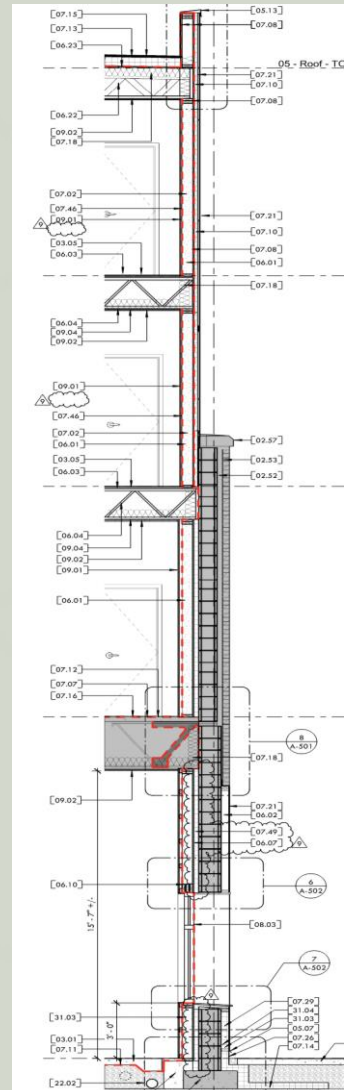


WE NEED THREE PLANETS

NEGLEY RETROFIT WALL COMPARISON



NEW CONSTRUCTION WITH POLYISO OR BIOGENIC INSULATION



An aerial photograph of a coastline, likely in the Pacific Northwest, showing a mix of green forested land and blue water. The sun is low on the horizon, creating a bright orange and yellow glow that transitions into a deep blue sky. The clouds are scattered and catch the light of the sun.

ASKING POLITELY IS NOT ENOUGH DESIGN PRACTICE AS ADVOCACY! DESIGN PRACTICE AS ACTIVISM!

THERE WILL BE RESISTANCE AT EVERY PHASE
MAKE ALLIES WITH DESIGN + CONSTRUCTION TEAM MEMBERS
PROVIDE DETAILS/ASSEMBLIES
PROVIDE MATERIAL VENDOR CONTACTS AND FOLLOW UP
PURSUE COST SAVINGS PROACTIVELY
YOU WILL LOSE MANY BATTLES TO TIME AND CONVENIENCE LET ALONE OUTRIGHT RESISTANCE

BUILD WITH REGENERATIVE MATERIALS



FABRICATION: BLUEPRINT ROBTICS

NEW FRAMEWORKS

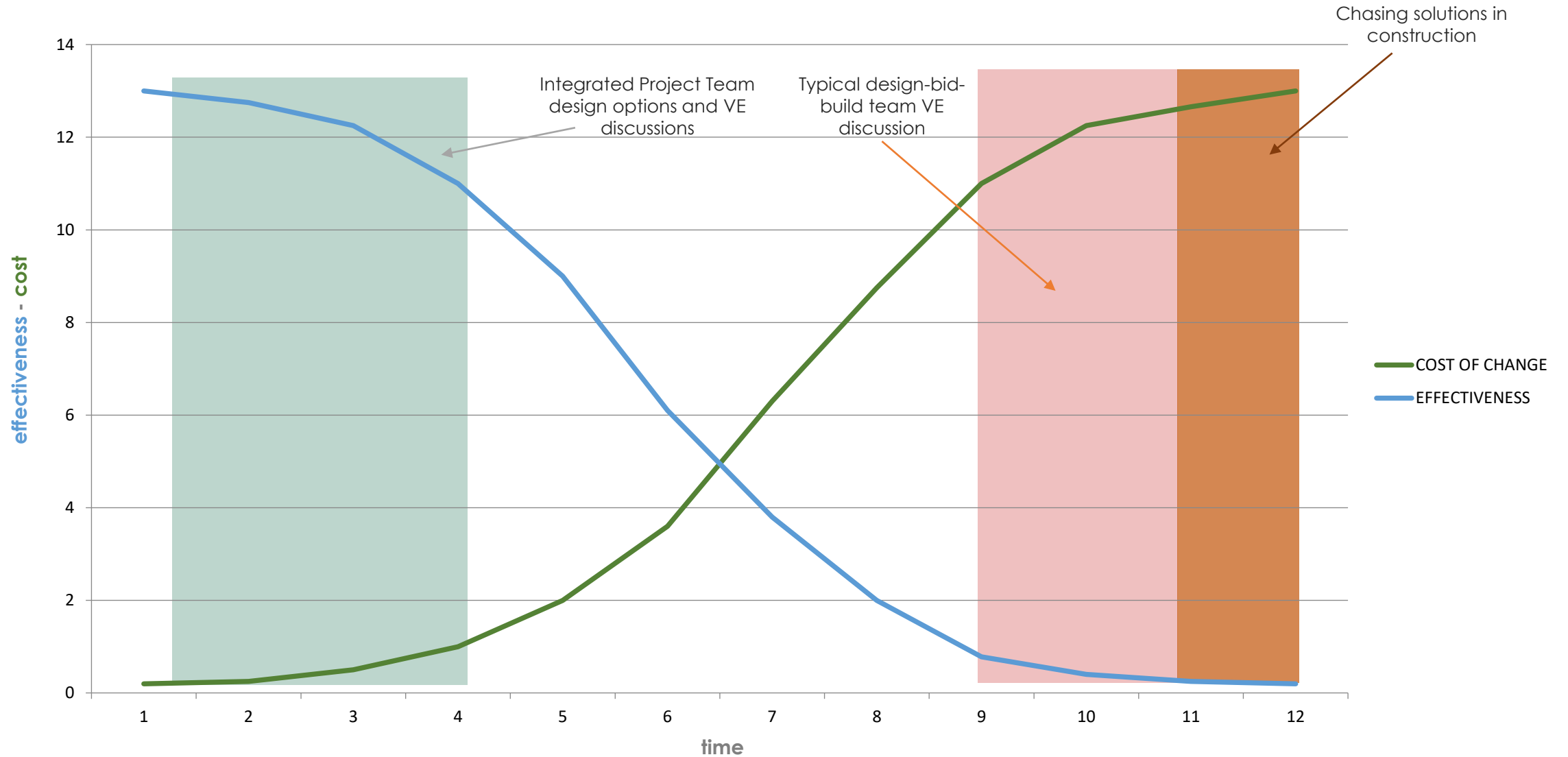
NATUREBUILT

BUILD WITH REGENERATIVE MATERIALS



THE PROCESS: The Path to Regenerative Design

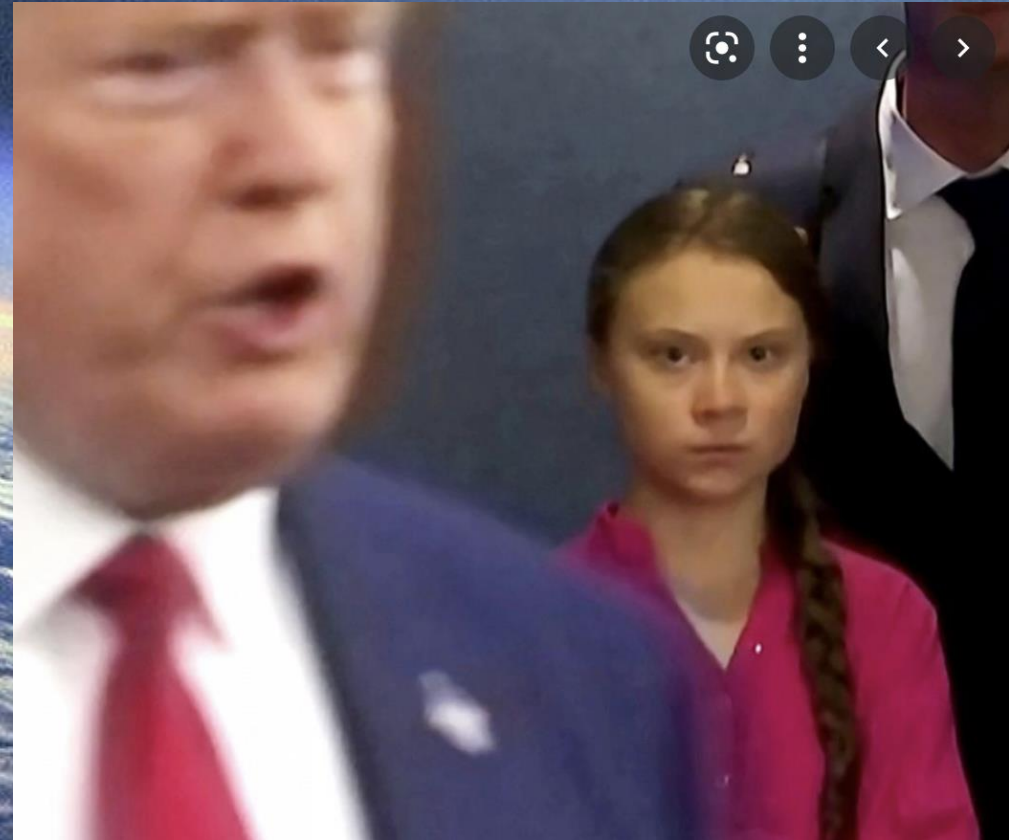
Front-loaded, collaborative design, materials research, and estimating



WHO HAS MORE COURAGE?



TYPICAL WHITE MALE ARCHITECT



GRETA

You don't understand, if my clients are not asking for it I am powerless.

WHO HAS MORE COURAGE?



TYPICAL WHITE MALE DEVELOPER

"Oh yeah, I'd be happy to do some of that green stuff as long as it fits the budget. Do well by doing good, right?"

What?, No I didn't include operational energy in my pro-forma. That would save my tenants money, not me!"



GRETA

WHO HAS MORE COURAGE?



HOUSING AGENCY OFFICIAL

"But if this costs one penny more we will have fewer affordable housing units."

CAREFUL with all that green talk! You'll scare away the developers!"



GRETA

WE NEED MORE COURAGE!



+



+



= INCREMENTALISM

IF WE ARE LUCKY

WE NEED MORE COURAGE!

INCREMENTALISM =

INEVITABLY

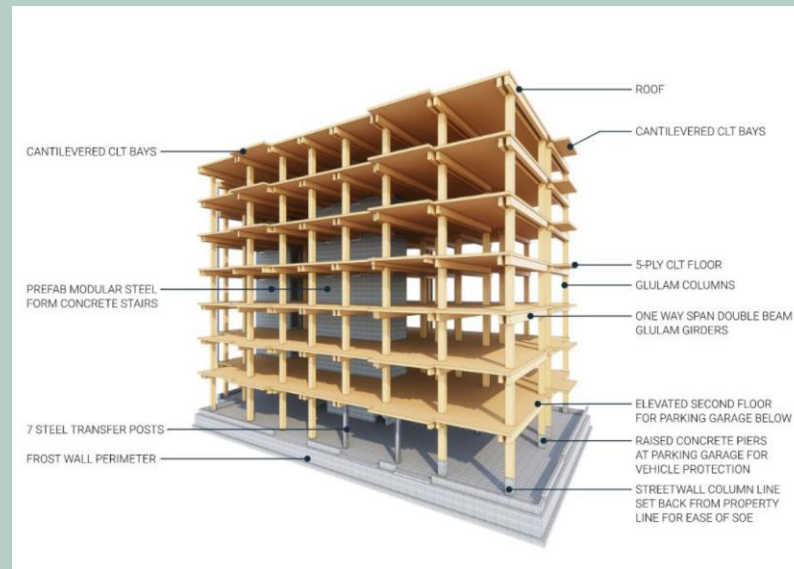


FUTURE CASE STUDIES



11 EAST LENOX ST. ROXBURY, MA

DEVELOPER: BOSTON REAL ESTATE COLLABORATIVE
 ARCHITECT: MONTE FRENCH DESIGN STUDIO A+P
 GC: HAYCON
 CLT: NORDIC STRUCTURES



- 7 STORIES – 37 APARTMENTS
- CLT PODIUM AND SUPER STRUCTURE
- LOW CARBON ENVELOPE
- PASSIVE HOUSE
- PV ARRAY
- GROUNDWATER RECHARGE

88 NOWA , BOSTON, MA

DEVELOPER: BOSTON REAL ESTATE COLLABORATIVE
ARCHITECT: MONTE FRENCH DESIGN STUDIO A+P
GC: HAYCON
CLT: NORDIC STRUCTURES



12 STORY HOTEL
CLT SUPER STRUCTURE

LOW CARBON
ENVELOPE

PASSIVE HOUSE

VERTICAL PV ARRAY

SMITHSONIAN ENVIRONMENTAL RESEARCH CENTER



ZERO ENERGY – CARBON NEGATIVE VILLAGE FOR VISITING RESEARCHERS
FUTURE DORMITORIES AND LODGE
RESILIENT NANO-GRID, TIED TO CAMPUS MICRO-GRID

URBAN VILLAGE WASHINGTON, DC



SOMERSET DEVELOPMENT
ARCHITECT: ERIC COLBERT + ASSOCIATES
STRUCTURAL: STRUCTURA
MEP: STEANGL ENGINEERING
FABRICATION: BLUEPRINT ROBTICS

117 UNITS OF AFFORDABLE HOUSING 1ST PHASE
7 STORY APARTMENT TOWER 2ND PHASE

PASSIVE HOUSE,
CLT PODIUM CONSRUCTION
LOW CARBON ENVELOPE
PV+STORAGE RESILIENT MICROGRID



BARRY FARM, NEIGHBORHOOD REDEVELOPMENT

WASHINGTON, DC

DEVELOPER: PRESERVATION OF AFFORDABLE HOUSING

ARCHITECTS: EDG, G+P
FABRICATOR: BLUEPRINT ROBOTICS

1st PHASE: 438 UNITS OF AFFORDABLE HOUSING PLUS TOWNHOMES

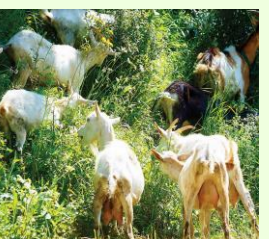
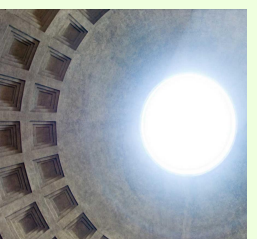
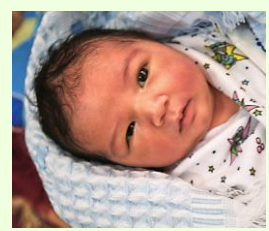
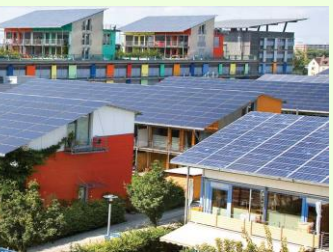
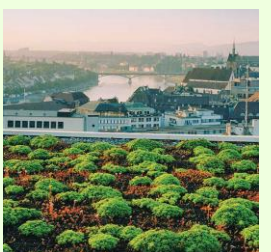
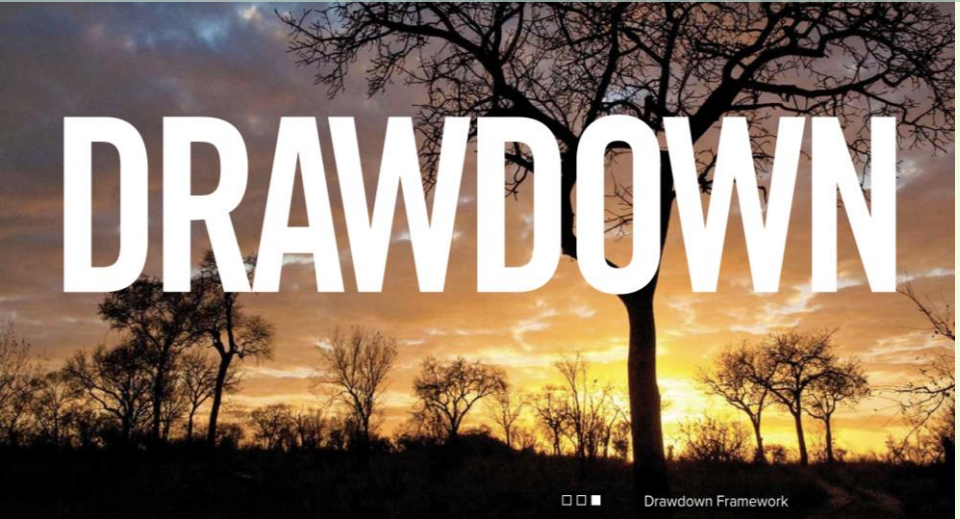
1st PHASE: 40,000 sf RETAIL

TOTAL OF 1100 RESIDENTIAL UNITS AND 55,000SF OF RETAIL,
COMMUNITY CENTER, PARKS, OUTDOOR PERFORMANCE SPACE

**ALL PASSIVE HOUSE +
SOLAR + STORAGE MICROGRID FOR CRITICAL LOAD RESILIENCY**



WE HAVE ALL THE SOLUTIONS, WE JUST HAVE TO CHOOSE THEM





BE RADICAL
IT'S FUN, NOT SCARY