Diverse Voices for Change

Kristie Broussard

How Women Architects Investigate Various Certifications and Strive Towards Truly Regenerative Building Design

phius con NEW YORK 2021

Sangeetha Sambandam

Ilka Cassidy

Christina Assmann

Kelly Moynihan

Angela Iraldi

Sayo Okada

Sangeetha Sambandam

CPHC, LEED AP BD+C, WELL AP, LFA

VILLAGE AT PARK RIVER

A multiphase, multifamily affordable housing project transforming a neighborhood in Hartford, Connecticut

VILLAGE AT PARK RIVER

A multiphase, multifamily affordable housing project transforming a neighborhood in Hartford, Connecticut

TRANSFORMATION OF A NEIGHBORHOOD

SITE PRIOR DEMO

PHASE 1 & 2 - IN CONSTRUCTION

Westbrook Village:

- 40-acre former public housing site

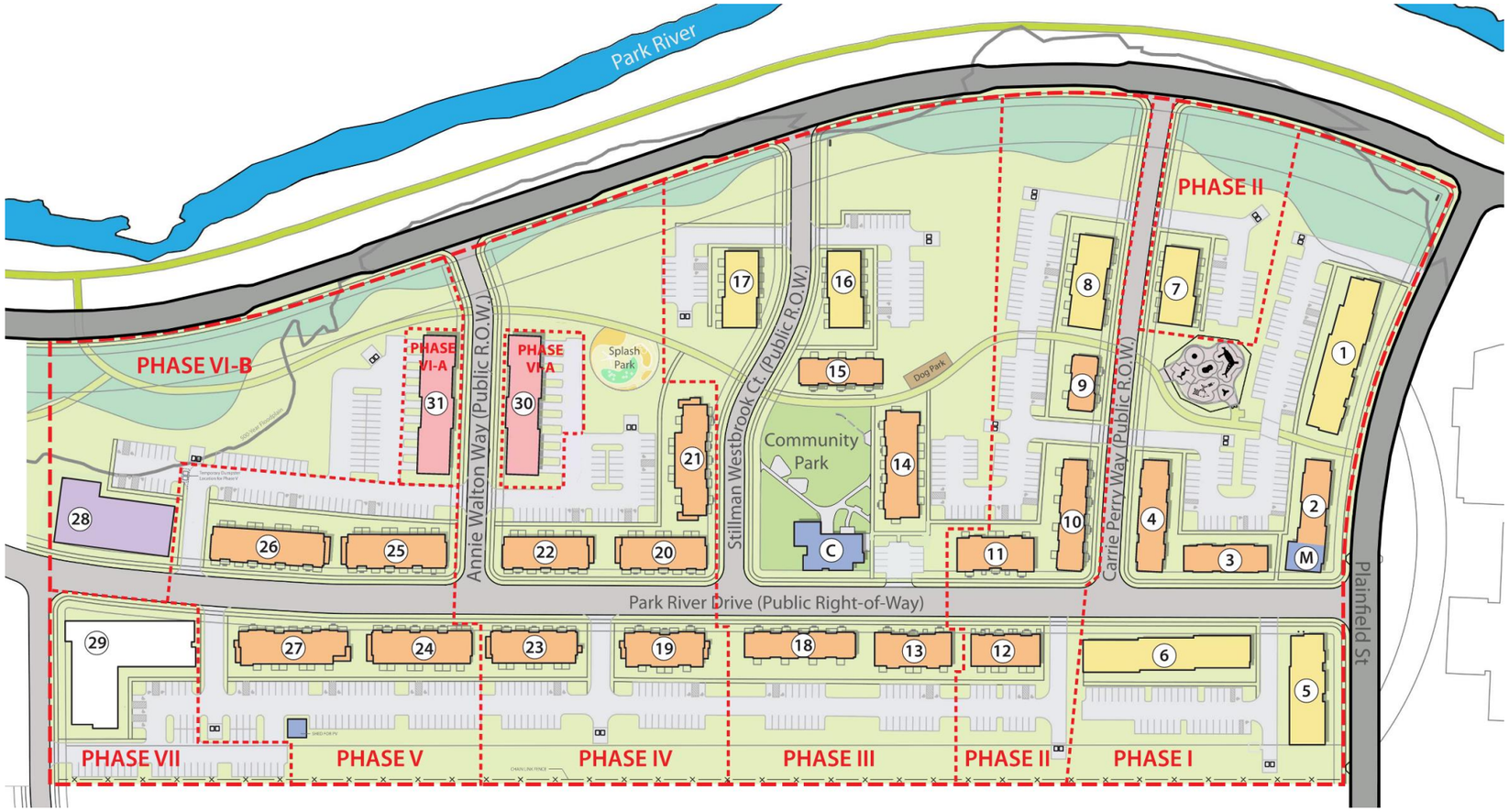
Village at Park River:

- 432 units
- Multiphase - 8 phases
- Multifamily
- Mixed Income Housing
- Mixed-use Community
- Re-establishment of premier gateway into the City

MULTIPHASE - MULTIFAMILY - MIXED INCOME HOUSING

PHASE	1 BR	2 BR	3 BR	Total
I	28 37%	32 43%	15 20%	75
II	29 48%	24 40%	7 12%	60
III	26 40%	31 48%	8 12%	65
IV	24 40%	29 48%	7 12%	60
V	26 45%	24 41%	8 14%	58

PH 1: LIHTC AWARDED - CONSTRUCTION COMPLETED - FULLY OCCUPIED - CERTIFIED TO PHI STANDARDS
PH 2: LIHTC AWARDED - CONSTRUCTION COMPLETED - FULLY OCCUPIED - CERTIFICATION IN PROCESS TO MEET PHIUS+ 2015
PH 3: LIHTC AWARDED - IN CONSTRUCTION - TO BE COMPLETED - SPRING 2022 - PRE-CERTIFIED TO PHI STANDARDS
PH 4: LIHTC AWARDED - CONSTRCUTION TO BREAK GROUND - FALL 2021 - TO BE CERTIFIED TO PHI STANDARDS
PH 5: LIHTC APPLICATION IN PROCESS - TO BE SUBMITTED - JAN 2022 - PHIUS CORE 2021 OR PHI - TBD



LIHTC (LOW INCOME HOUSING TAX CREDIT)
PUBLIC FUNDING FOR PASSIVE HOUSE DESIGN IN CONNECTICUT

CHFA QAP: Sustainability Design Measures - New Construction	Points
Benchmarking with EPA's Energy Star Portfolio Manager is a prerequisite for all Sustainability points	
Energy Conservation	**2-4**
Prerequisites: DOE Zero Energy Ready Home Certification AND Balanced ventilation	
Tier 1 Average HERS Index ≤50; OR Average % below ENERGY STAR Target Index ≥15%	2
Tier 2 Average HERS Index ≤46; OR Average % below ENERGY STAR Target Index ≥25%	3
Tier 3 Average HERS Index ≤42; OR Average % below ENERGY STAR Target Index ≥35%; OR Passive House; OR International Living Future Institute (ILFI) Zero Energy Ready	4
Green Building	**2-3**
Tier 1 Enterprise Green Communities 2020 (EGC 2020); OR National Green Building Standard (NGBS) Gold; OR Leadership in Energy and Environmental Design (LEED) Gold	2
Tier 2 National Green Building Standard (NGBS) Emerald; OR Leadership in Energy and Environmental Design (LEED) Platinum; OR Living Building Challenge (LBC) Core Ready	3
Renewables, Electrification, and Resiliency	**1-3**
Tier 1 PV system to offset ≥75% of the annual energy demand for site and interior common area lighting.	1
Tier 2 PV system to offset ≥90% of the annual energy demand for site and interior common area lighting; AND All-Electric Buildings (excludes backup generator); AND Backup Power to provide resiliency to Critical Systems, Emergency Lighting, and Access to Potable Water	2
Additional Additive Point All-Electric Buildings; AND Battery storage systems or fuel cell to serve as backup power to provide resiliency Critical Systems, Emergency Lighting, and Access to Potable Water	(+1)
Operations and Resiliency	**1-2**
Tier 1 Owner Paid Utilities (to cover usage for- heating, cooling & hot water at a minimum); AND Commissioning	1
Tier 2 Owner Paid Utilities (to cover usage for- heating, cooling & hot water at a minimum); AND Commissioning; AND Backup power to resiliency to Critical Systems, Emergency Lighting, and Access to Potable Water	2
Sustainable Development with Digital Literacy and Connectivity	**1**
High-speed Broadband access to units	1
Total Possible Points	**7-13**

CONNECTICUT HOUSING FINANCE AUTHORITY

- 7 - 8 month long process
- Requires site control, zoning and all regulatory approvals, tax agreements, etc.
- Coordination with Department of Housing
- 90% drawings with full detailed construction costs with trade
- item breakdowns

FOR MORE INFORMATION:

https://www.chfa.org/developers/tax-credit-program/lihtc/

PASSIVE HOUSE - BUILDING ENVELOPE & PREDICTED EUI

PREDICTED EUI
WORST CASE PER BUILDING
IN EACH PHASE

PHASE 1: 22.30 kBTU/SF/YR – BLDG 5
PHASE 2: 19.87 kBTU/SF/YR – BLDG 12
PHASE 3: 26.51 kBTU/SF/YR – BLDG 13
PHASE 4: 24.31 kBTU/SF/YR – BLDG 20

WITHIN PASSIVE HOUSE ENVELOPE

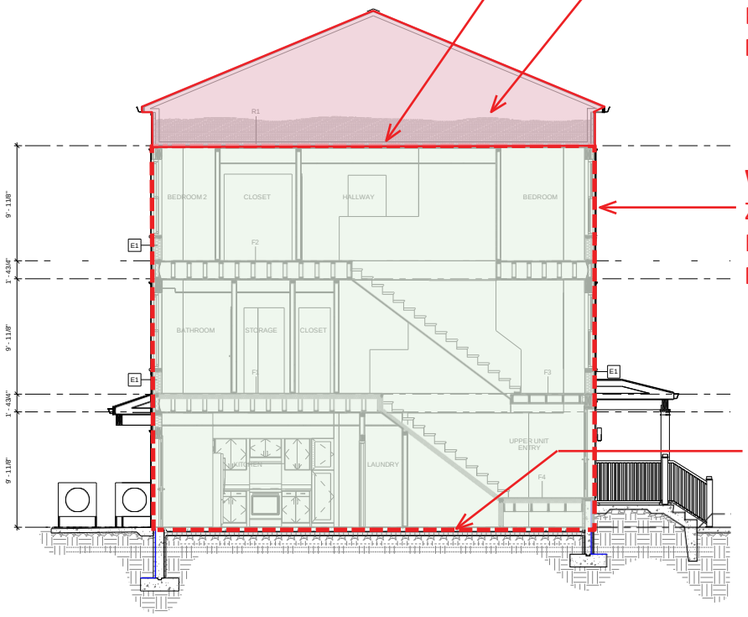
EXCLUDED FROM PASSIVE HOUSE ENVELOPE

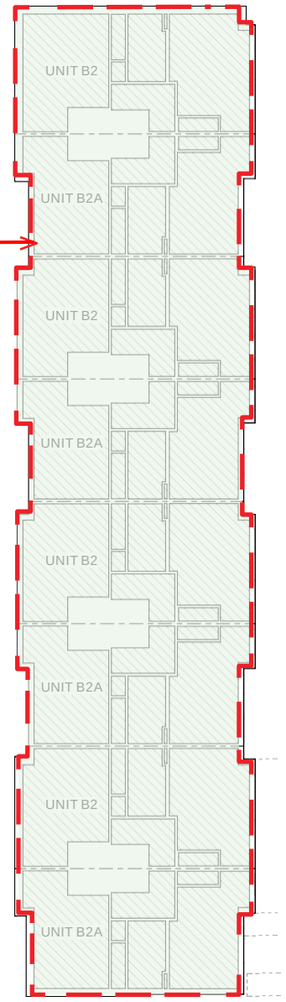
PASSIVE HOUSE AIR BARRIER

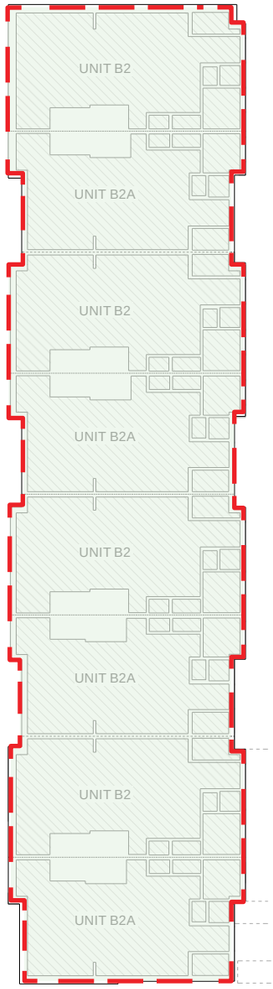
ROOF ASSEMBLY:
Blown-in cellulose
R-100

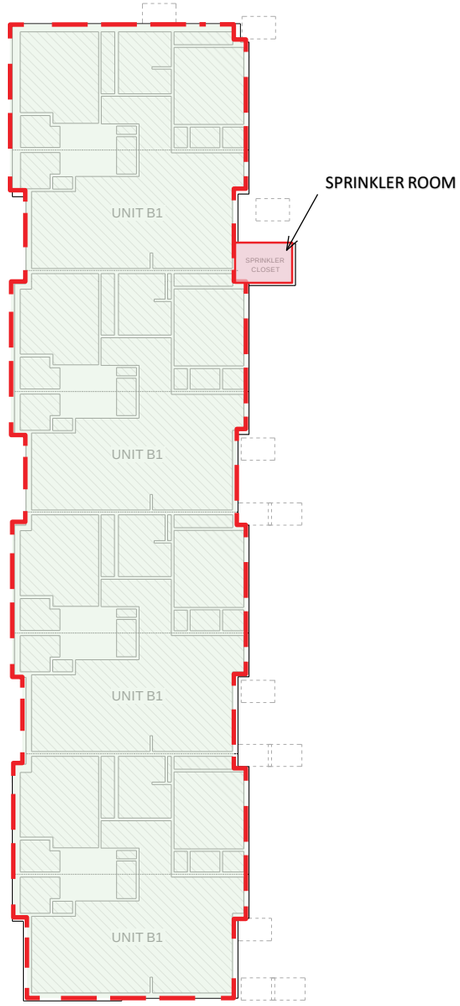
WALL ASSEMBLY:
Zip R-12 Ext, Sheathing
R-21 Batt Insulation
R-33

SLAB:
XPS Rigid Insulation:
R-20 or R-30









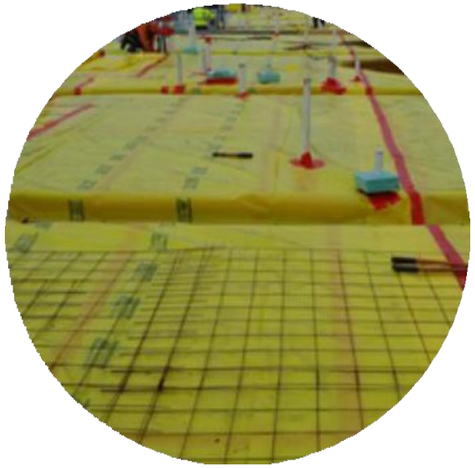
PASSIVE HOUSE - ENVELOPE FEATURES

ZIP R-12-EXT. SHEATHING

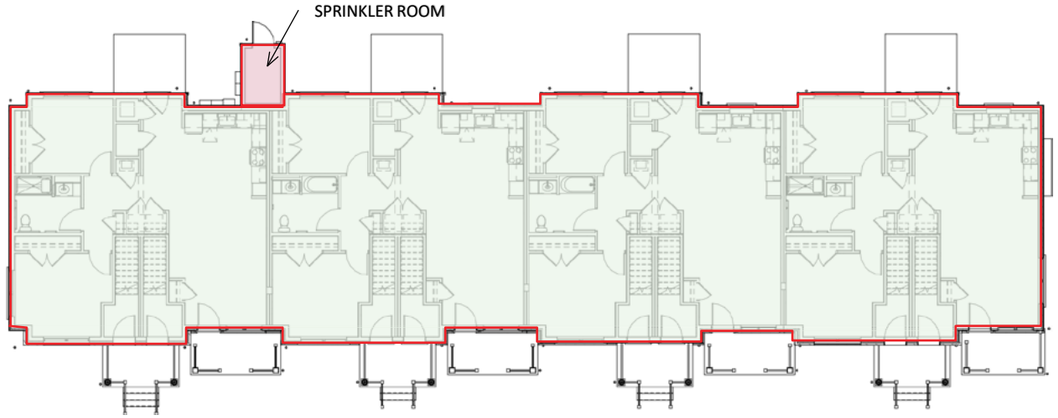
NON-PASSIVE HOUSE DOORS

PASSIVE HOUSE WINDOWS AT UNITS

PASSIVE HOUSE WINDOWS AT MANAGEMENT SUITE



SUB-SLAB XPS (R20 OR R30) WITH 15 MIL. VAPOR BARRIER



WITHIN PASSIVE HOUSE ENVELOPE

EXCLUDED FROM PASSIVE HOUSE ENVELOPE

ZIP SHEATHING AT CEILING

PASSIVE HOUSE - MECHANICAL FEATURES

DUCTED HEAT PUMPS IN
2 & 3 BEDROOM UNITS

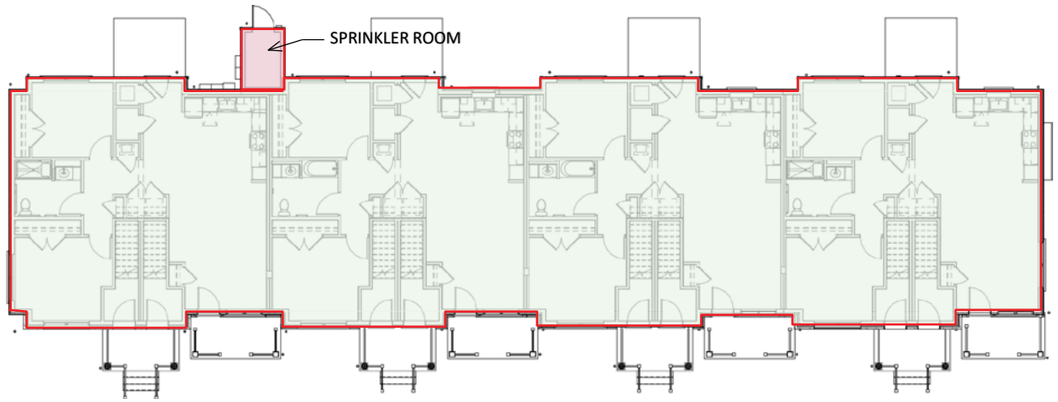
PHASES 1,2,3 & 4
INDIVIDUAL GAS FIRED
TANKLESS HOT WATER
HEATERS / SEALED
COMBUSTION, DIRECT VENT

PHASE 5:
EXPLORING - INDIVIDUAL
TANKED ELEC. HOT WATER
HEATERS

INDIVIDUAL ERV

PV SOLAR TO PARTIALLY
PROVIDE FOR SITE LIGHTING

WALL MOUNTED HEAT PUMPS
IN 1 BEDROOM UNITS

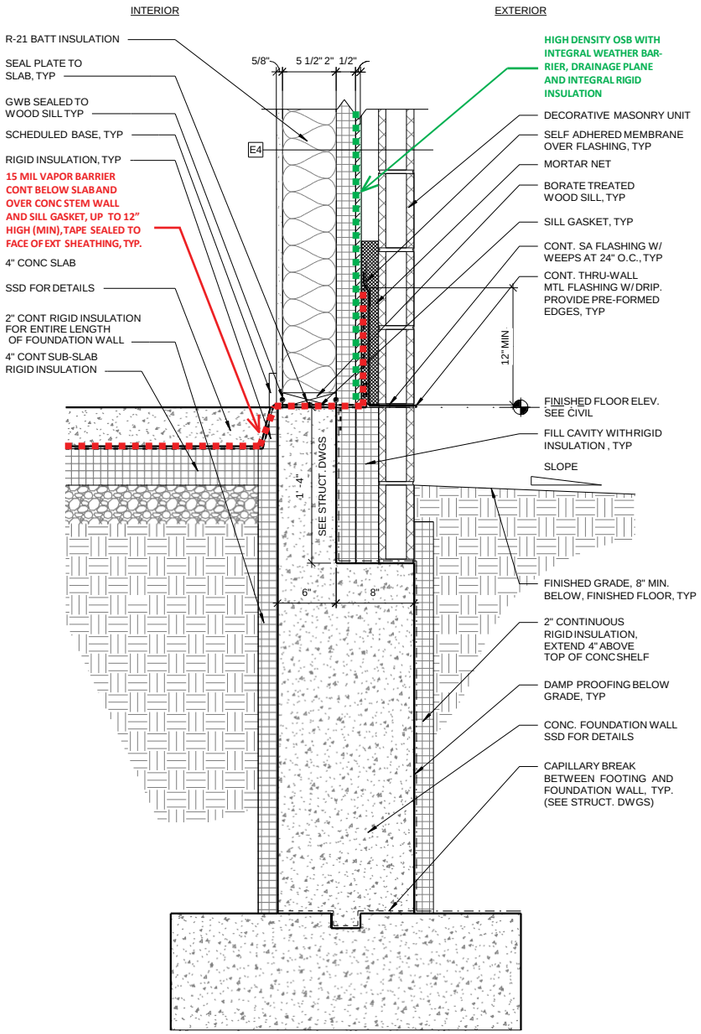


WITHIN PASSIVE
HOUSE ENVELOPE

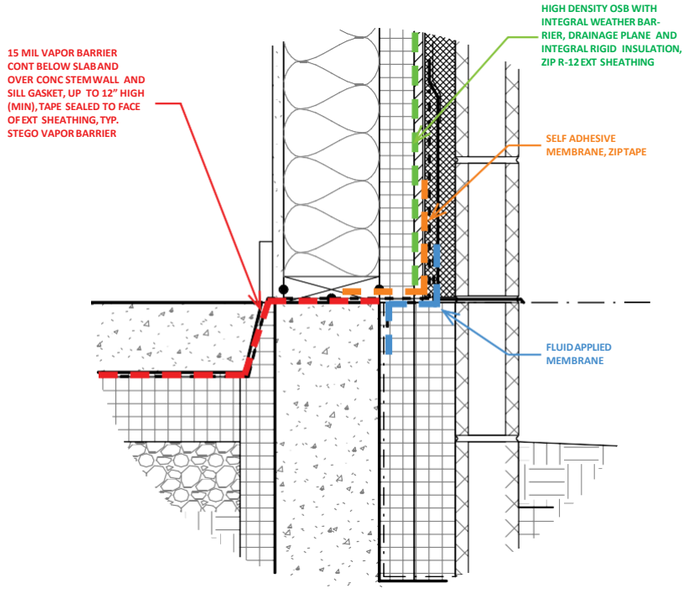
EXCLUDED FROM PASSIVE
HOUSE ENVELOPE

INDIVIDUAL LAUNDRY
WITH HEAT PUMP/
VENTLESS ELEC DRYERS

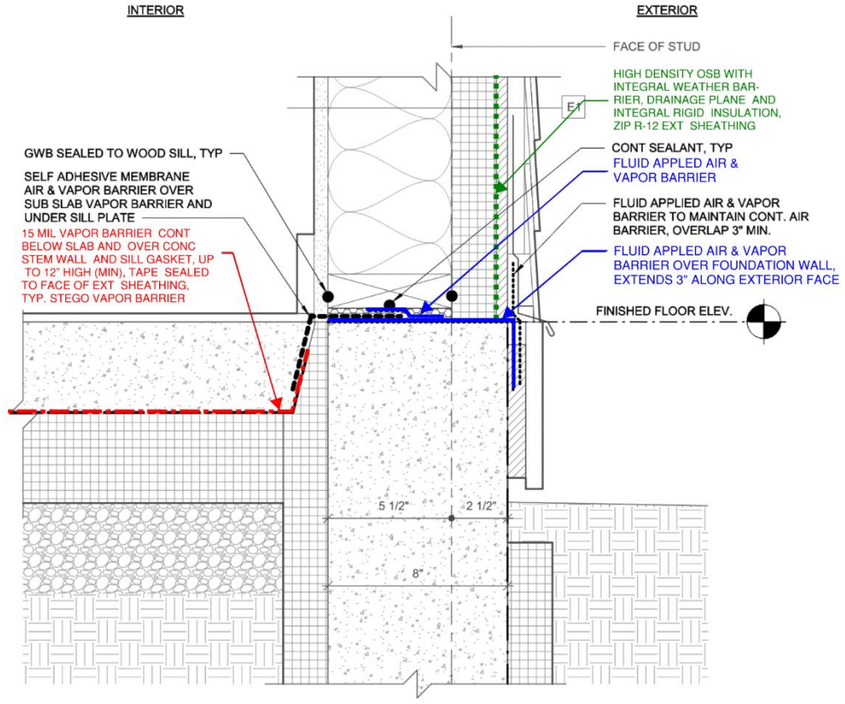
AIR BARRIER AT FOUNDATION



DESIGNED DETAIL
PHASES 1 & 2

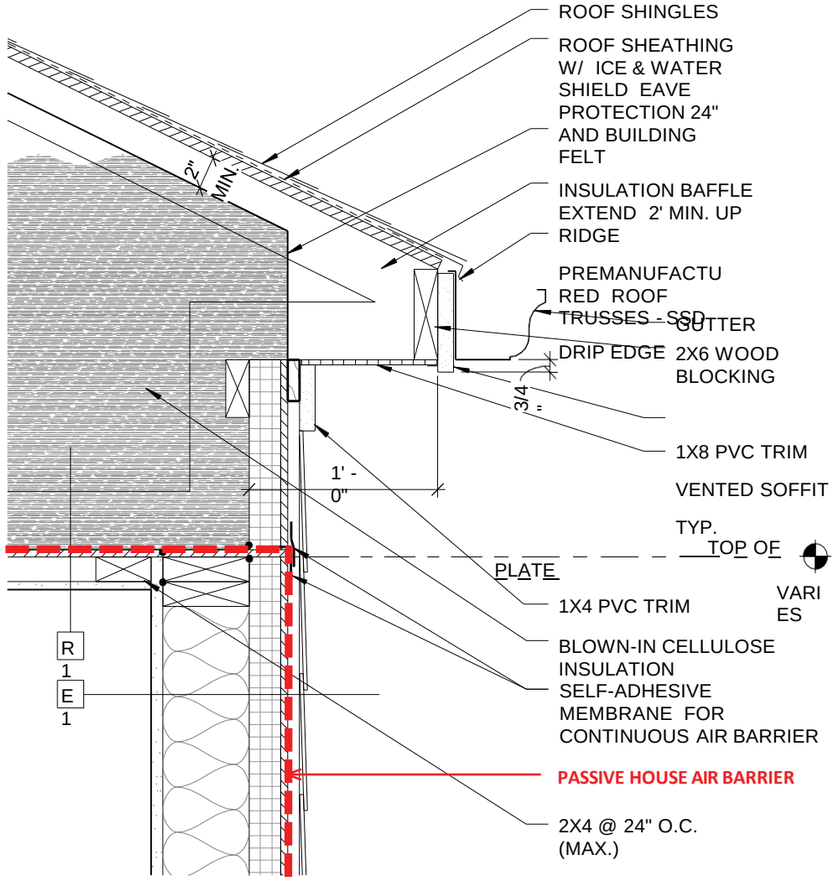


CONSTRUCTED DETAIL
PHASES 1 & 2



CONSTRUCTED DETAIL
PHASE 3

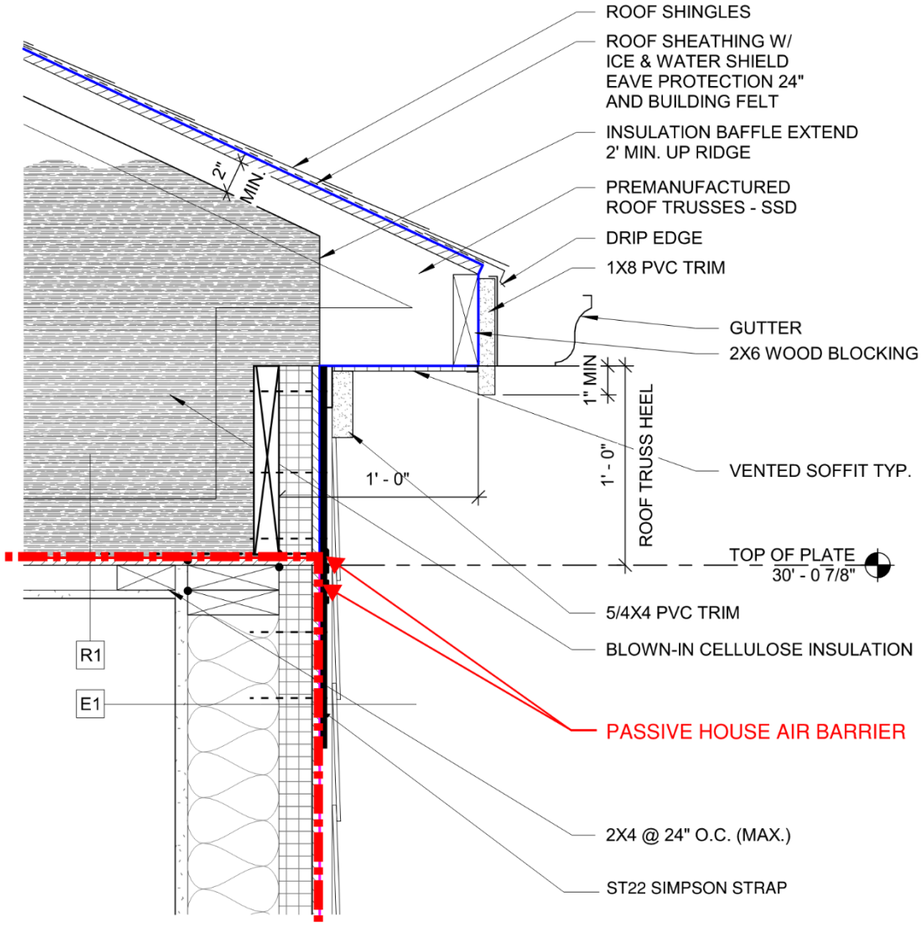
PASSIVE HOUSE AIR BARRIER AT CEILING/ROOF



PHASE 1 & 2
CONSTRUCTION DETAIL

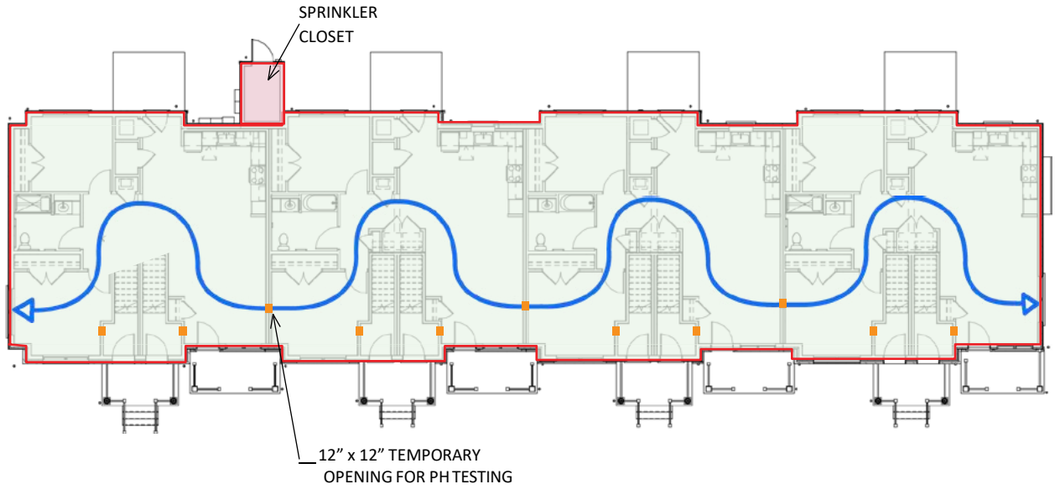
PHASE 1 & 2
CONSTRUCTION PHOTO

PHASE 3
CONSTRUCTION PHOTO



PHASE 3
CONSTRUCTION DETAIL

PHI OR PHIUS CERTIFICATION
CHFA REQUIRES TESTING TO PHIUS PROTOCOLS



PHIUS+ RATER = ENERGY STAR PARTNER + EPA Indoor airPLUS + ZERO ENERGY READY HOME U.S. DEPARTMENT OF ENERGY PARTNER

PRIOR TO PRELIMINARY TESTING:

- CHECK PH ENVELOPE
- CHECK AIR INFILTRATION AT SILL PLATE
- CHECK AND ADJUST WINDOWS
- CHECK FOR AIR INFILTRATION AROUND ERV VENTS / VENTS
- CHECK FOR AIR INFILTRATION AT ROOF TRUSSES

PRELIMINARY BLOWER DOOR TEST WORST CASE:

- **PHASE 1**: 0.60 ACH 50 – ALL BUILDINGS
- **PHASE 2**: 0.50 ACH50 – ALL BUILDINGS
- **PHASE 3**: WORST & BEST CASE

  0.43 ACH50 – BUILDING 17

  0.29 ACH50 – BUILDING 16

COMPARING PHI & PHIUS

	INTERNATIONAL PASSIVE HOUSE INSTITUTE (PHI)	PASSIVE HOUSE INSTITUTE U.S. (PHIUS)
Space Conditioning Energy Targets	Fixed - except for certain allowances made for dehumidification in relevant climates	Climate zone specific based on US climate.
Energy Threshold	**Primary Energy Criteria:** 38.04 kBTU/ft^2.yr	**Source Energy Criteria:** 5,500 kWh/person.yr (PHIUS+ Core) 3,840 kWh/person.yr (PHIUS+)
Airtightness	**Set threshold for all building types:** 0.6 ACH50 required	**Determined by Building Envelope Area:** 0.06 CFM/ft^2 for buildings 4 stories and below 0.08 CFM/ft^2 for buildings 5 stories and above
Passive House Area Calculation	TFA (Treated Floor Area)	iCFA (Interior Conditioned Floor Area)
Modeling Software	Passive House Planning Package (PHPP)	WUFI Passive
Certification Options	Passive House Classic Passive House Plus (net-zero enrgy) Passive House Premium (net-positive energy)	PHIUS+ Core PHIUS+ PHIUS+ Source Zero (net-zero energy)
Space Heating & Cooling Criteria Thresholds	Required to comply with: - Heating Demand **OR** Heating Load **AND** - Cooling Demand **OR** Cooling Load	Required to comply with: - Heating Demand **AND** Heating Load **AND** - Cooling Demand **AND** Cooling Load

PHASE 1 & PHASE 2: CONSTRUCTION

PHASE 1 - MANAGEMENT SUITE

PHASE 1 - BLDG 4

PHASE 2 - BLDG 10

PHASE 2

PHASE 3 & COMMUNITY BUILDING

PHASE 3 – IN CONSTRUCTION


DESIGN BY: WRT
RENDER BY: KIRK FROMM
WRT
FROMM 2020

Ilka Cassidy, Dipl. – Ing. Architecture, CPHC
Holzraum System

Looking at the whole picture – a broader lens beyond Passive House Certification

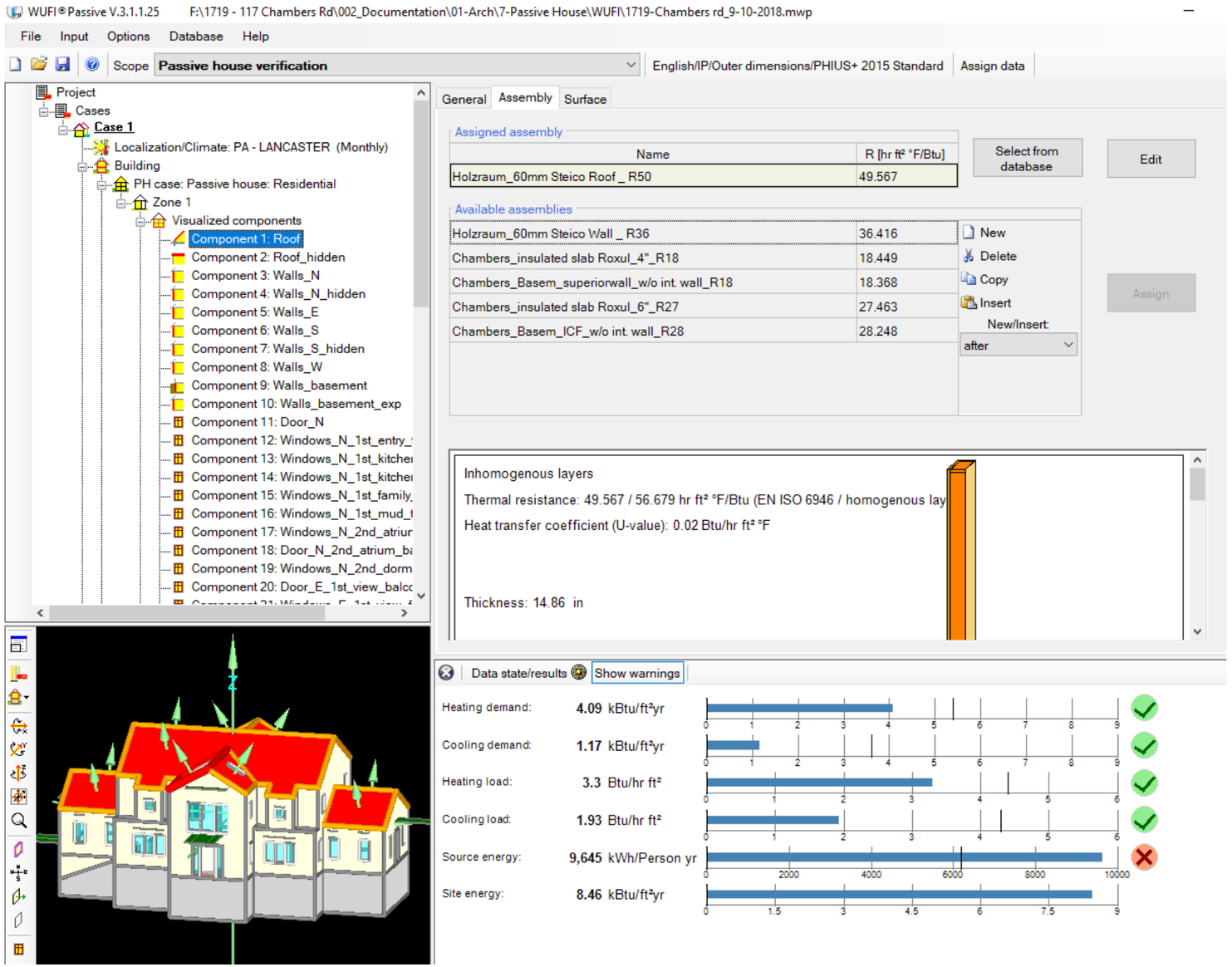
PHIUS Certification works well for single family homes.

Pre-certification reviews by PHIUS identifies risky assemblies and details that could lead to mold growth.

The on-site verification by a PHIUS certified rater or verifier assures quality control.

Certifications give leverage to the consultant/ architect/ homeowner.

PHIUS – WUFI Passive Energy Model



Climate Specific Performance Criteria

PHIUS CORE & ZERO 2021

phius 2021
Performance Criteria Calculator v2

UNITS:	IMPERIAL (IP)
BUILDING FUNCTION:	RESIDENTIAL
PROJECT TYPE:	NEW CONSTRUCTION
STATE/ PROVINCE	PENNSYLVANIA
CITY	LANCASTER
Envelope Area (ft²)	13,422
iCFA (ft²)	6,317
Dwelling Units (Count)	1
Total Bedrooms (Count)	5

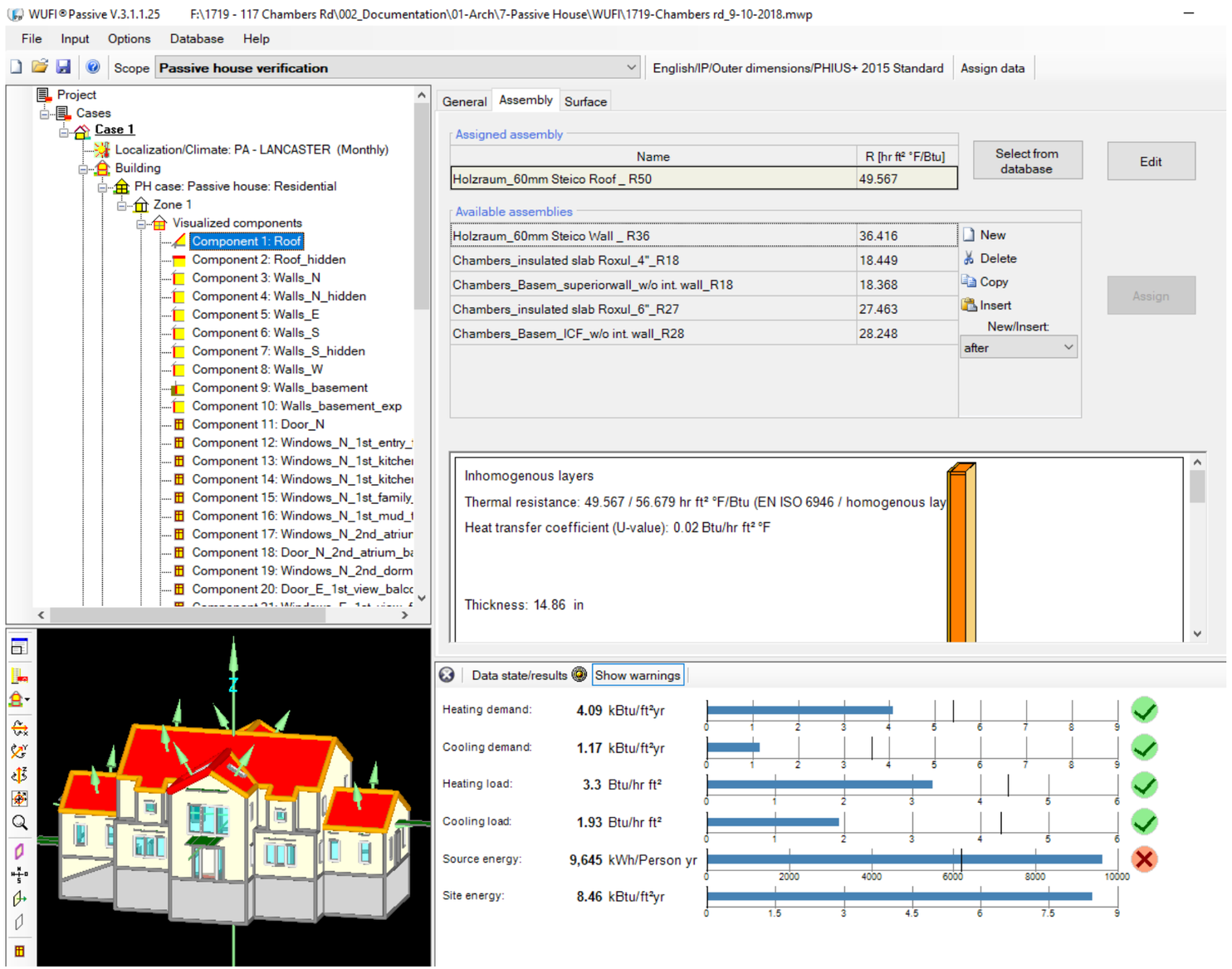
Space Conditioning Criteria

Annual Heating Demand	5.7	kBtu/ft²yr
Annual Cooling Demand	4.7	kBtu/ft²yr
Peak Heating Load	4.0	Btu/ft²hr
Peak Cooling Load	1.9	Btu/ft²hr

Source Energy Criteria

phius CORE	5612	kWh/person.yr
phius ZERO	0	kWh/person.yr

PHIUS – WUFI Passive Energy Model



In our Climate, Wufi typically rewards:

Windows with a high Solar Heat Gain Coefficient – which can influence comfort.

Recirculating kitchen exhaust hoods - which lowers the indoor air quality and risks blower door results.

Larger building surface - which increases overall energy usage.

High r-value – without regards to certain material choice implications.

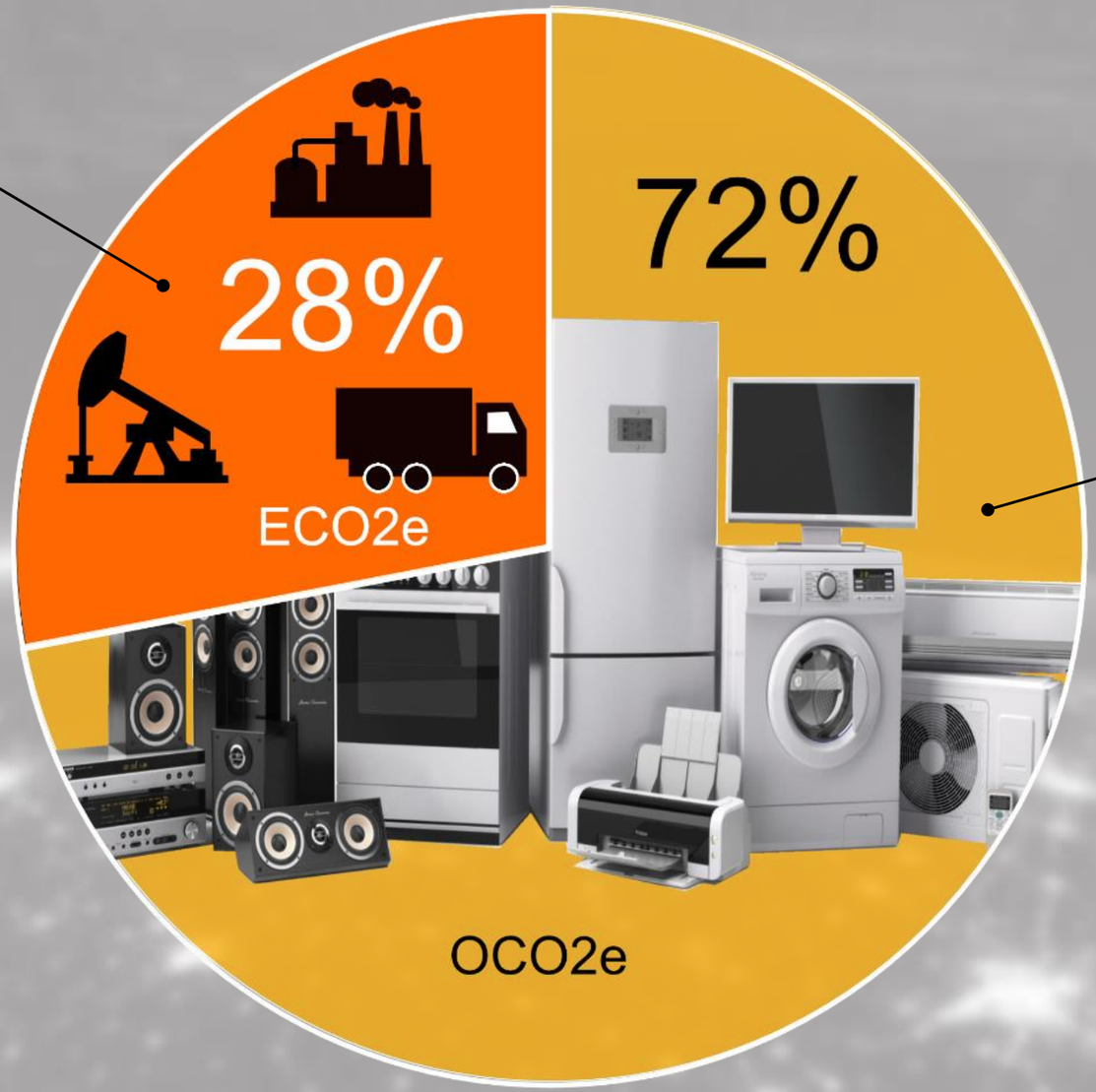
Operational Carbon

Passive House is a Performance Based Building Standard that focuses on Operational Carbon.

At this point, there is no Passive House certification criteria that rewards the use of building materials with low Embodied Carbon.

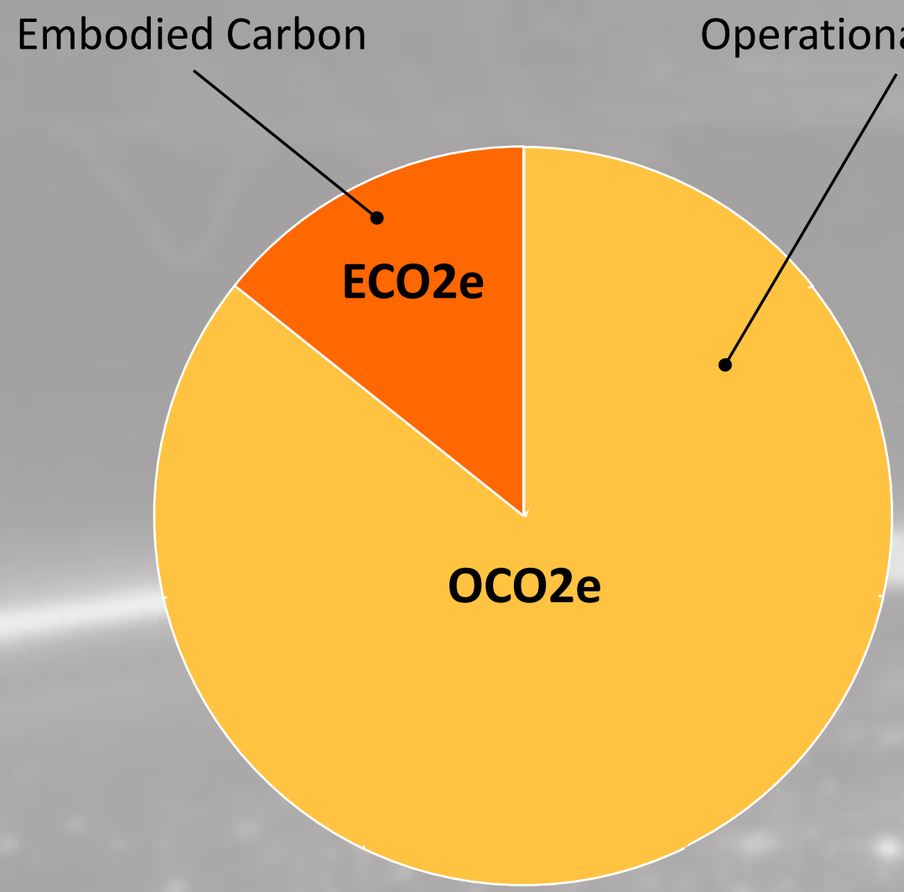
Embodied Carbon

Annual Global Building Sector

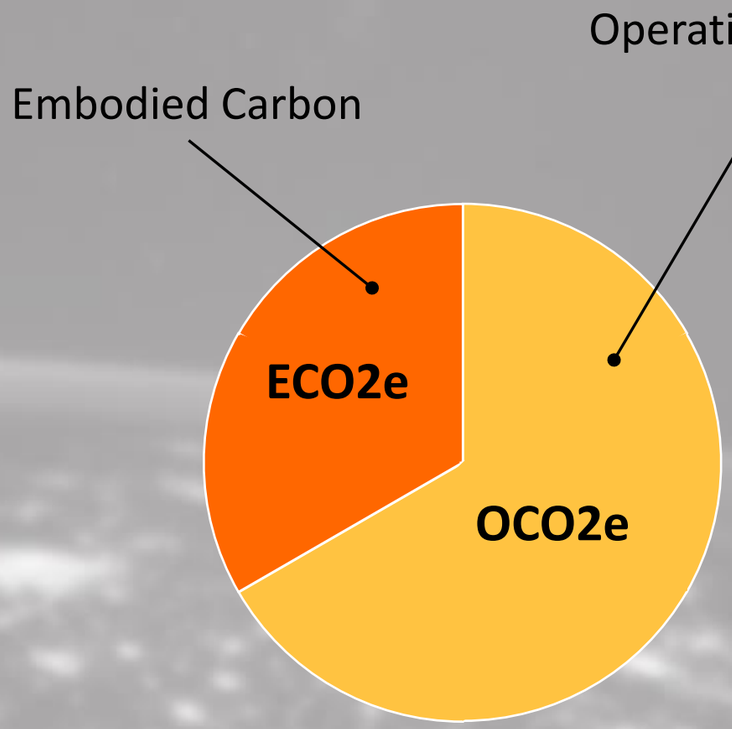


CO2e Emissions

Source: Architecture 2030



Typical Buildings



High Performance Buildings

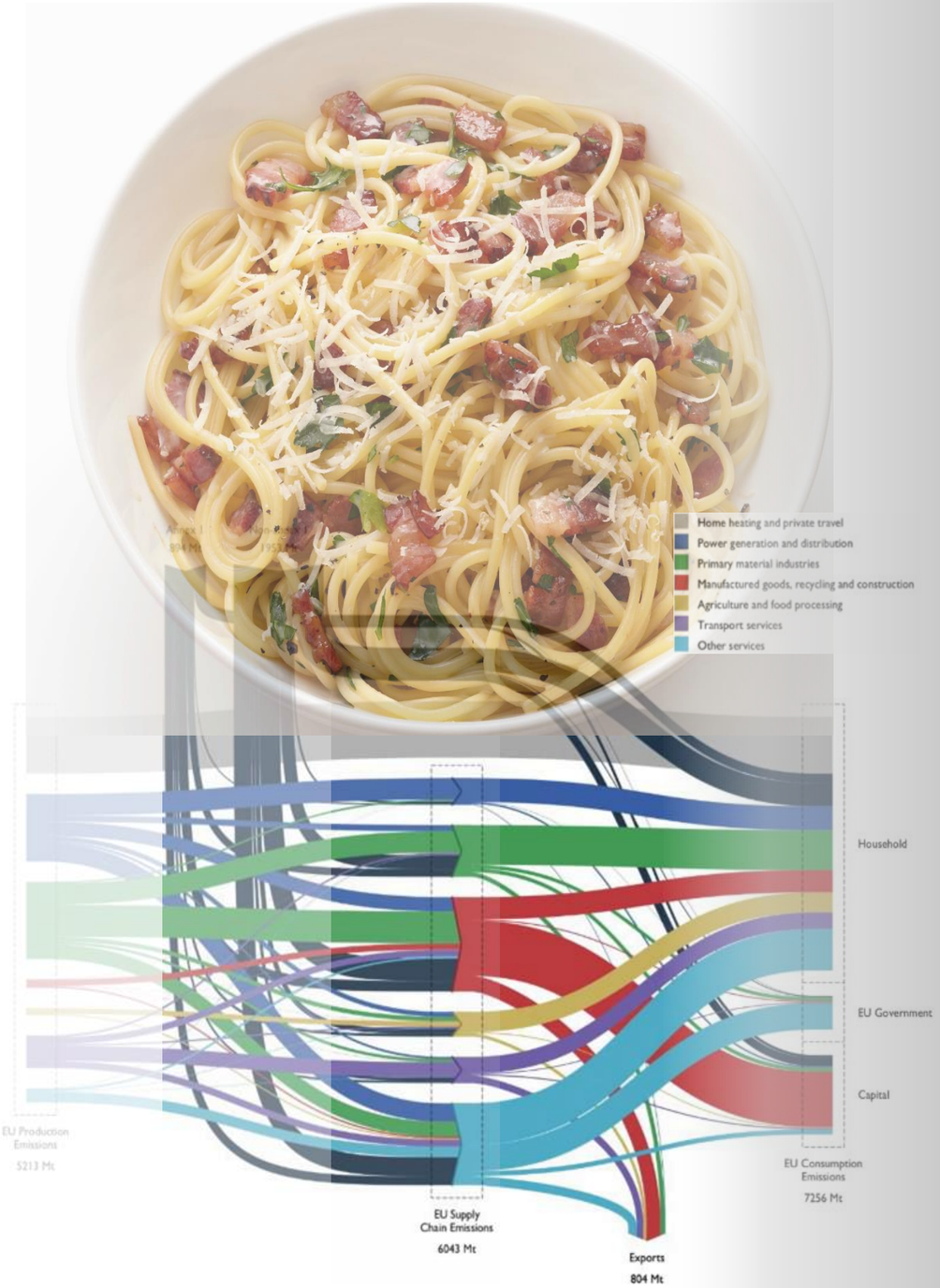
Source: Carbon Leadership Forum

Spaghetti Carbon – Era:
Disentangling Operational & Embodied Carbon

David Salamon, CPHD-CPHC
Re:Vision Architecture

Ilka Cassidy, Dipl. Eng. CPHC
C2 Architecture
Holzraum System, LLC

Steve Hessler, CPHC
Holzraum System, LLC

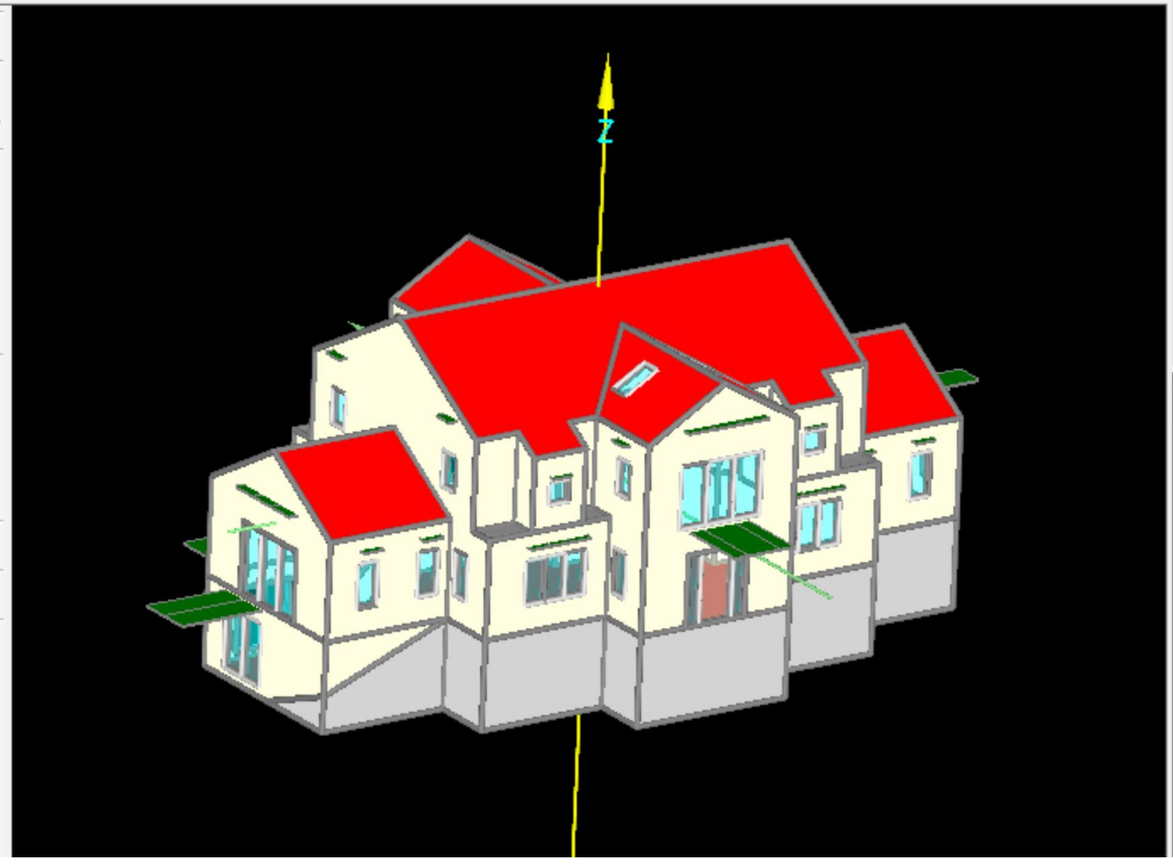


WUFI® Passive V.3.2.0.1 C:\Users\salamon\OneDrive - Revision Architecture\dcs Docs\Carbon-Era\Chambers Road.mwp

File Input Options Database Help

Scope **Passive house verification** | English/IP/Outer dimensions/PHIUS+ 2015 | Assign data | **Project/Cases/Case 5: PHIUS+ 2015_Holzraum_improved carbon (basement)**

Project
- Cases
  - Case 1: Code Home assemblies, ACH50 3.0 /hr, no heat pumps, regular erv
  - Case 2: Code Home assemblies, ACH50 3.0 /hr, efficient systems
  - Case 3: PHIUS+ 2015_high embodied carbon
  - Case 4: PHIUS+ 2015_Holzraum
  - Case 5: PHIUS+ 2015_Holzraum_improved carbon (basement)



General | Report: data & results

Name: PHIUS+ 2015_Holzraum_improved carbon (basement)

Remarks:

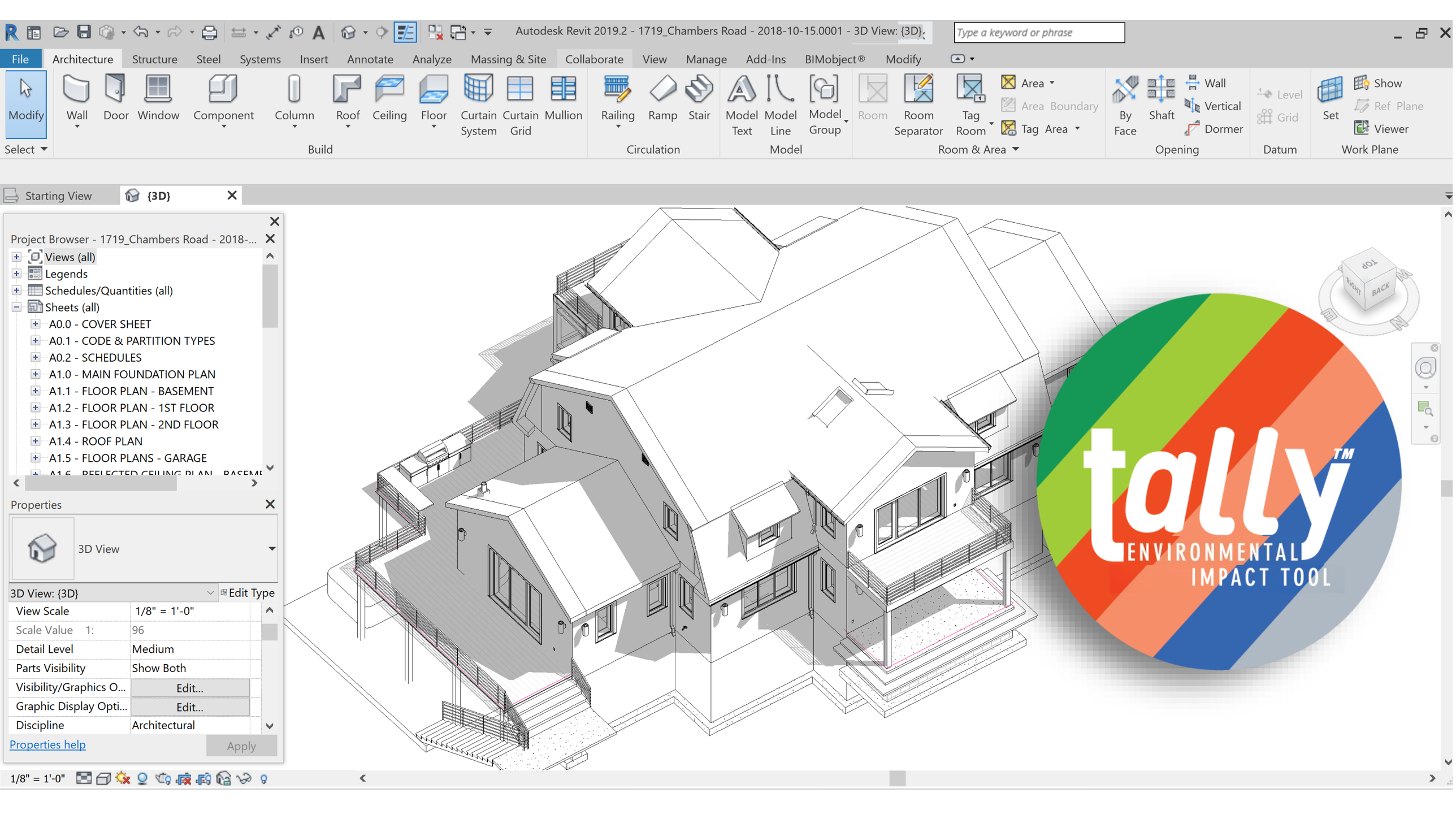
Calculation

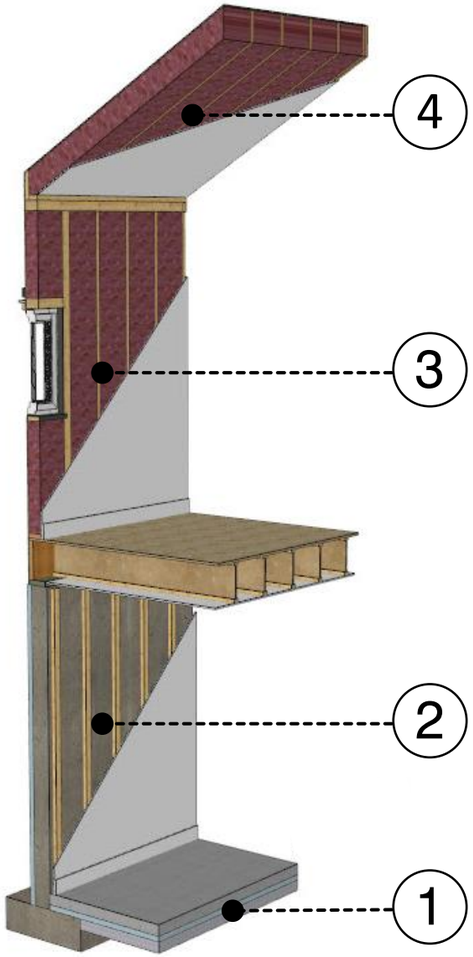
Certificate criteria: PHIUS+ 2015

☑ Use WUFI month mean shading factors

Data state/results | Show warnings | Calculate WUFI shading

Heating demand:	**4.14** kBtu/ft²yr	0 1 2 3 4 5 6 7 8 9
Cooling demand:	**1.1** kBtu/ft²yr	0 1 2 3 4 5 6 7 8 9
Heating load:	**3.32** Btu/hr ft²	0 1 2 3 4 5 6
Cooling load:	**1.84** Btu/hr ft²	0 1 2 3 4 5 6
Source energy:	**5,809** kWh/Person yr	0 2000 4000 6000 8000 10000
Site energy:	**5.18** kBtu/ft²yr	0 1 2 3 4 5 6


Autodesk Revit 2019.2 - 1719_Chambers Road - 2018-10-15.0001 - 3D View: {3D}
Type a keyword or phrase
File
Architecture
Structure
Steel
Systems
Insert
Annotate
Analyze
Massing & Site
Collaborate
View
Manage
Add-Ins
BIMobject®
Modify
Modify
Wall
Door
Window
Component
Column
Roof
Ceiling
Floor
Curtain System
Curtain Grid
Mullion
Railing
Ramp
Stair
Model Text
Model Line
Model Group
Room
Room Separator
Tag Room
Area
Area Boundary
Tag Area
By Face
Shaft
Wall
Vertical
Dormer
Level
Grid
Set
Show
Ref Plane
Viewer
Select
Build
Circulation
Model
Room & Area
Opening
Datum
Work Plane
Starting View
{3D}
Project Browser - 1719_Chambers Road - 2018-...
Views (all)
Legends
Schedules/Quantities (all)
Sheets (all)
A0.0 - COVER SHEET
A0.1 - CODE & PARTITION TYPES
A0.2 - SCHEDULES
A1.0 - MAIN FOUNDATION PLAN
A1.1 - FLOOR PLAN - BASEMENT
A1.2 - FLOOR PLAN - 1ST FLOOR
A1.3 - FLOOR PLAN - 2ND FLOOR
A1.4 - ROOF PLAN
A1.5 - FLOOR PLANS - GARAGE
Properties
3D View
3D View: {3D}
Edit Type
View Scale
1/8" = 1'-0"
Scale Value 1:
96
Detail Level
Medium
Parts Visibility
Show Both
Visibility/Graphics O...
Edit...
Graphic Display Opti...
Edit...
Discipline
Architectural
Properties help
Apply
1/8" = 1'-0"
TOP
RIGHT
BACK
tally™
ENVIRONMENTAL
IMPACT TOOL



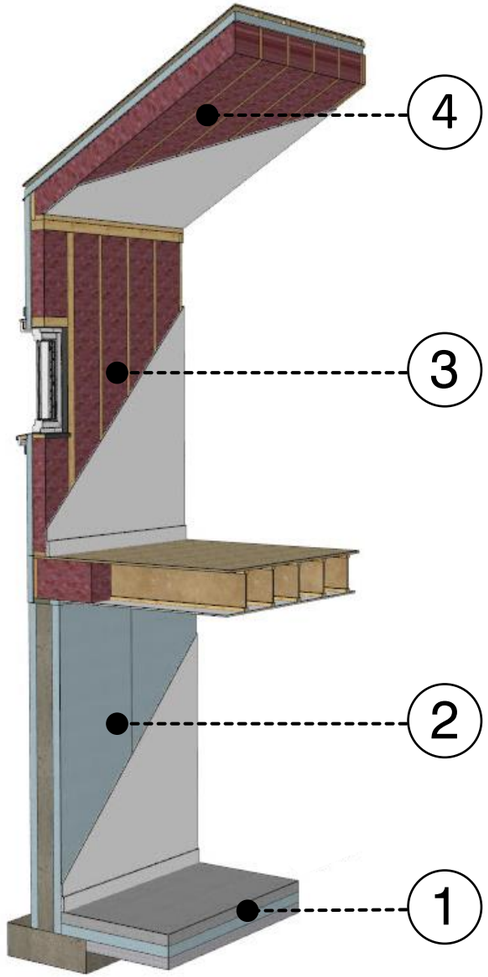
CODE BUILDING
Case1&2

4. Roof: FG (R19), LVL

3. AG-Wall: FG (R19), 2X6

2. BG-Wall: EPS (R10), 8” CMU

1. Slab: XPS (R10), 4” CC



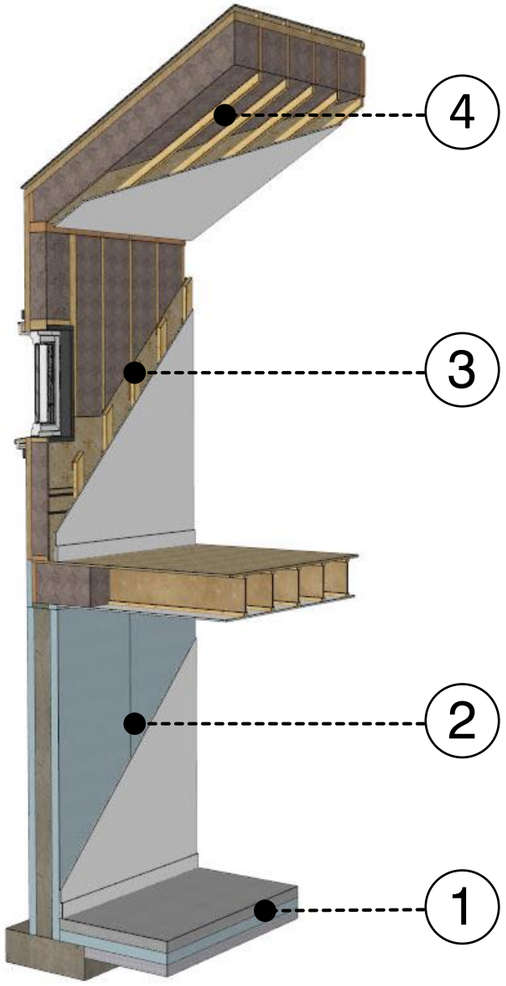
PH (HIGH FOAM)
Case 3

4. Roof: XPS (R17), CLOS (R33), LVL

3. AG-Wall: EPS (R14.5), CLOS (R21), 2x6

2. BG-Wall: ICF (R27)

1. Slab: EPS (R14.5), 4” CC



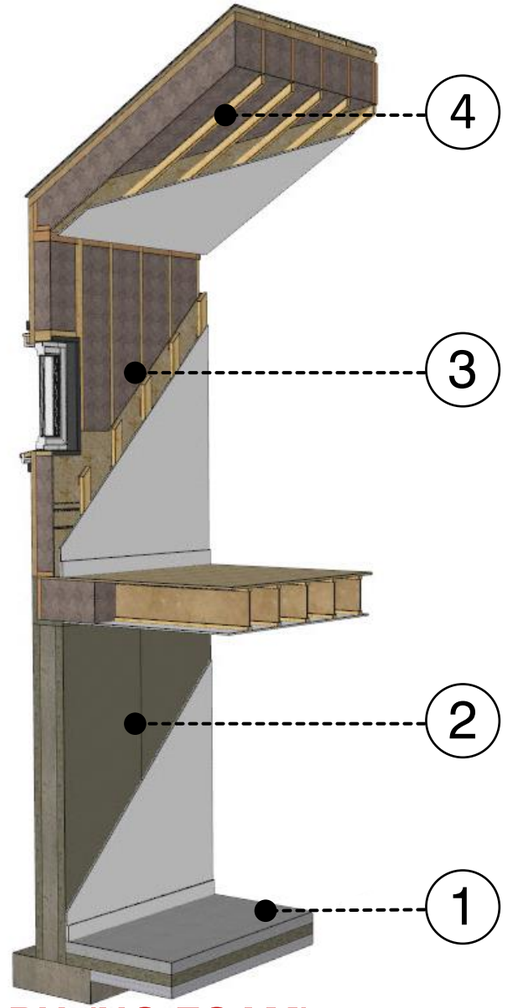
PH (LOW FOAM)
Case 4

4. Roof: WF (R7.5), CLOS (R44.5), LVL

3. AG-Wall: WF (R7.5), CLOS (R27), 2x8

2. BG-Wall: ICF (R27)

1. Slab: EPS (R14.5), 4” CC



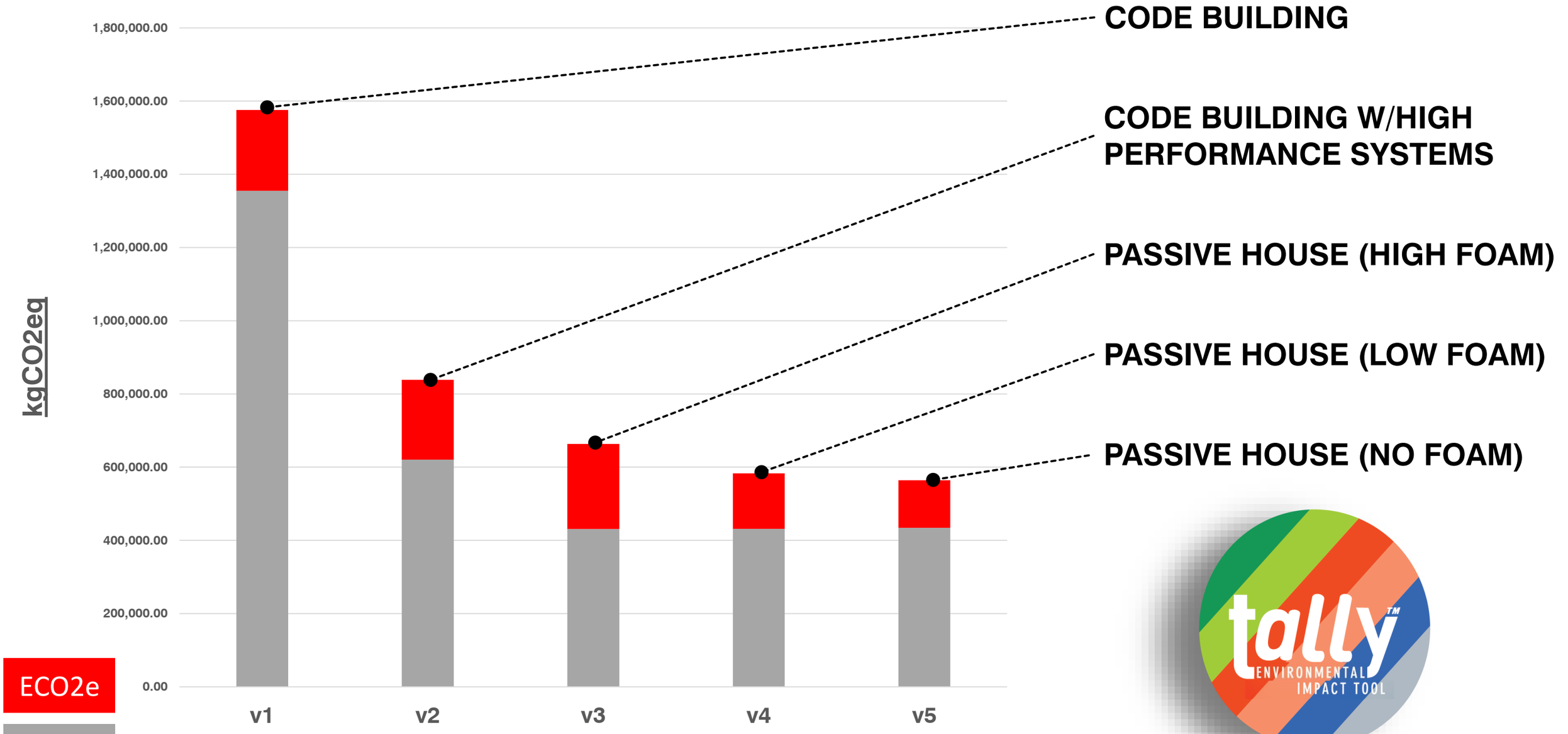
PH (NO FOAM)
Case 5

4. Roof: WF (R7.5), CLOS (R44.5), LVL

3. AG-Wall: WF (R7.5), CLOS (R27), 2x8

2. BG-Wall: RF (R16), 8” CMU, CLOS (R13)

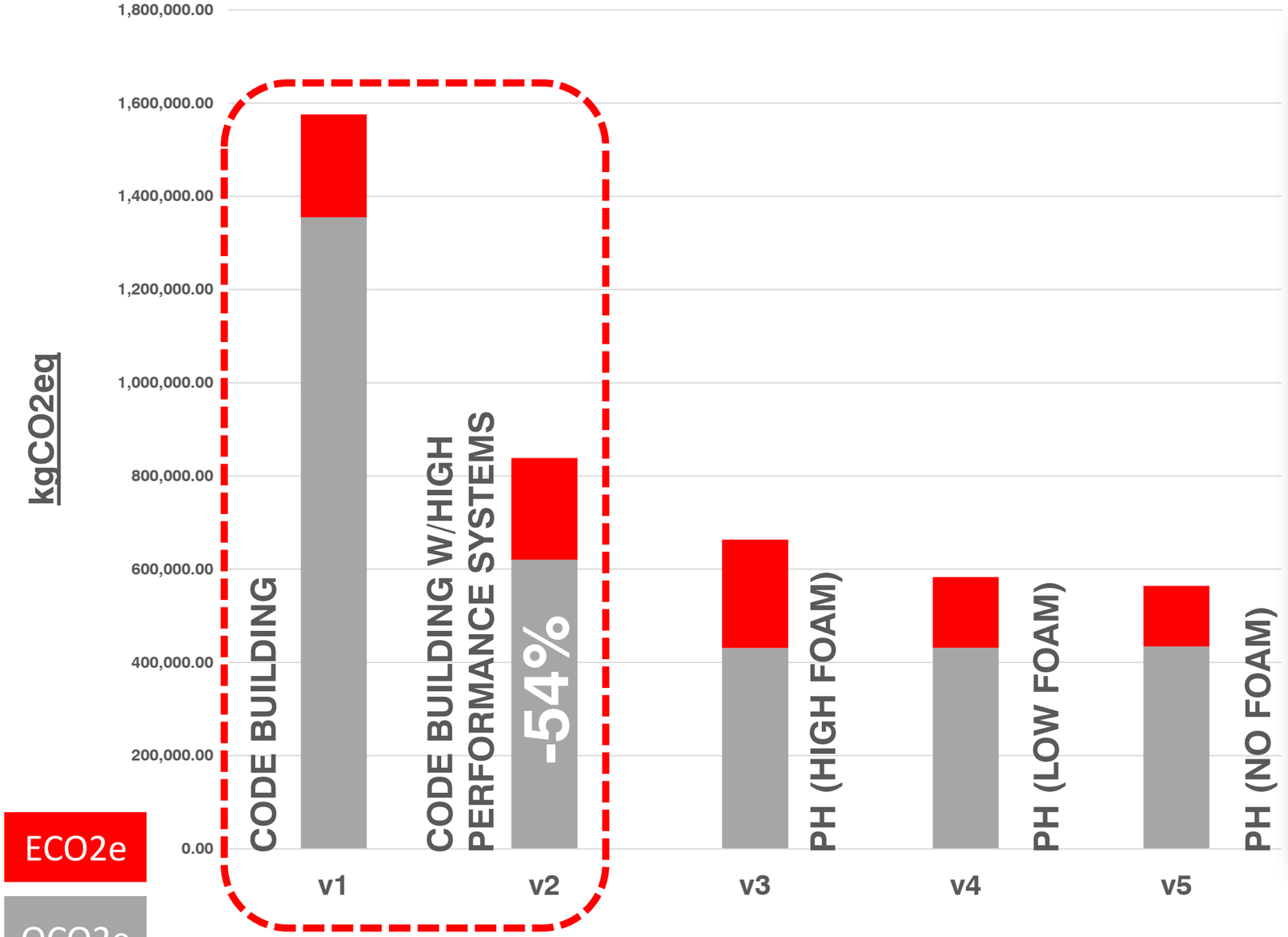
1. Slab: RF (R16), 4” CC



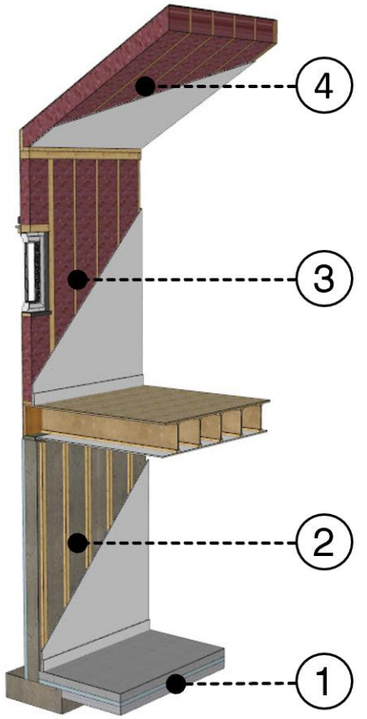
OERATIONAL AND EMBODIED CARBON - 60 YR ANALYSIS

tally™ ENVIRONMENTAL IMPACT TOOL

HIGH PERFORMANCE SYSTEMS…



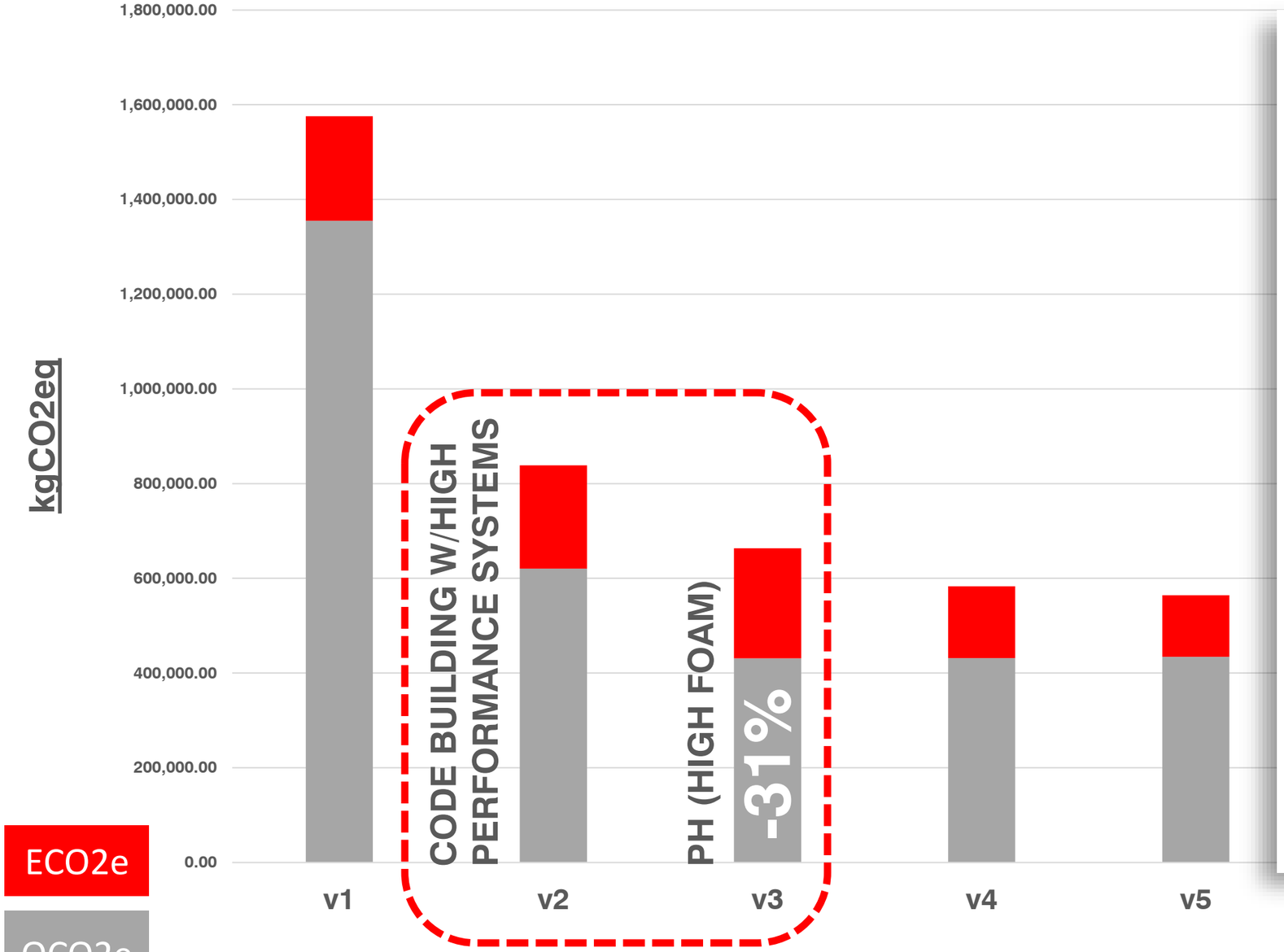
OERATIONAL AND EMBODIED CARBON - 60 YR ANALYSIS



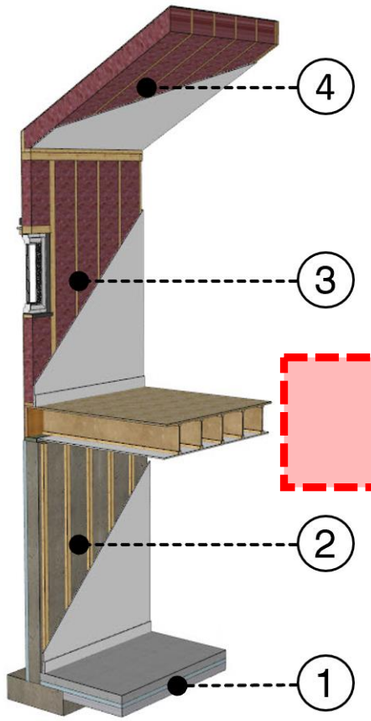
Case1&2

4. Roof: FG (R49), LVL
3. AG-Wall: FG (R19), 2X6
2. BG-Wall: EPS (R10), 8” CMU
1. Slab: XPS (R10), 4” CC

UPGRADE CODE ENVELOPE TO PH ENVELOPE

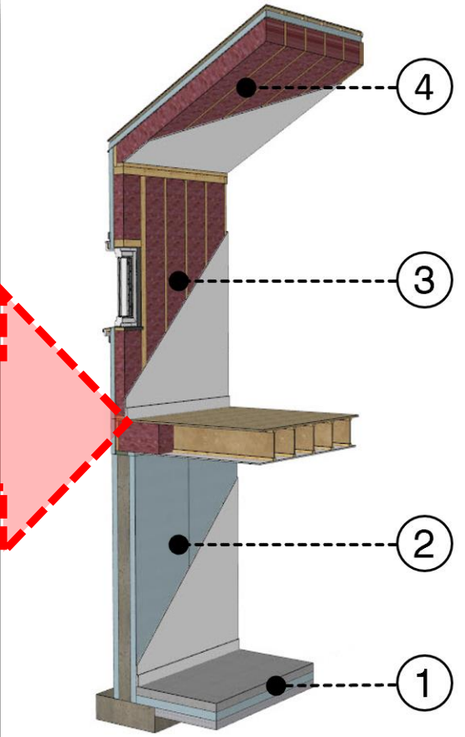


OERATIONAL AND EMBODIED CARBON - 60 YR ANALYSIS



Case1&2

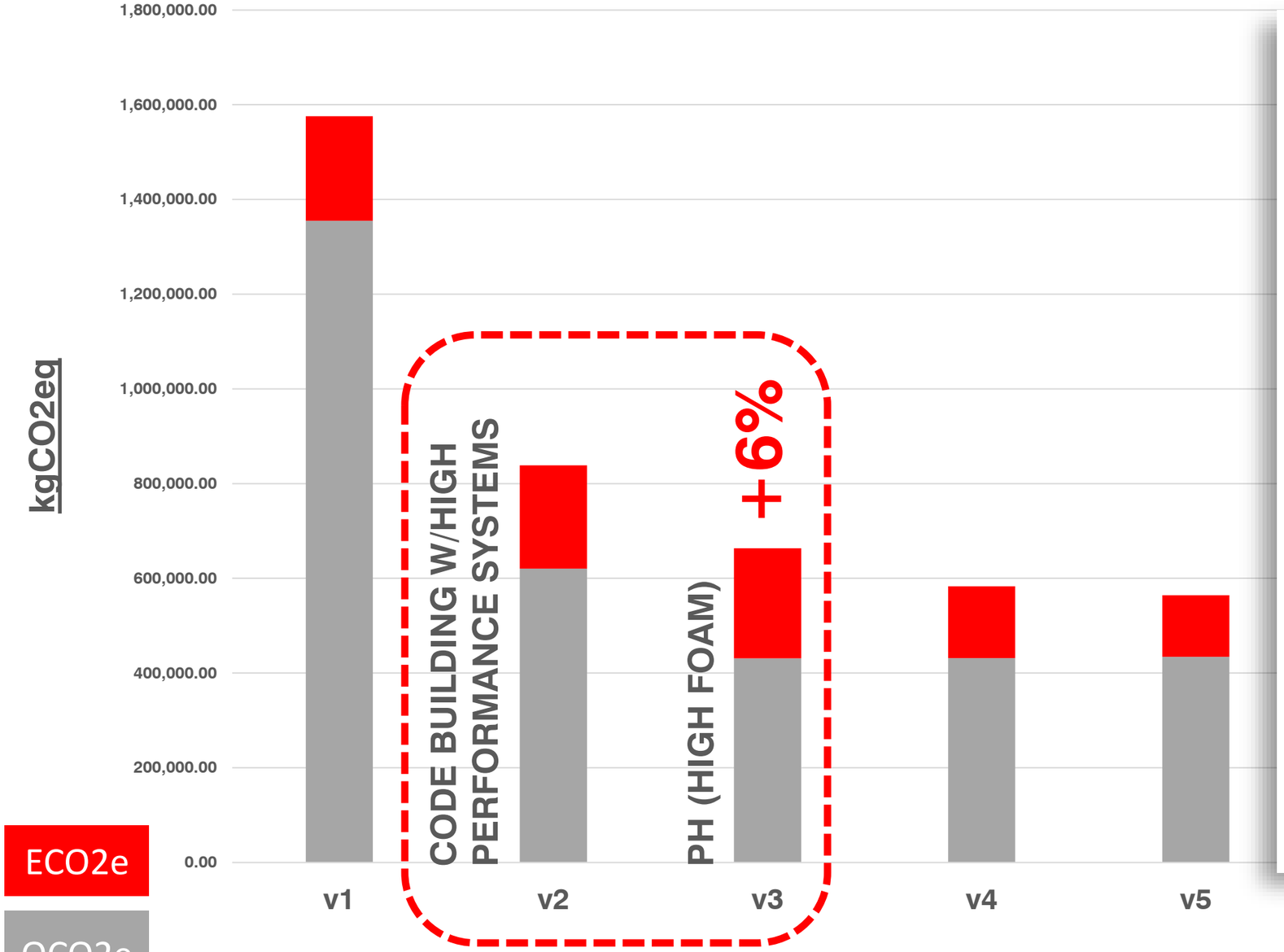
4. Roof: FG (R49), LVL
3. AG-Wall: FG (R19), 2X6
2. BG-Wall: EPS (R10), 8" CMU
1. Slab: XPS (R10), 4" CC



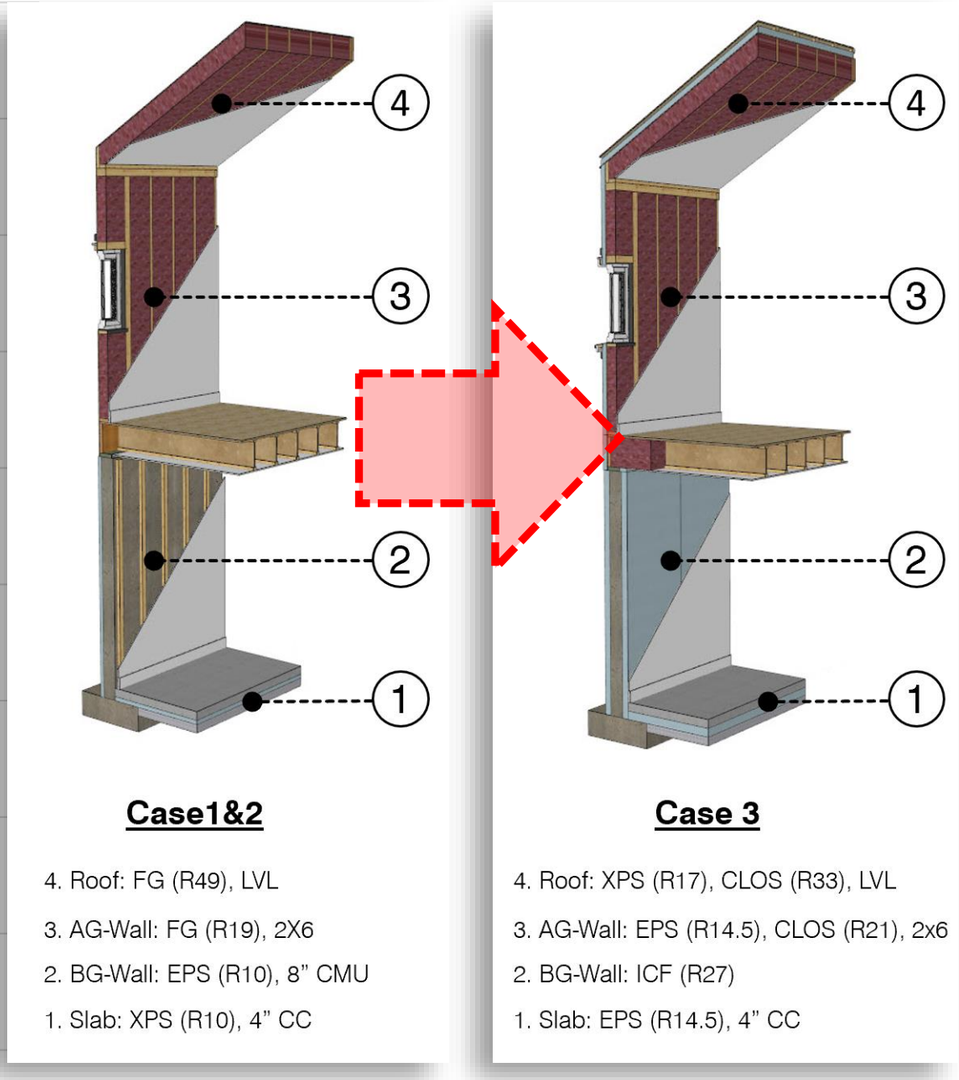
Case 3

4. Roof: XPS (R17), CLOS (R33), LVL
3. AG-Wall: EPS (R14.5), CLOS (R21), 2x6
2. BG-Wall: ICF (R27)
1. Slab: EPS (R14.5), 4" CC

UPGRADE CODE ENVELOPE TO PH ENVELOPE



OERATIONAL AND EMBODIED CARBON - 60 YR ANALYSIS



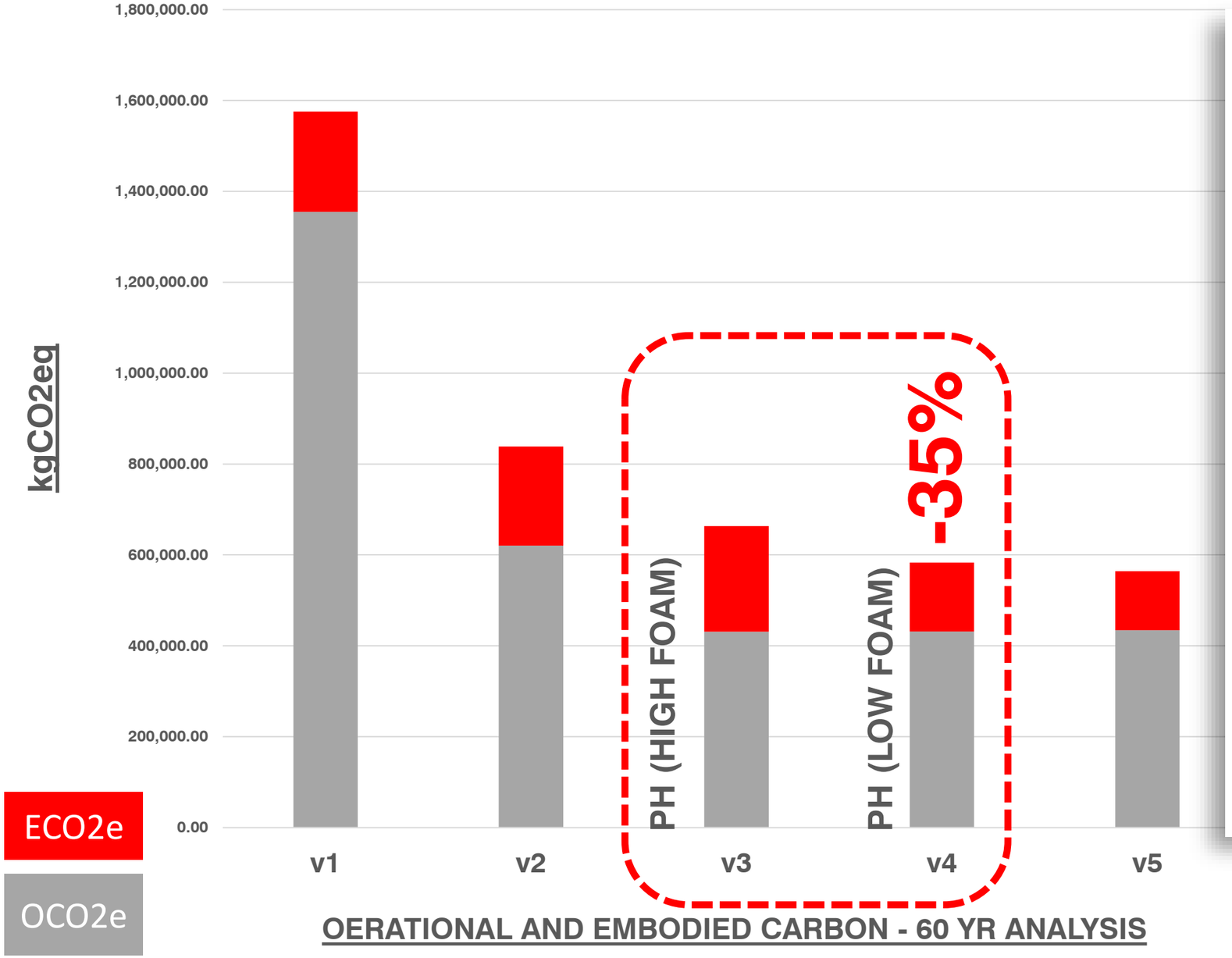
Case1&2

4. Roof: FG (R49), LVL
3. AG-Wall: FG (R19), 2X6
2. BG-Wall: EPS (R10), 8" CMU
1. Slab: XPS (R10), 4" CC

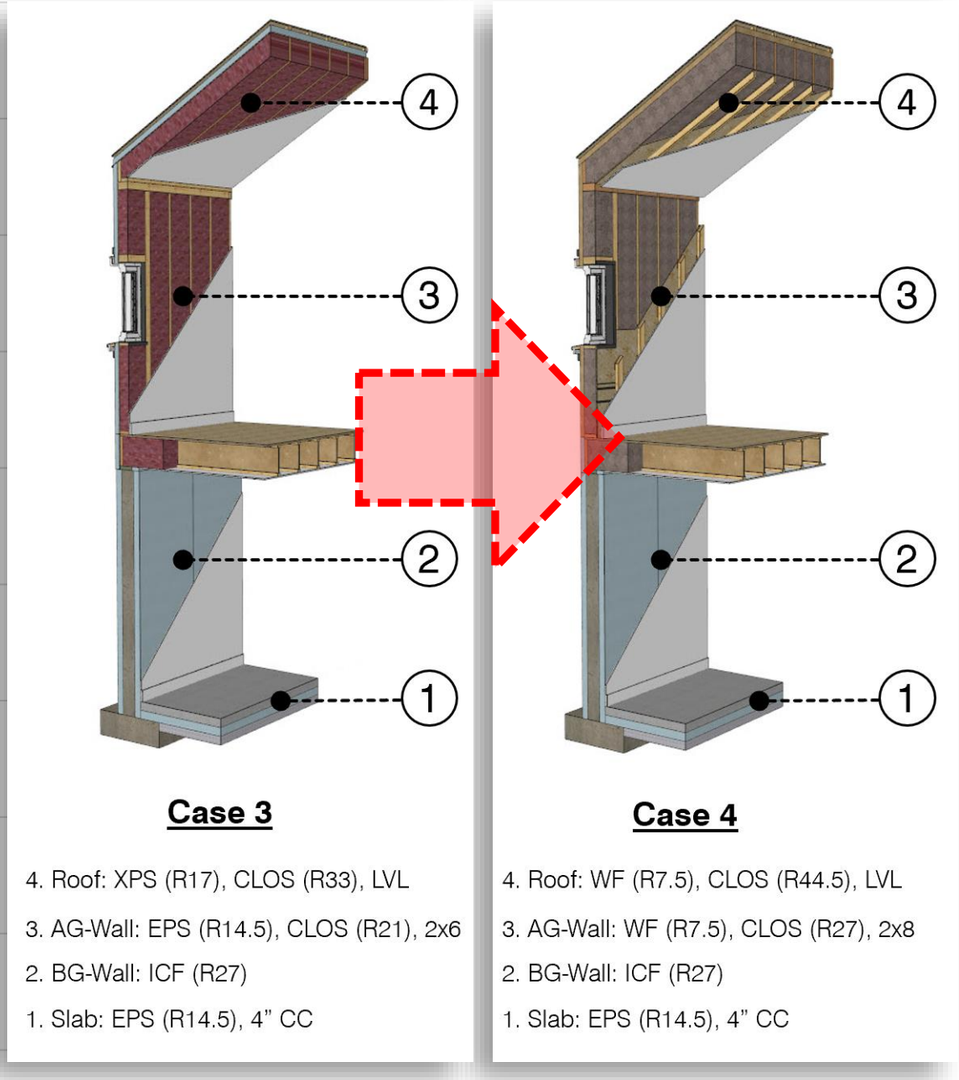
Case 3

4. Roof: XPS (R17), CLOS (R33), LVL
3. AG-Wall: EPS (R14.5), CLOS (R21), 2x6
2. BG-Wall: ICF (R27)
1. Slab: EPS (R14.5), 4" CC

UPGRADE PH ENVELOPE TO LOW CO2e PH ENVELOPE



OERATIONAL AND EMBODIED CARBON - 60 YR ANALYSIS



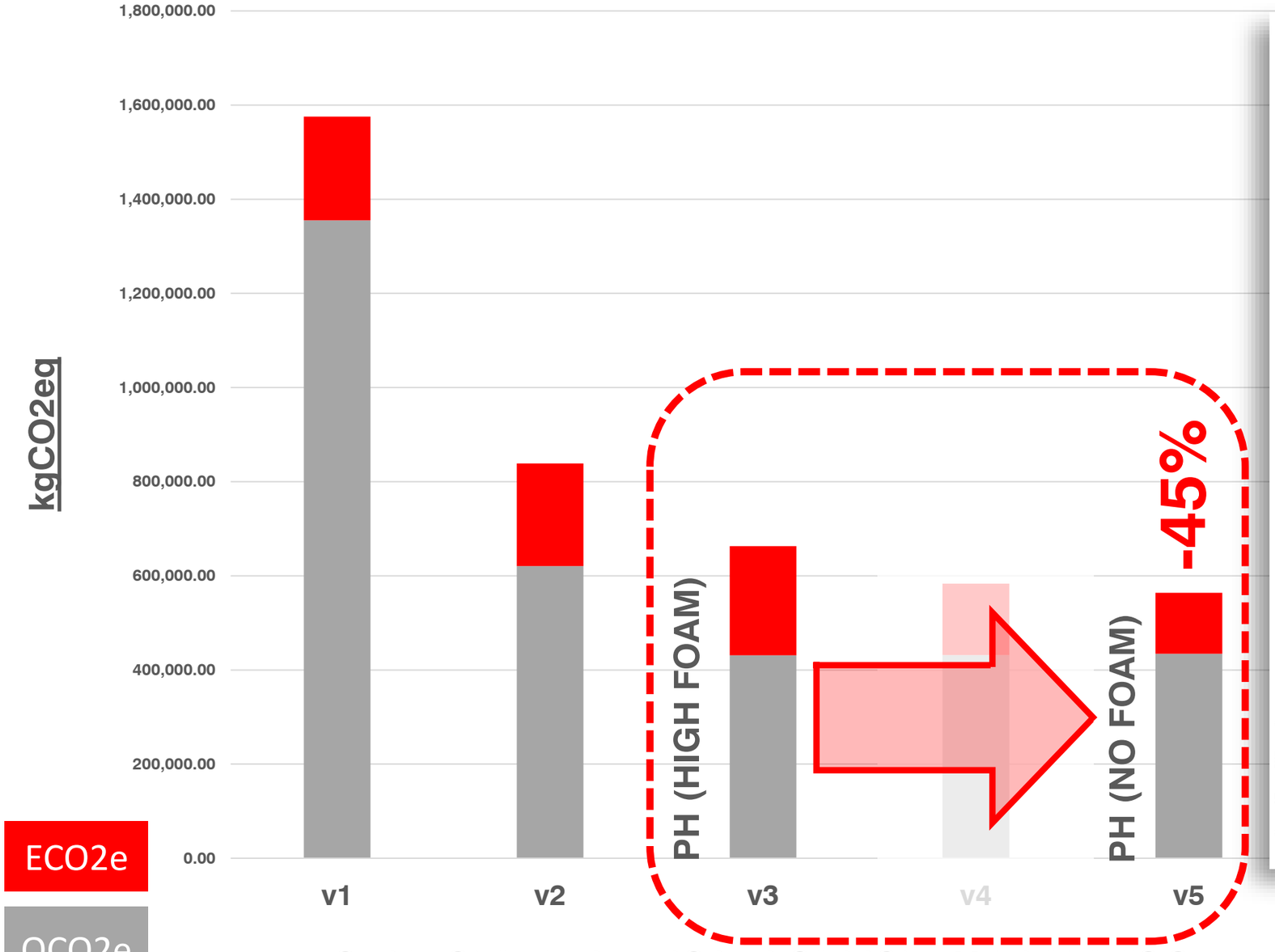
Case 3

4. Roof: XPS (R17), CLOS (R33), LVL
3. AG-Wall: EPS (R14.5), CLOS (R21), 2x6
2. BG-Wall: ICF (R27)
1. Slab: EPS (R14.5), 4" CC

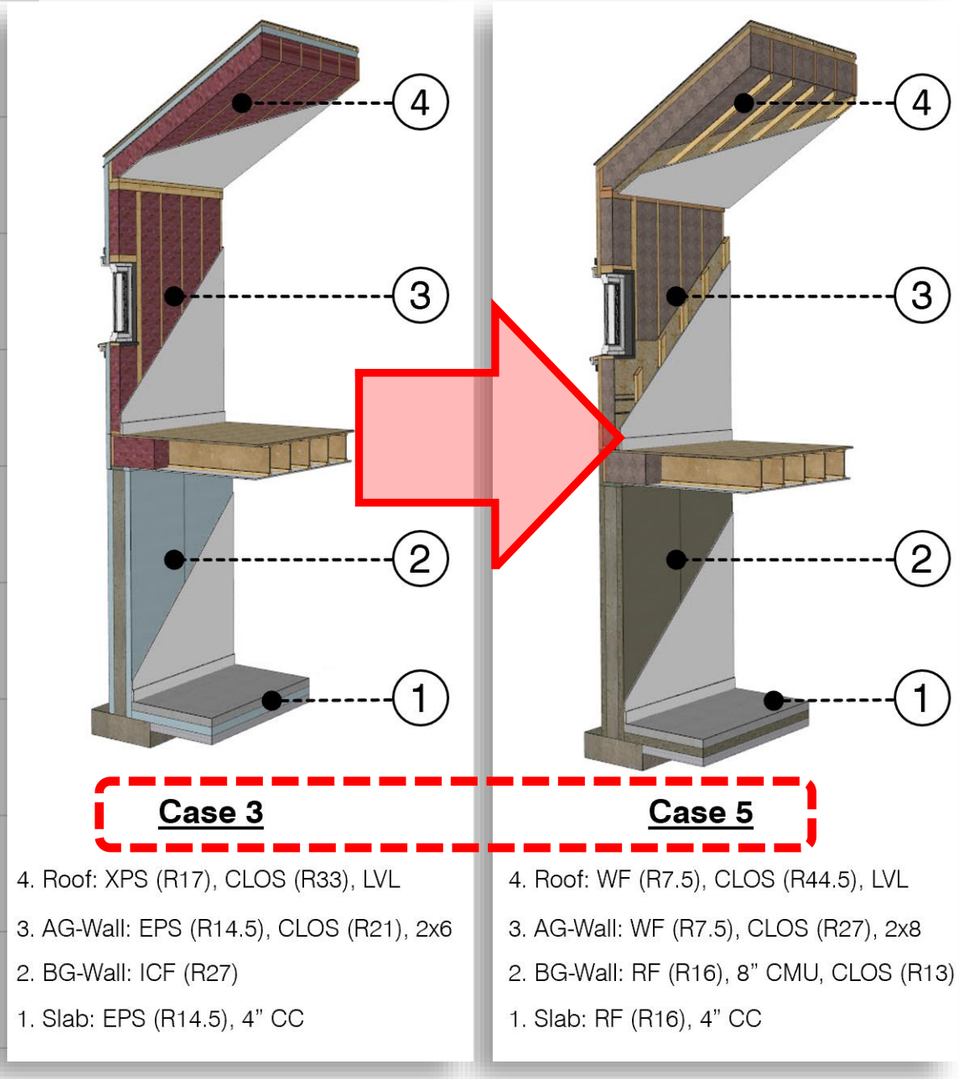
Case 4

4. Roof: WF (R7.5), CLOS (R44.5), LVL
3. AG-Wall: WF (R7.5), CLOS (R27), 2x8
2. BG-Wall: ICF (R27)
1. Slab: EPS (R14.5), 4" CC

UPGRADING THE LOW CARBON PH ENVELOPE WITH FOAM FREE MATERIALS DECREASED ECO2e ~54%

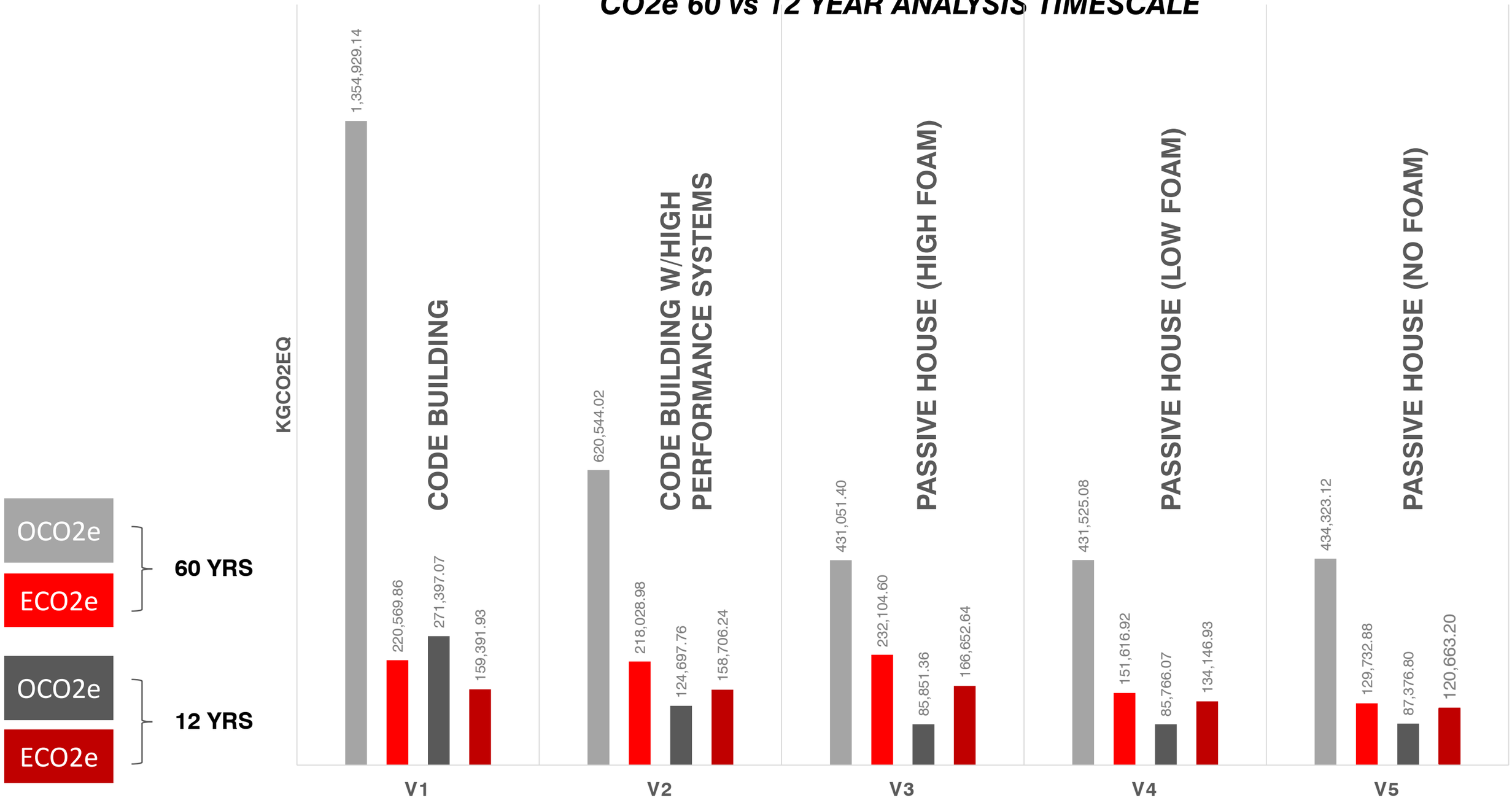


OERATIONAL AND EMBODIED CARBON - 60 YR ANALYSIS

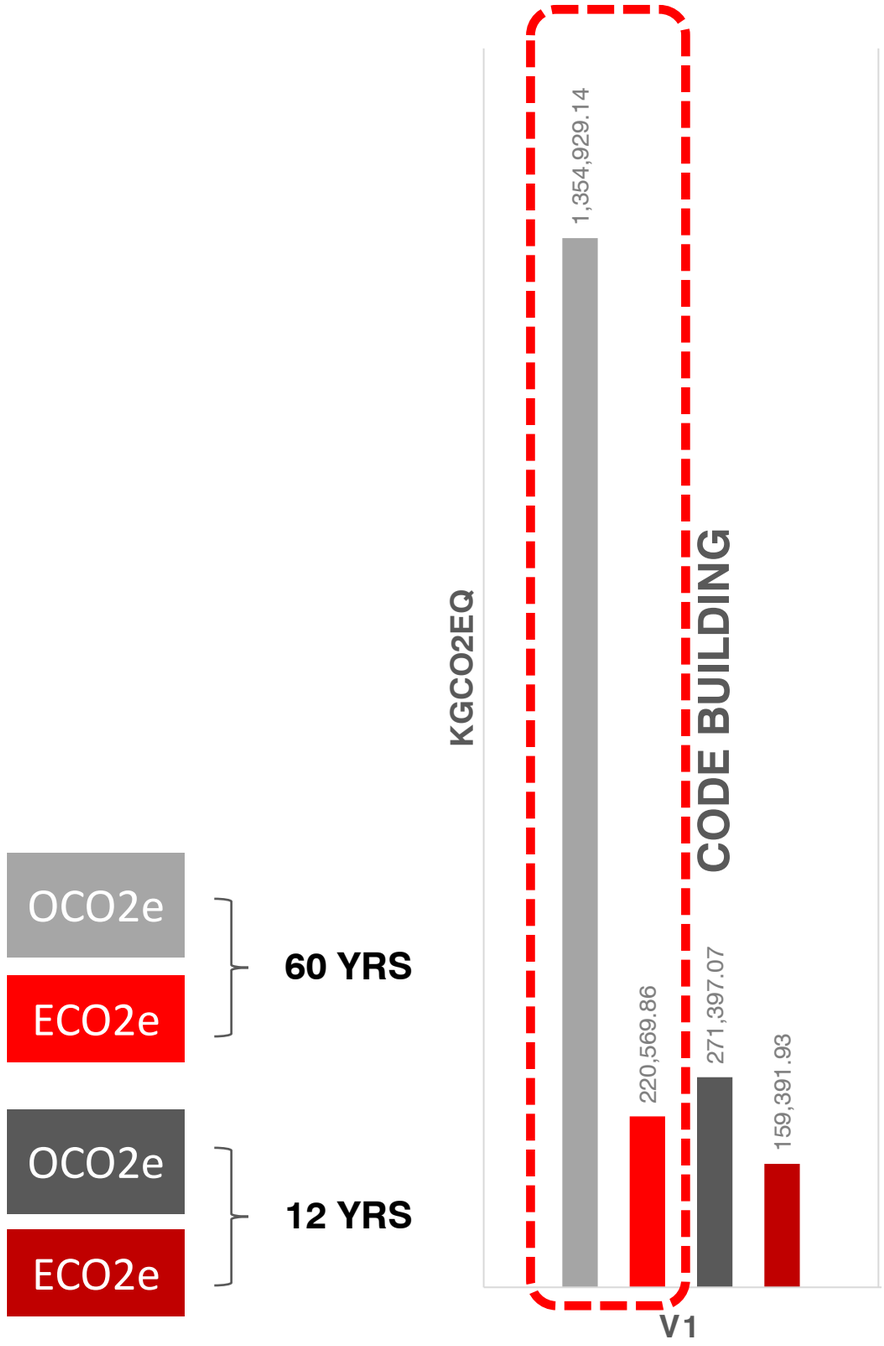


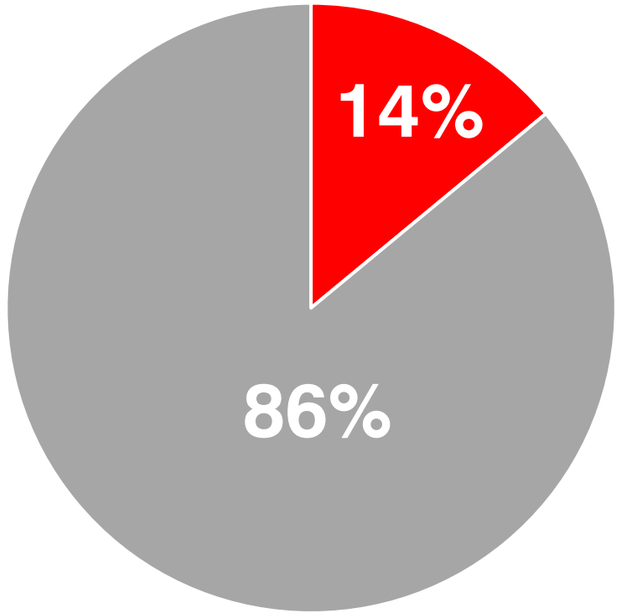
Case 3	Case 5
4. Roof: XPS (R17), CLOS (R33), LVL	4. Roof: WF (R7.5), CLOS (R44.5), LVL
3. AG-Wall: EPS (R14.5), CLOS (R21), 2x6	3. AG-Wall: WF (R7.5), CLOS (R27), 2x8
2. BG-Wall: ICF (R27)	2. BG-Wall: RF (R16), 8” CMU, CLOS (R13)
1. Slab: EPS (R14.5), 4” CC	1. Slab: RF (R16), 4” CC

CO2e 60 vs 12 YEAR ANALYSIS TIMESCALE



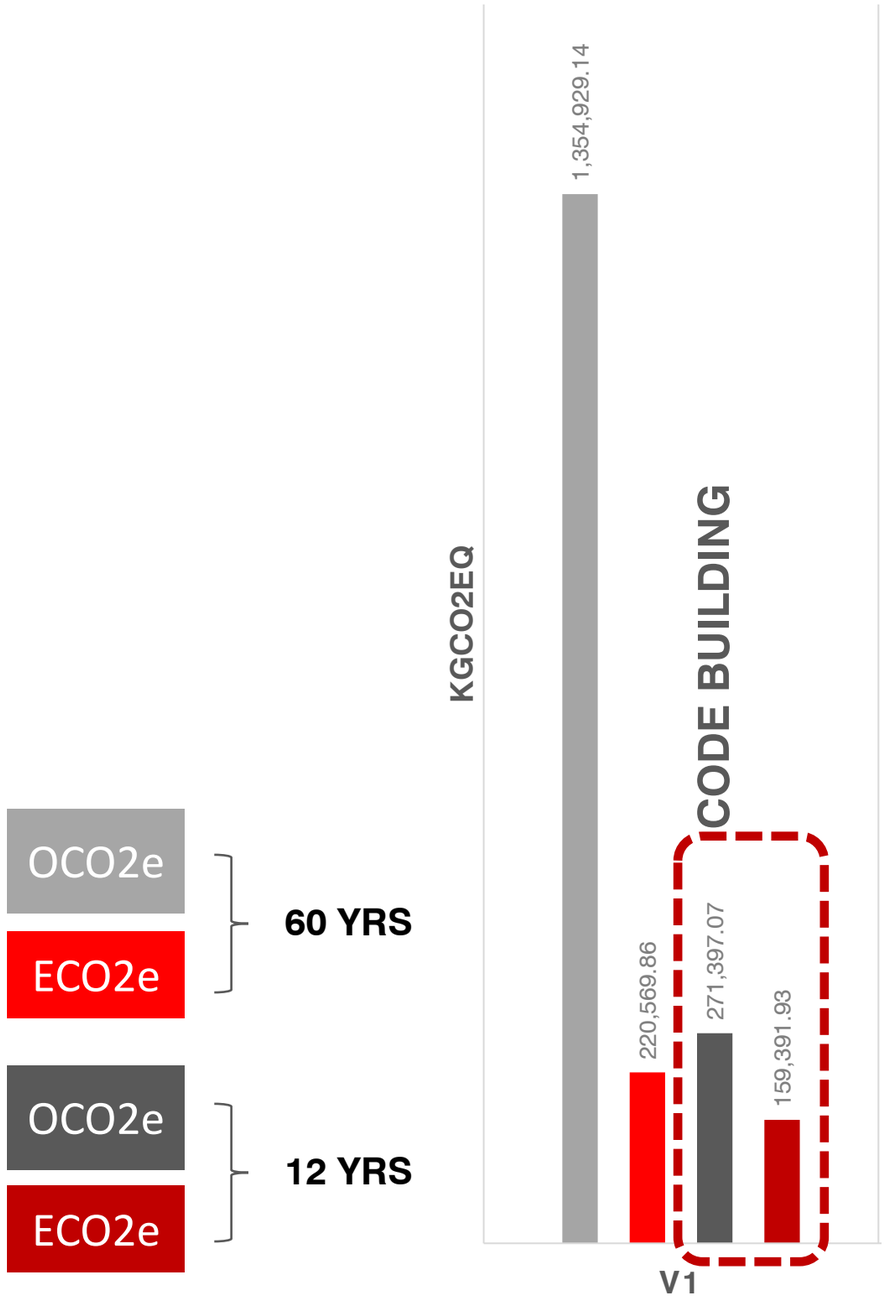
CO2e 60 vs 12 YEAR ANALYSIS TIMESCALE

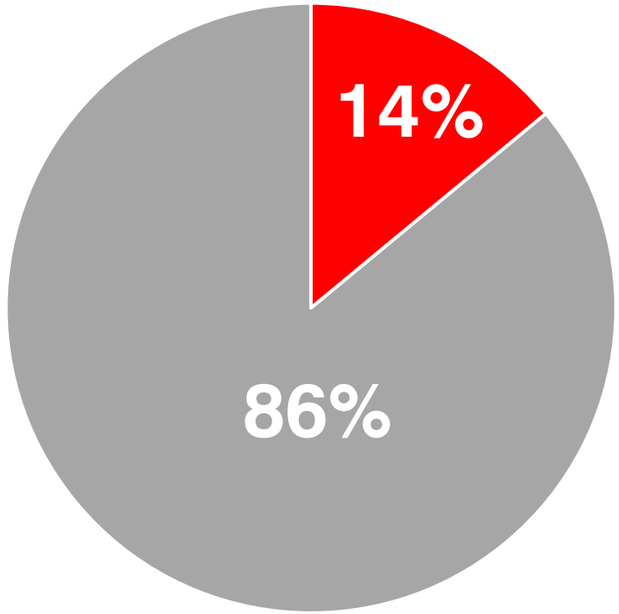




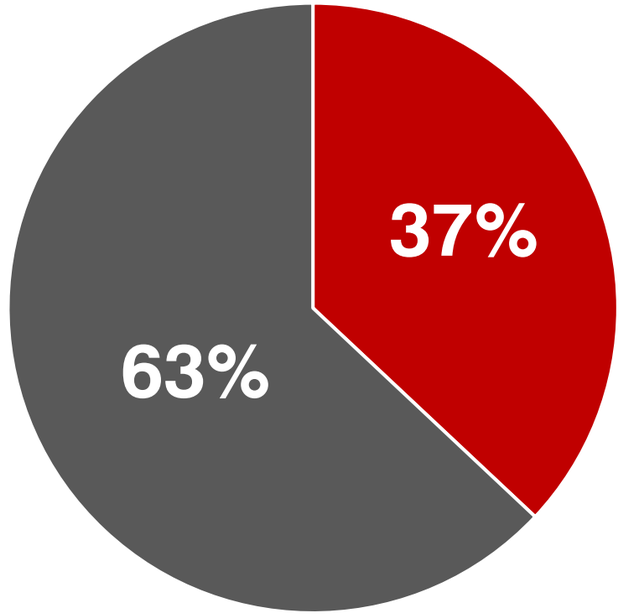
TOTAL CO2e
60 YRS

CO2e 60 vs 12 YEAR ANALYSIS TIMESCALE



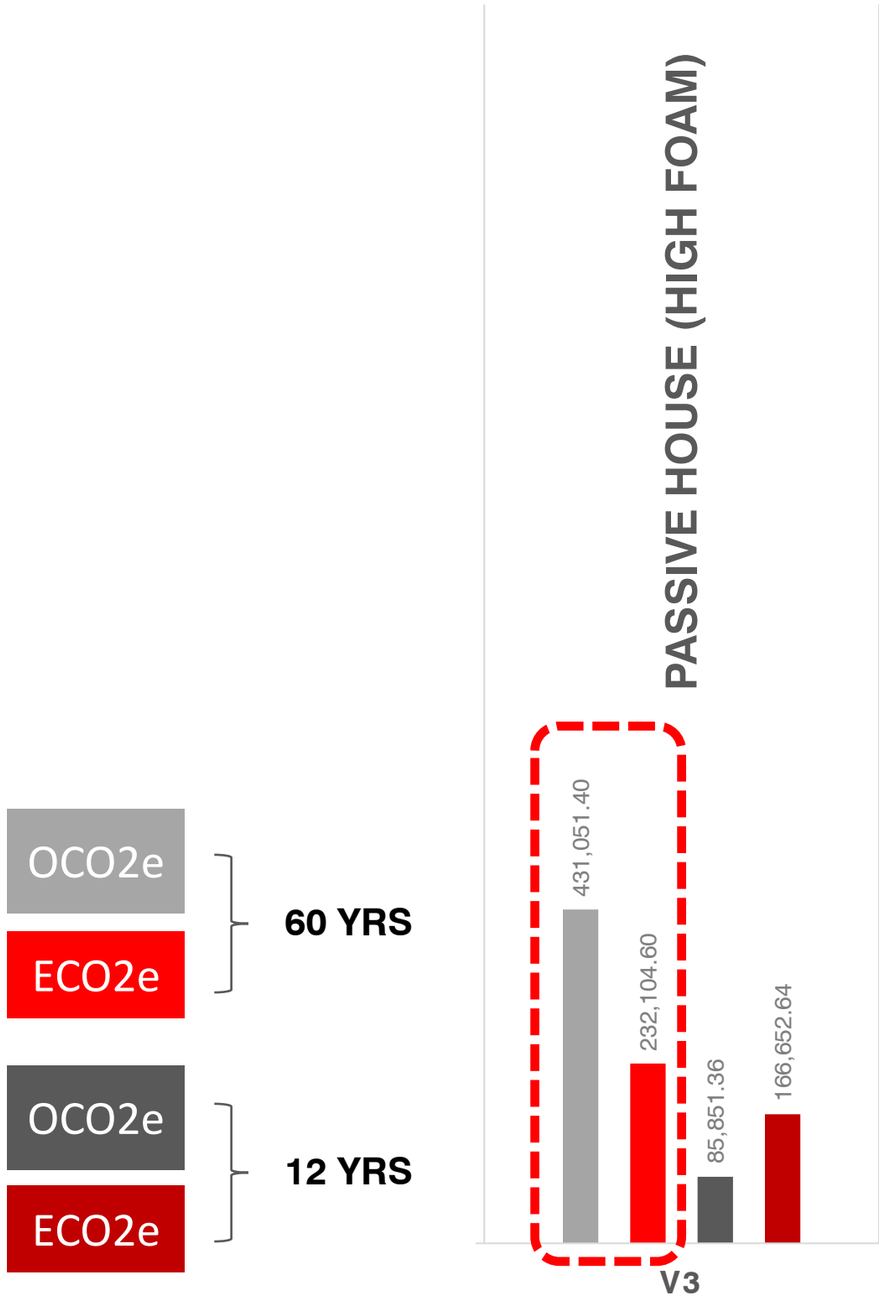


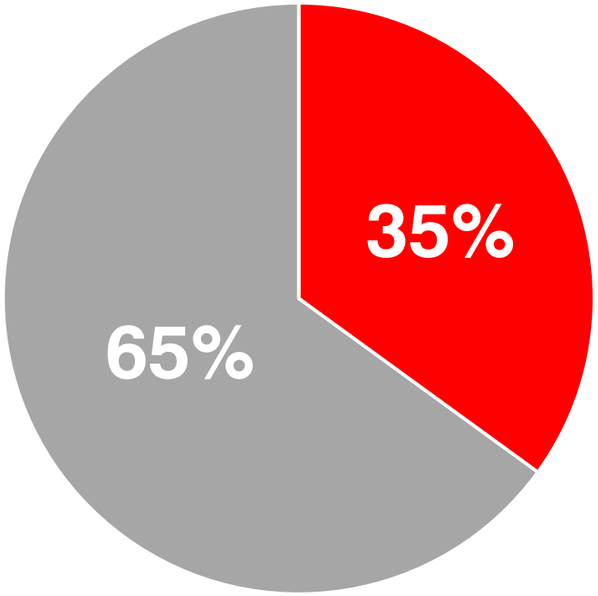
TOTAL CO2e
60 YRS



TOTAL CO2e
12 YRS

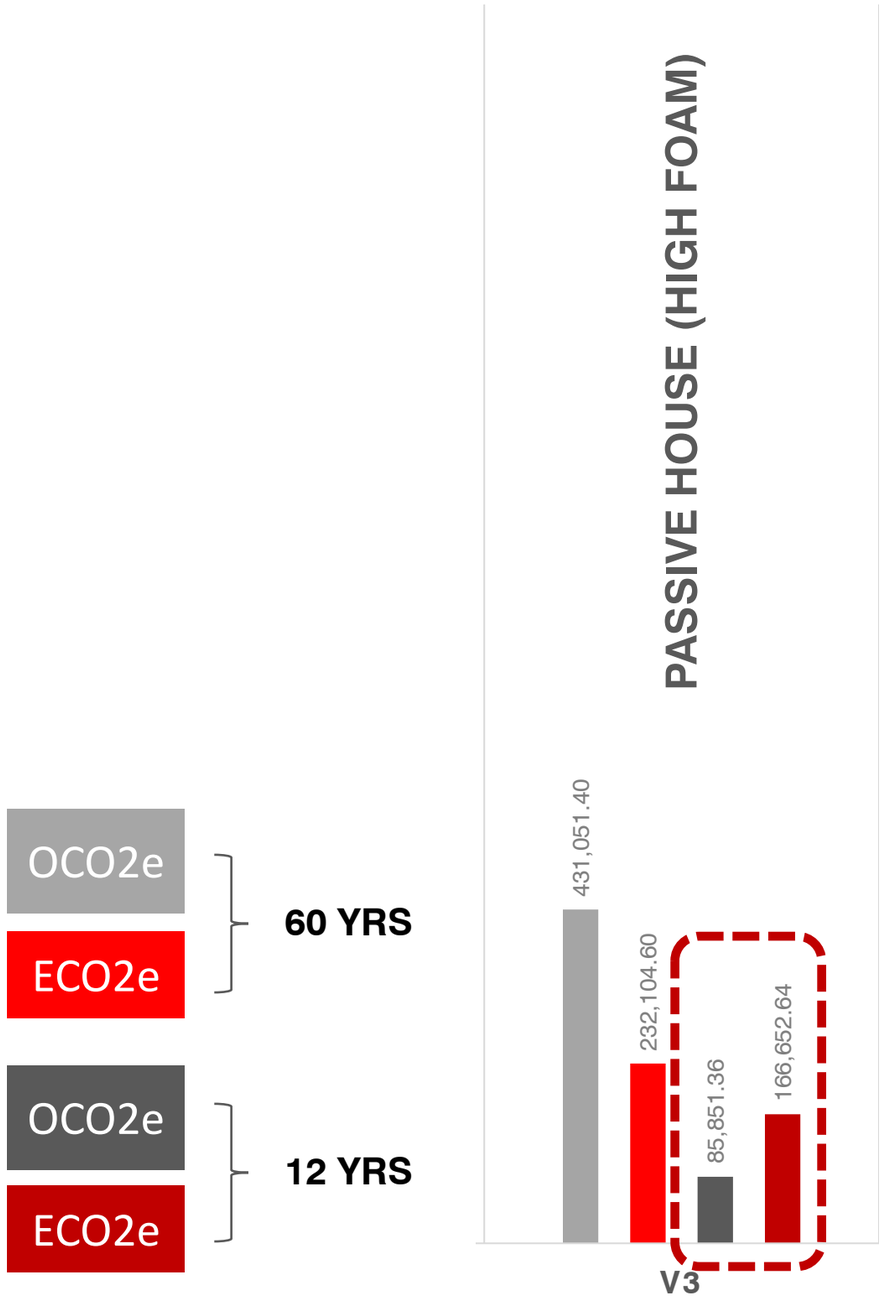
CO2e 60 vs 12 YEAR ANALYSIS TIMESCALE

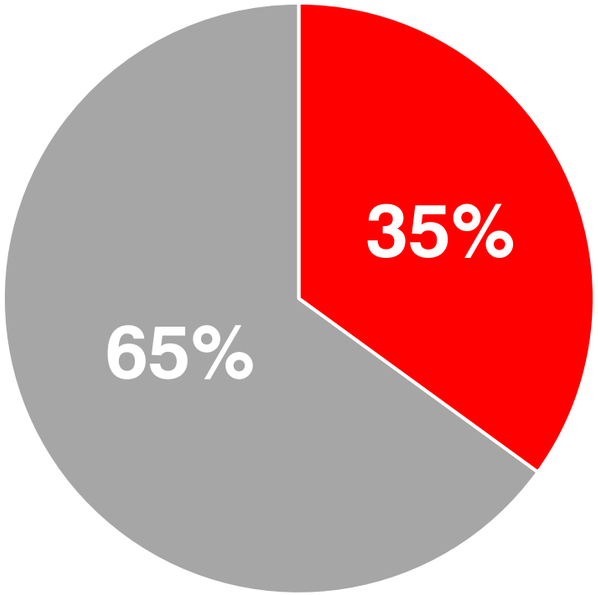




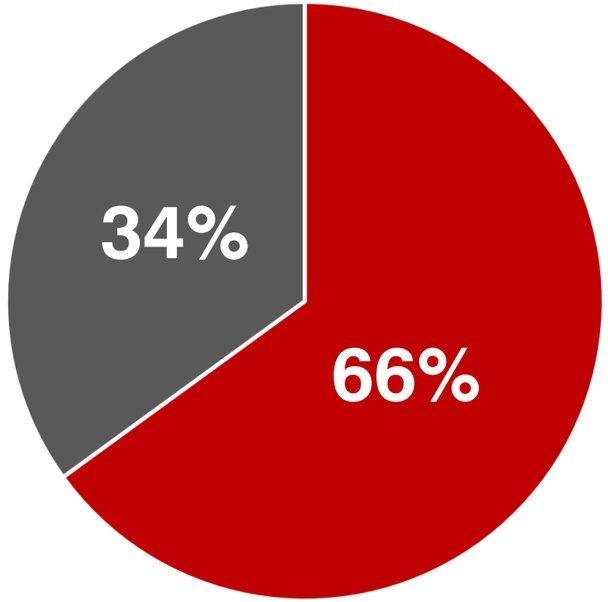
TOTAL CO2e
60 YRS

CO2e 60 vs 12 YEAR ANALYSIS TIMESCALE



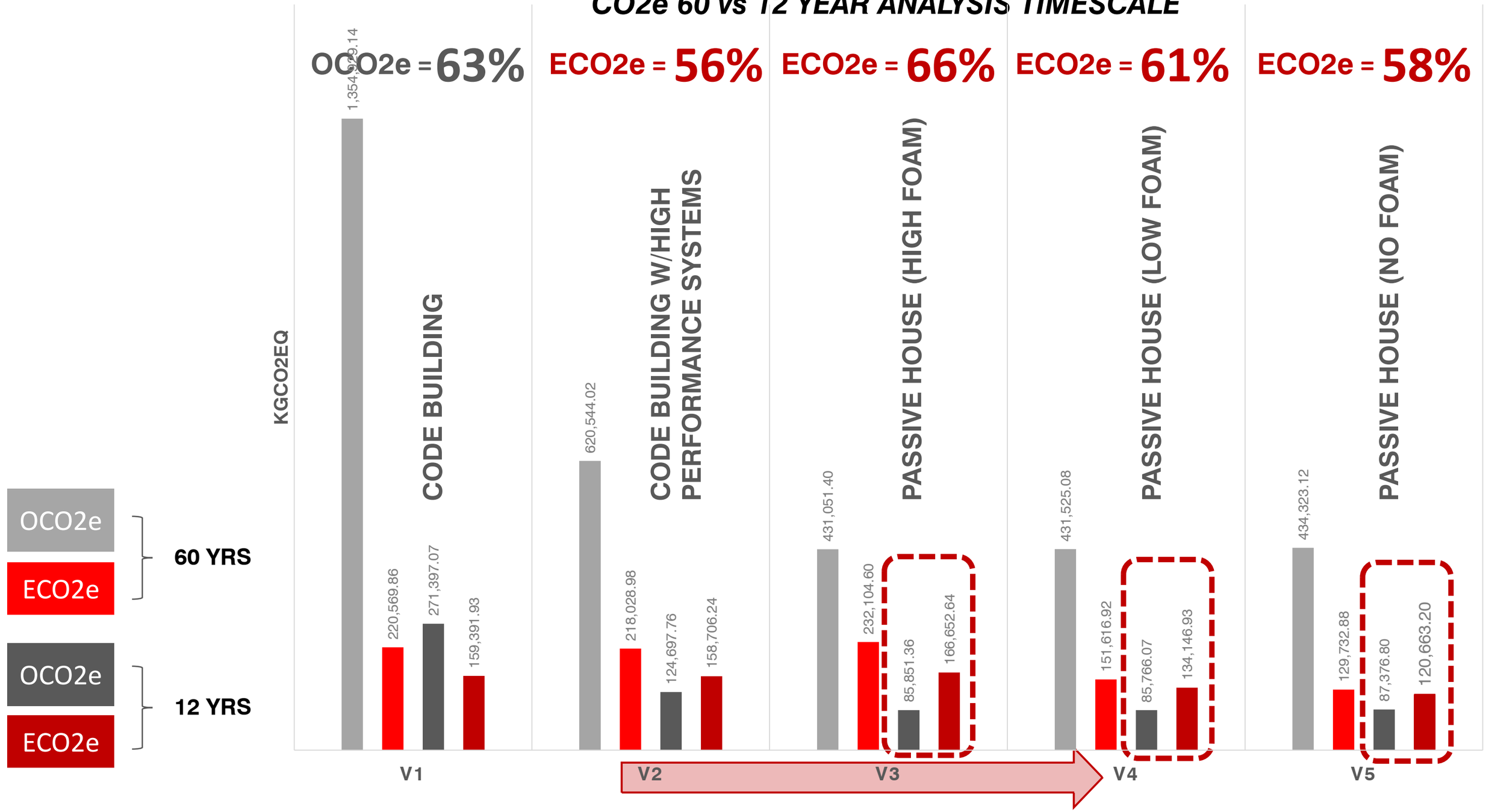


TOTAL CO2e
60 YRS



TOTAL CO2e
12 YRS

CO2e 60 vs 12 YEAR ANALYSIS TIMESCALE



Factory Built – Opportunity to Scale up Passive House

Factory Built – Waste Reduction and Opportunity to Specify Sustainable Building Materials

Blueprint Robotics

OPPORTUNITIES

Specification and Optimization for Prefabrication

Wood Fiber as Vapor Open Exterior Insulation and Sheathing
- Up to 4x the drying capacity compared to outside layers for typical plywood or OSB sheathed assemblies.

Wood Stud Wall filled with Cellulose
- Moisture Management and Hygric Buffering

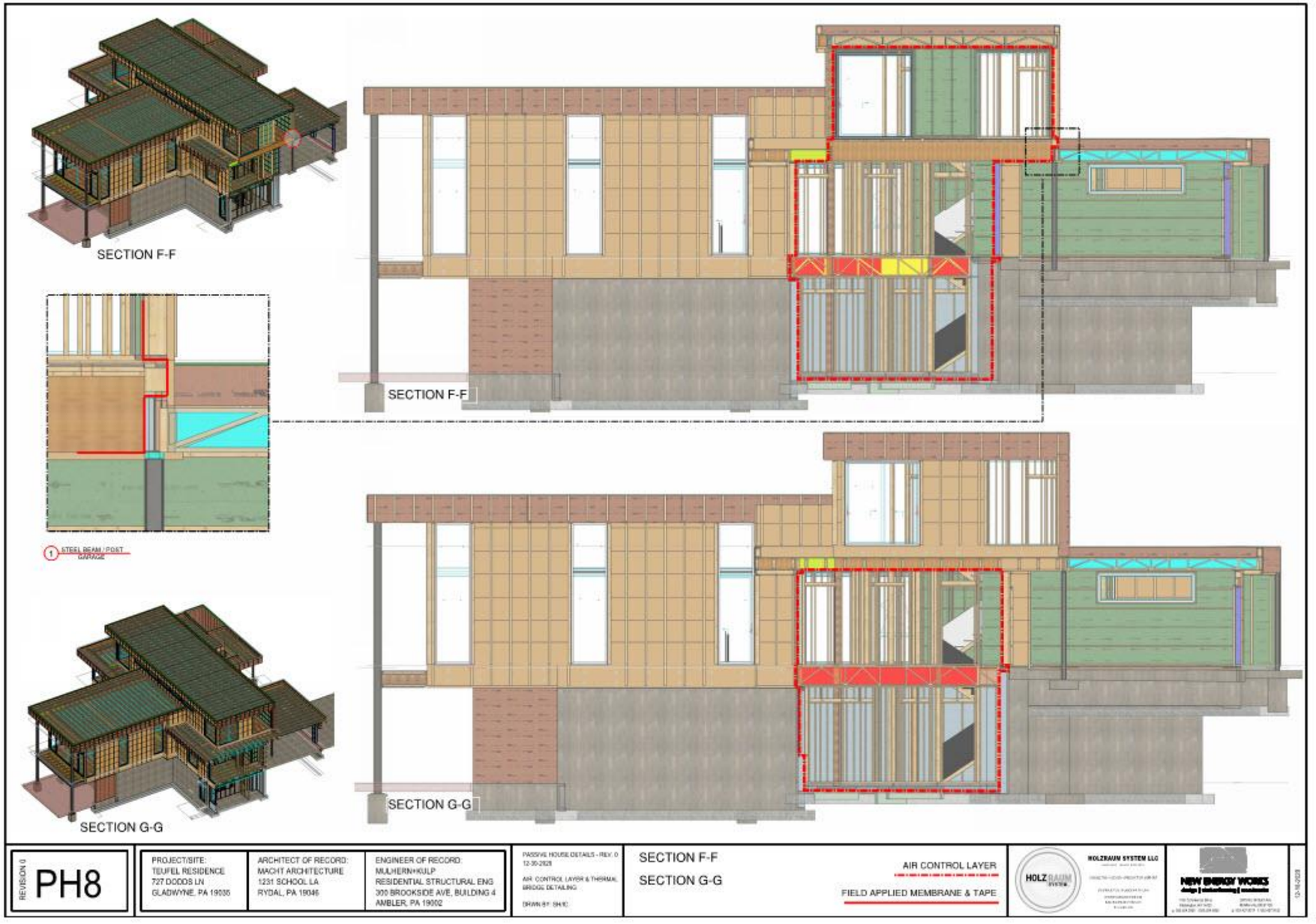
Interior Structural OSB- or Zip Sheathing
- Interior Air-Barrier and Vapor-Retarder

Service Cavity
- Separation of Service access from Permanent Performance Envelope.
- Air-Barrier Protection

Pre-Installed, Triple Glazed Passive House Windows

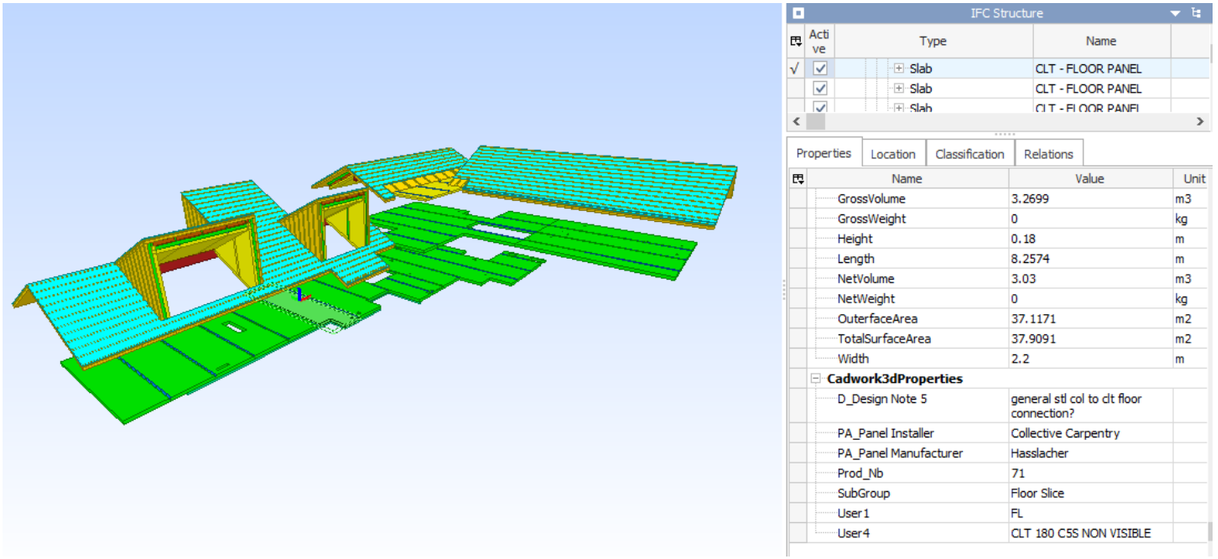
OPPORTUNITIES

Passive House Detailing and Instructions



OPPORTUNITIES

Future SIMM



IFC Structure

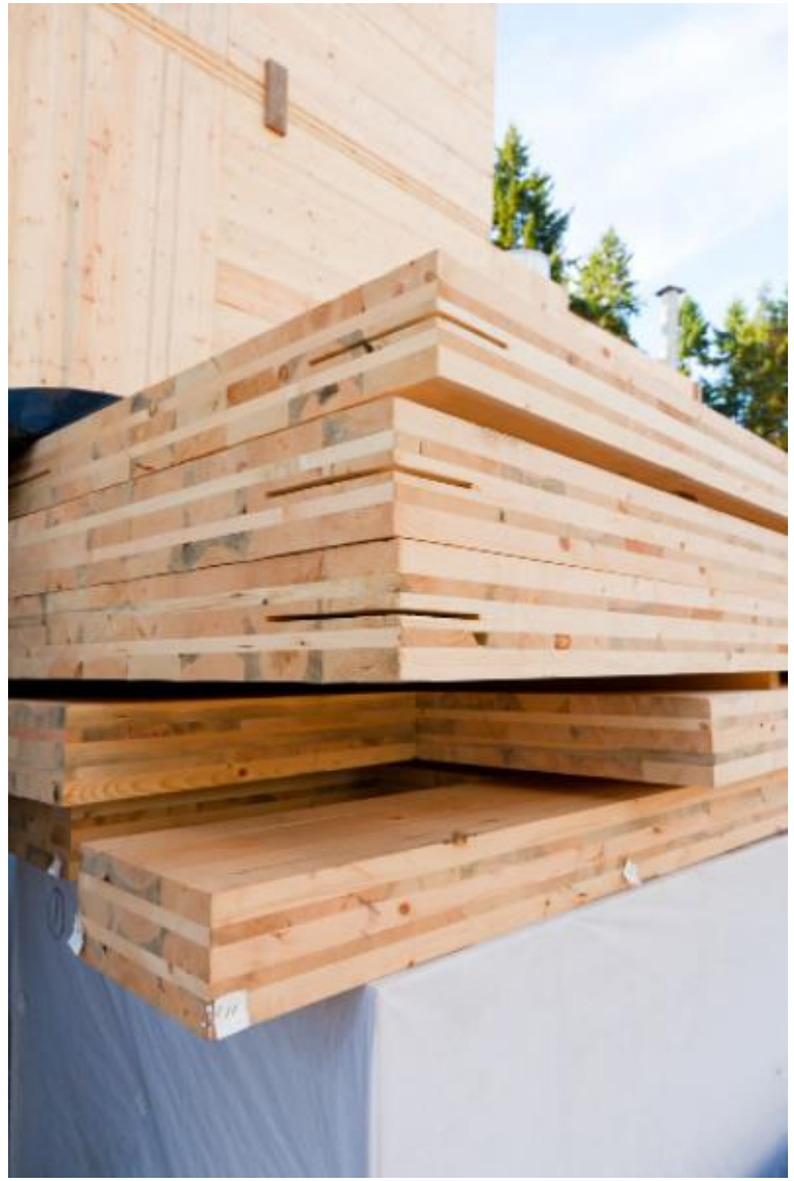
Active	Type	Name
√	Slab	CLT - FLOOR PANEL
	Slab	CLT - FLOOR PANEL
	Slab	CLT - FLOOR PANEL

Properties | Location | Classification | Relations

Name	Value	Unit
GrossVolume	3.2699	m3
GrossWeight	0	kg
Height	0.18	m
Length	8.2574	m
NetVolume	3.03	m3
NetWeight	0	kg
OuterfaceArea	37.1171	m2
TotalSurfaceArea	37.9091	m2
Width	2.2	m
Cadwork3dProperties		
D_Design Note 5	general stl col to clt floor connection?	
PA_Panel Installer	Collective Carpentry	
PA_Panel Manufacturer	Hasslacher	
Prod_Nb	71	
SubGroup	Floor Slice	
User1	FL	
User4	CLT 180 C5S NON VISIBLE	

Once a holistic parts-based model is virtually constructed, it begins to offer limitless opportunities as an evolving visual database that can store and release project data in very organized ways.

It can guide present and future operational, performance, and repurposing goals and can stay accessible throughout and beyond the building’s lifecycle.

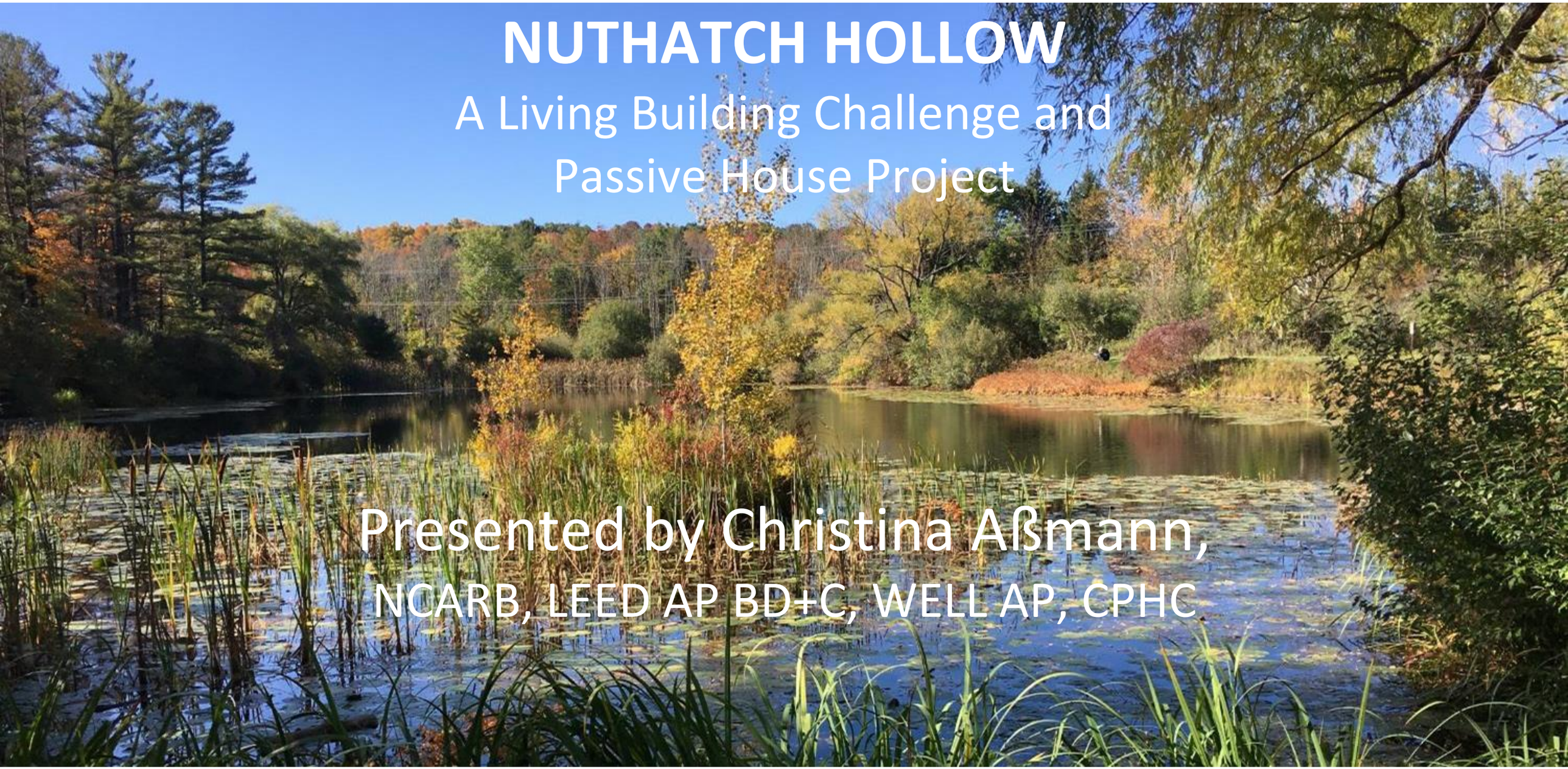


Reaching to meet PH certification shouldn’t supersede the broader design goals to achieve the best possible outcome including sustainability and occupant’s health and comfort.

Certification and Wufi modeling needs to be looked at as an adaptive tool that is part of the overall design process, but it shouldn't take over.

Passive House Certification is instrumental for the push towards lowering energy consumption in the building sector on a large scale.

PHIUS certification assures quality control and provides education to build better buildings far beyond the building code, paving the way for broad adaptation.

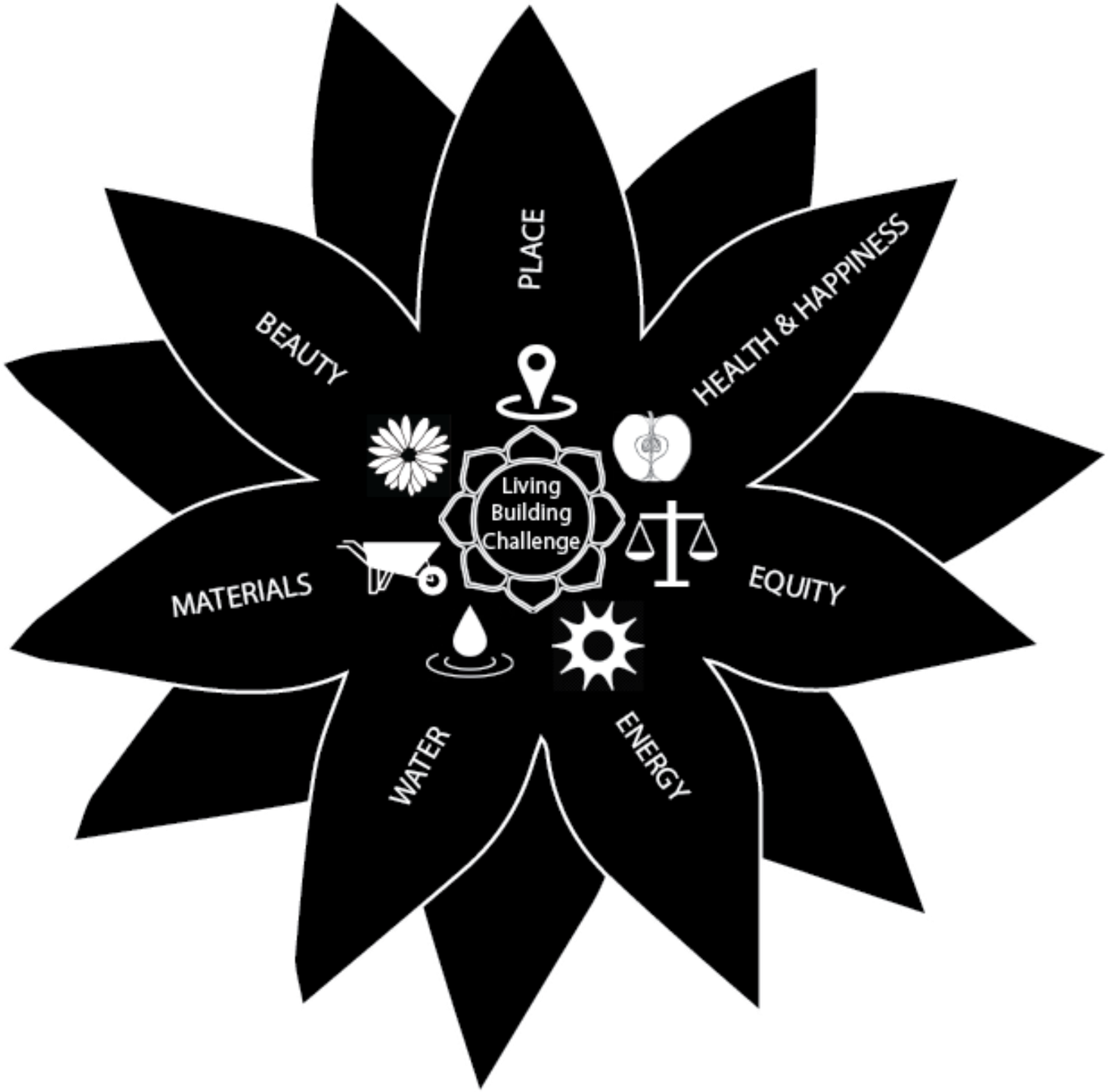


NUTHATCH HOLLOW

A Living Building Challenge and Passive House Project

Presented by Christina Aßmann,
NCARB, LEED AP BD+C, WELL AP, CPHC

Living Building Challenge



MATERIALS

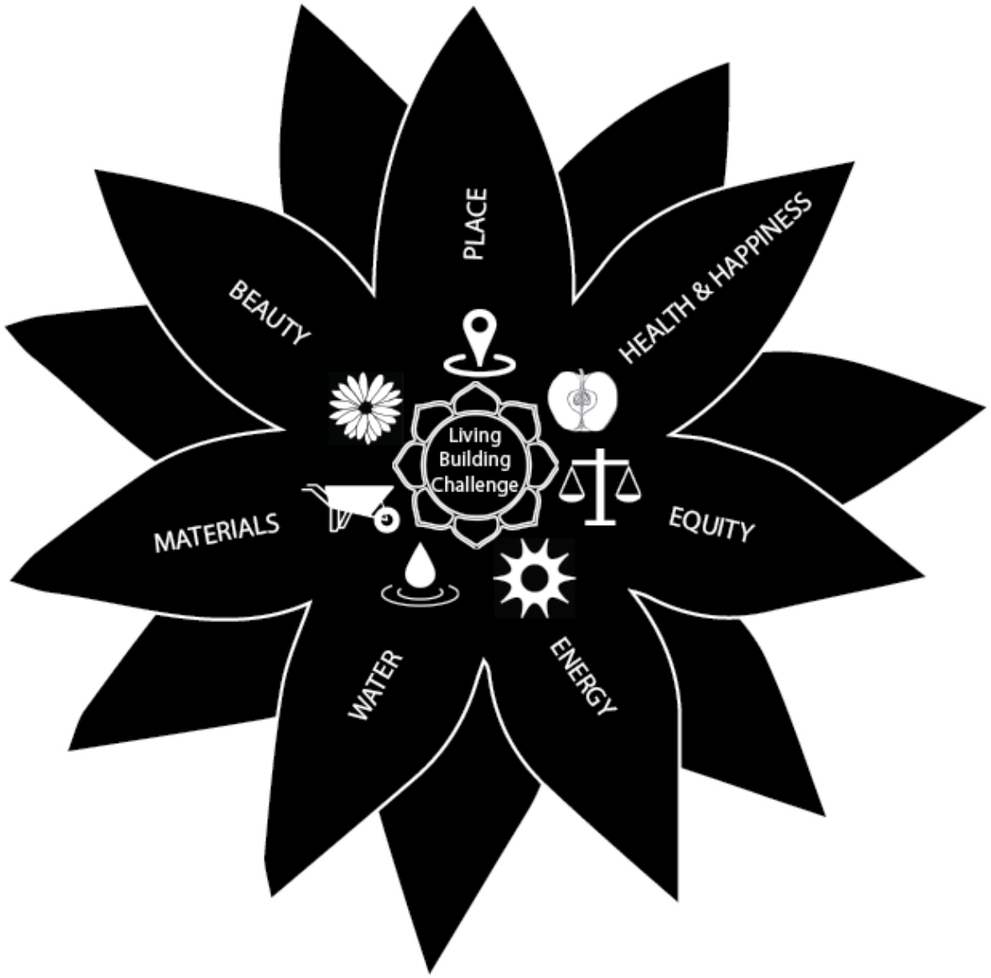
- Most challenging
- Red list of materials/ chemicals
- Understand and offset embodied carbon
- Regional materials
- Reduce or eliminate waste

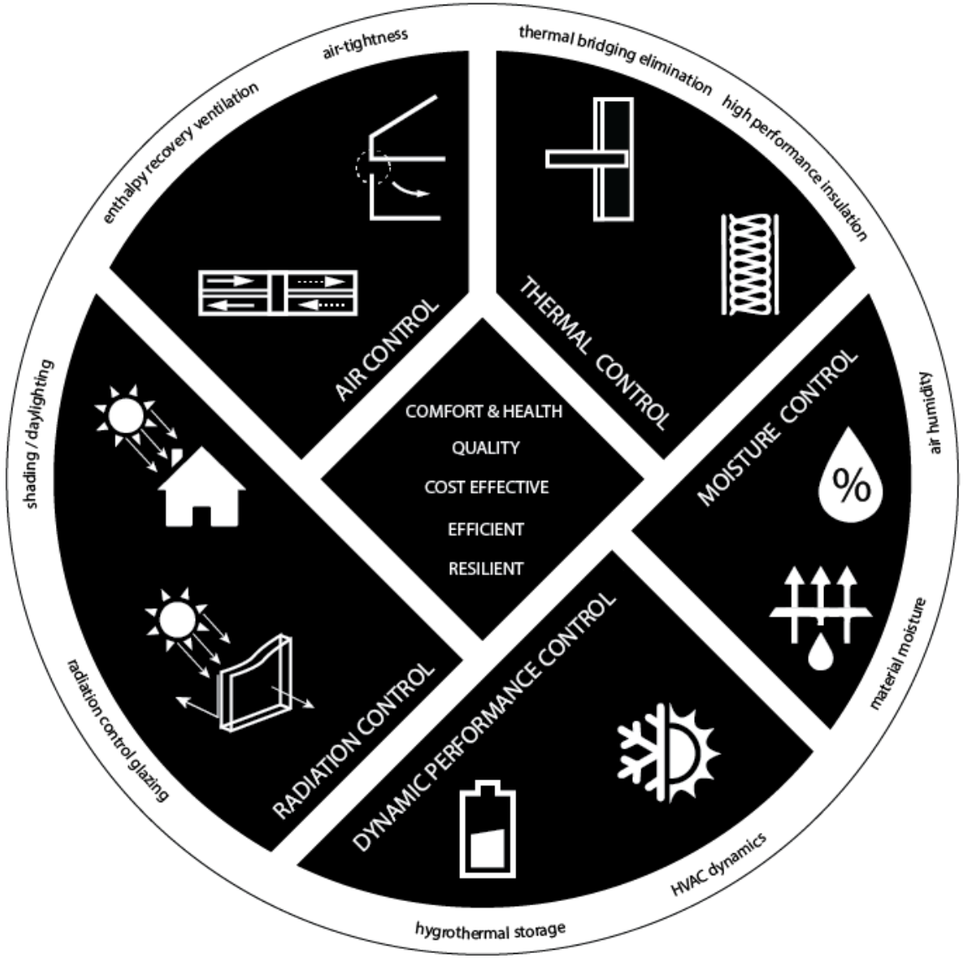
UniverCity Childcare Centre
Burnaby, BC
Courtesy space2place

- Net-Zero Water
- Rainwater
- Waste Water Treatment

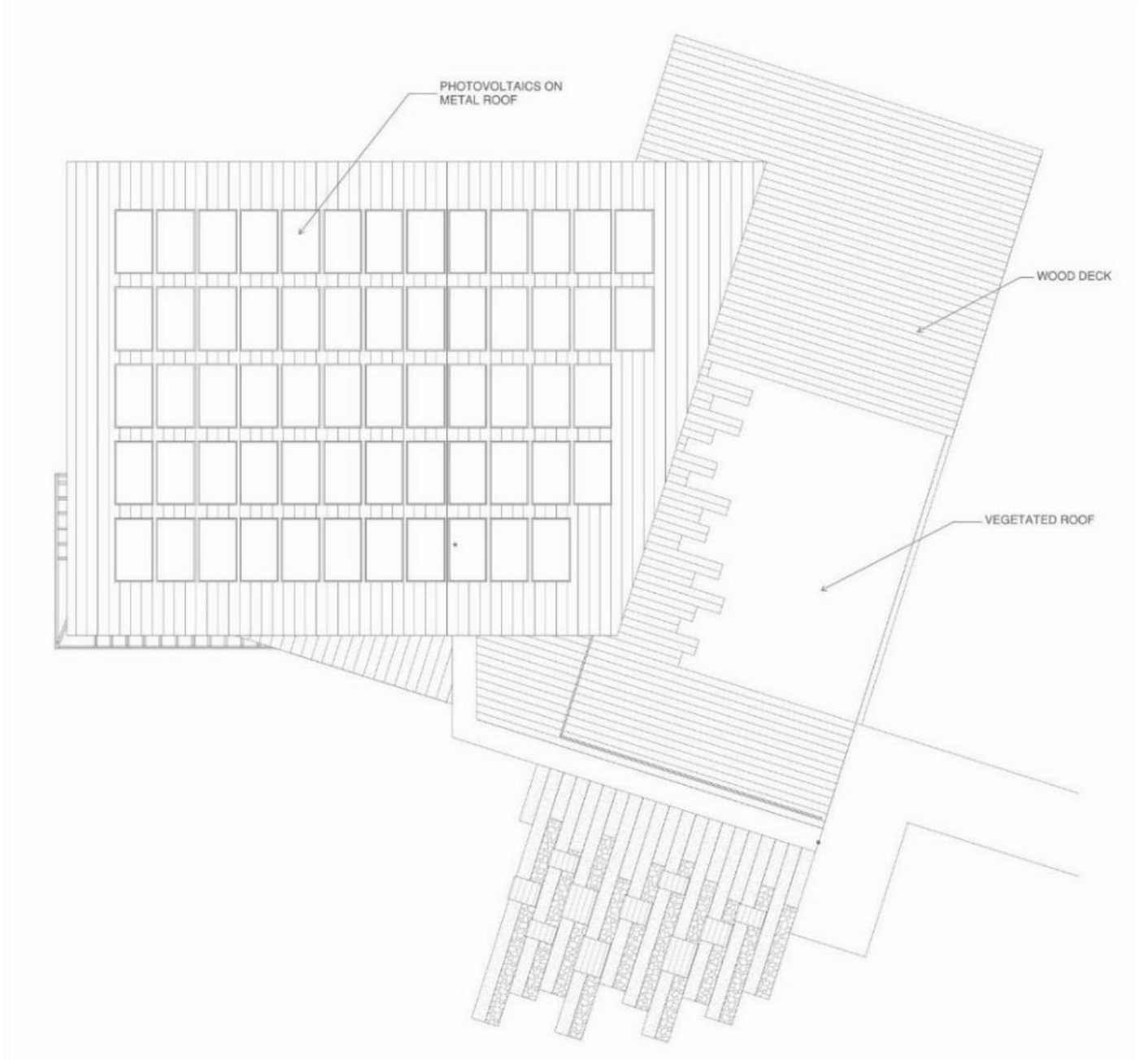
- Net Positive
- No On-Site Combustion
- Resilience

Living Building Challenge and Passive House

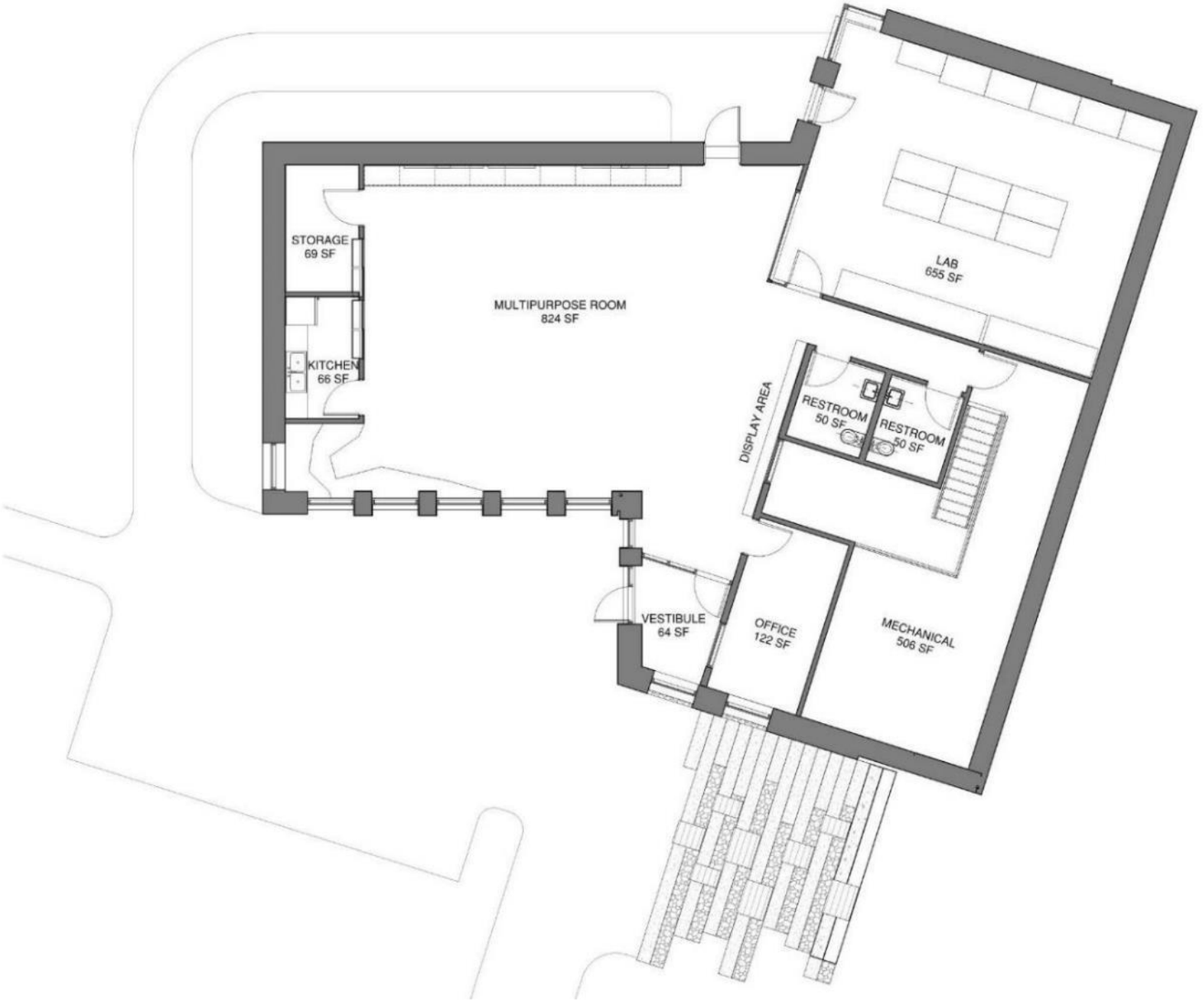




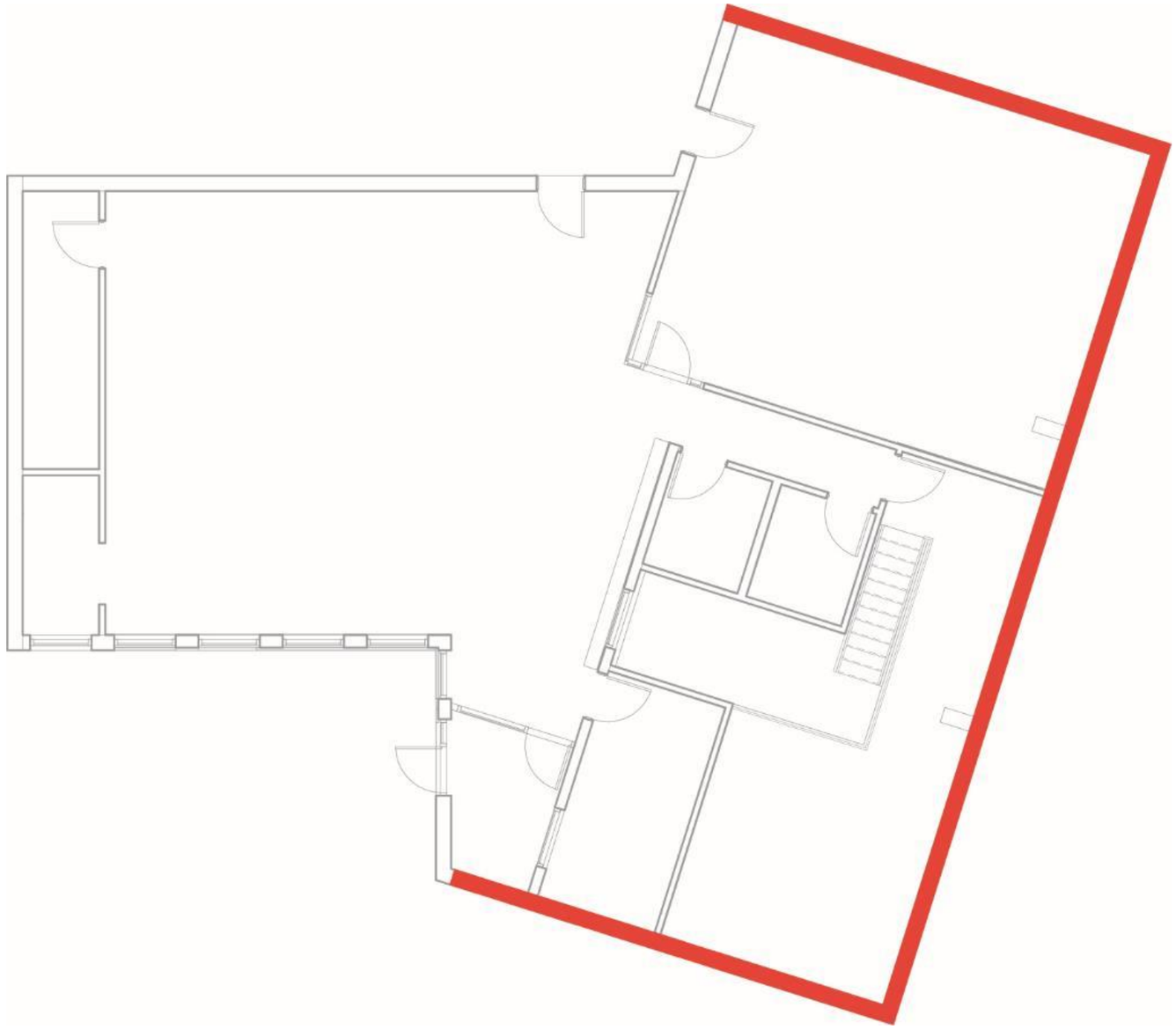
NUTHATCH HOLLOW **Roof Plan**



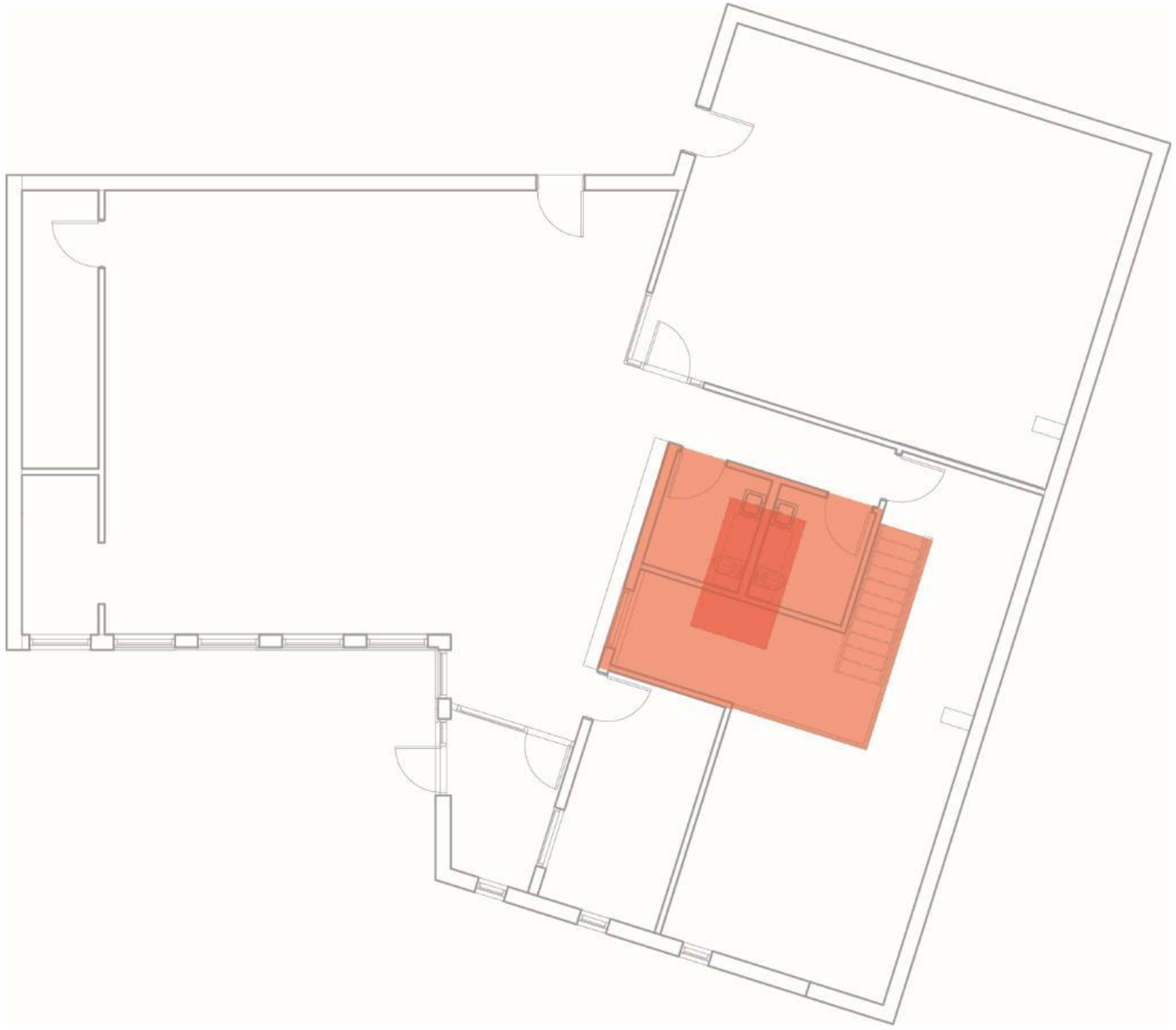
NUTHATCH HOLLOW **Floor Plan**



NUTHATCH HOLLOW **Existing Foundation Wall**



NUTHATCH HOLLOW **Composter**



NUTHATCH HOLLOW **Materials**