FOOTPRINT DEVELOPMENT

Solstice Northeast

Cost/Carbon Analysis

THE TRUE NORTH STUDIO

FOOTPRINT DEVELOPMENT

Building Tomorrow's Climate-Resilient Housing and Financial Returns, Today

We live in a world of increasingly constrained resources where demand for energy efficiency, durability, and air quality are market requirements. **How we build, what we build and where we build matters more than ever.**

Footprint Development's ambition is to deliver **superior climate risk-adjusted returns,** enhance Minneapolis's urban fabric, and move regional multifamily development toward more **carbon-smart, climate-compatible** practices …delivering **better results for people, the planet and investment partners.**

Our Projects

Carbon Smart Apartments
(Completed 2021)

Solstice Northeast
(Under Construction)

3561 Minnehaha
(Coming 2024)

Footprint develops carbon-smart, climate-resilient, multifamily assets built to last

1 What We Build

- 100% Electric
- Solar Powered
- Energy Efficient

2 How We Build

- Low Embodied Carbon
- Building Science Based

3 Where We Build

- Urban
- Walkable
- Bikeable
- Transit Oriented

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Project Overview

A low carbon / high performance, cycling and transit-oriented market-rate multifamily development located in the heart of Northeast Minneapolis, MN

CONTEXT: Infill urban lot

- No onsite vehicle parking, but a reserved onsite temporary drop-off and loading zone
- 5-minute walk to multiple transit lines
- 10-minutes to the commercial heart of both Saint Anthony East and Logan Park; two of Minneapolis' most vibrant arts, entertainment and jobs districts, and home to dozens of breweries, coffee shops, performance venues and workspaces.

AMENITIES: Ground floor Bike Hub with a 42" wide automatic door, 1.5 stalls per unit, water bottle refill station, bike repair station, and bike/pet wash station

ENERGY: 33.75 kW DC bifacial photovoltaic roof top array, projected annual energy production of ~40,000 kWh.

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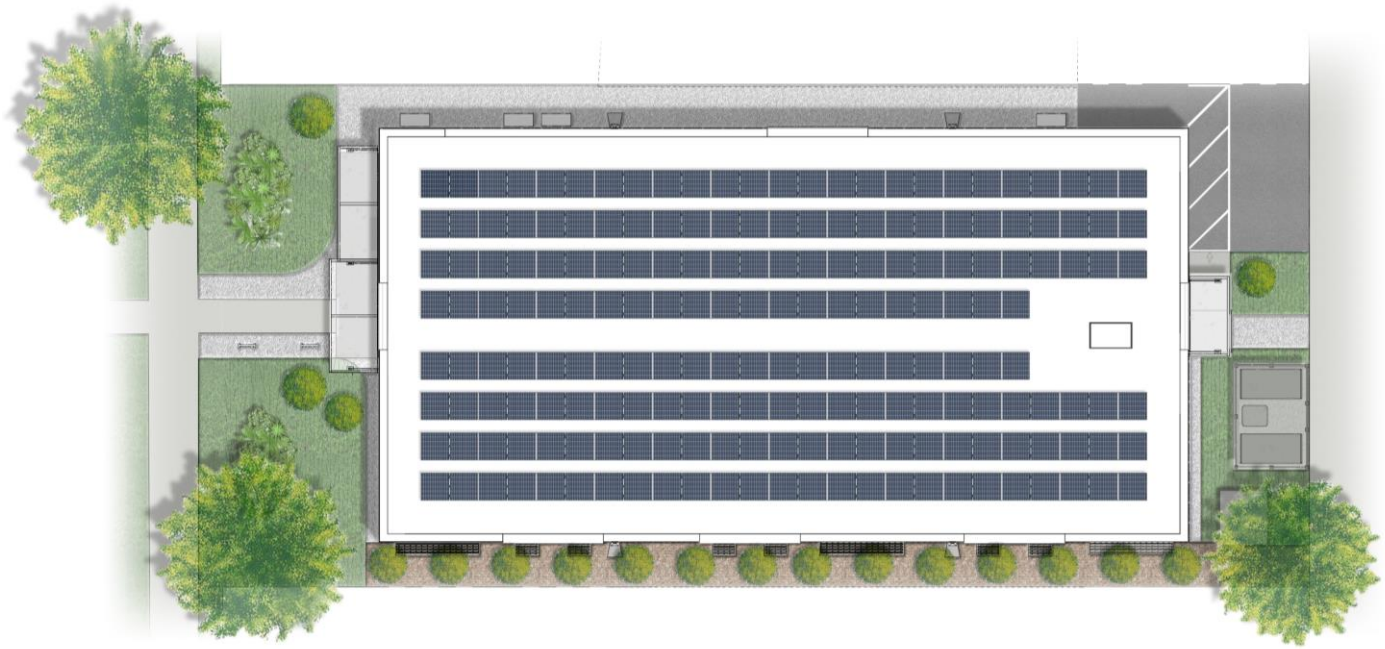
Project Specifics

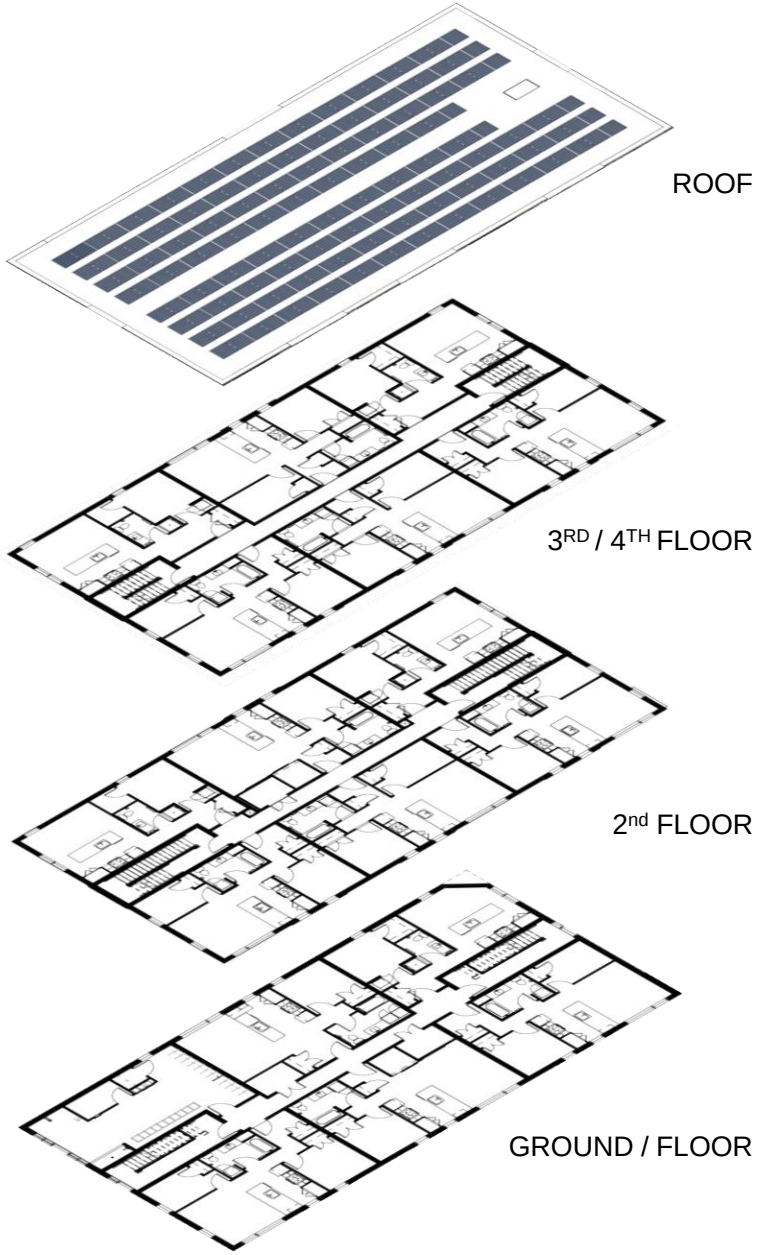
MN BUILDING CODE
IBC Construction VA R-2
Wood frame combustible materials,
1-hr rated from interior and exterior

MN ENERGY CODE
IECC 2018, ASHARE 90.2-2016
Climate Zone 6B – Cold Wet

SIZE
18,960 GSF
50'x100' Footprint, 4 Stories
(23) 1-2 Bedroom Units
Double loaded corridor, ~6 units/floor

CONTRACT
Design to PHIUS Core 2021
Target 40% reduction in MCE





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Passive & low carbon are complimentary

DESIGN → **SPECIFICATION** → **CONSTRUCTION**

Climate responsive strategies

- Simple massing and optimized orientation
- WWR, shading, and selective solar gain

Passive building principles

- Continuous insulation / TB free
- Airtight

Mechanical Systems

Materials

- Structural Systems
- Insulation – Thermal / Sound Transmission
- Finishes and Cladding

Product selection

- EPDs

Quality of Installation

Testing and Verification

Product verification onsite

- Evaluate substitution requests

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Carbon/Cost Case Study

SOLSTICE

Phius Core 21 Design Certified

Low-carbon material specification

100% electric

Rooftop solar array

STANDARD

Typical local construction

Some assemblies “slightly better than code”

Gas and electric

* Climate responsive design consistent

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Case Study - Envelope and Systems Comparison

	Solstice	Standard
ENVELOPE	**Air Tightness:** 0.06 CFM/sf @ 50Pa **Windows** • Fiberglass - Fixed & Casement • Triple Pane U-value @ 0.16 **Insulation:** • Foundation: GPS @ R10/ Perimeter GPS @ R15 • Wall: Cellulose + GPS @ R36 • Roof: Cavity Cellulose @ R18 / Polyiso @ R36	**Air Tightness**: 3.0 CFM/sf @ 50Pa **Windows** • Vinyl - Fixed & Double Hung • Double Pane U-value @ 0.4 **Insulation:** • Foundation: None / Perimeter EPS @ R15 • Wall: Fiberglass Batt + Polyiso @ R24 • Roof: Polyiso @ R36
MECHANICAL	**Unit HVAC:** • 100% Electric • Heating/Cooling: Minotair (Heat Pump) • Ventilation: Minotair (Integrated ERV) • Bath & Kitchen: Minotair Boost Switch **Common HVAC:** • 100% Electric • (x3) Carrier Mini Splits • (x2) 200 CFM ERVs **Hot Water** • (x6) 80 gallon Rheem hybrid heat pump DHWH • On-demand recirculation	**Unit HVAC:** • Gas & Electric • Heating/Cooling: Magic Pak V-Series • Ventilation: None • Bath & Kitchen: x2 Exhaust Fans @ 30 CFM **Common HVAC:** • 100% Electric • (x3) Carrier Mini Splits **Hot Water** • (x23) Power vented gas DHWH • No recirculation

Goals and Outcomes – Energy & Emissions

Phius Core 21 Certification

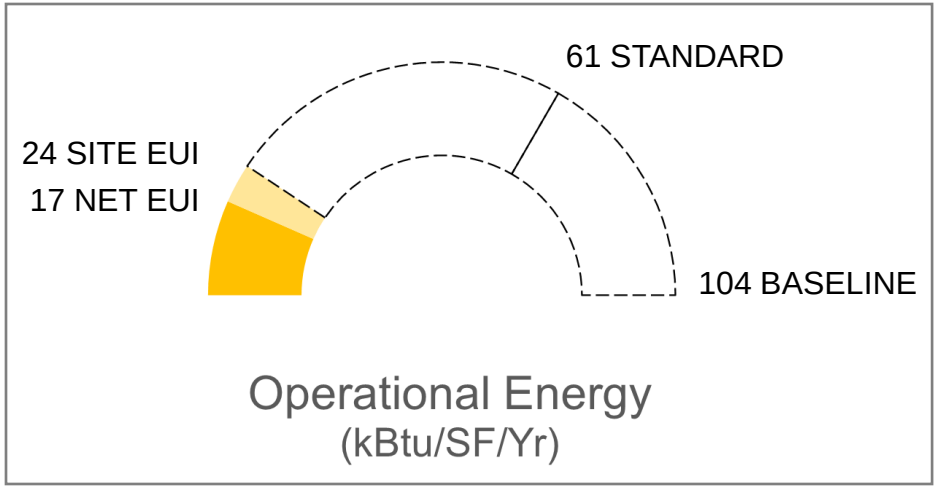
- 60%-70% reduction from Standard

Net-Zero Energy Ready

- 100% electric

AIA 2030 Commitment

- 80% energy reduction from Baseline



FOOTPRINT DEVELOPMENT

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Goals and Outcomes – Energy & Emissions

Phius Core 21 Certification

- 60%-70% reduction from Standard

61% Reduction Total Energy

72% Reduction in Net EUI

Net-Zero Energy Ready

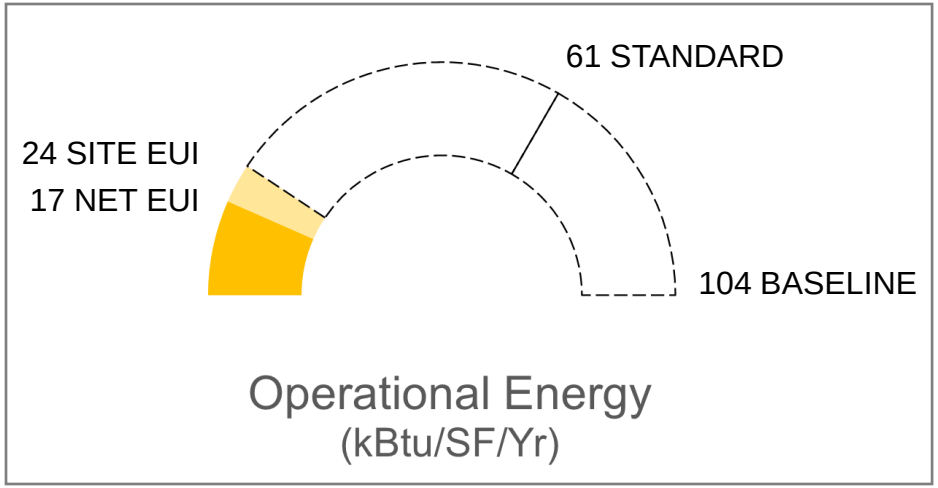
- 100% electric

~30% Onsite solar

AIA 2030 Commitment

- 80% energy reduction from Baseline

84% Reduction



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72% Reduction in Net EUI

Net-Zero Energy Ready

- 100% electric

~30% Onsite solar

AIA 2030 Commitment

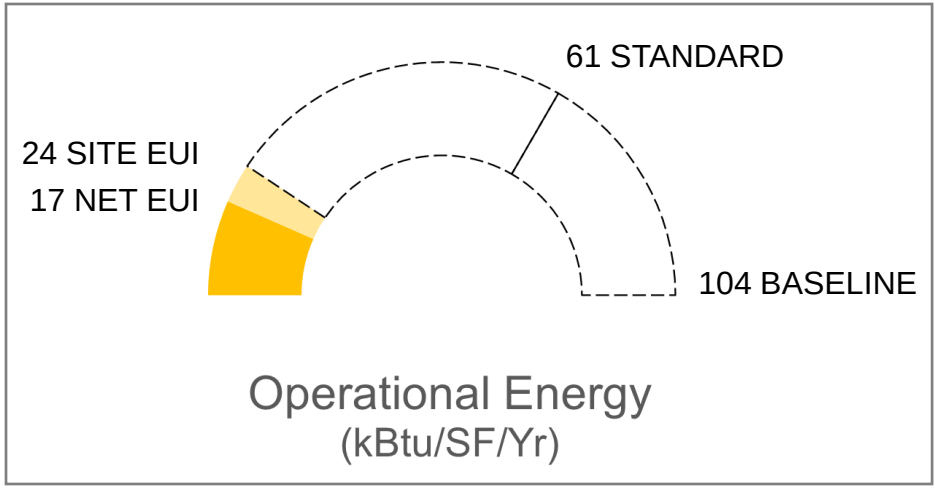
- 80% energy reduction from Baseline

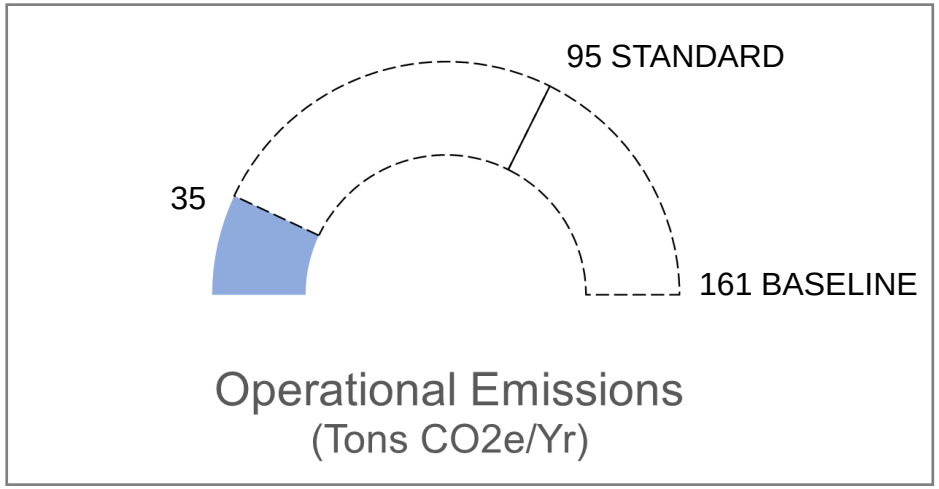
84% Reduction

Operational Emissions

78% Reduction from 2030 Baseline

- Currently electricity grid has greater GWP per equivalent unit of energy than natural gas
- This improves as utilities add renewable energy and decommission coal plants





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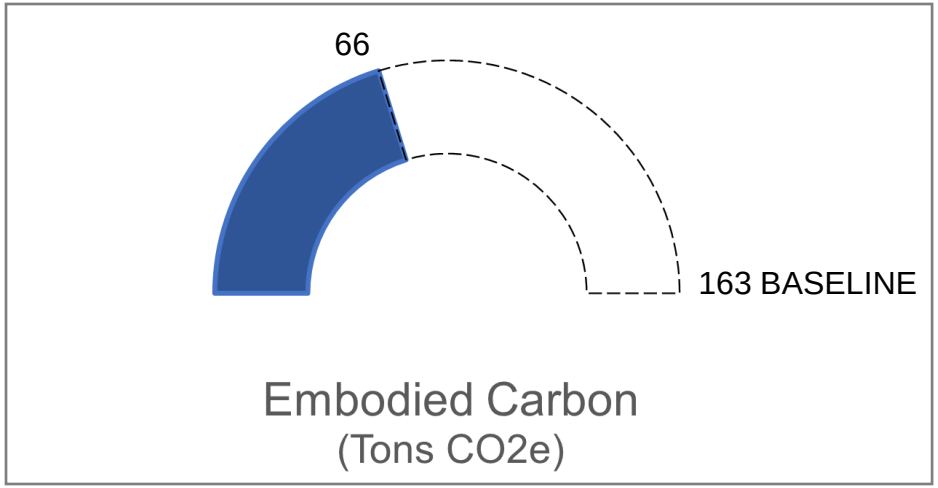
Goals and Outcomes – Emissions

Embodied Carbon

- 40% EC reduction vs. Standard building **60% Reduction**



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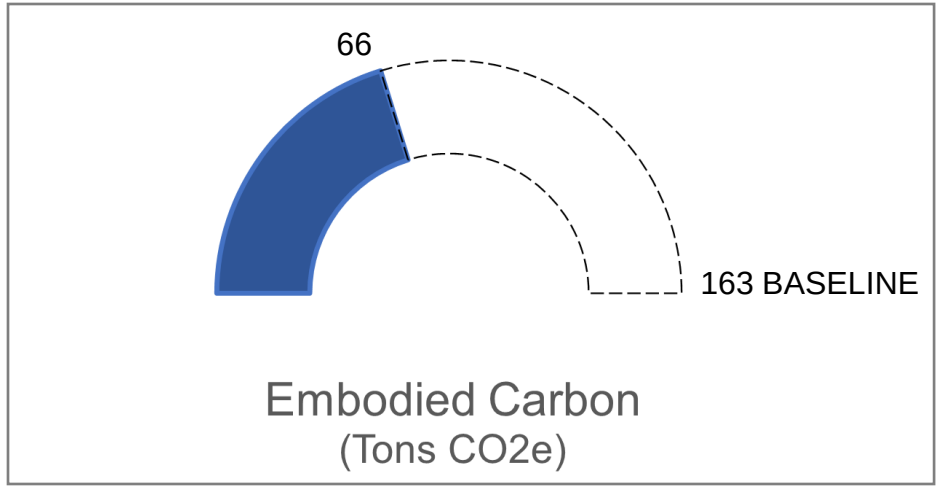
Goals and Outcomes – Emissions

Embodied Carbon

- 40% EC reduction vs. Standard building **60% Reduction**

Equivalent to 38 kgCO2e/m2

1.1 Metric Tons per occupant (59 Occupants)



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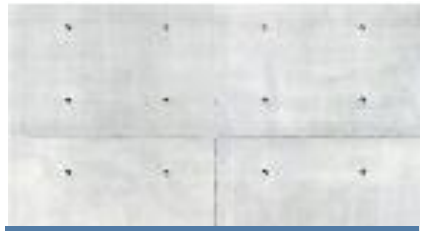
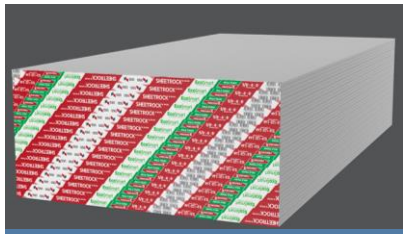
A handful of specs have a disproportionate impact on Embodied Carbon

How We Build

High Impact Embodied Carbon materials, design and specifications

	Concrete	Steel	Wood	Insulation	Gypsum Board
					
Strategies	Mix Design Structural Efficiency	Minimize Use	FSC Certified Structural Efficiency	Carbon Sequestering Low GWP Foams	Low Carbon

Substantial reductions in embodied carbon can be achieved using **readily available**, **familiar** to trades and largely **cost-neutral** materials

Source: Architecture 2030 Carbon Smart Materials Pallet

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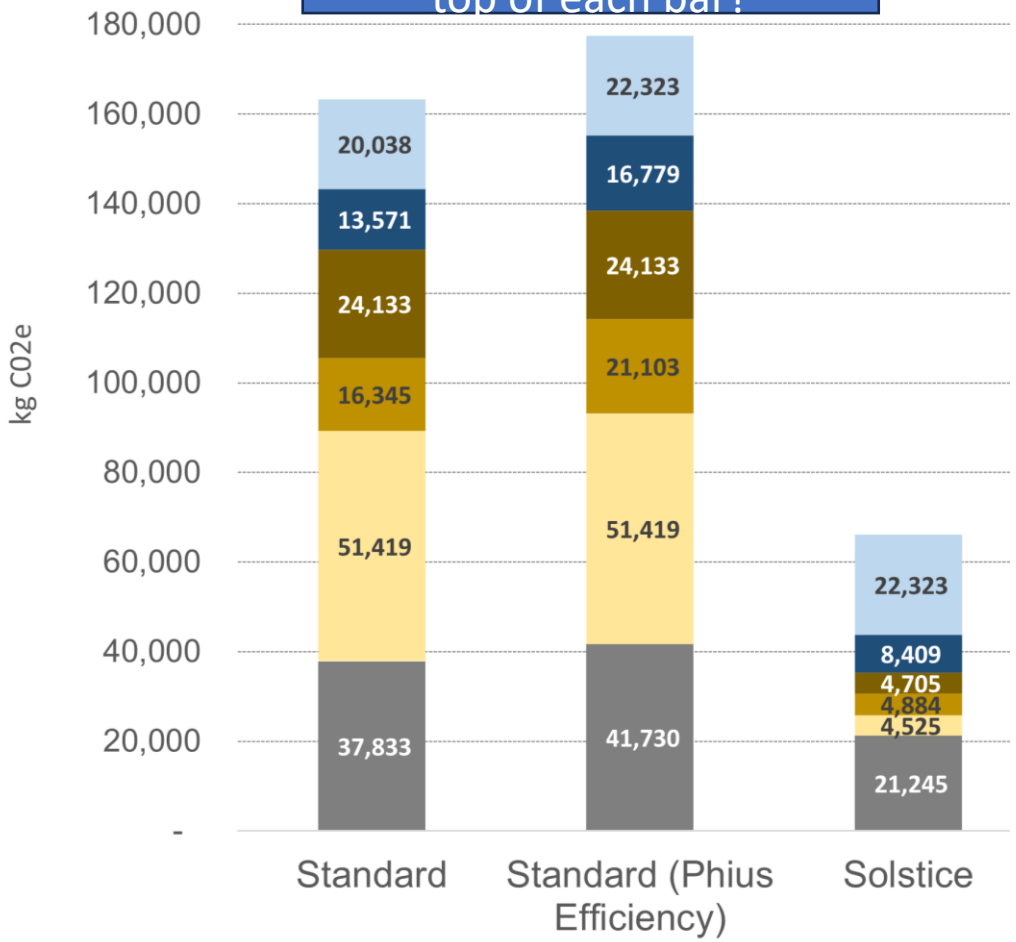
Case Study – Materials Comparison

	Solstice	Standard
STRUCTURE	**Concrete** • Low Carbon mix + Fibers in Slab **Framing Lumber** • FSC Certified Lumber (excludes trusses)	**Concrete** • Standard mix + Wire Mesh in Slab **Framing Lumber** • Standard Lumber
INSULATION	• **Foundation**: GPS @ R10/ Perimeter GPS @ R15 • **Exterior Wall Sheathing**: Plywood / GPS @ R15 • **Exterior Wall Cavity**: Dense Pack Cellulose (DPC) @ R21 • **Roof**: Cavity Cellulose @ R18 / Polyiso @ R36 • **Interior Partitions**: Cellulose	• **Foundation**: None / Perimeter EPS @ R15 • **Exterior Wall Sheathing**: Zip-R6 • **Exterior Wall Cavity**: Fiberglass Batt @ R21 • **Roof**: Polyiso @ R36 • **Interior Partitions**: Fiberglass Batt
FINISHES	**Flooring** • Interface Carpet & LVP **Gypsum Board** • USG Ecosmart 5/8” Type X **Cladding** • 85% engineered wood • 15% thin brick veneer	**Flooring** • Standard Carpet & LVP **Gypdum Board** • Standard 5/8” Type X **Cladding** • 85% cement board • 15% face brick

Net Embodied Carbon Comparison

* 1,000 kgCO2e = 1 Metric ton

Can you put a total at the top of each bar?



177 **(9% INCREASE)**

163 Metric tons

66 **(60% REDUCTION)**

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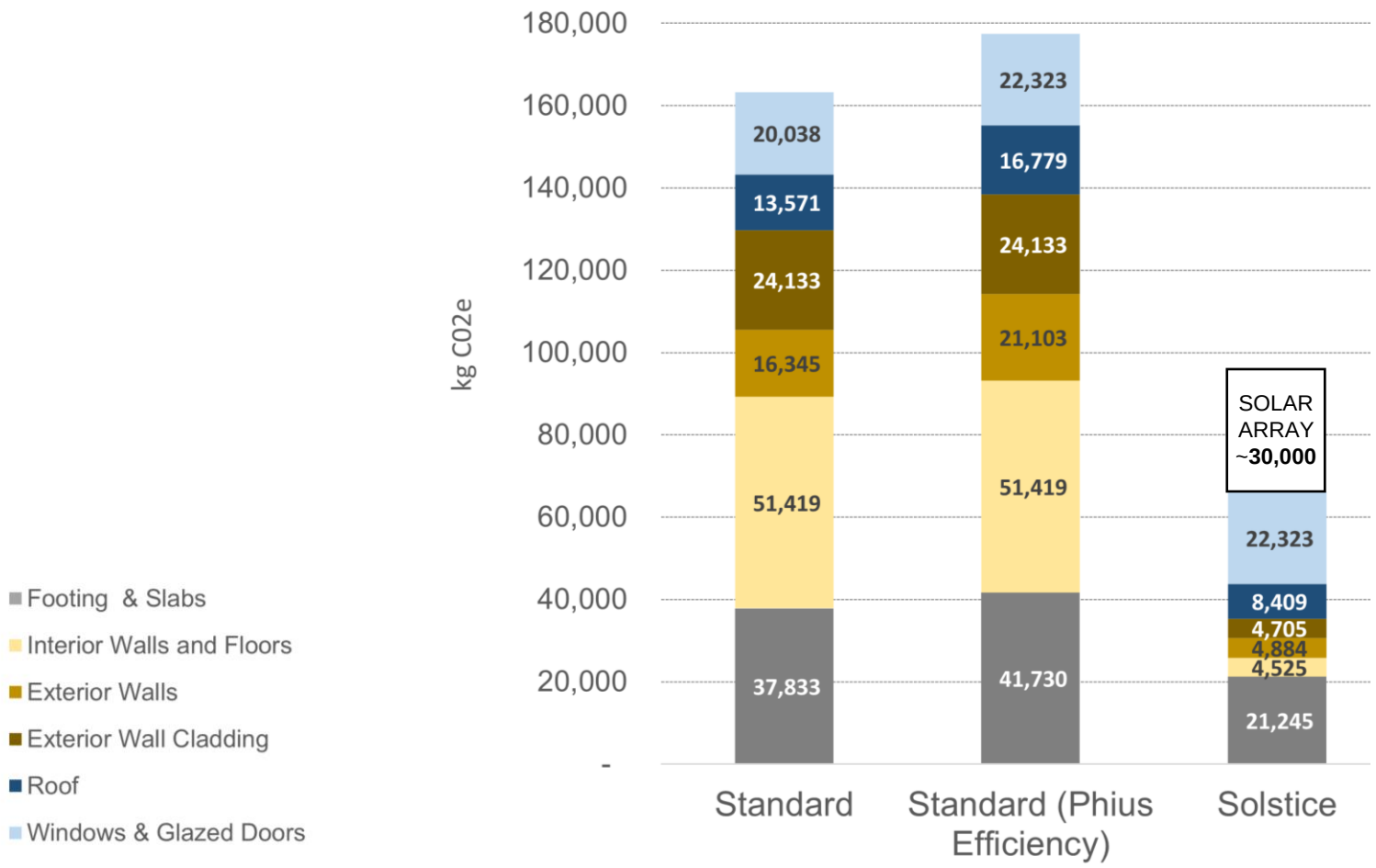
Net Embodied Carbon Comparison

* 1,000 kgCO2e = 1 Metric ton



177 **(9% INCREASE)**

163 Metric tons

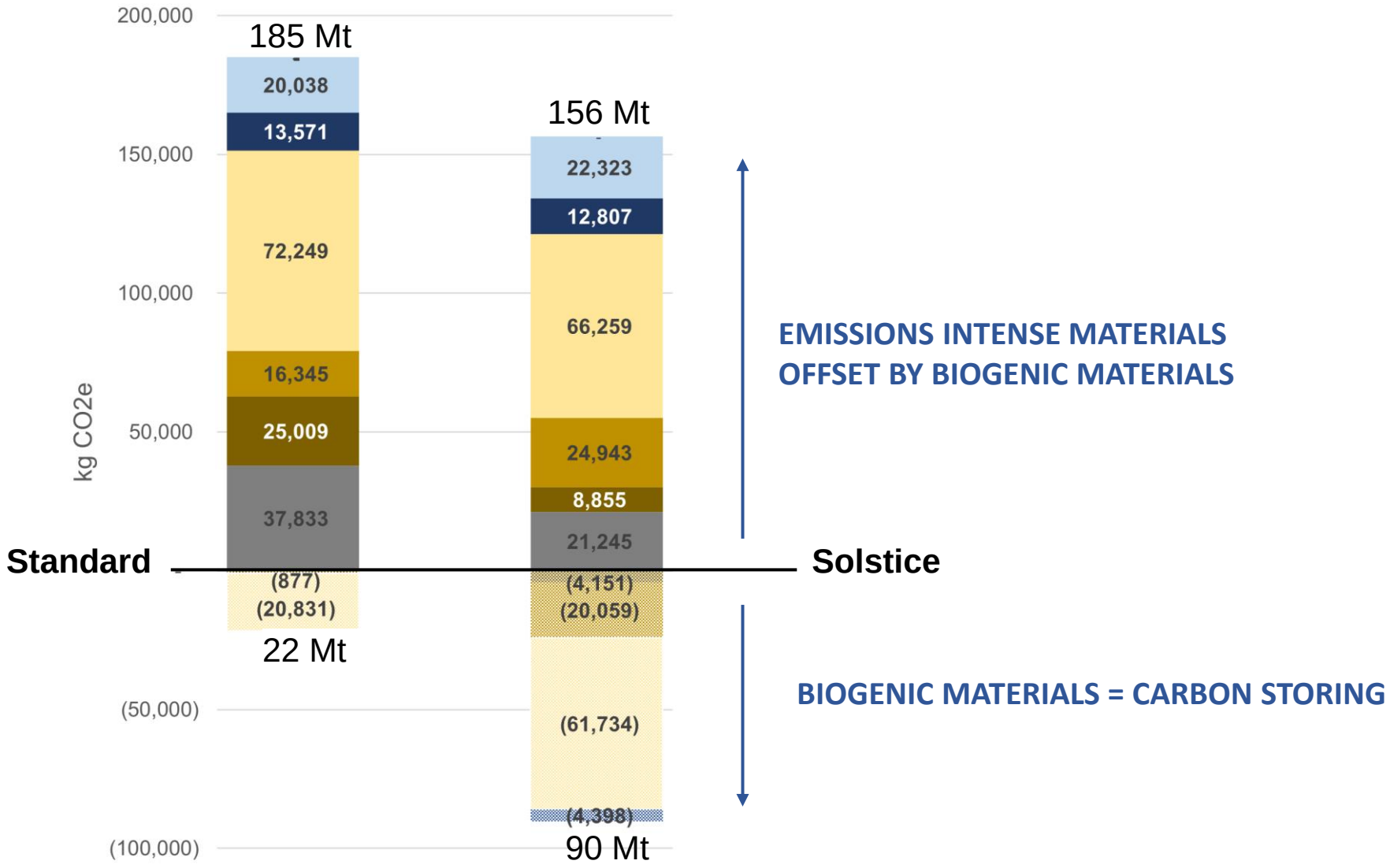
66 **(60% REDUCTION)**

FOOTPRINT DEVELOPMENT

THE TRUE NORTH STUDIO

Full Embodied Carbon Comparison

* 1,000 kgCO2e = 1 Metric ton



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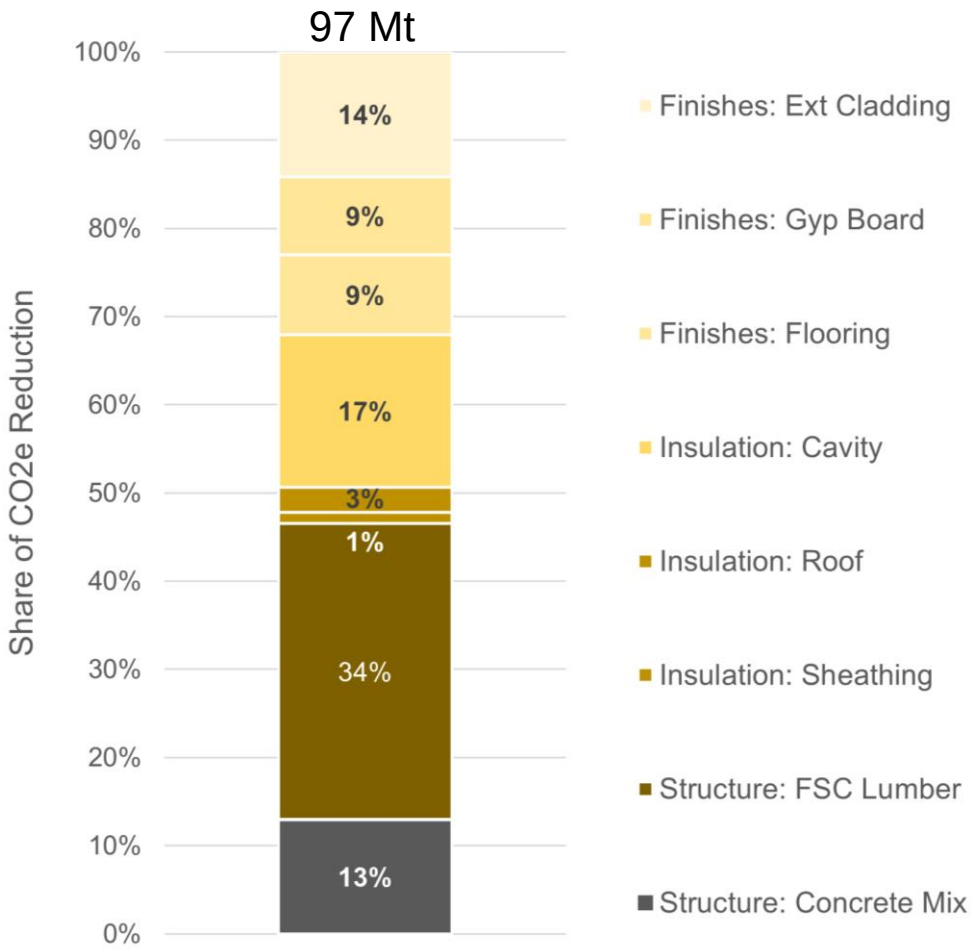
Highest Impact Materials



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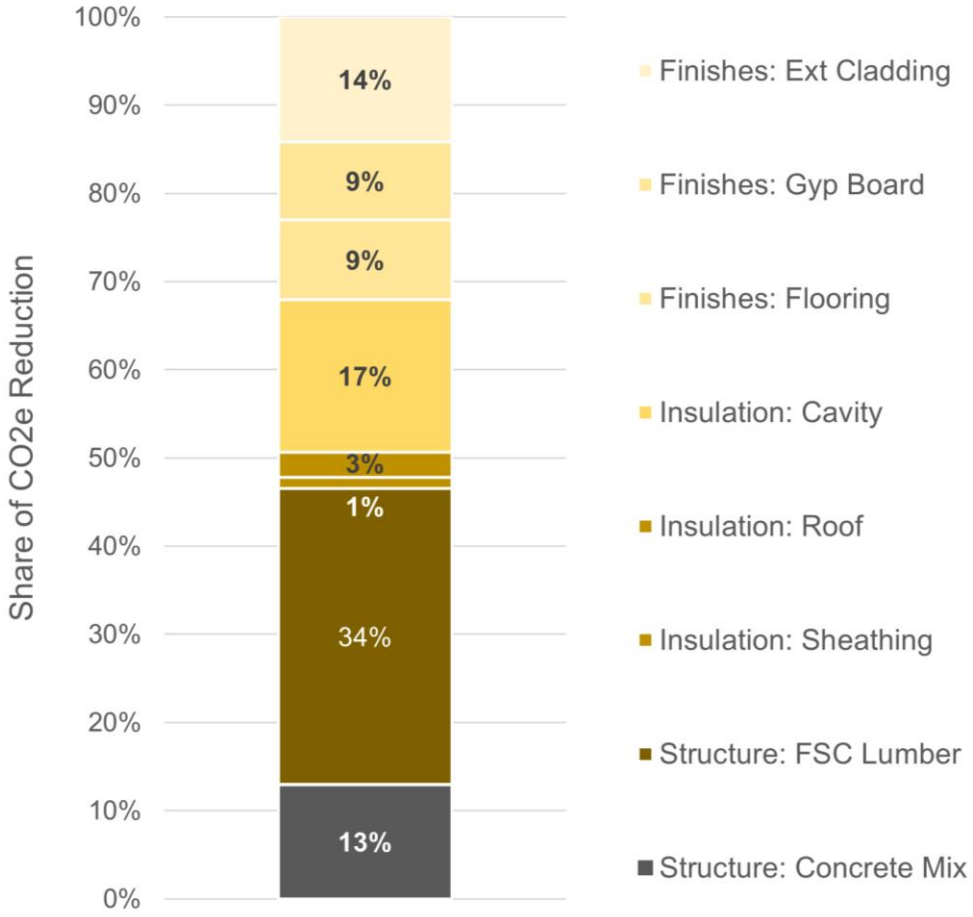
Highest Impact Materials



*** BIOGENIC VALUE OF VIRGIN FOREST PRODUCTS DEBATABLE, WE CREDITED 30% OF EC STORAGE POTENTIAL**

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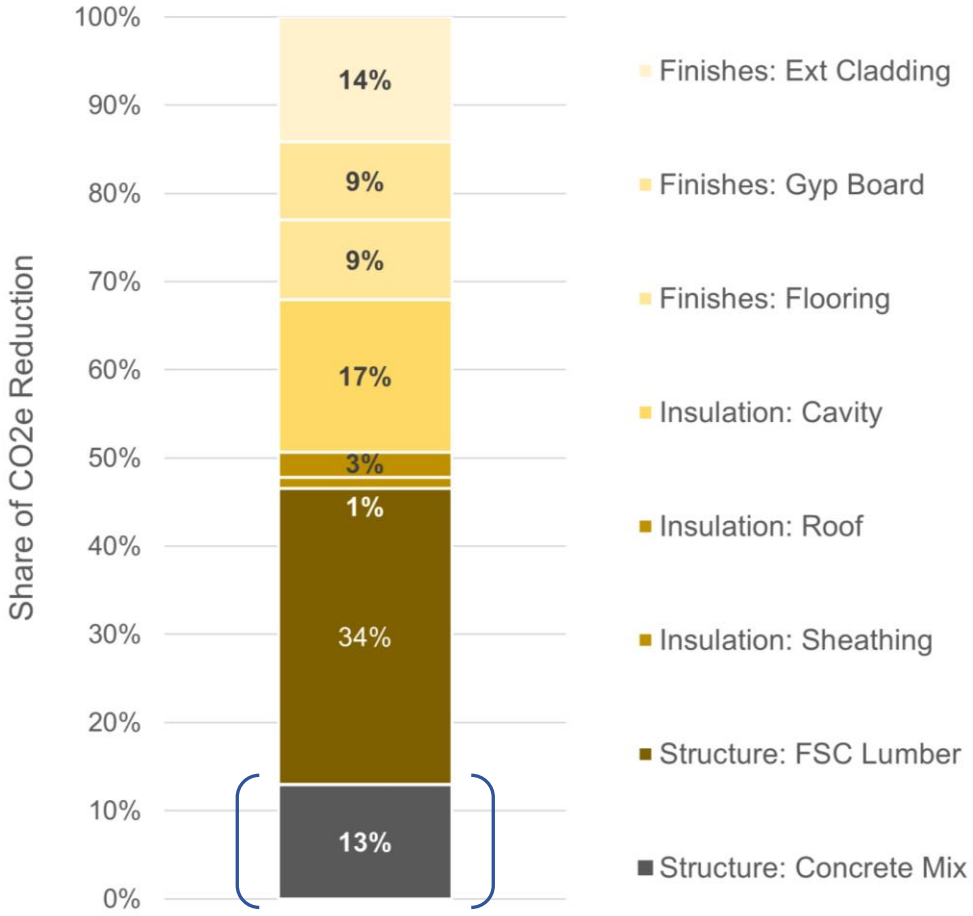
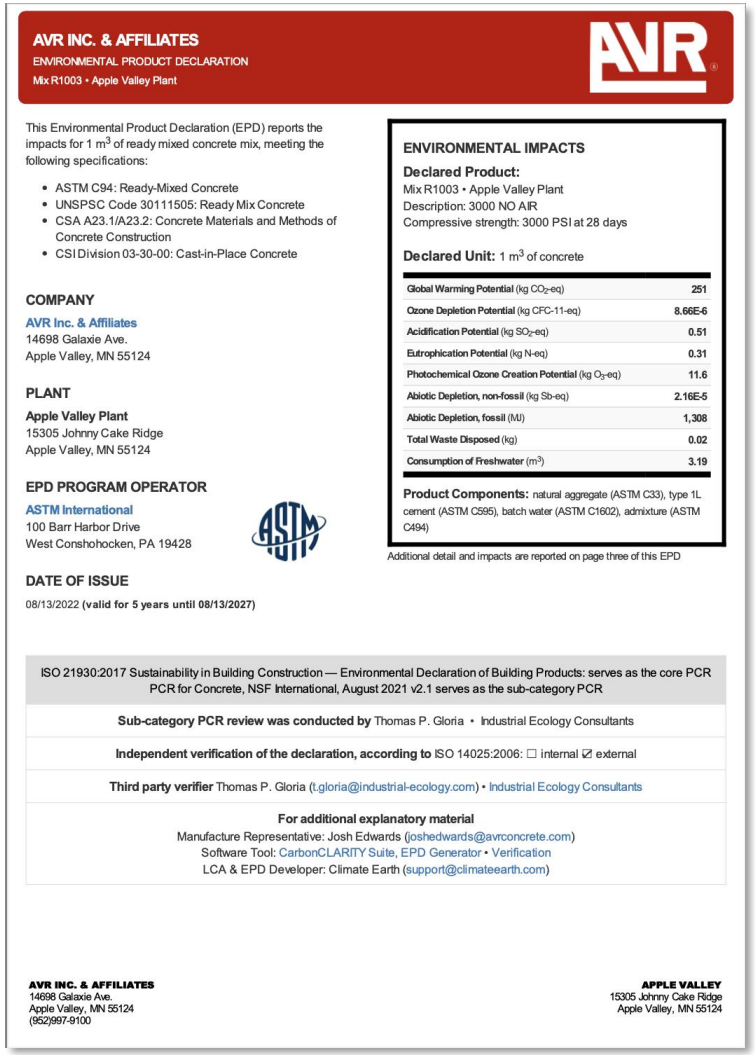
Highest Impact Materials - Concrete





AVR INC. & AFFILIATES
ENVIRONMENTAL PRODUCT DECLARATION
Mix R1003 • Apple Valley Plant

This Environmental Product Declaration (EPD) reports the impacts for 1 m^3 of ready mixed concrete mix, meeting the following specifications:

- ASTM C94: Ready-Mixed Concrete
- UNSPSC Code 30111505: Ready Mix Concrete
- CSA A23.1/A23.2: Concrete Materials and Methods of Concrete Construction
- CSI Division 03-30-00: Cast-in-Place Concrete

COMPANY
AVR Inc. & Affiliates
14698 Galaxie Ave.
Apple Valley, MN 55124

PLANT
Apple Valley Plant
15305 Johnny Cake Ridge
Apple Valley, MN 55124

EPD PROGRAM OPERATOR
ASTM International
100 Barr Harbor Drive
West Conshohocken, PA 19428

DATE OF ISSUE
08/13/2022 **(valid for 5 years until 08/13/2027)**

ENVIRONMENTAL IMPACTS
Declared Product:
Mix R1003 • Apple Valley Plant
Description: 3000 NO AIR
Compressive strength: 3000 PSI at 28 days

Declared Unit: 1 m^3 of concrete

Global Warming Potential (kg CO_2-eq)	251
Ozone Depletion Potential (kg CFC-11-eq)	8.66E-6
Acidification Potential (kg SO_2-eq)	0.51
Eutrophication Potential (kg N-eq)	0.31
Photochemical Ozone Creation Potential (kg O_3-eq)	11.6
Abiotic Depletion, non-fossil (kg Sb-eq)	2.16E-5
Abiotic Depletion, fossil (MJ)	1,308
Total Waste Disposed (kg)	0.02
Consumption of Freshwater (m^3)	3.19

Product Components: natural aggregate (ASTM C33), type 1L cement (ASTM C595), batch water (ASTM C1602), admixture (ASTM C494)

Additional detail and impacts are reported on page three of this EPD

ISO 21930:2017 Sustainability in Building Construction — Environmental Declaration of Building Products: serves as the core PCR
PCR for Concrete, NSF International, August 2021 v2.1 serves as the sub-category PCR

Sub-category PCR review was conducted by Thomas P. Gloria • Industrial Ecology Consultants

Independent verification of the declaration, according to ISO 14025:2006: ☐ internal ☑ external

Third party verifier Thomas P. Gloria (t.gloria@industrial-ecology.com) • Industrial Ecology Consultants

For additional explanatory material
Manufacture Representative: Josh Edwards (joshedwards@avrconcrete.com)
Software Tool: CarbonCLARITY Suite, EPD Generator • Verification
LCA & EPD Developer: Climate Earth (support@climateearth.com)

AVR INC. & AFFILIATES
14698 Galaxie Ave.
Apple Valley, MN 55124
(952)997-9100

APPLE VALLEY
15305 Johnny Cake Ridge
Apple Valley, MN 55124

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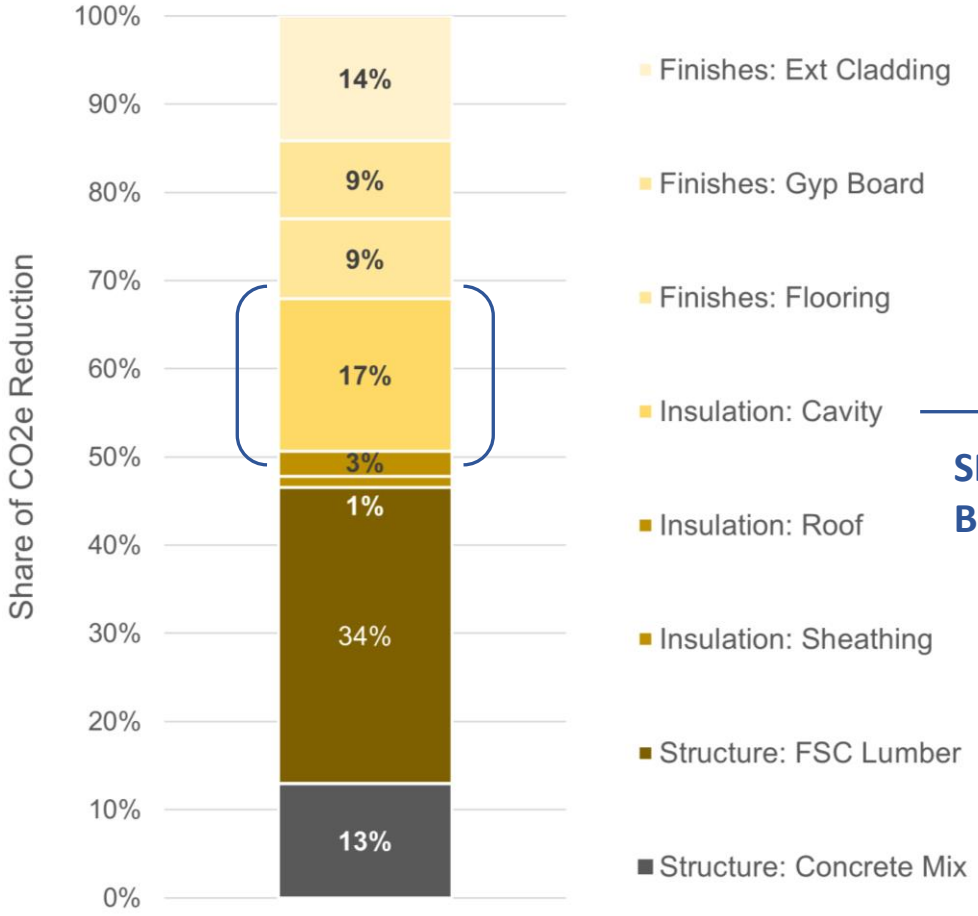
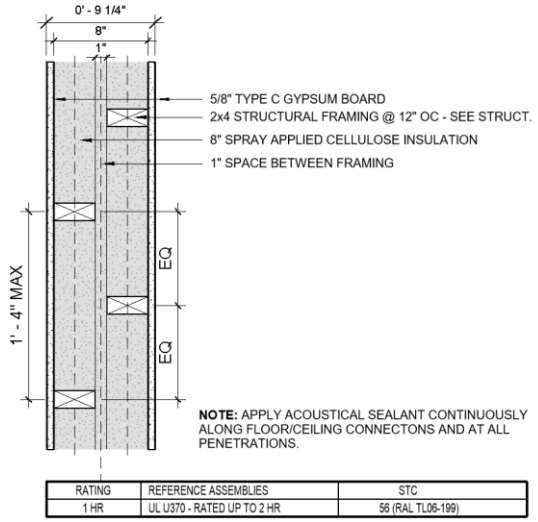
Highest Impact Materials – Cavity Insulation



SPECIFY ASSEMBLIES WITH BIO-BASED INSULATION



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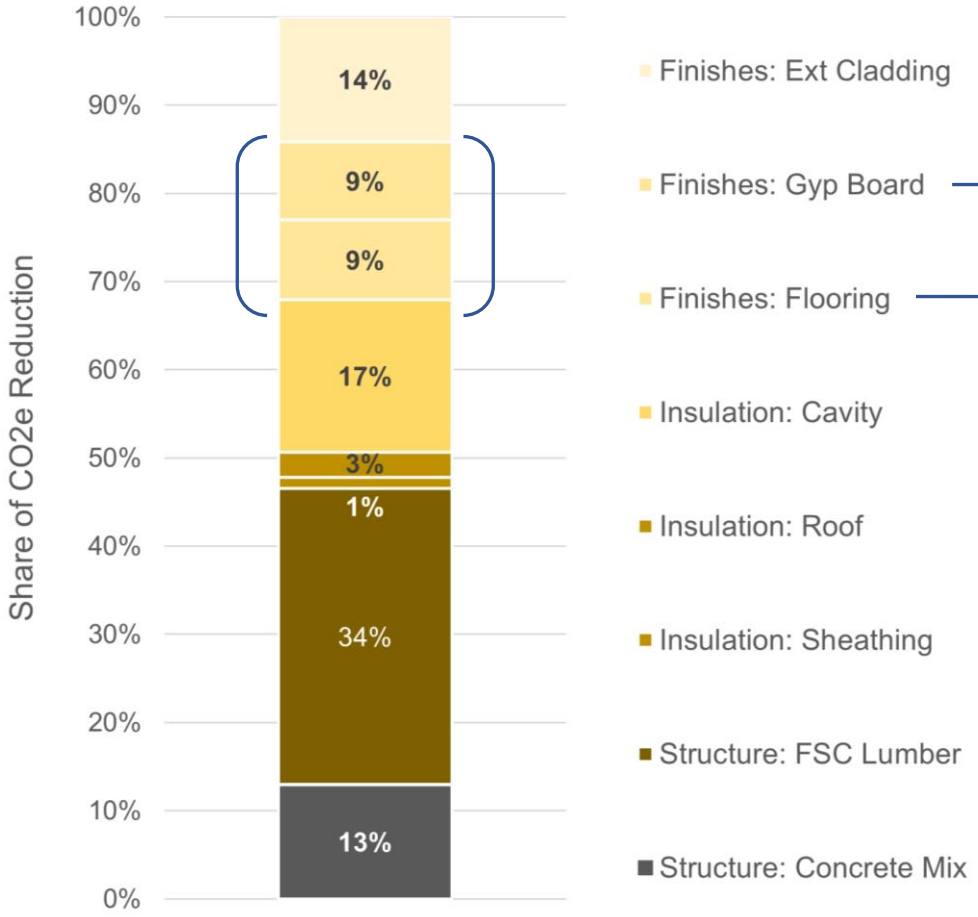
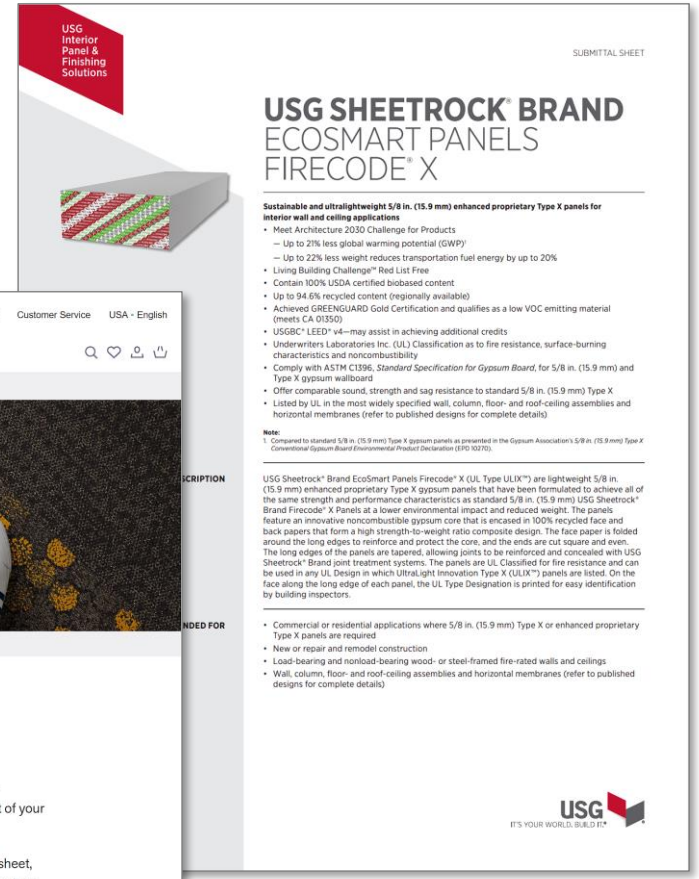
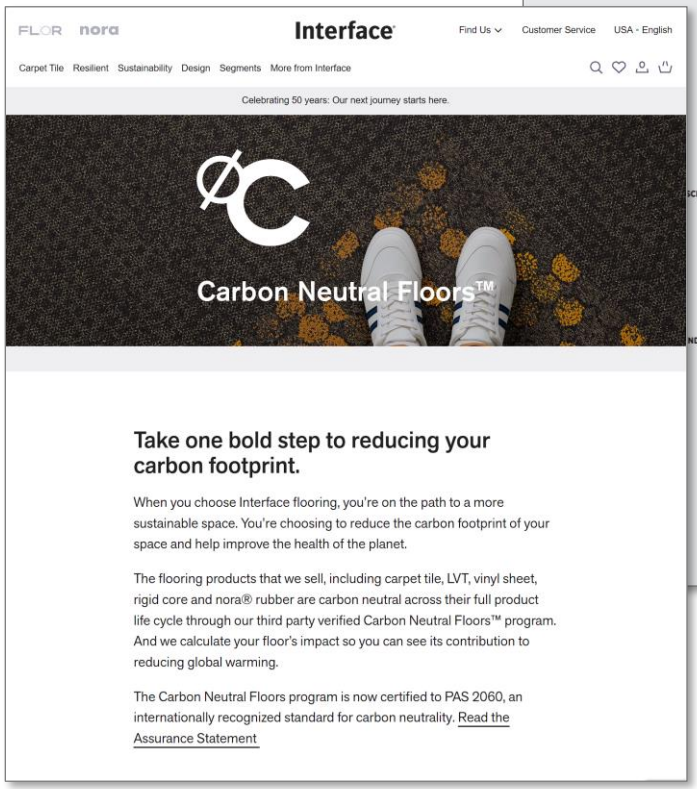
Highest Impact Materials – Finishes







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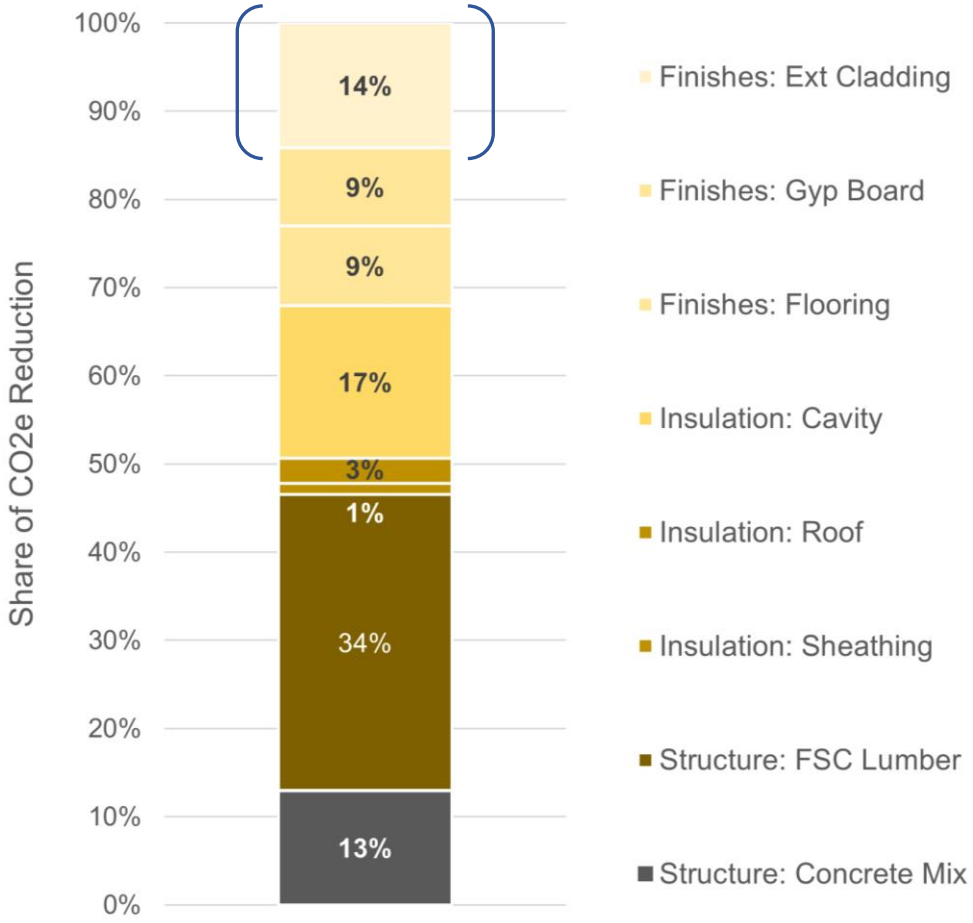
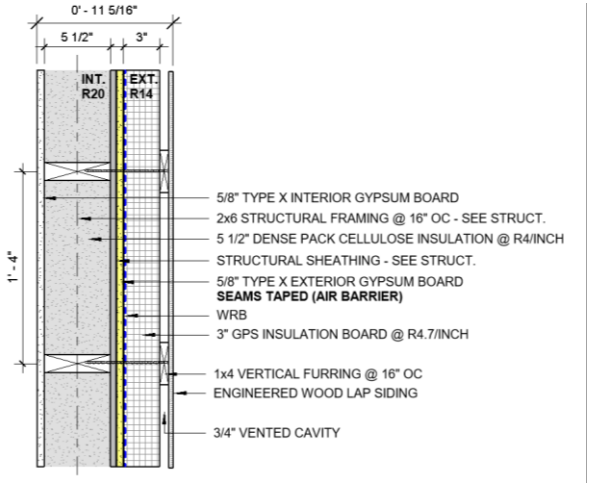
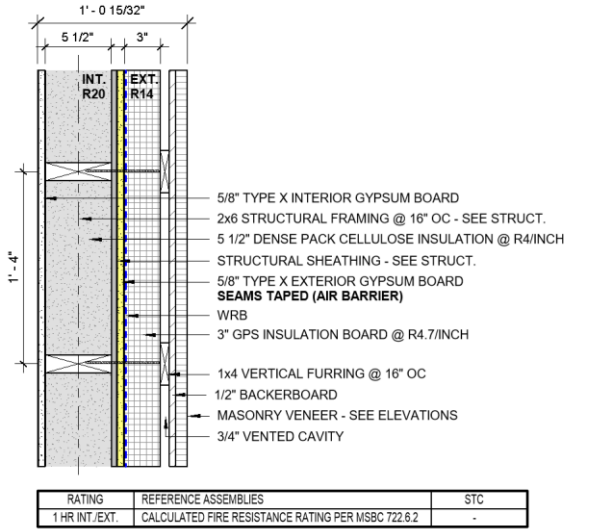
Highest Impact Materials – Cladding



ENGINEERED WOOD VS FIBER CEMENT



THIN VENEER MASONRY



RATING	REFERENCE ASSEMBLIES	STC
1 HR INT./EXT.	CALCULATED FIRE RESISTANCE RATING PER MSBC 722.6.2	-

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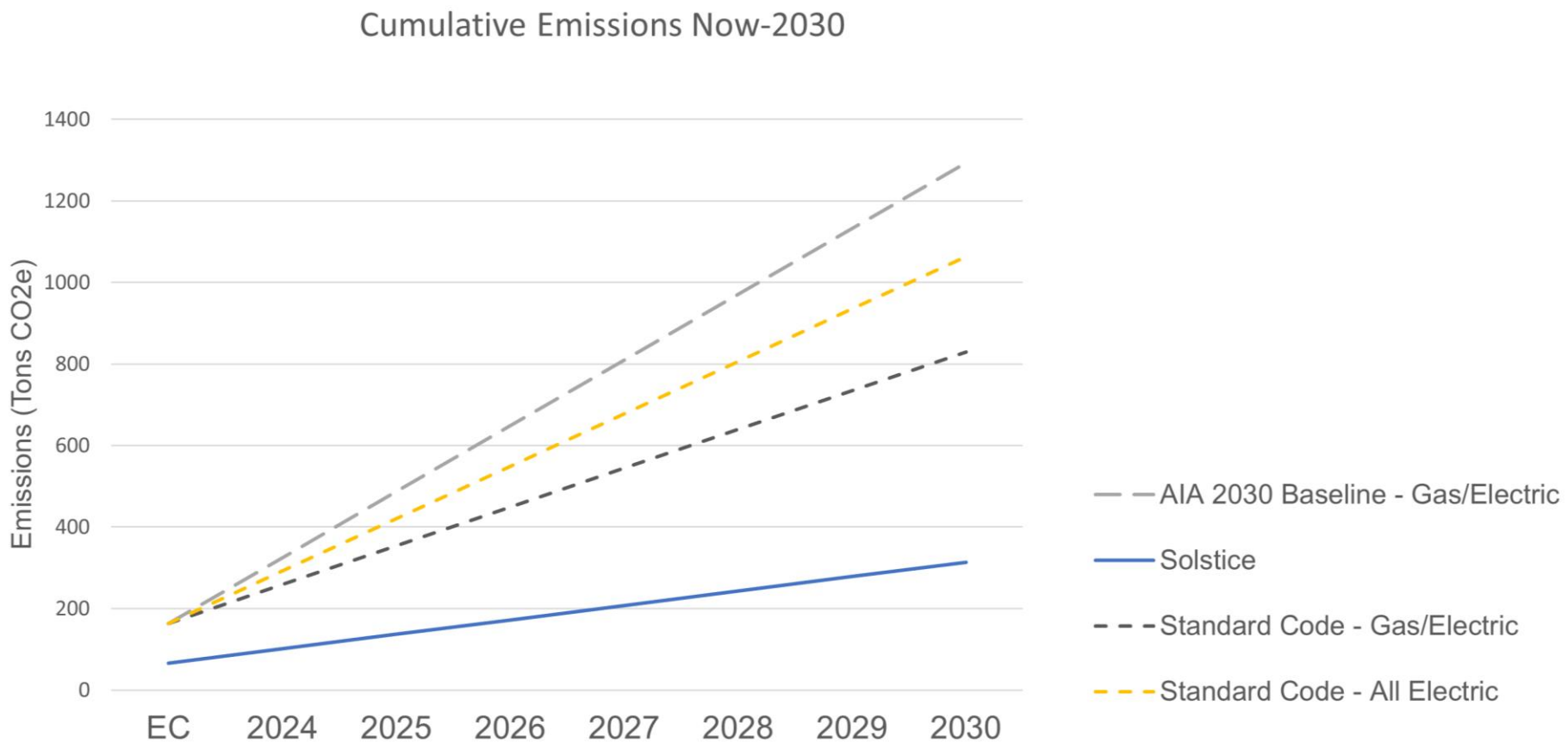
Impact



* Does not reflect future grid emission factor reductions

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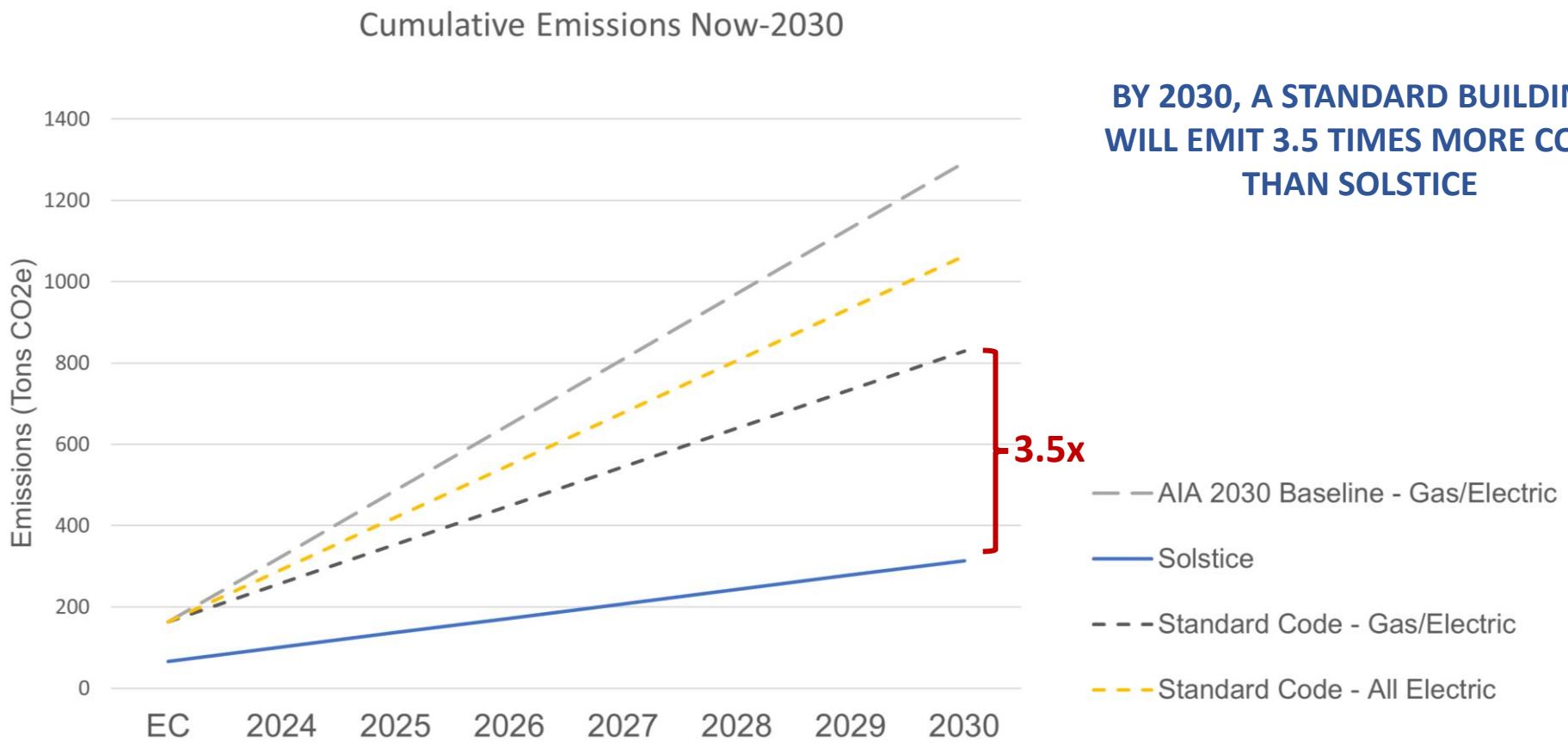
Impact



BY 2030, A STANDARD BUILDING WILL EMIT 3.5 TIMES MORE CO2e THAN SOLSTICE

* Does not reflect future grid emission factor reductions

FOOTPRINT DEVELOPMENT

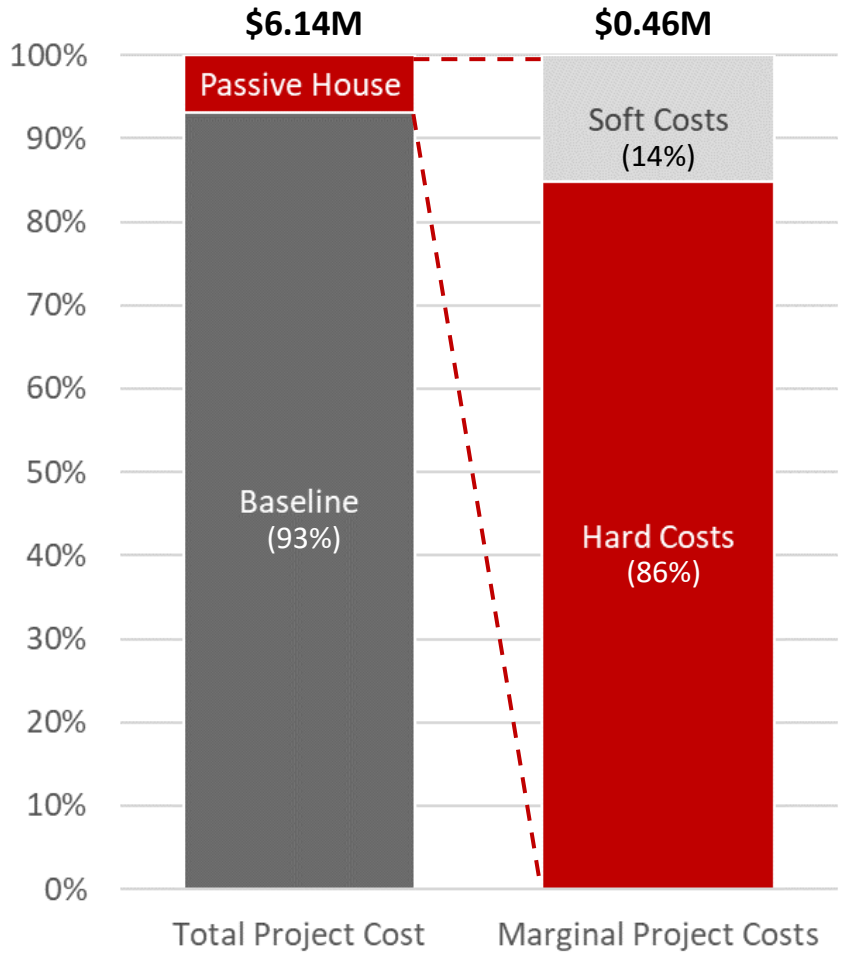
THE TRUE NORTH STUDIO

What are the cost implications of Carbon-Smart Passive House Constuction?

Passive House costs accounted for 7.5% of Total Cost, with Hard Costs accounting for ~86% of Marginal PH Cost

Passive House Incremental Cost Data

Total Project Cost	Total	Share
Base Cost	$5,675,738	92.5%
Phius Cost	$462,262	7.5%
Hard Cost	*$398,112*	*6.5%*
Soft Cost	*$64,150*	*1.0%*
Total	$6,138,000	



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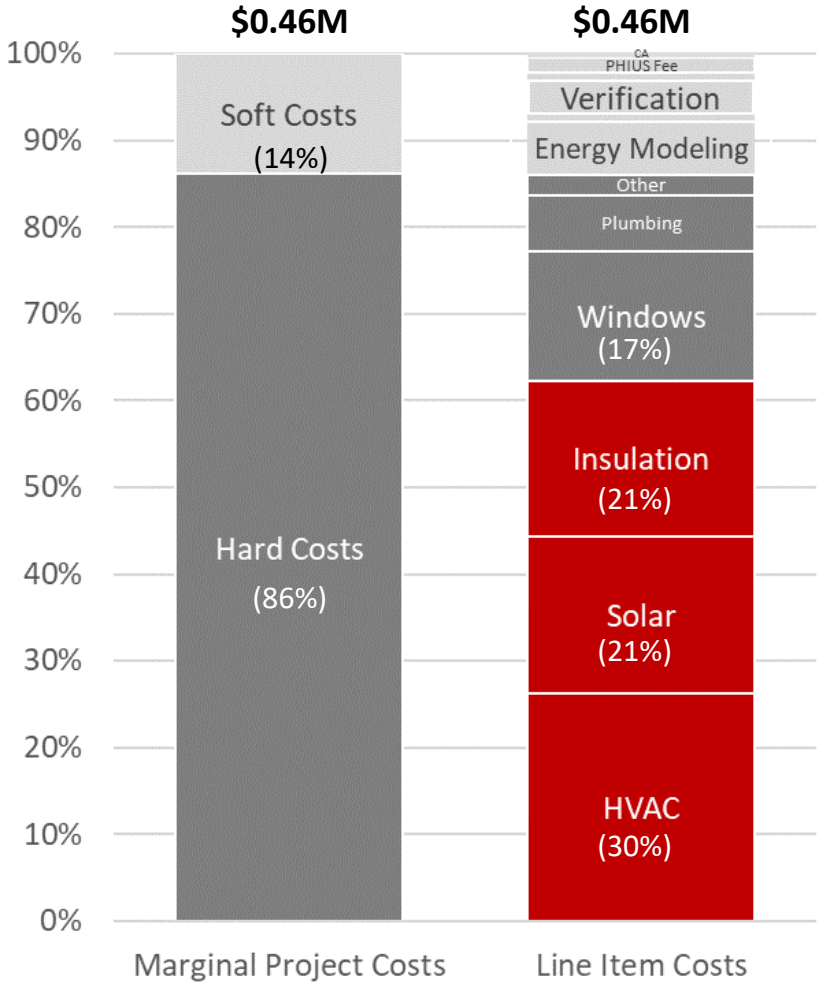
HVAC, Solar and Insulation were the largest cost drivers



	Solstice	Baseline	Incr. ($)	Category Incr. (%)	Project Incr. (%)
Hard Costs	**$1,181,912**	**$783,800**	**$398,112**	**50.8%**	**7.0%**
HVAC	**$476,667**	**$355,934**	**$120,733**	**33.9%**	**2.1%**
Unit HVAC	*$172,500*	*$115,000*	*$57,500*	*50%*	*1.0%*
Common Space ERV	*$3,000*	*$0*	*$3,000*	*N/A*	*0.1%*
Labor & Other Material	*$301,167*	*$240,934*	*$60,233*	*25%*	*1.1%*
Windows	**$ 109,121**	**$40,458**	**$68,663**	**169.7%**	**1.2%**
Plumbing	**$280,000**	**$250,000**	**$30,000**	**12.0%**	**0.5%**
Insulation	**$198,234**	**$114,409**	**$83,826**	**73.3%**	**1.5%**
Below Grade	*$20,064*	*$4,968*	*$15,096*	*304%*	*0.3%*
Wall Cavity	*$14,149*	*$12,472*	*$1,677*	*13%*	*0.0%*
Exterior Sheathing & Insulation	*$95,036*	*$30,591*	*$64,445*	*211%*	*1.1%*
Roof Polyiso	*$66,378*	*$66,378*	*$0*	*0%*	*0.0%*
Roof Cellulos	*$2,608*	*$0*	*$2,608*	*N/A*	*0.0%*
Other	**$117,890**	**$23,000**	**$94,890**	**N/A**	**1.7%**
Roof Self-Adheared Vapor Barrier	*$13,990*	*$0*	*$13,990*	*N/A*	*0.2%*
Unit Gas Lines	*$0*	*$23,000*	*($23,000)*	*N/A*	*-0.4%*
Air Sealing Contingency	*$20,000*	*$0*	*$20,000*	*N/A*	*0.4%*
Solar	*$83,900*	*$0*	*$83,900*	*N/A*	*1.5%*

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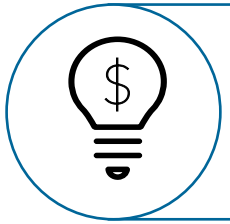
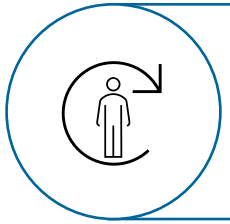
How can higher first costs deliver superior climate-risk adjusted returns for investors?

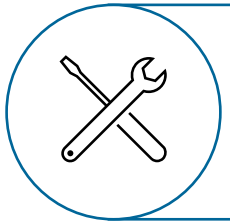
Resilient returns on higher upfront costs are generated through:



Utility fees – Residents pay a flat monthly fee for water, energy and waste management. Acting as the utility intermediary, owners generate a return on investments in energy efficiency and solar generation, increased NOI and cash out at refinancing, and provide occupants with lower, more predictable utility costs than available elsewhere



Reduced Turnover – Other Passive House multifamily developers report lower resident turnover because their buildings are healthier, more comfortable and quieter than standard construction. This reduces maintenance, marketing and vacancy costs.



Lower Maintenance Costs – Building-science design best practices, superior (verified & tested) build quality and unitized HVAC drive lower annual insurance, maintenance and repair costs

Lower Insurance Costs – A growing number of insurers are providing discounts for building certification and measures taken to reduce a property's carbon footprint.*

Sources *Climate Change Creating a New Climate for Real Estate Investing, Blomberg Law (March, 2023)

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Key financial definition metric definitions

IRR

Internal Rate of Return (IRR) is the compounded rate of return on an investment, with the inputs being the cash inflows/(outflows) over a specified number of time periods (e.g. years).

Market Rate

12-25%

Varies widely by geography, product type, economic cycle, investor type, etc.

Cash-on-Cash

Cash-on-Cash return is the pre-tax cash distributions to equity holders divided by the equity invested. Often calculated annually and as an average over multiple years

Market Rate

3-10%

Varies widely by geography, product type, economic cycle, investor type, etc.

Equity Multiple

Equity Multiple is the total cash distributions received from an investment, divided by the total equity invested

$$\text{Equity Multiple} = \frac{(\text{Total Profit} + \text{Max. Equity Invested})}{(\text{Max. Equity Invested})}$$

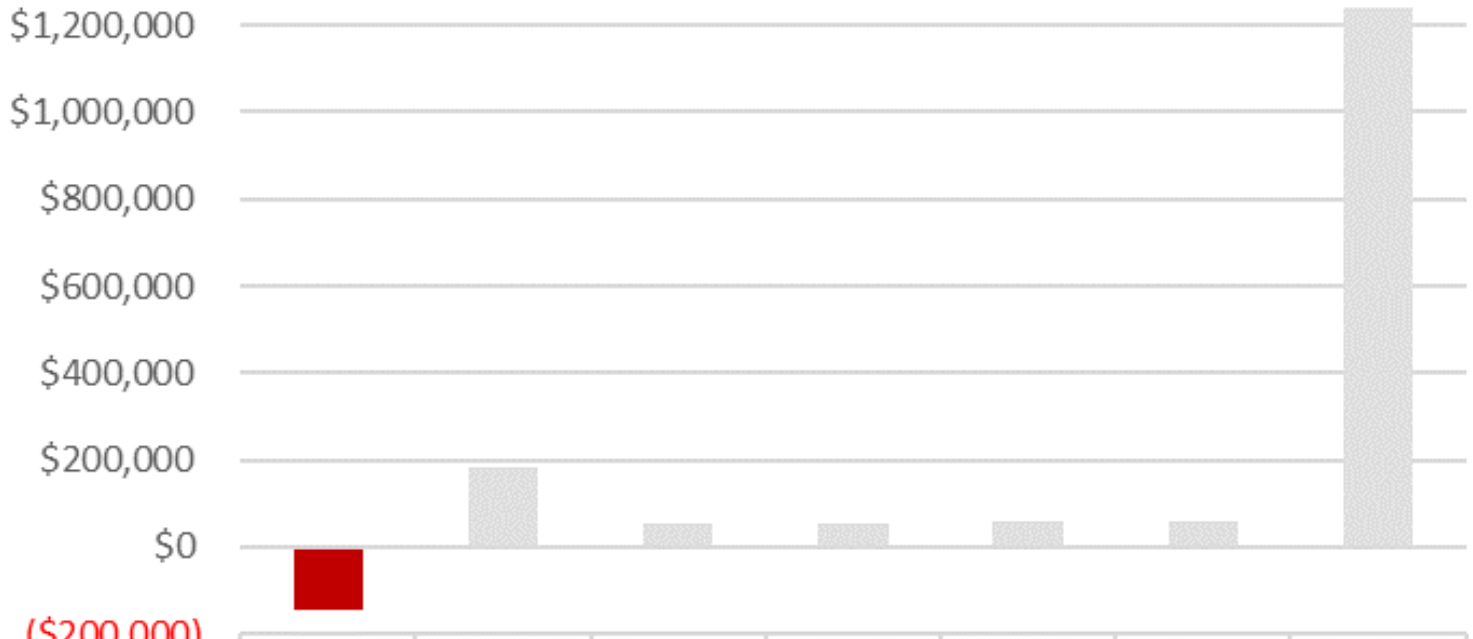
Example

($8,588 + $10,000) / $10,000 =

1.86x

i.e. "your money back, plus 86%."

The five-year marginal IRR is 105%, with a ~37% average stabilized Cash-on-Cash return



	Construction	Y1	Y2	Y3	Y4	Y5	Sale
Marginal Revenue		$182,440	$54,013	$55,634	$57,303	$59,022	$1,240,6
Marginal Costs	$(144,66	$(3,457)	$(3,561)	$(3,668)	$(3,778)	$(3,891)	

IRR (5 year)
105%
(v. 12%)

Cash-on-Cash
37%
(v. 4%)

Equity Multiple
11.3x
(v. 2.3x)

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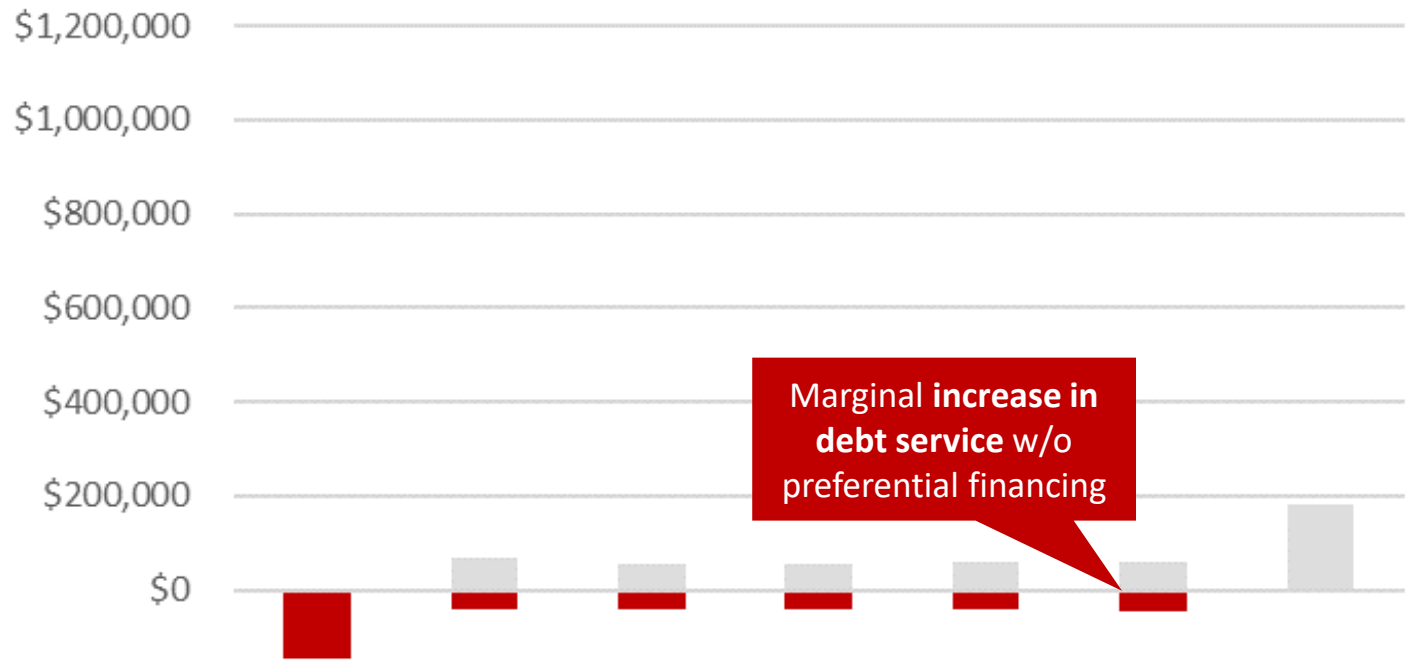
But what does a worst-case scenario look like?

- Project Specific Inputs
  - Financing
    - Interest rate
    - LTV
    - Loan Amount
    - Equity Required
  - Grants & Rebates
  - Vacancy Expense
  - Utility Fees
  - Insurance Premiums
  - Sale Premium

- Worst Case Inputs
  - Financing
    - ~~Interest rate~~
    - LTV
    - Loan Amount
    - Equity Required
  - ~~Grants~~ & Rebates
  - ~~Vacancy Expense~~
  - Utility Fees
  - ~~Insurance Premiums~~
  - ~~Sale Premium~~

The marginal IRR of Passive House is still 15%, even excluding grant, financing, turnover and resale benefits



	Construction	Y1	Y2	Y3	Y4	Y5	Sale
Marginal Revenue		$66,440	$54,013	$55,634	$57,303	$59,022	$181,106
Marginal Cost	($144,667	($41,522)	($42,085)	($42,665)	($43,262)	($43,877)	

IRR (5 year)
15%
(v. 12%)

Cash-on-Cash
9%
(v. 4%)

Equity Multiple
1.8x
(v. 2.3x)

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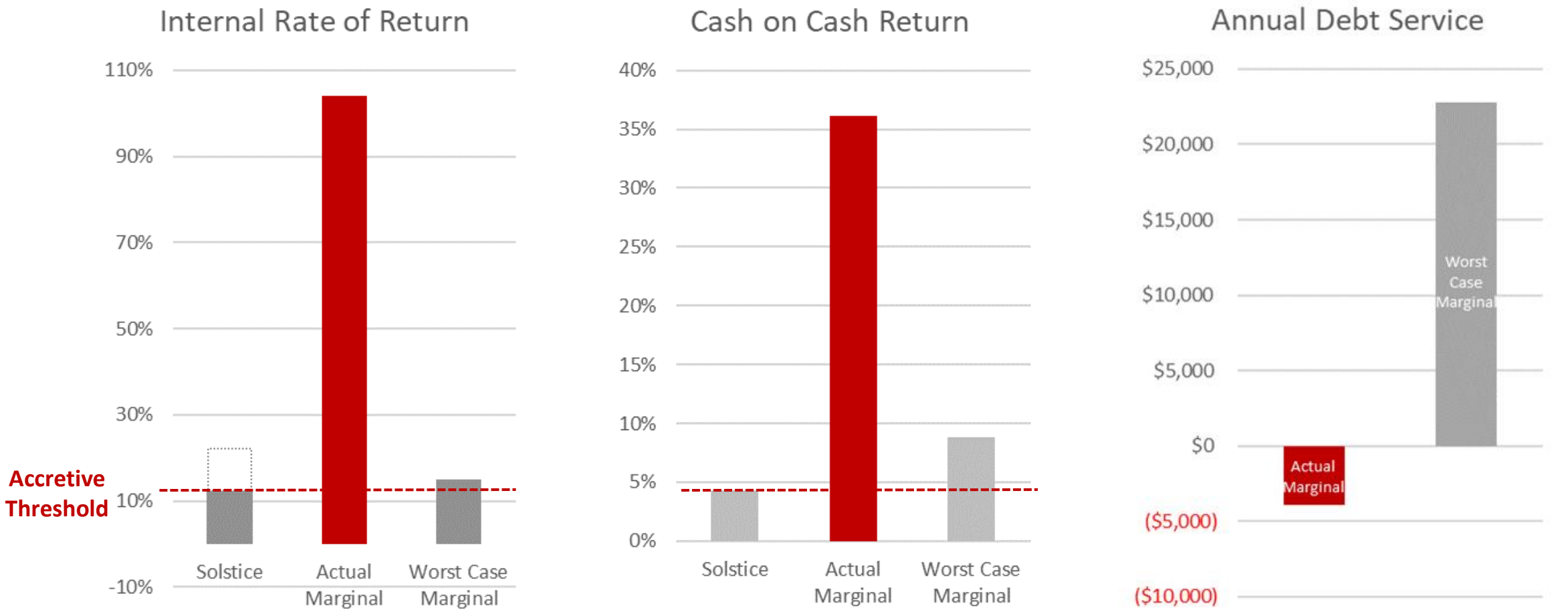
Passive House increases project value more than cost, even in a worst case where debt service increases



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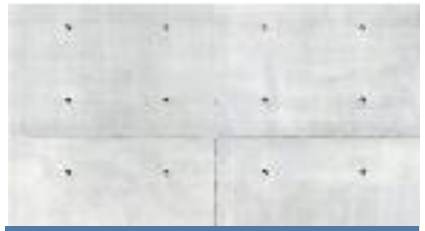
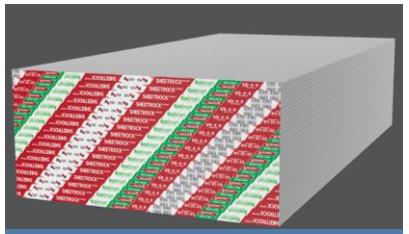
A handful of specs have a disproportionate impact on Embodied Carbon

How We Build

High Impact Embodied Carbon materials, design and specifications

	Concrete	Steel	Wood	Insulation	Gypsum Board
					
Strategies	Mix Design Structural Efficiency	Minimize Use	FSC Certified Structural Efficiency	Carbon Sequestering Low GWP Foams	Low Carbon

Substantial reductions in embodied carbon can be achieved using **readily available**, **familiar** to trades and largely **cost-neutral** materials

Source: Architecture 2030 Carbon Smart Materials Pallet

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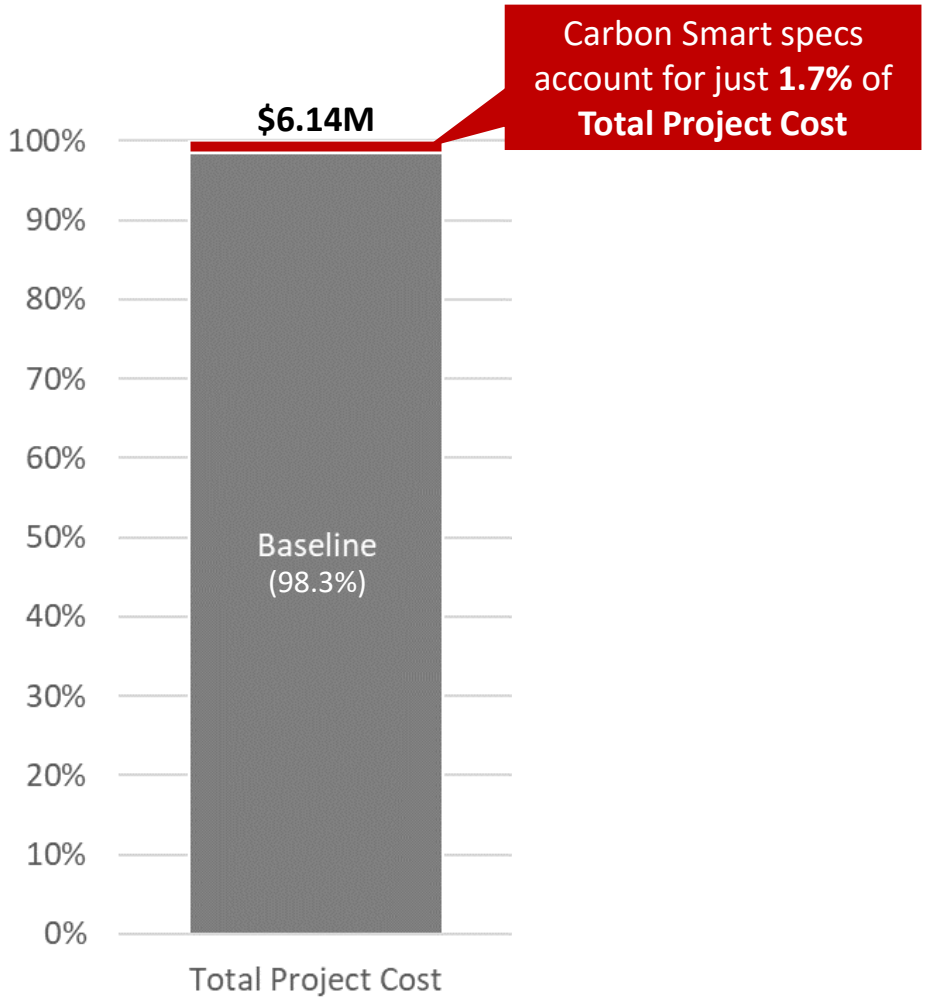
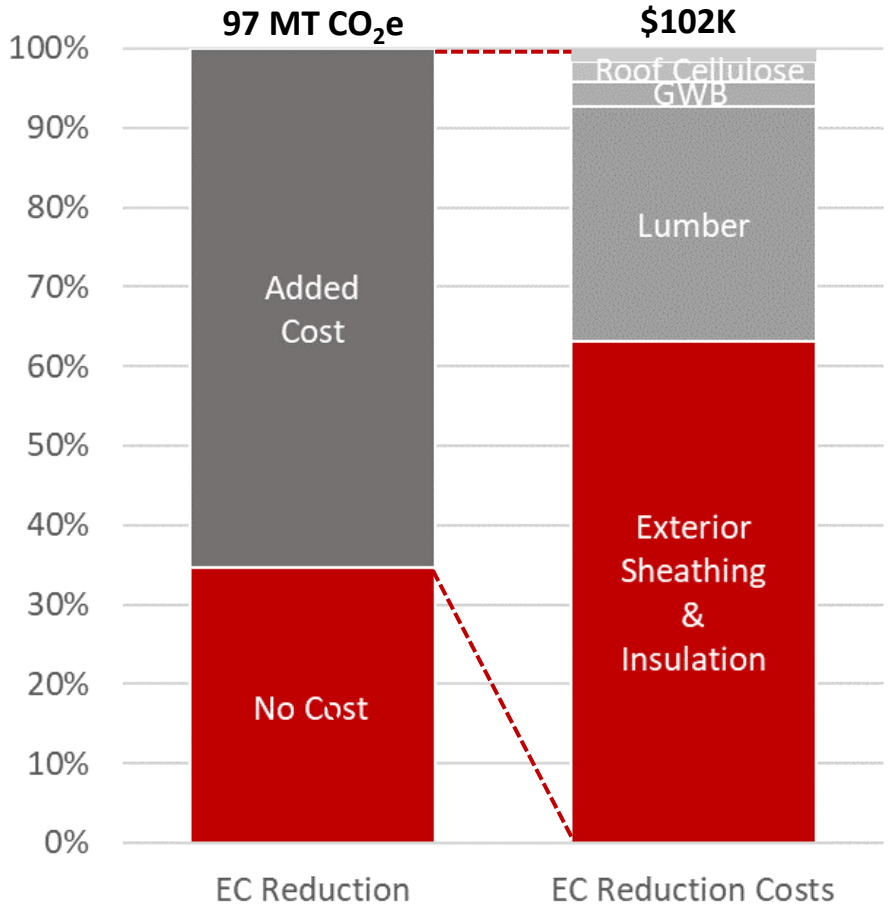
~35% of EC reductions cost nothing; exterior insulation had the lowest ‘Carbon Return on Cost’





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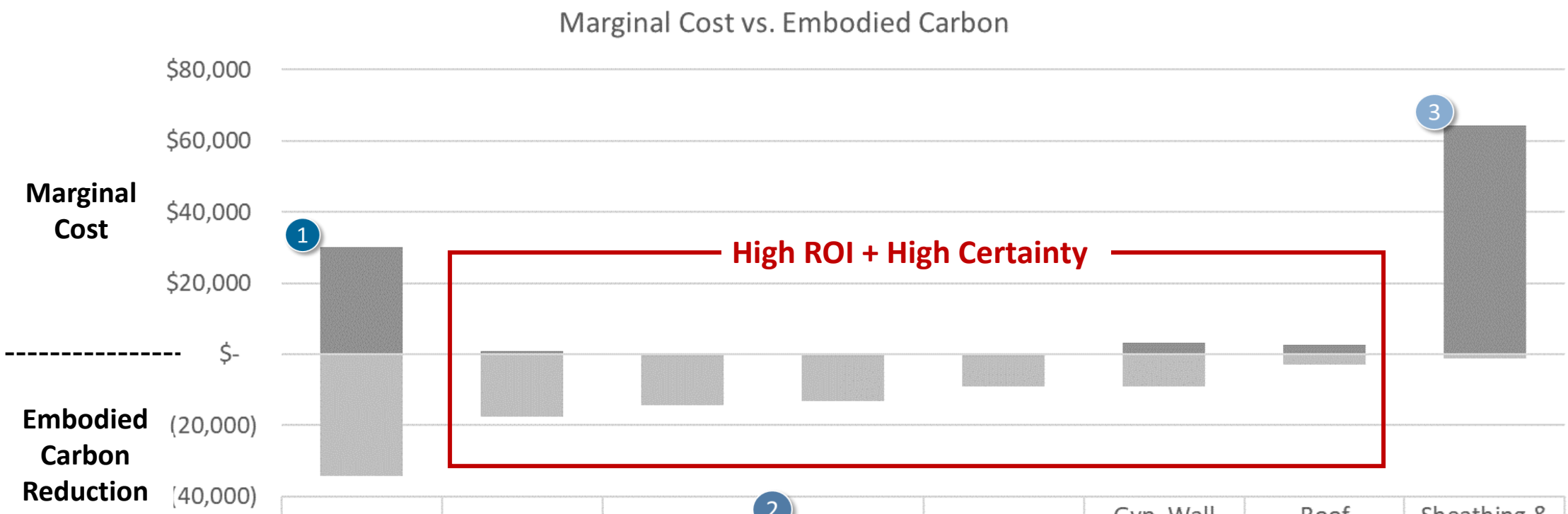
Certainty of impact & cost are highly variable



	Lumber	Wall Cavity ®	Cladding	Concrete	Flooring	Gyp. Wall Board	Roof Cellulose ®	Sheathing & Exterior ®
Kg of CO2e Reduction	(34,276)	(17,673)	(14,448)	(13,234)	(9,211)	(9,059)	(2,857)	(1,309)
Carbon Smart Costs	$30,000	$800	$-	$-	$-	$3,200	$2,608	$64,445
Carbon ROI	(1.14)	(22.09)	N/A	N/A	N/A	(2.83)	(1.10)	(0.02)

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Key Takeaways for missing middle housing

- **Economically rational investors will choose Passive House** at this scale *(in current market conditions)*
    - *This should also apply to larger scale projects, but may not apply to smaller scale*
- **Passive House financial returns are better**...even without incentives or adjusting for climate risk
- **Major Embodied Carbon reductions** can be achieved for **no cost**
- **Start with structural for Embodied Carbon.** Invest marginal dollars in **Wall Cavity Insulation & Gypsum Board**

Questions?

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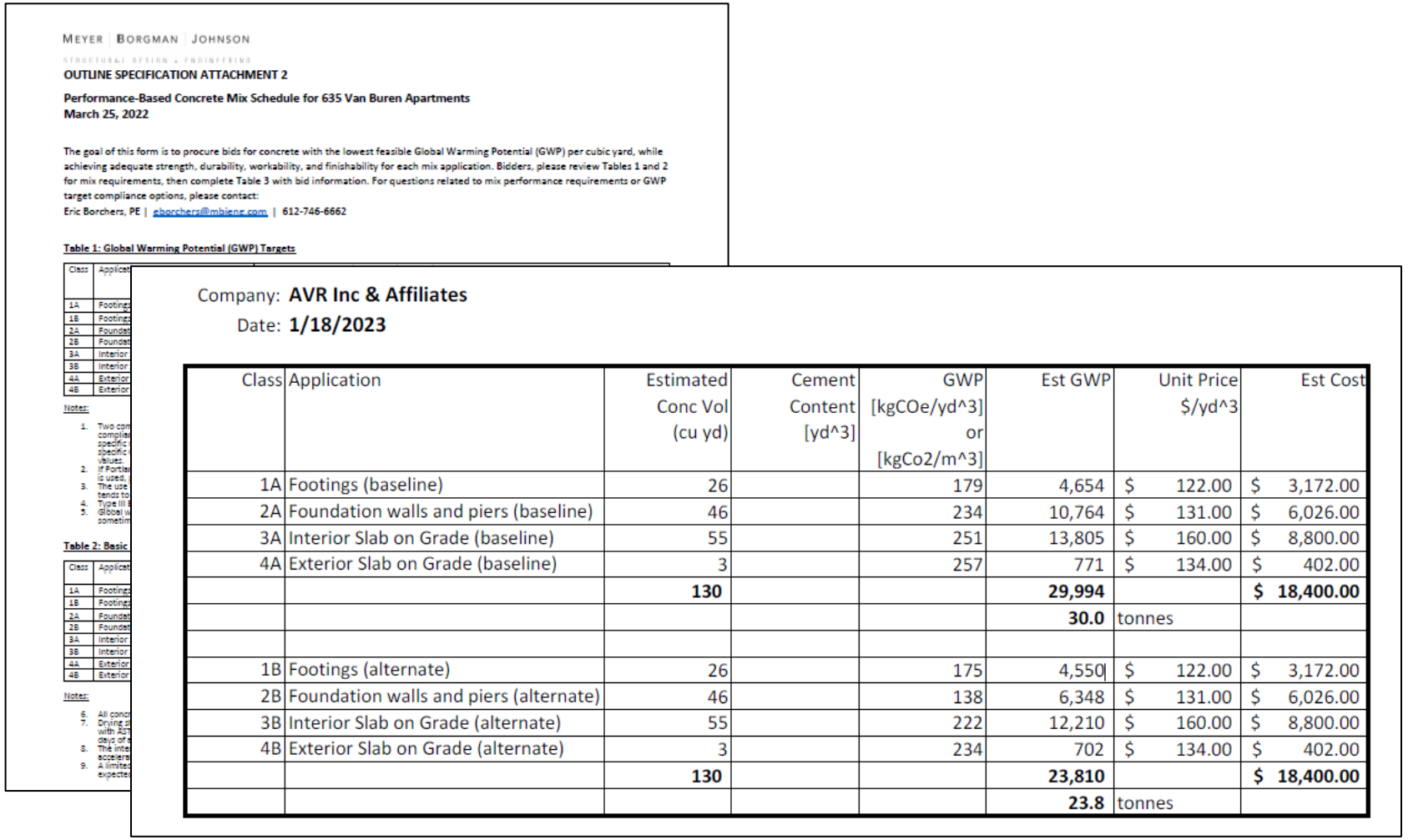
Low carbon concrete is readily available, easy to specify and (largely) cost equivalent



MEYER | BORGMAN | JOHNSON

STRUCTURAL DESIGN + ENGINEERING

OUTLINE SPECIFICATION ATTACHMENT 2

Performance-Based Concrete Mix Schedule for 635 Van Buren Apartments
March 25, 2022

The goal of this form is to procure bids for concrete with the lowest feasible Global Warming Potential (GWP) per cubic yard, while achieving adequate strength, durability, workability, and finishability for each mix application. Bidders, please review Tables 1 and 2 for mix requirements, then complete Table 3 with bid information. For questions related to mix performance requirements or GWP target compliance options, please contact:
Eric Borchers, PE | eborchers@mbjeng.com | 612-746-6662

Table 1: Global Warming Potential (GWP) Targets

Class	Applicat
1A	Footings
1B	Footings
2A	Foundati
2B	Foundati
3A	Interior
3B	Interior
4A	Exterior
4B	Exterior

Notes:

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Table 2: Basic

Class	Applicat
1A	Footings
1B	Footings
2A	Foundati
2B	Foundati
3A	Interior
3B	Interior
4A	Exterior
4B	Exterior

Notes:

6. All concr
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expecte

Company: **AVR Inc & Affiliates**

Date: **1/18/2023**

Class	Application	Estimated Conc Vol (cu yd)	Cement Content [yd^3]	GWP [kgCOe/yd^3] or [kgCo2/m^3]	Est GWP	Unit Price $/yd^3	Est Cost
1A	Footings (baseline)	26		179	4,654	$ 122.00	$ 3,172.00
2A	Foundation walls and piers (baseline)	46		234	10,764	$ 131.00	$ 6,026.00
3A	Interior Slab on Grade (baseline)	55		251	13,805	$ 160.00	$ 8,800.00
4A	Exterior Slab on Grade (baseline)	3		257	771	$ 134.00	$ 402.00
		130			**29,994**		**$ 18,400.00**
					30.0	tonnes	
1B	Footings (alternate)	26		175	4,550	$ 122.00	$ 3,172.00
2B	Foundation walls and piers (alternate)	46		138	6,348	$ 131.00	$ 6,026.00
3B	Interior Slab on Grade (alternate)	55		222	12,210	$ 160.00	$ 8,800.00
4B	Exterior Slab on Grade (alternate)	3		234	702	$ 134.00	$ 402.00
		130			**23,810**		**$ 18,400.00**
					23.8	tonnes	

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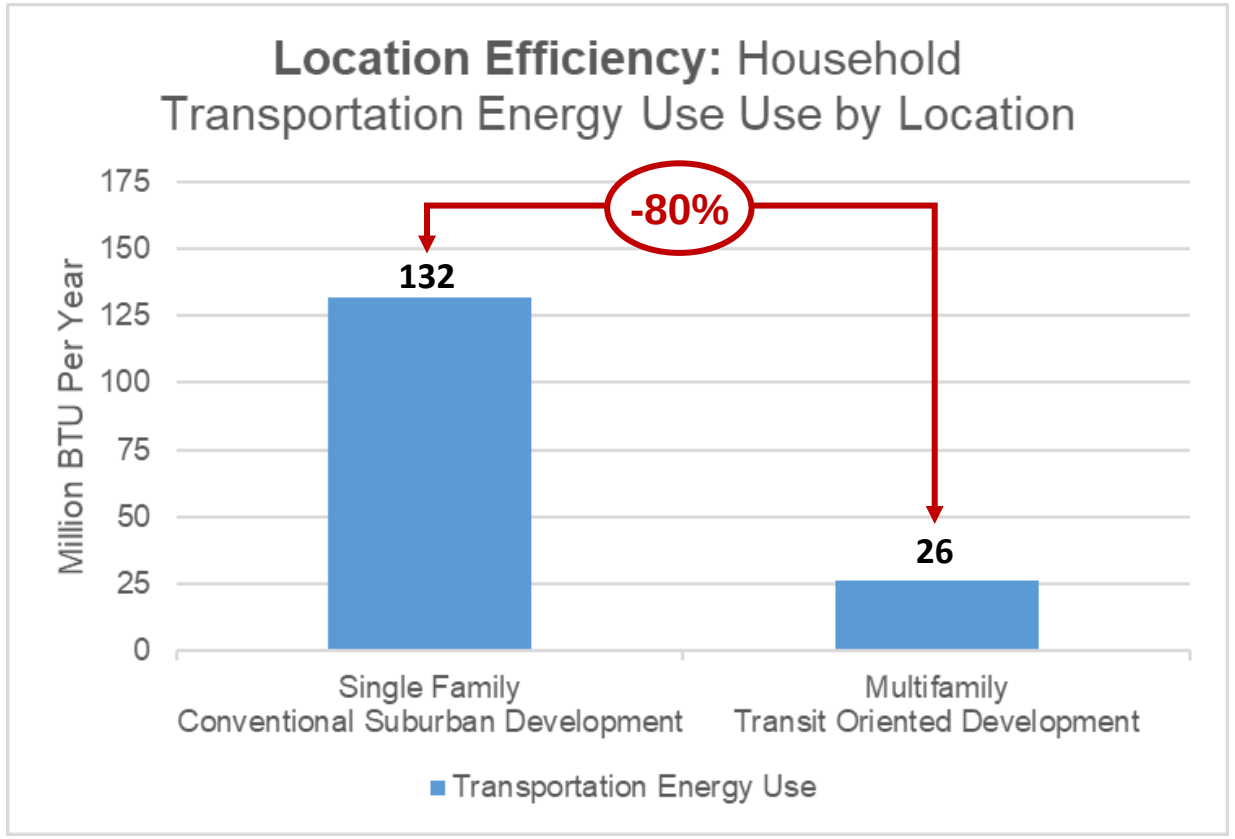
Footprint's transit-oriented multifamily homes radically reduce household transportation energy consumption

Where We Build



EPA United States Environmental Protection Agency

Transit Oriented Multifamily households use ~80% less energy on transportation than single-family home households in auto-dependent locations

Source: U.S. Environmental Protection Agency (March 2011); "Location Efficiency and Housing Type"

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Climate risks are not yet widely or accurately priced in real estate markets, but winds are shifting

Where We Build

Insurers are reassessing risk exposure in historically hot real estate markets…

Bloomberg

"Climate Is Forcing the Most Risk-Aware Industry to Reinvent Itself"

- Bloomberg (January 2023)

Tampa Bay Times

*"Farmers Insurance is **leaving Florida** in latest blow to homeowners"*

-Tampa Bay Times (July 2023)

AP Associated Press

*"**California** insurance market rattled by **withdrawal** of major companies"*

-Associated Press (June 2023)

…and Industry leaders are trumpeting the opportunity for sophisticated investors

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Data & analytics providers are proliferating as savvy investors seek to understand and manage climate risk

Where We Build

CoreLogic®

Climate Impact Lab

ClimateCheck®

American Communities Project

CLIMATE X

RISK FACTOR®

ATTOM™

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Real assets face both physical and transitional risks as markets and governments react to climate change

Where We Build

Physical Risks

- ***Resilience***:

  Certain geographies carry greater risk of **physical damage** and **declining asset** values from:
  - Floods
  - Fires (& air quality)
  - Hurricanes
  - Increased heat
  - Rising sea levels
  - Access to fresh water

- ***Tort Liability:***

  Owner liability for failing to anticipate how climate events could harm a tenant's safety or property

Transitional Risks

- ***Insurance Cost and Availability***

  The growing number of catastrophic weather events may lead to significant increases in property insurance premiums or even limit the availability of insurance in some markets altogether.

- ***Emissions Regulations***

  Major cities throughout the US are enacting rules to curb greenhouse gases emitted from the construction and operation of buildings.

- ***Diligence Scopes & Methods***

There will be a **flight to resilience**, **quality**, and **climate havens** as markets begin accurately pricing climate risk

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