

# Carbon Smart Wood Within The Built Environment



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Co-founder & CEO  
Green Canopy Inc.



Jacob Dunn

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Sustainability  
Coordinator  
ZGF Architects



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Green Markets  
Program Director  
Sustainable Northwest



Stacy Smedley

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Director of  
Sustainability  
Skanska USA Building



*Moderator:* Don Davies

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President  
Magnusson Klemencic  
Associates

# Single Family Fee-Simple as an Asset Class



# The Future of Housing

- **Blackstone, Invitation Homes IPO** - FNMA guarantees for \$1B in rental-home mortgage-backed securities
- **Amherst Holdings**, 08/2018 launched \$1B to buy SFR in addition to \$2.5B already invested in SFR
- **Cerberus Capital Management** is raising an additional \$500 Million to go with 11,000 existing rental homes with a desire to get to 40,000
- **Front Yard Residential Corp.** \$500M+ to build on their current 3,500 home base
- **Pretium Partners** has over \$10B in SFR assets announced in July successfully raising another \$1B
- **Tricon Capital Group** announced a \$2B JV with Teacher's Retirement System, etc. to buy up to 12,000 SFR
- **GTIS** over \$1B invested in SFR build to rent and buying existing.





# **Institutional Capital Wants to own our cities**



# RAD URBAN



- Cost / Speed
- Scale
- Technology
- Consumer Acceptance

- Capital
- Affordability
- Government promotion



Modernizing Building with Off-Site Automation



**The U.S. is currently building 6 billion square feet per year and roughly 4.5 billion is residential.**

Responsible for roughly

**40%**

**of global CO<sub>2</sub> emissions**





In the next 2 decades,  
an equivalent of

**60%**

**of the world's current  
building stock will be built  
and re-built, locking in  
emission patterns for the  
next 80 to 120 years.**





**FSC Framing Panel  
Company?**

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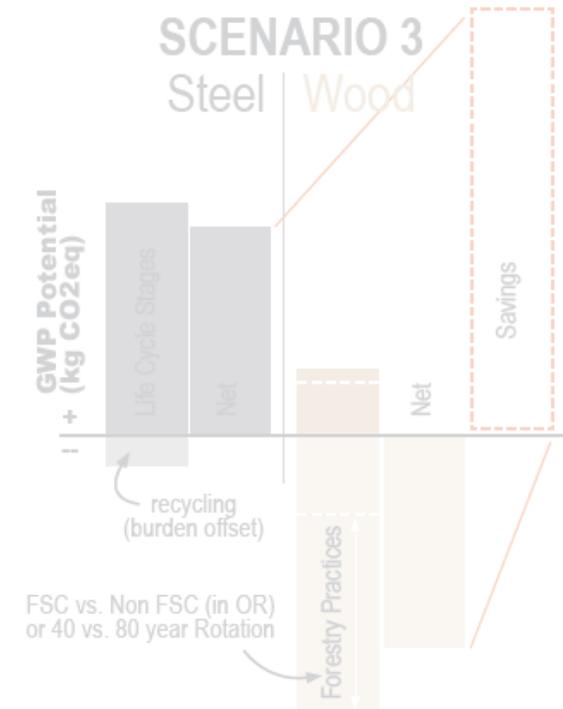
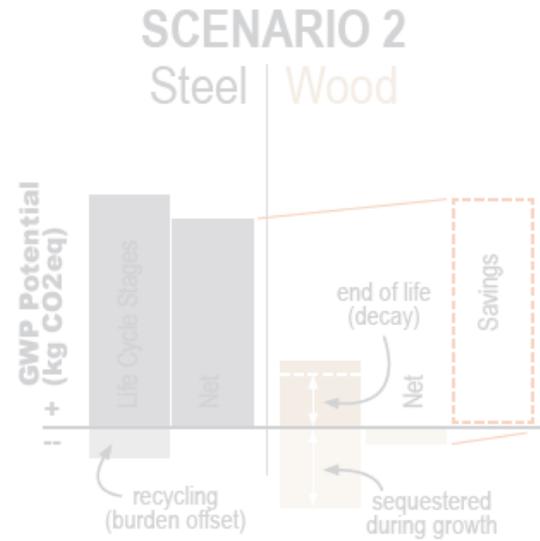
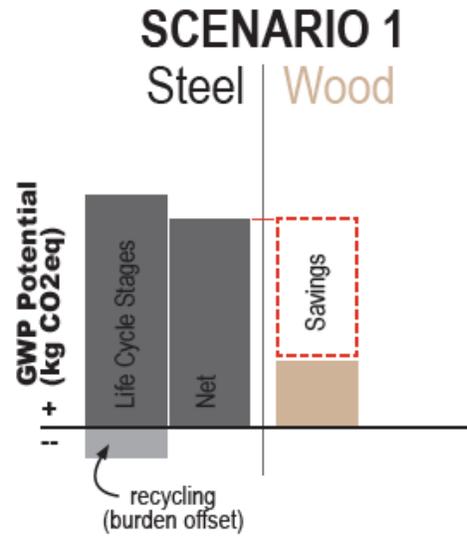


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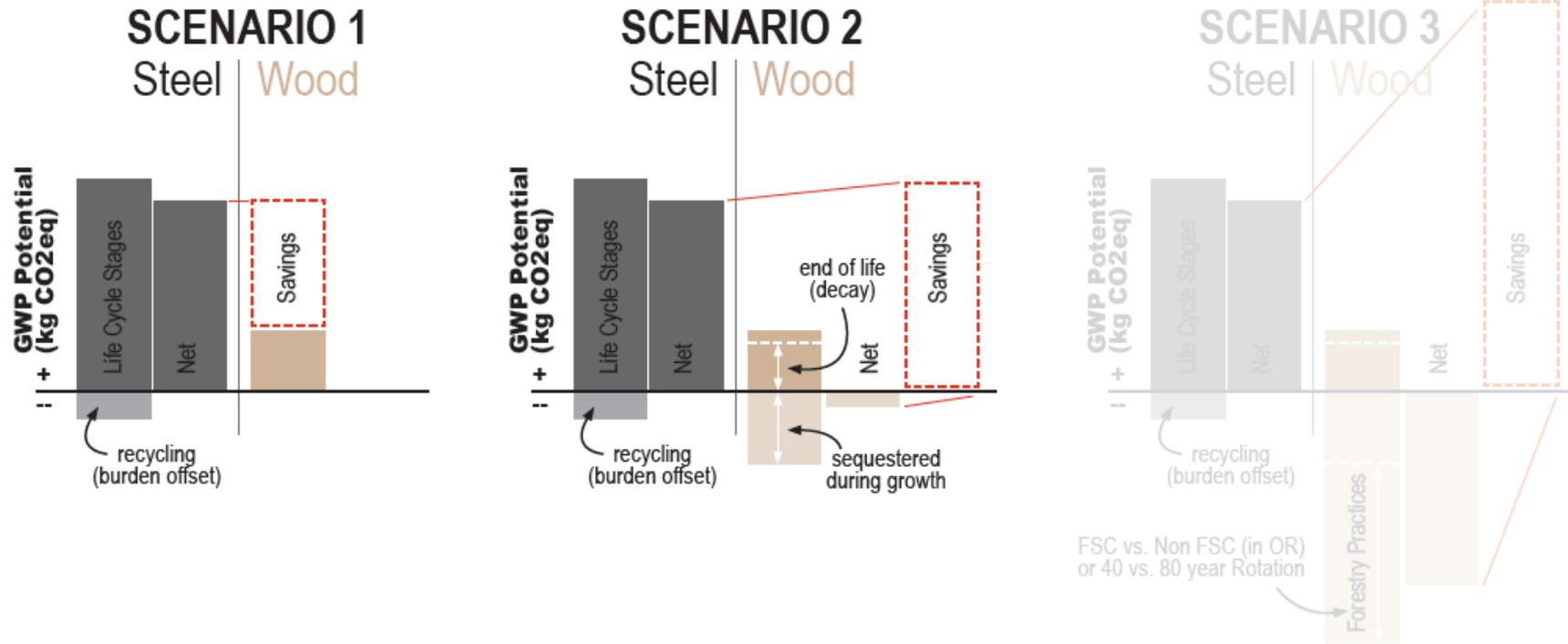
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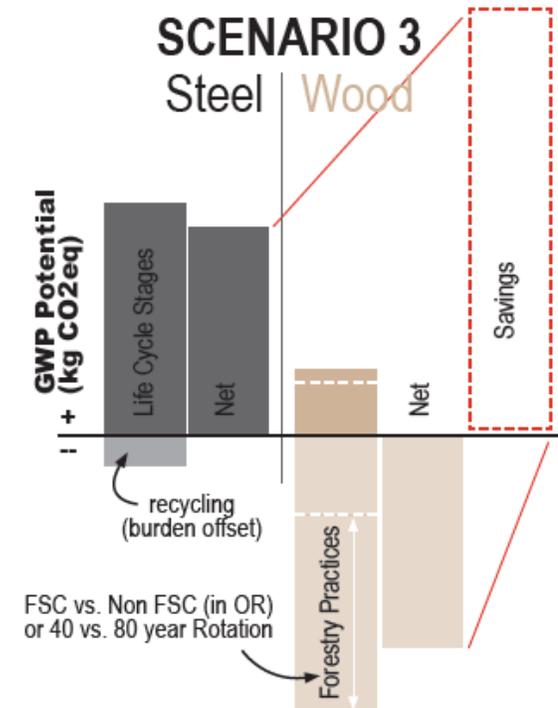
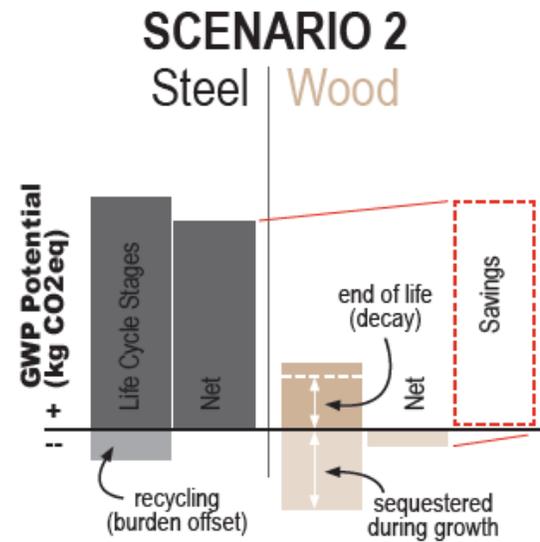
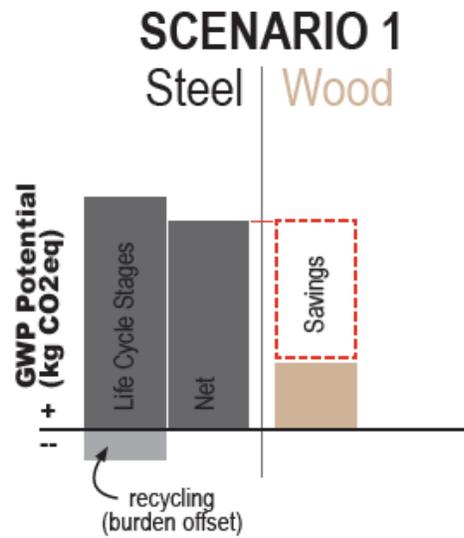
# LCA WOOD CARBON MECHANICS



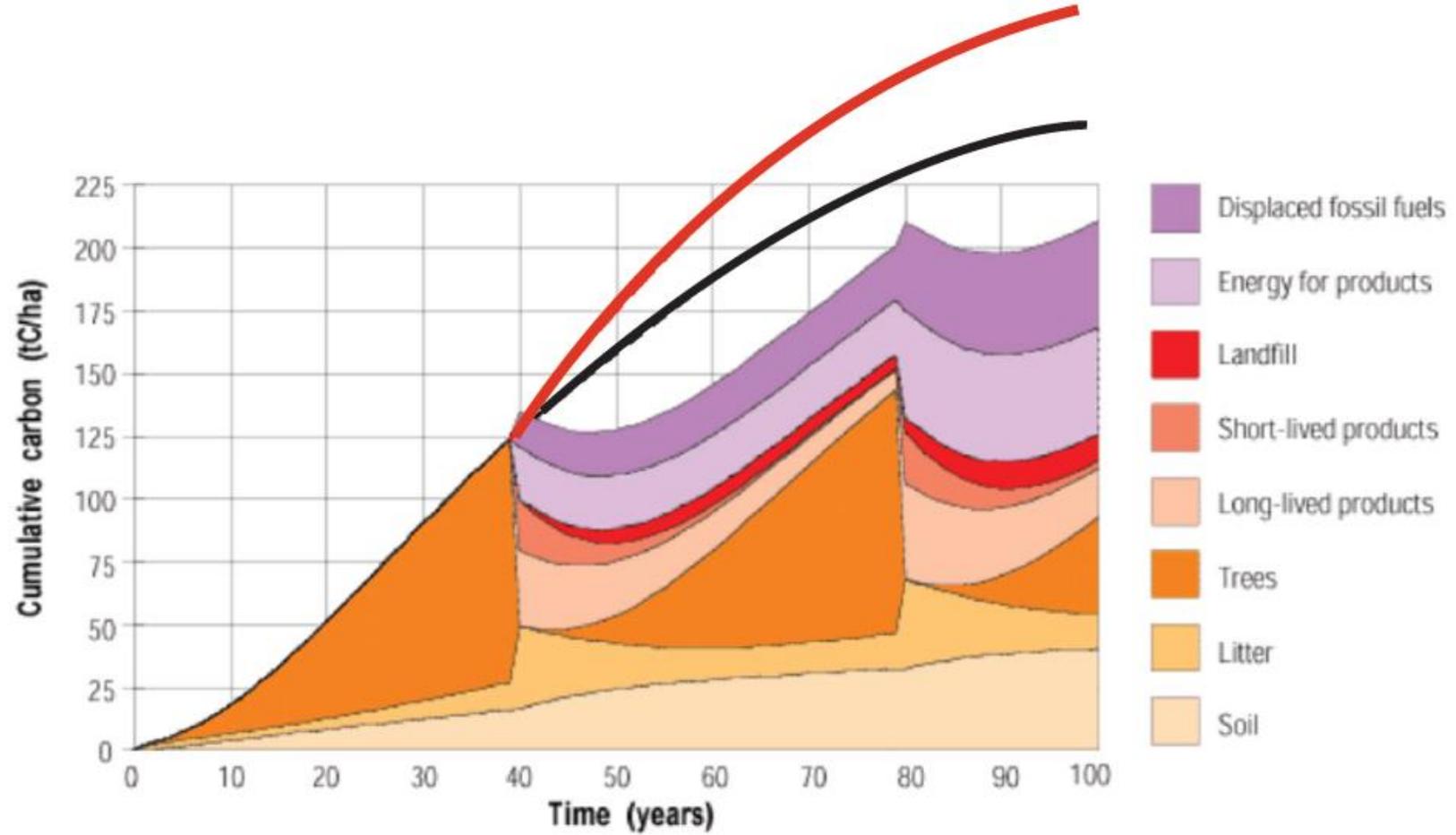
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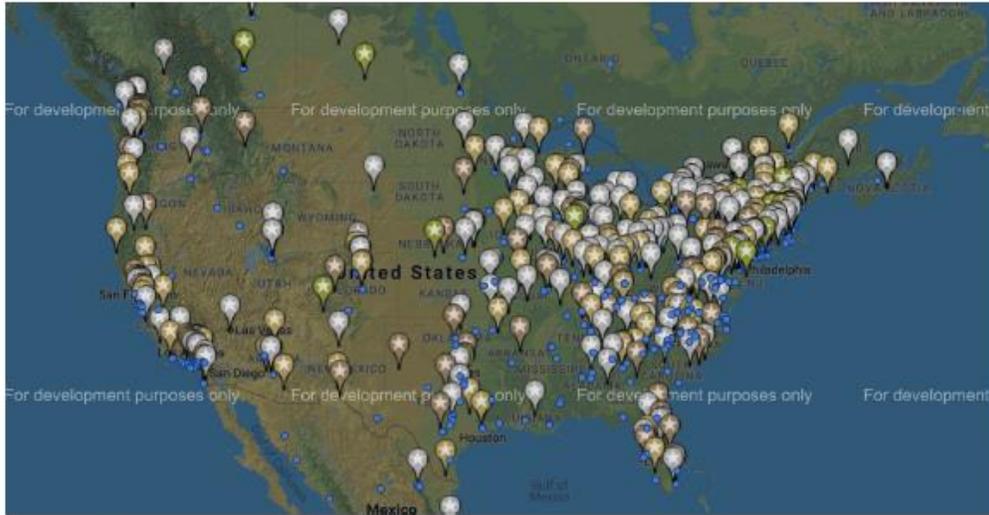
# LCA WOOD CARBON BREAKDOWN



# INSTITUTIONAL COMMITMENT NETHERLANDS LCA REQUIREMENTS

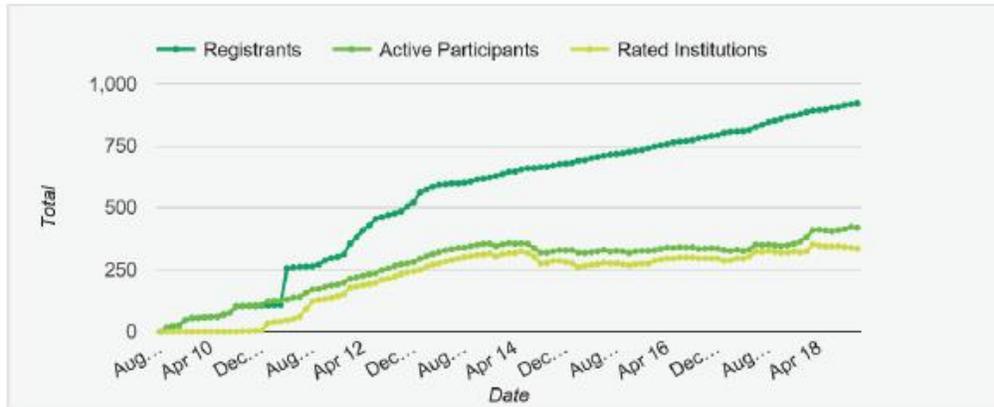


# INSTITUTIONAL COMMITMENT HIGHER EDUCATION



<b>Registrants</b>	921
<b>Active Participants</b>	420
<b>Rated Institutions</b>	335

*Registrants have signed up to use the Reporting Tool. Active participants have a valid STARS report or a full access subscription. Rated institutions have a valid report.*

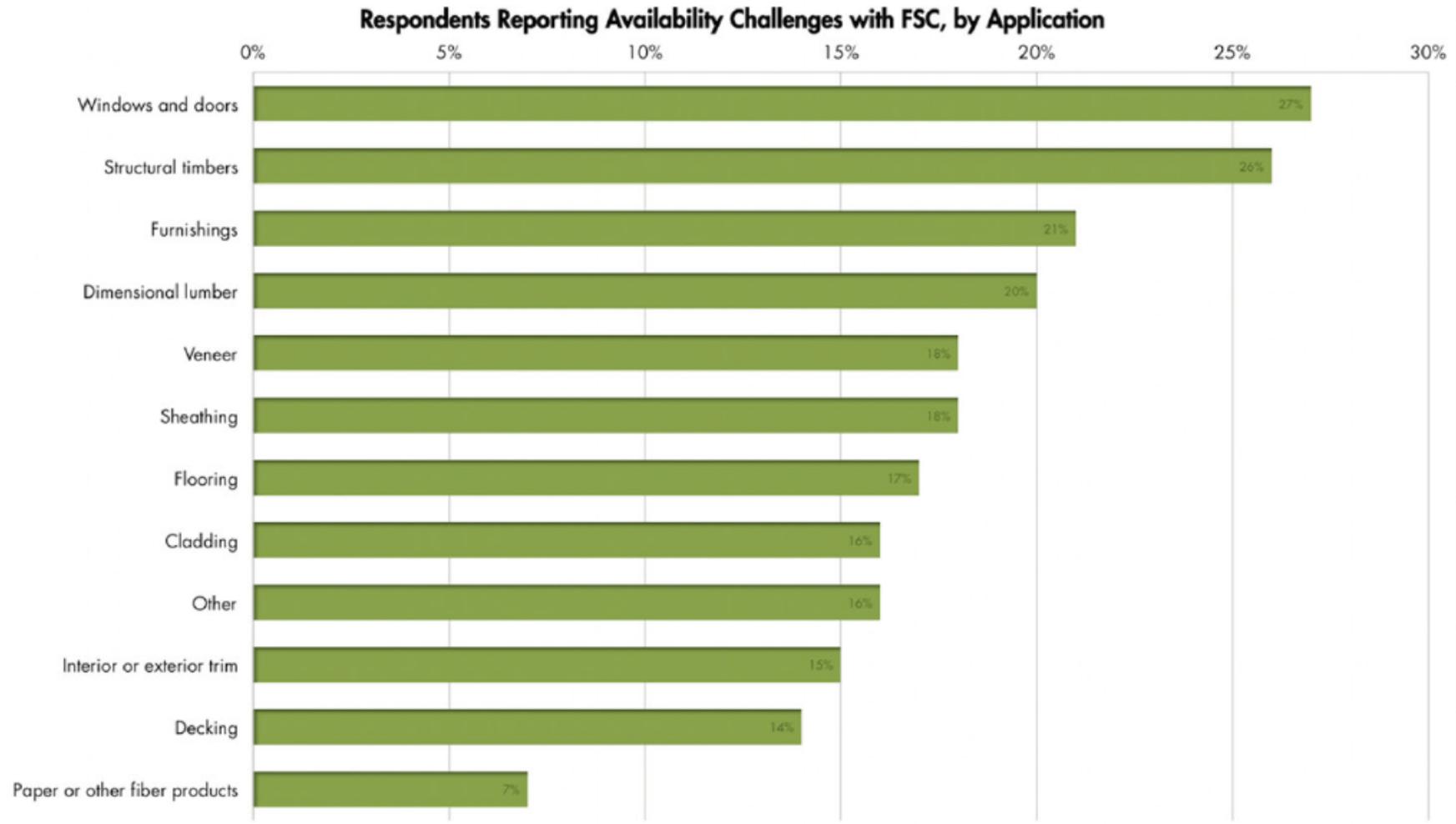


OP-11 - SUSTAINABLE  
PROCUREMENT

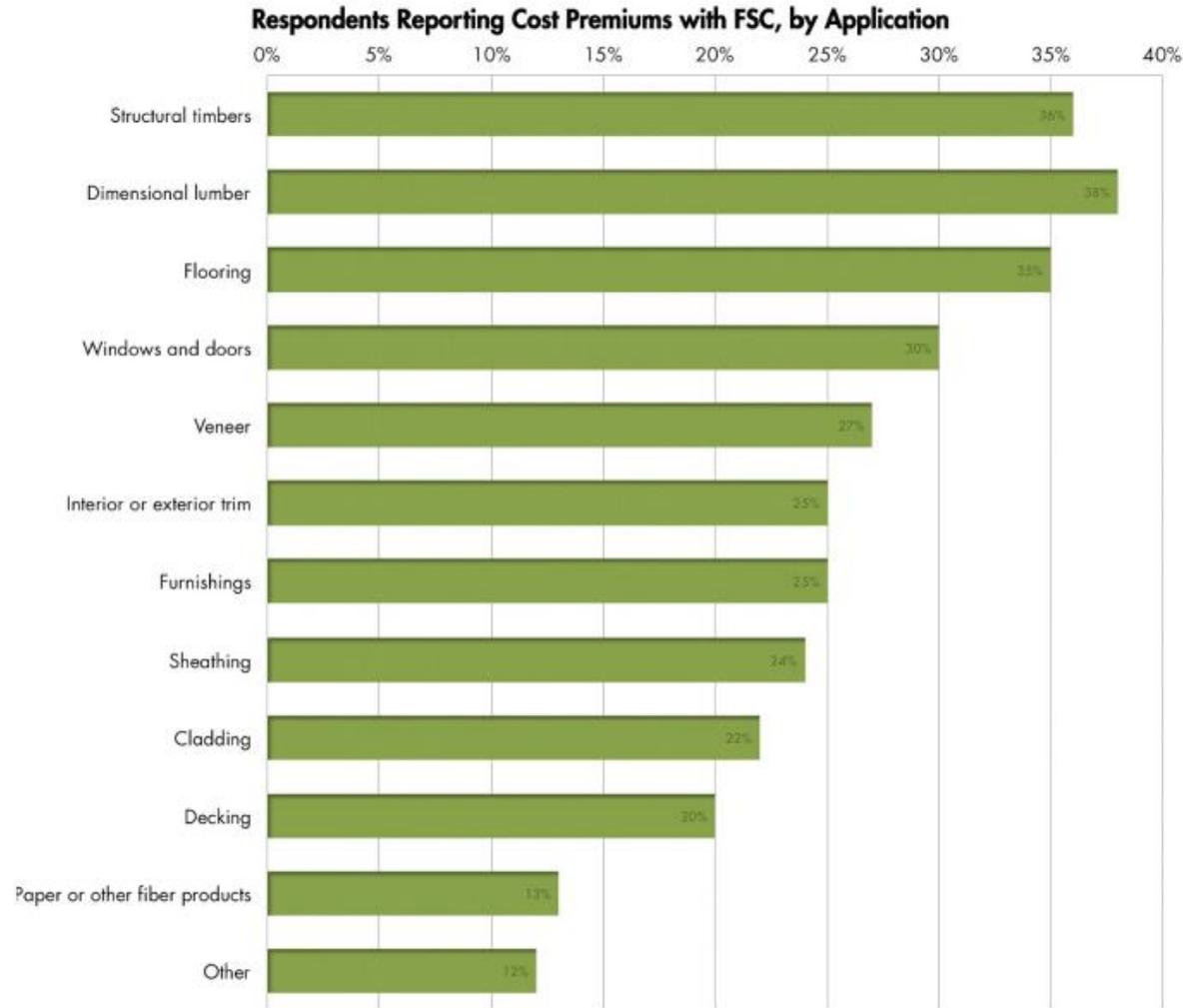
OP-4 - DESIGN AND CONS.

OP-1 - GREENHOUES GAS  
EMISSIONS

# CURRENT MARKET PERCEPTION



# CURRENT MARKET PERCEPTION



# CURRENT MARKET PERCEPTION AGAINST INNOVATION



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# Policies for Climate Smart Wood



10-26-2018  
Paul Vanderford  
Director of Green Markets

# Examples of Current Policies

## King County - Seattle – Portland

Are current policies working to increase the purchase of climate smart wood?



# Policy Next Steps

## Existing Policies

- **Improve Purchase Experience**
  - Easier
  - More Affordable
- **Life Cycle Analysis**
  - Include source forest data
  - Include post harvest storage data

## New Policies and Actions

- **Carrots to Increase Purchasing**
  - Builder Incentives
- **Arm Advocates**
  - Quantitative Data
  - Stories





# Thank you



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Green Markets Program Director  
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# What is our impact?

Over the next 35 years,

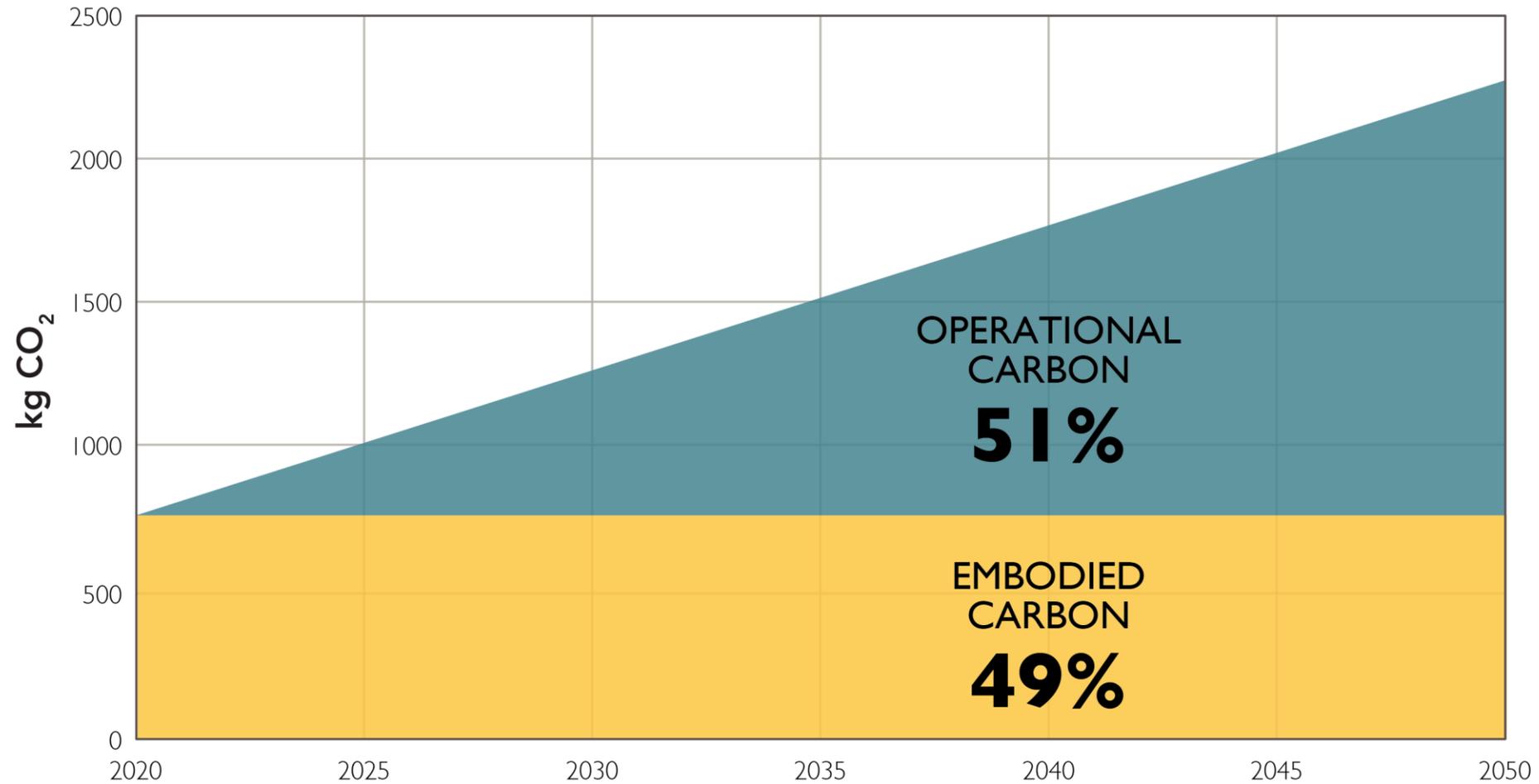
**two trillion ft<sup>2</sup>**

of new and rebuilt buildings  
will be constructed in cities worldwide.



# What is our impact?

## Total Carbon Emissions of **Single Building** *Global Average Building Carbon Footprint: Business as Usual*



# Industry Benchmarking

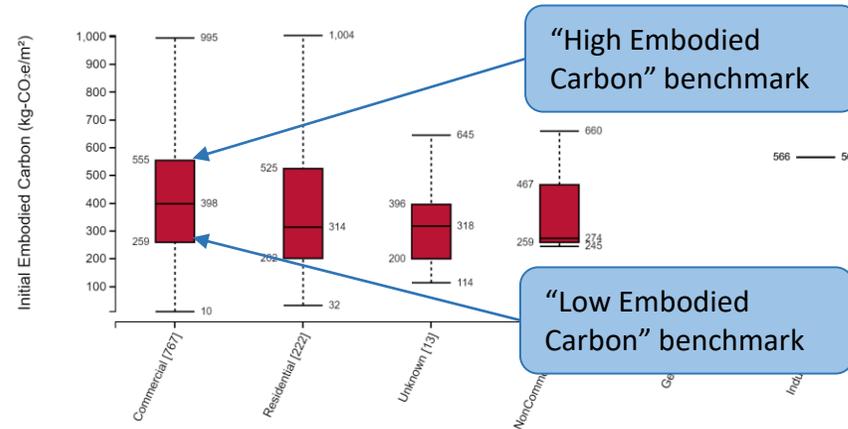


## Embodied Carbon Benchmarking Study

- Over 1,000 building entries
- 12 Building Categories
- Open Source Database
- Phase 1 of Larger LCA Practice Guide Funded Project

X Axis: Program Type Building scope Activate:  Structure only (no foundations)

Benchmark Activate:  Value: Crop outliers



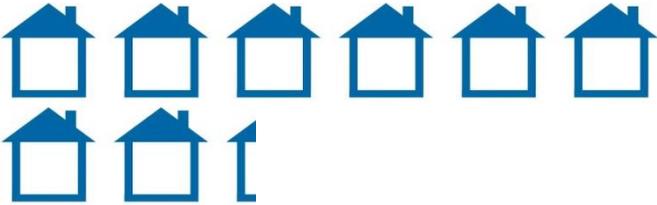
## SPONSORS

<http://www.carbonleadershipforum.org/data-visualization/>

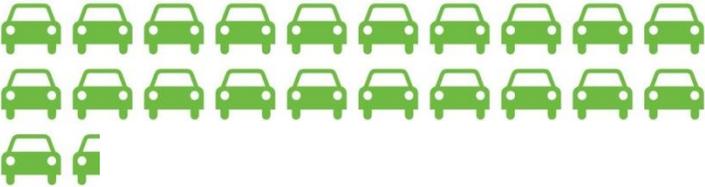
# Demonstrating the Impact

SEATTLE MIDRISE: 'HIGH EMBODIED CARBON'

BASELINE EUI of 38  
Embodied Emissions: 45,900 tons of CO<sub>2</sub>  
Operational Emissions: 180 tons of CO<sub>2</sub>/yr

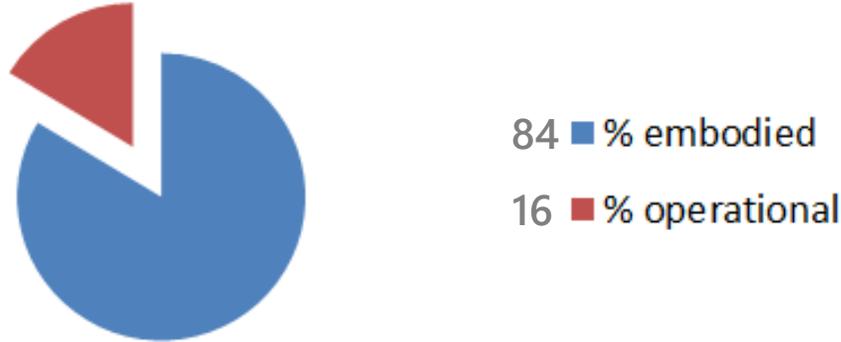


4,222 houses' annual energy use



10,762 passenger vehicles on the road for a year

54,900 tons of CO<sub>2</sub> over 50 years



A 747 flying for 70 days



172,897 barrels of crude oil

*It will take 255 years of building operation to equal the amount of embodied carbon produced during manufacturing and construction.*

# Environmental Product Declarations (EPDs)



Nutrition Facts	
Serving Size 2/3 cup (55g)	
Servings Per Container About 8	
Amount Per Serving	
<b>Calories</b> 230	Calories from Fat 40
% Daily Value*	
<b>Total Fat</b> 8g	<b>12%</b>
Saturated Fat 1g	<b>5%</b>
Trans Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 160mg	<b>7%</b>
<b>Total Carbohydrate</b> 37g	<b>12%</b>
Dietary Fiber 4g	<b>16%</b>
Sugars 1g	
<b>Protein</b> 3g	

## Life Cycle Impact Results (per m<sup>3</sup>)

Declared Unit: 1 m<sup>3</sup> of 10,000 psi concrete at 28 days

OPERATIONAL IMPACTS	PerformX™ PECC10K
Plant Operating Energy (MJ)	38.6
On-Site Plant Fuel Consumption (MJ)	11.1
Concrete Batch Water (m <sup>3</sup> )	1.68E-01
Concrete Wash Water (m <sup>3</sup> )	1.91E-02
On-Site Waste Disposal (kg)	0.0
ENVIRONMENTAL IMPACTS	
Total Primary Energy (MJ)	3,017
Climate Change (kg CO <sub>2</sub> eq)	445
Ozone Depletion (kg CFC 11 eq)	1.31E-08
Acidification Air (kg SO <sub>2</sub> eq)	2.96
Eutrophication (kg N eq)	0.09
Photochemical Ozone Creation (kg O <sub>3</sub> eq)	0.61

# EPDs – Searchable & Downloadable Repository

Home All Materials ▾ / Concretes ▾

## CONCRETE SEARCH BY PROPERTIES

Product Description

**▼ GEOGRAPHIC**

Filter by State/Province  
Washington

**▼ DESIGN INTENT**

Compressive Strength ...?

Curing Time  
28 d

Amb...

SCM (min)

SCM (max)

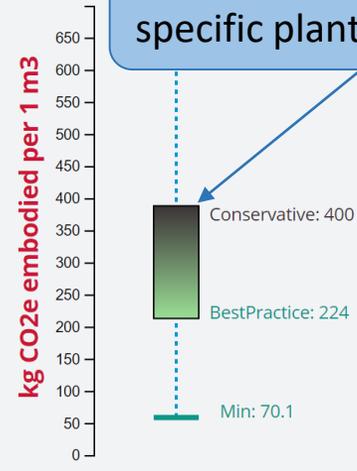
Jurisdiction: US|WA and Curing Time: 28d

### SEARCH RESULTS AND STATISTICS

Samples	Average	Standard Deviation	Conservative Esti...	Best Practice	Declared Unit
140	320 kgCO <sub>2</sub> e	105 kgCO <sub>2</sub> e	400 kgCO <sub>2</sub> e	224 kgCO <sub>2</sub> e	1 m <sup>3</sup>

Manufacturer	Plant	Product	Strength @28D	Description	GWP	Details
STONEWAY CONC...	Houser	Mix 671174	6 ksi	F0, #57 CA, ADVA, ...	444 kgCO <sub>2</sub> e	<input type="button" value="Details"/>

Range of CO<sub>2</sub>e based on specific plant and mix

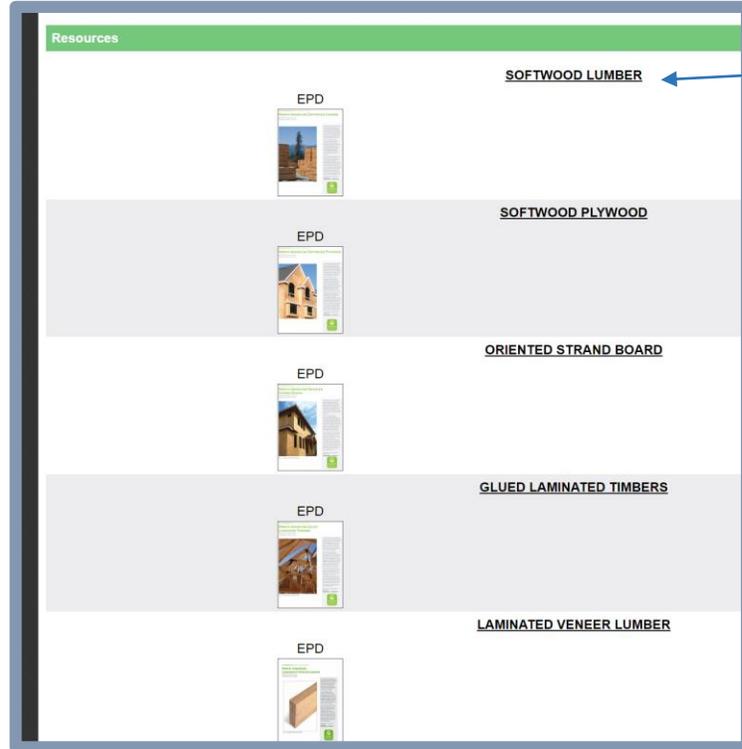


Number of WA produced concrete mixes currently with EPDs



# Demonstrating the Impact

## Data Visualization: What about timber?



Industry Average EPDs exist

# Demonstrating the Impact

## Data Visualization: What about timber?

Resources

- SOFTWOOD LUMBER  

- SOFTWOOD PLYWOOD  

- ORIENTED STRA  

- GLUED LAMINATE  

- LAMINATED VENE  


### ENVIRONMENTAL PRODUCT DECLARATION

Page 10 of 15



**AMERICAN WOOD COUNCIL**  
Canadian Wood Council / Conseil canadien du bois



**North American Softwood Lumber**  
North American Structural and Architectural Wood Products

According to ISO 14025 and ISO 21930

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#### Cradle-to-Gate Impact Assessment Results

The impact assessment results are shown in Table 3. This LCIA does not... indicators, meaning that no single indicator is given more or less value than... as equals. Additionally, each impact indicator value is stated in units that... Some variations exist between the five underlying data sets and are a result... in produ...



...the cradle-... CA studie... by the P... However, the U.S. regional esti-... sumptive use. As a result, the combined weighted average overstates total water consumption and is therefore conservative.

Impact category indicator	Unit	Total	Forestry operations	Lumber production
Global warming potential	kg CO <sub>2</sub> eq.	72.64	10.56	62.09

Specific to forest practices and production locations similar to concrete is specific to mix procurement and plants.



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