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mM EDUCATION SESSION #5

# The Role of Research, Science, and Data in Materials Decision Making

**Priya Premchandran**
Habitable

**Nora Rizzo**
Design for Freedom

**Shannon Goodman**
Build Reuse

Moderator

**Annie Bevan**
mindful MATERIALS

# Thank you to our Sponsors!

National Gypsum®

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# Imagine a world where….

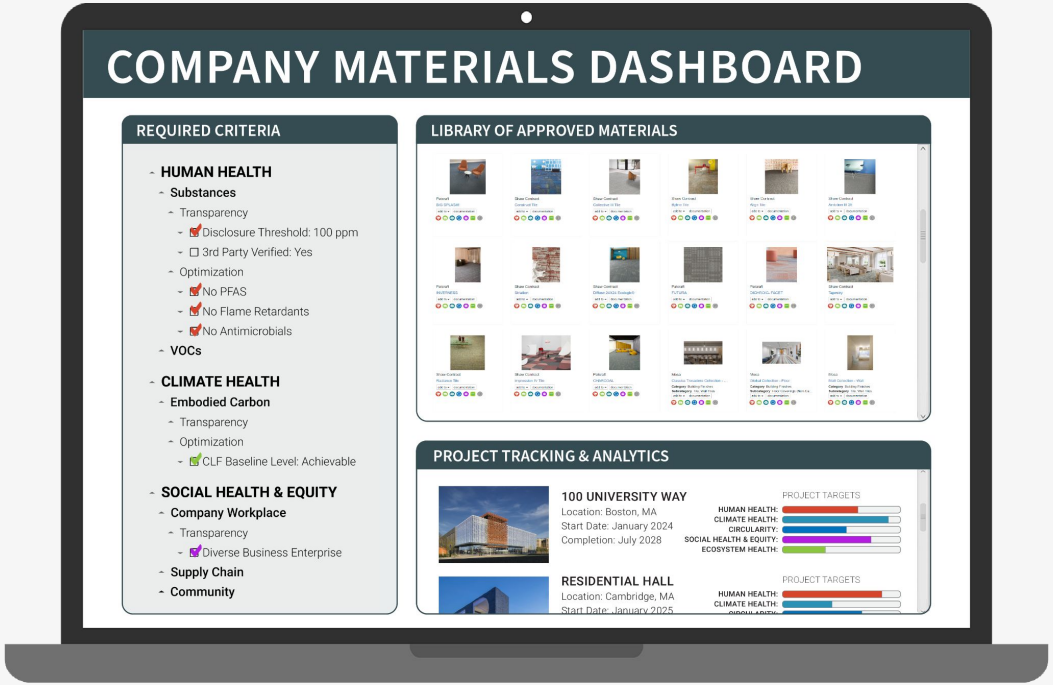
It’s easy to identify and select better materials in workflow.

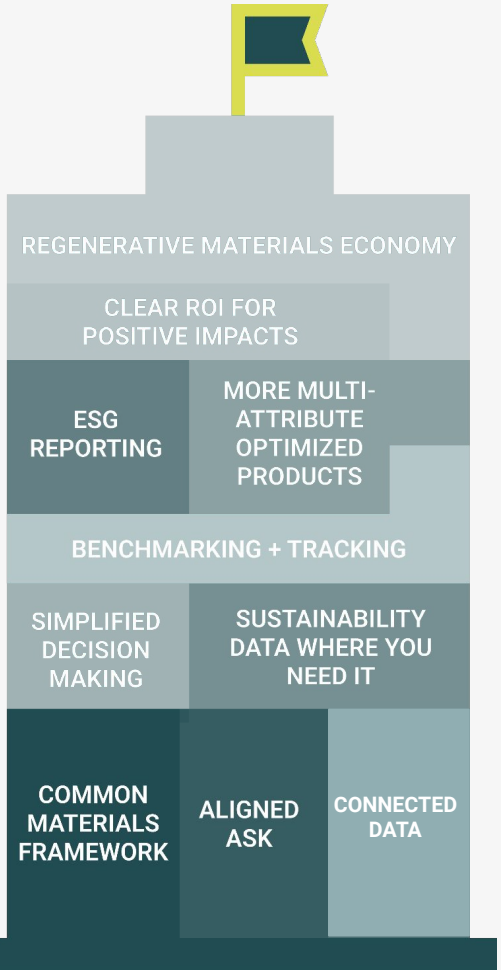
We can quantify holistic impacts of products in projects to support ESG reporting.

We can Valuate Buildings & Analyze Risk leveraging impact reductions

Manufacturers see a clear ROI for their sustainability investment


# Our Adventure to the Regenerative Materials Economy Requires the Eas(ier) Button!



# The Eas(ier) Button we are working towards:

+ Access product sustainability data in common framework in workflow

+ Overlay your materials requirements

+ Manage your materials library

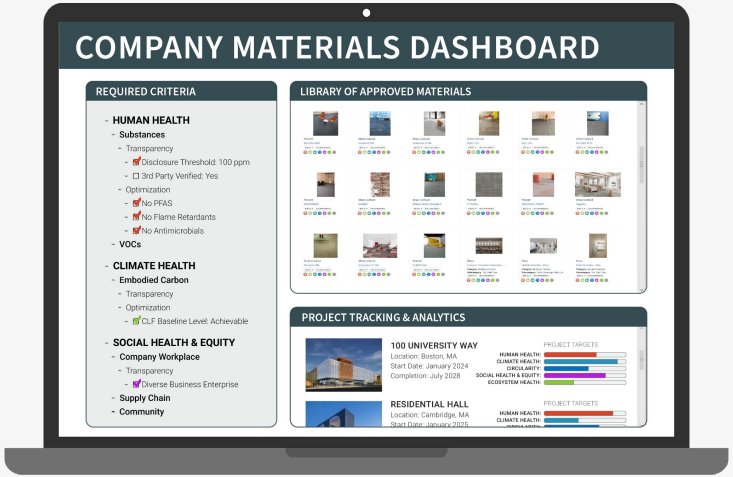
+ Track materials used on projects

+ Analytics + Reporting on impacts

+Unlock quantifiable ESG metrics to Valuate & Analyze Risk

+ Manufacturers can track ROI

+ No more disparate spreadsheet requests



# A Materials Foundation: A Common Materials Language

## The Common Materials Framework

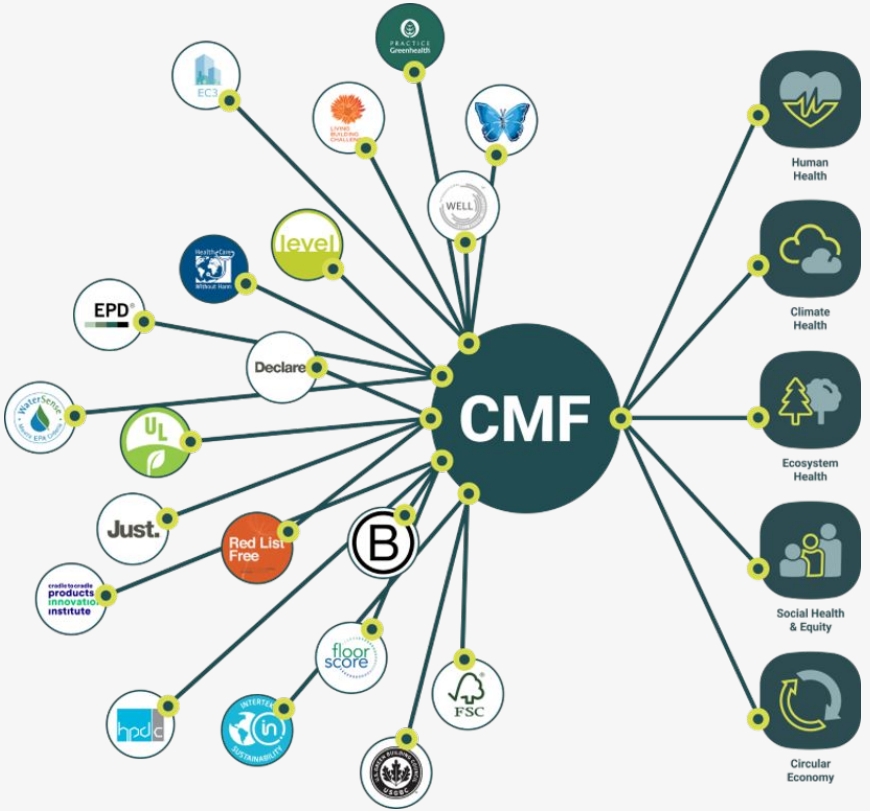
Sustainability Certifications & Data, Structured for Impact.

# The Framework

The CMF analyzes and contextualizes over 150 of the most common building product and material certifications and disclosures.

The framework gives structure to over 650 data ‘factors’ identified within these certifications & programs, organizing them into 5 buckets of holistic sustainability.

This is the common language our industry has needed to drive accountability and momentum.




2024
mM
Forum
Summit
An unprecedented opportunity.
HARVARD Office for Sustainability
Google
THE GREEN CITIES COMPANY
The Durst Organization
KAISER PERMANENTE
AvalonBay COMMUNITIES
salesforce
State of Oregon Department of Environmental Quality
DEQ
Brookfield Properties
BRIGHTWORKS SUSTAINABILITY
Construction Specialties
ShawContract
patcraft
ASSA ABLOY Opening Solutions
Carnegie
SPRINGS WINDOW FASHIONS
Mecho
Humanscale
SAINT-GOBAIN
certainteed
Kingspan
PROSOCO
MAPEI
nCompass
HKS
BA
BOULDER ASSOCIATES
MSR Design
SKANSKA
ZGF
IA INTERIOR ARCHITECTS
o+k
DPR CONSTRUCTION
Kirksey ARCHITECTURE
Gensler
LITTLE
Perkins&Will
DIALOG
PERKINS EASTMAN
BURO HAPPOLD
Turner
Gresham Smith
ARUP
DLRGROUP
RYAN
Material Bank
BuildingEase.com
Red2Green integrated ecostrategy
source
Sustainable Minds
GreenCircle CERTIFIED
Building Transparency
hpdc
INTERNATIONAL LIVING FUTURE INSTITUTE
cradle to cradle products innovation institute
BIFMA
BUILD REUSE
design for FREEDOM
U.S. GREEN BUILDING COUNCIL USGBC
LPA
AIA
INTERNATIONAL WELL BUILDING INSTITUTE
Building Passport Alignment Project
Urban Land Institute
HABITABLE
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
GSA
mindful MATERIALS

# Foundational Milestone: Industry Wide Report

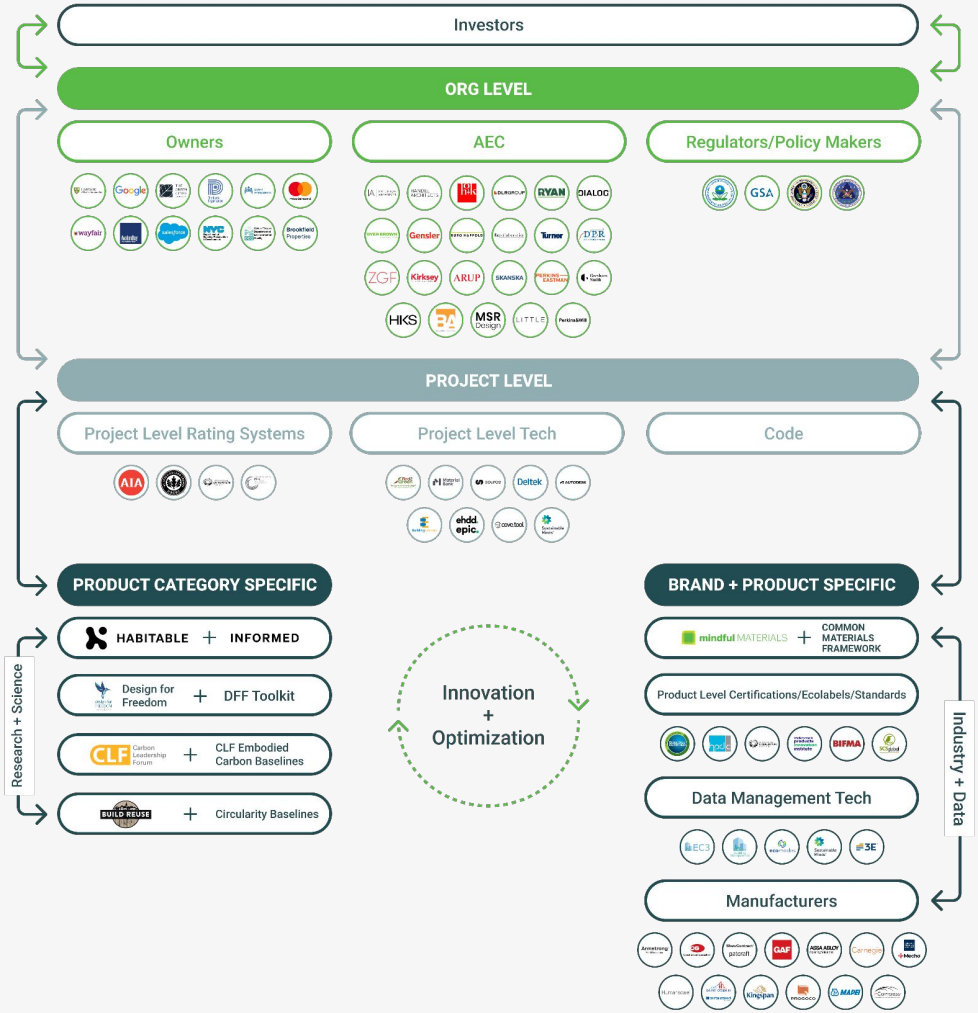
+ Industry Wide Communication & Awareness Resource

+ Detailed Overview of our shared Vision of Future, State of the State of the industry, Summary of Forum/Industry Efforts, Forthcoming Solutions, and Opportunity for Action

+ Milestone Marker to ensure Forums don't get too far ahead of industry

# An Ecosystem Approach to Scale Change

# Where research & science inform third party certifications & vice versa



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# LIFECYCLE BUILDING CENTER


# LBC REUSE CENTER & STORE


# LBC NONPROFIT MATERIAL MATCH PROGRAM

# LBC NONPROFIT MATERIAL MATCH PROGRAM

LIFECYCLE BUILDING CENTER OF GREATER ATLANTA

# LBC'S OPERATIONAL IMPACT

Since beginning operations in 2011, LBC has:

**DIVERTED 12.6 MILLION POUNDS OF USABLE BUILDING MATERIALS FROM LANDFILLS**

## 12.6 MILLION

**AWARDED 425 BUILDING MATERIAL GRANTS TO NONPROFIT ORGANIZATIONS**

## 425 TOTAL

**SAVED THE COMMUNITY OVER $6 MILLION THROUGH DISCOUNTED AND FREE MATERIALS**

## $6,000,000

# REBUILDATL COALITION / WORKFORCE DEVELOPMENT

# REBUILDATL COALITION / WORKFORCE DEVELOPMENT

# KENDEDA BUILDING @ GEORGIA TECH

# KENDEDA BUILDING @ GEORGIA TECH

# KENDEDA BUILDING @ GEORGIA TECH


**GA Film Lumber**

- 3,840 tons annually
- 2,000 housing units

## CHICKADEE

| | |
|---|---|
| UNITS: | 1 |
| BEDROOMS: | 2 |
| BATHROOMS: | 1.5 |
| STORIES: | 2 |
| GROSS SF: | 896 SF |
| PORCH SF: | 84 SF |

2ND FLOOR PLAN


1ST FLOOR PLAN

1 FRONT PORCH
2 LIVING
3 KITCHEN
4 BEDROOM
5 BATH
6 GARAGE

KRONBERG URBANISTS + ARCHITECTS
2024 HOUSING CHOICE LIBRARY

KRONBERG URBANISTS ARCHITECTS

# REBUILDATL: DOE RE-X BEFORE RECYCLING PRIZE

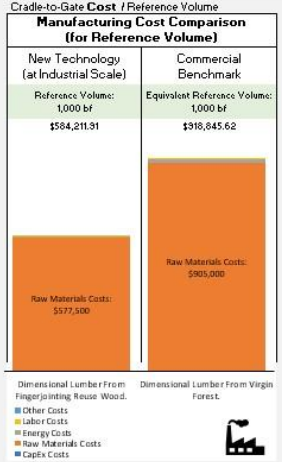
U.S. DEPARTMENT OF ENERGY (DOE) OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY (EERE)

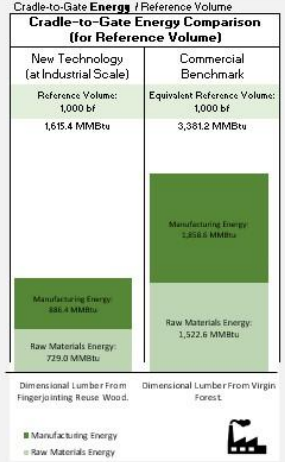
**Techno-economic, Energy & Carbon Heuristic Tool for Early Stage Technologies (TECHTEST)**

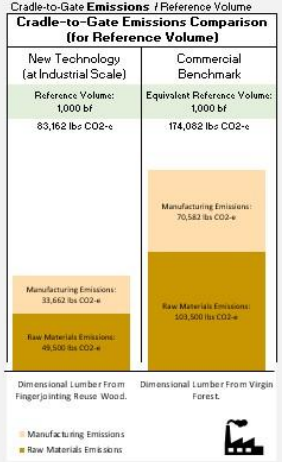
**Results Summary Plots**

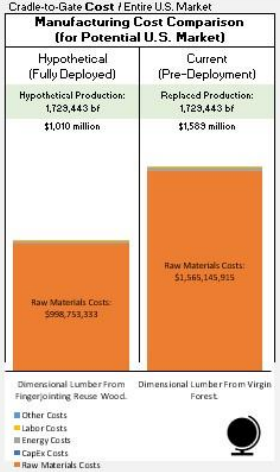
Note 1: Results will populate as data entried are made in the tool.

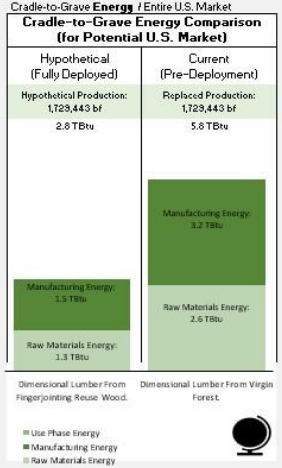
Results in charts below are in annual impact, some inputs have been scaled up from a per functional unit basis.

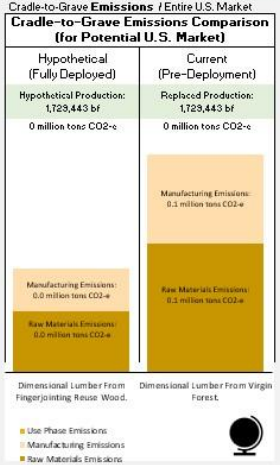



**Potential Manufacturing Cost Savings per Reference Volume Manufactured:**

$334,633.71 saved per ref. volume
36.4% cost savings per unit of production replaced

**Potential Cradle-to-Gate Energy Savings per Reference Volume Manufactured:**

1,765.8 MMBtu saved per ref. volume
52.2% manufacturing energy savings per unit of production replaced

**Potential Cradle-to-Gate Emissions Reduction per Reference Volume Manufactured:**

90,920 lbs CO2-e saved per ref. volume
52.2% manufacturing energy savings per unit of production replaced

**Annual Potential Cost Savings to U.S. Manufacturers:**

$579 million saved per year
36.4% cost savings per unit of production replaced

**Annual Potential Life Cycle Energy Savings for Affected U.S. Markets:**

3.1 TBtu saved per year
52.2% life cycle energy savings in affected markets

**Annual Potential Life Cycle Energy Savings for Affected U.S. Markets:**

0.1 million tons CO2-e saved per year
52.2% life cycle emissions reduction in affected markets

**Cost Impact Summary (Reference Volume)**

| Manufacturing Cost Category | Cost Savings |
|---|---|
| Capital Expenses | $3.12 |
| Raw Materials | $321,500.00 |
| Energy (Utilities) | $7,154.75 |
| Direct Labor | -$24.16 |
| Total Cost Savings | $334,634 |

**Energy Impact Summary (Reference Volume)**

| Life Cycle Phase | Energy Savings |
|---|---|
| Raw Materials | 793.60 MMBtu |
| Manufacturing | 972.18 MMBtu |
| Total Energy Savings | 1,765.78 MMBtu |

**Emissions (GWP) Impact Summary (Reference Vol**

| Life Cycle Phase | Emissions (GWP) Reduction |
|---|---|
| Raw Materials | 54,000 lbs CO2-e |
| Manufacturing | 36,320 lbs CO2-e |
| Total Energy Savings | 90,320 lbs CO2-e |

**Cost Impact Summary (U.S. Manufacturers)**

| Manufacturing Cost Category | Cost Savings |
|---|---|
| Capital Expenses | $0.0 M |
| Raw Materials | $566.4 M |
| Energy (Utilities) | $12.4 M |
| Direct Labor | $0.0 M |
| Total Cost Savings | $578.7 M |

**Energy Impact Summary (U.S. Market)**

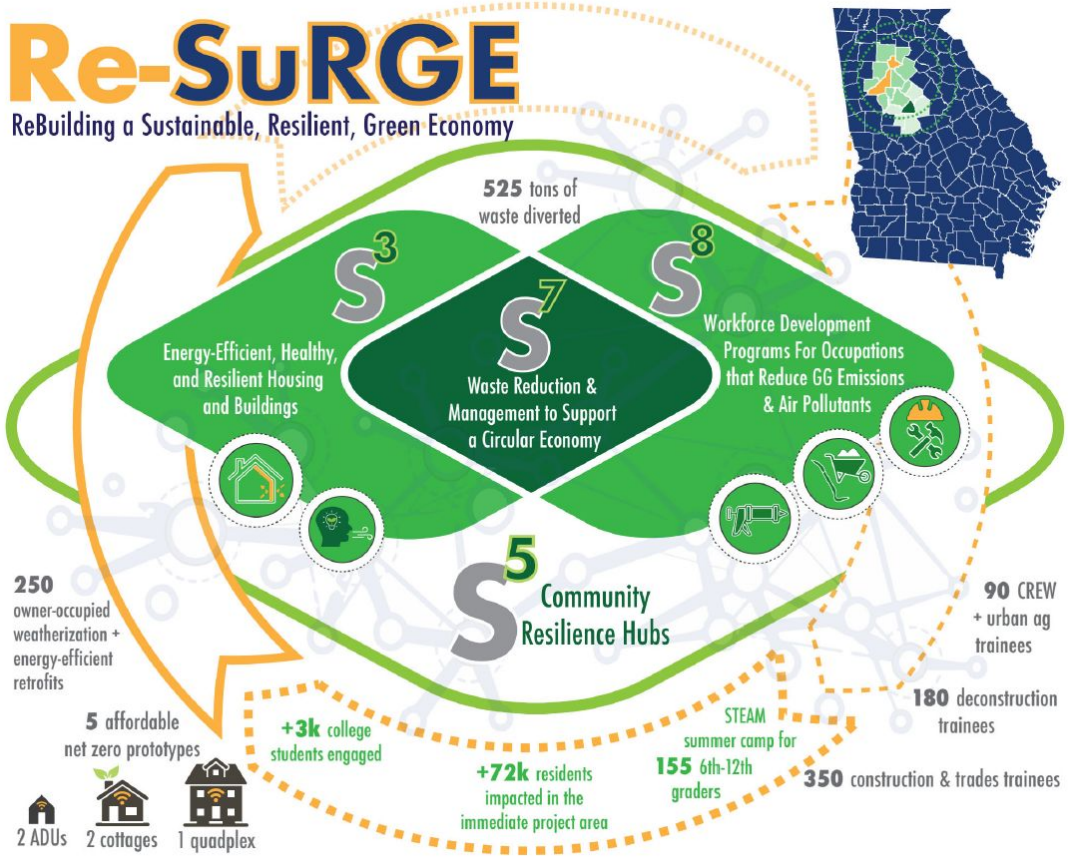
| Life Cycle Phase | Energy Savings |
|---|---|
| Raw Mater. Embodied Energy | 1.4 TBtu |
| Manufacturing | 1.7 TBtu |
| Use Phase | 0.0 TBtu |
| Total Energy Savings | 3.1 TBtu |

**Emissions (GWP) Impact Summary (U.S. Market)**

| Life Cycle Phase | Emissions (GWP) Reduction |
|---|---|
| Raw Mater. Embodied Energy | 0.0 million tons CO2-e |
| Manufacturing | 0.0 million tons CO2-e |
| Use Phase | 0.0 million tons CO2-e |
| Total Energy Savings | 0.1 million tons CO2-e |

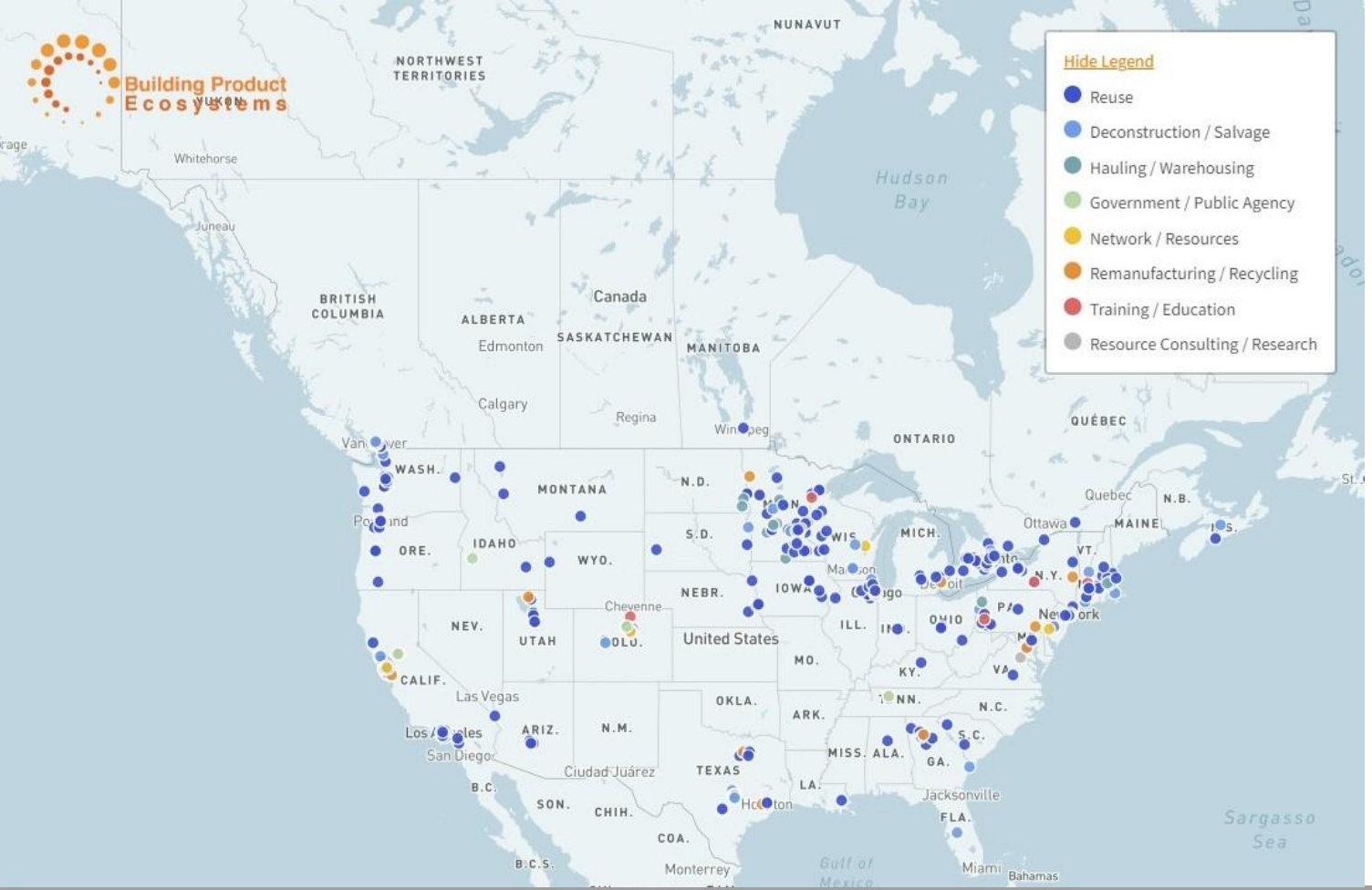
**Key**
Net Savings
Even
Net Increase

# REBUILDATL: DOE RE-X BEFORE RECYCLING PRIZE




# Re-SuRGE: EPA Community Change 2025 - 2027 Targets

- 250 Owner-Occupied Weatherization & Energy-Efficiency Retrofits
- 5 Net-Zero Affordable Housing Prototypes
- 620 Individuals Trained
- 525 Tons Diverted
- 5 Resilience Hubs

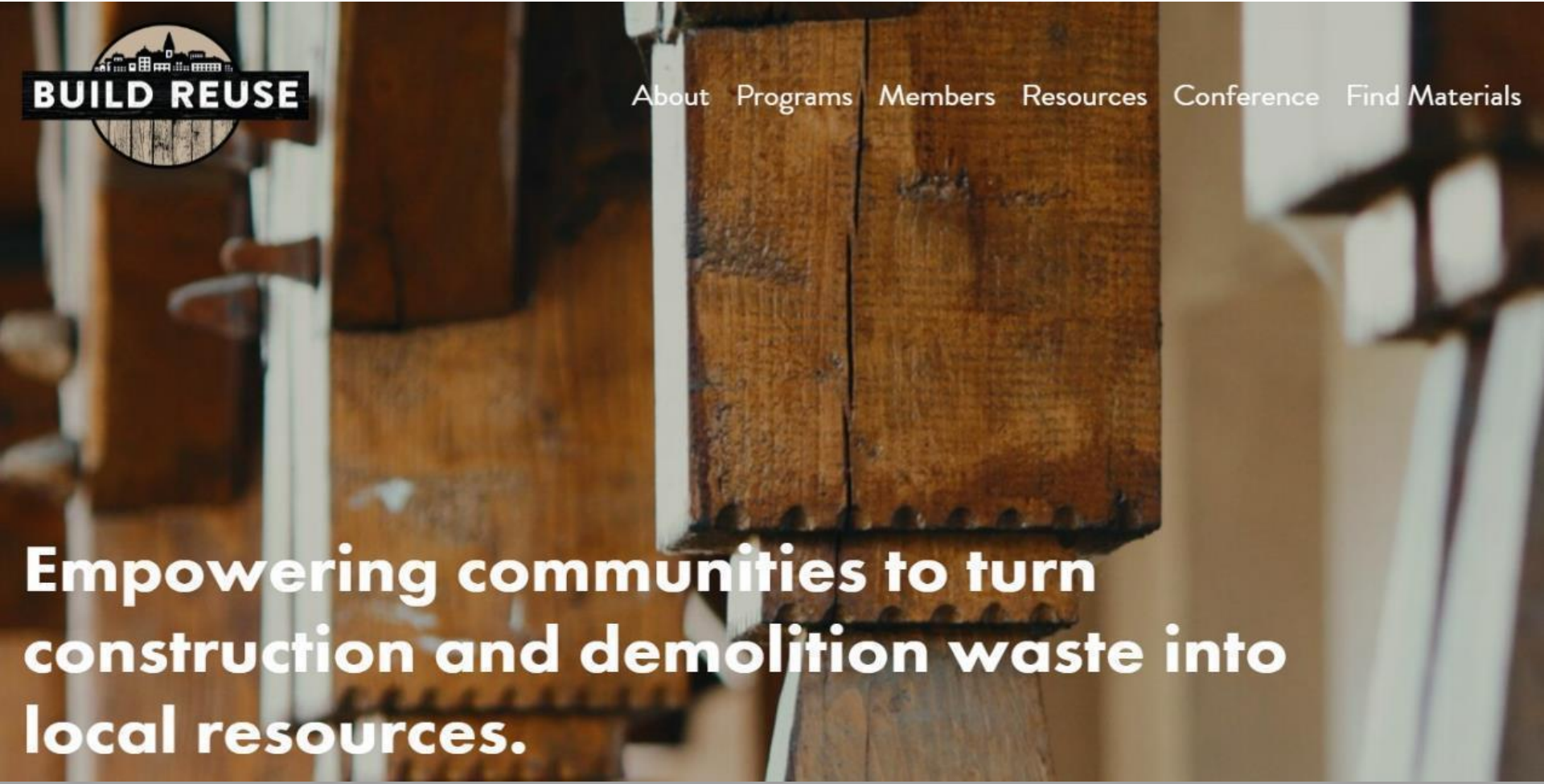



**Reduce Waste & Emissions**

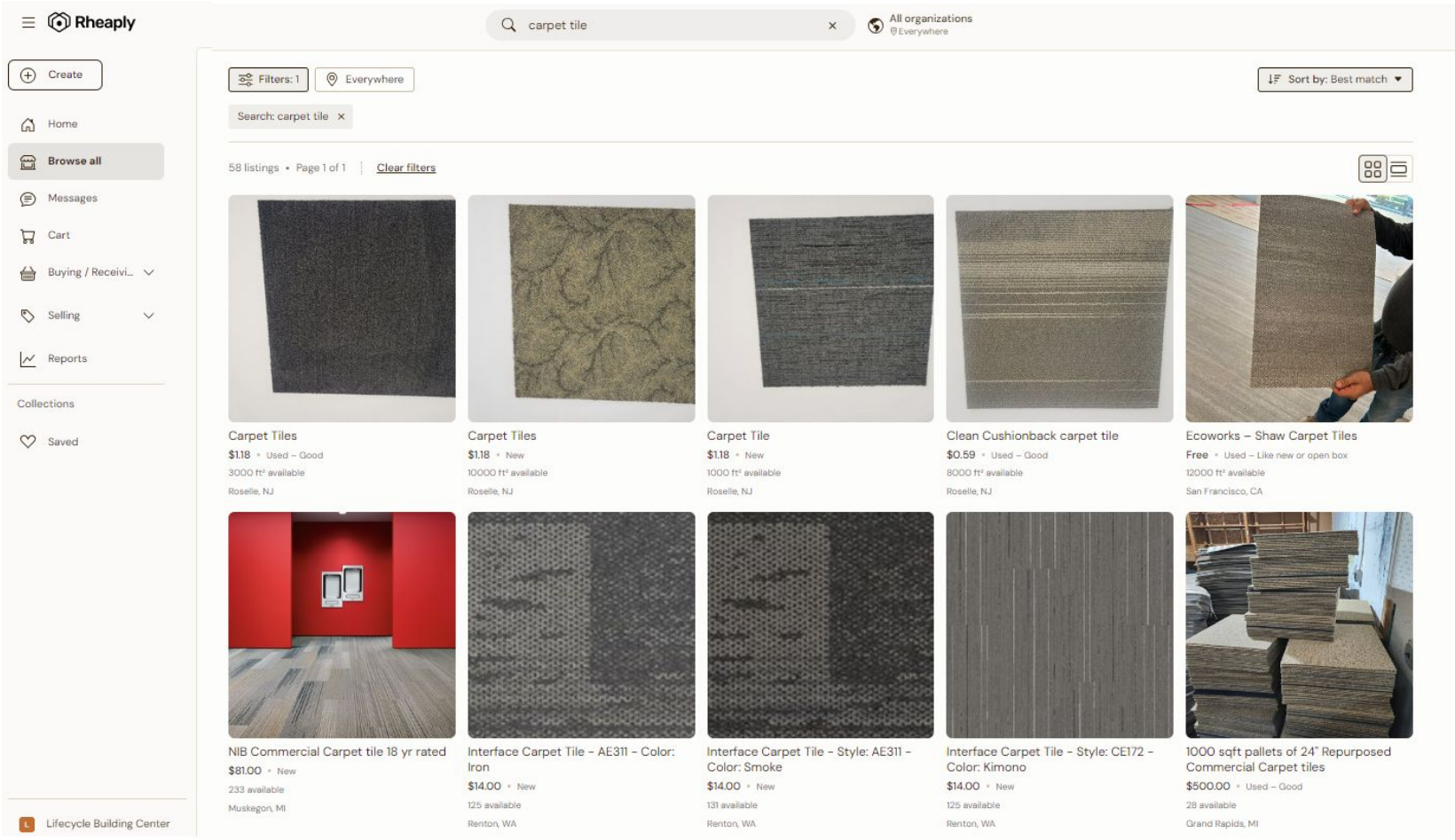
**Foster New Circular Businesses**

**Accelerate the Rate of Change**

# ALL FOR REUSE – REUSE ECOSYSTEM MAP



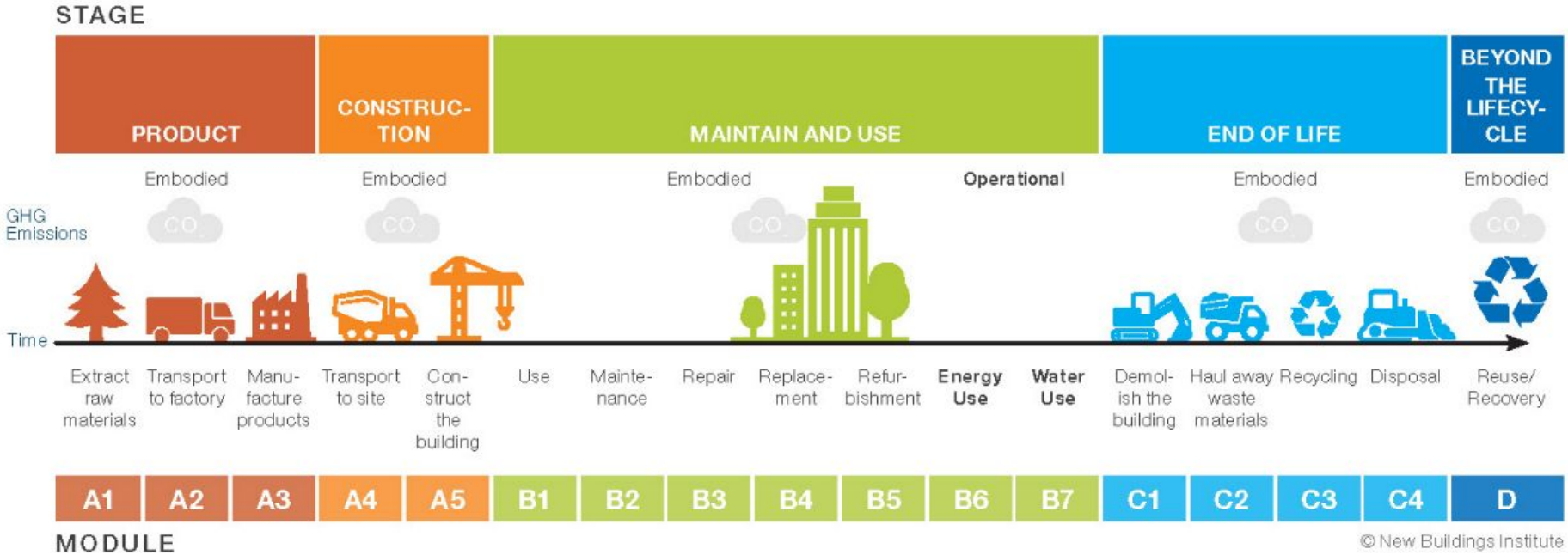

# BUILD REUSE – EPA REDUCING EMBODIED GHG GRANT



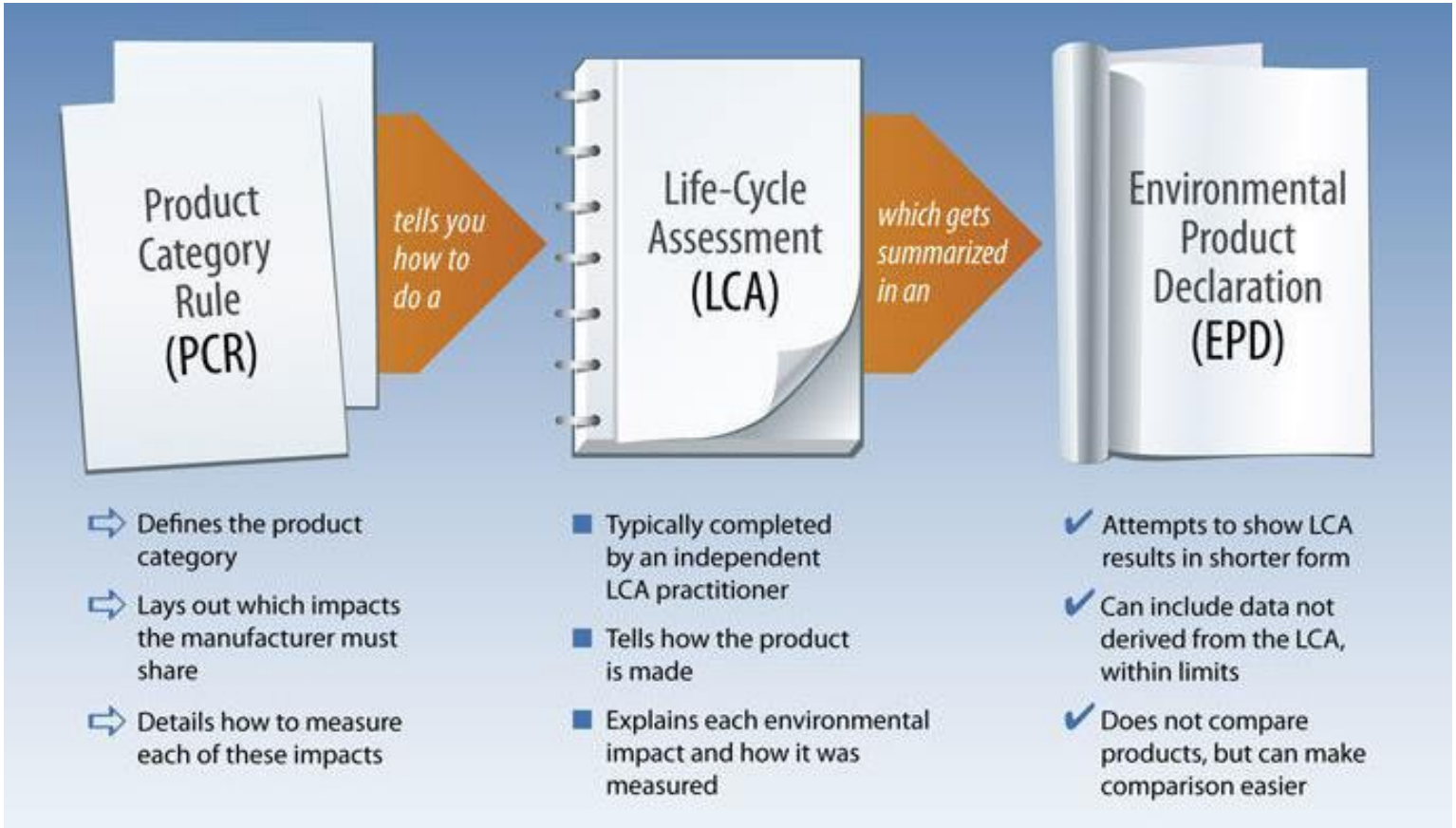

# BUILD REUSE / MANNINGTON / RHEAPLY PARTNERSHIP

FIGURE 1: LIFECYCLE STAGES

Data source: BS EN 15978:2011

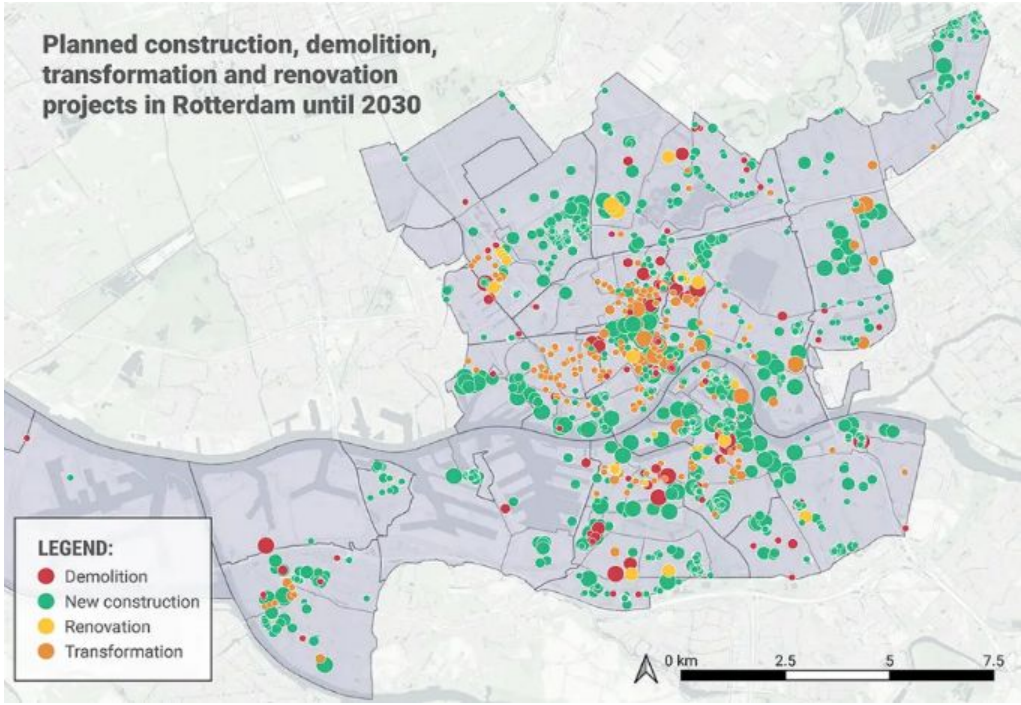



# BUILD REUSE – EPA REDUCING EMBODIED GHG GRANT




source: buildinggreen.com

# BUILD REUSE – EPA REDUCING EMBODIED GHG GRANT


metabolic.nl/news/urban-mining-and-circular-construction/

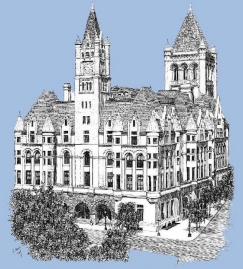
# MATERIAL “PASSPORTS” / URBAN MINING


## Bridging the Reuse Gap : from Promise to Practice

**August 4-6, 2025 | St. Paul, Minnesota**

Build Reuse is proud to once again present our annual Deconstruction + Reuse Conference in-person at the historic Landmark Center in downtown St. Paul, MN.

The only North American conference focused explicitly on reuse in the built environment will host people from around the world to discuss the current economic, social, and environmental challenges and solutions to making building material reuse the norm. Presentation topics include design for deconstruction, reducing embodied carbon emissions, measuring reuse data, inspiring reuse projects, policy change, reuse retail, innovative deconstruction projects and so much more!



*Drawing by Roger Hall*

**Information & Registration**


Photo Credit: John M. Phillips

# 2025 BUILD REUSE CONFERENCE: AUG 4-6, ST. PAUL, MN

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INFORMED

# Advancing Health and Equity Through Better Building Products

**Greenbuild 2024 | mM EDUCATION SESSION #5**

# Habitable believes that all people and the planet will thrive when the materials economy is in balance with earth's natural systems.

**Our mission: To improve human and environmental health by creating bold, science-based solutions that inspire materials innovations to eliminate pollution, mitigate climate change, and create a more equitable future.**

# Healthy Materials' Newest Power Couple Present an Informed and Aligned Approach

**Dec 6, 2023**

***Healthy Building Network (HBN) and mindful MATERIALS (mM) have teamed up to simplify selection of healthier building materials. On a recent webinar, CEOs Gina Ciganik and Annie Bevan presented renewed alignment between HBN's Informed™ approach and mM's Common Materials Framework (CMF).***

# Transparency + Disclosure

**CURRENT STATE**

**~7,000 HPDs**

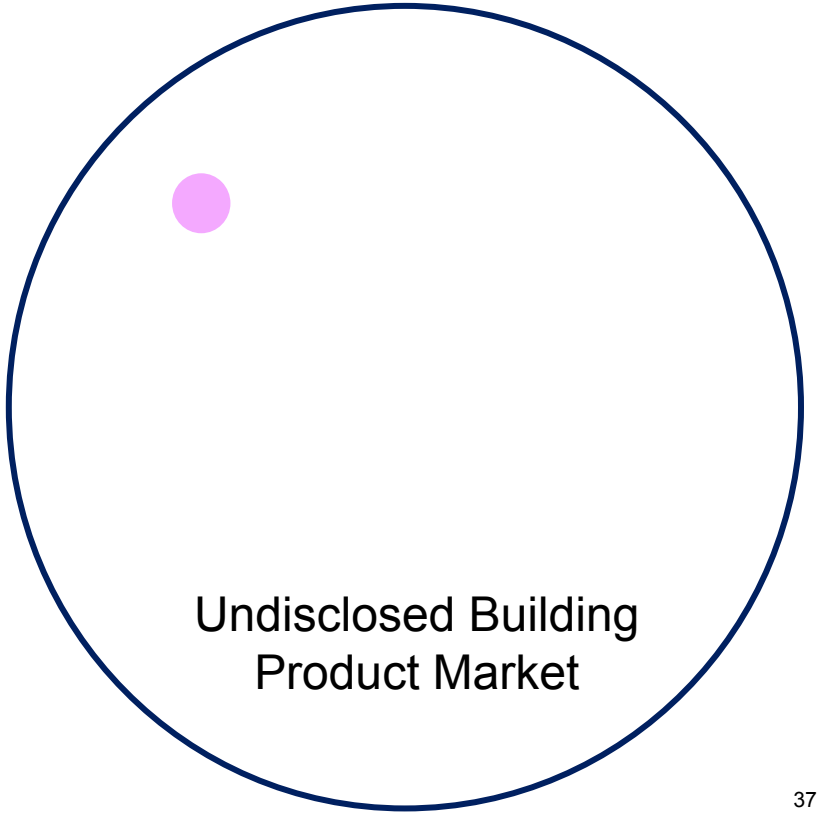
**~1,700 Declare**

**~400 Cradle to Cradle**

# Transparency + Disclosure

**LIMITED DATA**

*How do you make an informed decision when the product you want is not yet disclosed?*



# How did we get here?

1. Lack of regulation
2. Industry secrets & greenwash
3. Missing the product lifecycle view

# +2.5 trillion square feet

**by 2060**

# Finding Healthier Building Products is Too Hard

**STAFF CONSTRAINTS**

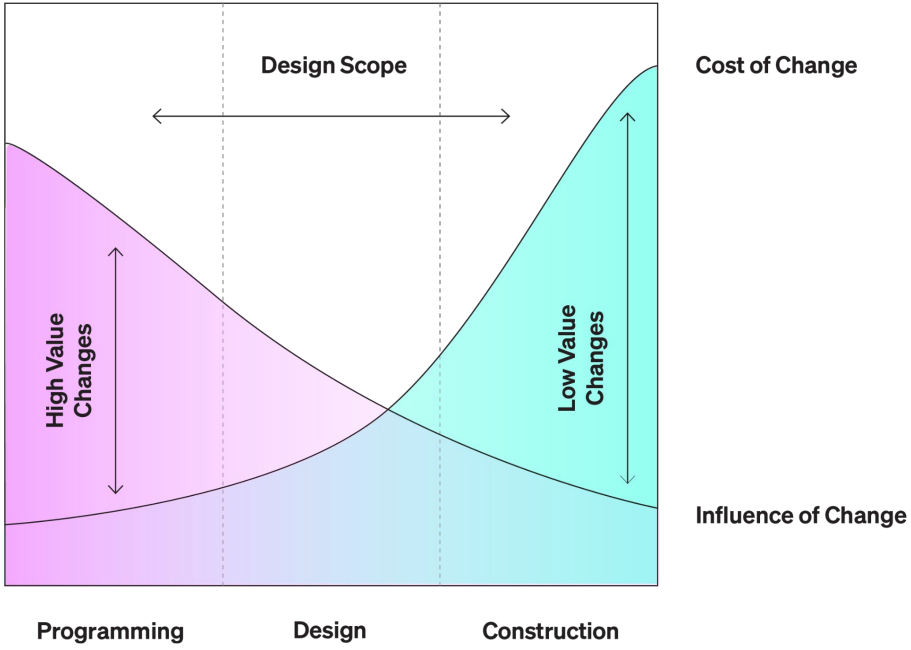
*Takes too much time, energy, and specialized expertise.*
*Existing tools and approaches are not scalable.*



# Finding Healthier Building Products is Too Hard

**LIMITED IMPACT**

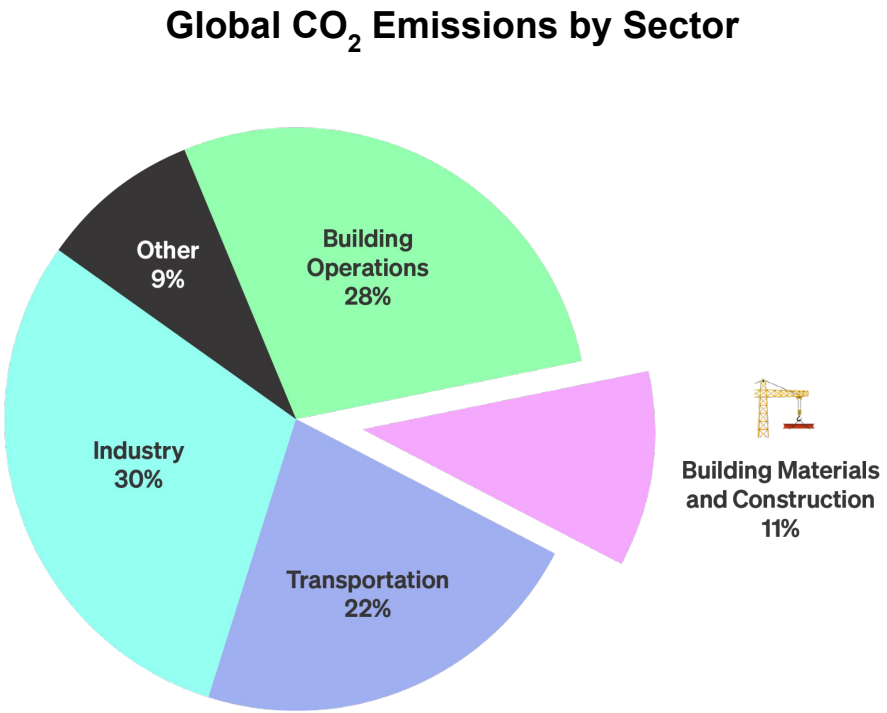
*Decisions are often made too late in the design process, beyond the tipping point where real impact can be made.*

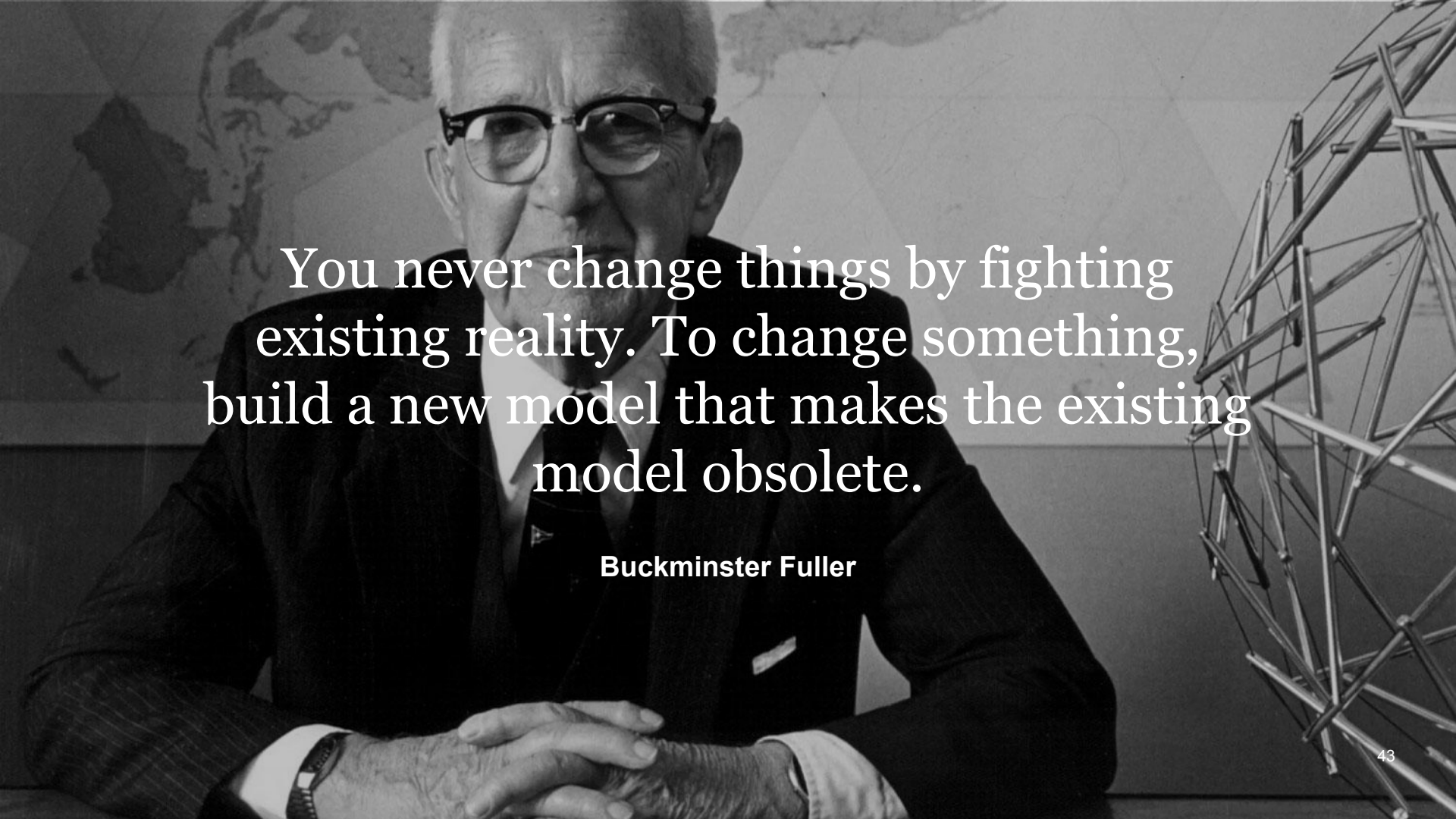


# Finding Healthier Building Products is Too Hard

**NO BUSINESS CASE**

*Carbon and climate goals often overshadow concerns about material health.*




You never change things by fighting existing reality. To change something, build a new model that makes the existing model obsolete.
Buckminster Fuller

# We need a new system.

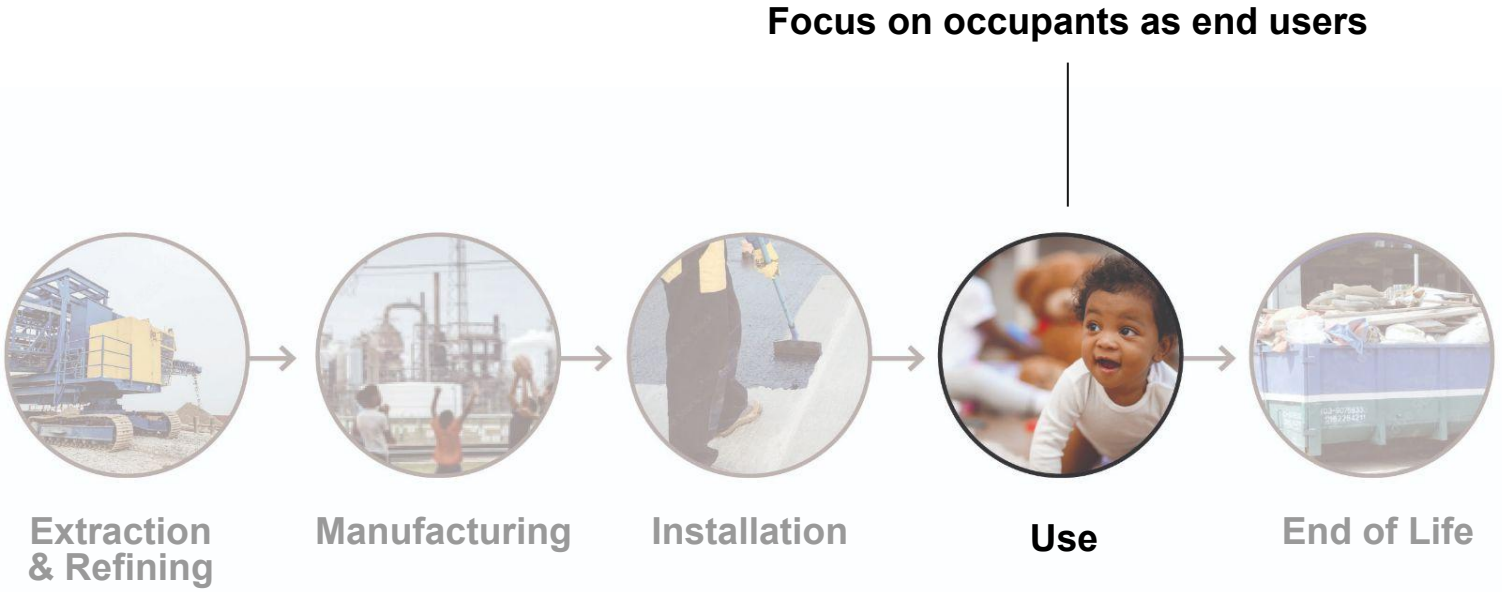
# Informed™

Science-based materials modeling for healthy material selection.

# Informed™ Materials Modeling

**Our mission:** To empower everyone with science based, data driven information to choose materials with positive impact on human health, climate and environmental justice throughout the building lifecycle.

# Certifications & Standards Have a Limited View



# Certifications & Standards Have a Limited View

*“It’s not healthy unless it’s healthy for all.”*

**Informed™ takes into account health impacts across the entire product lifecycle.**
This allows you to confidently make decisions that are are better for all people and our planet.

# Reduce Disproportionate Harms

*People of Color*

*Low-Income Populations*

*Children*

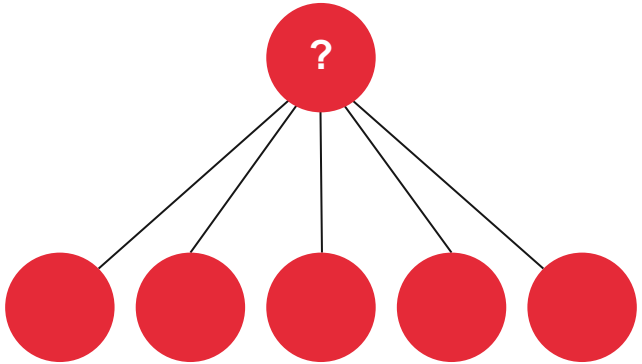
# Informed™—Scientific Rigor, Easy to Use

**CREDIBLE, ACTIONABLE, SCALABLE**

*Simplifying product selection through an intuitive ranking system of product types.*

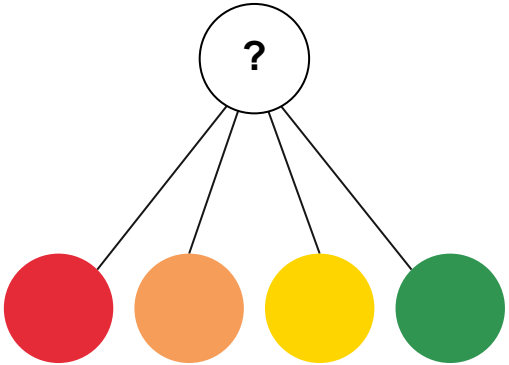
# Start With the Right Question

*Which vinyl should I use?*



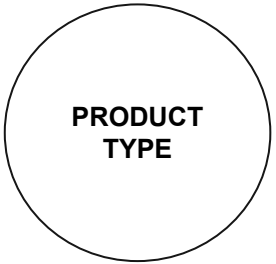

Spoiler Alert! **Red** is **Red**.

*What are healthier flooring types?*



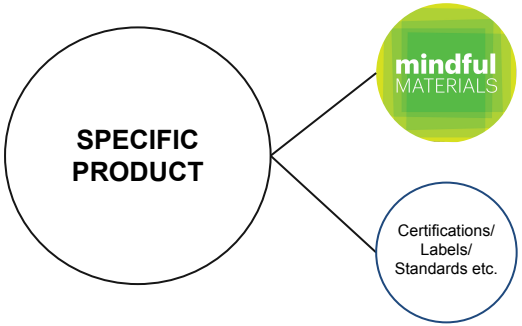
# Then Narrow Down Your Selection

**Step 1: Based on independent science**



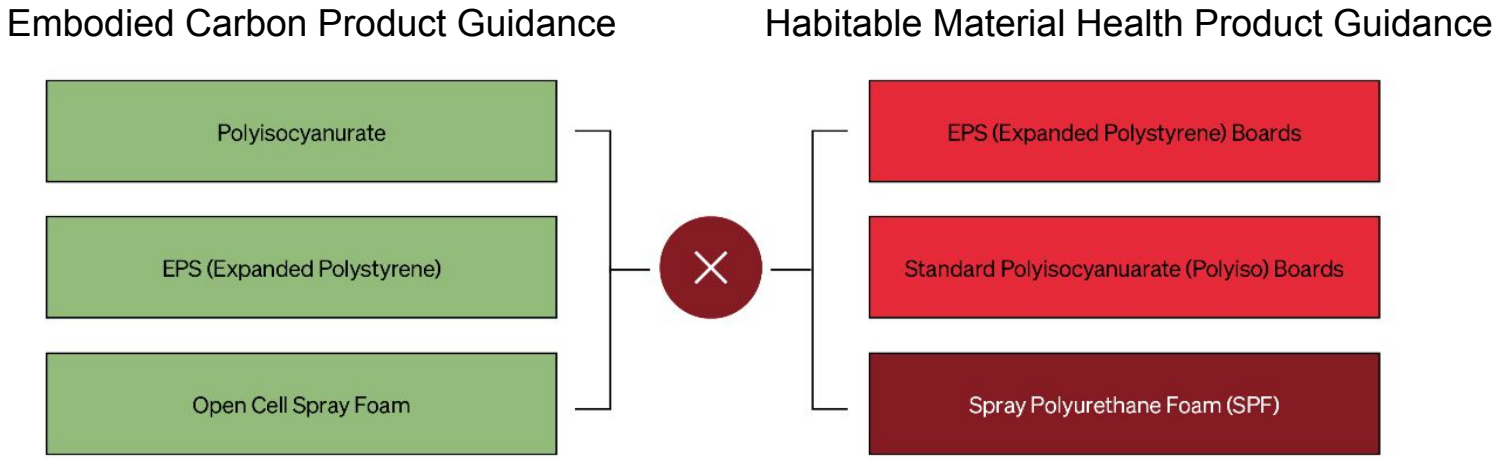

Use Informed$^{TM}$ 's red-to-green color ranking to identify product types that are healthier for people and the planet.

**Step 2: Based based on trusted industry information**



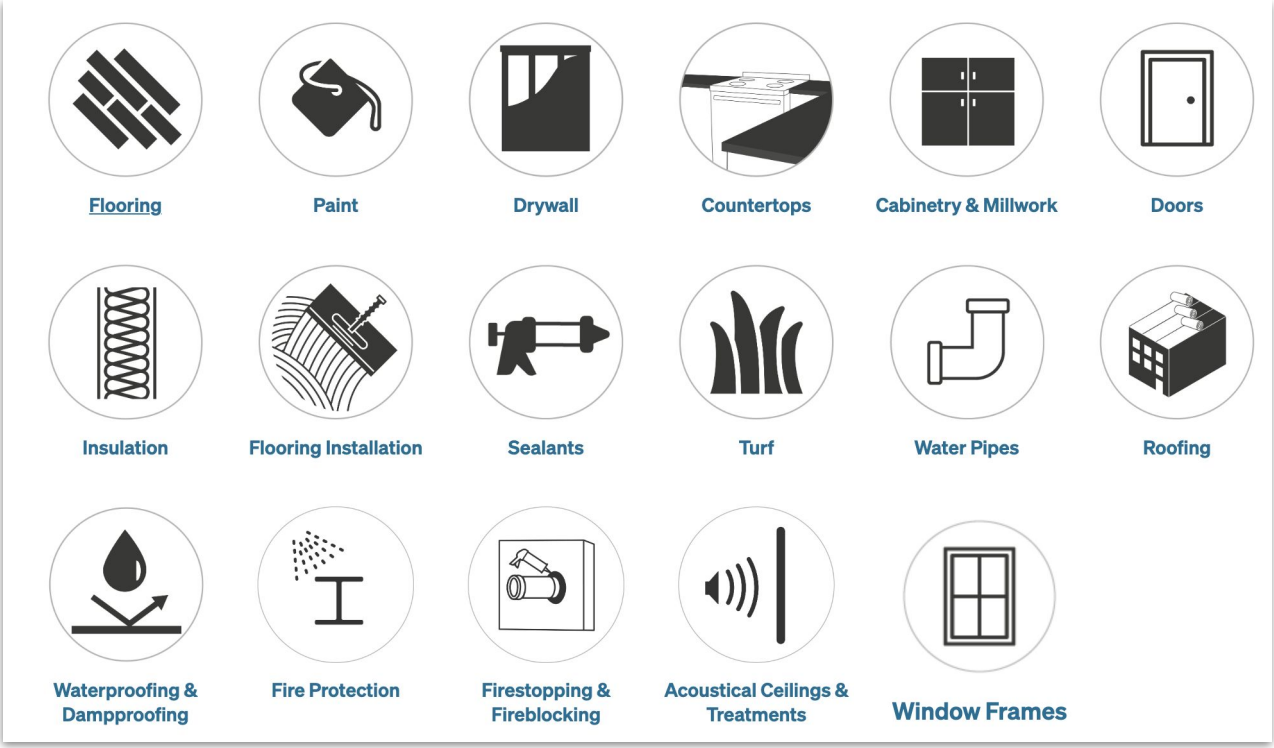

Of the product types selected, choose a specific product that meets your needs.

# Carbon/Health Conflict: Insulation




Steps to improve embodied carbon can **negatively impact material health** or vice versa

# Available Across 17 Product Categories and Growing

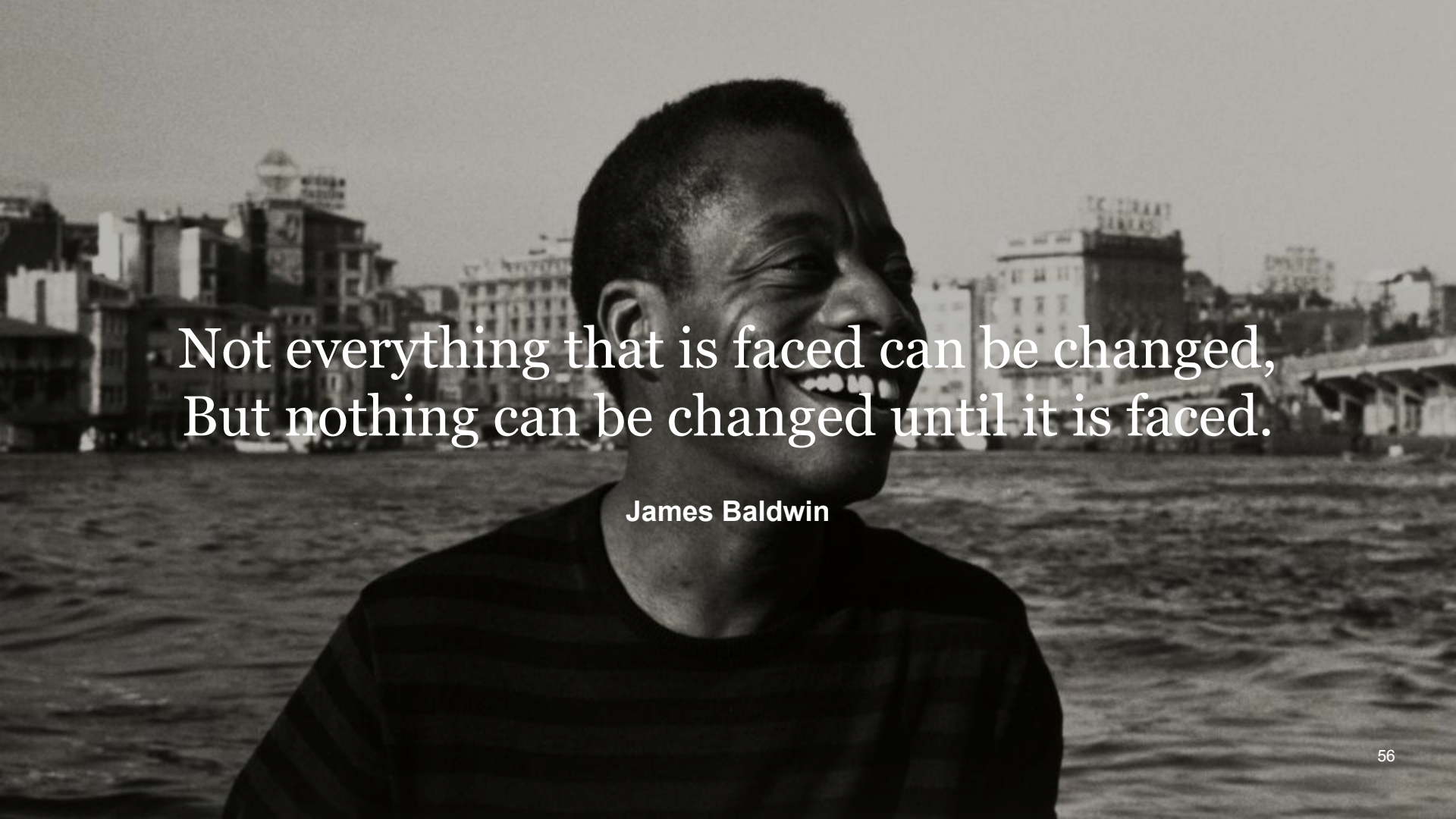


# Why Informed™?

**Don’t need to be an expert.**

**Easy to understand: avoid products in the red, prefer yellow and above.**

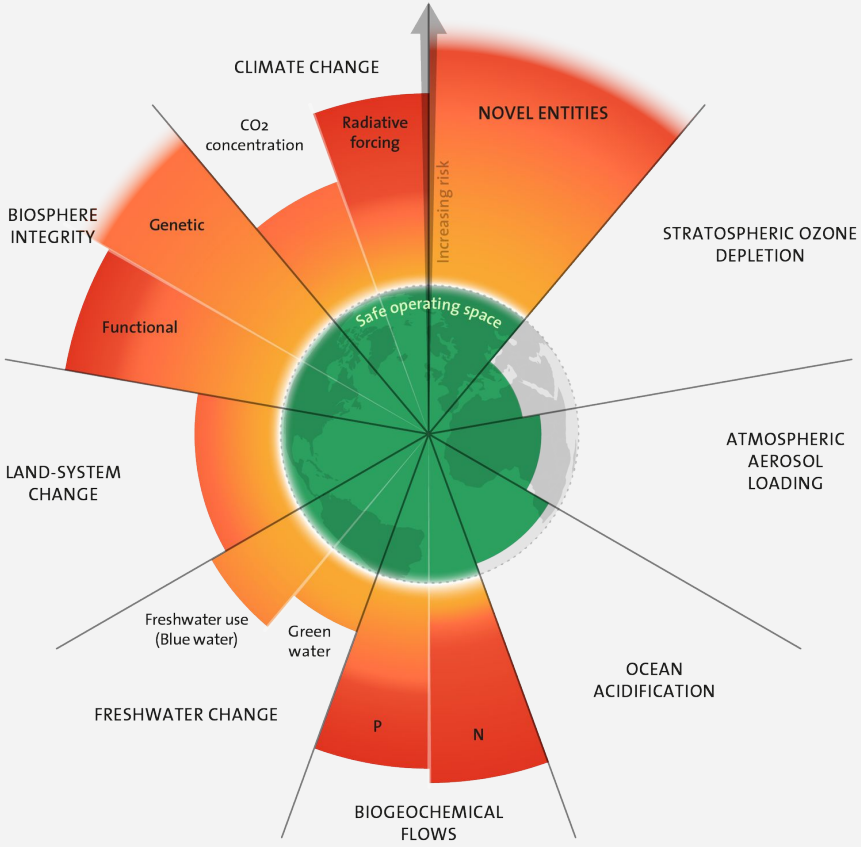
**Make decisions earlier, with more impact.**


Not everything that is faced can be changed,
But nothing can be changed until it is faced.
James Baldwin

# 6 of 9

**planetary boundaries**
have been exceeded

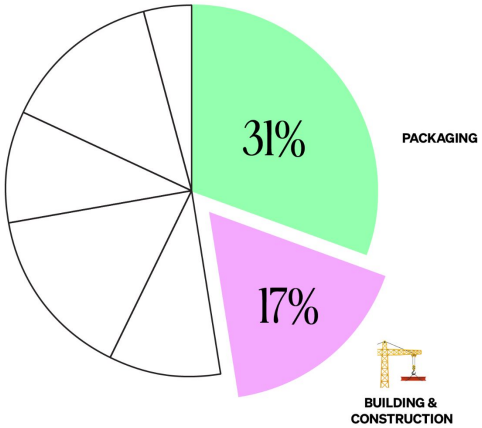
**Source:** Stockholm Resilience Centre
Planetary Boundaries



# Our Disposable Plastic Buildings

**Source:**
energyanalysis.lbl.gov/publications/climate-impact-primary-plastic

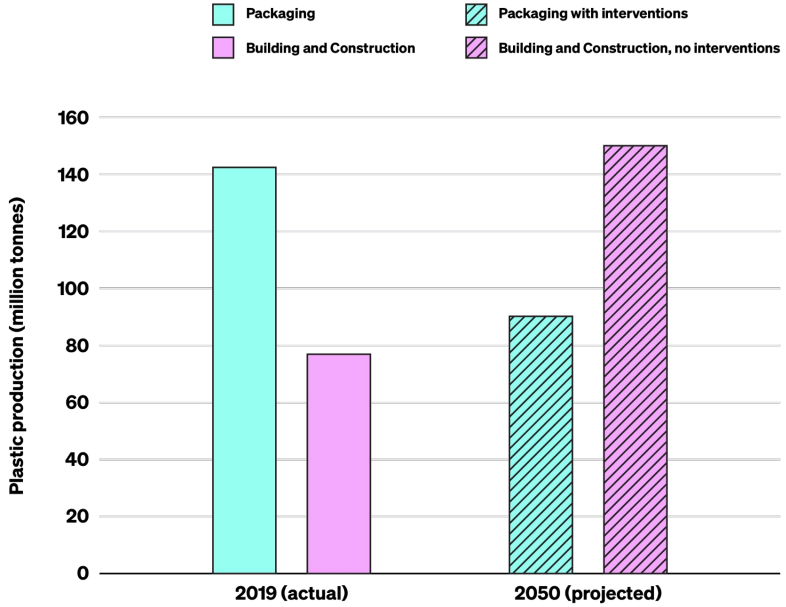
*Building and construction is the second-largest consuming sector of plastics, which are almost exclusively derived from fossil fuels, a major contributor to climate change.*




= +50%
**of plastics market**

# Replacing one problem with another

**Source:** OECD (2022), *Global Plastics Outlook: Policy Scenarios to 2060*, OECD Publishing, Paris, https://doi.org/10.1787/aa1edf33-en.
Becque and Sharp. Phasing Out Plastics: The Packaging Sector (2020). ODI report. https://odi.org/en/publications/phasing-out-plastics-the-packaging-sector/



# Plastic Waste from Carpet

1.2 million tons

of plastic in carpet discarded in the U.S. each year

**1.1 MILLION TONNES**

=

All plastic water bottles, bags, and straws

used in the U.S. each year

# Informed™ Analysis—Plastic in Carpet

| Informed™ Product Guidance Rankings | Approximate % Plastic |
|---|---|
| Linoleum | 1% |
| Solid Wood Floor (pre finished) | 2% |
| Concrete (no finish/accessories or only densifier without PFAS) | 0% |
| Ceramic Tiles (no added lead)* | 0% |
| Solid Wood Floors (site-finished) | 2% |
| Cork Floors (pre-finished) | 15% |
| PVC-free Resilient Flooring | 30% |
| Engineered Wood Floors (pre-finished) | 4% |
| Rubber or Rubber/Cork Floors made without tire-derived crumb rubber) | 29% |
| Laminate | 16% |
| Carpet (with no fly ash, no vinyl or polyurethane backing, and no PFAS) | 62% |
| Engineered Wood Floors (site-finished) | 4% |
| Vinyl Floors (no pthalates or hazardous recycled content) | 23% |
| Rubber or Rubber/Cork Floors (made with tire-derived crumb rubber) | 29% |
| Carpet (containing fly ash, vinyl or polyurethane backing and PFAS) | 62% |
| Vinyl Floors (containing phthalates, hazardous stabilizers, and hazardous recycled content) | 23% |

# What Do These Numbers Mean?

**Source:** EPA, US estimates 40 million tons of municipal plastic waste was generated in the US in 2021, Toxic Free Future

## 33

Coal plants offline for one year

## 50%

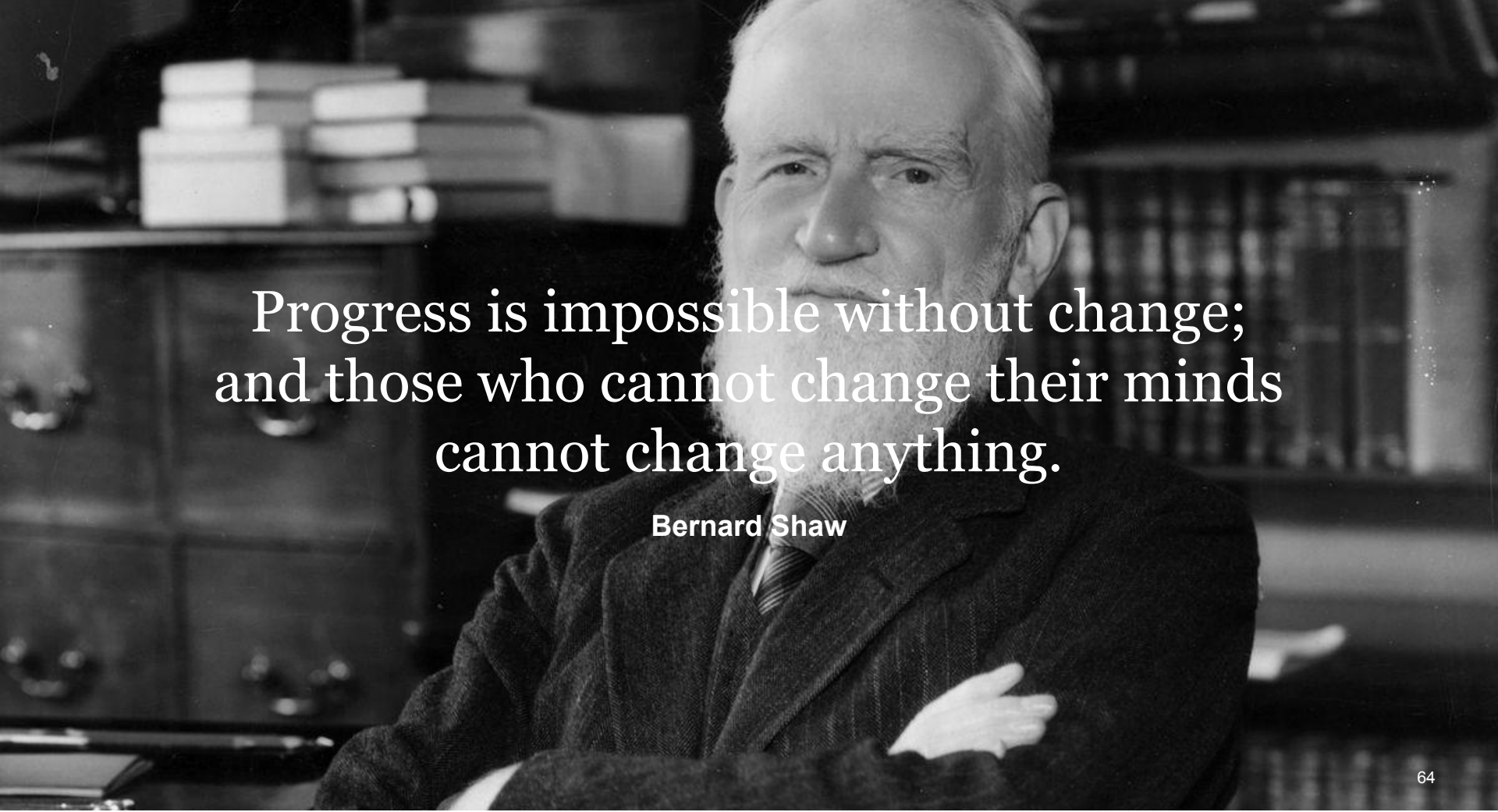
Total plastic waste generated in the US in one year

## 45,000

Rail cars full of vinyl chloride out of our communities

# Product Innovation: Hempcrete

*Lower Sioux Indian Community | Morton, MN*


Progress is impossible without change;
and those who cannot change their minds
cannot change anything.
Bernard Shaw

# Take Action

# How Are Teams Using Informed™ Today?

## Community of Practice

Housing, Healthcare, Education, Workplace

## Workflow Process & Tools

Revit Plug-in, Specification Language, Materials Library

## Third-Party Standards

Innovation Credit

# Trusted by Industry Leaders













# Trusted by Sustainability Experts

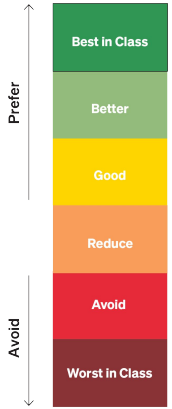
"Knowing that Informed™ product guidance is not influenced by manufacturers helped make it a more credible resource."

**Lona Rerick**
Sustainable Materials Leader, ZGF


Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it's the only thing that ever has.
Margaret Mead

# Get Involved

*Commit to step up from red on your next project.*




*Join a pilot project.*

WELL

Revit

U.S. GREEN BUILDING COUNCIL LEED USGBC

*Get in touch to learn more.*

# Join Us!


**Hidden in Plain Sight: Building Products' Contribution to Global Plastic Pollution**

As the second-largest consumer of plastics globally, the building industry has a crucial role to play. Discover actionable solutions to drive meaningful change today!

# Thank you.

**Priya Premchandran**
premchandran@habitablefuture.org

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## mM EDUCATION SESSION #5

# The Role of Research, Science, and Data in Materials Decision Making

**Priya Premchandran**
Habitable

**Nora Rizzo**
Design for Freedom

**Shannon Goodman**
Build Reuse

Moderator

**Annie Bevan**
mindful MATERIALS


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grace farms

Our humanitarian work to end modern slavery and foster more grace and peace in our local and global community includes leading the Design for Freedom movement to eliminate forced labor in the building materials supply chain.

Grace Farms' SANAA-designed site breaks down barriers between people and across sectors.

The built environment has a relationship with nature and people

Is your building ethically sourced, forced labor-free, as well as sustainably designed?

design for FREEDOM
by grace farms

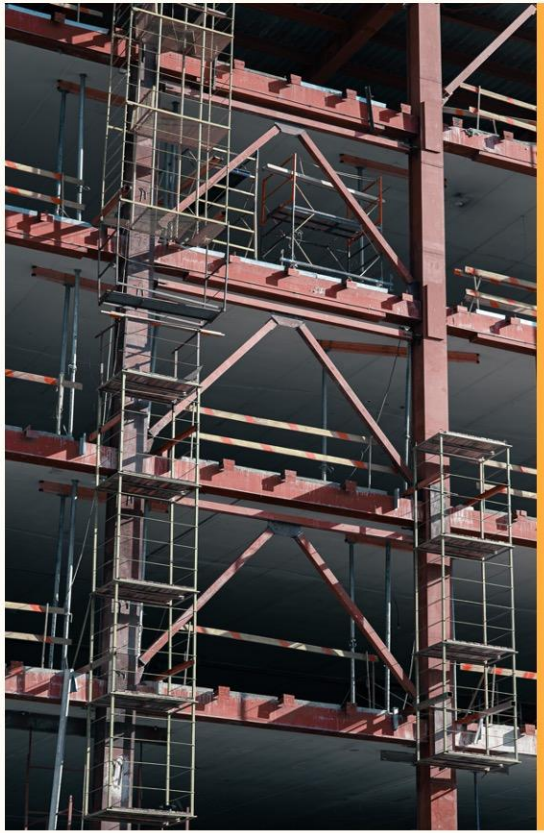
Addressing on-site labor is only half of the equation

Forced labor in the building materials supply chain must also be addressed




design for FREEDOM by grace farms

Construction is one of the largest global industrialized sectors at the highest risk of forced labor



**$236 billion**
annual dollar value of the modern slavery criminal industry worldwide

**$63 billion**
goods made with forced labor

**$13.7 trillion**
construction-related spending globally (USD)

**12 materials**
(raw and composite) at highest risk of forced labor in buildings



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# 28 million People Are Trapped In Forced Labor Today

# What is Modern Slavery?




**Modern slavery** is defined as situations of exploitation that persons cannot refuse or leave because of threats, violence, coercion, deception, and/or abuse. (ILO)

- Forced Labor
- Debt Bondage
- Forced Marriage
- Child Soldiers
- Human Trafficking
- Child Labor

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# Design for Freedom Principles

1

Find and address embedded forced labor

2

Pursue ethical decarbonization

3

Prioritize circularity

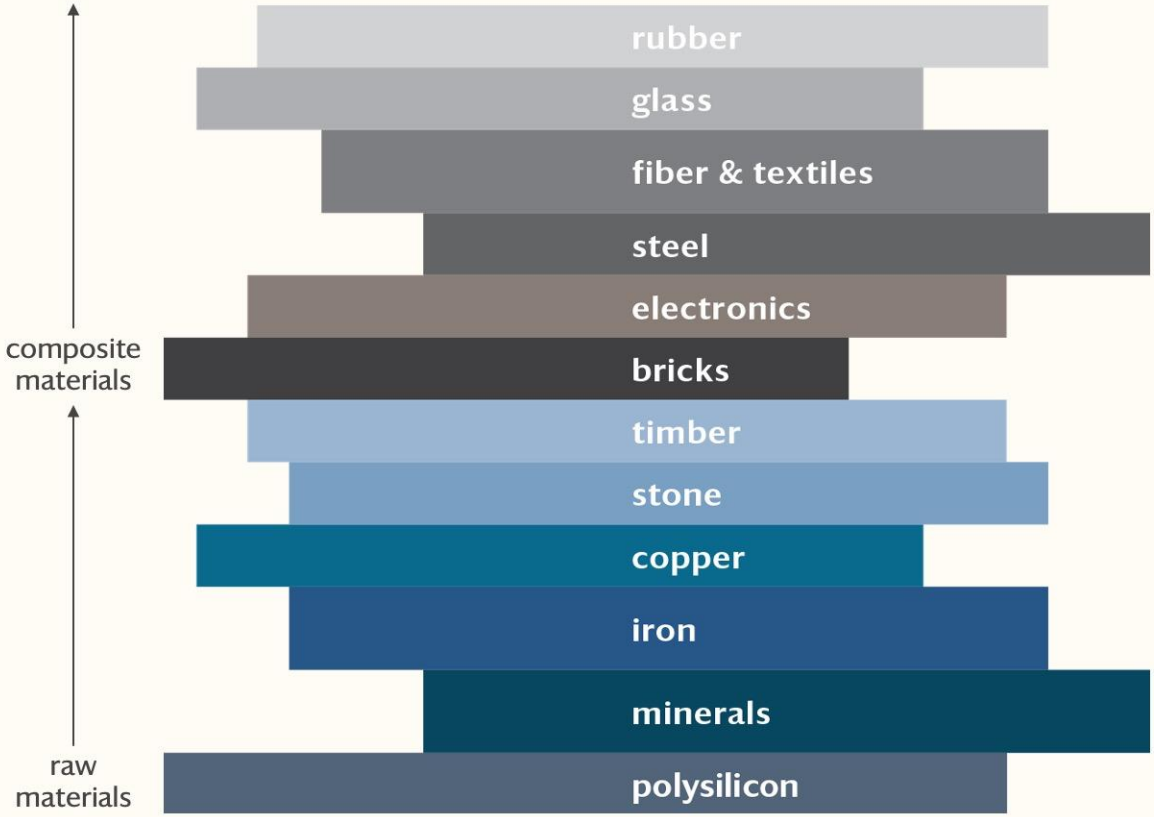

## Report
expert industry analysis

## Toolkit
sourcing strategies resources

## Case Studies
completed pilot projects

# What are the Riskiest Products?

# Raw and Composite Materials at the Highest Risk of Embedded Slavery




Source: Verité *Commodities Atlas* and the U.S. Department of Labor's List of Goods Produced by Child Labor or Forced Labor, Grace Farms analysis

Refer to *Design for Freedom Toolkit* for in-depth analysis

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design for FREEDOM

# Design for Freedom International Guidance and Toolkit 2024

# Design for Freedom | Pilot Project Locations 2024

United States
Newark, NJ
New Canaan, CT
New York, NY
Wappingers Falls, NY

Bigfork, MT
Charlottesville, VA
Chicago, IL
Dallas, TX

England
London

India
Jodhpur
New Delhi

# Case Studies

Design for Freedom is a movement to create a radical paradigm shift to remove forced labor from the building materials supply chain

# *Shadow of a Face*

## Nina Cooke John
## Harriet Tubman
## Monument

Newark, New Jersey
2,163 SF
Opened March 2023

# Humanscale Showroom

Suchi Reddy
Humanscale
The Sheward Partnership

Chicago, Illinois
4,000 SF
Opening 2024


# Bigfork Library

Cushing Terrell
Imagine IF Foundation

Bigfork, Montana
6,000 SF
Opening 2024

# Karsh Institute of Democracy

Höweler + Yoon
Hanbury Architects
Hourigan Construction
University of Virginia

Charlottesville, Virginia
65,000 SF
Opening 2026

# Pilot Project RFP Launch

Submission Due: December 16, 2024

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# Design for Freedom Office Hours

## First Thursday of Every Month

**Join Nora Rizzo**, LEED AP BD+C, WELL AP, LFA and **Brigid Abraham**, AIA, LEED GA, WELL AP, on Zoom

- Learn more about the movement
- Integrate best practices
- Meet other industry professionals
- Discuss the Pilot Project process

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# Design for Freedom Summit 2025

March 27, 2025

# Design for Freedom Summit 2025

Scan to Register

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Once you know, you can't unknow it, now there is a duty to act

# We all have the agency to design for freedom

# design for FREEDOM

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# Q+A

# Thank you!

**Thank you to our Education Session sponsors:**

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