



A SUSTAINABLY RESPONSIBLE MATERIAL

Chris Hellstern

Living Building Challenge Services Director

MILLER HULL



Seattle



MILLER HULL



San Diego



THE MILLER HULL PARTNERSHIP
TURNER CONSTRUCTION
TENANT IMPROVEMENT

LIVING BUILDING PETAL CERTIFIED









The image is the cover of a report titled 'Sustainability Action Plan'. It features a photograph of a modern building with a concrete walkway and a pond. The text is overlaid on the right side of the image.

2017-2030 Sustainability Action Plan
THE MILLER HULL PARTNERSHIP, LLP

SUSTAINABILITY ACTION PLAN

MILLER HULL SUSTAINABILITY PLAN

Goal A: 100% regenerative design by 2030

- *Objective A.1: Target Net Positive Energy*
- *Objective A.2: Target Net Positive Water (potable gray and black water)*
- *Objective A.3: Contribute to site restoration*

Goal B: 100% healthier material choices by 2020

- *Objective B.1: Design to achieve the LBC Materials Petal*

Goal C: Design to enhance occupant health

- *Objective C.1: Design to optimize indoor air quality*
- *Objective C.2: Design to support natural human biological processes*
- *Objective C.3: Design to promote physical activity*

Goal D: Ensure our design thinking supports our core values

- *Objective D.1: Think smarter, not just bigger*
- *Objective D.2: Drive industry change through transparency*
- *Objective D.3: Address the social and environmental justice impacts of our work*

MILLER HULL SUSTAINABILITY PLAN

Goal B: 100% Healthy Material Choices by 2020

Objective B.1: Design to achieve the LBC Materials Petal

- Vet all specified products for Red List compliance
- Design every project to be embodied carbon neutral
- Specify wood as FSC certified or 100% salvaged/reclaimed
- Specify products with disclosed ingredients through a Declare Label, C2C Gold or better rating, or properly disclosed HPD
- Specify products with an Environmental Product Declaration (EPD) that makes 10% improvement of GWP over a forthcoming established baseline
- Every project sends at least 1 advocacy letter to a product manufacturer/industry supporting healthier materials
- Identify recycled content and/or local sourcing for final assembly

"A Living Building"

—Bullitt Center: Celebrating five years as the Greenest Commercial Office Building in the World

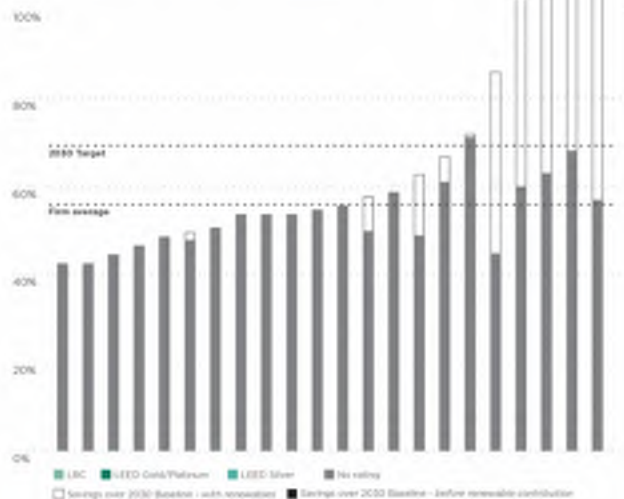
Sustainability Commitments

AIA 2030 Commitment

As an early signatory to this AIA program that seeks transformation of the built environment through greenhouse gas emission reductions, Miller Hull has designed many buildings that exceed this standard.

As part of Miller Hull's ongoing participation in the AIA 2030 Commitment, we collect and report the the estimated energy reduction from each of our projects annually. The goal of the challenge is to design buildings that are carbon-neutral by the year 2030. While we are not yet meeting the Challenge, we are steadily improving our performance each year in pursuit of the target reduction.

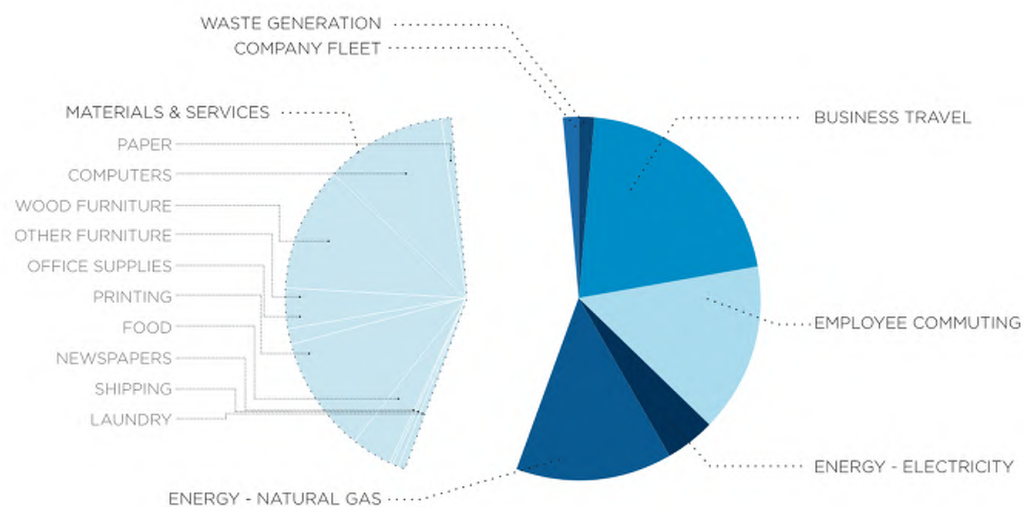
2017 PROJECTS - ENERGY REDUCTION



"A Living Building"

—Bullitt Center: Celebrating five years as
the Greenest Commercial Office Building in
the World

OFFICE OPERATIONS 2016 - OPERATING CARBON



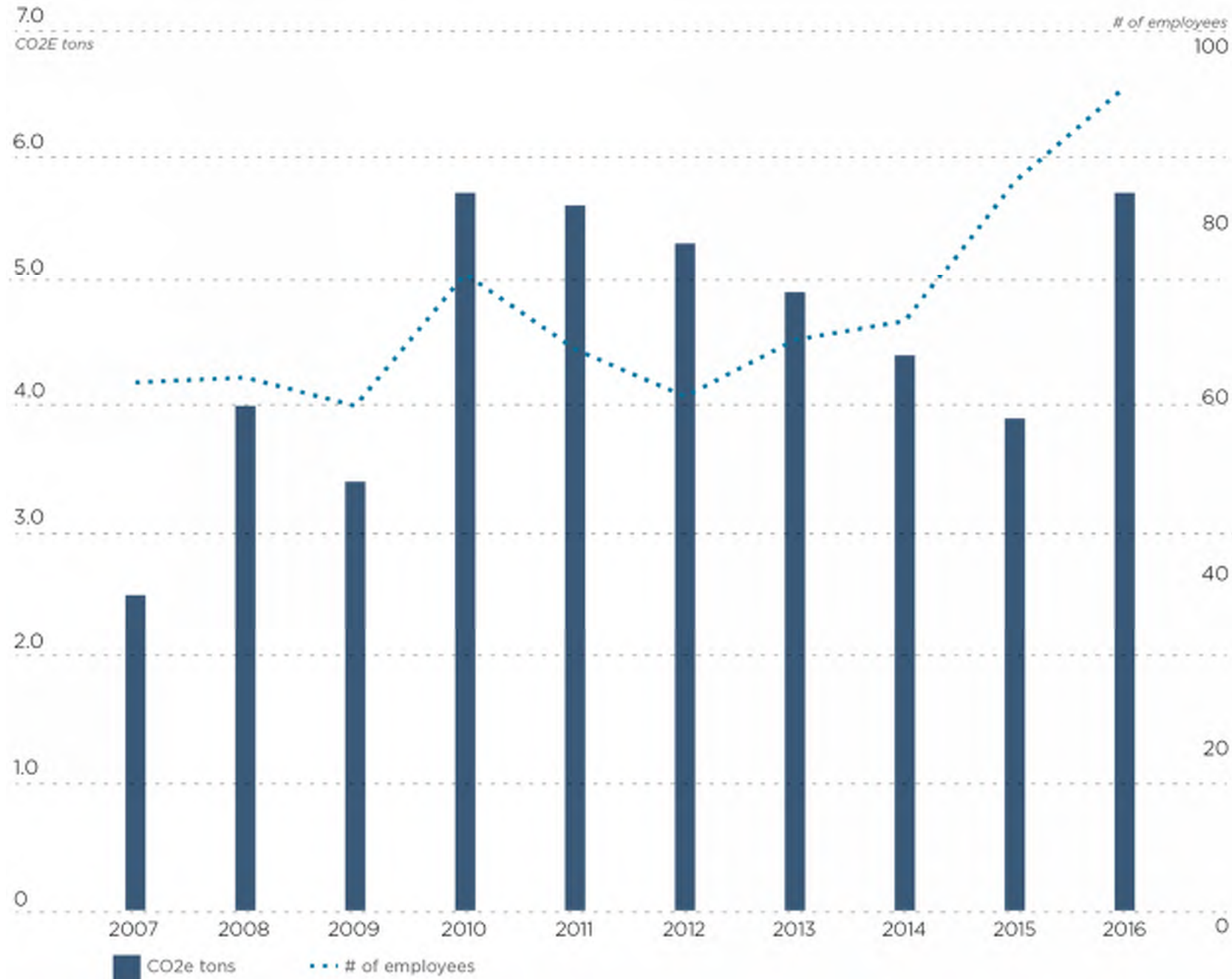
49 MEN
49 WOMEN

2016 COMPANY FOOTPRINT

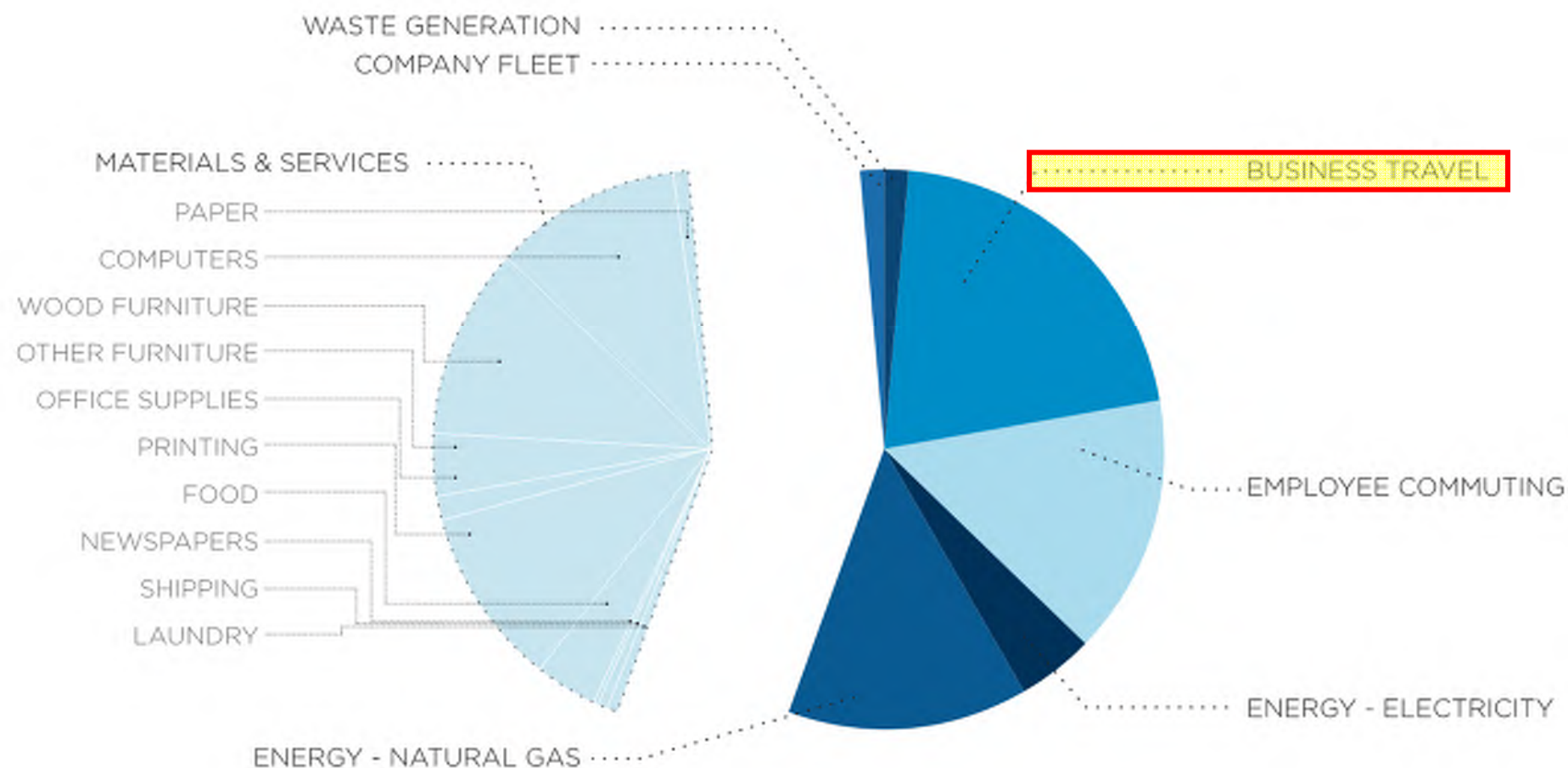
515
METRIC TONS OF
CO₂E ANNUALLY

5.7
METRIC TONS OF
CO₂E PER EMPLOYEE

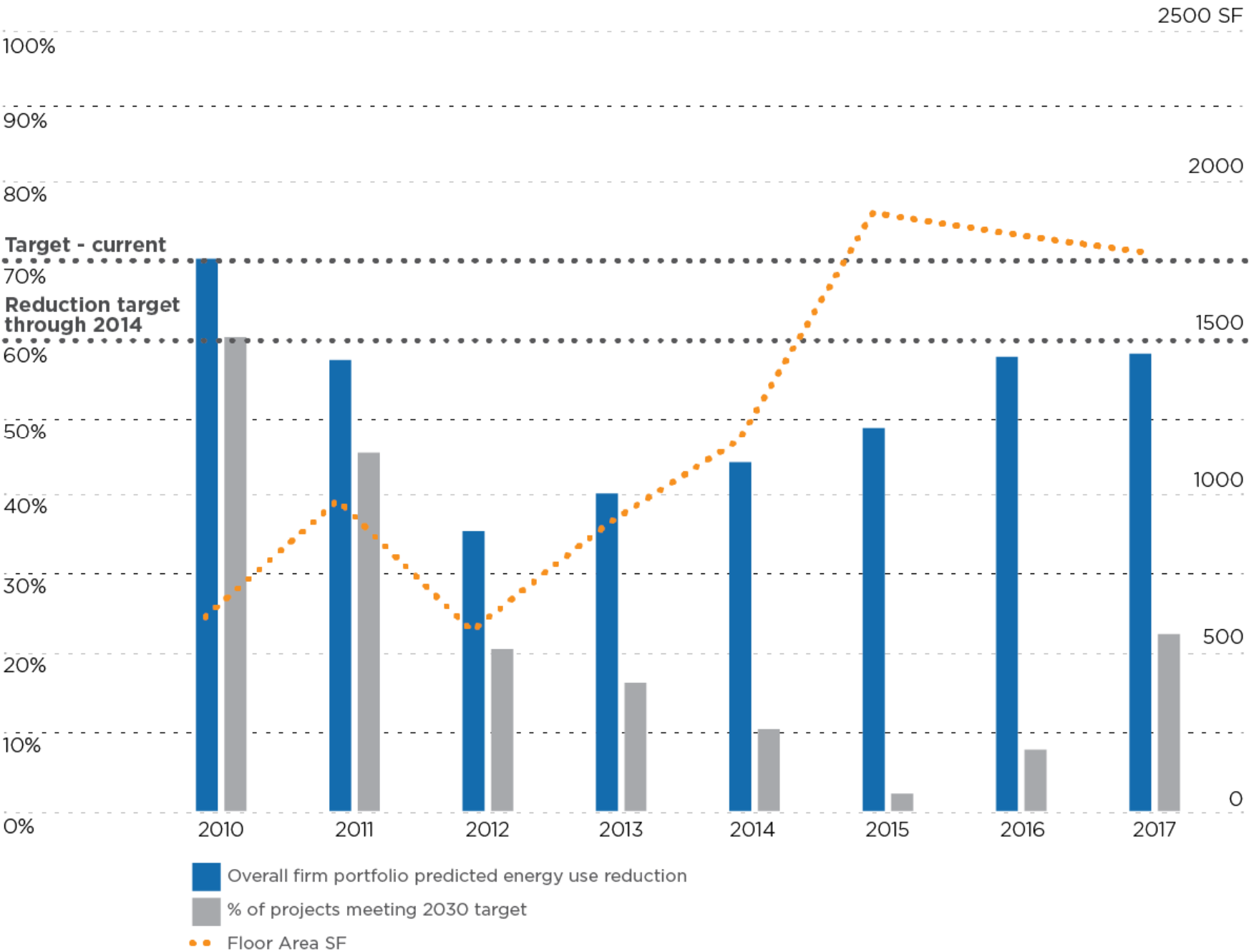
CO2E TONS PER EMPLOYEE



OFFICE OPERATIONS 2016 - OPERATING CARBON



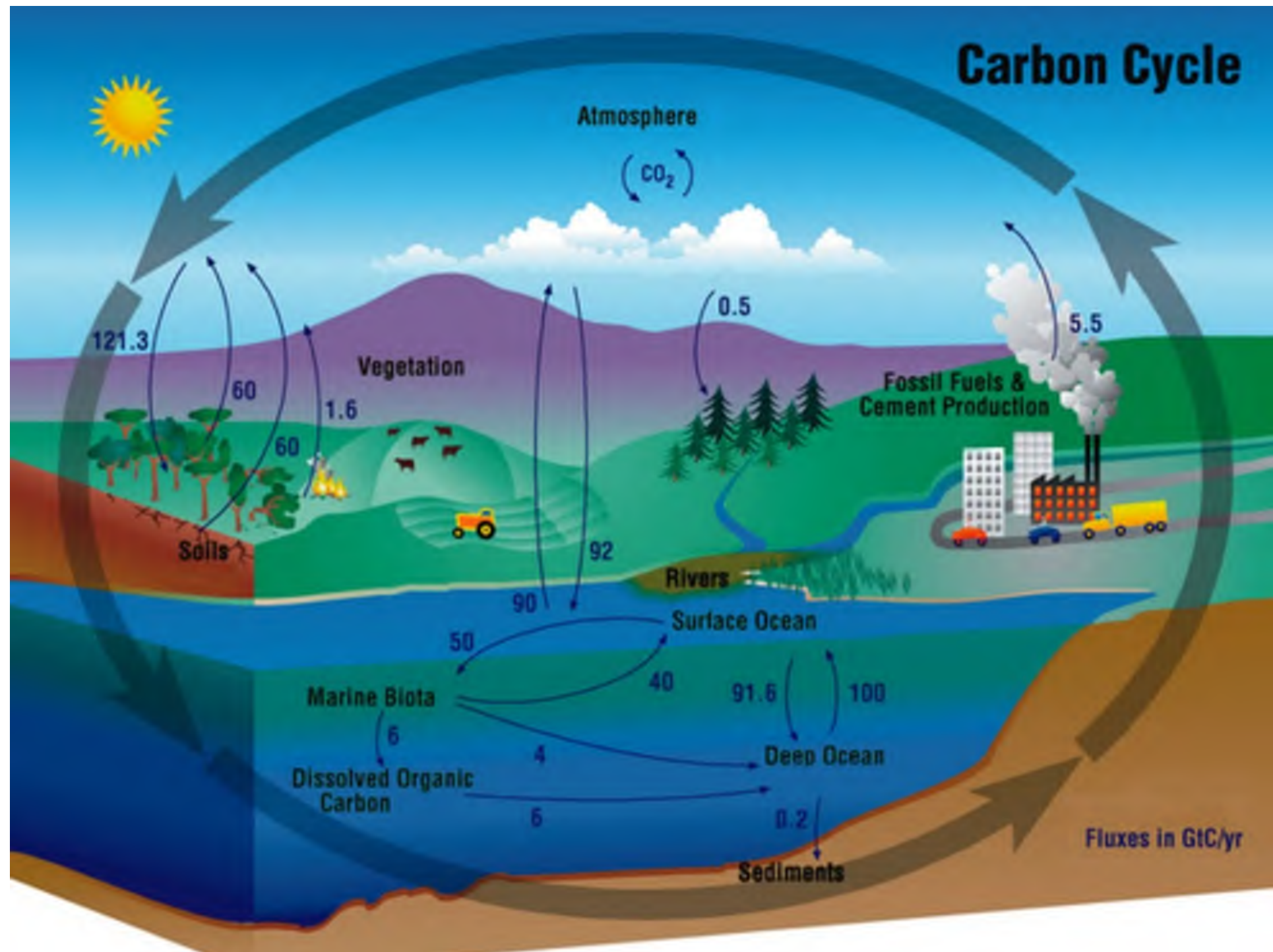
2030 COMMITMENT TRENDS - ANNUAL PROJECT ENERGY REDUCTION

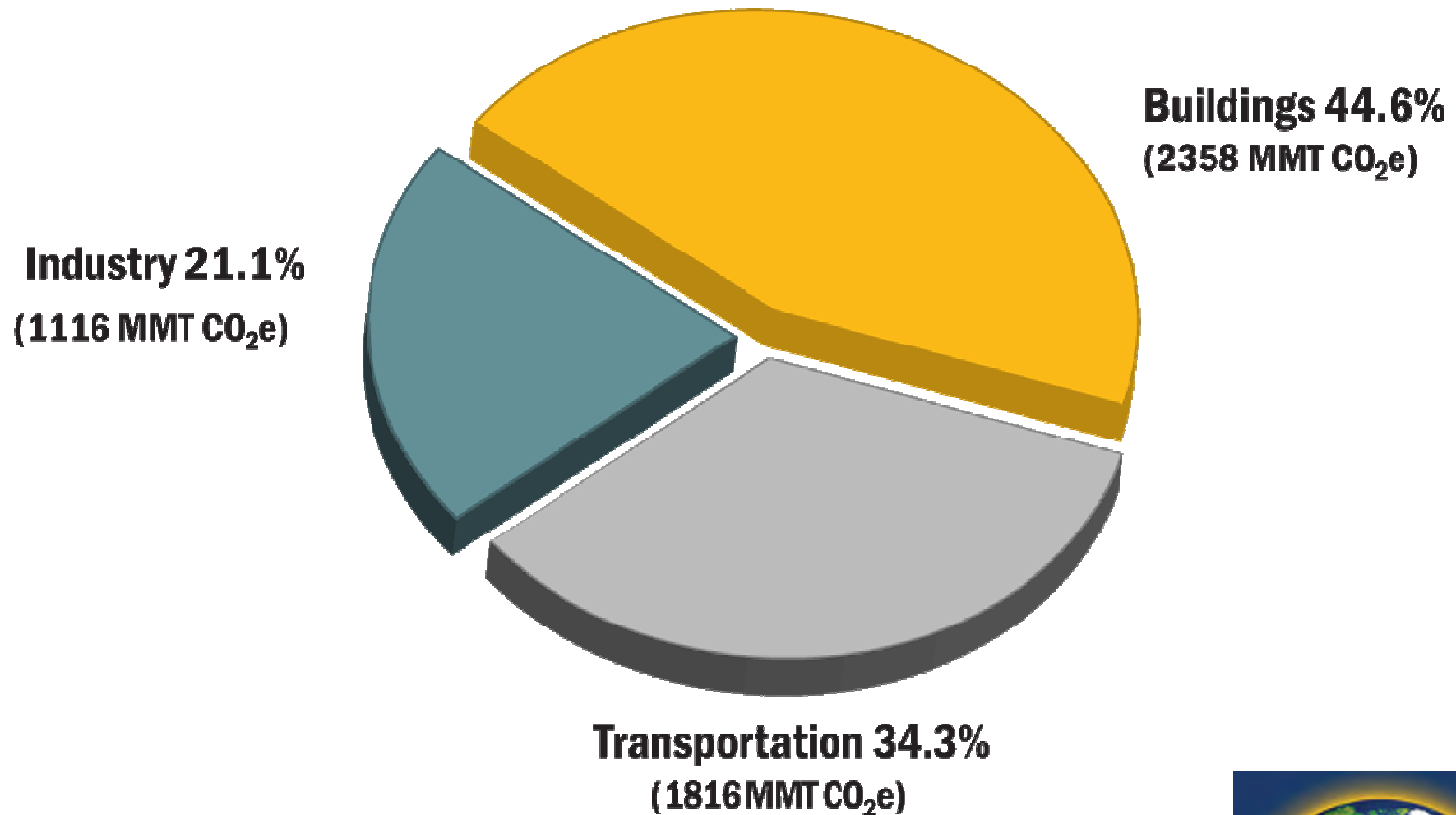


GLOBAL ISSUES CONFRONTING ARCHITECTURE



Carbon Cycle



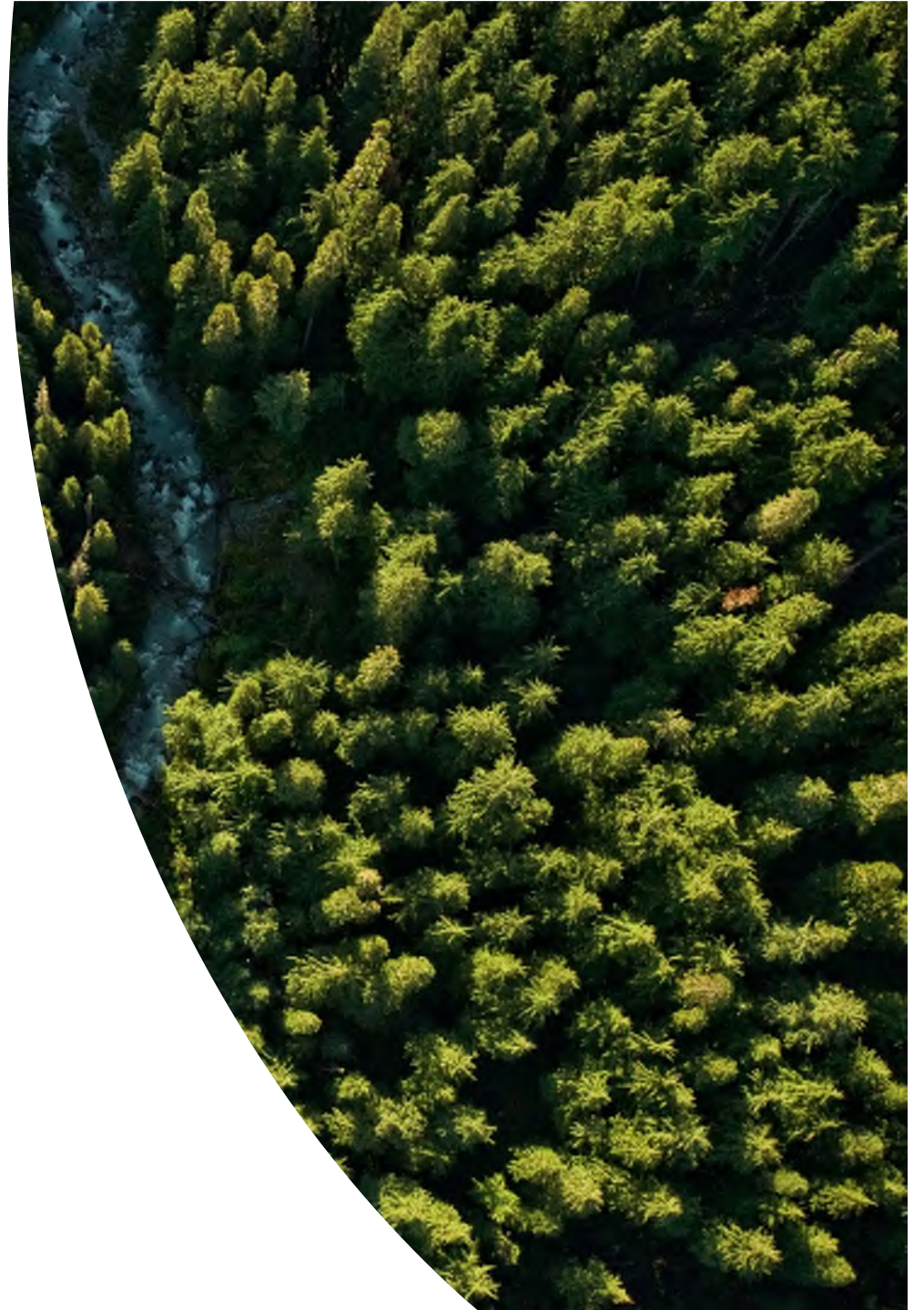


U.S. CO₂ Emissions by Sector

Source: ©2013 2030, Inc. / Architecture 2030. All Rights Reserved.
Data Source: U.S. Energy Information Administration (2012).



WHY WOOD?




Aesthetics



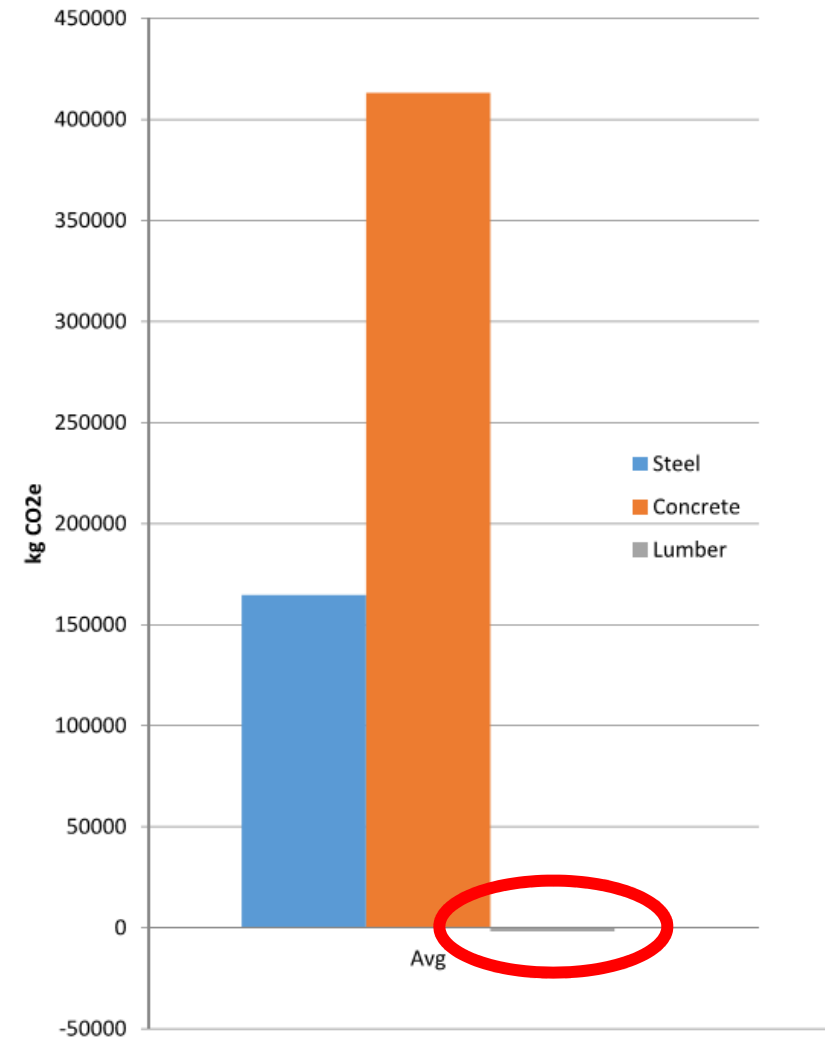


Biophilia

A photograph of several industrial smokestacks emitting thick, dark smoke into a hazy, orange-tinted sky. The smoke is dense and billowing, creating a dramatic and somewhat ominous scene. The image is used as a background for a text overlay.

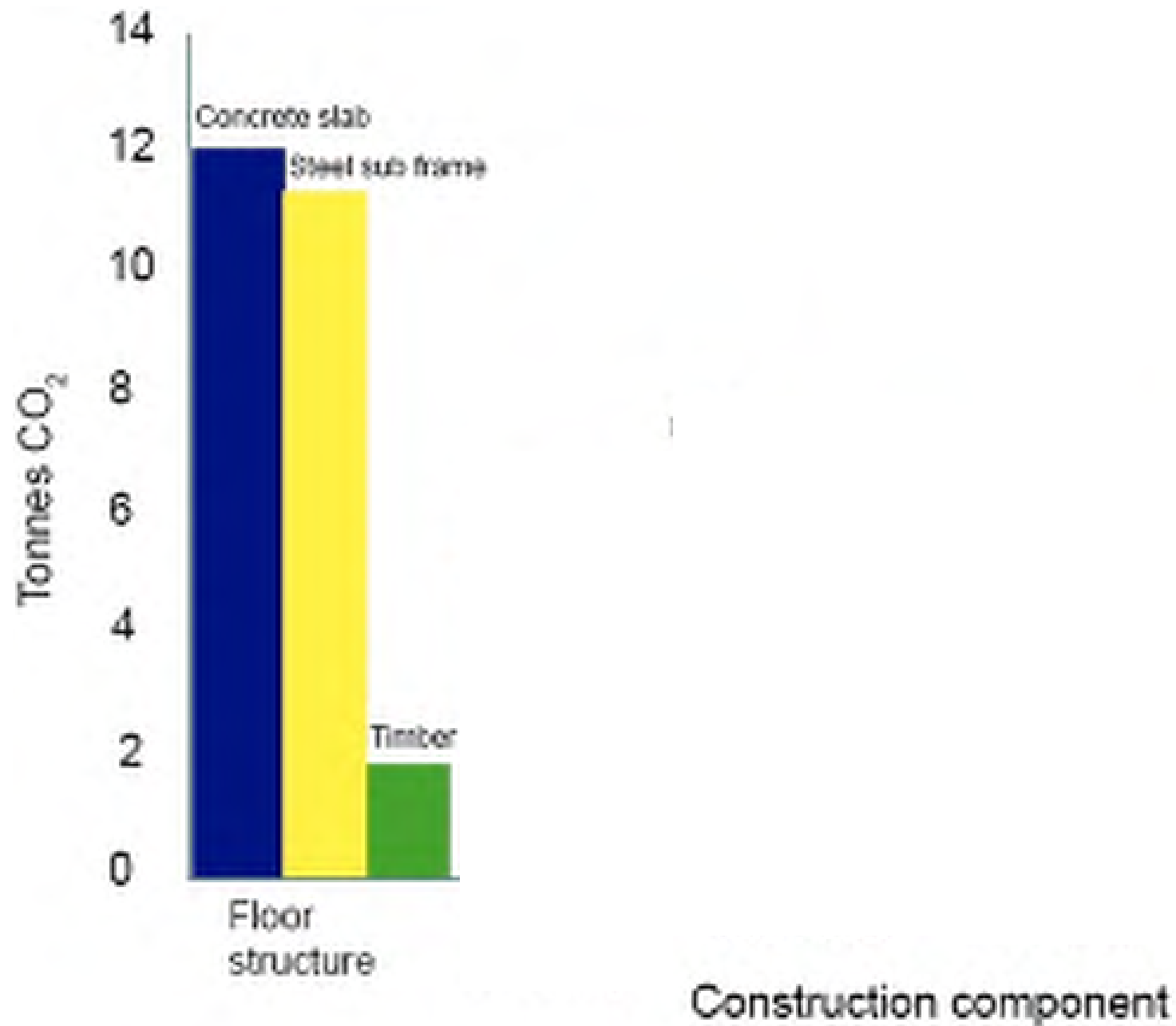
**The manufacture of concrete and steel are
responsible for nearly 10% of global CO2
emissions**

STRUCTURAL SYSTEM – EMBODIED CARBON



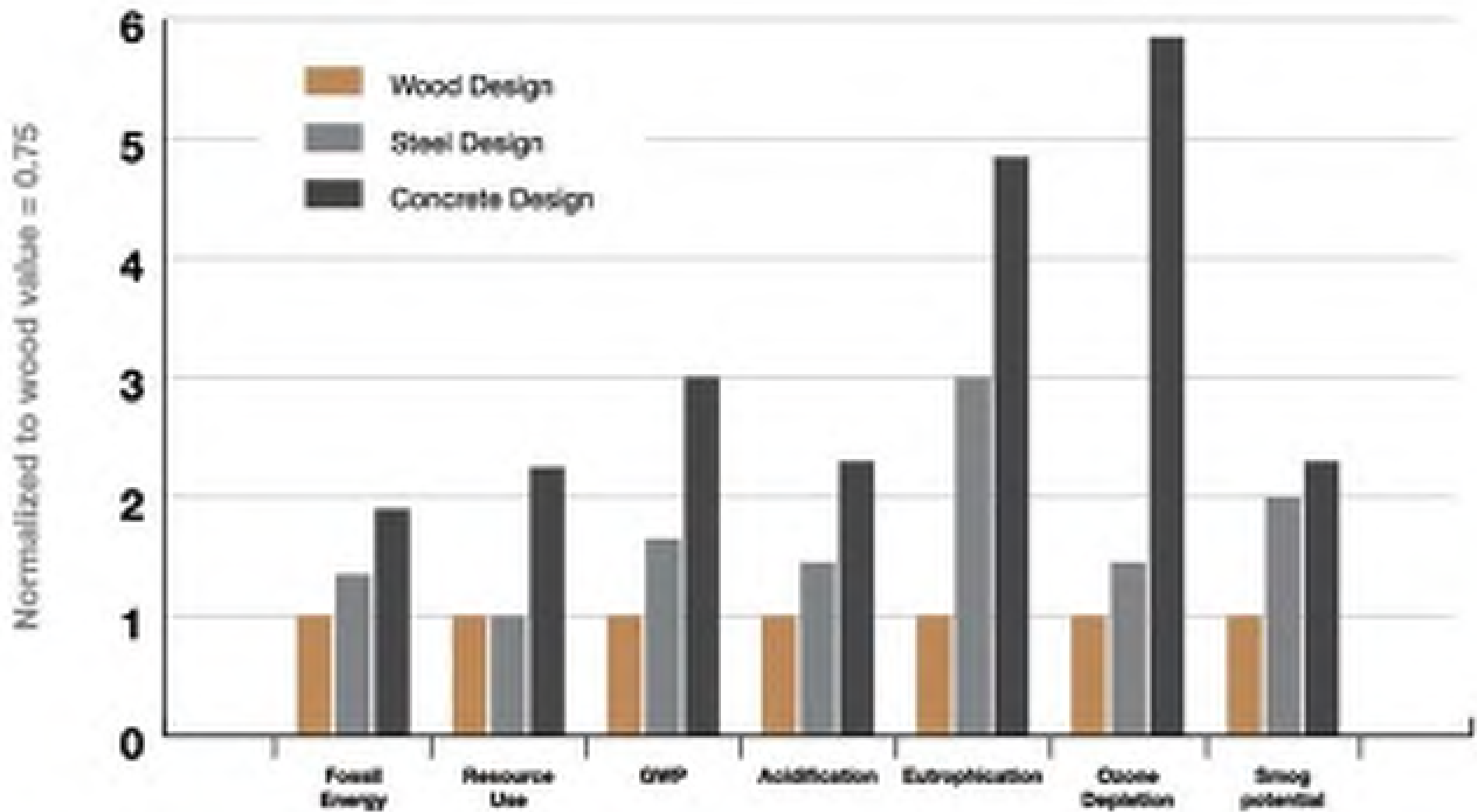
SOURCES:
ii) Lab 8-PATH Tool

CARBON IN BUILDINGS



SOURCE:
Treehugger

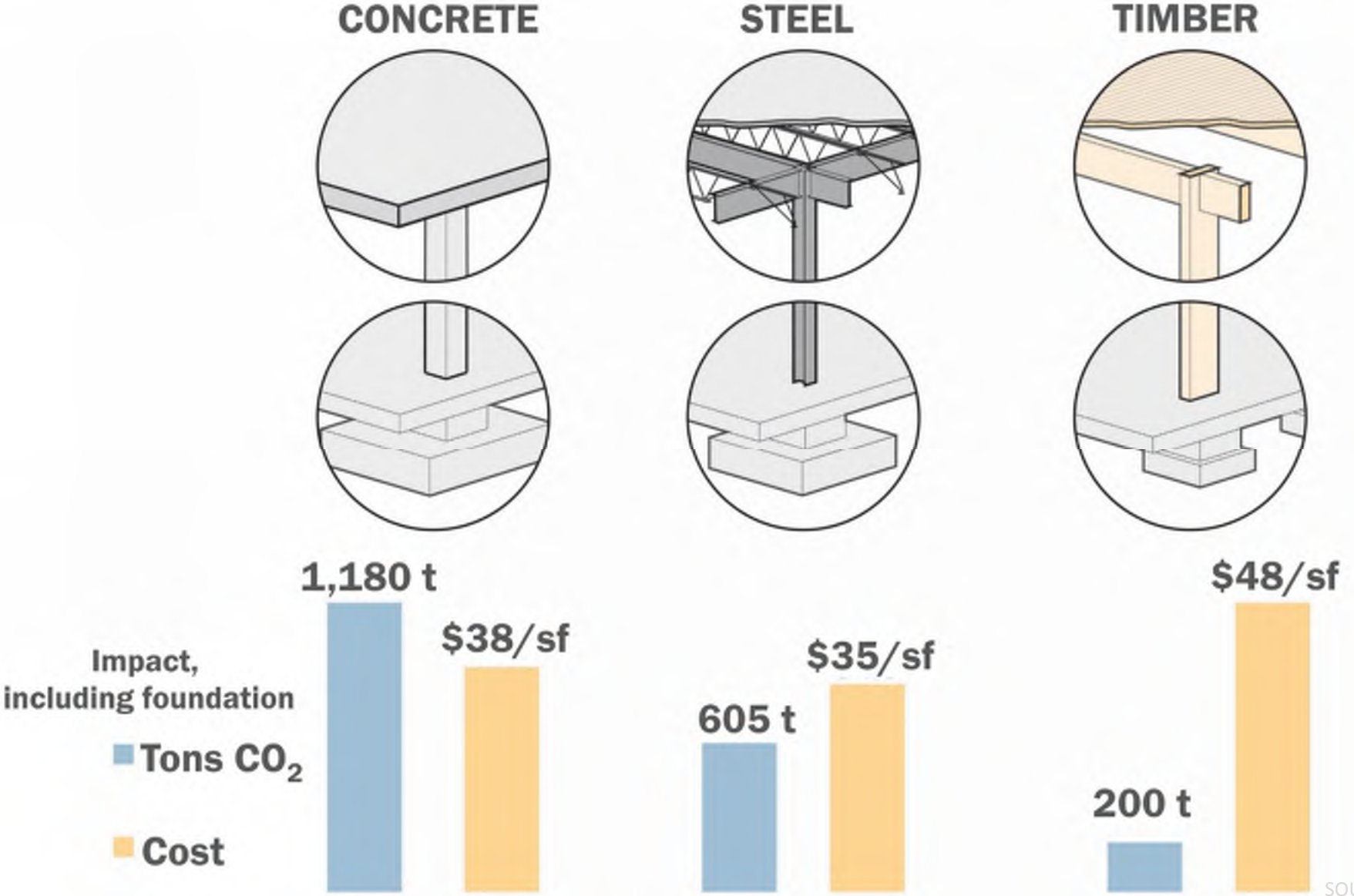
STRUCTURAL SYSTEMS EMBODIED EFFECTS



SOURCE:
FPInnovations

STRUCTURAL SYSTEMS

Cost & Emissions



SOURCE:
Eskew Dumez Ripple

**WOOD MUST BE
SUSTAINBLY
MANAGED**





SUSTAINABLE FOREST MANAGEMENT

- Preserves habitat
- Diversity of species and maturity



CLEAR CUT

- Destroys ecosystem
- Monoculture



LIVING BUILDING CHALLENGESM 3.1

**A Visionary Path to a
Regenerative Future**



**INTERNATIONAL
LIVING FUTURE
INSTITUTETM**

FOREST STEWARDSHIP COUNCIL (FSC)

- **Second largest forest standard**
- **The most rigorous**
- **Fastest growing standard**








20% of greenhouse gas emissions from deforestation
More emissions than from the transportation sector



A photograph of a dense forest with large, moss-covered tree trunks and a fallen log on the forest floor. The scene is lush and green, with sunlight filtering through the canopy. The text is overlaid on the bottom left of the image.

**The Northwest mixed conifer-
hardwood systems have some
of the largest soil carbon
stocks in the country**

– US Forest Service

A photograph of a dense forest of tall, moss-covered evergreen trees. The ground is covered in a thick layer of green moss and fallen branches. The background is misty, creating a serene and somewhat somber atmosphere.

Clearcutting is Oregon's single largest source of greenhouse gas emissions

– The Oregonian



Compaction from harvesting equipment can reduce total pore space, which may be beneficial for plant production in poorly-structured soils

**More carbon resides in soil than
in the atmosphere and all plant
life combined**

– Yale Forestry

**Large clear cuts result in the
release of more biogenic carbon
than selective harvests**

--IPCC

**Effective land restoration could
play a major role in sequestering
CO₂ and slowing climate change**

– Yale Forestry



**Wood discarded in landfills continues to store carbon
for some time**

**Portion that decomposes releases significant quantities
of methane**

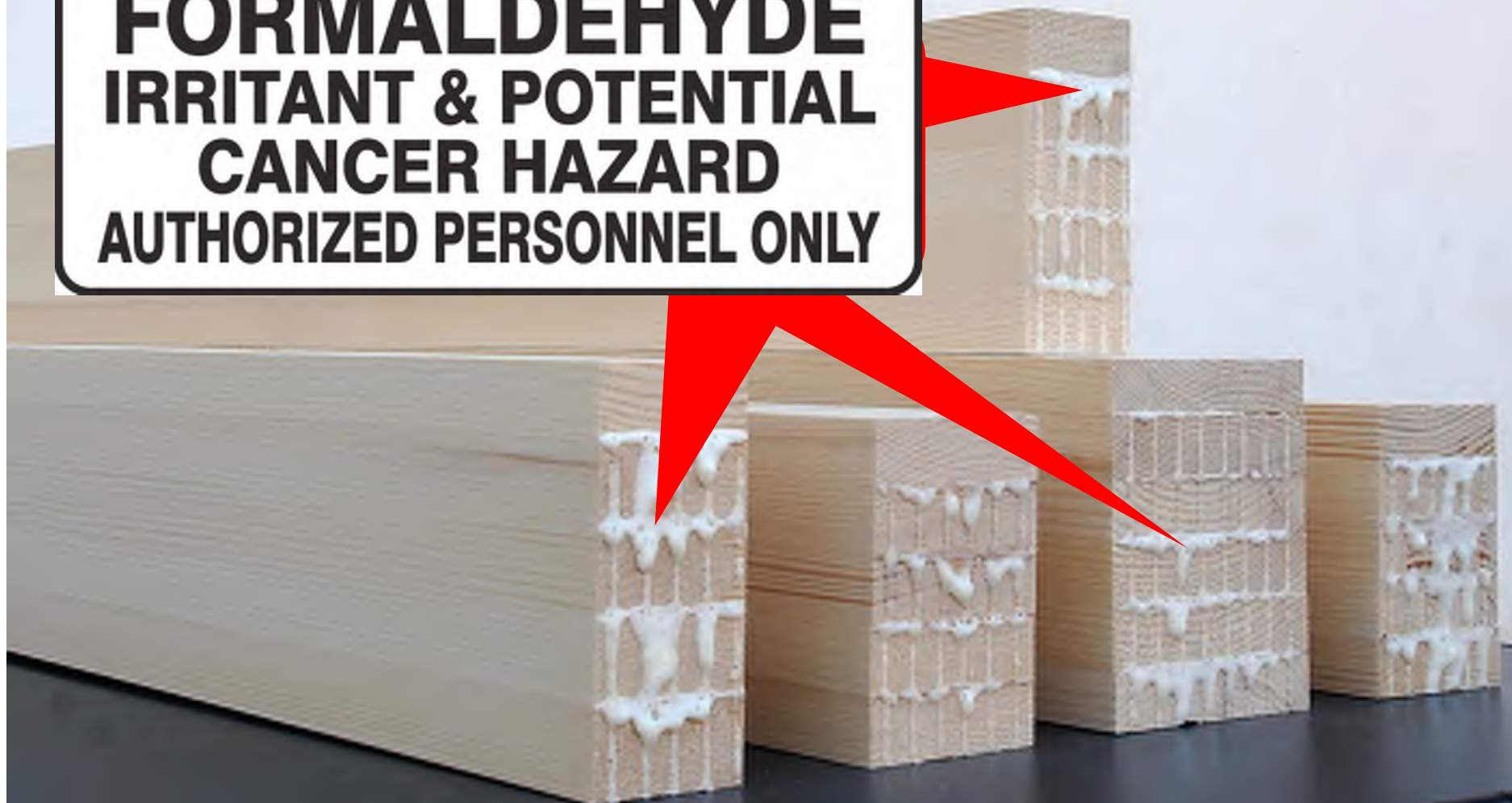
Higher global warming effect than CO₂

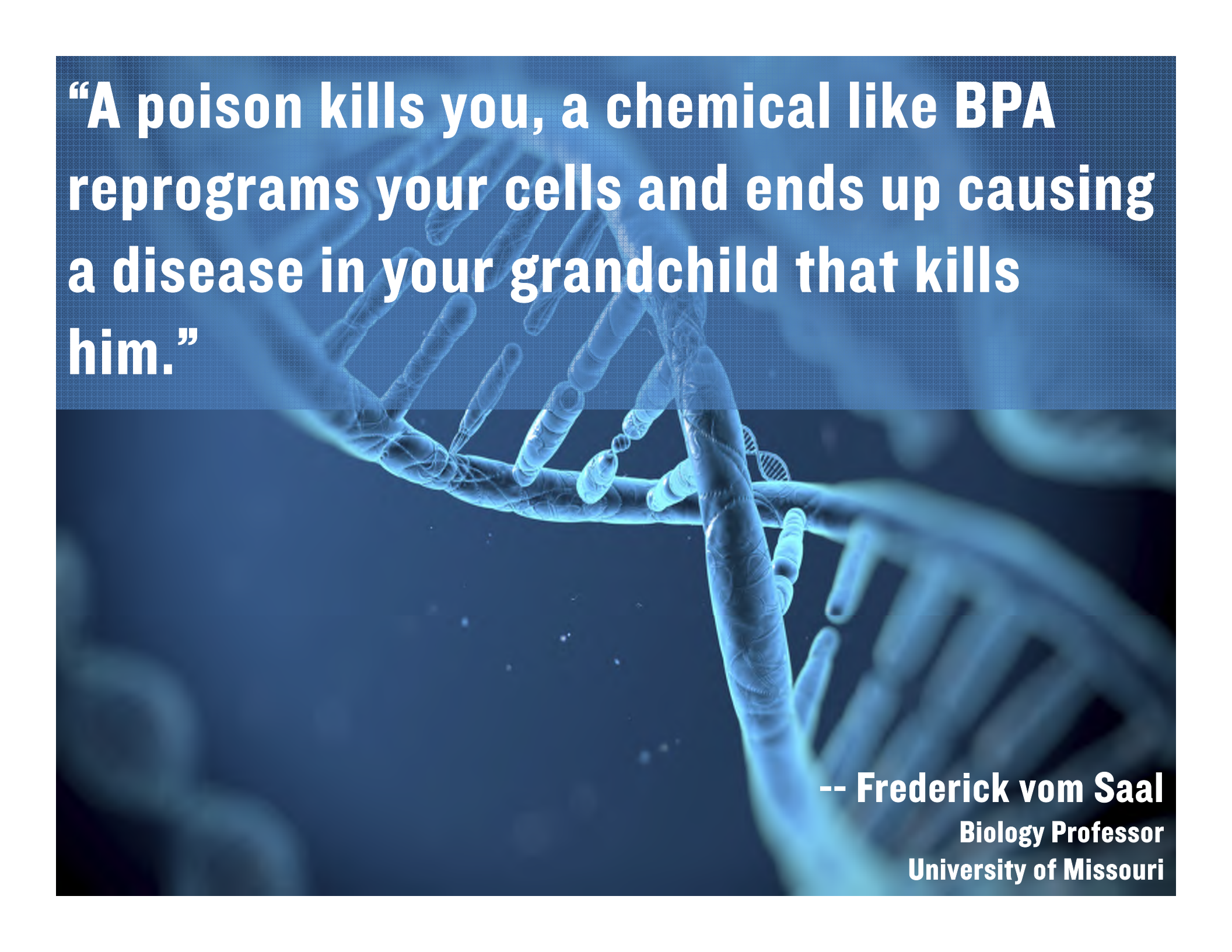
– US Forest Service



DANGER

**FORMALDEHYDE
IRRITANT & POTENTIAL
CANCER HAZARD
AUTHORIZED PERSONNEL ONLY**





**“A poison kills you, a chemical like BPA
reprograms your cells and ends up causing
a disease in your grandchild that kills
him.”**

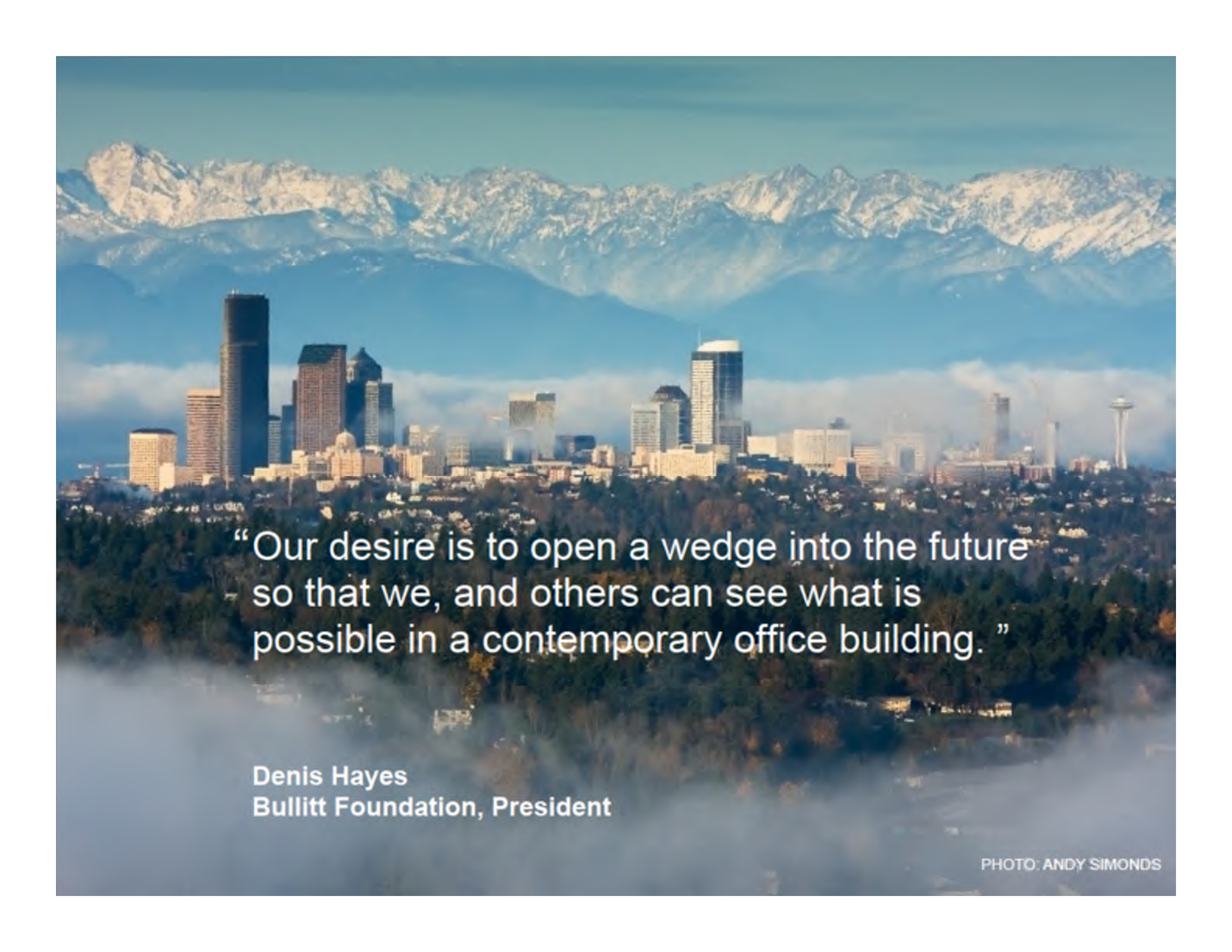
**-- Frederick vom Saal
Biology Professor
University of Missouri**

CASE STUDY #1

The Bullitt Center Living Building





A wide-angle photograph of the Seattle skyline. In the foreground, a dense forest of trees with autumn-colored foliage sits on a hillside. Above the trees, the city's skyline is visible, featuring several prominent skyscrapers, including the dark, cylindrical Smith Tower. To the right, the white, tiered Space Needle stands out. In the background, a long, rugged mountain range with significant snow cover stretches across the horizon under a clear blue sky. A layer of low-lying clouds or fog is visible at the base of the mountains and around the city.

“Our desire is to open a wedge into the future
so that we, and others can see what is
possible in a contemporary office building. ”

Denis Hayes
Bullitt Foundation, President

PHOTO: ANDY SIMONDS

BUILDING LIFE CYCLE



250 YEAR STRUCTURE
HEAVY TIMBER, CONCRETE & STEEL

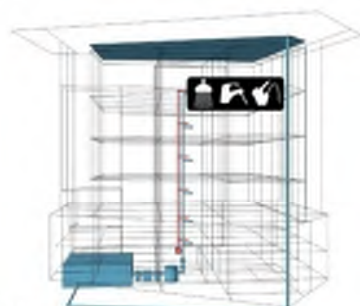


50 YEAR SKIN
HIGH PERFORMANCE ENVELOPE

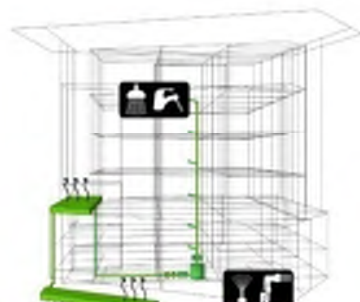


25 YEAR TECHNOLOGY
ACTIVE SOLAR CONTROL
PHOTOVOLTAICS

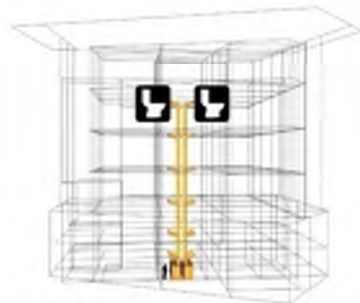
NET ZERO WATER



RAINWATER COLLECTION
100% DEMAND MET ON SITE
50,000 GALLON CISTERN



GREYWATER
100% TREATMENT ON SITE
EVAPOTRANSPIRATION & INFILTRATION

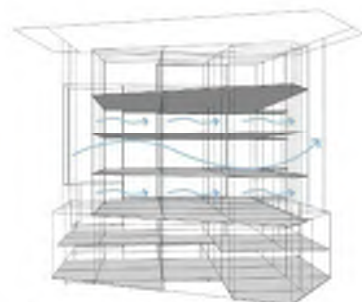


WASTE COMPOST
100% TREATMENT ON SITE

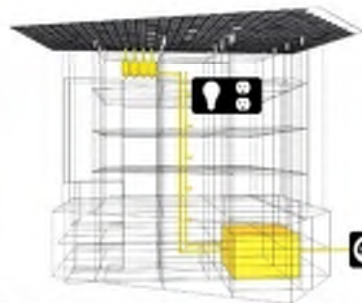
NET ZERO ENERGY



MECHANICAL
GROUND SOURCE HEAT EXCHANGE
RADIANT HEATING/COOLING
HEAT RECOVERY AIR SYSTEM

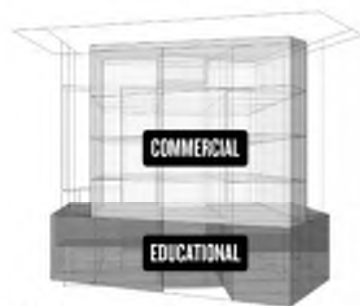


NATURAL VENTILATION
NIGHT FLUSH & OPERABLE WINDOWS

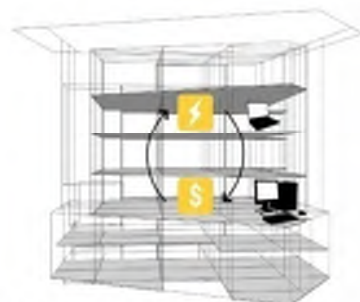


ENERGY
100% RENEWABLE ON SITE
GRID USED AS BATTERY

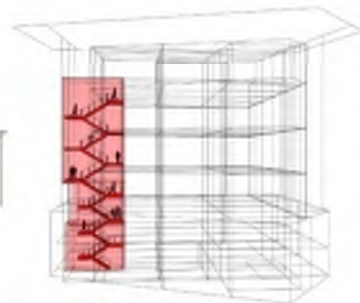
OCCUPANT



PROGRAM
OCCUPANCY
PRIVATE USERS ABOVE, PUBLIC FOCUS
USERS AT GRADE



INTERNAL CAP & TRADE
EACH TENANT HAS AN ENERGY BUDGET;
UNUSED ENERGY CAN BE TRANSFERRED



IRRESISTIBLE STAIR
ELEVATOR ALTERNATIVE, HEALTHIER
OCCUPANTS, ENGAGEMENT WITH STREET

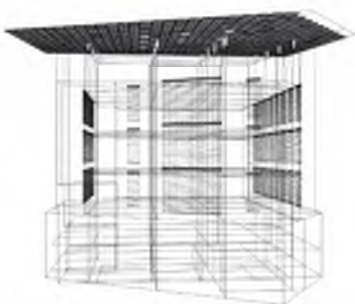
BUILDING LIFE CYCLE



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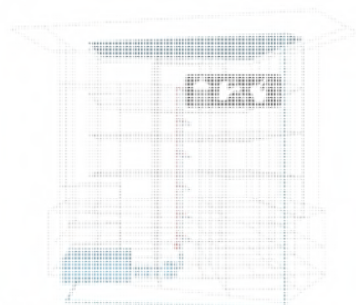


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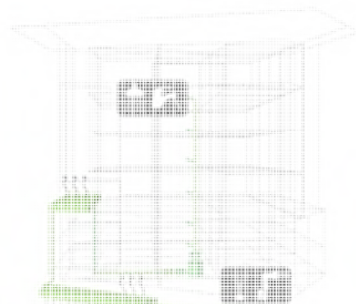


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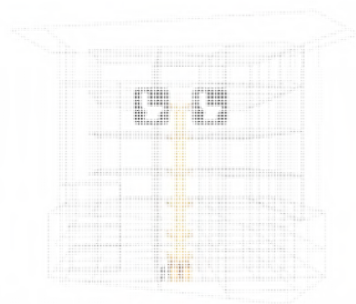
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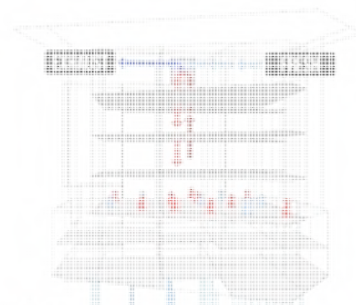


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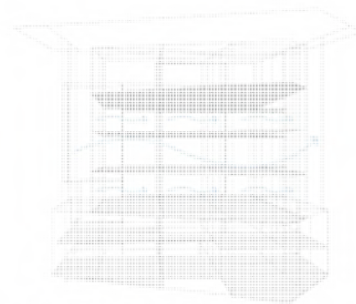


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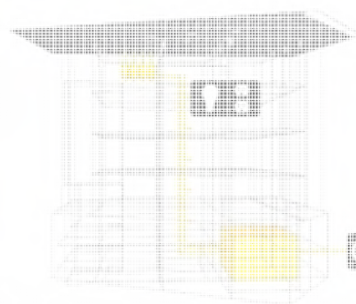
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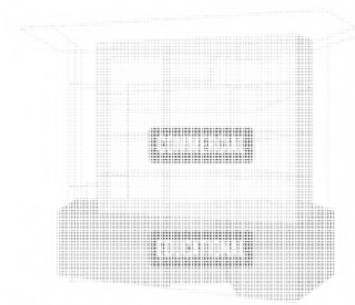


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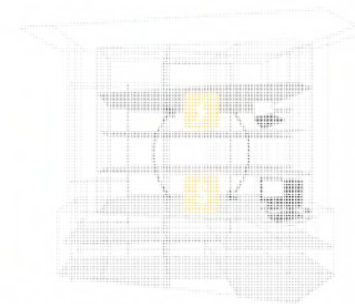


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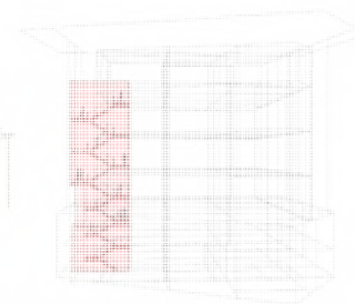
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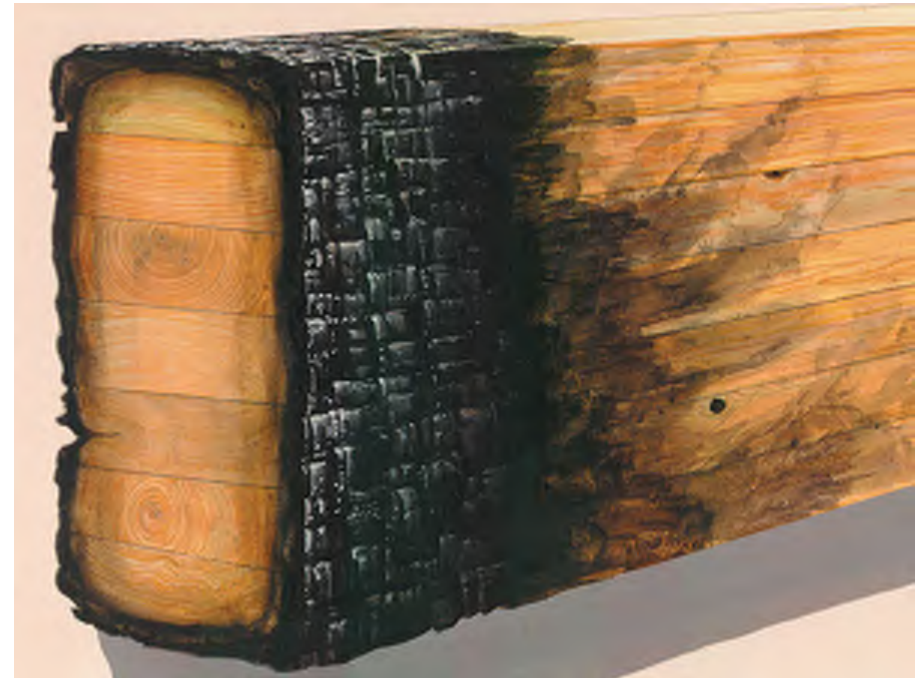
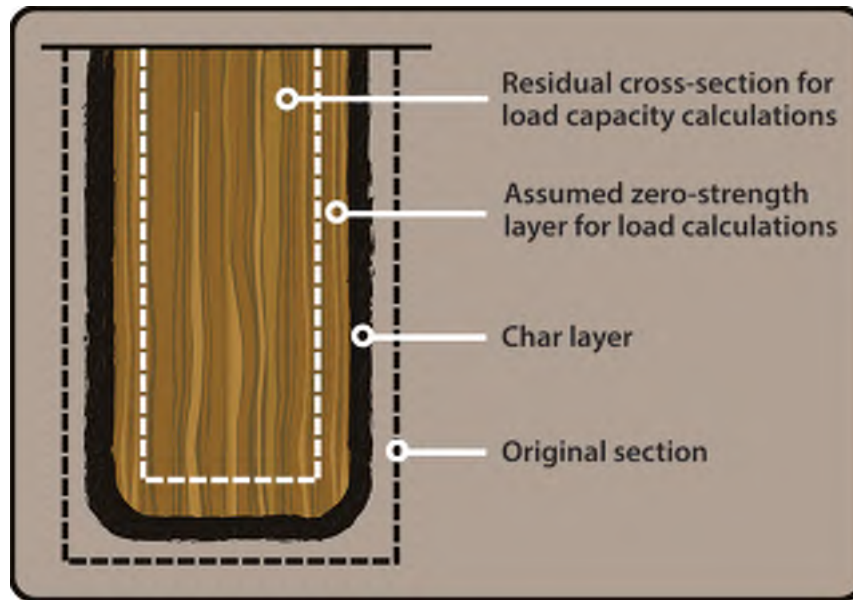
IRRESISTIBLE STAIR
ELEVATOR ALTERNATIVE, HEALTHIER
OCCUPANTS, ENGAGEMENT WITH STREET





The Bullitt Center, The Miller Hull Partnership

GLU-LAMINATED TIMBER



FIRE PROTECTION

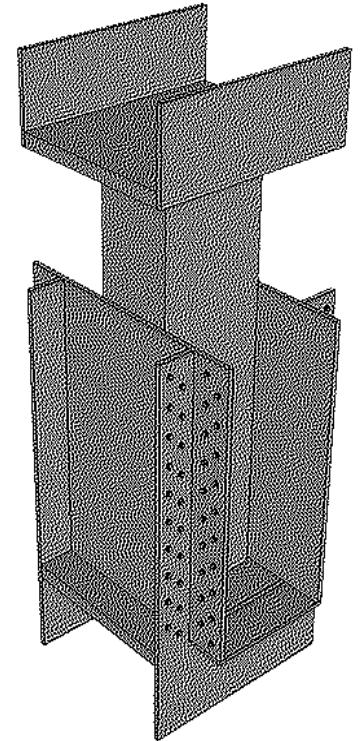
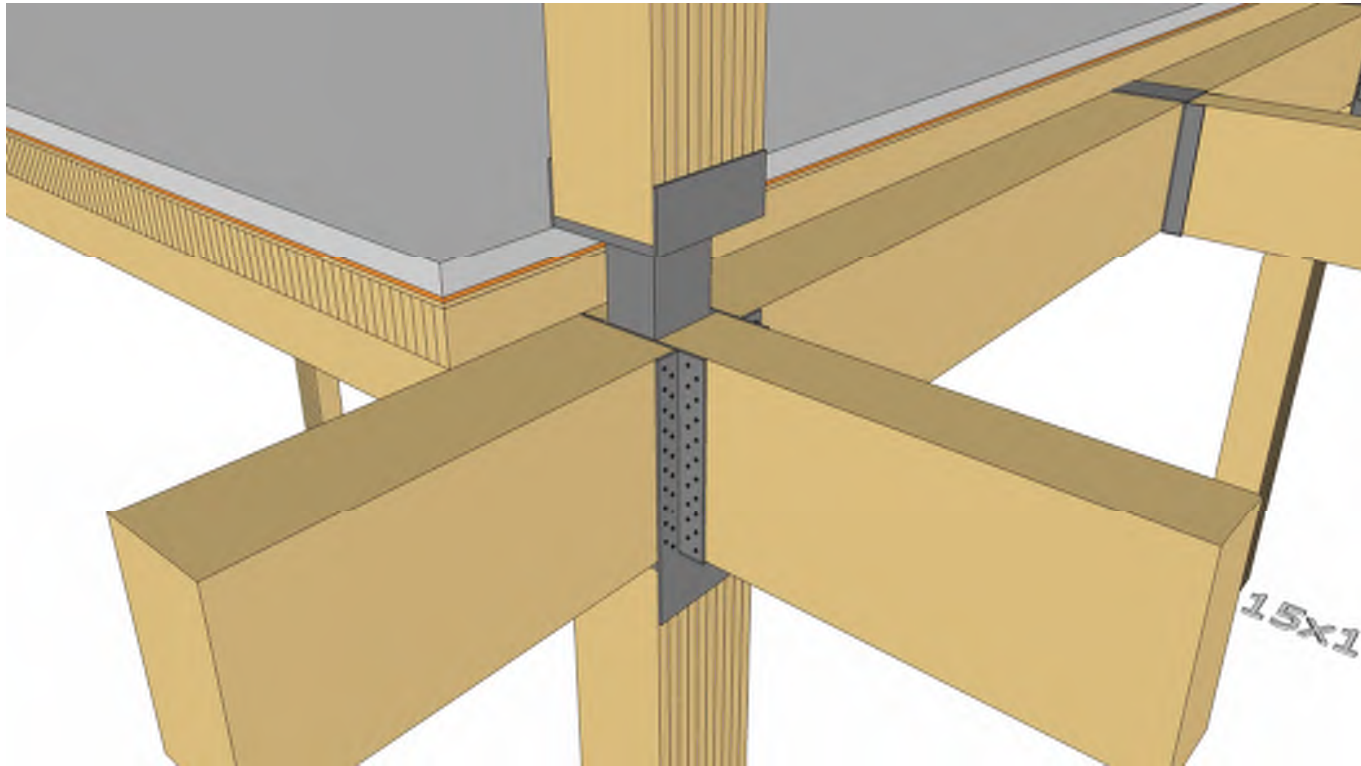


Bullitt Center, The Miller Hull Partnership



Wood Innovation Center, Michael Green Associates

CONNECTIONS—CONCEALED OR HIDDEN?



BUCKET CONNECTION



BUCKET CONNECTION













CASE STUDY #2

The Kendeda Center Living Building



- **262 Wood processing mills,
1400 forest product
manufacturers**
- **108,112 Jobs in Georgia**
- **24 Million acres timberland
available for commercial use—
more than any other state**
- **Georgia's forest industry is
2nd largest in the state**











WHAT'S NEXT?

TALL WOOD



Bullitt Center, The Miller Hull Partnership

COMPLETE

6 STORIES—SEATTLE



Wood Innovation Center, Michael Green Associates

COMPLETE

7 STORIES—CANADA



WSU Spokane student housing proposal, The Miller Hull Partnership

CONCEPT DESIGN

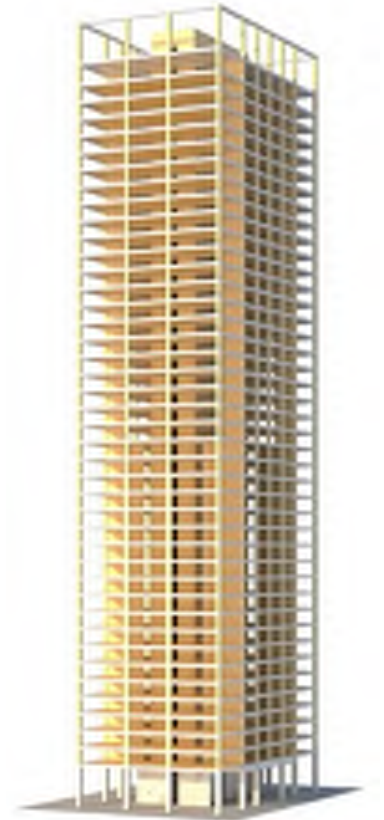
14 STORIES—USDA TALL WOOD COMPETITION



Paris Tower proposal, Michael Green Associates

DESIGN PROPOSAL

35 STORIES—PARIS



Timber Tower Research Project, SOM

RESEARCH PROPOSAL

42 STORIES—?

A scenic photograph of a sunset over a body of water. The sun is low on the horizon, creating a bright orange glow and a long, shimmering reflection on the water's surface. In the background, dark, silhouetted mountains rise against the sky. The sky is filled with soft, wispy clouds, some of which are illuminated by the sunset light. The overall mood is peaceful and serene.

THANK YOU

CHRIS HELLSTERN
AIA | LFA | LEED AP | CDT

MILLER | HULL

sustainability@millerhull.com