



WoodWorks™
WOOD PRODUCTS COUNCIL

Building Sustainably: Wood's Role in Healthy Forestry and Healthy Buildings

Presented by Jeff Peters, CGC, PE



**Forestry Innovation
Investment®**

BOARD PARTNERS

2021

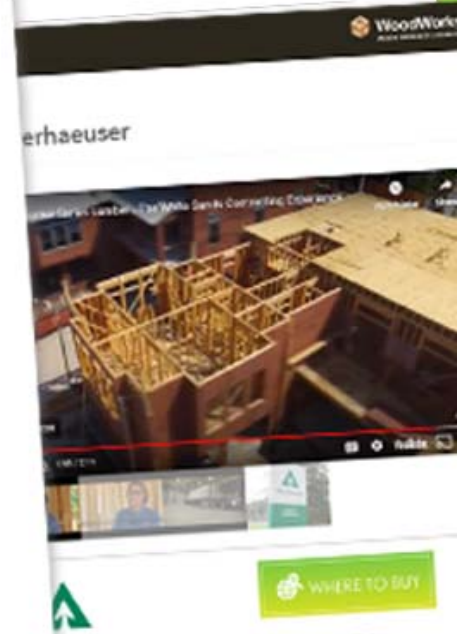
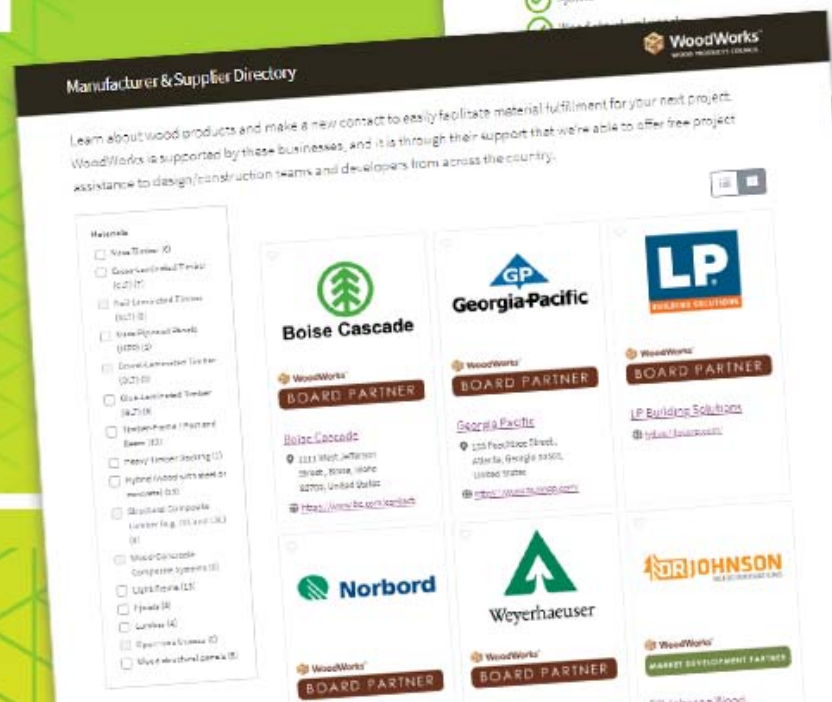


MARKET DEVELOPMENT PARTNERS




PRODUCT INFORMATION,
SALES RESOURCES
& MORE.

- ✓ Hybrid (wood with steel or concrete)
- ✓ Light-Frame
- ✓ Lumber



PROJECT SUPPORT AND CONVERSION



University of Massachusetts
Green Design Building
Loren Wintersgill Architecture
photo: Massimo Sestini

TS Monogram, 2017/2018 Green
photo: Chris Day

**Designing a wood building?
Ask us anything.**

 **WoodWorks™**
WOOD PRODUCTS COUNCIL

FREE PROJECT SUPPORT | EDUCATION | RESOURCES

woodworks.org | help@woodworks.org

The Hubbell Center,
The White Hall Partnership
photo: John Sponberg

Alison Wolf, LEED® Accredited
photo: Andrew Wright & Associates



“The Wood Products Council” is a Registered Provider with The American Institute of Architects Continuing Education Systems (AIA/CES), Provider #G516.

Credit(s) earned on completion of this course will be reported to AIA CES for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

This course is registered with AIA CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

➤ Learning Objectives

1. Highlight North America's ecological capacity to support a diverse range of forests.
2. Discuss how using a variety of forest products can economically support healthy and sustainable forests.
3. Describe how wood's use can be leveraged in a number of green building rating systems to help achieve certification.
4. Demonstrate how wood can contribute to sustainable development trends such as biophilic design and healthy buildings.

A photograph of a forest. In the foreground, a large, vibrant yellow fern frond is in sharp focus, its feathery structure clearly visible. The background is a dense forest of tall, thin evergreen trees, slightly out of focus. Sunlight filters through the canopy, creating a soft, dappled light effect. A small, bright green circular light artifact is visible in the upper center of the image.

**Is Wood A Sustainable
Construction Material Choice?**

**Wood as a Renewable
Resource**

State of Our Forests



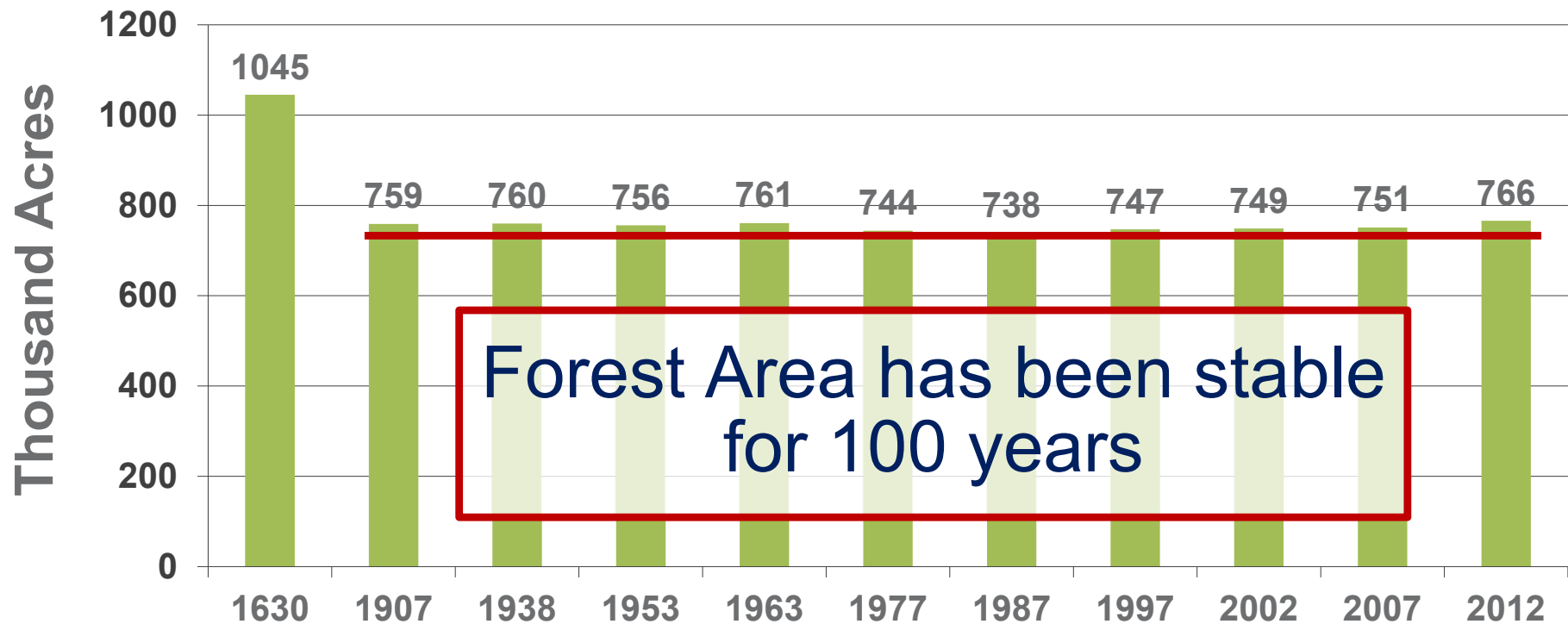


Common Environmental Concerns About Specifying Wood

1. Is North America **running out of Forests?**
2. Does specifying wood products contribute to **deforestation?**
3. Is wood a **renewable resource?**

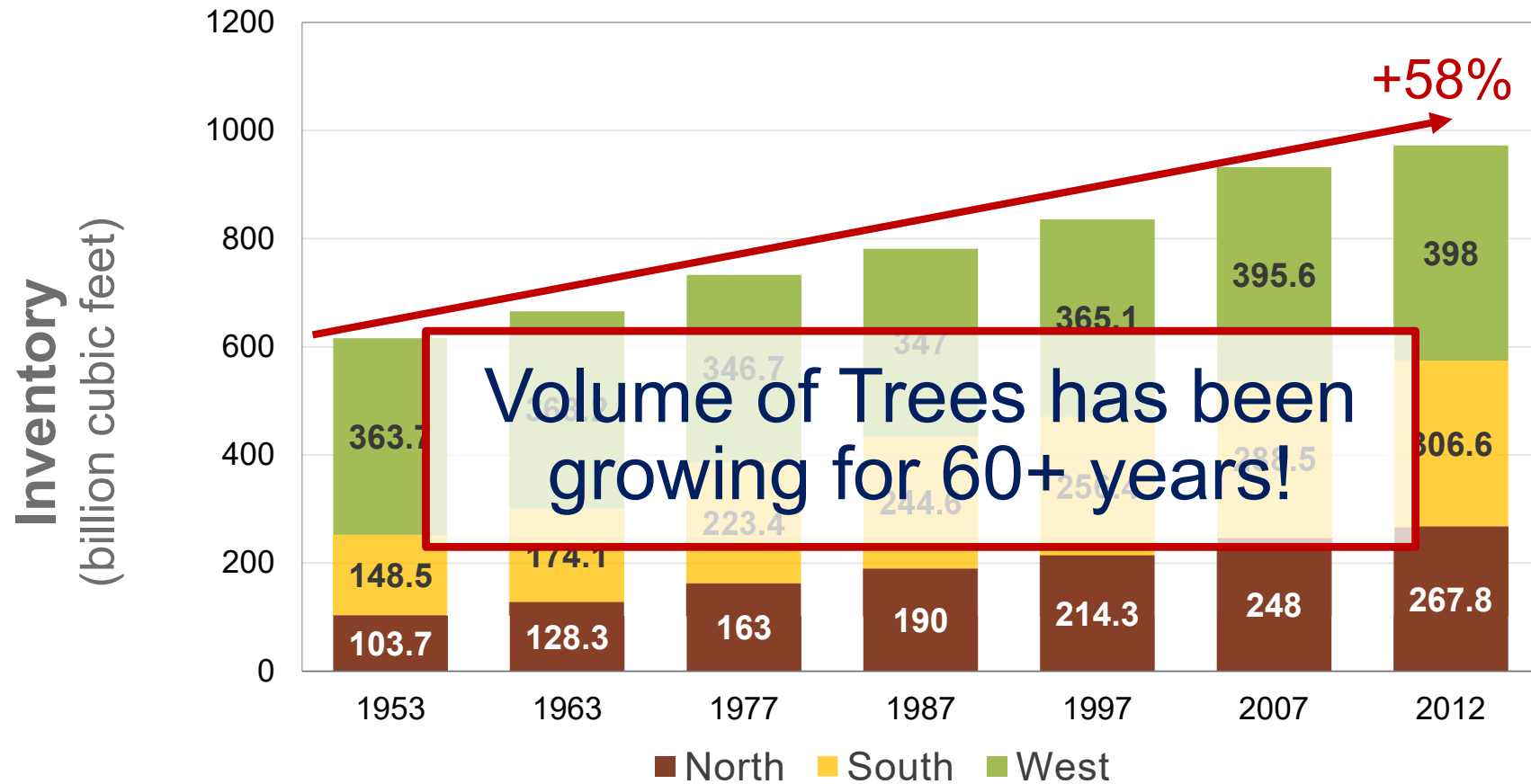
U.S. Forest Land:

Forest Area in the United States 1630 – 2012



Source: USDA-Forest Service, US Forest Resource Facts and Historical Trends FS-1035. (2014).

State of our Forests: US Timber Volume on Timber Land

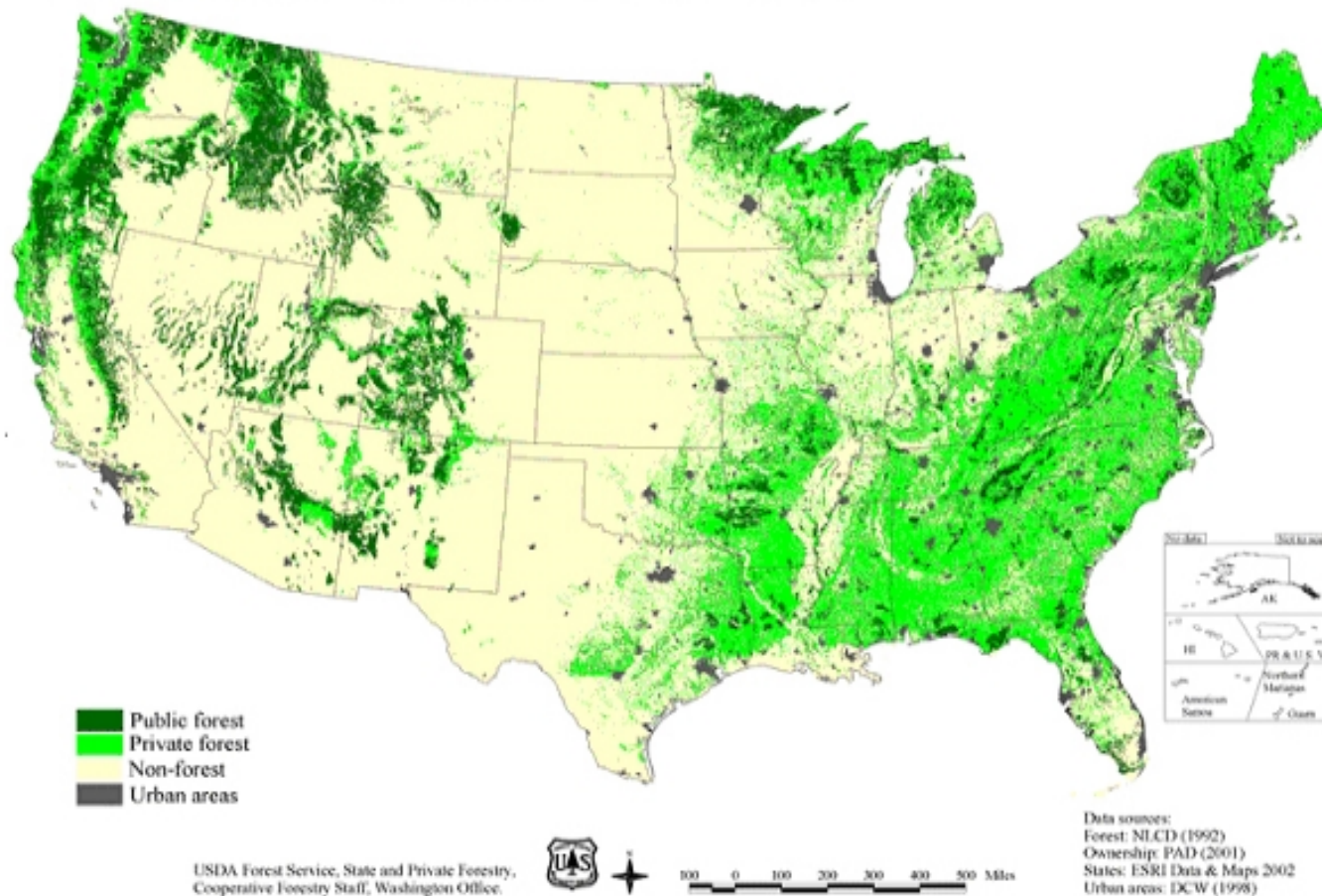


Source: USDA-Forest Service, US Forest Resource Facts and Historical Trends FS-1035. (2014).

US Forest Lands

Forest Land Ownership

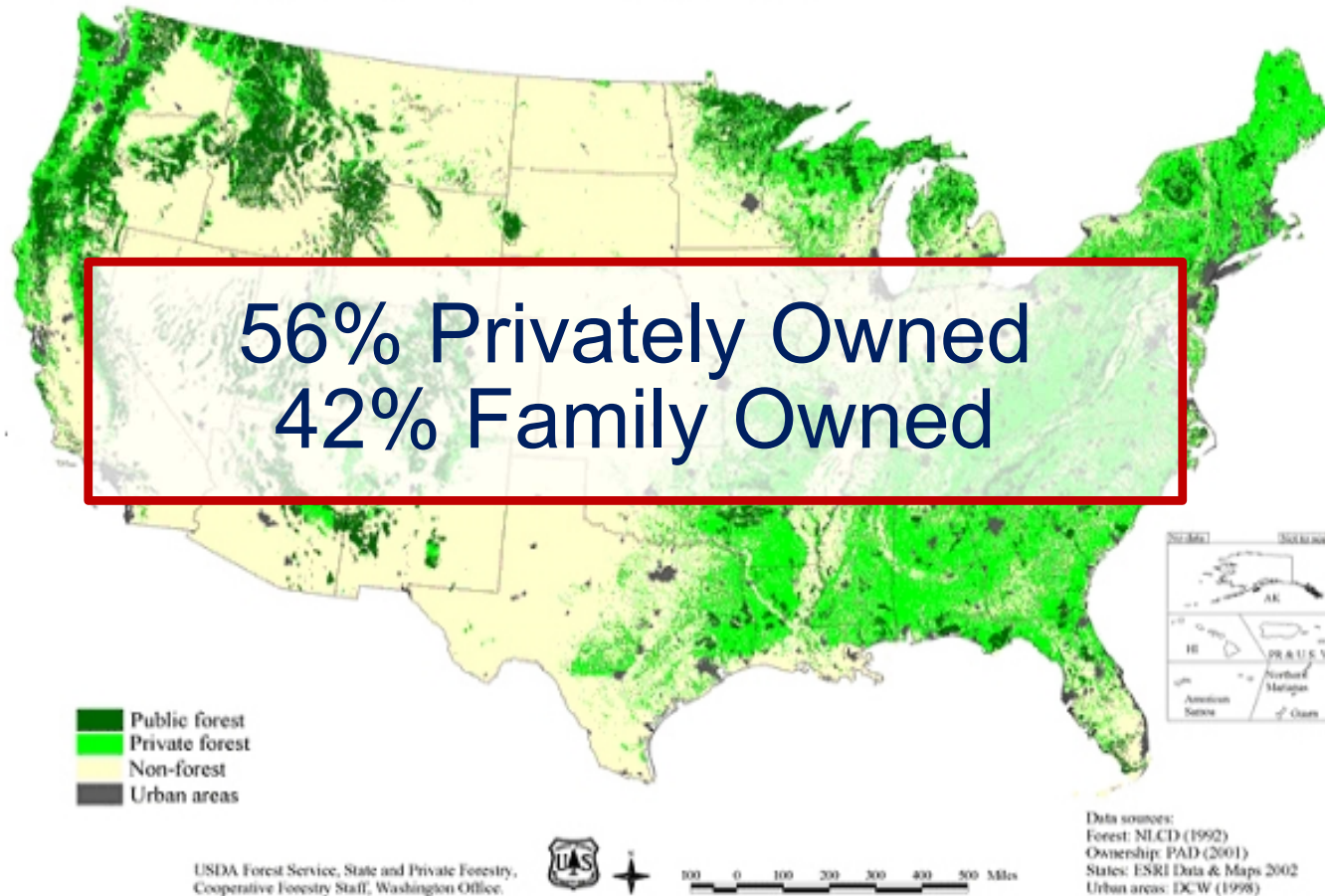
This map displays the basic vegetation (forest vs. non-forest) of the conterminous United States as well as ownership (private vs. public). The lands displayed as "public" include Federal and State lands but do not generally include lands owned by local governments and municipalities.



US Forest Lands

Forest Land Ownership

This map displays the basic vegetation (forest vs. non-forest) of the conterminous United States as well as ownership (private vs. public). The lands displayed as "public" include Federal and State lands but do not generally include lands owned by local governments and municipalities.



US Forest Lands

Forest Land Ownership

This map displays the basic vegetation (forest vs. non-forest) of the conterminous United States as well as ownership (private vs. public). The lands displayed as "public" include Federal and State lands but do not generally include lands owned by local governments and municipalities.



Regeneration vs. Deforestation



Deforestation is the permanent conversion of forest land to non-forest land uses. Worldwide, agricultural expansion is the main driver of deforestation, but in the U.S., the rate of deforestation has been virtually zero for decades.

Source: State of the World's Forests—2020— FAO and UNEP, USDA Forest Service, US Forest Resource Facts and Historical Trends FS-1034 (2014)

Forest Management



Good Forestry = Sustainable Forestry

“Forestry is the art and science of creating, using and conserving forests. The forestry profession was a pioneer in developing techniques for sustainable management and, later, techniques for the multiple use of forests.

The term sustainable forest management is synonymous with good forestry”.

Source: State of the World's Forests 2012. United Nations Food and Agriculture Organization

Photos: Oregon Forest Resources Institute



Forests are more than Lumber Factories

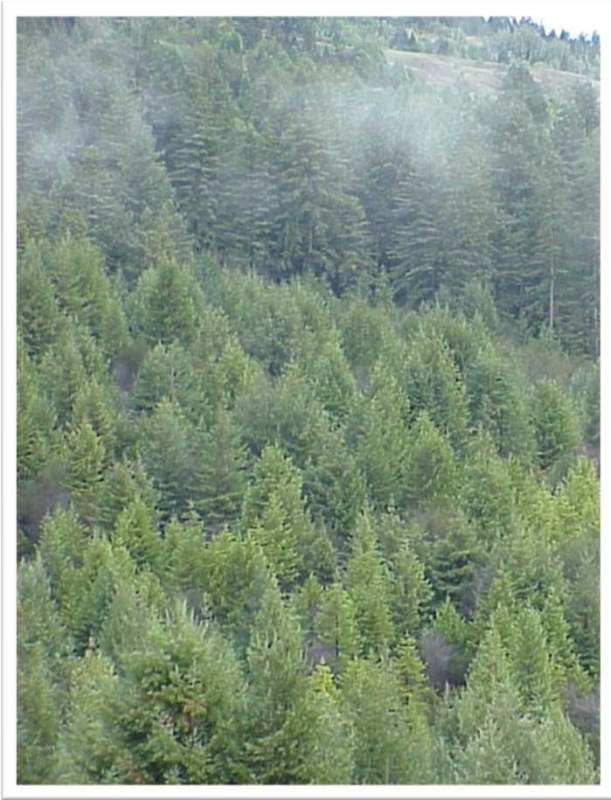


Photo: Green Diamond Resource Company

- We can balance the long-term and short-term desires and the multiple uses through responsible forest management.
- Best Management Practices (BMPs)
- State, Federal and Provincial monitoring and forest inventory programs
- Forestry Practices and Laws
- Professional Logger Training and Certification
- Sustainable Forest Management Systems

Sustainable Forestry Management Systems

- Wood from well-managed forests is sustainable over the long term.
- Forest certification shows that the wood comes from well-managed forests
- The major North American programs are:



FSC



SFI



CSA



ATFS

Sustainable Forestry Management Systems



Similarities:

- Biological diversity
- Wildlife habitats / species diversity
- Special sites/values
- Soil & water resources
- Sustainable harvests
- Prevent illegal or unauthorized sources
- Protect from deforestation and conversion
- Aboriginal rights and/or involvement
- Independent audit required
- Audit of forest planning and practices
- Public disclosure required
- Chain of custody and label option



Forest



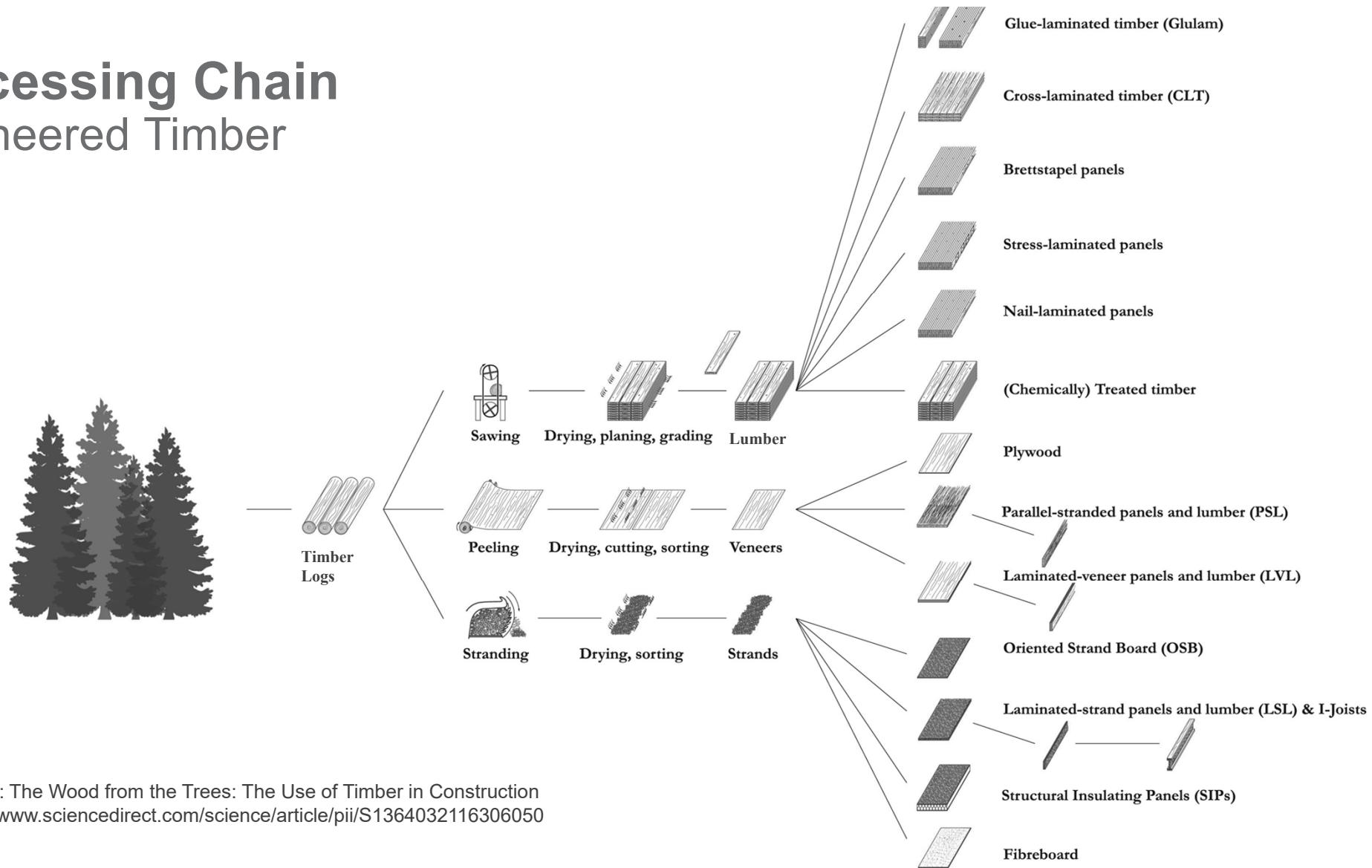
Logging Site, Springfield, Oregon | Photo: WoodWorks

Timber



Logs at Manufacturing Facility, Oregon | Photo: WoodWorks

Processing Chain Engineered Timber



Source: The Wood from the Trees: The Use of Timber in Construction
<https://www.sciencedirect.com/science/article/pii/S1364032116306050>

Small Diameter Trees



Photos: WoodWorks



Mass Timber Products



Glue Laminated Timber (GLT)



Cross-Laminated Timber (CLT)
Solid sawn laminations



Photo:
Freres Lumber

Cross-Laminated Timber (CLT)
SCL laminations



Photo: StructureCraft



Photo: LendLease



Photo: LEVER Architecture

Dowel-Laminated Timber (DLT)



Photo: StructureCraft

Nail-Laminated Timber (NLT)



Photo: Think Wood

Decking



Photo: StructureCraft



Photo: Ema Peter



Photo: Bernard André Photography

Large Pre-fabricated Mass Timber Panels

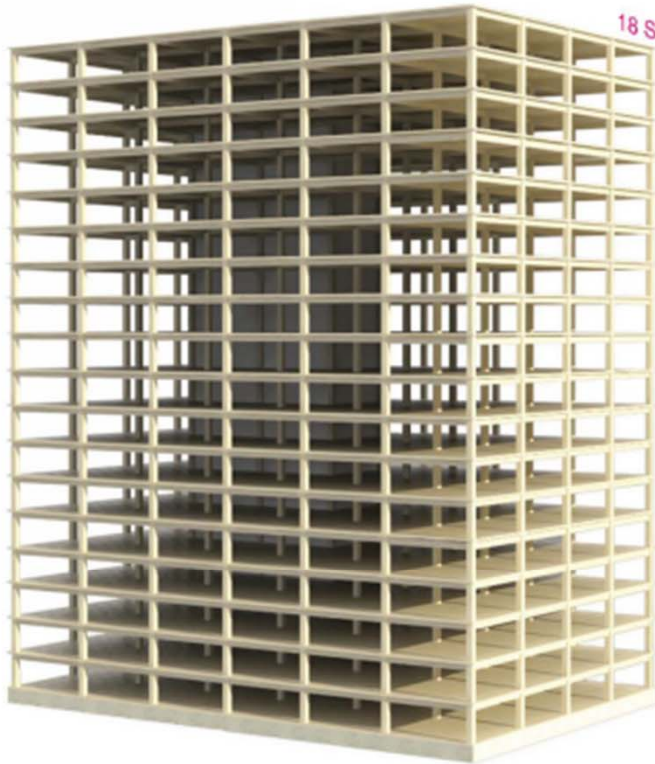


Image: MyTiCon

Mass Timber Buildings

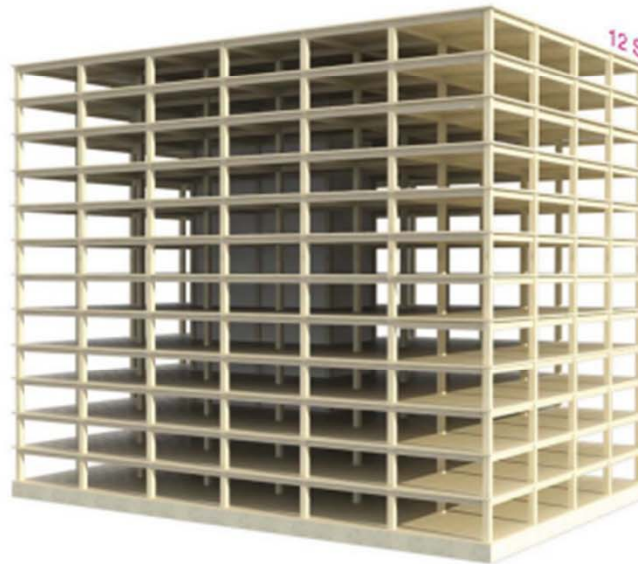


Tall Mass Timber Buildings



18 STORIES
BUILDING HEIGHT 270'
ALLOWABLE BUILDING AREA 972,000 SF
AVERAGE AREA PER STORY 54,000SF

TYPE IV-A



12 STORIES
BUILDING HEIGHT 180 FT
ALLOWABLE BUILDING AREA 648,000 SF
AVERAGE AREA PER STORY 54,000SF

TYPE IV-B



9 STORIES
BUILDING HEIGHT 85'
ALLOWABLE BUILDING AREA 405,000 SF
AVERAGE AREA PER STORY 45,000 SF

TYPE IV-C

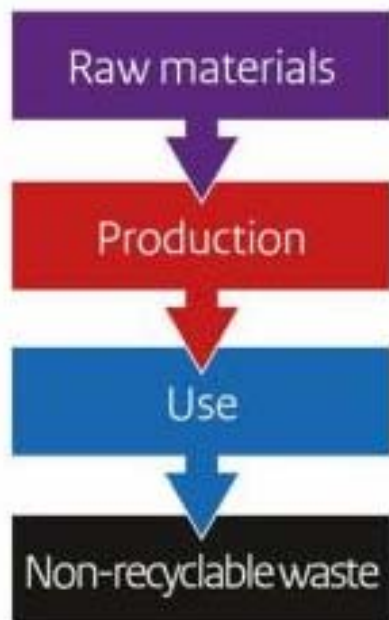
IBC 2021

Credit: Susan Jones, atelierjones

Circular Economy

Renewable Resource

Linear economy



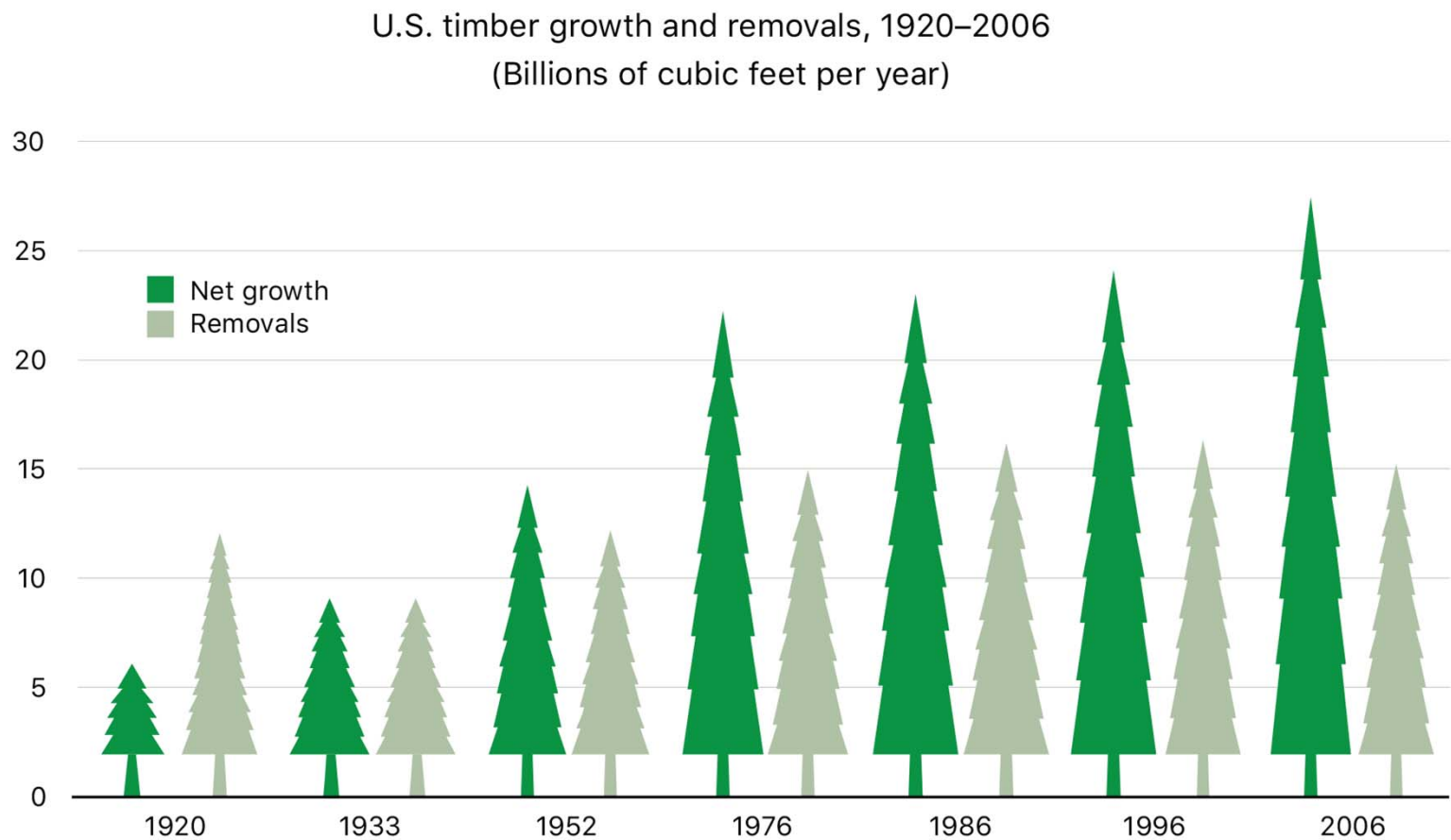
Reuse economy



Circular economy



Forest Supply: Growth vs. Removals



Source: The Forest History Society

Wood Products

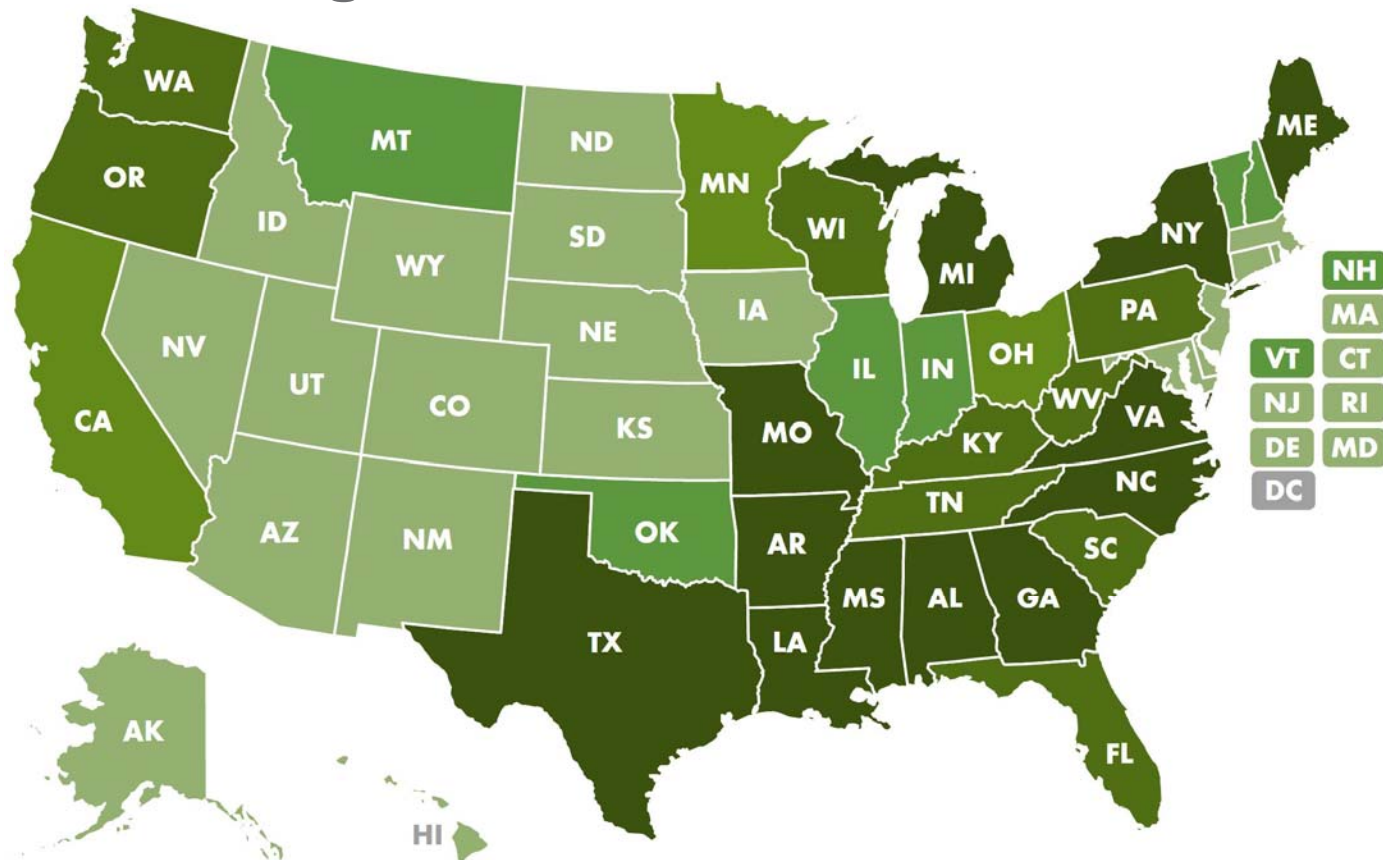
Increase Forest Value & Support Rural Economies



Download State info:

<https://www.awc.org/publicpolicy/statefactsheets>

Private Working Forests



Download State info:

<https://nafoalliance.org/>

Green Building Rating Systems

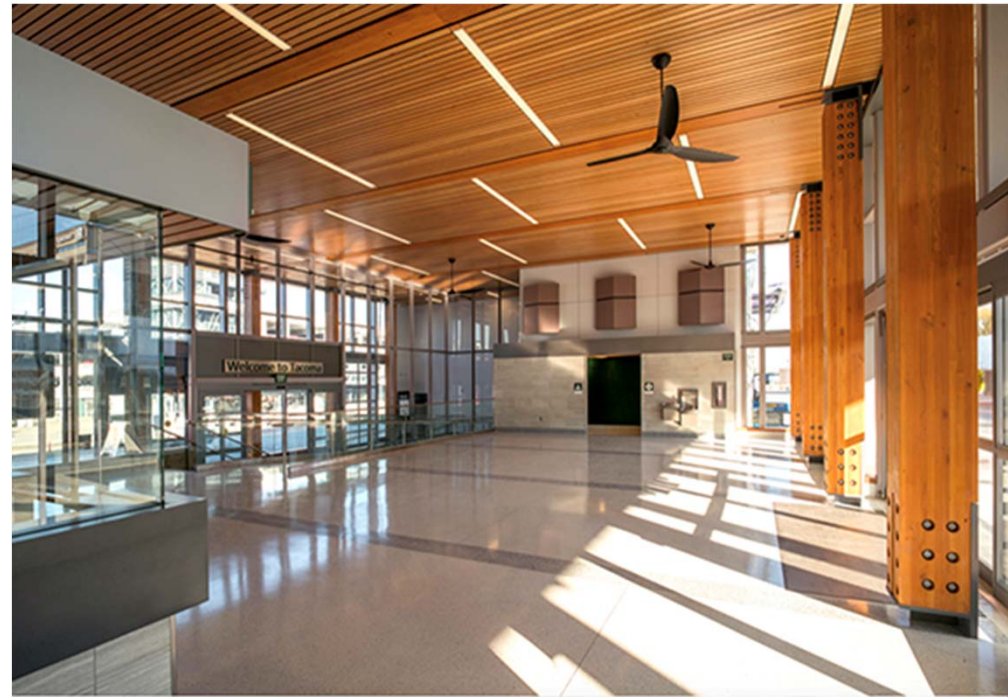


Green Building Rating Systems

What are They?

Building certification system that rates or rewards relative levels of compliance or performance with specific environmental goals and requirements.

Analyze the project as a whole, going beyond (but factoring in) performance of individual products used in the project.



Amtrak Cascades Station at Freighthouse Square,
Architect: VIA Architecture, Photo: Chris Eden/Eden Photography

Green Building Rating Systems

What is their main goal?

To clearly define, implement, and measure green strategies and their outcomes and impacts.



Amtrak Cascades Station at Freighthouse Square,
Architect: VIA Architecture, Photo: Chris Eden/Eden Photography

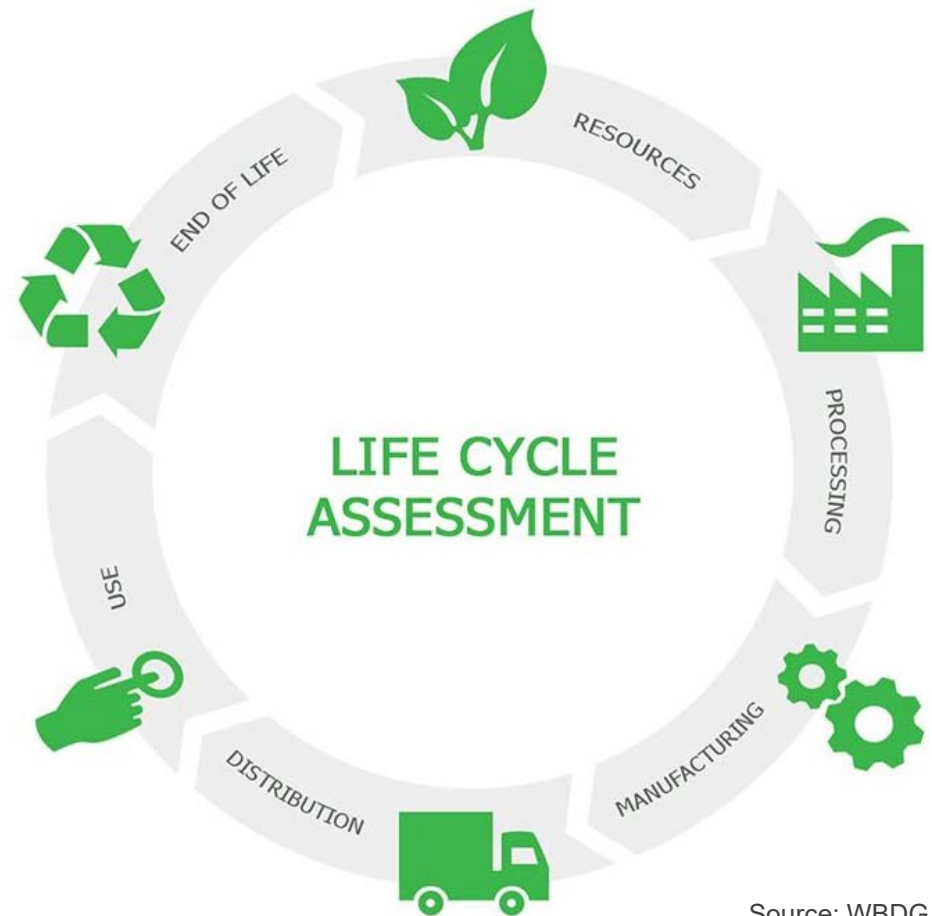


Source: USGBC

Green Building Rating Systems

What do they factor in?

Green building rating and certification systems require an integrated design process to create projects that are environmentally responsible and resource-efficient throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation, and demolition.



Source: WBDG

Green Building Rating Systems

Why target certification?

The reasons for pursuing a green building certification for a project are varied:

- Verification of the green nature of the project
- Valuable educational and marketing tool for owners and design and construction teams
- Provide an incentive for clients, owners, designers, and users to develop and promote highly sustainable construction practices
- It is important to note that a building does not have to be certified to be sustainable and well-built.

Source: WBDG



Source: USGBC & ILFI

Green Building Rating Systems

What are the benefits?

There are a wide range of economic and environmental benefits to sustainable design, often achieved through the use of standards, rating, and certification systems. Examples include:

Reduced embodied carbon

Reduced building energy and water use

Reduced construction waste

Increased occupant comfort/satisfaction

Increased building value, lease rates, ROI

Source: WBDG



RISD North Hall, Architect: NADAAA Architects, Photo: John Horner

Green Building Rating Systems

System choices

BREEAM[®]



...and many more

Green Building Rating Systems

Which one should I use?

Ultimately, the type of certification system pursued for a project depends upon that singular project; none of these certification systems are one-size-fits all. Project variables that can influence rating system choice include:

- Location
- Size
- Budget
- Overall project goals
- Rating system cost & ease of use

Rating systems are regularly updated & changed



Oregon Conservation Center, Photo: Jeremy Bittermann;
Lara Swimmer; Shawn Records; LEVER Architecture

Green Building Rating Systems

Credits for wood use

Generally, every prescriptive-based rating system offers a certain percentage of credits that can be achieved with the use of wood or wood products. In most cases, wood is recognized in the following areas:

- Certified wood
- Life Cycle Impacts
- Recycled/reused/salvaged materials
- Local sourcing of materials
- Materials efficiency
- Waste minimization
- Indoor air quality

Source: *Green Building and Wood Products*



ICE Block I, RMW Architecture & Interiors, Buehler Engineering, Bernard André Photography

Green Building Rating Systems

Certified wood

Credits are awarded for wood that has been third-party certified as coming from a sustainably managed forest. Different rating systems allow for different certification programs, with some more inclusive than others.

While rating systems commonly reward projects that use certified wood, they do not require any demonstration that other materials such as concrete, steel, or plastic have come from a sustainable resource.

Source: *Green Building and Wood Products*

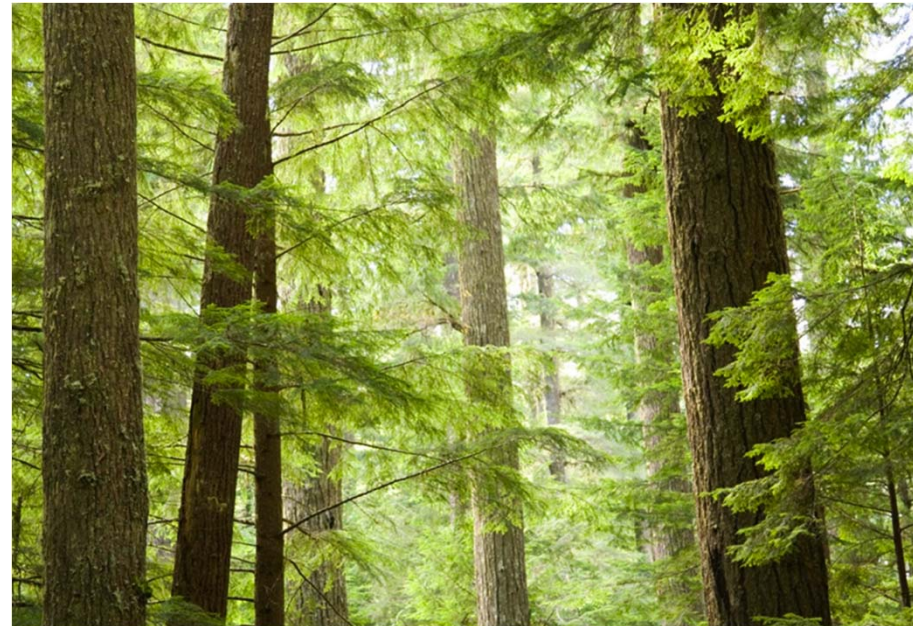


Photo: Frank Rosenstein, Courtesy of Plum Creek

Green Building Rating Systems

Life cycle impacts

Many rating systems give credits for the use of products with lower embodied energy and lifecycle carbon impacts. Wood products regularly perform well in embodied carbon comparisons of building materials.



John W Olver Design Building, Architect: Leers
Weinzapfel Associates, Photo: ©Albert Vecerka/Esto

Green Building Rating Systems

Recycled/reused/salvaged materials

Many rating systems give credits for the use of products with recycled content.

Wood products that qualify include:

- Finger-jointed studs,
- Salvaged timbers,
- Medium-density fiberboard
- Insulation board

Source: *Green Building and Wood Products*



Federal Center South, Building 1202. ZGF Architects,
Photo: Benjamin Benschneider

Green Building Rating Systems

Local material sourcing

Some systems place special emphasis on the use of local materials as an approach to reducing the environmental impacts of projects, rewarding materials sourced from within a certain radius—commonly 500 miles.

However, simply tracking transportation distances ignores such critically important factors as mode of transportation and the type, efficiency, and impacts of manufacturing processes.

Source: *Green Building and Wood Products*



Richard Woodcock Education Center, Western Oregon University. Mahlum Architecture. Photo: DR Johnson

Green Building Rating Systems

Material efficiency & waste minimization

Many rating systems reward use of lower quantities of building materials.

Credit is often awarded for avoiding or diverting construction waste—e.g., through jobsite protocols that include pre-cut packages or off-site production of building modules.

Source: *Green Building and Wood Products*



Platte 15, OZ Architecture. Photos: JC Buck

Green Building Rating Systems

Indoor air quality

Most rating systems have strict limits on the use of products that contain volatile organic compounds (VOCs). Many wood products are available that verifiably meet or exceed these guidelines.

Source: *Green Building and Wood Products*



Adohi Hall, University of Arkansas, Leers Weinzapfel Associates, Photo: Timothy Hursley; Kiara Luers

Green Building Rating Systems

Ancillary benefits of wood

Other key areas where wood may have further advantages that are currently not being considered in most of the ratings systems:

- **Acoustics** –Wood panel products are particularly useful in sound abatement and control strategies
- **New products in traditional applications** – i.e. wood fiber insulation
- **Thermal mass** – Use of wood framing in wall and roof assemblies can result in less thermal bridging

Source: *Green Building and Wood Products*



ICE Block I, RMW Architecture & Interiors, Buehler Engineering, Bernard André Photography

Wood in LEED



Point Distribution in LEED v4 & v4.1 New Construction (NC)

Credit Category	Max Points
Integrative Process	1
Location and Transportation	16
Sustainable Sites	10
Water Efficiency	11
Energy and Atmosphere	33
Materials and Resources	13
Indoor Environmental Quality	16
Innovation	6
Regional Priority	4
Total	110

Primary areas of points related to use of wood

Source: USGBC

Wood in LEED

V4 & v4.1



The use of wood products can contribute up to 12 points, accounting for more than 10 percent of LEED v4's total credits.

According to USGBC's *Industry Materials Brief on Forest Products*, the "use of wood as a building material is among the most highly incentivized strategies in LEED."



Oregon Zoo Education Center, Opsis Architecture, Photo: Christian Columbres

Source: Barbara Horwitz-Bennett & USGBC

Wood in LEED

V4 & v4.1



Specifically, wood products qualify for credits in these 5 categories:

1. Building Life-Cycle Impact Reduction (**5 points**). Materials and products with comparatively low environmental impacts fare well in v4's whole building life-cycle credit.
2. Building Product Disclosure and Optimization—Environmental Product Declarations (**2 points**). Many wood EPDs are available.
3. Building Product Disclosure and Optimization— Sourcing of Raw Materials (**2 points**). Projects can either specify wood from suppliers and manufacturers with a Corporate Sustainability Report or choose new wood products certified by the Forest Stewardship Council, Sustainable Agriculture Network or equivalent standard to contribute toward this credit.

Source: Barbara Horwitz-Bennett & USGBC

Wood in LEED

V4 & v4.1



Specifically, wood products qualify for credits in these 5 categories.

Building Product Disclosure and Optimization—Material Ingredients (**2 points**). Untreated and unfinished wood products as “inherently non-emitting sources” can contribute toward this credit.

Low-Emitting Materials (**3 points**). Untreated and unfinished wood products are also in line with this credit’s requirements.



Source: Barbara Horwitz-Bennett & USGBC

DPR Office, Architect: SmithGroup, Photo: Chad Davies

Wood in LEED

V4 & v4.1



Point Distribution in LEED v4 & v4.1 NC – Materials and Resources

0	0	0	Materials and Resources		13
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
			Credit	Building Life-Cycle Impact Reduction	5
			Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
			Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
			Credit	Building Product Disclosure and Optimization - Material Ingredients	2
			Credit	Construction and Demolition Waste Management	2

1 point in Sourcing of Raw Materials can be obtained using Certified Wood Pilot Alternative Compliance Path (ACP)

Source: USGBC

Wood in LEED

V4 & v4.1



Point Distribution in LEED v4 & v4.1 NC – Materials and Resources – ACP for Certified Wood

WHAT IS AN ACP?

An Alternative Compliance Path allows LEED projects to achieve an existing green building credit, using an alternative approach to what is specified in the existing rating tool.

An ACP pilot is used to test and work out any kinks with the new pathway. If the ACP pilot credit is adopted, it will become part of the LEED rating system.

In order to count towards a LEED point, the user must first know that:

- 100% of the forest products are from legal (non-controversial) sources, and
- 70% from responsible sources, and
- The remainder must be certified sources as evidenced by a chain of custody certification (CoC).

Generates opportunity to use wood products certified to SFI, FSC, ATFS, CSA and PEFC

Wood in LEED

V4 & v4.1



Point Distribution in LEED v4 & v4.1 NC – Indoor Environmental Quality

0	0	0	Indoor Environmental Quality	16
Y			Prereq Minimum Indoor Air Quality Performance	Required
Y			Prereq Environmental Tobacco Smoke Control	Required
			Credit Enhanced Indoor Air Quality Strategies	2
			Credit Low-Emitting Materials	3
			Credit Construction Indoor Air Quality Management Plan	1
			Credit Indoor Air Quality Assessment	2
			Credit Thermal Comfort	1
			Credit Interior Lighting	2
			Credit Daylight	3
			Credit Quality Views	1
			Credit Acoustic Performance	1

Use of wood products can contribute up to 2 points in this credit

Source: USGBC

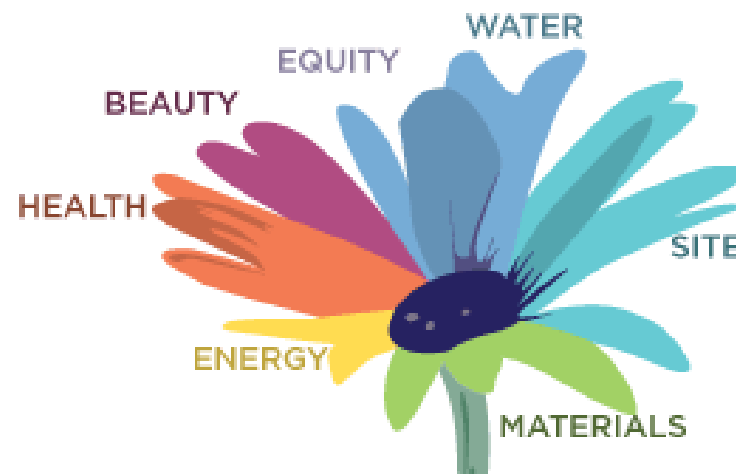
Wood in Living Building Challenge



The Living Building Challenge (LBC) is widely considered the most stringent green building standard in the world. It attempts to emulate a flower by encouraging net-zero or net-positive impact on virtually everything the built environment touches. Its requirements are categorized under seven petals:

1. Place
2. Water
3. Energy
4. Health
5. Materials
6. Equity
7. Beauty

LIVING BUILDING CHALLENGE PETALS



Source: ILFI

Wood in Living Building Challenge



Through detailed “imperatives” within each petal, LBC leaves little wiggle room. Everything is a prerequisite, unlike in LEED, where project teams can choose among credits.

MATERIALS PETAL

PETAL INTENT

10. RED LIST

11. EMBODIED CARBON FOOTPRINT

12. RESPONSIBLE INDUSTRY

13. LIVING ECONOMY SOURCING

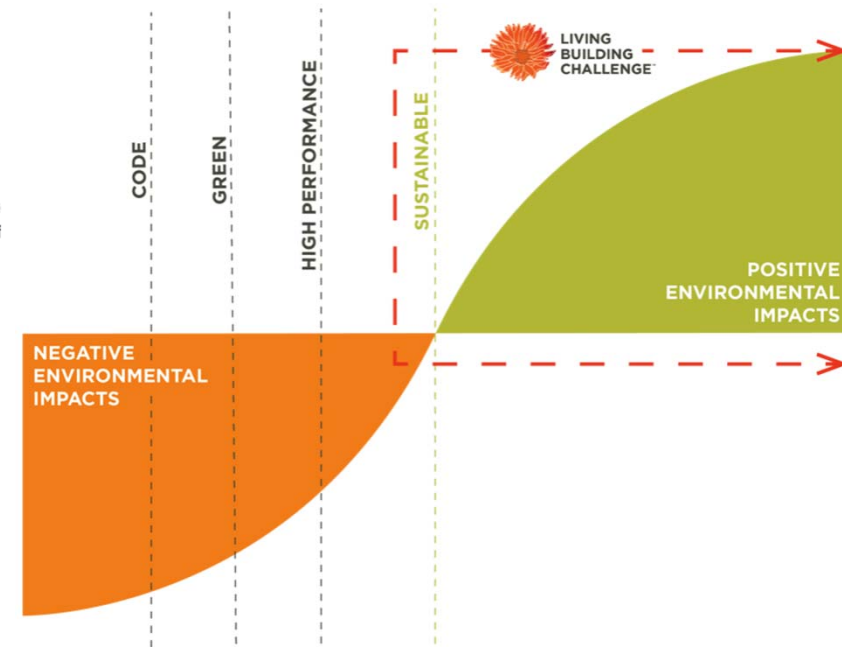
14. NET POSITIVE WASTE

10. RED LIST IMPERATIVE

There are temporary exceptions for numerous Red List items due to current limitations in the Materials Petal Handbook for complete and up-to-date listings. The project cannot contain any of

RED LIST MATERIALS OR CHEMICALS

- Alkylphenols
- Asbestos
- Bisphenol A (BPA)
- Cadmium
- Chlorinated Polyethylene and Chlorosulfonated Polyethylene



Source: ILFI

Wood in Living Building Challenge



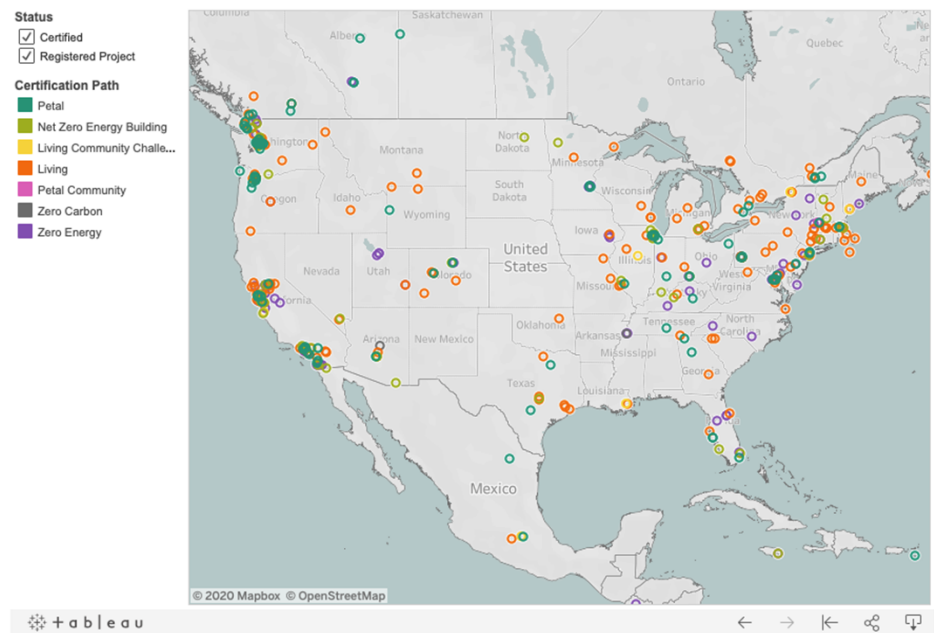
Projects can be 'Petal Certified' but can also extend to:

- Net Zero Energy Building
- Zero Carbon
- Living Community
- Petal Community

Many of the LBC petal-certified projects completed to date have implemented the use of wood and timber framing to meet the Materials Petal Imperatives

Source: ILFI

REGISTERED & CERTIFIED PROJECT MAP



Living Building Challenge Projects

Bullitt Center, Seattle, WA



- Type IV construction
- 4 stories of glulam & NLT over a 2-story podium
- 52,000 sf



Architect: Miller Hull Architects
Photos: John Stamets, Nic Lehoux



Living Building Challenge Projects

Bullitt Center, Seattle, WA

- Net Zero Building
- Goal- 250 year life expectancy
- 1st LBC Certified Office Building
- 80% Energy reductions
- PV array provides energy for building



Architect: Miller Hull Architects
Photos: John Stamets, Nic Lehoux

	Volume of wood used: 24,526 cubic feet
	U.S. and Canadian forests grow this much wood in: 2 minutes
	Carbon stored in the wood: 545 metric tons of CO ₂
	Avoided greenhouse gas emissions: 1,158 metric tons of CO ₂
	TOTAL POTENTIAL CARBON BENEFIT: 1,703 metric tons of CO ₂

EQUIVALENT TO:

Source: US EPA		325 cars off the road for a year
		Energy to operate a home for 145 years

Estimated by the Wood Carbon Calculator for Buildings, based on research by Sarthre, R. and J. O'Connor, 2010, A Synthesis of Research on Wood Products and Greenhouse Gas Impacts, FPInnovations. Note: CO₂ on this chart refers to CO₂ equivalent.

Wood in Living Building Challenge

R.W. Kern Center, Amherst, MA



- 17,000 SF
- Glulam frame with T&G decking
- The building is self-sustaining—generating its own energy, capturing its own water, and processing its own waste



Architect: Bruner/Cott & Associates
Photos: Robert Benson Photography



LCA tools for Green Building Certifications

WoodWorks Expert Tip

What **tools** are available to help designers and owners **compare** the **embodied carbon**, or **upfront greenhouse gas emissions** (GHG), of commercial or multi-family buildings designed with different structural systems in the US?

View WoodWorks Expert Tip online at:
<https://www.woodworks.org/experttip/feb-2020/>

Whole Building LCA Tools

Detailed LCA Analysis

		Acceptability for Green Building Credits/ Certificates			
WBLCA Tool	Analysis	LEED v4 credits	LEED v4.1 credits	ILFI Zero Carbon Certificate	Green Globes
Athena Impact Estimator for Buildings	Detailed robust WBLCA	Yes	Yes	Yes	Yes
Tally	Detailed robust WBLCA	Yes	Yes	Yes	Yes
One-Click LCA	WBLCA w/ regionalized generic data & global EPD library	Yes	Yes	Yes	Yes

WoodWorks LCA Expert Tip: <https://www.woodworks.org/experttip/feb-2020/>

Natural Wood Material

Biophilic Design



Biophilic Design Patterns

Nature in the Space

	Pattern	Stress Reduction	Cognitive Performance	Emotion, Mood & Preference
Nature in the Space	Visual Connection w/ Nature	✓	✓	✓
	Non-Visual Connection w/ Nature (smell, touch)	✓	✓	✓
	Non-Rhythmic Sensory Stimuli	✓	✓	
	Thermal & Airflow Variability	✓	✓	✓
	Presence of Water	✓	✓	✓
	Dynamic & Diffuse Light	✓		
	Connection w/ Natural Systems			✓

Source: Terrapin Bright Green: *14 Patterns of Biophilic Design*, 2014

How Might Wood Buildings Contribute to Biophilic Design?

Nature in the Space

	Pattern	
Nature in the Space	Visual Connection w/ Nature	Design opportunity (glazing/ courtyards)
	Non-Visual Connection w/ Nature (smell, touch)	Smell & touch – might the soft wood feel & wood scent contribute?
	Non-Rhythmic Sensory Stimuli	Design opportunity (biomimicry)
	Thermal & Airflow Variability	Wood is a living material & can help control temperature & humidity
	Presence of Water	Design opportunity (water features)
	Dynamic & Diffuse Light	Design opportunity (timber slats)
	Connection w/ Natural Systems	Wood buildings support healthy forests

Source: Conversations and emails between Bill Browning (Terrapin Bright Green) and Melissa Kroskey (WoodWorks)

Biophilic Design Patterns

Natural Analogues

Nature of the Space

	Pattern	Stress Reduction	Cognitive Performance	Emotion, Mood & Preference
Natural Analogues	Biomorphic Forms & Patterns			✓
	Material Connection w/ Nature		✓	✓
	Complexity & Order	✓		✓
Nature of the Space	Prospect	✓	✓	✓
	Refuge		✓	
	Mystery			✓
	Risk/ Peril			✓

Source: Terrapin Bright Green: *14 Patterns of Biophilic Design*, 2014

How Might Wood Buildings Contribute to Biophilic Design?

Natural Analogues

Nature of the Space

	Pattern	
Natural Analogues	Biomorphic Forms & Patterns	Design opportunity (symbolic patterns)
	Material Connection w/ Nature	Wood material connects us w/ nature
	Complexity & Order	Wood grain pattern – might it stimulate our senses?
Nature of the Space	Prospect	Design opportunity (distant views – atriums/ open offices)
	Refuge	Design opportunity (quiet spaces in an office warmed w/ wood)
	Mystery	Design opportunity (open wood screens)
	Risk/ Peril	Design opportunity (view down @ atrium)

Source: Conversations and emails between Bill Browning (Terrapin Bright Green) and Melissa Kroskey (WoodWorks)

Material Connection to Nature (visual)

Biophilic Pattern

- Wood is a natural material – timber is sourced from trees in our forests.
- Exposing natural materials provides a connection to nature in this biophilic pattern



First Tech Credit Union
Hacker

Material Connection to Nature (non-visual)

Biophilic Pattern

Other sensory connections to nature:

- Soft feel of wood – might this contribute to this biophilic pattern?
- Smell of wood in offices- might this contribute to this biophilic pattern?
- Smell of wood has surprised some designers who didn't consider it in design



Albina Yard
LEVER Architecture | Photo: LEVER Architecture

Material Connection with Nature

Biophilic Pattern

- Wood can be used as an extension of the outside environment to the interior



Washington Fruit & Produce Co.
Graham Baba Architects | Photo: Kevin Scott

Visual Connection with Nature

Biophilic Pattern

- Bringing nature inside the building & providing views outside



Federal Center South, Bldg 1202
ZGF Architects LLP | Photo: Ben Benschneider



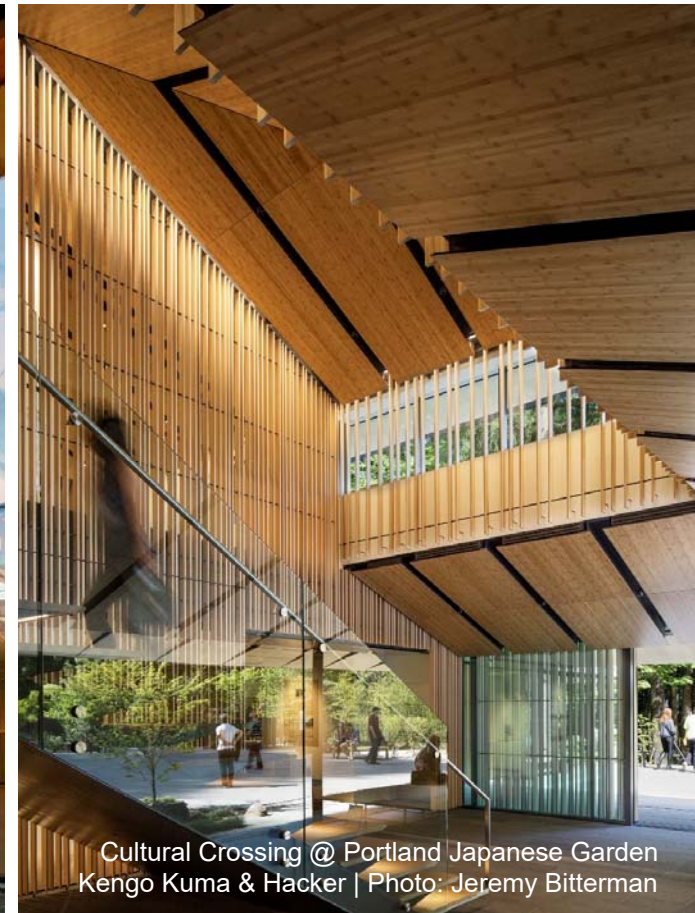
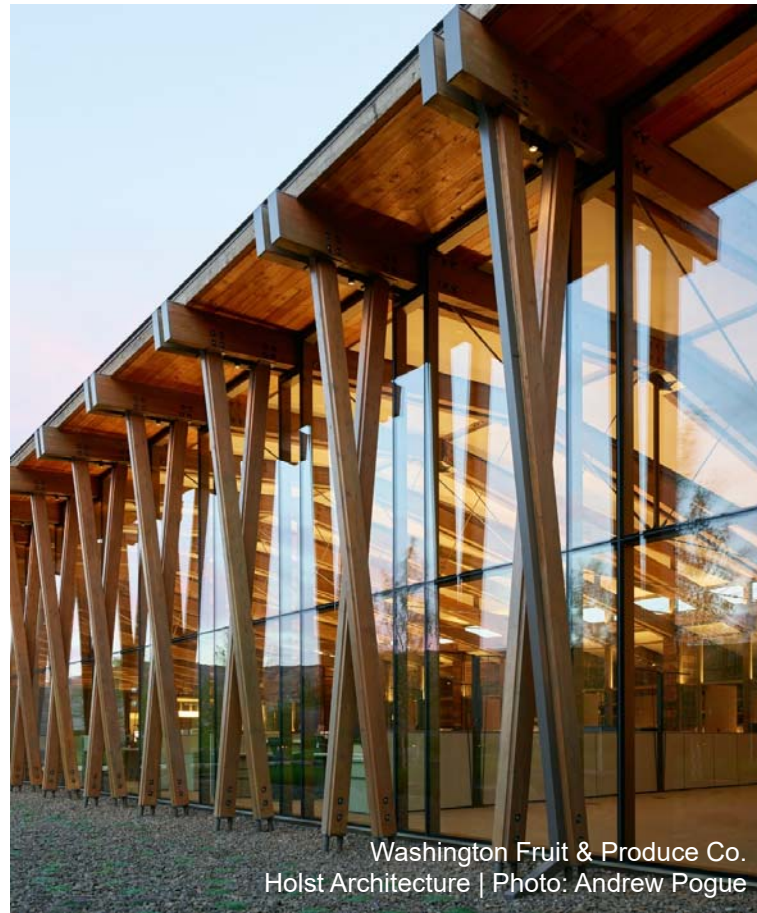
Promega Feyman Center, "The Crossroads" | Uihlein-Wilson
Architects | Photo: Aitor Sanchez/LeWingCole

Complexity & Order

Biophilic Pattern

- Rich sensory information w/ a spatial hierarchy similar to those in nature.

* Source: *14 Patterns of Biophilic Design*, Terrapin Bright Green, 2014 (includes list of testing citations)



Office Buildings Biophilic Design



Wellness + Wood = Productivity

Workplaces

“Those in workplaces with a higher proportion of **visible wood** **feel more connected to nature** and rate their working environment far more positively.”

These people report:

- lower stress levels
- higher concentration
- improved overall mood

“**Wood** in the workplace is associated with **higher productivity** and **reduced sick leave.**”

Report based on survey of 1,000 typical Australians working indoors



A report prepared for
Forest & Wood Products Australia*
by Andrew Knox,
Howard Parry-Husbands,
Pollinate**
February 2018

Pollinate



First Tech Credit Union | Image: Hacker

Natural Materials for Warm Gathering Spaces

Amenity Spaces

- Modern amenities battle: Spaces for informal collaboration are in demand
- Amenities provide a place to recharge & interact
- Connection to nature proven most impactful through outdoor access*
- Connection to nature indoors through materials & views is beneficial*

* Source: *14 Patterns of Biophilic Design*, Terrapin Bright Green, 2014 (includes list of testing citations)



Employee Retention

Healthy Building/ Biophilia

Cost of losing an employee
(assume: \$33/ hr):

\$ 1,000 termination

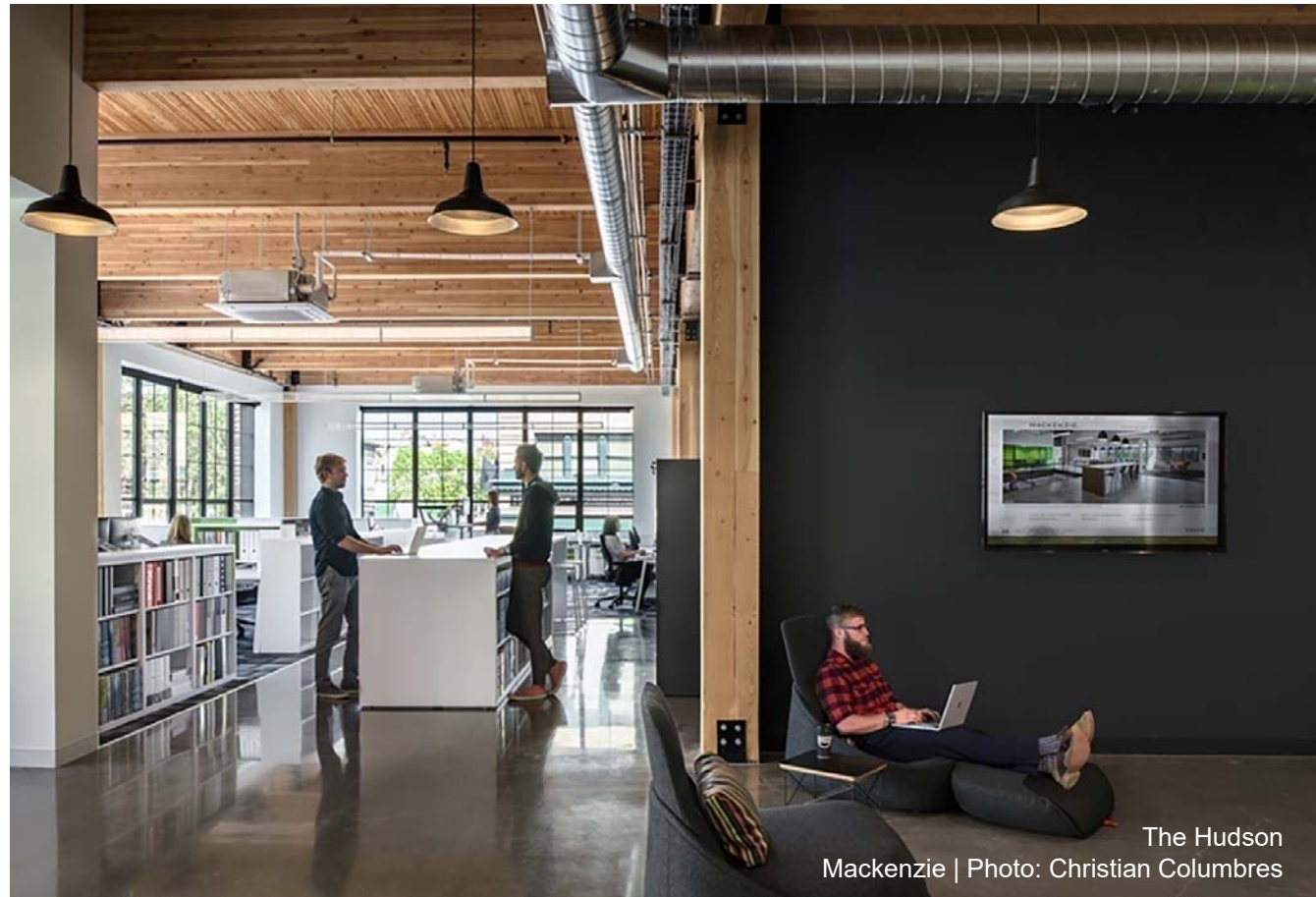
\$ 9,000 replacement

\$15,875 lost productivity

\$25,875 total

Sources by Terrapin Bright Green:

- *Economics of Biophilia*, 2012
- *14 Patterns of Biophilic Design*, 2014
(includes list of testing citations)



The Hudson
Mackenzie | Photo: Christian Columbres

Tech Companies Invest in Healthy Corporate Campuses

Microsoft Silicon Valley Campus



Microsoft Campus | Image: WRNS Studio

Connecting with Nature & Targeting Environmental Goals

Microsoft Silicon Valley Campus



Microsoft Campus | Images: WRNS Studio

Questions?

This concludes The American
Institute of Architects Continuing
Education Systems Course

Jeff Peters, CGC, PE
SE Regional Director, WoodWorks
Jeff.Peters@woodworks.org
386-871-8808

T3 Atlanta | Architects: Hartshorne Plunkard Architects, DLR Group | Photo: StructureCraft

Copyright Materials

This presentation is protected by US
and International Copyright laws.
Reproduction, distribution, display and use of
the presentation without written permission
of the speaker is prohibited.

© The Wood Products Council 2021

Disclaimer: The information in this presentation, including, without limitation, references to information contained in other publications or made available by other sources (collectively “information”) should not be used or relied upon for any application without competent professional examination and verification of its accuracy, suitability, code compliance and applicability by a licensed engineer, architect or other professional. Neither the Wood Products Council nor its employees, consultants, nor any other individuals or entities who contributed to the information make any warranty, representative or guarantee, expressed or implied, that the information is suitable for any general or particular use, that it is compliant with applicable law, codes or ordinances, or that it is free from infringement of any patent(s), nor do they assume any legal liability or responsibility for the use, application of and/or reference to the information. Anyone making use of the information in any manner assumes all liability arising from such use.