



Wood utilization II: Land use & global outlook

FCWG Learning Exchange

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Agenda

Introduction

Forests and climate mitigation

Demand-led climate solutions

Impact of wood products on climate

Mass timber and forests in the US

Knowledge gaps

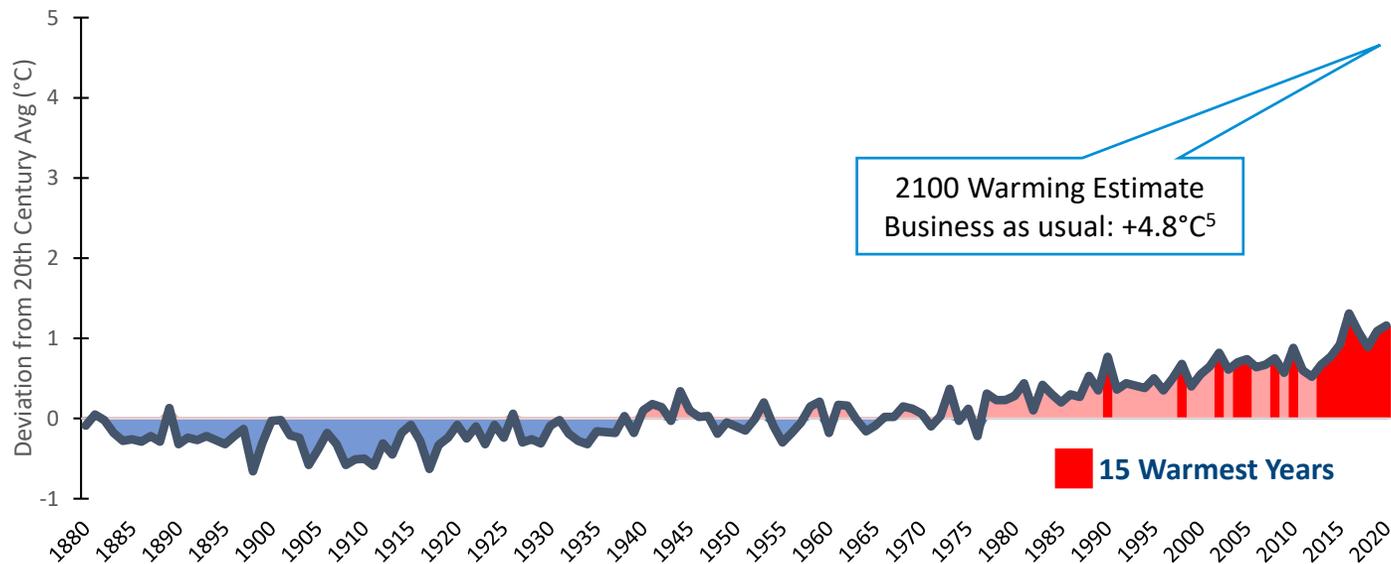
What can we do now?

Climate Change: The world's most urgent challenge

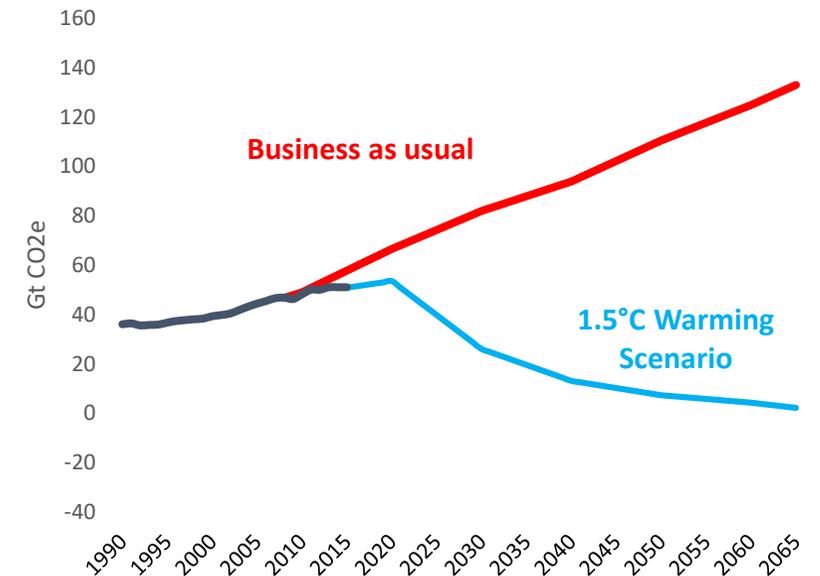
Business-as-usual warming projected to severely impair the global economy and cause irreversible damage to natural systems¹

- The world is on track to surpass a 1.5°C rise in global temperatures by 2040; **2013-2019 are among the warmest years ever recorded**^{1,2}
 - Temperature rise cause by increased greenhouse gas emissions from human activity³
 - **Emissions must fall by 7.6% p.a.** through 2030 to remain below the 1.5°C mark; today we are on track to overshoot this by 38%⁴
- Business-as-usual emissions projected to cause **7.2% reduction in Global GDP** per-capita by 2100⁵; observable impacts to human and natural systems already occurring (e.g. increased frequency of heatwaves in most regions)⁶

Historic global surface temperature anomalies²



Projected global CO₂e emissions⁷



Notes: (1) Natural Climate Solutions: The Business Perspective, WBCSD; (2) NOAA, Global Land and Ocean Temperature Anomalies Data and TIG Analysis, 2020; (3) NASA, NOAA Analyses Reveal 2019 Second Warmest Year on Record; (4) Emissions Gap Report 2019, UN Environment Programme, NOAA/NASA – Annual Global Analysis for 2019; (5) Kahn et al, Long-Term Macroeconomic Effects of Climate Change: A Cross-Country Analysis, 2019; (6) IPCC Special Report on Global Warming of 1.5C, 2018; (7) Climate Analytics and NewClimate Institute, 2019

Growing commitments to climate action

Government, corporate and investor commitments are growing and gaining momentum

International commitments to restoration and climate mitigation

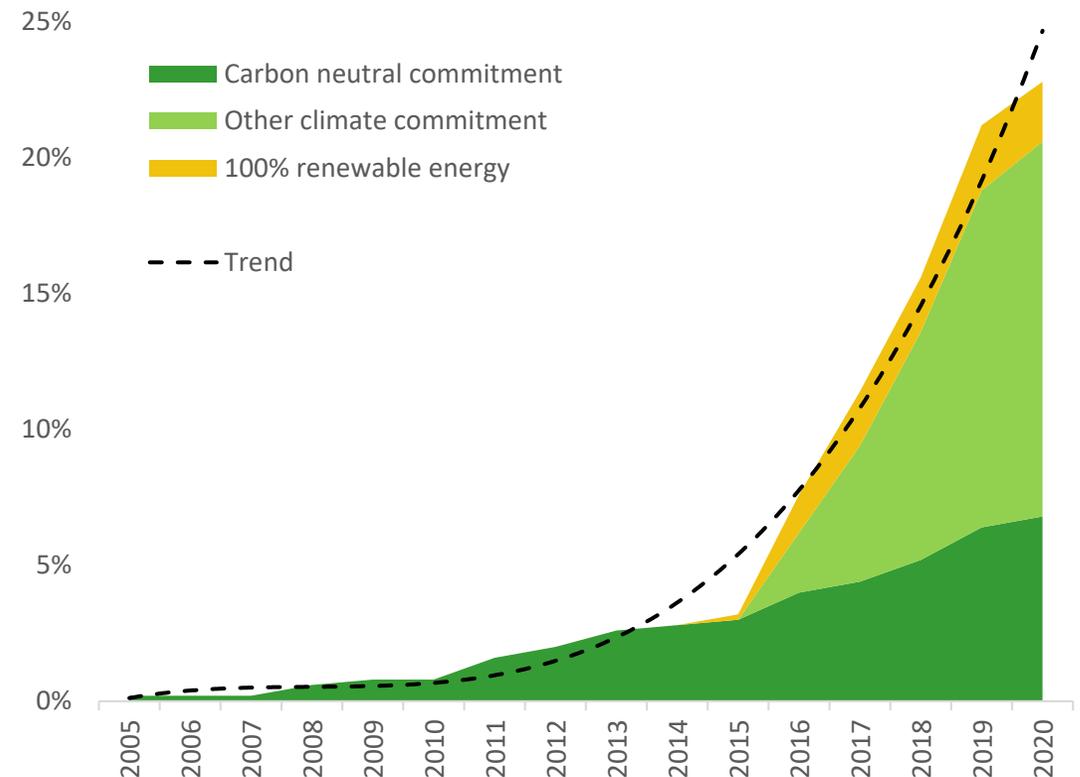
- **200+ governments, companies, others** committed to halving deforestation and restoring 865M acres of forests by 2030¹
- 189 countries committed to **limit warming to 2°C**²

Large investor and corporate commitments to climate mitigation

- US\$ 4.6T in AUM committed to **net-zero emissions by 2050**³
- **23% of global Fortune 500** committed to reduce/eliminate emissions by 2030⁴

Example Commitments	
Large Emitters	BP committed to net-zero by 2050 or sooner ⁵ ; Shell committed to reduce carbon-intensity of products by 65% by 2050 ⁶
Technology Companies	Microsoft committed to be net negative by 2030 ⁷ ; Amazon committed to be net neutral by 2040 ⁸
Pension funds	CalPERS, Nordea Life and Pension, PensionDanmark committed to net-zero emissions across their portfolios by 2050 ³

23% of the Global Fortune 500 have committed to reduce or eliminate emissions by 2030⁴



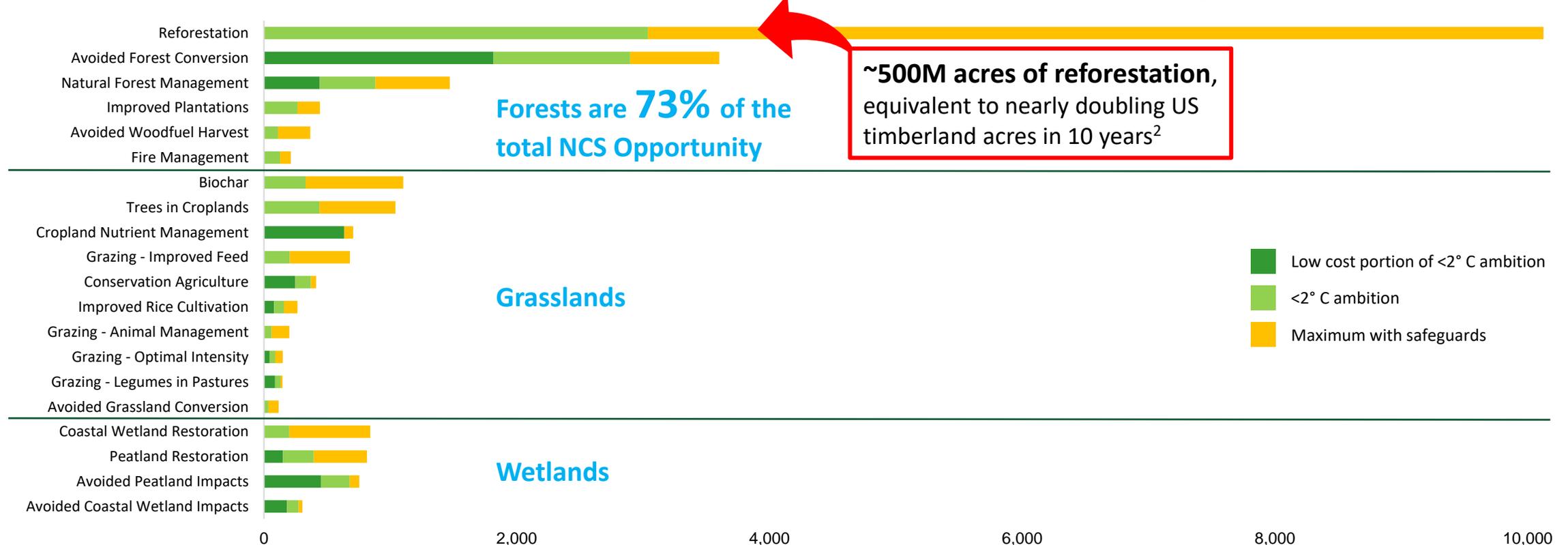
Notes: (1) Commitments under the New York Declaration on Forests and the Bonn Challenge; (2) United Nations Climate Change, Paris Agreement - Status of Ratification, 2020; (3) United Nations Finance Initiative, UN-convened Net-Zero Asset Owner Alliance; (4) Natural Capital Partners. September 2019. Deeds not words: The Growth of Climate Action in the Corporate World; (5) BP sets ambition for net zero by 2050, fundamentally changing organization to deliver, 2020; (6) What is Shell's Net Carbon Footprint Ambition?, 2020; (7) Microsoft will be carbon negative by 2030, 2020; (8) Amazon, Committed to a sustainable future, 2020.

Natural Climate Solutions (NCS)

Natural climate solutions are 30% of the solution, 10% of the conversation, and only 3% of the finance¹

- Better management of forests, grasslands, and wetlands can provide significant climate benefits through sequestration and avoided emissions¹
- Reforestation offers the single greatest opportunity to deliver climate mitigation at the landscape level¹

Potential contribution of the land sector to climate change mitigation through 2030 (millions of tCO₂e per year)²

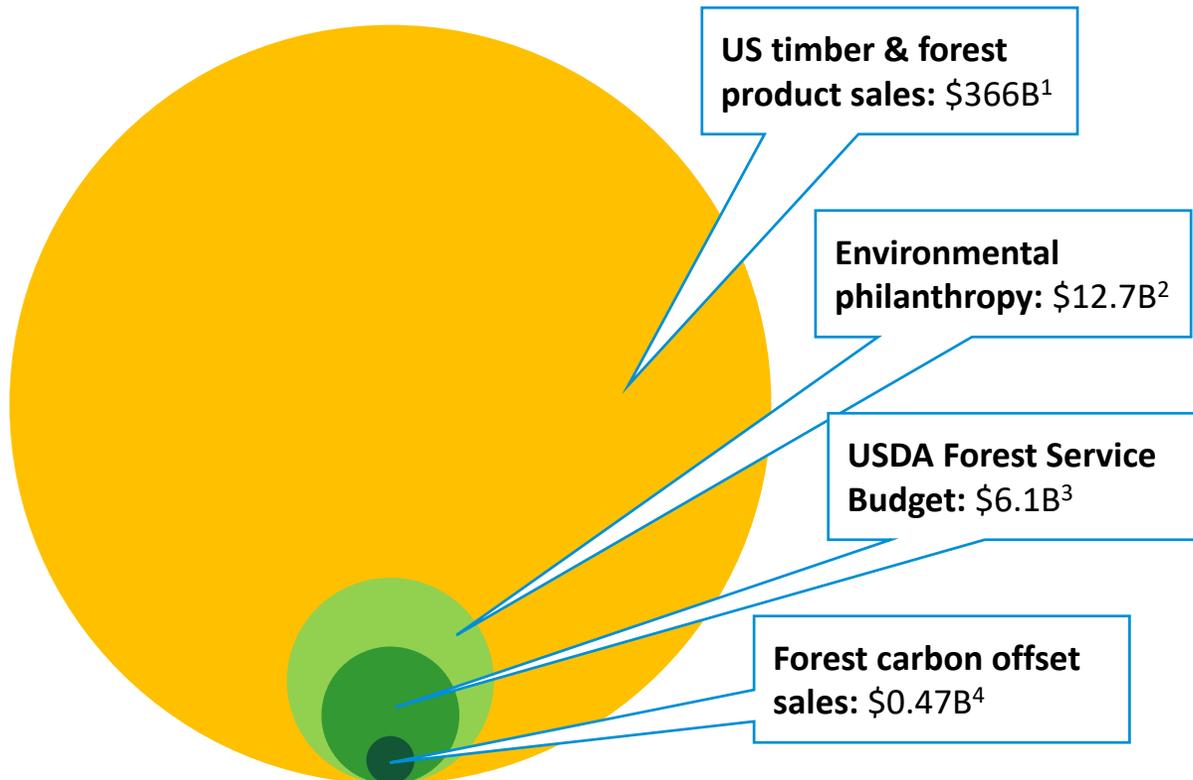


Notes: (1) Nature4Climate (www.nature4climate.org), as of May 2020; (2) Griscom et al. 2017. Natural climate solutions. Proceedings of the National Academy of Sciences. 114(44): 11645–11650. (2) Oswalt, Sonja N.; Miles, Patrick D.; Pugh, Scott A.; Smith, W. Brad. 2018. Forest Resources of the United States, 2017: a technical document supporting the Forest Service 2020 RPA Assessment. Gen. Tech. Rep. WO-GTR-97. Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office. xxx p.

The role of demand-led climate strategies

Markets can provide sustained economic incentives for action on the ground

Potential sources of funding for forest-related NCS



Multiple climate impacts of forest products

Sequestration



Storage



Substitution



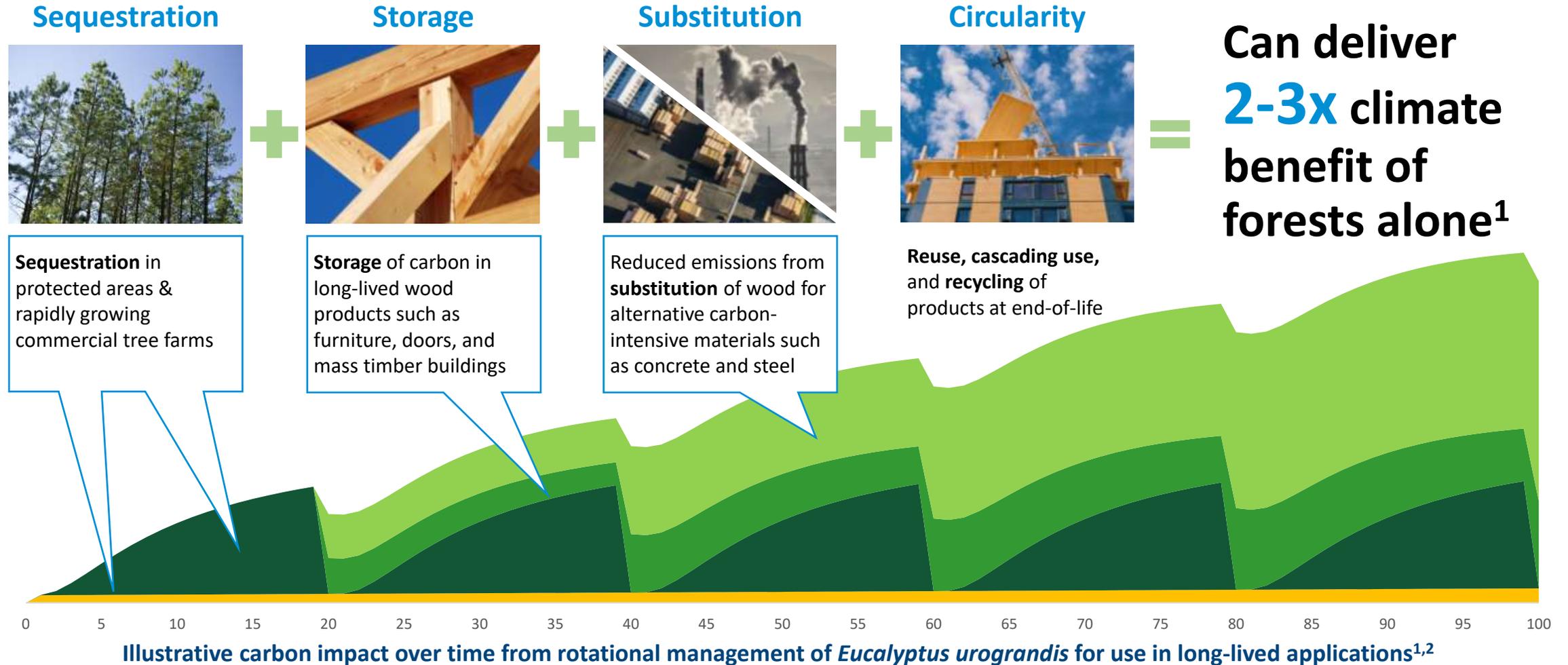
Circularity



Notes: (1) Value for all timber sales and manufacturing shipments, 2016 data, source: Forest2Market "The Economic Impact of Privately-Owned Forests in the 32 Major Forested States", April 4, 2019; (2) Giving USA 2019, [www. https://givingusa.org/giving-usa-2019-americans-gave-427-71-billion-to-charity-in-2018-amid-complex-year-for-charitable-giving/](https://givingusa.org/giving-usa-2019-americans-gave-427-71-billion-to-charity-in-2018-amid-complex-year-for-charitable-giving/), accessed on 5/29/2020; (3) Congressional Research Service, In Focus, Forest Service: FY2019 Appropriations and FY2020 Request. 2 pages. April 4, 2019; (4) Includes all California ARB offsets issued in 2019 (source: ARB Offset Credit Issuance Table, through May 26, 2020, <https://ww3.arb.ca.gov/cc/capandtrade/offsets/issuance/issuance.htm>, accessed on 5/29/2020) at a weighted average price of \$14.13 / tCO₂e (Source: World Bank Group, State and Trends of Carbon Pricing 2020) and global total voluntary forest offset sales in 2018 (Source: Ecosystem Marketplace, State of the Voluntary Carbon Markets, 2019); Image sources: Getty Images, Pollux Chung © / construction by Seagate Structures.

Potential benefits of using wood in construction – illustrative example

Sustainable forest management and production of climate-positive forest products can multiply the carbon impact of reforestation



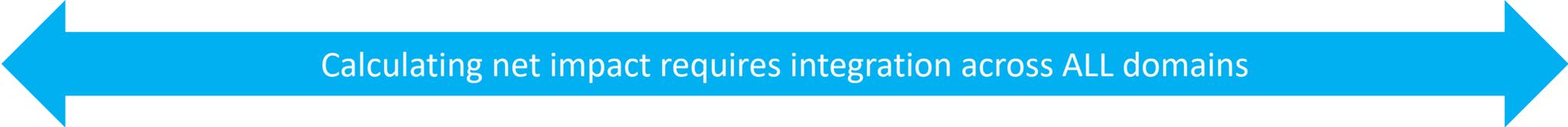
Notes: (1) Sources: "Substitution Effects of Wood-based Products in Climate Change Mitigation", Leskinen et. al, 2018, TIG Analysis; (2) TIG Analysis based on 18 year Eucalyptus sawlog rotation in Brazil; Image sources: Getty Images, Pollux Chung © / construction by Seagate Structures.

What is the impact of wood utilization on climate?

Forest products can have multiple impacts on climate



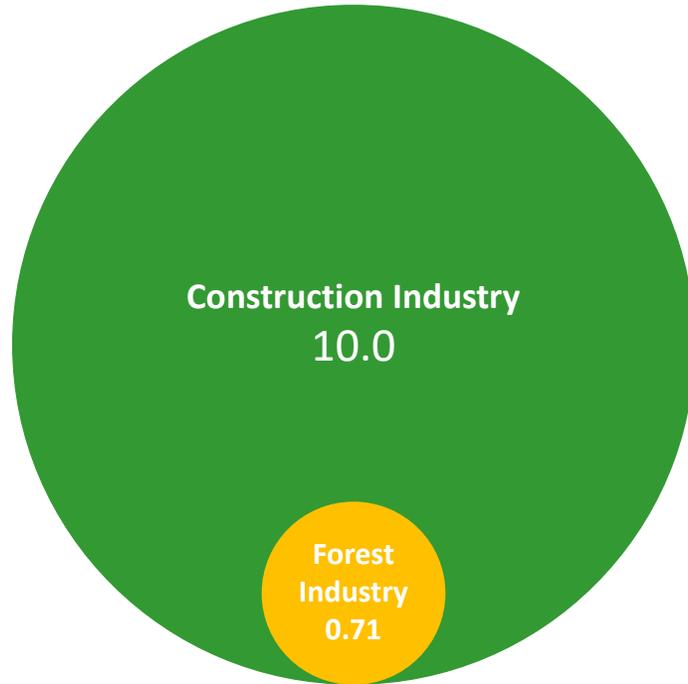
- Climate benefit
- No net impact
- Climate detriment



Why focus on wood in construction?

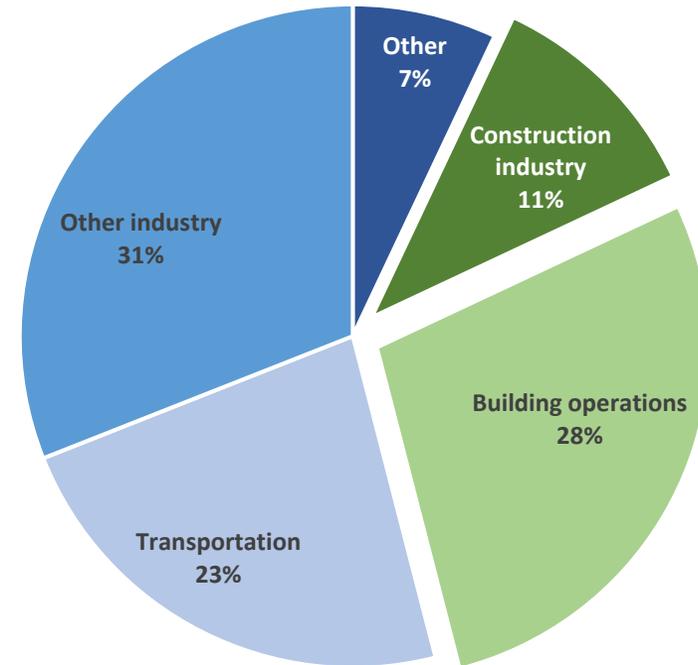
The construction sector is huge, growing fast, and generates more emissions than transportation or industry

Global industry size (US\$ trillions p.a.)^{2,3}



- Global construction industry is c. 14x the forest industry⁴
- Drives activity in every municipality across the globe

Global CO₂e Emissions (2018)¹



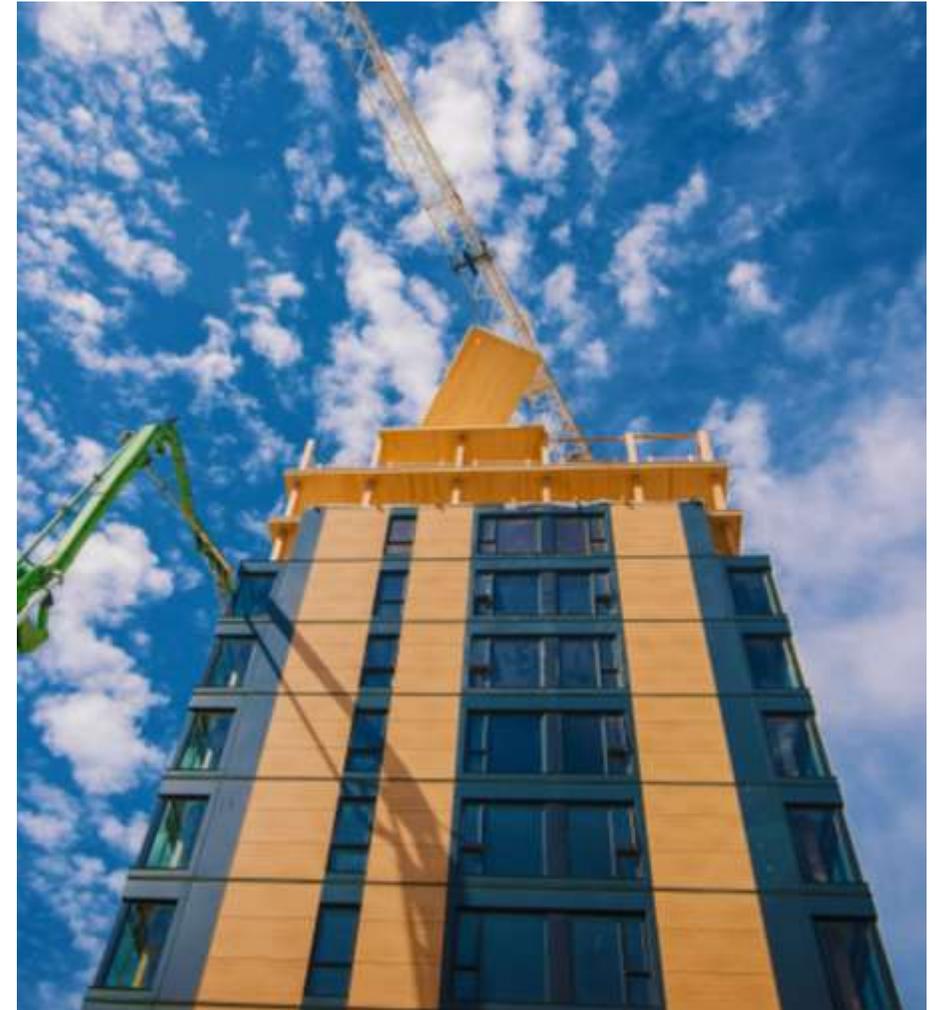
- Buildings are c. 39% of global emissions¹
- Global floor area projected to double by 2050¹

Notes: (1) Global Alliance for Buildings and Construction, International Energy Agency and United Nations Environment Programme, 2019. Global status report for buildings and construction: Towards a zero-emission, efficient and resilient buildings and construction sector, 41 pages.; (2) McKinsey Global Institute, 2017. Reinventing construction: a route to higher productivity. 168 pages.; (3) FAO, 2014. State of the world's forests. 133 pages and World Bank (data.worldbank.org, accessed April 21, 2020); (4) TIG analysis.

Mass timber

New engineered wood products that allow construction of tall buildings with wood

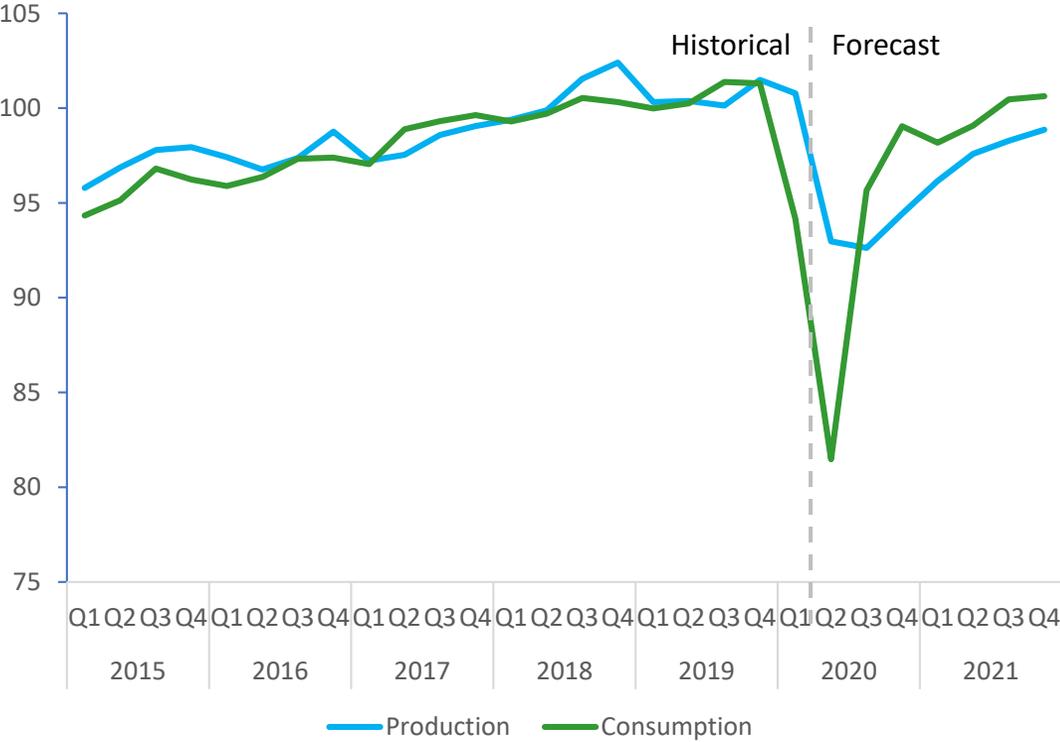
- Engineered wood products (cross-laminated timber (CLT), glued laminated timber (Glulam), mass plywood, others) used as structural beams and panels for construction of buildings up to 18 stories (under the IBC 2021 revision)
- Most mass timber is made from layering structural lumber (2x6's, 2x8s, etc.) to make larger structural elements
- Mass timber uses softwood lumber, the same species groups used for light-timber frame construction



Is demand for wood products good for forests?

What is the impact of marginal demand change

Global production and consumption of liquid fuels, 2015-2021
(millions of barrels per day)¹

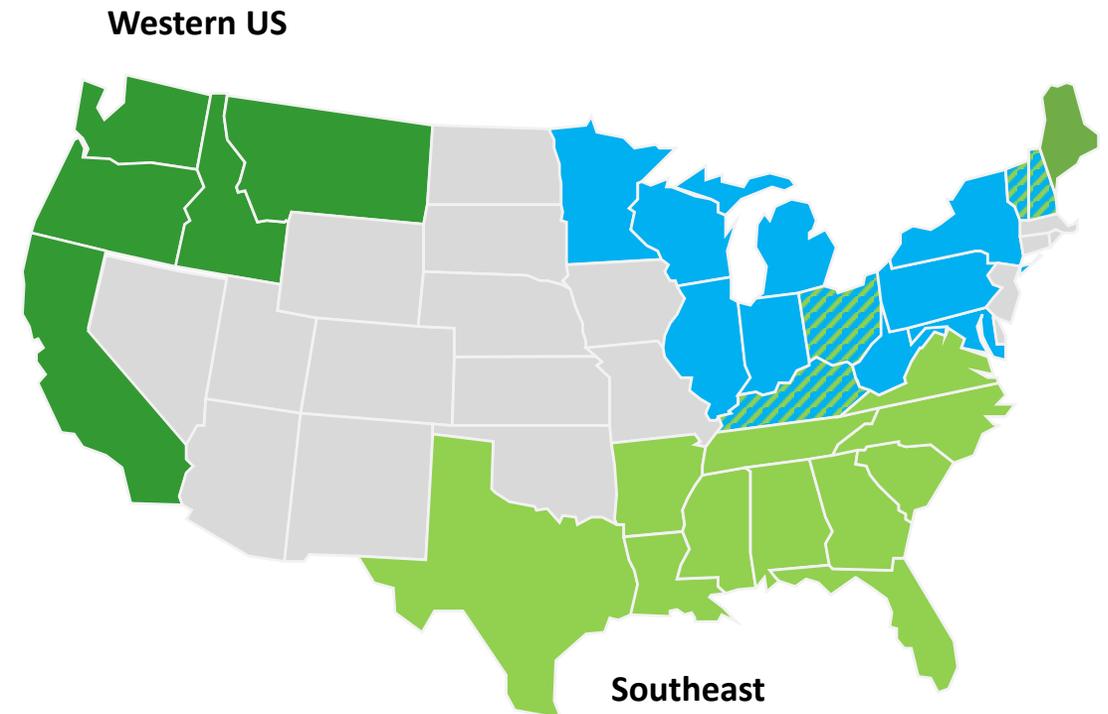


Notes: (1) US Energy Information Agency Short-term Energy Outlook, May 2020; Images from Getty Images, used under license.

Where does the wood in mass timber come from (US example)?

Almost half the world's industrial roundwood comes from planted forests¹

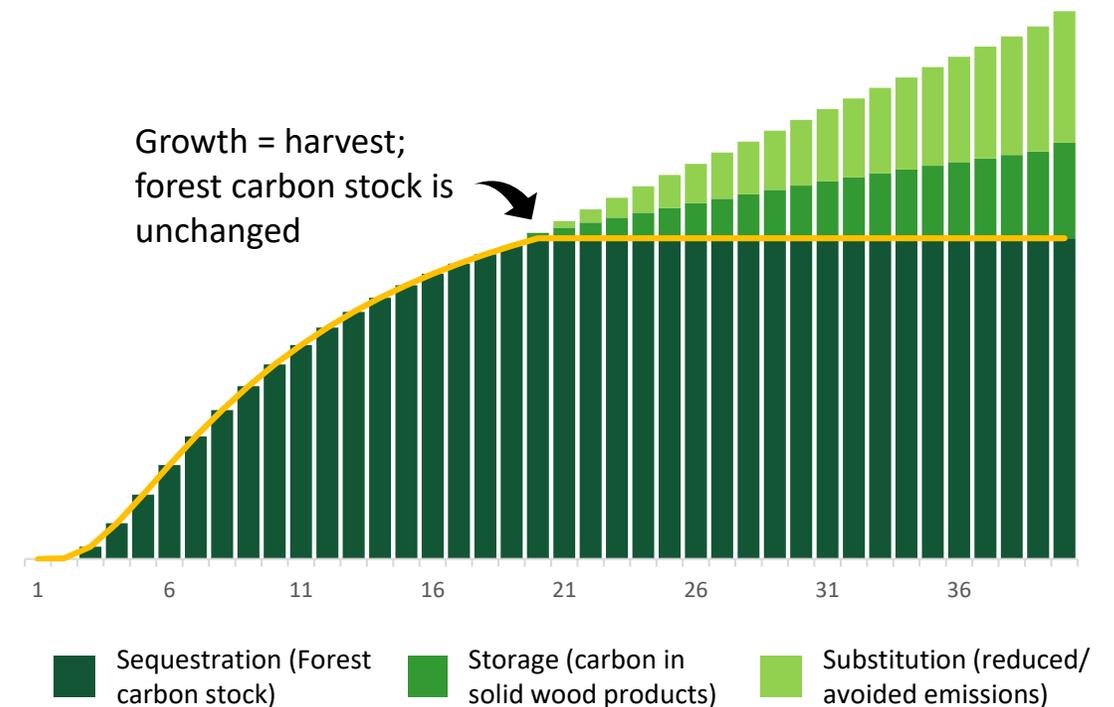
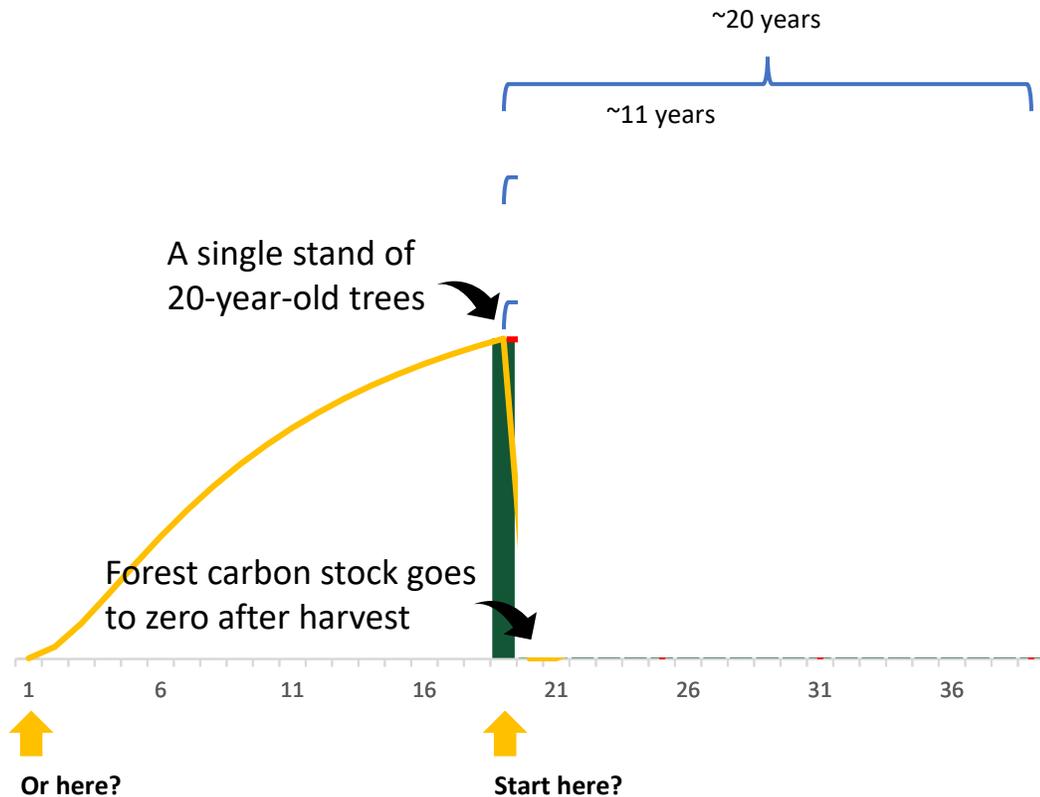
- 89% of US timber harvest is from private land²
- Timber doesn't come from National Parks or other protected areas
- USDA National Forest System²
 - 19% of US forestland, 4% of total US harvest
 - Harvest declined 80% from 1987-2017
- Mass timber is made from softwood lumber (needle-leaved trees, e.g. pine, spruce, fir, etc.)
- Globally, this means subtropics, temperate and boreal regions; mass timber is not made from tropical rainforest species or other hardwoods
- 63% of US softwood lumber comes from the southeast, which has 71% of the US planted forest; 29% comes from the west (including Rockies, West Coast and Alaska)²



What is the impact of harvest on forest carbon stock?

“Carbon debt”: Harvest always reduces the carbon stock of the stand that was harvested

But what if I have 20 stands of trees, and I harvest and replant one each year?



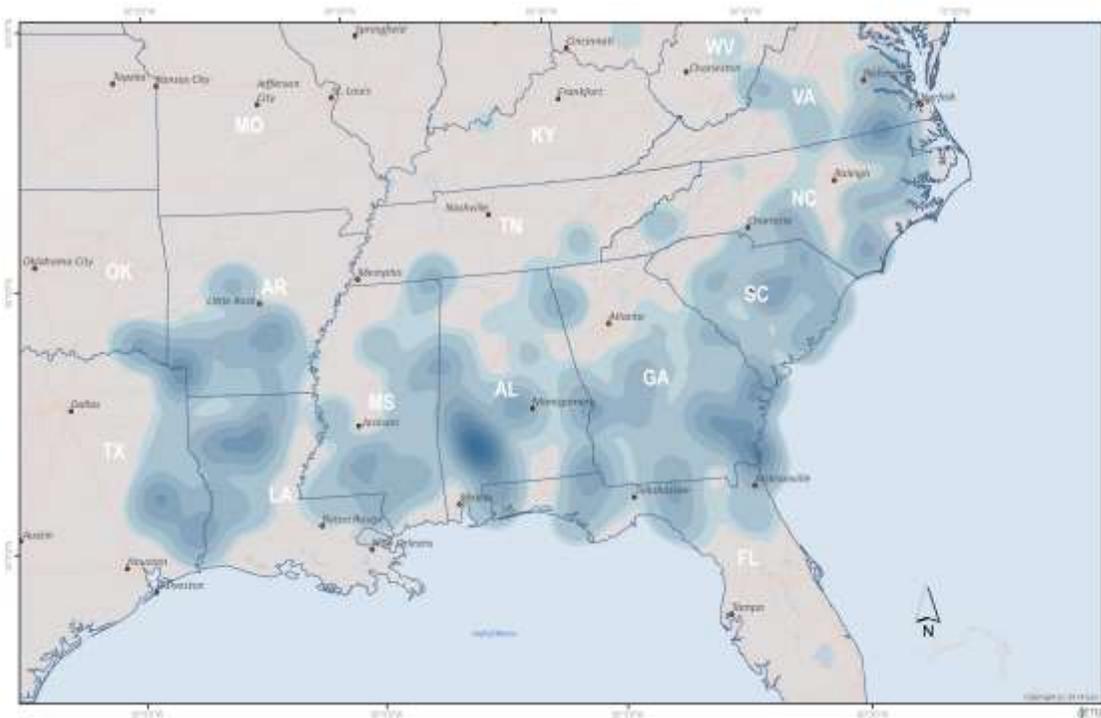
Notes: TIG Analysis; illustrative example only. Different species, sites, forest types, product mixes, and other factors will yield different results.

The view from a sawmill

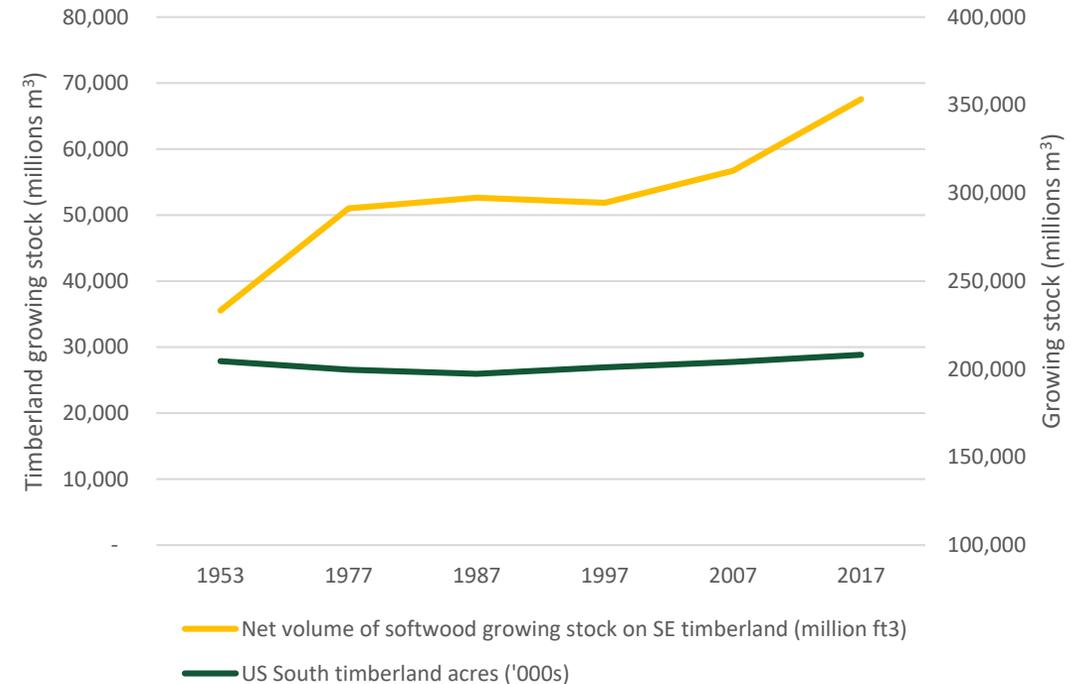
Most businesses require fairly steady flows of inputs, outputs and revenues

- Recent assessment of the US Southeast concludes that **removals** (e.g. harvested volume) have “**strong, positive, statistically significant correlation with acres, inventory and growth...** and explain 65 to 90% of the variance in [these variables]”¹

Mill demand heatmap (lumber, panel, pellet, pulp), US Southeast²



US south timberland growing stock (millions m³) and acres ('000s)³

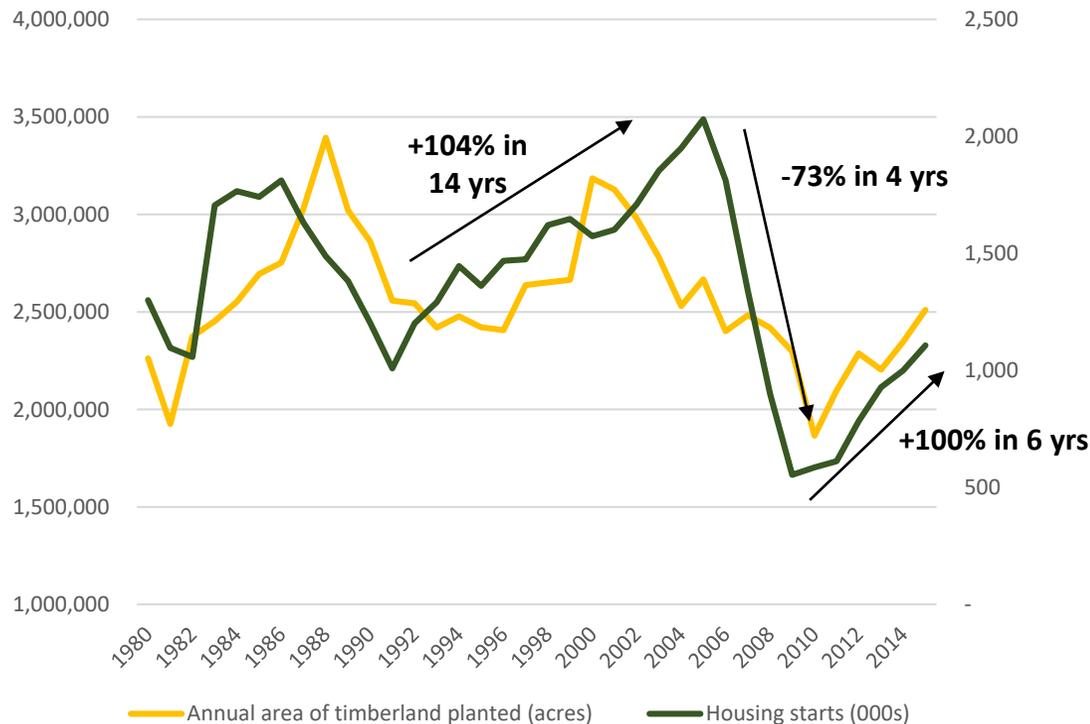


US timberland and housing starts, 1980-2015

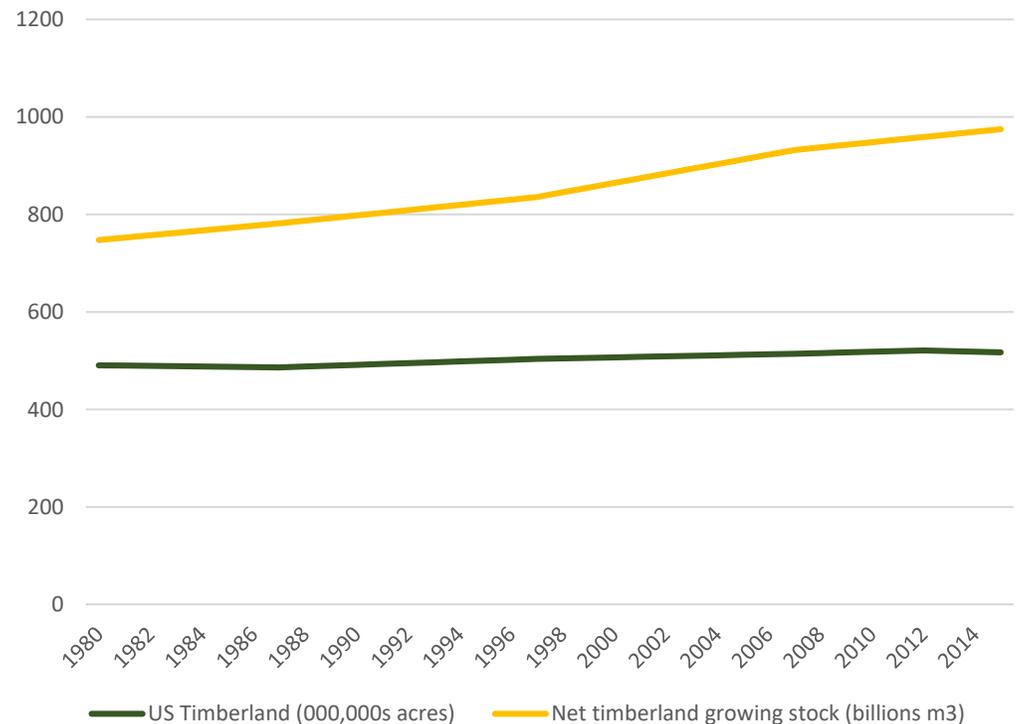
65% of US sawn softwood is used for construction¹; US timberland area is stable, and stock is increasing²

- Recent assessment of the US Southeast concludes that **removals** (e.g. harvested volume) have “**strong, positive, statistically significant correlation with acres, inventory and growth...** and explain 65 to 90% of the variance in [these variables]”³

US Housing starts (thousands) and timberland acres planted^{2,3}



US timberland acres (millions) and growing stock (billions m³)³



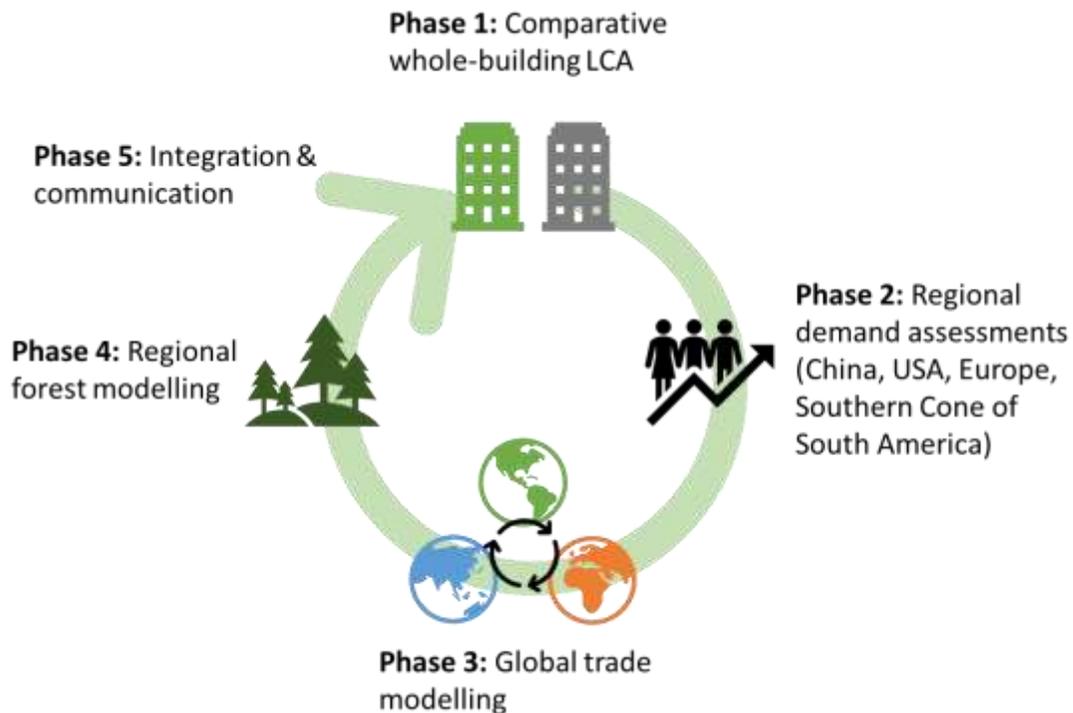
Sources: (1) Howard, James L.; McKeever, David B.; Liang, Shaobo. 2017. U.S. Forest Products Annual Market Review and Prospects, 2013–2017. Research Note FPL–RN–0348. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 11 p; (2) U.S. Census Bureau, U.S. Department of Housing and Urban Development, Oswald; (3) Sonja N.; Miles, Patrick D.; Pugh, Scott A.; Smith, W. Brad. 2018. Forest Resources of the United States, 2017: a technical document supporting the Forest Service 2020 RPA Assessment. Gen. Tech. Rep. WO-GTR-97. Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office. xxx p.

What gaps do we need to fill?

Better tools for understanding the marginal impact of utilization on forests

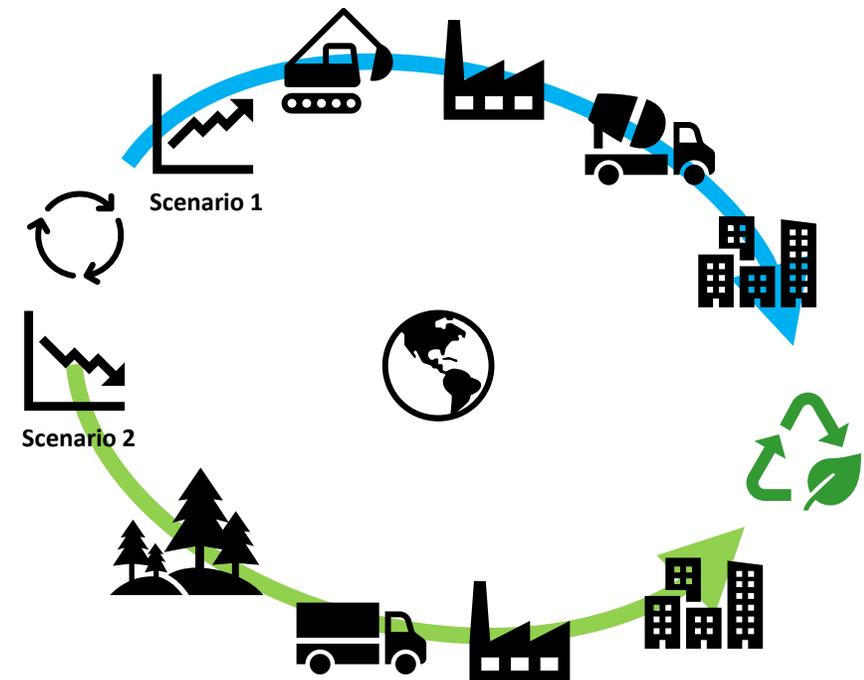
Global assessment of the impact of mass timber on climate and forests

- Led by The Nature Conservancy, in collaboration with more than two dozen researchers on 4 continents



“3-S” framework (sequestration, substitution, storage, end-of-life) to integrate impacts from the forest to end-of-life

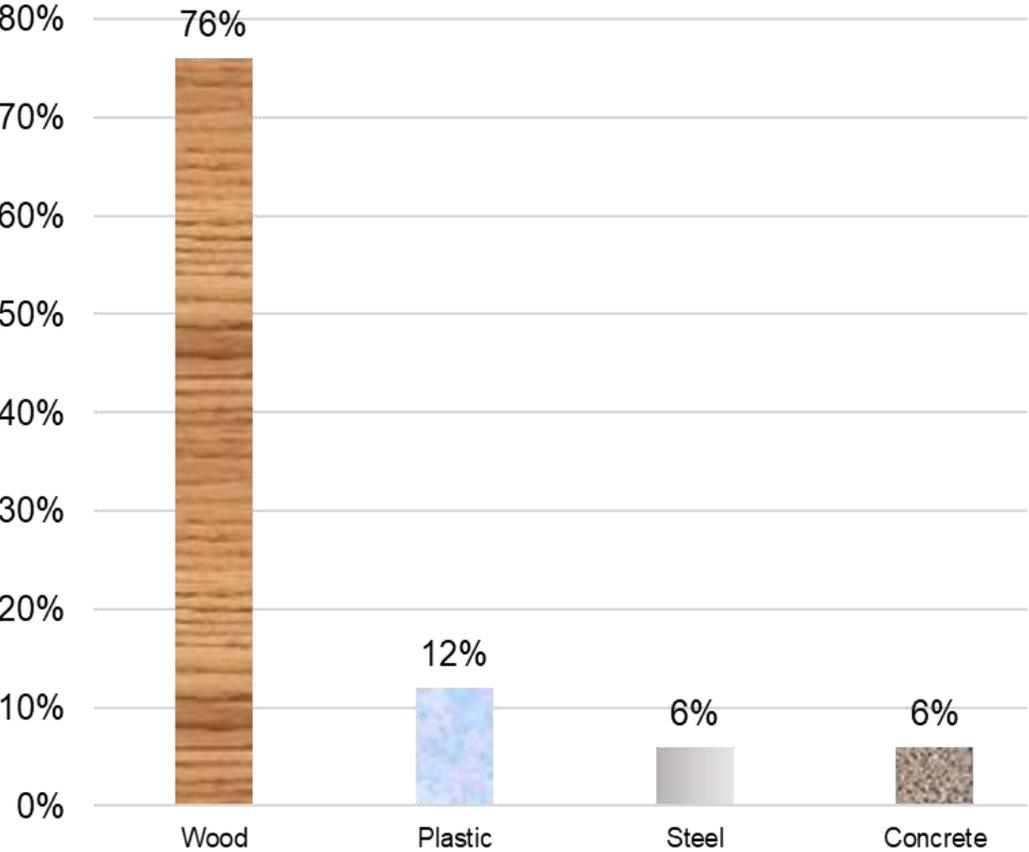
- Led by EIT Climate-KIC, World Resources Institute, The Nature Conservancy and collaborators



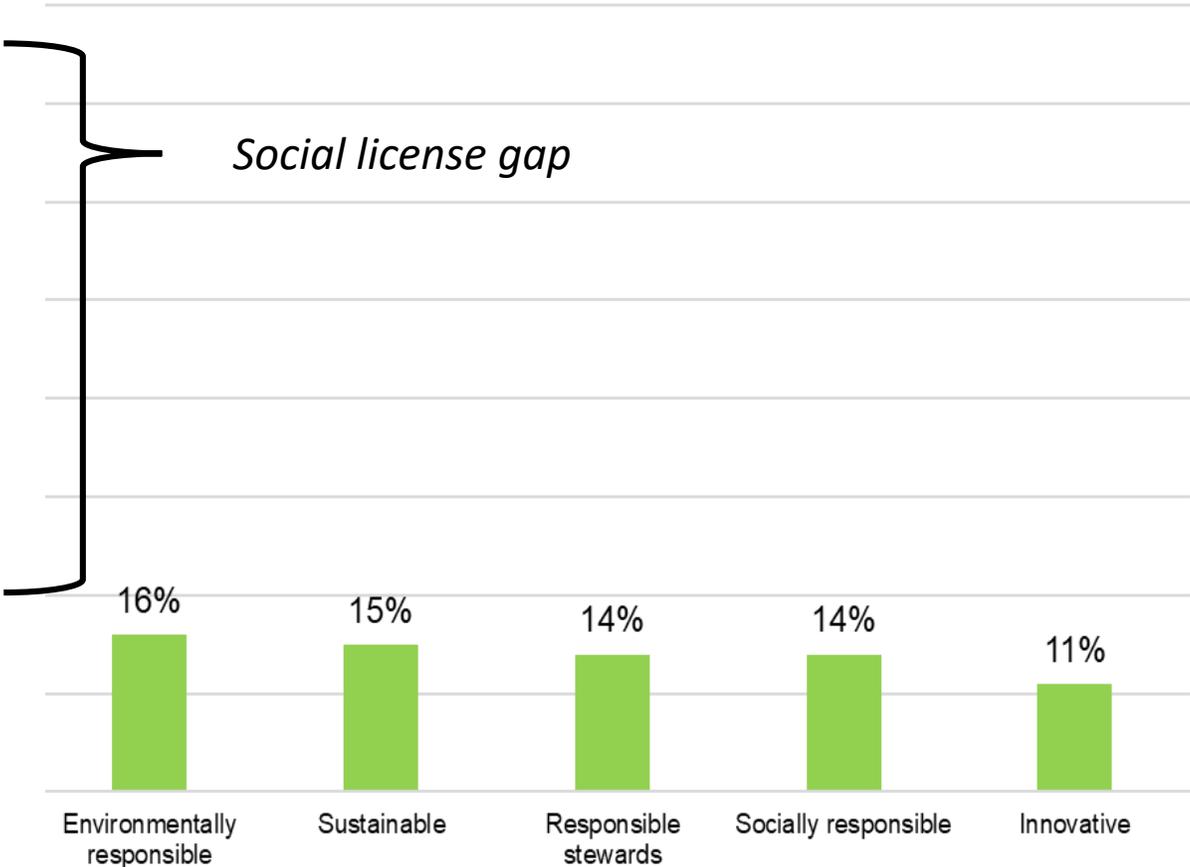
Social license

Forest products still gaining acceptance as a climate solution

Which is the most renewable material?¹



Does this phrase describe the forest sector?¹



Notes: (1) Source: 2017 Stakeholder Perceptions Survey conducted by Ideas in Focus on behalf of the North American Forest Partnership. Survey of 1,300 environmentally aware adults in North America.

How can we ensure positive outcomes now?

Responsible practices build social license

1. **Develop tools that integrate impacts across domains** to enable the design of policies that are good for climate, forests and people
2. **Forest industry** can take tangible, positive action to earn greater social license
3. **Take aggressive action now** to favor climate-positive wood utilization, applying two precautionary principals:
 - **Precautionary principal 1:** To qualify as climate-positive, wood should be harvested from **sustainably managed forests**:
 - In accordance with all applicable laws and regulations
 - In accordance with local community rights and interests
 - No conversion of forest type, no conversion of forest to other uses
 - Reforestation / restocking follows harvest
 - Streams, wetlands, other HCV sites are protected
 - *Note: Most certification standards account for these criteria, but most US forests aren't certified - though many are sustainably managed*
 - **Precautionary principal 2:** To qualify as climate positive, wood should be sourced from **wood baskets that have stable or increasing forest area & carbon stock**

“Timber Takeover

France mandates public buildings be built with at least 50 percent timber”

- Archpaper.com, February 11, 2020¹

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