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 systems

- 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
  - Temperature rise cause by increased greenhouse gas emissions from human activity
  - 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%
  - Business-as-usual emissions projected to cause 7.2% reduction in Global GDP per-capita by 2100; observable impacts to human and natural systems already occurring (e.g. increased frequency of heatwaves)

Historic global surface temperature anomalies

Projected global CO₂-e emissions

Natural Climate Solutions (NCS)

Natural climate solutions are 30% of the solution, 10% of the conversation, and only 3% of the finance\(^1\)

- Better management of forests, grasslands, and wetlands can provide significant climate benefits through sequestration and avoided emissions\(^1\)
- Reforestation offers the single greatest opportunity to deliver climate mitigation at the landscape level\(^1\)

Potential contribution of the land sector to climate change mitigation through 2030 (millions of tCO\(_2\)e per year\(^2\))

- **Forests are 73% of the total NCS Opportunity**
- **Grasslands**
- **Wetlands**

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

- US timber & forest product sales: $366B\(^1\)
- Environmental philanthropy: $12.7B\(^2\)
- USDA Forest Service Budget: $6.1B\(^3\)
- Global forest carbon offset sales: $0.47B\(^4\)

Multiple climate impacts of forest products

- Sequestration
- Storage
- Substitution
- Circularity

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

**Sequestration** in protected areas & rapidly growing commercial tree farms

**Storage** of carbon in long-lived wood products such as furniture, doors, and mass timber buildings

**Substitution** of wood for alternative carbon-intensive materials such as concrete and steel

**Circularity**
- Reuse, cascading use, and recycling of products at end-of-life

Can deliver **2-3x** climate benefit of forests alone¹

Illustrative carbon impact over time from rotational management of *Eucalyptus urograndis* for use in long-lived applications¹,²

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.
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 350M hectares of forests by 2030\(^1\)
- **189 countries** committed to **limit warming to 2°C**\(^2\)

Large investor and corporate commitments to climate mitigation

- **US$ 43T in AUM** committed to net-zero emissions by 2050\(^3\)
- **23% of global Fortune 500** committed to reduce/eliminate emissions by 2030\(^4\)

**Example Commitments**

<table>
<thead>
<tr>
<th>Category</th>
<th>Commitment Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Emitters</td>
<td>BP committed to net-zero by 2050 or sooner(^5); Shell committed to reduce carbon-intensity of products by 65% by 2050(^6)</td>
</tr>
<tr>
<td>Technology Companies</td>
<td>Microsoft committed to be net negative by 2030;(^7) Amazon committed to be net neutral by 2040(^8)</td>
</tr>
<tr>
<td>Pension funds</td>
<td>CalPERS, Nordea Life and Pension, PensionDanmark committed to net-zero emissions across their portfolios by 2050(^3)</td>
</tr>
</tbody>
</table>

Why focus on wood in construction?

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

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

- Buildings are c. 39% of global emissions
- Global floor area projected to double by 2050

Global industry size (US$ trillions p.a.)

- Construction Industry: 10.0
- Forest Industry: 0.71

Global CO₂e Emissions (2018)

- Construction Industry: 11%
- Building operations: 28%
- Transportation: 23%
- Other industry: 31%
- Other: 7%

Trillions of dollars have recently committed to net zero

NCS offers one of the few opportunities to offset net emissions – but the investible opportunity is small

<table>
<thead>
<tr>
<th>Net-zero asset manager commitments¹</th>
<th>Institutional AUM in timberland²</th>
<th>Institutional AUM in real estate³</th>
</tr>
</thead>
<tbody>
<tr>
<td>US$43,000 billion</td>
<td>US$ 49 billion</td>
<td>US$10,200 billion</td>
</tr>
</tbody>
</table>

The second challenge of scale: In the next 5-10 years trillions of dollars may need to flow into an asset class that has absorbed less than $100B in the last 30 years

What is the impact of wood utilization on climate?

Forest products can have multiple impacts on climate:

<table>
<thead>
<tr>
<th>Positive</th>
<th>Neutral</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sequestration</strong>&lt;br&gt;(forest carbon stock)&lt;br&gt;Reforestation&lt;br&gt;Longer rotations</td>
<td><strong>No net change in forest carbon stocks</strong></td>
<td><strong>Shorter rotations</strong>&lt;br&gt;Degradation &amp; deforestation</td>
</tr>
<tr>
<td><strong>Storage</strong>&lt;br&gt;(carbon in materials)&lt;br&gt;Carbon stored in products for short-long periods</td>
<td><strong>No storage</strong>&lt;br&gt;(carbon emitted immediately)</td>
<td><strong>N/A</strong></td>
</tr>
<tr>
<td><strong>Substitution</strong>&lt;br&gt;(production emissions)&lt;br&gt;Fewer emissions than functionally equivalent alternative materials</td>
<td><strong>Emissions equal to functionally equivalent alternatives</strong></td>
<td><strong>Emissions exceed those of functionally equivalent alternatives</strong></td>
</tr>
<tr>
<td><strong>Circularity</strong>&lt;br&gt;(end-of-life)&lt;br&gt;Materials can be reused multiple times, or in cascading uses</td>
<td><strong>Building demolished; materials may be ground, separated, and reused/recycled</strong></td>
<td><strong>Anaerobic decomposition w/o methane capture</strong></td>
</tr>
</tbody>
</table>

Calculating climate benefit or detriment requires integration across ALL domains.
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
Where does wood come from?

Planted forests are 7% of total global forest area\(^1\) and 49% of global wood production (as of 2013)\(^2\)

- Global area of planted forests increased by 33% from 2000-2015\(^1\)
- Planted forests often established for specific products and markets; one study identified rise in timber net returns as the most important factor driving the increase in forest areas in the United States between 1982 and 1997\(^3\)

- Reforestation should:
  - Comply with all applicable laws and regulations
  - Include FPIC, execute in accordance with community rights and interests, and provide local benefit
  - Exclude conversion of natural ecosystems or forest types, or conversion of forest to other uses
  - Integrate commercial production and other positive ecological/social impacts
  - Reforest / restock following harvest
  - Protect streams, wetlands, ecologically sensitive areas, areas of high ecological or cultural value
  - Apply other appropriate sustainability standards (forest certification standards, BMPs)

Social license

Forest products still gaining acceptance as a climate solution

Which is the most renewable material?¹

<table>
<thead>
<tr>
<th>Material</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood</td>
<td>76%</td>
</tr>
<tr>
<td>Plastic</td>
<td>12%</td>
</tr>
<tr>
<td>Steel</td>
<td>6%</td>
</tr>
<tr>
<td>Concrete</td>
<td>6%</td>
</tr>
</tbody>
</table>

Does this phrase describe the forest sector?¹

- Environmentally responsible: 16%
- Sustainable: 15%
- Responsible stewards: 14%
- Socially responsible: 14%
- Innovative: 11%

Social license gap

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.
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