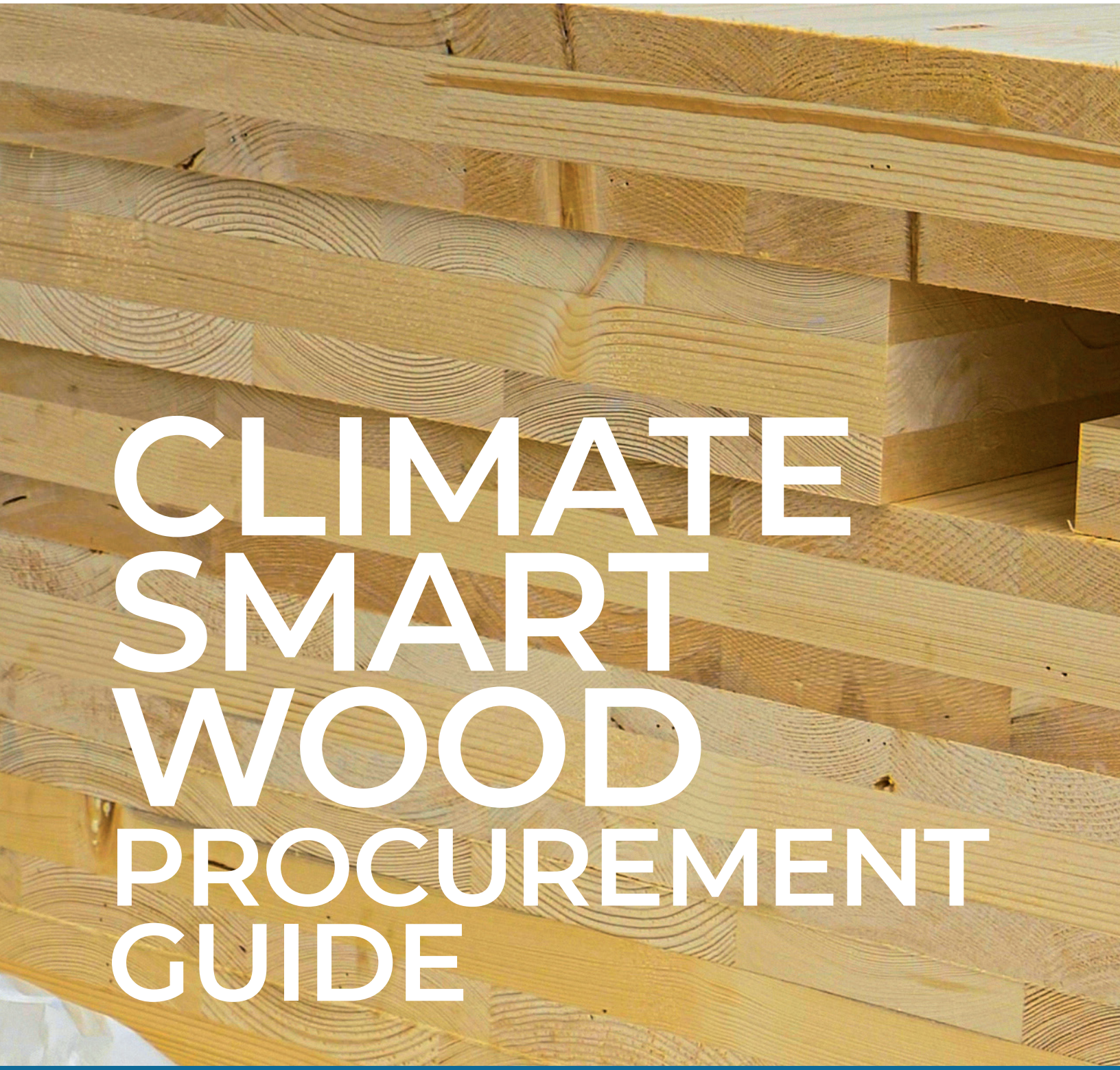
CLIMATE SMART WOOD GROUP



CLIMATE SMART WOOD PROCUREMENT GUIDE

Options for procuring climate-smart wood

This initial draft is designed to engage people in discussion.

If you would like to learn more about the Climate Smart Wood Group and get involved - including opportunities to refine these documents - please visit our website.

www.climatesmartwood.net

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TABLE OF CONTENTS

INTRODUCTION

The Climate Smart Wood Group (CSWG) is dedicated to helping the North American construction industry procure wood products – including mass timber and other products – that are Climate Smart. Climate Smart Wood (CSW) products are those that stem from, or otherwise support, Climate Smart Forestry, as well as recycled / reclaimed / salvaged wood.

This guidance builds from the CSWG's working definition of Climate Smart Forestry (CSF): forestry that "increases forest resilience in the face of climate change and sequesters and stores more carbon over time compared to conventional practices".

In the future, this guidance will be supplemented with additional tools and resources in support of the information now provided.

SECTION 1: TRACEABILITY & TRANSPARENCY

Encouraging transparency within the forest industry and improving the traceability of forest products are vital to the goals of promoting CSF and rewarding companies and forest managers who go the extra mile to supply CSW. These two terms are defined as follows:

- Traceability: The ability to track backwards from an end product up its supply chain to its origin
- Transparency: The disclosure of information about both the supply chain and origin. In the forest industry, there are two main components (see below for detail)
    - Supply chain mapping
    - Disclosure of relevant information about the source forest or forests

1.1 Why It's Important

Traceability and transparency enable a direct connection between projects and the people and forests that produce the wood products used in buildings. The insight that grows from this connection enables building projects to identify willing partners and opportunities to link the wood in buildings to specific environmental, equity, and economic outcomes, as illustrated by the case studies in Section 4. It requires communication, trust and relationship-building between project teams, fabricators, mills, and landowners. Such relationships are among the key reasons traceability and transparency are important. In pilot projects conducted to date, they have clarified needs, identified what is possible for each partner, and elevated the broad set of values represented by forest managers and managed forests.

In addition, traceability and transparency are necessary to link specific products to specific forestry operations practicing CSF. Section 2 of this guidance presents a number of different options for sourcing CSW or otherwise supporting CSF. Each of these rely on different degrees of traceability and transparency. Procurement options that don't require them are

generally more established and easier to exercise, but tend to be more indirect in their support of CSF. Procurement options that require traceability and transparency call for new and innovative ways to engage the supply chain and can strengthen claims of directly supporting landowners who are practicing CSF.

1.1a Summary of the Benefits of Traceability & Transparency:

- Enables a deeper connection to the people and forests that produce the wood products in our buildings
- Helps meet clients' Environmental Social Governance (ESG) goals and illuminates the full range of possibilities available to meet individual project goals. Builds understanding and potential to elevate the CSF, community, conservation and equity opportunities that align with client values
- Creates conditions for project teams (particularly contractors) to develop deep supply chain relationships. These relationships help reduce cost and supply chain risk related to material availability and build networks contractors can leverage to secure future project bids
- Creates conditions among wood product suppliers for a "race to the top" when it comes to the provision of climate benefits as companies vie for advantage in a growing market for CSW and CSF
- Can more directly bring into procurement evaluations the climate impacts of shipping mass timber products over long distances

1.2 Why It's Hard

While traceability and transparency are important, achieving them is challenging in many circumstances. One major reason is mixing within the supply chain: it is very common for wood to be mixed at different stages of manufacturing and distribution. To take cross-laminated timber as an example, starting at the forest and working down:

- A logging contractor takes ownership of standing trees after winning a timber sale or is contracted by a landowner to harvest timber. After felling, timber is cut to length, often sorted, and sold to buyers interested in each specific species and grade;
- In some instances, logs are not sold directly to mills but instead go to concentration yards that buy timber from numerous landowners and/or logging contractors and do further sorting;
- Sawmills procure logs from a variety of sources (e.g., forest owners, logging contractors, and concentration yards) and deck them in the log yard, sorting by species, grade, and length. Logs are pulled for manufacture into lumber in batches focused on yield or production of target dimensions and grade, often making it difficult to tie an individual board to a specific source;[1]
- In some cases, sawmills sell lumber (graded lamstock) direct to CLT manufacturers while in others lumber is sold to wholesale distributors who sell whole units (banded or packaged lots) to CLT fabricators or pull material from different units of lumber in inventory to fill an order;

[1] Note, however, that mills that focus on cutting higher grade lumber track individual log sources more often than mills focused on high production rates. For this reason, beams and wood used for lamstock offer a better opportunity for projects asking for segregation of logs from specific landowners than do mills cutting for standard dimensional lumber markets;

- CLT manufacturers either custom purchase lamstock for specified projects or buy inventory of lamstock from a number of distributors and sawmills.[2] Units from different suppliers are not often mixed but production rarely tracks input material origin in a way that can be shared with customers.

1.2a Additional challenges:

- There is no one-size-fits-all approach to cultivating traceability/transparency and there is a lack of consistent asks from owners and the AEC community (this guidance is intended to change that!)
- Requires additional time and planning up front
- Some pathways require a lot more effort than others, depending on context
- Requirements that add labor or other costs need to add value to the material or otherwise be compensated for, before industry will adopt them
- Secrecy, resistance and inertia throughout the supply chain -- for competitive reasons, it is typical for supply chain actors to closely guard information about their sources

For all these reasons, project teams should be prepared to invest in traceability/transparency and to reward suppliers for their cooperation, particularly when extraordinary efforts are needed.

1.3 Information Gathering

When gathering information on traceability and transparency, the project team can use, among other resources, the CSWG Questionnaire to obtain information important for decisions on CSW procurement. NOTE: the questionnaire is under development and will be available to project teams in 2023.

The Questionnaire should be tailored to suit any values and goals that have been developed for the project (see Section 3, Decision Point 1 below) as well as the procurement option(s) under consideration. The CSWG Questionnaire addresses the following elements:

- Traceability
- Transparency
    - Source forest disclosure
    - Supply chain mapping
- Avoidance of Unacceptable Sources
- Information on why the source is Climate Smart. Where wood is sourced from specific forests, this should include information on how the operation(s) are implementing CSF per the CSWG definition.

1.3a Traceability

Suppliers are asked about their capacity and willingness to provide information that allows for product traceability. Traceability is the ability to track backwards from an end product up

[2] Custom purchase of lamstock happens more frequently for large custom orders while production from inventory occurs more frequently at mills fulfilling smaller orders and commodity CLT dimensions. Options for custom purchase are often limited to known suppliers to reduce risks.

the supply chain to a source forest(s) with known management practices. This is linked to supply chain mapping (see below) but focuses on tracing individual products or batches of product backward through part or all of a supply chain map. A basic method for establishing traceability is through "Chain of Custody documentation": a paper trail (invoices, bills of lading, etc.) provided by the product vendor that extends as far up the supply chain as possible. This documentation should be collected, reviewed and authenticated.

Some manufacturers – particularly primary manufacturers – have sophisticated internal traceability systems that can enable accurate tracing up the value chain to forest source. In addition, there are a number of commercial digital traceability systems (e.g., Sourcemap, SupplyShift, Global Traceability) that can be used to aid traceability, but to date they are not commonly used by the North American forest products industry. Digital traceability systems are also being used by some national governments to improve law enforcement and improve revenue collection in the forest sector, but not in the US or Canada.[3] Finally, it is possible in some cases to use timber identification technologies[4] to identify the forest of origin for wood without knowing the full supply chain, but for a variety of reasons including cost and limited reference data, the use of these methods is currently uncommon. For all these reasons, the most practical way to establish traceability for wood products today is through Chain of Custody documentation.

1.3b Transparency

Supply chain mapping

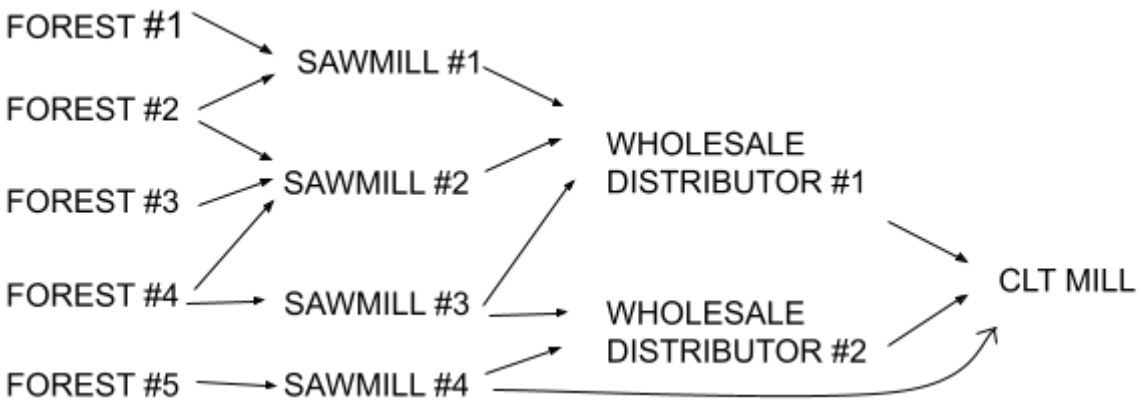
To provide transparency, suppliers can be asked to provide a schematic depiction of the supply chain links from forest(s) of origin down to the wood products they offer. If there are multiple products or source forests, there will likely be multiple supply chains. The ask for sensitive supply information is often best made by a vendor's direct customer whom they may know well and trust instead of by a project team member they are less familiar with (or in tandem). It is likely that efforts at supply chain mapping will yield some but not all forest-of-origin information.

A simple, single-source product supply chain map might look like this:

FOREST > SAWMILL > CLT MILL

[3] https://www.worldwildlife.org/pages/tnrc-topic-brief-traceability-systems-potential-tools-to-deter-illegality-and-corruption-in-the-timber-and-fish-sectors
[4] https://globaltimbertrackingnetwork.org/users/innovative-tools-for-wood-identification/

A more complex supply chain map might look like this:



Source forest disclosure

Suppliers can be asked to disclose information about the source forest(s) for the products they offer. This will allow the project team to assess which sources best match project goals and avoid sources that don't. There are different levels and methods of disclosure:

Level 0 No Disclosure	Represents "business as usual" sourcing, where only the immediate supplier of a product is known and upstream supply chain actors such as distributors, brokers, primary mills and log concentration yards are not identified or asked for.
Level 1 Disclosure to Primary Manufacturer	The next level up is to identify which primary manufacturer(s) (e.g., lumber or veneer mill) supplied the material used in the wood product in question. Knowing the location of the primary manufacturer can allow for educated guesses as to where the source forests are located because it is generally uneconomical for logs to be hauled more than a certain distance to the mill, e.g., the great majority of logs used by a softwood sawmill may come from within a 300-mile radius. It is then possible to determine more information about which landowners are harvesting what volumes from various data sources.
Level 2 Disclosure to Supply Area	With the cooperation of primary manufacturers, it is much easier to learn about forestry practices in the supply areas[5] from which their logs are sourced. This level of disclosure provides relevant information about the forests the manufacturer's logs come from without maintaining traceability to specific landowners. This can be done in numerous ways such as: providing information about specific counties

[5] A supply area is the area surrounding the "original log buyer," where the logs used to make a product or a product's components were harvested. Original log buyers are organizations that source nearby timber directly from forest owners (e.g. log concentration yards and mills that convert logs into primary products like lumber and veneer). A supply area will typically be a circle drawn around the location of the site of the original log buyer, with the size being dictated by the maximum hauling distance of the logs.

	sourced from; providing anonymized landowner information such as landowner type; providing detailed information about harvest practices for groups of landowners; etc. This type of log purchasing information can be provided for a specific period of time, e.g., on an annual basis or narrowed to a tighter timeline covering the period during which material flowed, or will flow, into batches of lumber or other materials needed for a specific project.
Level 3 Disclosure to Specific Landowners / FMUs	Disclosure to specific landowners / forest management units (FMUs)[6] is the highest level of disclosure. This requires a primary manufacturer to provide a list of landowners / FMUs from which logs were procured during a specified time frame, making it possible to gather and assess information about the forestry practices of specific source forests. If a project goal is to directly reward the practices of one or more landowners who are practicing climate smart forestry by using their wood (see Procurement Option 4 below), this level of disclosure is necessary, along with a method to establish traceability from finished product to source.

Transparency Implementation

The three different levels of disclosure can be achieved through two primary ways. First, design teams can work with the supply chain to simply ask for information about log purchases at varying levels of detail. This can be done with the right questionnaire, architectural specification and/or a reporting template, but most importantly relies on early engagement of and careful communication with the primary manufacturer and fabricator around goals and requirements. Information could be gathered from the supply chain actors for wood used in the project; if third-party certification systems are utilized (Option 4 below) and manufacturers use credit (mass balance) systems, teams can also ask for the same kinds of information about the forests supplying the timber used to build credits. Either information source would represent credible information about what kinds of landowners and forestry the project supported.

The other method of transparency targets level 3 and generally requires some level of segregation, i.e., segregating logs from certain sources and tracking them through normal or dedicated production runs. This requires enhanced logistics at the primary mill, so it takes the right partner, the right timing, the right size of job, financial incentives, and early engagement to make this happen. More vertically integrated or small-scale mills may be more suited for segregation due to more limited log sources. Segregation goes beyond obtaining a report of all potential forest sources for a particular batch of wood, and can increase precision in linking wood products back to specific forests that meet certain criteria.

Moving toward more transparency and optimized procurement could take the following trajectory:

[6] A forest management unit (FMU) is an area of forest managed under a single management plan and may consist of single or multiple parcels.

- Short term: Report and Analyze - design teams will start to work with suppliers to provide transparency of log purchase sources. Teams can analyze the sources according to the frameworks in this document to determine how much of the wood package came from operations practicing various types of CSF. For instance, a primary manufacturer could provide a report of all the log sources – organized by landowner and volume purchased – for a specified period of time. The design team could then analyze the sources to determine which align with the criteria/methods outlined in procurement Option 2 or Option 3 below. This doesn't provide much opportunity to influence where the wood comes from for the project, and likely the number of reported sources will be large with a wide spectrum of different forest practices. Claims of meeting CSF criteria would thus need to be prorated depending on the volume of inputs for the overall batch. Even though this method only links the wood products back to the forests that it might have come from, this represents a key first step in cultivating transparency in the wood supply chain and starting conversations about how to support CSF.

- Medium term: Optimization - the next level would be incorporating the idea of targeting to increase the amount of wood that meets CSW goals. This can be done most effectively through segregation, but optimization is possible with modifying purchase timing and behavior without segregation as well. For instance, a primary manufacturer could simply target more wood from a certain source based on the upcoming batch of lumber to increase the amount of CSW in the overall blend of sources.

1.3c Avoidance of Unacceptable Sources

Suppliers can be asked to provide evidence that forest sources avoid unacceptable practices, for example:

- Illegal logging
- Conversion of natural forests to plantations or non-forest uses
- Destruction or significant degradation of High Conservation Values, including but not limited to primary (old growth) forests, intact forest landscapes (areas of primary forest that are 50,000 hectares or larger), and habitat for Rare, Threatened and Endangered species

Evidence of compliance can take any of a number of forms, including:

- Formal declarations by suppliers
- Attestations from independent experts (NGOs, academics, etc.)
- FSC National Risk Assessments for Controlled Wood indicating low risk for the source forest(s) and/or supplier invoices or other documentation indicating that the material is FSC Controlled Wood
- Analysis using remote sensing tools (e.g. Global Forest Watch)
- Third-party audits

SECTION 2: PROCUREMENT OPTIONS

CSWG has developed five options for CSW procurement that may be used individually or in combination, offering flexibility for projects with different goals and levels of aspiration and resources.

PROCUREMENT OPTION OVERVIEW
Option 1: Recycled/reclaimed/reused
Option 2: Wood from Climate-Smart Forestry operations
Option 3: Forest carbon stock approach
Option 4: Certified wood
Option 5: Credits from registered forest carbon projects

2.1 Option Descriptions

The following procurement options reflect CSWG's current knowledge of methods to identify, source and validate CSW or otherwise support CSF; we expect to improve and augment them with time. For each one, we also provide commentary on the importance or relevance of traceability and transparency.

Option 1: Recycled, Reclaimed, or Reused wood

Description:

Includes products with pre- or post-consumer recycled content; wood reclaimed from old buildings and other structures; adaptive reuse of wood buildings; as well as wood salvaged from urban forests, orchards, or similar sources.[7]

Why This is Climate Smart:

Recycling, reclaiming and reusing wood has multiple carbon-related benefits:

[7] Salvage logging after fires, insect infestation, and other natural disturbances is sometimes controversial and should not automatically be considered "climate smart." Salvage logging after fires, insect infestation, and other natural disturbances is a case by case consideration. Only salvage logging within ecologically restorative forest management plans that are attempting to maintain the restorative values associated with that stand should be considered climate smart.

- It extends the life of material that would otherwise be burned or decompose, releasing its stored carbon into the atmosphere.
- It avoids emissions that occur whenever virgin timber is harvested: logging causes a release of carbon stored in forest soils and understory plants as well as the release of much of the carbon stored in living trees through on-site decomposition of logging slash (branches, leaves and needles) and root wads, as well as slash burning.
- It avoids much or all of the emissions associated with wood product manufacturing: a fraction[8] of the original carbon in a tree is carried through to the end of the processing chain if it is cut and converted to products – unless it is recycled, the rest is downfall that rots or is burned as an energy source, releasing stored carbon into the atmosphere in the short term,
- Finally, it avoids fossil fuel emissions from logging operations and log transportation.

Traceability/transparency:

Traceability and transparency may apply only on a limited basis or not at all to recycled/reclaimed/reused products, but it is more important for salvaged wood depending on the source. Project teams may want to consider asking for third party validation of claims for these products, such as:

- SCS Recycled Content Certification
- Interek Recycled Content Verification
- UL Recycled Content Validation

Pros / Cons of Recycled, Reclaimed, or Reused Wood:

Pros:

- *Climate Benefits:* This option provides the clearest climate benefits, per the above.
- *Possible Cost Reductions:* Adaptive reuse of wood structures can be cost-competitive when compared to using virgin material.
- *Cultural Preservation:* Can support the reuse of historic structures instead of demolishing and discarding existing buildings and rebuilding with virgin materials.

Cons:

- *Limited Supply:* In many instances there is not a well-developed or large supply of recycled, reclaimed, or salvaged wood, which means project teams must expend additional effort to seek out these sources of wood.
- *Possible Cost Increases:* In many cases, recycled/reclaimed/salvaged wood costs more than virgin wood
- *Quality Control and Material Consistency:* May vary widely, which could pose challenges for project teams.
- *Additional Testing and Processing:* May require additional processing, testing, grading, or treatment in order to meet project requirements.
- *Red Tape:* There may be jurisdictional barriers to utilizing these types of material sources. Project teams will need to check with their local building departments in order to understand what is allowed by code.
- *Precision:* The exact amount of carbon savings (and avoided burden) is hard to quantify based on lack of data for different re-processing emissions pathways depending on specific reuse case.

[8] See Option 5 below

- *Lack of Influence on CSF:* Fails to influence or reward the practices of forest owners.

Option 2: Wood from Climate-Smart Forestry Operations

Description:

This procurement option aims to more directly tie wood products back to their forests of origin in order to support CSF. It requires moving beyond business-as-usual procurement and certification (Option 4) toward knowing more about how a project's wood was harvested. As such, this option relies on levels of traceability and transparency beyond typical procurement.

CRITERIA (includes, but not limited to):	LEVEL OF DISCLOSURE/TRANSPARENCY
Federal forests with the support of local forest collaboratives	Lvl 2, 3
Small family forests (<500 acres)	Lvl 2, 3
Tribally owned and managed forests	Lvl 2, 3
Forest restoration (e.g., forestry operations that reduce carbon stocks for wildlife, drought, or disturbance resilience benefits)	Lvl 3
Forestry operations with state habitat conservation plans	Lvl 3
Forestry operations with extended harvest rotations	Lvl 3
Forestry operations with higher than required retention	Lvl 3
Forestry operations with larger than required riparian buffers	Lvl 3
Other region-specific criteria	Lvl 2, 3

Why this is Climate Smart:

The table above shows both prescriptive source forest criteria that align with the CSWG's definition of CSF and the level of traceability/transparency required to make credible claims. More detailed criteria such as "extended harvest rotations" point to a specific practice that results in higher carbon stocking in certain types of forests. Additionally, a criterion such as

"small family forests" is more of a proxy criteria that generalizes management according to a landowner type. The aim of this guidance is to provide an example of how different criteria could be used to identify CSF, but future work is needed to tailor them to different forest types.

Traceability & Transparency:

This option should incorporate traceability and transparency based on the type of source forest criteria. The level of confidence in validating CSW claims is determined by the level of disclosure and transparency. This can be disclosure to landowner type, specific landowner, specific forest with a known management plan and harvest prescriptions tied to wood purchased. With no disclosure and no certification, it is not possible to validate claims that wood is climate smart. For instance, to make a claim that your wood procurement is supporting a certain landowner type criterion, such as "tribally owned and managed forests," the mill could disclose their wood supply area (Lvl 2) and any % of the wood volume that came from tribal nations could be counted as "climate smart." However, to claim that you're supporting a forest with extended rotations, disclosure to the FMU (Lvl 3) and traceability is required to link back to a specific forest with known harvest practices. With the 3rd level of disclosure, likely only a portion of the wood package will meet criteria as primary manufacturers typically source from a large number of landowners for any given batch of wood. For additional info about the different levels of traceability and implementation strategies, see the following video: Disclosure and Transparency Approaches to Wood Sourcing – Mill Input Reporting plus Targeted Sourcing

Pros / Cons of Buying Wood from Climate Smart Forests:

Pros:

- *Direct Impact:* With proper transparency and traceability, this pathway provides a very direct method for supporting CSF practices. With full supply chain mapping and source forest disclosure, project teams should be able to point to specific positive outcomes that their projects have supported within specific forests.
- *Market Transformation:* By asking supply chains for the transparency and traceability needed for this option, project teams can transform the forest products industry in ways that differentiate forest practices, reward CSF, and make transparency requests more accessible for future projects.

Cons:

- *Complexity and Barriers to Entry:* This pathway is among the most complicated options for supporting CSW, and will usually require a significant time commitment from the project team.
- *Early Commitment Usually Required:* This pathway usually requires commitments early in the planning of a project because identifying climate smart forestry operations and tracing wood products to their source can be a difficult and time-consuming effort.

Option 3: Carbon Stock Change Factors

Description:

This approach to identifying Climate Smart Wood relies on the calculation of forest carbon stock change factors in source forests. These use available data that depict the change in forest biomass or carbon stocks and timber product output at appropriate spatial resolutions to determine the change in forest carbon stocks for a forest area that can be allocated to a known amount of timber harvest in a specific supply area over a certain timeframe.[9] Dividing carbon stock change by timber output from a given area over time produces an "upstream" embodied carbon factor that represents a carbon benefit or burden for each unit of industrial roundwood (i.e., logs) harvested from that area over time. This approach provides both a stock change number over time, and a carbon stock number -- both of which can be used when determining climate smart criteria based on this type of data.

Carbon stock change factors can be used within this approach in one of two ways (see below), both of which need additional research and guidance to create clear criteria of what amount of carbon stocks or change represent CSF (this will happen in future phases of this work). As a novel and innovative approach, the specific methods, data sources, and the understanding of precision and uncertainty in their use are evolving and expected to improve over time. The use and scrutiny afforded by increasing adoption of this approach by more project teams will help improve them.

1. Option 3A: Linked to a climate smart forest- connect wood products to their source forest through traceability/transparency procurement methods (see below). If the source forests have certain carbon stock change profiles or carbon stock numbers, we can claim that these products support CSF. More research is needed to evaluate the carbon stock data to determine what is considered "climate smart" based on a certain amount of negative carbon stock change (i.e. net sequestration) over time as compared to a baseline. Or, depending on the forest, elevated carbon stocks or a return to the ideal carbon carrying capacity based on that forest type can serve as alternate criteria. The creation of such criteria is needed before this pathway can be utilized.

2. Option 3B: Net carbon calculation between the forest and wood product carbon pool- This "upstream" embodied carbon factor (carbon stock change per unit of timber output) can be tied to building products following appropriate calculations to estimate the volume of roundwood needed to generate a specific end-product. This would effectively attribute a forest carbon stock benefit or burden to wood products used in a project, that could then be counted against the wood product LCA or viewed as a carbon offset. The conversion factors that relate the volume of industrial roundwood required to produce a particular volume of various end-products (e.g., lumber, CLT, etc.) are often published in the LCAs that were conducted to produce EPDs. This approach allows for the net calculation of carbon between the forest and wood product carbon pool, and thus criteria around how much savings or what amount of carbon reduction per unit of wood product would be determined as "climate smart." Given the specificity of this approach, more research on the datasets and method of product attribution is needed before this pathway becomes available.

[9] https://ecotrust.org/mapping-forest-carbon-data/

Why this is Climate Smart:

An overarching concept of this pathway is to support forests that are growing more than they harvest. Forests whose carbon stocks are growing are a sink for atmospheric carbon and it generally means that forest growth exceeds timber harvest and natural mortality. Negative carbon factors indicate a net gain of forest carbon stocks in the timber supply area and may be considered an upstream carbon benefit, while positive carbon factors indicate a net loss of forest carbon stocks in the timber supply area that may be considered an upstream carbon burden. Future criteria may identify that any forest with a negative carbon stock change number (i.e. net sequestration), is considered "climate smart." Alternatively, only the top 25th percentile of forests might achieve that designation depending on how the criteria are formulated. Finally, forests with decreasing carbon stocks could still be considered climate smart if they are also on a trajectory of restoring the landscape back to its theoretical carbon carrying capacity. This would cover, for instance, active management of dry side forests in the West that reduces carbon stocking but makes forests more resilient to catastrophic wildfire, all while producing wood products.

Traceability & Transparency:

Carbon stock change data currently exists broken down by landowner type at the county scale and larger. Thus, this option should incorporate traceability and transparency down to the level of the primary manufacturer supply area at minimum (Lvl 2) and to the level of the source FMU if possible (Lvl 3). More precise estimates may be available where timber supply can be traced to specific owner types (e.g., industrial, federal, tribal, state) or to specific ownerships. This method is designed to characterize "upstream" carbon stock change as an emergent property of a forest management or timber production *system* rather than to characterize the impact of a specific harvest. When applying this method, is it important to include the entire area believed to be supplying timber over time Thus, a timber supply area used for this type of analysis should include areas that are regrowing from previous harvests, areas that are expected to be harvested in the future, and areas where management may be limited or constrained as part of best management practices (e.g., riparian management zones, steep and erodible slopes, or areas of high conservation value within an actively managed landscape). This type of analysis should not be applied exclusively on specific cut blocks or harvest units.

Pros / Cons of Buying Wood Using Carbon Stock Change Factors

Pros:

- *Based on Objective Measures:* This approach is based on observational data of how a timber supply area has actually changed over time rather than relying on industry-wide averages or simulations of hypothetical landowner behavior.
- *Identifying Source Forest Not Required:* Does not require tracing to a specific source forest, but increased levels of disclosure would lead to less uncertainty in the carbon stock change factor. Uncertainty factors could be applied to account for this penalty.
- *Increasing Availability:* Data is becoming readily available for most forests across the US
- *Novel and Innovative:* Option A above is close to being ready for primetime, and using this new approach will drive positive change.

Cons:

- *Still in Development:* Neither option is currently ready for primetime. Regionally specific criteria need to be determined for timber supply areas with this kind of data. Peer review and methodology refinement is needed to better attribute observational change to management choices. For example, more research is needed to better separate the impact of natural disturbance on carbon stock changes.
- *Boundary Size-Dependent:* Inclusion of areas that are not part of the timber supply in the analysis obscures and confounds the carbon stock change that can reasonably be attributed to timber production. For instance, if the area analyzed includes a significant proportion that is not actively managed or part of the timber supply (e.g., a park or protected area) then the overall growth in forest carbon stocks that are observed in this area could more than offset decreasing stocks that might be occurring in more intensively managed areas. This can be mitigated to an extent depending on if you can allocate the factor by landowner type and by county, versus only by county, or only by a specific landowner type.
- *Hard to separate impacts* from disturbance vs. impact of management (active research is ongoing on how to do this)
- *Narrow Focus:* Although growth in carbon stocks can often be a useful indicator of "climate smartness", growth in carbon stocks does not necessarily indicate improvements in ecological health and resilience, and information on climate, community, and biodiversity impacts beyond carbon stocks may be necessary to confidently characterize the climate-smartness of a particular timber supplier or timber supply area.
- *Lack of Data Availability:* Data needed for this approach is hard to find and may not ever be statistically rigorous enough to drill down to the individual FMU or landowner scale

Option 4: Certified Wood

Description:

Forest certification systems are voluntary, market-based tools designed to verify forestry and forest products as "responsible" or "sustainable", enabling consumers to choose wood and other forest products that meet their environmental and social standards. The major systems in North America are the Forest Stewardship Council (FSC)[10] and the Sustainable Forestry Initiative (SFI).[11]

Procurement of certified wood can be a relatively straightforward way for project teams to support CSF when a certification standard is strong enough to secure climate benefits.

[10] FSC is a Leadership Council member of the Climate Smart Wood Group. To avoid a conflict of interest, this procurement guidance was written and reviewed by a group of experts in green building and ecological forestry and CSWG Leadership Council members that did not include FSC. The contents can be verified by readers by referencing the certification systems' publicly available standards and numerous independent academic studies.

[11] While FSC is a global system, SFI operates only in the U.S. and Canada. Internationally, SFI is one of numerous national forest certification schemes that are united under the umbrella of the Programme for the Endorsement of Forest Certification (PEFC) and have the right to use the PEFC name and label. PEFC does not itself set sustainable forestry standards; instead, it endorses systems that meet its international standards and guides. SFI has its own label and brand identity, thus the PEFC label is generally only seen on imported products.

Why This is Climate Smart:

CSF may be practiced under any certification system as well as in forests managed by landowners that choose not to participate in certification programs. However, when using certification as a proxy for identifying and procuring CSW, peer reviewed studies indicate that FSC standards prescribe[12] key elements of CSF to a degree that other systems have yet to achieve.

In general, in order to meet FSC forest management standards, forestry operations must adopt practices that lead to improved long-term outcomes compared to conventional forestry in the three critical areas of: 1) mitigation, 2) adaptation, and 3) equity (see CSF definition).

While FSC requires practices that exceed most forestry regulations in the USA and Canada, SFI does not assure management that reaches significantly beyond the regulatory floor.[13] This difference informs a consensus within the conservation community that FSC is the ecologically stronger standard.[14] Examples of practices required by FSC's forest management standards that result in greater carbon storage[15] and ecosystem resilience outcomes include:

- Wider riparian buffers (mitigation)
- Smaller clearcuts (mitigation & adaptation)
- Higher levels of live tree retention (mitigation & adaptation)
- Protection of high-conservation values like old growth and threatened species habitat (mitigation & adaptation)
- Reduced chemical use (mitigation)
- Provisions to respect and uphold the rights and interests of Indigenous Peoples and local communities (equity)

It is important to note that CSF may be practiced under any certification system as well as in forests managed by landowners who choose not to participate in certification programs. SFI-certified and non-certified wood may be considered climate smart when additional supply chain transparency and traceability support a conclusion that CSF is being practiced in the source forest.

Traceability & Transparency:

Traceability and transparency are not currently inherent to forest certification systems.[16] However, in the case of FSC which requires performance significantly beyond regulatory baselines, certification reduces the need to map supply chains and verify specific forest origin,

[12] https://journals.sagepub.com/doi/full/10.1177/1086026619858874
[13] https://www.mdpi.com/1999-4907/9/8/447/htm
[14] https://www.ecologyandsociety.org/vol16/iss1/art3/
[15] https://ecotrust.org/publication/exploring-the-landscape-of-embodied-carbon/
[16] The FSC 100% label, though uncommon in North America, does provide some additional traceability and transparency, especially for short supply chains like lumber.

forest management plan, or harvest prescription. Wood certified under other certification systems should be complemented by additional information gathering efforts to verify the specific practices that enable a project team to conclude climate benefit compared to status quo practice.

Pros & Cons of Using Certification for Climate Smart Wood Procurement:

Pros:

- *Assurance:* Through third-party auditing, assures compliance with a known minimum standard of forest management, though the stringency of that standard varies significantly depending on forest certification system.
- *Does Not Require Traceability/Transparency*: Can be the simplest method for acquiring CSW without need for further information gathering, provided that the certification system is sufficiently robust.

Cons:

- *Lack of Traceability/Transparency:* Certification alone does not provide information relating to the forest of origin or the names of businesses in the supply chain. For projects that want to support minority-owned, family owned, or local businesses this limitation requires additional due diligence. Lack of supply chain information also fails to allow for intentional support of landowners such as Tribal nations or sourcing in support of publicly owned forests being managed to reduce wildfire intensity.
- *Limited Adoption:* Many producers, from small landowners to Tribal and government forestry agencies, choose not to get certified for a variety of reasons. Many may be practicing CSF despite lack of certification.
- *Lack of Supply:* It can be difficult to acquire certified wood products if certified supply chains are incomplete (the chain of custody is broken) or there is not enough underlying certified forest land. Due to either of these circumstances, project teams may be unable to source desired products that are certified.

Option 5: Buying Credits from Registered Forest Carbon Projects

Description:

Wood users can support climate-smart forestry operations without actually procuring wood from them by purchasing carbon offset credits from third-party certified forest carbon projects. Offset credits issued to and retired by these projects are generally recorded in publicly accessible online registries. In the United States, the major voluntary carbon standards organizations (Climate Action Reserve, American Carbon Registry, and Verra) each maintain publicly accessible registries. “Compliance-grade” offset credits issued under the California cap-and-trade program are also listed in these registries and are considered by some experts to be more robust than, and therefore preferable to, credits issued under other standards. Offset credits can often be purchased directly from project proponents, or from brokers and retailers.
Building projects can estimate the quantity of offset credits to purchase based on the cost or volume of wood procured for a project (more wood, more credits). Two ideas for doing this:

1. Buy credits equal to a percentage of the overall spend, such as between 5% and 20% depending on your level of ambition. For example, if you buy $100,000 worth of wood, then purchase between $5,000 and $20,000 worth of offset credits.

2. Offset part or all of the emissions associated with the volume of wood that you use. A cubic foot (12 board feet) of kiln-dried Western red cedar lumber contains about 39 pounds of CO2 equivalent (about 10.7 pounds of carbon), Douglas fir contains about 55, and red oak about 70.[17] 50 pounds is a reasonable mean and a nice round number. As noted in the LCA/EPDs section of this document (see below), about half of the carbon in a live tree is contained in roots, branches, leaves or needles, etc. that are left to decay or are burned post-harvest, and about half of the carbon that was in the tree will be contained logs that leave the site. In the manufacture of lumber, approximately half of the carbon stored in logs becomes waste or by-products (e.g., chips or sawdust) which are often combusted for heat and/or energy. Thus about 25% of the carbon that was held in a living tree will be retained in the finished lumber while 75% is emitted in the relatively near term.

   Leaving aside possible net decreases or gains of carbon stocks in the forest over time associated with management activities, using lumber as a basis for calculation, we can conservatively assume that 50 pounds of stored CO_2 equivalent per cubic foot of wood is associated with about 150 pounds of emitted CO_2. Lumber volume is often reported in units of board-feet, with 12 board feet per cubic feet of lumber.[18] Thus, each board foot is associated with about 12.5 pounds of CO_2 equivalent emissions (150 ÷ 12). One carbon credit offsets one metric ton of CO_2 equivalent emissions. As one metric ton is equivalent to 2,204 pounds, a single offset credit could be purchased per 176 bd. ft. of wood used (12.5 x 176 = 2204). The price of a carbon credit fluctuates, but assuming a cost of $20, in this scenario the cost of offsetting 1000 bd. ft. of wood would be about $125 (1000 ÷ 176 x 20 = 11).

Why this is Climate Smart:

To become registered and generate certified offset credits, forest carbon projects undergo independently audited screening procedures to confirm eligibility and verify that the carbon measurement and accounting methods specified by a carbon offset standard have been appropriately applied. These standards generally require forest projects to demonstrate increased carbon storage over time to generate credits, and often involve obligations for project verification and monitoring that may extend from decades to more than a century depending on the standard. When considered in reference to the carbon storage and emissions that would occur if the forest were managed at the regulatory baseline, the carbon benefit is called “additionality” and the amount of credits generated is tied to the amount of additionality a project can demonstrate. In general, ecological co-benefits also arise from forest management practices that result in carbon additionality (e.g., letting trees grow older before harvesting, harvesting less intensively, increased tree retention, wider riparian buffers).

[17] https://dovetailinc.org/land_use_pdfs/carbon_in_wood_products.pdf

[18] Project teams should not confuse volumes of lumber reported in units of board-feet with volumes of timber or logs reported in units of board-feet. Though efficiency varies from mill to mill, a common rule of thumb applied in the milling industry is that each board-foot of logs translates into two board-feet of lumber.

Traceability/transparency:

This is an indirect way to support CSF and traceability/transparency are inapplicable since offset credits are unrelated to the forests from which wood for a building project is procured. Project teams can, however, seek to gather information on the specific forest carbon project(s) that they buy credits from.

Pros / Cons:

Pros:

- *Well-documented:* Credits from forest carbon projects certified under major carbon standards are backed by carbon accounting practices and methods that have been developed with public input and are subject to independent auditing of emission reduction claims. The issuance and retirement of offset credits are generally tracked with serial numbers available in publicly accessible registries to prevent double-counting or sales of fraudulent credits.
- *Flexibility:* This option for supporting CSF can be exercised without having to procure wood from specific sources or with certification. Additionally, a decision to buy third-party certified offset credits from forest carbon projects can be made at any stage of a project, or even after its completion, providing maximum flexibility.
- *Benefit to the landowner:* Landowners generally receive a substantial portion of the revenue from offset credit sales. Purchasing credits ensures that landowners receive some financial compensation for practicing CSF, which may or not be the case with other procurement options (e.g., premiums paid to a manufacturer or distributor for certified wood may not be passed up the supply chain to landowners).
- *Longevity:* Each carbon standard imposes different rules governing continuation, monitoring, and verification of carbon benefits that range from decades to more than a century. Through long-term legal agreements, "compliance-grade" credits bind landowners to plans for improved forest management designed to achieve the carbon benefit reflected by the quantity of credits issued (one credit per ton of carbon removed or avoided relative to a legal forestry baseline). These agreements run with the land, so the permanence is unaffected by changes in ownership.[19]

Cons:

- *Disconnected:* By utilizing this option, a project will be rewarding CSF in a forest whose identity may or may not be known and the actual wood used could originate in forests where CSF is not being practiced.
- *Less impactful:* This approach could be less impactful in transforming the forest sector than if project teams seek out wood from CSF and require traceability/transparency. Participation in carbon offsetting is still very limited in the forest sector and is dwarfed by the amount of land involved in supplying timber.
- *Credit quality concerns:* The quality of carbon credits and crediting varies, and offsetting through carbon credits in general and forest carbon credits in particular has

[19] This is an advantage because in most other circumstances forest landowners are free to convert their forest if they wish or sell it to someone who does (certified landowners will have to drop their certification to do this, but there is nothing to prevent it).

been subject to valid criticism. These risks and concerns can be mitigated, but not entirely eliminated, by limiting purchasing to third party certified offset credits.

2.2 What about Wood Product LCA & EPDs?

Life Cycle Assessment (LCA) and Environmental Product Declarations (EPDs) are the most common tools used to assess and compare the relative "climate smartness" of building materials. In particular, when LCA studies are conducted for individual companies and the results are reported in product-specific (as opposed to industry-generic) EPDs, it is possible to compare the carbon footprint of competing products of the same type. This allows purchasers to select the product that has the smallest footprint and feed that information into Whole Building LCAs in pursuit of reducing a building's overall embodied carbon. Why then doesn't this guidance include LCAs and EPDs as an option for the procurement of CSW?

The answer is that current LCA methods used in the forest sector do not directly account for changes in forest carbon stocks resulting from different approaches to forest management that are readily observed across managed landscapes over time. As a result, contemporary EPDs for wood products do not reflect or acknowledge carbon gains or losses that are actually occurring in managed forests. Instead, current LCAs generally adopt a "biogenic carbon neutrality" assumption that assumes carbon gains from forest regrowth in a managed area are exactly equal to the amount of carbon stored in forest soils, logging slash (branches, leaves and needles), and roots that will be emitted through decay or be burned post-harvest[20] as well as the amount of carbon removed from the forest in the form of harvested logs. This assumption is often invoked so that emissions of "biogenic carbon" that occur during the processing of logs into finished products can be conservatively ignored[21]. However, this assumption, particularly when applied at regional and continental scales, obscures the critical underlying reality that no forest is exactly carbon neutral just because it is deemed to be "sustainably" managed. The shortcomings of this assumption and the scale at which it has been widely applied offered the primary motivation for the "upstream" accounting approach[22] described in Procurement Option #3. Because the "biogenic carbon neutrality" assumption treats all "sustainably" managed forests as exactly carbon neutral, it eliminates any ability to differentiate timber suppliers or timber supply areas based on observable differences in carbon stocks that accrue on landscapes being managed differently over time. Considering many forest owners are intentionally increasing carbon stocks as a CSF strategy while others may have flat or decreasing carbon stocks in their forests over time, Option #3 attempts to correct for the fact that this benefit (or burden) is currently ignored in product-specific EPDs given local and regional data suitable for this purpose are publicly available.

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[20] Of a living tree's total biomass, about 40-55% (hardwoods) and 50-55% (softwoods) is contained in the "merchantable" portion that would ultimately enter a sawmill. The remainder of the tree's biomass is contained in its fine roots, stump, branches, bark, and top of the tree, which are generally left on-site to decay or are burned following timber harvests. These ratios are drawn from: Jenkins, J. et al. (2004). "Comprehensive Database of Diameter-Based Biomass Regressions for North American Tree Species." NE-GTR-319. U.S. Department of Agriculture, Forest Service, Northeastern Research Station: Newtown Square, PA: 45pp. https://doi.org/10.2737/NE-GTR-319 and Cairns, M. et al. (1997). "Root Biomass Allocation in the World's Upland Forests." Oecologia 111(1): 1-11. https://doi.org/10.1007/s004420050201

[21] The process of converting logs into finished products retains a fraction of the carbon in the log, with half or more of the carbon in logs commonly transformed into waste or by-products (e.g., chips or sawdust) which have short lifespans and are often combusted for heat and/or energy during manufacturing. For example, the "recovery ratio" for producing softwood lumber from logs in the Pacific Northwest was estimated at 0.505 m^3 lumber per m^3 of logs: Milota, Mike. (2015). "CORRIM REPORT: Module B Life Cycle Assessment for the Production of Pacific Northwest Softwood Lumber." CORRIM: Seattle, WA. 73pp. https://corrim.org/wp-content/uploads/Module-B-PNW-Lumber.pdf.

[22] The approach to accounting for the "upstream" carbon impact for biomass products such as wood is described in: Johnson, Eric. (2009) "Goodbye to Carbon Neutral: Getting Biomass Footprints Right." Environmental Impact Assessment Review: 29(3): 165–68. https://doi.org/10.1016/j.eiar.2008.11.002

In summary, through the lens of LCA, wood products from forests that represent a wide variety of management practices and starting conditions are treated the same – the only differences captured are in emissions resulting from a given company's use of energy and fossil fuels in timber harvest and downstream manufacturing and transportation. And yet, the carbon benefit of CSF can easily outweigh all other factors combined. In other words, current LCAs and EPDs for wood provide no advantage for companies that practice or source wood from CSF, and thus they have limited relevance in this guidance.
LCAs and product-specific EPDs for materials other than wood promote internal competition among companies within the industry in question to reduce their net emissions. However, the assumption of forest carbon neutrality blunts this effect in the forest products industry. Research on improving LCA methodology to address this blind spot is underway, and our guidance will change when science-based methods for factoring forest carbon stock changes into LCAs and translating those changes into EPDs for wood products are developed.

2.3 Additional Factors

There are additional factors that project teams may wish to consider in selecting a supplier or choosing and implementing a procurement option that have an impact on "climate smartness." Examples include:

- Proximity of the source to the project
- Choice of species and grades
- Efficiency of manufacturing processes

SECTION 3: DESIGN/CONSTRUCTION PROCESS DECISION POINTS & RECOMMENDATIONS FOR CSW PROCUREMENT

Owners and project teams have numerous potential motivations to use climate smart wood in construction. These include but are not limited to: project ESG goals, improved tenant environment, pro-forma cost benefit, among others. Specific to projects considering mass timber as a structural system, projects typically make a commitment to proceed with mass timber at three different stages:

- Day-one of design
- At the end of concept, potentially involving comparison of mass timber system versus alternate materials,
- Parallel designs of mass timber compared with steel and/or concrete systems deeper into design with a decision point corresponding to the end of the design development phase.
    - This stage of commitment typically misses key collaboration between timber vendor, erector, designer and owner as many key decisions have already been made, and may only be feasible for simpler projects. Commitment made at this stage would pose significant challenges to follow the CSW strategies laid out earlier.

The following outlines CSWG's recommendations for several key procurement decision points in the design evolution.

3.1 Conceptual Design Decision Point

In the earliest stages of a project, high level decisions are made with implications for later design and procurement options, for example:

- Deciding to build, not build, or renovate.
- Defining the project vision, program, and area summaries (how big, how tall, etc.)
- Establishment of development goals, with a cash-flow proforma development.
- Identification of major environmental and/or social goals

Recommendations

At this stage multiple options will be on the table and specific material choices will rarely have been discussed or have yet to be fully defined. If it is likely that wood will be a major component of the project it is best to open discussion of CSW procurement as early as possible. CSWG recommends that the owner and project team review the CSWG Climate Smart Forestry definition and CSW Procurement Options as part of a process to clarify values and establish high-level project goals that will guide future decision-making. Procurement input should help establish a framework for future decision making. Procurement support can help a developer define the following for their project:

- What values are most important to them and why?
- What criteria should they consider to support those values?
- How can or should those criteria be evaluated? Is there a criteria already established that can be adopted?
- What is available and reasonable to implement?

3.2 Schematic Design Decision Point

As construction schematics are taking shape, procurement priorities and options can begin to come into sharper focus. This is an opportunity to move from concept to general commitment, e.g., through:

- Establishing the criteria/metrics to be applied later in the design and procurement process.
- Consideration of what material(s) to build with (e.g. wood/steel/concrete)
- Identify general fabrication shapes, modules or cassettes that might be installed to validate schedule efficiencies
- How much board feet are potentially coming out of forests, mills, etc, and who can fulfill these requirements?
- Developers at this point often provide a financial scenario analysis to their development committees and/or lending institutions to secure project funding.
- Questions to be answered at this stage include:
    - Is prioritizing the engagement of local businesses, woman- or minority-owned businesses, indigenous peoples a project goal?
    - Should experts on CSW be engaged to provide advice and guidance?

Specific to mass timber construction, early design decisions include selection of the lateral system, preferred floor assembly, optimal grid spacing for tenant fit out and system fabrication, method of facade attachment, MEP routing, acoustic performance, fire performance, etc.

Recommendations

Where wood is to be used in a project, the five CSW procurement options outlined in Section 2 should be considered and one or more procurement strategies should be prioritized at this time. General solicitation to the supply chain should start to validate strategies, assess availability of sizes and material types, and will drive healthy competition during the bidding phase.

Procurement guidance can help with “why” a developer should pick one (or some combination) of the five CSW procurement paths over another. This ideally would involve a quantitative decision-making process. Developers are typically motivated to manage their risk and maintain optionality. Tracking cost, schedule and risk implications of particular pathways allows the project team to find the best-value way to achieve the overall project goals.

Procurement guidance should recognize and work with this risk framework and show developer value (and risk reduction) in order to encourage a more aggressive climate smart criteria establishment

3.3 Design Development & Construction Documents Decision Point

As schematics formalize into designs, product decisions and quantities and priority procurement options are narrowed. This is the stage where planning and intention for sourcing CSW can be locked into construction and scheduling plans through:

- Design refinement, optimization, benchmarking
- Reporting against the project criteria established at Decision Point #1 & #2.
- Gathering information from suppliers (see section below). Building relationships with suppliers is often critical to obtaining good information at critical decision points in procurement (Decision Point #4).
- Questions to be answered at this stage include:
    - Is virgin or recycled/reclaimed/salvaged wood preferable? Is there an available source of reclaimed wood that meets the project design criteria?
    - If virgin wood will be used, is it important to source directly from specific forestry operations or are indirect methods that may entail less cost and/or work acceptable?
    - Identify suppliers, manufacturers, etc to target any previously established goals of engagement of local businesses, woman- or minority-owned businesses, indigenous peoples

Recommendations

This is the stage at which specific material suppliers who can satisfy project priorities and criteria should be identified and contacted, though they may or may not be selected yet. Leveraging these suppliers to validate how procurement choices will enable the project to meet previously established criteria and validate budgeting through the design process is essential. Other decisions relevant to wood are often made at this stage. e.g., what species of wood to use, what framing schemes are to be used, delegated design opportunities, etc. The team may consider bringing on an erector early as constructibility decisions may drive some design decisions.

3.4 Procurement Decision Point

As projects go out for bid, criteria established at Decision Points #1 & #2 will be instrumental for communicating project goals and priorities to potential bidders. This may help potential

bidders self-select for ability and motivation to meet these goals and engage more deeply with supply chains. Procurement goals may be both signaled and vetted by:

- Collecting data from bidders, comparing against established criteria/metrics (identified in Decision Point #1), awarding contracts, considering cost and other quantifiable criteria. Utilizing a weighted scoring system that assesses this data against the project goals might be one way to establish a bidder selection criteria.
- Vendor Specific, 3rd party verified Type III EPD comparisons occur at this stage, comparing back against pre-established project baselines and criteria/metrics (see Section 2 for the limitations of EPDs).
- Evaluation of cost and other metrics beyond those contained in EPDs, if the information is readily available to do so.

Recommendations

Wood procurement typically occurs concurrent with the Design Development or Construction Documents phase, though different timelines exist depending on the elements in question. Procurement commitment of CSW mass timber will likely need to be made on the order of 8-months prior to the start of erection of mass timber (depending on overall quantity of material being procured). Procurement commitment of the use of CSW for interior or landscape elements can potentially be made later in the project timeline. This commitment utilizes the ground work established in Decisions Points #1, #2, and #3, to ensure materials can be procured via one or more of the CSW procurement strategies in a manner that allows the project to meet its goals.

Having early involvement from the general contractor, a CSW advisor, consultants savvy in the procurement of CSW, and maintaining consistent and diligent connection by the whole team to critical forestry operations, vendors, suppliers and subcontractors is instrumental in successfully procuring CSW and meeting the project goals, schedule and budget.

SECTION 4: CASE STUDIES

Meyer Memorial Trust Headquarters

- Sourcing criteria adopted to optimize economic, social and environmental outcomes
- 3 tiers of acceptable traceability in wood supply & associated tolerance for cost premium
- 12 wood products: 12 sourced from regional forests; 6 from minority-owned business;7 from small businesses; 9 support ecological forest management.

Oregon State University Ray Hall

- Complete supply chain mapping of Glulam and CLT
- Wood sourced from ecological forestry on Yakama Nation and Colville National Forest
- Local jobs and rural economies supported through logging and milling infrastructure

Port of Portland, PDX Airport Main Terminal Expansion

- 600,000 board feet of timbers segregated and directly tracked back to forest of origin (Disclosure Level 3)
- 1.5 million board feet of 2x8" lamstock traced to forest of origin through 3rd party credit disclosure (Disclosure Level 3)
- 400,000 board feet of 2x8" lamstock with simple log purchase disclosure from both vertically integrated and non-vertically integrated mills (Disclosure Level 3)
- 700,000 of mass plywood tracked back to forest of origin by landowner type (Disclosure Level 2)
- Wood sources include (but not limited to): 3 PNW Tribes and Tribal Nations, small family forests, and non-profits like the Nature Conservancy
- Supply Chain Story & Map
- 1.5 Hour presentation on Sourcing Story and Transparency