

# Top 10 Questions and Answers from the Wood Carbon Seminars

This document presents a curated list of the top ten questions from the Wood Carbon Seminars with answers provided by the webinar speakers. These questions reflect common themes and concerns about wood carbon and LCA in the building industry. For more questions and answers from the Wood Carbon Seminars, go to <http://carbonleadershipforum.org/projects/wood-carbon-seminars/>.

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## Questions and Answers

### 1. What are the key assumptions behind the current PCR for wood products?

- (a) That the survey adequately represents the regional production. While we can never know the differential between those that respond to surveys and those that don't, because wood is a commodity product and the price margins are therefore very small the industry as structured favors the most efficient producer. During the 2008 downturn, many small, less efficient producers left the market. It is now dominated by large, highly efficient, highly mechanized processing facilities that drive towards a highly uniform product at the lowest possible price. This tends to even out the variability in production emissions at the regional level.
- (b) That the forest which provides the raw materials is continuing to be managed for forestry so the forest carbon on the land base is stable. In prior EPDs this was an optional component of the report. Under the new PCR, the reporting of this component is now mandatory and consistent with ISO 21930 standards regarding forest carbon.
- (c) Average regional grids are used by the industry. This may not actually be so, as they can produce energy themselves with their own boilers so they may be better than the average grid in places with heavy dependence on fossil inputs to the grid or slightly worse in regions with less dependence on fossil inputs to the grid.

*Answered by Elaine Oneil (CORRIM)*

### 2. How are industry-wide EPDs calculated?

- (a) First: Regional data are developed based on surveys of the manufacturing industry (lumber mills, plywood plants, glulam manufacturers etc) and the wood suppliers. It is real data based on real facilities. Because it is also market data, we are required to anonymize the data as a prerequisite for getting it. Just like in the building and construction industry, competitors do not share their bid sheets, and neither do forest products companies. In some cases, the wood supplier (forestry) data is developed from modeled data on forest growth, forest inventory, and management practices informed by the literature and time series studies on forest operations. In others, it is based on survey data, just like manufacturing.

- (b) That regional data is developed into an LCA report (typically 60-100 pages of detailed analysis and outputs). Data are weighted based on production estimates.
- (c) Those regional data are then aggregated into a North American-wide EPD based on the relative percentage of market share that each region has in the market. This goes back to the notion that wood is a commodity product and therefore it can (and is) shipped to any part of North America (or the world) based on market demand and available supply.

*Answered by Elaine Oneil (CORRIM)*

### **3. Why do wood EPDs not distinguish between tree species and forest types?**

EPDs are a summary document of a much larger analysis that includes both the manufacturing and the forest management and growth. The data on tree species and management is embedded in the input values to the process but it is upstream of the main output. In other words, a single tree could go into a piece of lumber, OSB, plywood, glulam, MDF or particle board, and in fact may go into multiple products – so the granularity of ‘this tree going to that process’ is not apparent in the EPD, but is tracked in the upstream data that gets rolled into the final output (on a weighted average basis) in the ‘forestry’ column of the EPD.

Tree species isn’t all that big of a driver in the LCA as the variability in SG (specific gravity) which is the driver for carbon content is not that significant between the major softwood species used for most industrial wood products in the US.

Yield and management strategies can have an impact on the LCA values, but if we assess regional data most wood comes from remarkably similar types of management within a regional context. Hence we refer to the PNW as the Douglas-fir region because it produces mostly Douglas-fir with a bit of HemFir (hemlock/true firs), the SE as the SYP (southern yellow pine), and British Columbia wood comes as SPF (spruce/pine/fir) or if it comes from the coastal zone HemBal (Hemlock/true firs).

Again – the EPDs are reporting on commodity products that represent a significant portion of the world’s softwood lumber production.

*Answered by Elaine Oneil (CORRIM)*

#### **4. How is carbon neutrality calculated for North America?**

Most countries are required to report annual GHG emissions under the United Nations Framework Convention on Climate Change (UNFCCC). Biogenic carbon dioxide emissions are calculated by comparing the carbon stocks in forests and forest products at the beginning and end of the year. If stocks increased, it means emissions of biogenic carbon dioxide were less than zero. If stocks decreased, it means that biogenic carbon dioxide emissions were greater than zero. (There are nuances regarding imports and exports of wood and wood products, but they can be considered variations on this general approach). In addition, nations are required to report, for information purposes only, emissions of biogenic CO<sub>2</sub> associated with use of biomass for energy, but these are not added to fossil fuel CO<sub>2</sub> emissions because that would double count the biogenic CO<sub>2</sub> emissions (as these emissions are already captured by the stock-change calculations required under the UNFCCC). Many other methods could be used to calculate biogenic carbon emissions for a country, but under the UNFCCC, the methods are specified as described here.

*Answered by Reid Miner (NCASI)*

- **Is the carbon flux still neutral or negative on a regional scale or smaller scale?**

Net flux of forest carbon varies by region. The smaller the spatial scale of the analysis, the more variable the flux from year to year and site to site. Also, there are fewer data available at smaller scales. Under the Forest Inventory and Analysis (FIA) program, the US Forest Service collects forest data at regular intervals. The US Forest Service often aggregates these data at the regional level (North, South, Rocky Mountain and Pacific Coast), but data are also sometimes aggregated at smaller spatial scales. The Forest Service recently issued a paper showing forest carbon emissions on a state-by-state basis (see Greenhouse Gas Emissions and Removals from Forest Land, Woodlands, and Urban Trees in the United States, 1990-2018). This report indicates that in 2018, net forest carbon sinks (i.e., forest carbon stocks increasing) existed in all but six states, Colorado, Idaho, Montana, New Mexico, Utah and Wyoming. These are not large wood producing states but are often affected by fires.

*Answered by Reid Miner (NCASI)*

**5. Why is carbon neutrality commonly used/assumed in wood LCAs?**

Carbon neutrality isn't assumed or used in wood LCAs. Instead, we calculate carbon flows in terms of inputs and outputs and measure the difference. The EPD requires confirmation either (a) that that country of wood origin's net carbon stocks are stable or increasing, or (b) the fiber comes from a certified forest. Biogenic carbon then enters the product system as sequestered carbon (denoted as a removal) and its emissions are tracked and reported in the stages where they occur.

*Answered by Elaine Oneil (CORRIM)*

**6. Isn't all negative biogenic carbon a delayed emission? Isn't the real benefit to wood products the fact there is an opportunity to remove and store carbon in wood (in buildings or landfill) while the forest is recapturing the emitted carbon in new forests?**

The relevant standards (ISO 21930 and the Wood Products PCR) specify that no credit is granted based on delayed emission and that delayed emissions may only be reported as additional information. The carbon storage benefits in the EPDs are for permanent carbon storage. The US EPA has determined based on experimental data that 88% of lumber carbon is stored permanently in the landfill:

[Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model \(WARM\) \(2019\)](#).

*Answered by James Salazar (Coldstream Consulting / Athena Sustainable Materials Institute)*

**7. Wood and forestry management practices are being hailed as the most sustainable type of construction due to the nature of wood and potential for forestry management, but what is being done/studied in terms of potential risks and downfalls? What is being done to combat the use of skewed data or less-than-ideal practices in the name of sustainable wood manufacturing?**

It is important to generally know the country where your wood is coming from as that will tell you the relative risk you have a sourcing wood from unsustainable practices. In the US and Canada, this risk is low and there is ample information and annual reports that substantiate this. In addition, 47% of all forests in Canada are certified and 19% in the US, which is well above the global average of 11%.

Some important resources are shared below:

At the national level, both the US and Canada track performance on key sustainability indicators: see <https://www.fs.fed.us/research/sustain/criteria-indicators/> for the US and <https://www.nrcan.gc.ca/our-natural-resources/forests-forestry/state-canadas-forests-report/sustainability-indicators/20016> for Canada. These indicators cover both private and public lands. Certified forests also report out on progress annually: See the SFI annual progress report (<https://www.sfiprogram.org/progressreports/>), FSC report (<https://annual-reports.fsc.org/en>). The USFS BMP report (<https://www.fs.fed.us/naturalresources/watershed/bmp.shtml>) summarizes best management practices associated with forest management within watersheds and implementation percentage by state. The State of America's Forests ([www.usaforests.org](http://www.usaforests.org)), compiles a WEALTH of information associated with US forest benefits, threats, and stewardship. The Land Grant Universities and others are doing research about forests and have since the beginning of the 20th century. [NCASI.org](http://NCASI.org) is another large research program on forestry, water and wildlife. Many manufacturing plants have biomass energy and some are adding solar power to support mills. I think you will find that forest/wood production is different from other non-wood competing products in the market place.

In countries with poor governance and/or competing land uses it is important to source wood from certified forests.

*Answered by Elaine Oneil (CORRIM)*

*Edie Sonne Hall (Three Trees Consulting)*

## **8. What are some key criticisms of current frameworks for carbon accounting?**

Criticisms of life cycle accounting for forests and forest products from the conservation community generally point to the underlying assumptions and limited scope of analysis for LCAs rather than a criticism of LCA as an accounting approach in general.

- Perhaps the most common criticism is related to the geographic scale of the assumption of neutrality for "biogenic carbon" and definitions of "sustainability." The common practice of treating all "biogenic carbon" as carbon neutral if the total forest area or carbon stocking of

forests across a country is non-declining clearly ignores differences among regions and owners that are directly observable.

- The fact that soil carbon stocks are often assumed to be stable, or modeled rather than measured, is a common criticism as well, although many studies show that soil carbon is relatively stable over time in a forest system, with the biggest difference occurring in conversion away from- or to- a forest. Due to high variability and cost, direct measurement of soil carbon stock remains a major hurdle.
- There is also significant debate in the scientific, industry, and conservation communities over whether and how LCAs should consider alternative land-use or management scenarios (e.g., leaving a forest unmanaged, or assuming some other kind of "baseline") and consider "forgone sequestration." These concerns move into "consequential" rather than "attributorial" LCA, which is also where contentious issues surrounding assumptions and methods for estimating the impact of substituting wood for non-wood products are found.
- The scope of LCAs has been criticized both in terms of which impacts are commonly considered (e.g., global warming potential) and which are not (impacts on biodiversity, threatened and endangered species, water quality) as well as the differential treatment of some carbon stocks and emissions as in-scope or out-of-scope (e.g., the decomposition of slash after harvests).
- LCAs were conceived and traditionally applied for engineered rather than biological systems. Ecosystem science includes many methods for tracking stocks and fluxes through forest and non-forest ecosystems that are conceptually analogous to LCA methods, but many ecosystem stocks and fluxes remain poorly reflected in LCAs.
- The timespan considered by LCAs has also been criticised. Unsustainable harvesting and land-use conversion that led to the liquidation of most of the world's temperate old-growth forests over the past 200-300 years is generally out-of-scope, while contemporary deforestation and degradation in tropical forests is generally in-scope, raising concerns similar to those regarding historical liability for greenhouse gas emissions by industrialized nations.

*Answered by James Salazar (Coldstream Consulting / Athena Sustainable Materials Institute)*

## 9. If we increase demand, will we harvest too much?

This is a great question and empirical evidence shows that forest landowners respond to increasing demand of wood products by planting more trees. At a global level, the countries with the highest industrial roundwood (the term used to describe wood that is manufactured into a commercial product) have the most stable or increasing carbon stocks and lowest rates of deforestation (land-use change). The converse is true as well (countries with little harvest experience the highest rates of deforestation).

In the US, for example, prior to the Great Recession, harvest levels increased 35% from 1952 and forest volume increased by 50% in that same time period (USFS 2014. Forest Resources Facts and Historical Trends). In Sweden, both harvests and forest volume have doubled in the past 60 years (Royal Academy of Agriculture and Forestry. 2009. The Swedish Forestry Model).

Some findings from the USFS Resource Planning Act assessment report (2010): “If future technology development and wood demands provide enhanced timber revenues, then historic experience suggests that forests and forest management will thrive. If the value of timber declines, however, through low-value use, limited demand, or insufficient forest product technology development, the future sustainability of forests will be compromised”

The IPCC also summarized: “Rather than leading to wide-scale loss of forest lands, growing markets for tree products can provide incentives for maintaining or increasing forest stocks and land cover, and improving forest health through management (IPCC 2014).

*Answered by Edie Sonne Hall (Three Trees Consulting)*

## 10. All these models look forward to the long-scale. What should we do today to make a meaningful carbon difference in the next 30 years? What can concerned builders do to support higher carbon storage in forests and help keep forests as forests?

The easiest way to make a meaningful carbon difference in forests is to get more carbon in forests without reducing harvest (otherwise you have to deal with complications of accounting for leakage—either to other forests or to other materials that have higher embodied carbon).

The following strategies can enhance forest carbon without impacting harvest levels and prevent land conversion to a non-forest:

1. Plant new forests
2. Manage forests for productivity
3. Reduce risk of fire, insects, mortality.

Advice for architects, engineers, owners, and other builders:

- Use wood products more to encourage landowners to keep forests as forests and to manage those forests.
- Do a better job of using the wood you get. CORRIM recently held a circular economy workshop (<https://corrim.org/circular-economy-workshop/>) where a presenter (Alan Organschi of Gray Organschi Architects) spoke to this need. While I thought the whole event was spectacular if you have only limited time please listen to his talk for some amazing inspirations on using wood as a climate mitigation solution. <https://corrim.org/designing-a-global-carbon-sink/>
- Ask for certification. Ask for any disclosures about the carbon and other environmental impacts that the supplier can provide about the forest or company that produced the logs.
- Ask for SFI, PEFC, FSC sources.
- Think local.
- Question that a specifier can ask: Where was this wood sourced? Are the wood suppliers certified, and/or are they operating in a well-regulated environment where rule of law prevails? Are forest resources in the supplying region increasing or declining?

*Answered by:*

*Elaine Oneil (CORRIM)*

*Pat Layton (Clemson University)*

*Edie Sonne Hall (Three Trees Consulting)*