THE WILDERNESS SOCIETY

February 20, 2009

Gary Gero
President
California Climate Action Registry
523 W. Sixth Street, Suite 428
Los Angeles, CA 90014

Re: Comments on the CCAR Wood Products Guidance

We appreciate the opportunity to provide comments on the Harvested Wood Products Guidance for the California Climate Action Registry, and we offer the following comments for your consideration.

The draft language on Harvested Wood Products Guidance proposed for inclusion in the Draft Forest Project Protocol registered by the California Climate Action Registry will overestimate the benefits of carbon stored in wood products due to several data gaps and unfounded assumptions.

Process 1) applies specific gravity (green weight basis) to the volume of logs harvested to calculate weight of logs harvested and their carbon content. Mixing very different species into a "miscellaneous" category introduces unnecessary inaccuracy to the estimates – it should be possible to track individual species and apply species-specific density factors.

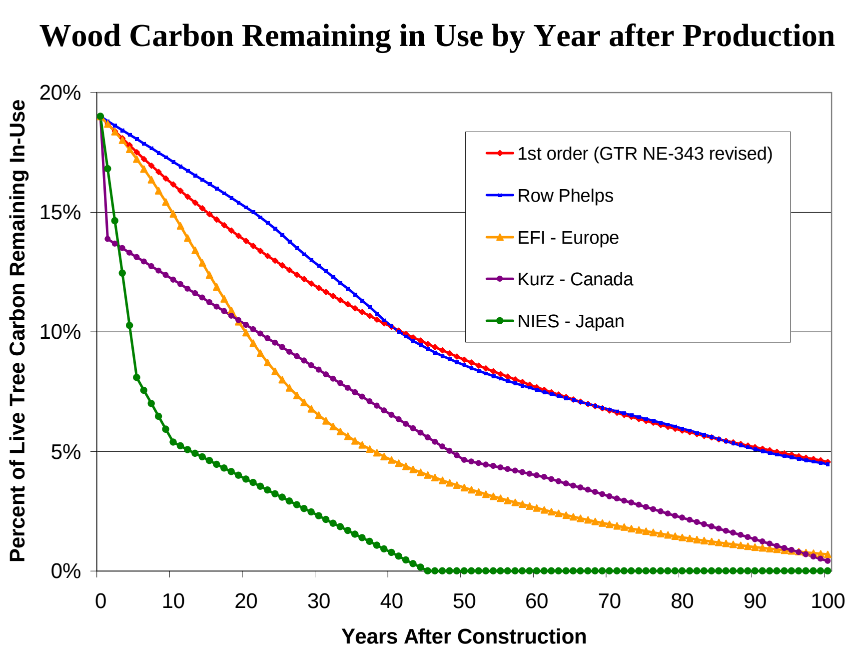
Process 2) applies mill efficiencies from 1605(b) tables to estimate the mass of wood embodied in finished products. There are several problems with use of these tables for this purpose.

- First, any fuelwood included in total harvest volume should be deducted before applying the parameters in Table A.1 of the CCAR HWP draft. Fuelwood will release its carbon content immediately rather than entering the long-lived wood products processing stream.
- Second, the 1605(b) tables for the Pacific Southwest apply to softwood only, and do not distinguish between sawlogs and pulp. Parameters from the softwood table should not be applied to any hardwood material harvested. If hardwoods are harvested from an enrolled project, the project will need to provide its own project-specific data on uses rather than applying inappropriate softwood parameters. Processing efficiency is generally lower for hardwoods, particularly when secondary processing losses are included. Separate factors should be developed for sawlogs and smaller diameter material, as less of the smaller material will be processed into long-lived products.

- Third, the 1605(b) tables reflect processing losses at the primary mill, but do not fully reflect losses in secondary processing (construction of cabinetry, flooring, or windows and doors, for instance). Secondary losses are assumed at 10% of roundwood volume, but in many cases losses will be much higher.
- Finally, 1605(b) tables are based on average values across very large regions, and processing efficiencies and end-product mix will vary widely in particular localities. The draft mentions that CCAR will provide more specific data for assessment areas based on mill surveys. Offset projects wishing to register wood product carbon storage should cover the cost of these supplemental surveys, since the information is required in order for these projects to be credible. An alternative approach would be for projects that harvest timber to periodically sample their own market outlets to provide project-specific data on mill efficiencies and end uses. This process will be less onerous than field sampling of forest carbon pools, and is equally important if project accounting is to reflect actual carbon stores. Inclusion of project-specific wood processing factors would also provide incentives to reduce wood waste and extend product life for material generated by an offset project property.

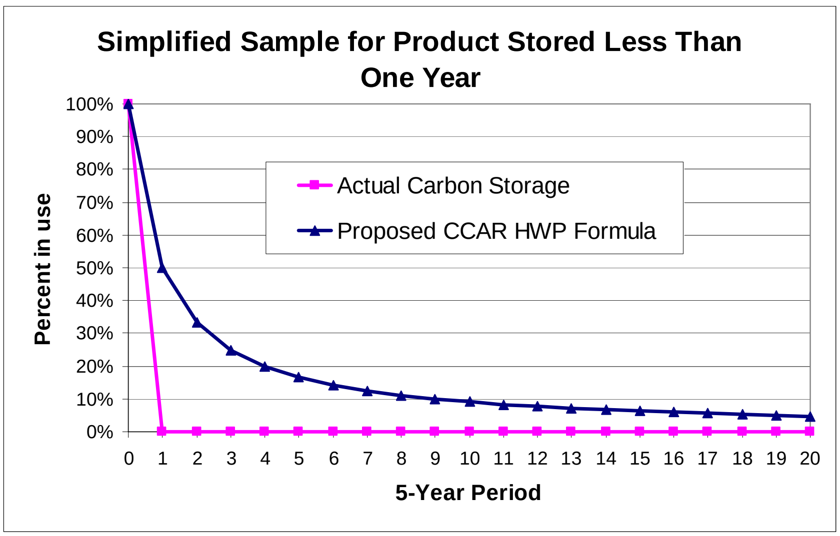
Process 3) tracks the rate of disposal of finished products over time. These data also have some serious limitations.

- First, assumptions about the form of equation describing product disposal (labeled 1st order below) used in the 1605(b) tables result in much higher estimates of wood product carbon stores when compared to assumptions made by other programs around the world[1]. In the face of uncertainty, offset protocols should adopt conservative assumptions so as not to overcount actual carbon storage.



[1] For a description of alternative disposal paths, see Miner, Reid. 2006. The 100-year method for forecasting carbon sequestration in forest products in use. Mitigation and Adaptation Strategies for Global Change. published online at http://www.springerlink.com/content/2l672741l7366751/.

- Second, the values in Table A.2 are variously described as "100-year in use value" or "average value over 100 years". They are neither. The formula uses a five-year interval rolling average. This generates an exaggerated value at the end of each 5-year interval, because it averages current amounts with the amounts present 5 years previously, and disregards the lesser amounts present in intervening years. Because the disposal path is nonlinear, this approach results in exaggerated estimates of average carbon stores. To illustrate the anomalous results generated by the five-year interval averaging procedure, take the extreme case where a wood product is stored for less than one year, with 100% of its carbon present in Year 0 and 0% remaining in Year 1. Such a short-lived product would release its CO_2 just as rapidly as the mill waste that receives no offset credit, and would contribute nothing to mitigating climate change. Yet the formula proposed in the CCAR HWP draft would generate "average" carbon storage estimates of 5% over 100 years (even though none of the carbon was actually stored as much as a single year!). The chart below illustrates actual carbon stores and the periodic average values generated by the proposed CCAR formula.



If CCAR insists on using an average value, the simplest approach would be to sum the estimated amounts of carbon for each year and divide by the number of years. Year 0 should be excluded from this averaging, because it represents carbon that is not stored for any amount of time at all. The table below shows CCAR proposed values, followed by actual 100-year averages.

	Softwood Lumber	Hardwood Lumber	Softwood Plywood	Oriented Strandboard	Nonstructural Panels	Miscellaneous Products	Paper
CCCAR Formula	0.470	0.262	0.490	0.585	0.387	0.189	0.078
100-Year Average	0.458	0.242	0.479	0.577	0.373	0.168	0.048

We strongly discourage use of an average value for crediting harvested wood product carbon, however. For a long-term policy objective like climate change mitigation, the time path of CO_2 losses from wood products in-use is important. Short-term storage has no beneficial impact on the climate. CCAR is promoting the acceptance of 100 years as equivalent to permanent storage, and requires that forest carbon stores be retained for at least this period of time in order to earn offset credits. To be consistent with this in-forest standard, only wood products carbon stored for at least 100 years should be eligible for credit.

The DOE 1605(b) registry, using a conservative approach appropriate to carbon accounting, credits only the wood expected to remain in use 100 years after harvest. This approach is a reasonable compromise that undercounts carbon stored during the first 100 years but overcounts carbon stored thereafter (since the amount is treated as fixed, but will actually shrink over time as products are disposed of after the 100-year date). We strongly urge a return to the 1605(b) approach to crediting of wood products carbon.

Process 4) estimates wood carbon stored in landfills, although the current draft does not propose to credit these stores. For most solid wood products, exclusion of landfills from project accounting is an appropriately conservative assumption, given vast uncertainties about landfill behavior over 100-year timeframes. If paper is included as a wood product eligible for storage credits, however, it will be critical to account for the effects of landfill methane. A much higher percentage of paper than solid wood decomposes relatively rapidly in landfills, and about half of its carbon will be released as methane, with a global warming potential 25 times that of carbon dioxide. Life-cycle analyses show paper as a strong net emitter of greenhouse gases. Including the climate effects of landfill methane generation for any paper storage claimed would provide incentives to boost the recycling rate and to recapture more landfill methane for energy generation, actions that could produce significant climate benefits.

The CCAR Forest Project Protocol draft issued in December, 2008 also contained some procedures relevant to wood products. In particular, that draft proposed no uncertainty discount for harvested wood products, apparently under the assumption that these can be measured with great precision. It is true that roundwood is measured with relatively high precision, since it forms the basis for payments made by brokers or mills to landowners. However, estimates of carbon stored over time as a result of processing this roundwood are extremely uncertain. They are based on very broad measures of harvest and mill production across large regions, and broad nationwide patterns of consumer use and disposal. The wood processing chain is likely to vary considerably in specific localities, and the rate of disposal of wood products is likely to change dramatically over 100 years, given consumer preferences and technological changes that could either extend product life or increase the proportion of disposables. It is entirely consistent with the measurement protocol for forest pools to impose a discount for uncertainty of wood products estimates.

Process 5)?

It is critical that CCAR incorporate a very large missing piece in its wood products carbon accounting framework. When wood products are included as part of a forest project, the project boundaries are essentially extended geographically and temporally to the final use and disposal of those products. Long-term storage of harvested wood clearly would be impossible without transforming and transporting that wood, and those processes generate GHG emissions. The carbon registered by forest offset projects has value only because of public policies that permit “outside-the-cap” entities like forests to sell the carbon they remove from the atmosphere. This publicly-conveyed value should not treat in-forest carbon, which has no associated fossil fuel emissions, as equivalent to wood products carbon, which has significant fossil emissions.

It is often claimed that wood processing and transport emissions are already covered under an economy-wide cap, so that forest projects cannot possibly increase emissions in capped sectors. Even when such a policy is in place, however, a forest project claiming wood products carbon credits places an additional burden on the processing sectors through harvest activity subsidized by carbon credit sales. Crediting the full value of wood products carbon to the landowner, while placing the burden of related emissions allowances on capped entities, is not an equitable policy approach.

A related claim asserts that wood products substitute for materials that have higher GHG emissions, and this may in fact sometimes occur. But this effect cannot be assumed in all cases, and if projects want to claim substitution credit they would need to document that substitution actually occurs. For most wood uses, wood is already the "business as usual" material, with limited opportunities for further substitution, so a 1:1 substitution with other materials is unlikely when harvest increases. This substitution claim also treats demand for houses and other long-lived wood products as constant. In fact, as climate policy increasingly favors a shift to a low-carbon economy, total demand for housing (both number and average size) should decrease as the costs of building and maintaining those homes rises. Because of uncertainties associated with a possible substitution effect, wood products should be favored as a GHG-friendly approach through such voluntary standards as green building codes, rather than through crediting through offsets which must be fully equivalent to emissions reductions.

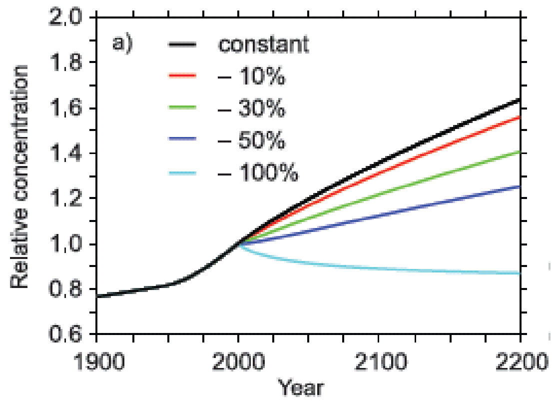
Processing emissions can far exceed the CO_2e stored in products and landfills at 100 years, and transport for some products can emit more than twice the CO_2e storage value[2]. We recommend that CCAR develop emissions factors for wood products processing sectors through a survey of available life-cycle assessments, and that forest projects wishing to credit wood products stores use these emissions factors, plus direct calculations of transport emissions for their own unique wood stream, to deduct fossil emissions from wood carbon stores credited to the project. Including emissions associated with wood products in the offset accounting would boost incentives to reduce energy use and reduce transport distances, practices which generate clear climate benefits.

100 Year Carbon Storage as Permanent?

Finally, we urge the CCAR to reconsider accepting either forest or wood products carbon stored for 100 years as fully equivalent to fossil fuel emissions reductions. The acceptance of a 100 year term is based loosely on popular statements that carbon dioxide has an "atmospheric lifetime" or "residence time" of 100 years. Yet credible scientific sources emphasize the impossibility of defining an atmospheric lifetime for this gas. According to IPCC Fourth

[2]See Meil, Jamie, Lippke, Bruce, Perez-Garcia, John, Bowyer, Jim, Wilson, Jim. August 23, 2004. CORRIM: Phase I Final Report, Module J Environmental Impacts of a Single Family Building Shell – From Harvest to Construction;and Gower, Stith T., McKeon-Ruedifer, Ann, Reitter, Annabeth, Bradley, Michael, Refkin, David J., Tollefson, Timothy, Souba, Fred J., Taup, Amy, Embury-Williams, Lynn, Schiavone, Steven, Weinbauer, James, Janetos, Anthony C., and Jarvis, Ron. 2006. Following the Paper Trail: The Impact of Magazine and Dimensional Lumber Production on Greenhouse Gas Emissions: A Case Study. Washington, DC: The H. John Heinz III Center for Science, Economics and the Environment.

Assessment Report, Working Group I, Chapter 10, "the lifetime of a gas in the atmosphere [is] defined as the time it takes for a perturbation to be reduced to 37% of its initial amount. While for CH_4, N_2O, and other trace gases… such lifetimes can be reasonably determined, a lifetime for CO_2 cannot be defined." Because CO_2 has no well-defined atmospheric lifetime, even dramatic decreases in CO_2 emissions will fail to stabilize atmospheric levels because a portion of any new CO_2 remains for millennia and joins with past residuals to have a significant cumulative effect on the atmosphere (see chart below, showing impacts of various reductions in CO_2 emissions compared to current emissions levels).[3]



Archer, et al[4] explain the confusion over the time path of fossil fuel carbon dioxide emissions.

> The gulf between the widespread preconception of a relatively short (hundred-year) lifetime of CO_2 on the one hand and the evidence of a much longer climate impact of CO_2 on the other arguably has its origins in semantics. There are rival definitions of a lifetime for anthropogenic CO_2. One is the average amount of time that individual carbon atoms spend in the atmosphere before they are removed, by uptake into the ocean or the terrestrial biosphere. Another is the amount of time it takes until the CO_2 concentration in the air recovers substantially toward its original concentration. The difference between the two definitions is that exchange of carbon between the atmosphere and other reservoirs affects the first definition, by removing specific CO_2 molecules, but not the second because exchange does not result in net CO_2 drawdown. The misinterpretation that has plagued the question of the atmospheric lifetime of CO_2 seems to arise from confusion of these two very different definitions.

Archer et al clearly explain the arbitrary nature of the popular assumption of 100 years as an atmospheric lifetime for carbon dioxide: "In practice, the tail [of carbon dioxide remaining in the atmosphere for thousands of years] is generally thrown out of GWP [global warming potential] calculations by truncating the integral at 100 years, a timescale that we argue arises from our own lifetimes rather than anything intrinsic about the carbon cycle."

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[3] IPCC Fourth Assessment Report, Working Group I, Chapter 10, Frequently Asked Question 10.3. See also Archer, et al. 2009. Atmospheric Lifetime of Fossil Fuel Carbon Dioxide. Annual Review of Earth and Planetary Sciences 37:21.1–21.18.

[4] Archer, David, Eby, Michael, Brovkin, Victor, Ridgwell, Andy , Cao, Long, Mikolajewicz, Uwe, Caldeira, Ken, Matsumoto, Katsumi, Munhoven, Guy, Montenegro, Alvaro and Tokos, Kathy. 2009. Atmospheric Lifetime of Fossil Fuel Carbon Dioxide. Annual Review of Earth and Planetary Sciences 37:21.1–21.18.

An atmospheric lifetime for carbon dioxide of 50 to 200 years was first reported in the Second Assessment Report of the IPCC. This result was generated by models that predicted the time it would take for ocean and atmosphere to reach a new equilibrium after a pulse of carbon dioxide is released into the atmosphere. The results ignore the essentially permanent increase of CO_2 that remains in the atmosphere after a new equilibrium is reached. Subsequent IPCC reports revised the atmospheric lifetime range for CO_2 to 5 to 200 years, reflecting even more rapid short-term uptake by terrestrial sinks, but still ignoring the essentially permanent increase in atmospheric levels. Finally, in IPCC's Fourth Assessment Report, Working Group 1 stated unequivocally that "while more than half of the CO_2 emitted is currently removed from the atmosphere within a century, some fraction (about 20%) of emitted CO_2 remains in the atmosphere for many millennia". Modeling by Archer et al shows that either a larger pulse of CO_2, which could overwhelm sink capacity, or warming of the oceans, which would decrease the solubility of carbon dioxide in seawater, could increase the percentage of residual atmospheric carbon dioxide substantially (up to 40%).

Because a significant portion of fossil carbon dioxide released to the atmosphere has such a very long term impact on atmospheric GHG levels, it is critical that we not substitute short term (100 years or less) carbon sequestration for fossil emissions. Recognizing that forest landowners may hesitate to make permanent commitments, one option to introduce greater flexibility would be for offset project contracts to be cancellable at any time by replacing the offsets with unused emissions allowances purchased for the purpose. This approach would support forest offsets as a bridge strategy that can buy the time necessary to develop the fossil-free technologies required to truly address climate change.

For more information on our comments, please contact Ann Ingerson at ann_ingerson@tws.org or 802-586-9625.