

Presentation 3.5: Greenhouse gas and carbon profile of the global forest products industry

Reid Miner

Vice President

National Council for Air and Stream Improvement, Inc. (NCASI)

Email: RMiner@NCASI.org

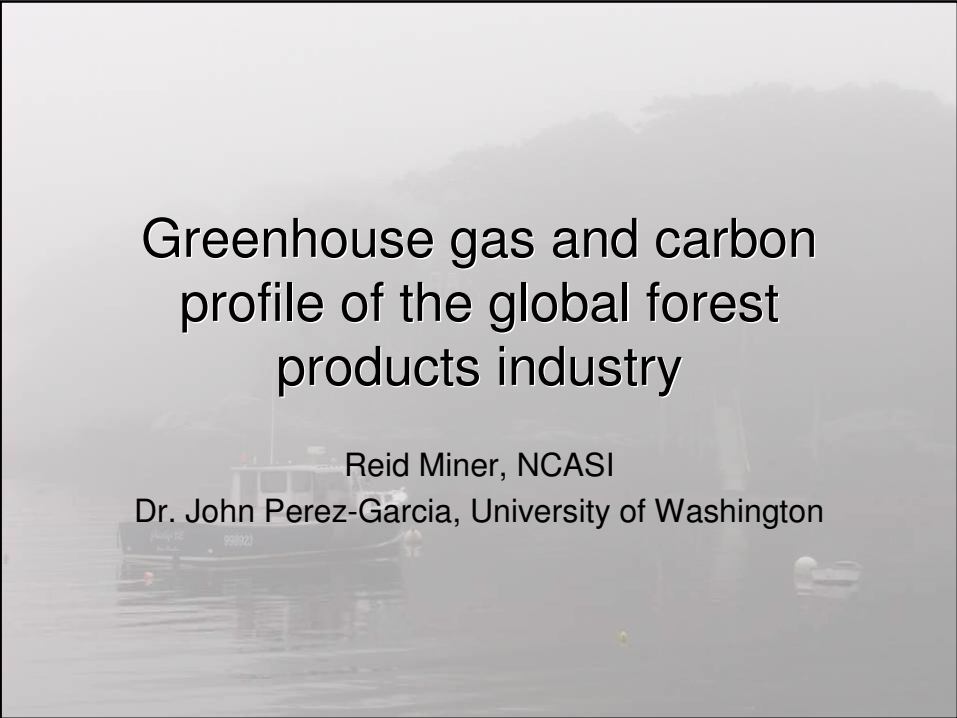
Abstract

The global greenhouse gas and carbon profile of the forest products industry value chain consists of emissions, sequestration and avoided emissions. In this paper, we characterize the different components of this profile and examine trends and policies that may affect it in the future.

The estimates developed in this study suggest that emissions related to (a) fossil fuel use in manufacturing, (b) electricity purchases and (c) decomposing forest products in landfills are of comparable importance to the industry's global profile. The greenhouse gas emissions along the industry's value chain, however, are largely offset by sequestration, primarily in forest products. Due to data gaps and uncertainties in the estimates, primarily for carbon sequestration in forests and methane emissions from forest products in landfills, it is not possible at this time to know the precise balance between global value chain emissions and sequestration.

Emissions from the global forest products industry value chain are expected to remain constant or decline slowly as the effects of increasing production are offset by improvements in the emissions intensity of manufacturing and reduced emissions from products in landfills. Carbon sequestration in products will become an even larger piece of the industry's profile as the demand for forest products increases in response to population growth and increasing standards of living.

Continued progress in improving the industry's greenhouse gas and carbon profile will depend on industry maintaining its efforts to reduce emissions intensity. Private investment and public policies to ensure adequate supplies of biomass for raw material and fuel will also be needed. Also critical will be policies that keep forest products out of landfills, and control methane releases from landfills.



Greenhouse gas and carbon profile of the global forest products industry

Reid Miner, NCASI
Dr. John Perez-Garcia, University of Washington

Background

- This work makes use of information developed in several earlier projects performed by NCASI and Univ. of Washington for WBCSD and ICFPA
- The analysis is based on primarily on data and methods from IPCC, FAO, IEA, and national trade associations
- This is a global assessment
 - The footprint will look different for specific nations or regions

The pieces of the profile

- Emissions
 - Direct emissions - manufacturing
 - Indirect emissions
 - * Purchased power - manufacturing
 - * Transport (assuming are indirect)
 - * Methane from products in landfills

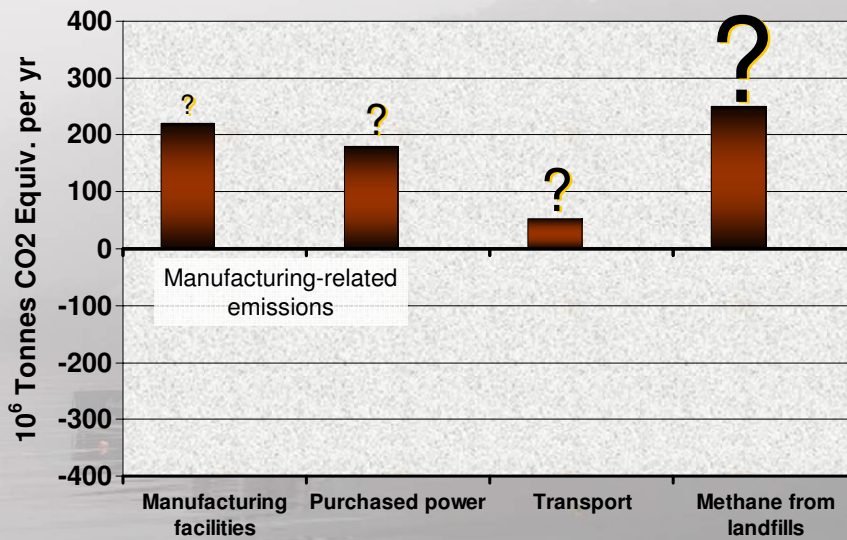
- Carbon sequestration
 - Forests
 - Products in use
 - Products in landfills

- Avoided emissions
 - Biomass energy
 - CHP
 - Recycling
 - Substitution effects

The pieces of the profile

- Emissions
 - Direct emissions - manufacturing
 - Indirect emissions
 - * Purchased power - manufacturing
 - * Transport (assuming are indirect)
 - * Methane from products in landfills

The Emissions Picture



The pieces of the profile

- Emissions
 - Direct emissions - manufacturing
 - Indirect emissions
 - * Purchased power - manufacturing
 - * Transport (assuming are indirect)
 - * Methane from products in landfills

- Carbon sequestration
 - Forests
 - Products in use
 - Products in landfills

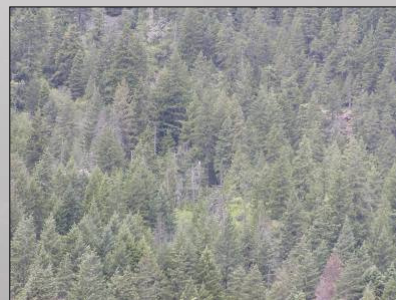
- Avoided emissions
 - Biomass energy
 - CHP
 - Recycling
 - Substitution effects

The pieces of the profile

- Carbon sequestration
 - Forests
 - Products in use
 - Products in landfills

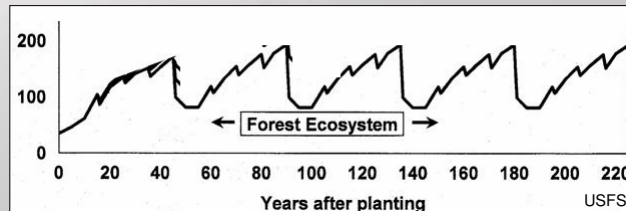
Forest ecosystem carbon

- Three types of effects
 - Sustainably managed forests
 - Establishing new forests
 - Converting forest to non-forest (deforestation)



Forest ecosystem carbon

- Sustainably managed forests
 - Net zero stock change is a reasonable base assumption

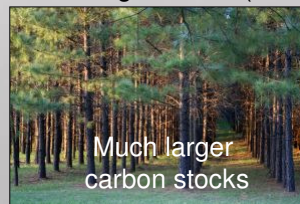
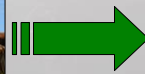
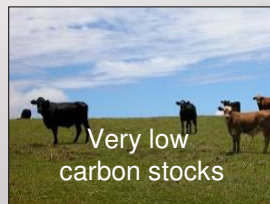


- Steady-state assumption ignores carbon accumulating on industry-owned or –managed set asides

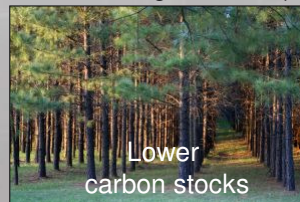
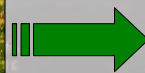


Forest ecosystem carbon

- Establishing new managed forests
 - 1990s, ~ 1.6 million acres of non-forest to managed forest (FAO)



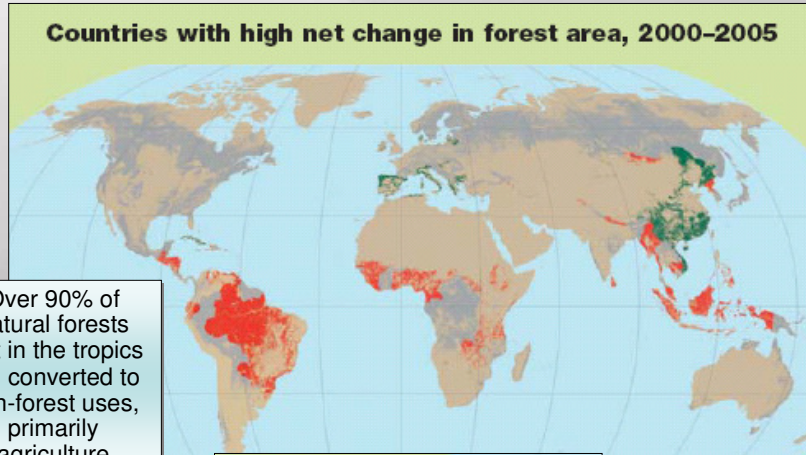
- 1990s, ~ 1.5 million acres of natural forest to managed forest (FAO)



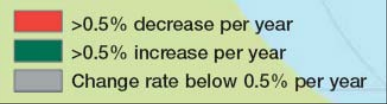
- Available information suggests that at a global level, the carbon impacts approximately cancel each other out

Forest ecosystem carbon

- Converting natural forest to non-forest
 - Where and why is deforestation happening?



Over 90% of natural forests lost in the tropics are converted to non-forest uses, primarily agriculture



Source FAO

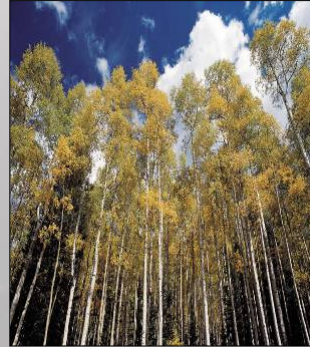
The industry's position

- The global forest products industry is opposed to illegal logging and is committed to a global expansion of third-party certification of sustainable forest management practices

Forest ecosystem carbon summary

- Sustainable forest management
- Establishing new forests
- Deforestation

- The forest products industry's use of forests probably does not directly cause significant increases or decreases in global forest carbon stocks
 - Very high uncertainty in the estimates



Carbon in products-in-use

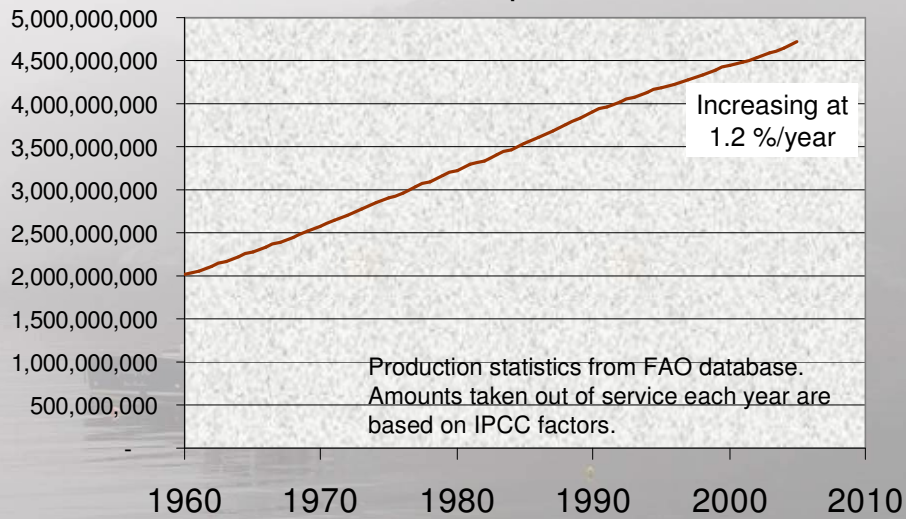
- The amount of carbon sequestered in products in use is increasing because...
 - Some products remain in use for long times



- More products are made every year due to population growth and increasing standards of living
- As more carbon is accumulated in products, more is kept out of the atmosphere

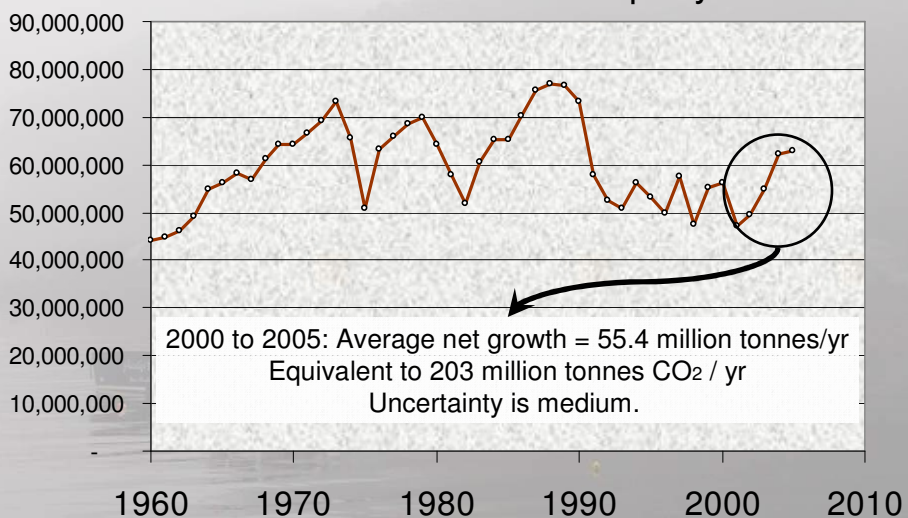
The results

Size of pool of carbon in Products in Use
- Tonnes of carbon in products in use -



The results

Net growth in carbon in Products in Use
- Tonnes of carbon increase per year -



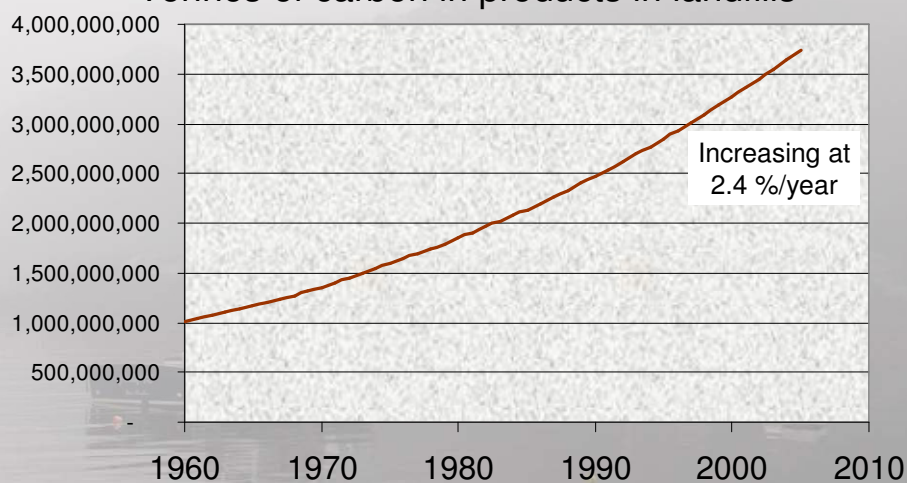
Carbon in products in landfills

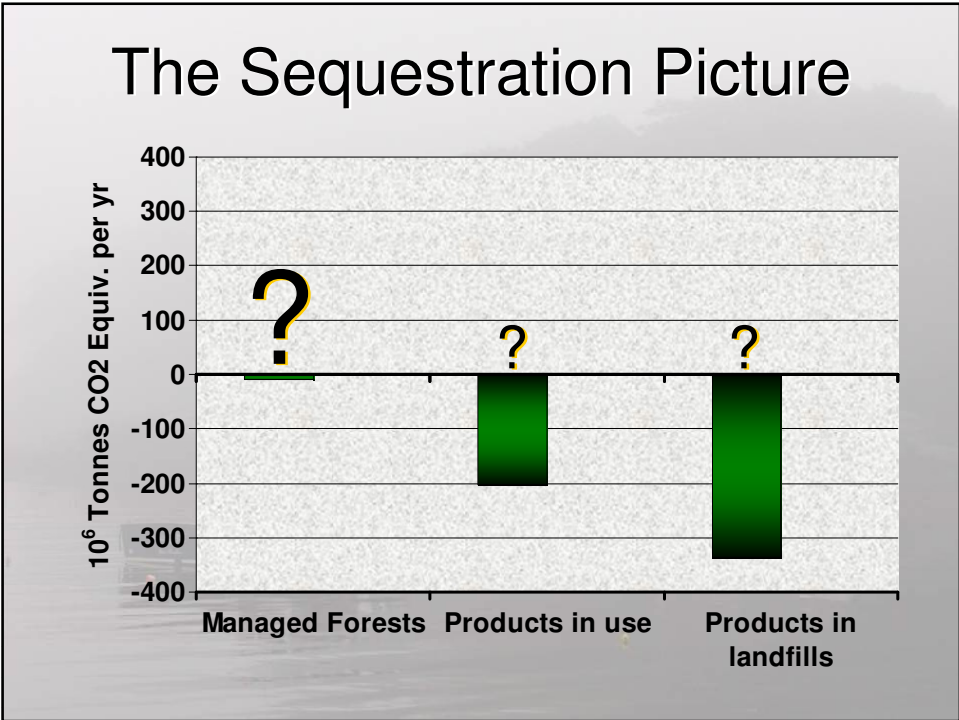
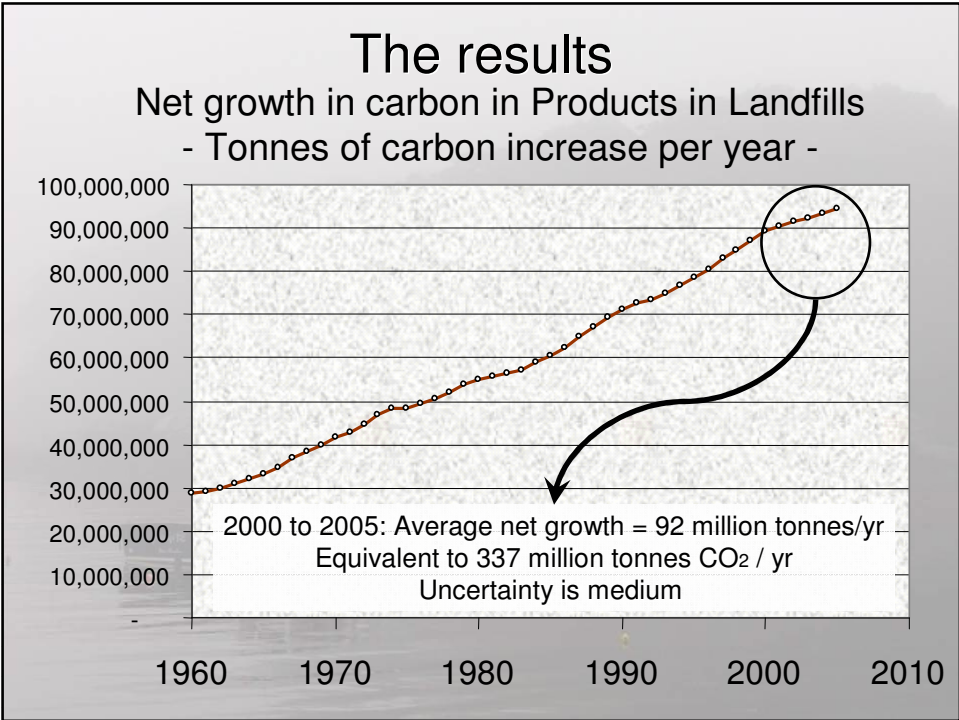
- Some discarded forest products are landfilled
- Estimate from products-in-use calculations and regional waste data
- Landfill mass balance
 - IPCC approach and default assumptions



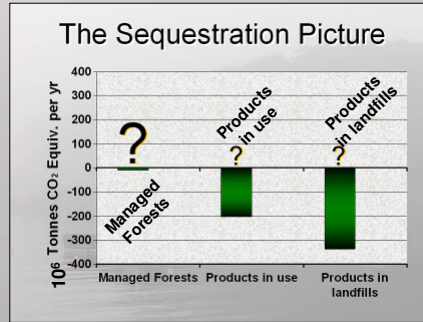
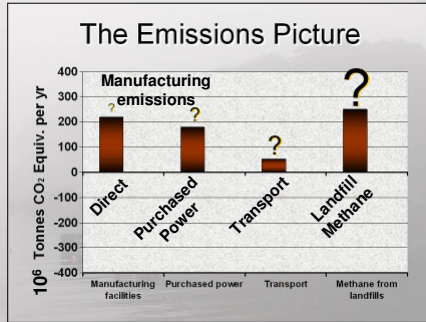
The results

Size of pool of carbon in Products in Landfills
- Tonnes of carbon in products in landfills -





Putting the pieces of the profile together



Value chain emissions are largely offset by sequestration

The pieces of the profile

- Emissions
 - Direct emissions - manufacturing
 - Indirect emissions
 - * Purchased power - manufacturing
 - * Transport (assuming are indirect)
 - * Methane from products in landfills

- Carbon sequestration
 - Forests
 - Products in use
 - Products in landfills

- Avoided emissions
 - Biomass energy
 - CHP
 - Recycling
 - Substitution effects

The pieces of the profile

- Avoided emissions
- Biomass energy
- CHP
- Recycling
- Substitution effects

Avoided emissions associated with the use of biomass energy

- What are the GHG emissions avoided via the use of biomass fuels?
 - Alternative scenario = industry uses current fossil fuel mix to satisfy all energy needs
 - Would result in GHG emissions increasing by 175 million tonnes CO₂ per year



Avoided emissions associated with use of CHP

- What are the GHG emissions avoided via the use of CHP?
 - Alternative scenario = industry generates none of its own power but purchases all it needs
 - Would result in indirect GHG emissions increasing by 94 million tonnes CO₂ per year



Avoided emissions associated with recycling paper

- Estimates are very dependent on many parameters that are highly variable from one region to another and not known for many regions
- Not possible to derive global estimate of avoided emissions associated with paper recycling
 - May be possible to estimate this effect for a specific region
 - Benefits will vary by region

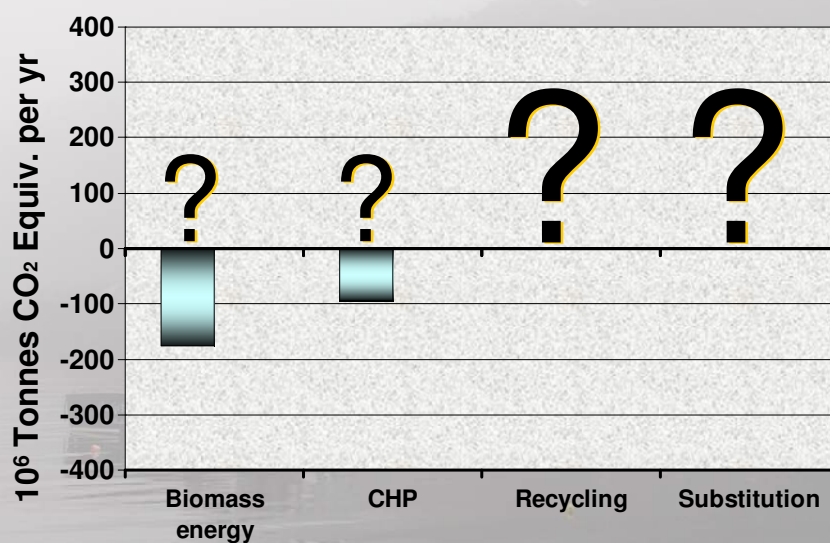


Avoided emissions due to substitution effects

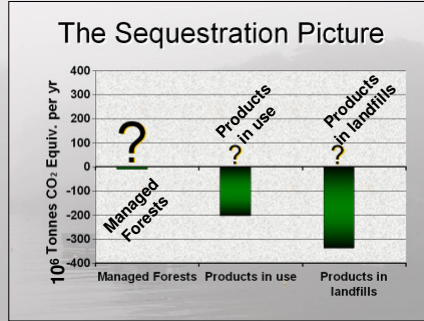
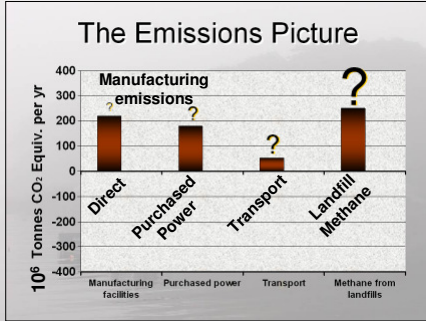
- Substitution effects are very product-specific and site-specific
- Not possible to derive global estimate of avoided emissions associated with all substitution effects
 - May be possible to estimate this effect for a specific product substitution in a specific region
 - Wood based building materials



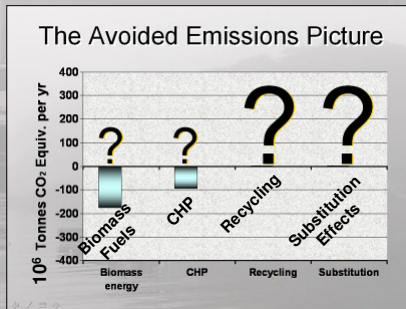
The Avoided Emissions Picture



Putting the pieces of the profile together



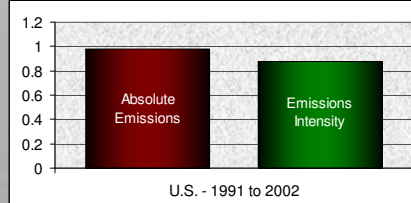
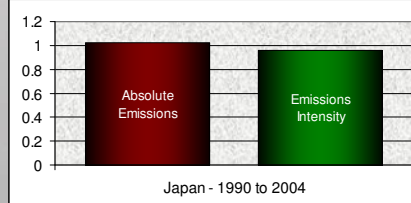
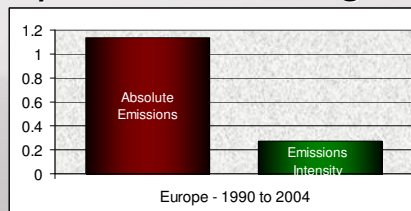
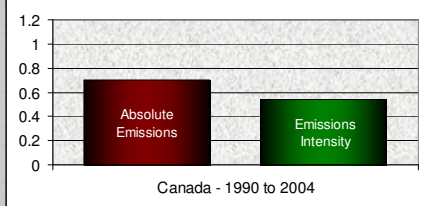
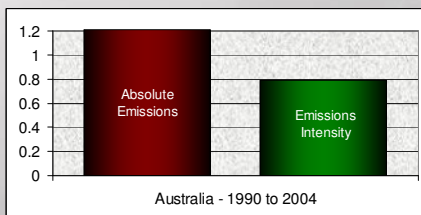
Value chain emissions are largely offset by sequestration



Avoided emissions provide additional benefits

How do we expect this profile to change?

- Direct emissions
 - Reduced intensity offset by increased production



How do we expect this profile to change?

- Indirect emissions from purchased power
 - Uncertainties regarding activities in the power sector
 - Increased use of CHP to reduce electricity purchases
 - Interaction between steam demand and power production
 - It seems possible that indirect emissions may increase, but more slowly than production



How do we expect this profile to change?

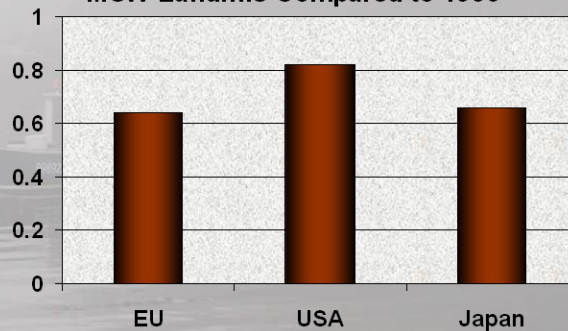
- Transport-related emissions
 - Increased globalization
 - Migration of production capacity to sites more distant from markets
 - Transport-related emissions are likely to become a more important element of the industry's profile



How do we expect this profile to change?

- Methane emissions from landfills
 - Emissions are decreasing (CH₄ capture, recycling)
 - Should become less important part of profile
 - Importance of public policies on recycling and landfill design

2003/4 Methane Emissions from MSW Landfills Compared to 1990



How do we expect this profile to change?

- Sequestration
 - Extension of sustainable forestry practices suggests that industry-managed forests will continue to be, at worst, a net zero contributor to emissions
 - The carbon impacts of establishing new forests will depend on previous land use
 - Carbon storage in products and landfills will be an increasingly important element of the industry's profile



Conclusions

- The global forest product industry's value chain emissions are largely offset by sequestration
 - Several different types of avoided emissions provide further benefits
- Manufacturing-related emissions are important
 - Can be expected to be constant or grow more slowly than output
- Transport emissions are a small part of the global profile
 - But will be increasingly important
- Landfill methane is very important to the global profile
 - But is expected to be less important over time
- Sequestration, especially in products, is a very important part of the industry's profile
 - It will almost certainly become increasingly important over time
- Continued progress will depend on appropriate public policies, especially policies that...
 - Keep used products out of landfills and reduce methane emissions
 - Provide incentives for CHP and access to "green" power markets
 - Facilitate capital turnover
 - Ensure adequate supplies of biomass as raw material and fuel



Thank You