Indicator 5.23.

Total Forest Product Carbon Pools and Fluxes

What is the indicator and why is it important?

Indicator 5.23 assesses the role that forest products play in the sequestration, cycling, or emission of carbon. Long-term storage of carbon in products and landfills delays or reduces carbon emissions. Use of wood products can also reduce emissions if they substitute for products with higher carbon emission processes. As domestic forest biomass is harvested carbon is shifted from forest ecosystems to forest products held in products and landfills. The rate of accumulation of carbon in products can be influenced by the mix of products and uses (e.g., the lumber used in housing versus the paperboard used in boxes) and by patterns of disposal, recycling, and landfill management. This indicator shows the harvested wood product (HWP) contribution to the combined system of annual CO_2 emissions and removals by forests and products. This indicator primarily uses the production accounting approach to track the HWP contribution. This approach tracks carbon levels in wood that was harvested in the United States, including carbon held products that are exported. The United States uses this approach to report the HWP contribution under the UN Framework Convention on Climate change. HWP contributions are also shown for the stock change approach which tracks carbon stock changes in the United States and the atmospheric flow approach which tracks net carbon exchange with the atmosphere. Estimates are made using methods recommended by the Intergovernmental Panel on Climate Change.

What does the indicator show?

In 2006, under the production approach, HWP contribution due to carbon additions to forest products in use and in landfills was 110 million tons CO_2 equivalent or about 17 percent of the value of annual carbon additions to forest ecosystems. In 2006 this contribution offset emissions equal to about 34 percent of the CO_2 emitted by fossil fuel combustion in residential housing. The annual contribution is now less than the contribution in 1990 due, in part, to the decreasing amount of U.S. timber harvested and to the replacement of products from domestic harvest products by imported products. Under the stock change accounting approach, HWP contribution has increased notably since 1990 because of increases in imports. Annual contributions under the atmospheric flow approach are about the same as for the production approach (fig. 23-1).

Under the production approach, additions to carbon storage have been increasing for solidwood products in landfills, and decreasing for solidwood in uses, and for paper in uses and landfills. Annual additions to paper in uses were negative for the 2001-to-2003 period. (fig. 23-2).

Figure 23-1. Harvested wood product contribution to CO_2 removals under the three accounting approaches, 1990 to 2006 (Tg CO_2e).

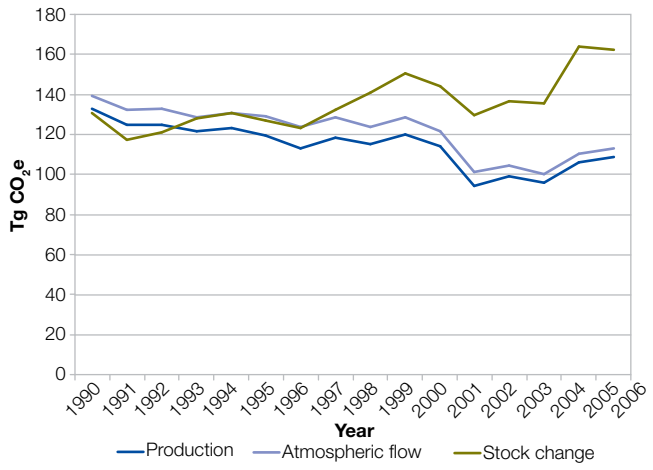
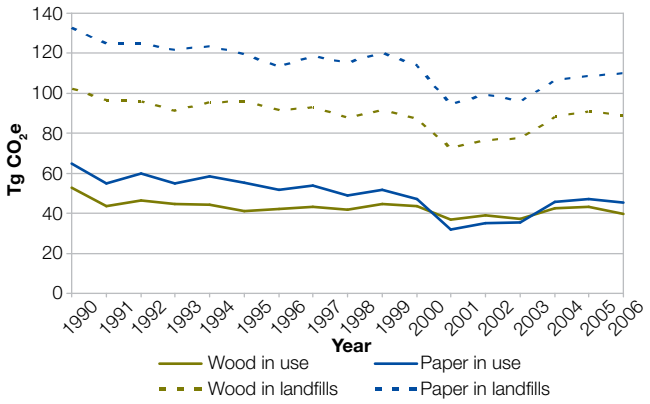


Figure 23-2. Cumulative annual harvested wood product contribution by location of storage—wood and paper products in use and wood and paper product in landfills, 1990–2006 (Tg CO_2e).



The annual amount of HWP contribution as a percent of total forest carbon stock has decreased since 1990 (fig. 23-3).

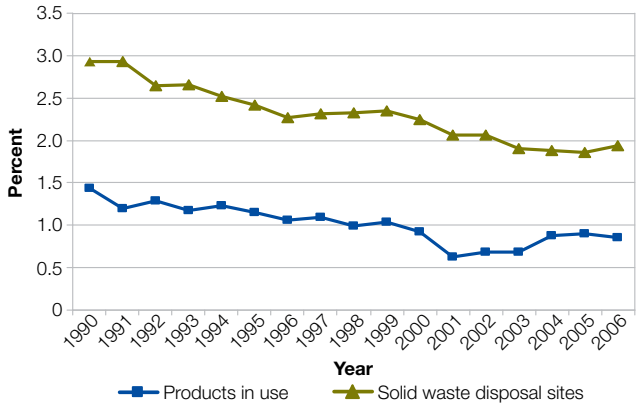
In 2007, total carbon stored in forest products in use and in landfills under the production approach equaled more than 8,000 Tg CO_2 equivalent or more than 1 year worth of CO_2 emissions in the United States.

A rough estimate of the GHG emission savings because of building wood framed single-family detached homes in 2005 instead of building homes using example designs that use steel or concrete walls is 1.7 million tons of CO_2 equivalent. This potential savings is because of lower Greenhouse Gas emissions associated with production of wood products. The emission savings associated with using wood in single-family detached homes is only part of the total savings, which would also include wood framed single-family attached and multifamily houses. Single-family detached houses provided about 54 percent of the total housing floor area build in 2005.

What has changed since 2003?

The estimates of HWP contribution to forests and products emissions and removals have been improved and now better track effects of changes in product production, use and disposal. It is now estimated that the HWP contribution to carbon storage has decreased since 1990 under the production and atmospheric flow accounting approaches.

Figure 23-3. Annual harvested wood product carbon additions as a percent of total forest plus product carbon stock in the United States, 1990–2006.



Are there important regional differences?

Regional differences in contribution to carbon storage in products were identified by estimating the contribution each county makes to wood carbon storage. The objective is to estimate the portion of carbon harvested in 2006 that is still stored after 100 years. To do this we estimate the wood harvest in each county, estimate the wood products that are produced (lumber, panels, and paper), the end uses where those products are used (e.g., housing and paper products), the rate of discard from use, the rate of disposal to landfills, and their decay from landfills. The amount still stored after 100 years has offset an equivalent CO_2 emission for 100 years.

Figure 23-4 shows the estimated amounts of carbon still stored in products from 2006 harvest in U.S. counties after 100 years in tons of carbon storage per hectare of timber land. Carbon storage per hectare is highest for timber land in Midwest and Mid-Atlantic States. The amount of carbon stored per hectare after 100 years is influenced by the harvest per hectare and by the mix of sawlogs or pulpwoods and softwoods or hardwoods produced. About 30 percent of carbon from both hardwood and softwood sawlogs is stored after 100 years along with about 20 percent from hardwood pulpwood and 10 percent from softwood pulpwood.

Figure 23-4. Estimated amount of carbon still stored in 100 years from wood harvest in 2006 by county (Mg CO_2e per hectare of timber land).