Climate VISION Progress Report

American Forest & Paper Association

Results through 2006

Highlights:

American Forest & Paper Association (AF&PA) members are meeting their Climate VISION commitment to reduce GHG emission intensity by conserving energy, generating and using renewable biomass energy, developing new biomass-based sources of energy, and using recycled materials.

From 2000 to 2006, combining both direct and indirect emissions intensity, AF&PA member companies decreased their emissions intensity from 0.738 to 0.637 tons of CO_2 equivalents per ton of production – a decrease of 14 percent. This total is comprised of a direct greenhouse gas emissions intensity decrease of 24 percent, from 0.513 to 0.389 tons of CO_2 equivalents per ton of production, and an indirect emissions intensity increase of 10 percent. Indirect emissions are those generated by suppliers of purchased electricity.

In addition, in 2006, AF&PA member companies' use of recycled paper to make new paper products prevented emissions of 21.1 $MMTCO_2$-eq due to the avoidance of methane emissions from landfills, where the paper would otherwise decay.

Carbon sequestered in growing trees remains locked in wood and paper products during their lifecycles. In 2006, the paper and wood building materials produced by AF&PA member companies were responsible for the long-term storage of 23.8 $MMTCO_2$-eq of CO_2.

Industry Sector and Participants:

AF&PA's commitment is made on behalf of 83 company members, who manufacture approximately 80 percent of the pulp and paper and approximately half of the wood building materials produced in the United States. Trees and wood and paper products are natural, renewable, and recyclable resources that help remove CO_2 from the atmosphere and store its carbon. The world's forests—and the wood and paper products they provide—are valuable tools for helping to meet the challenges of global climate change and the needs of the global economy. The forest products industry's carbon footprint is diverse and includes direct and indirect emissions of GHGs from manufacturing operations, the ability to sequester carbon in forests and products, and the ability to reduce methane emissions from landfills through the use of recycled paper.

Primary Climate VISION Goal:

Members of AF&PA are committed to collectively reducing their emissions intensity through improving energy efficiency; enhancing sequestration in forests and products; developing and implementing improved technologies; inventorying emissions; and increasing fiber recovery for recycling. When the commitment was made in January 2003, AF&PA members estimated that these programs would reduce their GHG intensity by 12 percent by 2012 relative to 2000.

Additional Climate VISION Goals:

AF&PA members also are pursuing a new paper recovery goal of 60 percent by 2012. Achieving this recovery rate will lead to corresponding reductions in GHG emissions by reducing methane emissions from landfills. In 2007, the U.S. recovery rate for paper and paperboard reached 56 percent, and AF&PA is asking households and businesses across the country to help meet the new goal. AF&PA has created partnerships with organizations, including EPA, Keep America Beautiful, and Scholastic, Inc. to raise visibility for the goal and continue increasing recovery of high-quality fiber. Nearly 80 percent of U.S. papermakers use some recovered fiber in manufacturing new paper products, and substantial investments have been made in new machines for recycling.

Metrics Identified:

Working with the National Council for Air and Stream Improvement (NCASI), AF&PA members developed a protocol to monitor progress in each area described in the Climate VISION commitment. The protocol defines three metrics that characterize the industry's performance in terms of emissions and reductions to emissions from sequestration and recycling activities. Indirect emissions associated with the generation of purchased electricity and forest sequestration are also monitored but not formally included in calculating progress against the Climate VISION Commitment.

DIRECT EMISSIONS METRIC**:** This metric measures direct emissions of CO_2 from stationary combustion of fossil fuel. An earlier examination of emission sources determined that CO_2 emissions from stationary combustion of fossil fuels represent at least 90 percent of direct emissions from the U.S. forest products industry. In addition, it is these emissions that can be estimated with greatest accuracy. AF&PA collects data on fossil fuel consumption at member companies and these data are used, along with emission factors from the World Resources Institute (WRI)/World Business Council for Sustainable Development (WBCSD) GHG Protocol tools.

PRODUCT CARBON SEQUESTRATION METRIC**:** The industry calculates the annual carbon sequestration in forest products in use by employing a method called "the 100-year method." This method, developed and first used by Georgia Pacific Corporation and since endorsed by the International Council of Forest and Paper Associations (ICFPA), calculates the amount of carbon in the current year's production that is in products expected to be in use for at least 100 years. It has been adopted as one of the accepted methods under the 1605b program for Voluntary Reporting of Greenhouse Gases Program.

AVOIDED METHANE EMISSIONS METRIC**:** EPA has examined the GHG and carbon implications of using various methods to manage the major components of the municipal solid waste stream, including the effects of paper recycling on methane releases from municipal solid waste landfills. EPA's analysis has been used to develop emission factors representing the amounts of methane avoided per ton of paper recycled. The emission factors are then multiplied by the changes in the quantities of paper recycled by AF&PA members in any given year, compared to a 2000 base year. The quantities of paper being recycled are determined based on data collected by AF&PA.

Other Measures Monitored:

INDIRECT EMISSIONS**:** Indirect emissions are associated with the generation of purchased electricity: Although indirect emissions are not included in the AF&PA VISION commitment, the industry is tracking and reporting changes in these emissions. This is being done both to determine whether improvements in direct emissions intensity are a result of increased power purchases and to determine if the industry's purchases of power are changing dramatically. Indirect emissions are calculated from net purchases, using the most recent average U.S. emission factor for purchased electricity. The data on electricity consumption and sales come from the AF&PA biennial fuel and energy survey. The data are used to derive estimates of indirect emissions using methods analogous to those used for direct emissions.

FOREST CARBON SEQUESTRATION**:** Forests play a crucial role in the global carbon cycle. Well-managed forests, improvements in their productivity, and the creation of new forests provide a powerful mechanism for removing CO_2 from the atmosphere. The forest industry owns a relatively small percentage of the world's forests, and AF&PA members' contribution to forest sequestration is not quantified in this report. However, the industry plays a major role in promoting and supporting sustainable forest management on all forestlands through its commitment to the Sustainable Forest Initiative® (SFI) Program. The SFI Program—the most-recognized forest management standard and certification system in the U.S. and Canada—sets standards for maintaining long-term forest resources. Adherence to the SFI standard is a condition of membership for all AF&PA members.

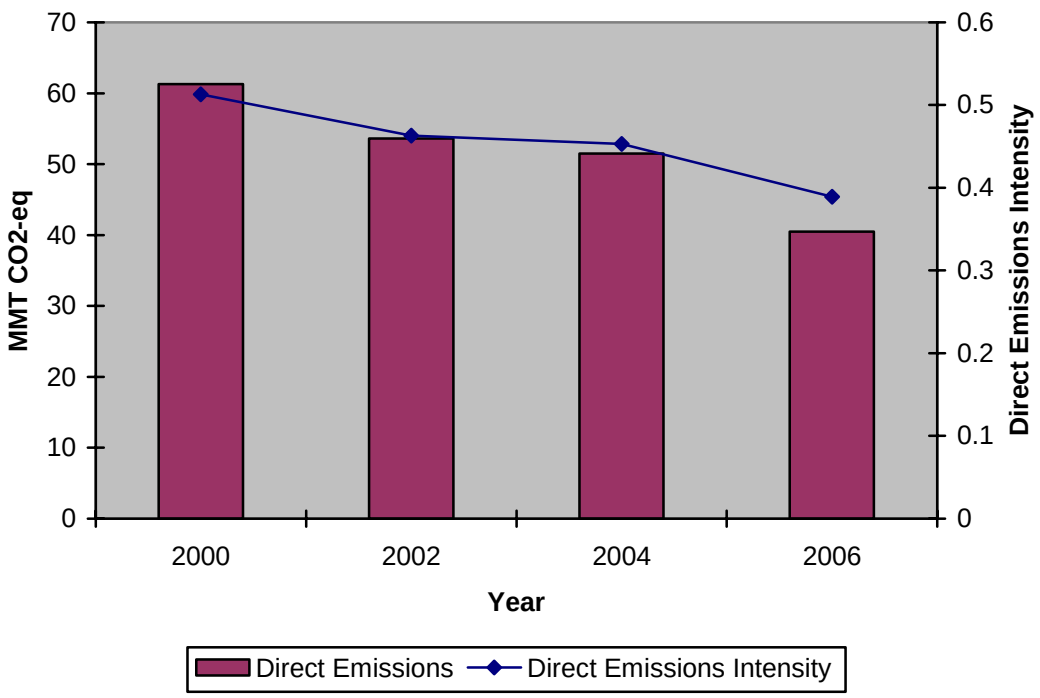
Measured Results to Date:

Taking direct and indirect emissions intensity together, emissions intensity decreased from 0.738 to 0.637 tons of CO_2 equivalents per ton of production – a decrease of 14 percent. This total is comprised of a direct greenhouse gas emissions intensity decrease of 24 percent, from 0.513 to 0.389 tons of CO_2 equivalents per ton of production and an indirect emissions intensity increase of 10 percent. Indirect emissions are those generated by suppliers of purchased electricity.

From 2000 to 2006, AF&PA member companies collectively reduced their absolute direct GHG emissions 34 percent, from 61.2 to 40.5 $MMTCO_2$-eq. Absolute indirect emissions associated with the generation of purchased electricity decreased 4 percent from 26.8 to 25.8 $MMTCO_2$-eq from 2000 to 2006. Combined direct and indirect absolute emissions decreased 24.6 percent falling from 88.0 million metric tons of CO_2 equivalents to 66.3 million metric tons. Approximately half of this reduction can be attributed to improvements in GHG emissions, such as efficiency improvements or reduced fossil fuel use and half can be attributed to decreases in production and changes in baseline from the year 2000.

In addition, in 2006, AF&PA member companies' use of recycled paper to make new paper products has resulted in avoided emissions of 21.1 $MMTCO_2$-eq due to the avoidance of methane emissions from landfills, where the paper would otherwise decay.

Carbon sequestered in trees becomes stored in wood and paper products for the duration of the products' useful life. In 2006, long-term carbon storage in products produced by AF&PA member companies totalled 23.8 $MMTCO_2$-eq.



ENERGY AND BIOMASS USE**:** Current energy data show that AF&PA members are focused on conservation and made great strides in reducing their reliance on fossil fuels between 2000 and 2006. The data in Table 3-1 indicate that per ton of production pulp and paper mills:

Reduced fossil fuel use by 19.1 percent
Increased renewable energy use by 10.2 percent
Reduced overall energy use (from both fossil fuel and renewable energy sources) by almost 2.4 percent

Table 3-1
Energy per Ton of Paper Produced 2000 – 2006 (Million Btu)

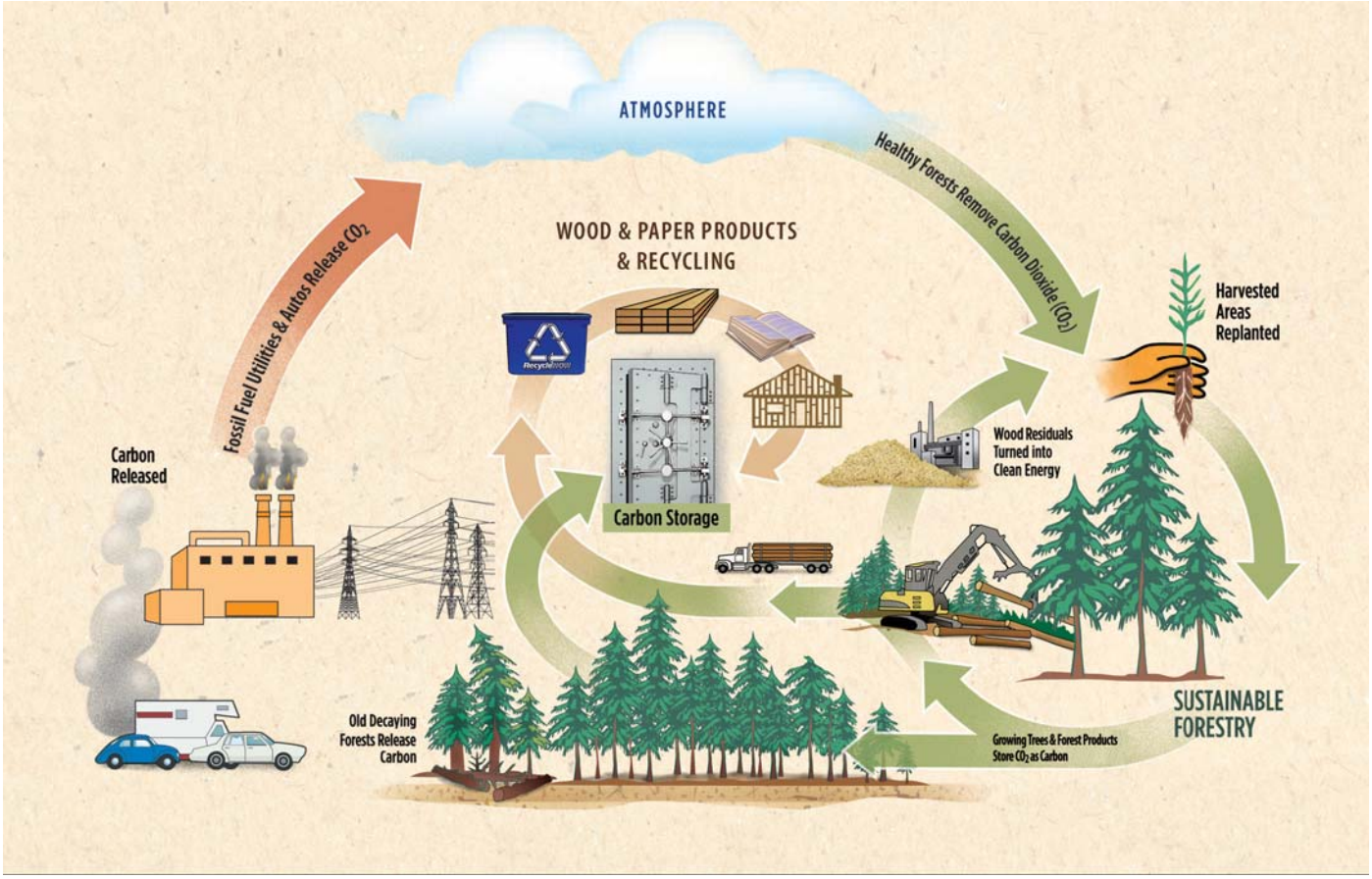
	2000	2002	2004	2006
Fossil Fuel	10.44	9.76	9.31	8.45
Biomass & Hydroelectric	13.78	14.74	14.22	15.19
Total Energy Per Ton	24.22	24.50	23.53	23.64

Additionally, according to the latest DOE figures, in 2005, 98 percent of the electricity generated at pulp and paper mills and 96 percent of the electricity generated at wood products facilities was co-generated (produced from steam generated on-site).[1] The forest

[1] Data extracted from National Energy Information Center (NEIC) surveys EIA-906/920, January - December 2005 and Nonutility Energy Balance. The data is available at: http://www.eia.doe.gov/cneaf/electricity/page/eia906_920.html

products industry leads all other industries in the use of biomass energy. The 2006 data indicate that 74 percent of the fuel used at wood product facilities and 64 percent of the fuel used at pulp and integrated pulp and paper mills are biomass fuels.

Biomass fuels are typically derived from wood, chips, bark, sawdust, other wood and vegetation residuals and pulping liquors recovered from harvesting and manufacturing processes. DOE data show that wood products facilities and pulp and paper mills produced 82 percent of the biomass-based fuel generated by all industrial sectors in 2005.[2] Energy-rich biomass results from tree and other vegetative growth that removes CO_2 from the atmosphere and transforms it into carbon. DOE's 1605b program for Voluntary Reporting of Greenhouse Gases, the Intergovernmental Panel of Climate Change (IPCC), EPA, the European Union's Emissions Trading Scheme (ETS), and other internationally recognized climate policy groups have concluded that GHG emissions totals should not include emissions of CO_2 associated with the combustion of sustainably managed biomass. As a result, biomass is often referred to as carbon neutral. Operationally, "although these fuels do emit CO_2, in the long run the CO_2 emitted from biomass consumption does not increase atmospheric CO_2 concentrations if the biogenic carbon emitted is offset by the growth of new biomass."[3] It is assumed that the carbon released during the consumption of biomass is recycled as U.S. forests and crops regenerate, causing no net addition of CO_2 to the atmosphere.[4]



[2] http://www.eia.doe.gov/cneaf/solar.renewables/page/rea_data/table8.pdf
[3] U.S. GHG Inventory to UNFCCC (1990-2004) page 3-11, Box 3-2 (2006 submission)
[4] U.S. GHG Inventory to UNFCCC (1990-2004) Energy 3-0 (2006 submission)

Other Sustainability Accomplishments

Our greenhouse gas reductions, generation and use of renewable energy, and carbon sequestration and storage in forests and forests products are only part of the sustainable nature of the forest products industry. We also sustainably use renewable resources, lead the way in recycling, and have dramatically reduced our environmental footprint.

Sustainable Use of Renewable Resources

We sustainably manage and rely on forests that continue to grow more trees than are harvested. The area of U.S. forests has significantly increased over the past 50 years, and there are 12 million more acres of forestland today than there were 20 years ago. We promote sustainable forest management and have made it a condition of AF&PA membership for the 80 percent of our members that own forest land or purchase fiber directly from the forests. AF&PA members participate in the Sustainable Forestry Initiative® (SFI) program, among others, and most have been independently certified to this internationally recognized standard. In 2006, the SFI® program participants reforested 1.2 million acres of forestland through planting or natural regeneration and over 7,000 loggers completed SFI-supported training on best forest management practices.

Leading The Way In Recycling

The forest products industry is a leader in the area of paper recycling. Today, more paper is reused in new products than is sent to landfills. For example, in 2007, a record 56 percent of paper consumed in the U.S. was recovered for recycling, more than any other commodity. The industry has committed to recover 60 percent of paper consumed in the U.S. by 2012 through public-private partnerships. Each percentage point increase means recovery of an additional one million tons of paper – enough to fill more than 14,000 railroad cars. Moreover, in 2007, recycled fiber constituted 37 percent of the total fiber use in U.S. paper and paperboard manufacture, compared to 27 percent in 1990.

Reducing Our Environmental Footprint

Over several decades, we have dramatically improved our environmental performance. For example, between 1975 and 2006, AF&PA member pulp and paper facilities decreased the volume of discharged water per ton of production by 53 percent, TSS discharges have been reduced by 80.1 percent, and BOD discharges have been reduced by 87.3 percent. Member mills' reductions in air emission rates between baseline year 1980 and 2006 were 71.9 percent for SO_2, 42.9 percent for NOx, and 83.9 percent for TRS. Finally, since 1995, member pulp and paper mills reduced their waste generation by 21 percent.

Industry Climate Change Mitigation Initiatives

Industry researchers are partnering with academia, government and other industries to create new products that are both renewable and carbon-neutral. Through these projects, the

industry seeks to develop greater efficiencies in the generation and use of wood fibers and to enhance the carbon sequestration potential of both the trees as well as products made from those trees.

Biorefinery - uses advanced technology to grow and convert forest materials to produce bio-energy and bio-products in conjunction with manufacturing traditional forest products. Several AF&PA member companies have undertaken projects to gasify wood debris and generate transportation bio-fuels, including bio-diesel, which are not only renewable, but carbon-neutral. These pilot projects are evaluating the feasibility of full-scale gasification as well as critical issues associated with the availability of sufficient feedstock to supply the gasification project. One company is undertaking the project so that it can become energy independent.

VPP - ***Value Prior to Pulping*** seeks cost-effective, high-yield processes to separate components from wood prior to pulping and to process the extracted components to produce commercially viable chemical and liquid fuel products. Researchers are particularly interested in extracting hemicellulose from wood chips prior to pulping for use as a biochemical feedstock such as ethanol, acetic acid, or chemical intermediates. A series of projects is underway through a partnership of seven pulp and paper companies, three universities, three suppliers, two federally funded laboratories and a non-profit economic development organization. The first hurdle of these projects is to demonstrate that the hemicellulose can be extracted prior to pulping without compromising the quality of the pulp and paper being manufactured. Ultimately the goal is to develop new carbon-neutral, renewable, and economically feasible products which can enhance the use of each tree harvested.

Nanotechnology – Using nanotechnology to improve the qualities of paper and wood products will enable the industry to more efficiently use the wood resource to develop new climate-friendly products. AF&PA members are partnering with the National Nanotechnology Initiative – a U.S. government group of 26 agencies which funds research and development to understand and control matter at the nanoscale for national economic benefit, national and homeland security and improved quality of life.

Carbon Footprint -- The National Council for Air and Stream Improvement (NCASI) and the USDA Forest Service have collaborated to develop a greenhouse gas and carbon profile of the U.S. forest products sector. This study differs somewhat from earlier profile studies published by NCASI in that it is organized around a carbon footprint framework developed, with assistance from NCASI, by the Confederation of European Paper Industries (CEPI). The study evaluates net fluxes of CO_2 and other greenhouse gases to the atmosphere from the U.S. forest products industry value chain. Where possible, estimates are included for 1990 and 2005 or the closest dates with available data. The value chain examined for this analysis consists of the forests supplying wood to the U.S. industry, the fate of that wood through manufacturing, use, and disposal, and emissions that occur in harvesting, transport, manufacturing, producing raw materials and fuels, and at products' end of life. The profile does not include carbon stored in imported wood or imported forest products

Program Reports and Other Links:
To learn more about forest products industry efforts to address GHGs, please visit these websites:

American Forest & Paper Association

Climate VISION Private Sector Initiatives: Forest Products

Recycling guides for schools, offices, and communities and a recycling video are available at the Paper Industry Association Council website.

Tools for calculating pulp and paper mill and wood products facility emissions and the amount of carbon stored in wood and paper products are available at the National Council for Air and Stream Improvement website.

Information on the Agenda 2020 program is available at the Agenda 2020 Technology Alliance website.

For information on the climate change benefits of building with wood-based materials go to the Consortium for Research on Renewable Industrial Materials http://www.corrim.org/reports/

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